

An aerial view of a modern hospital atrium. The space is characterized by a large, multi-story glass skylight that allows natural light to flood the area, creating a warm, golden glow. The architecture features a mix of materials, including wood paneling and metal accents. In the center, there is a circular courtyard with several green trees, blue tables, and blue chairs. The surrounding levels of the building are visible, showing various rooms and corridors. The overall atmosphere is bright and open.

Baycrest

Energy Conservation & Demand Management Plan

2019

Executive Summary

The purpose of this Energy Conservation and Demand Management (ECDM) Plan from Baycrest 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 be accomplished in part by looking at future projections of energy consumption and reviewing past conservation measures.

In keeping with Baycrest'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, Baycrest has achieved the following results since 2013:

- 218,406 m³ reduction in natural gas use

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

- Energy Use Index (EUI) was 48 ekWh/ft²
- Energy-related emissions equaled 4,904 tCO₂e

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

- 23% reduction in annual electricity consumption
- 25% reduction in annual natural gas consumption
- Continuously review opportunities for further energy conservation and demand management

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1 Introduction

In order to obtain full value from energy management activities, and strengthen conservation initiatives, a strategic approach must be adopted. 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. Progress over the past five years, and the projected impact of the new ECDM Plan is presented in the graph below.

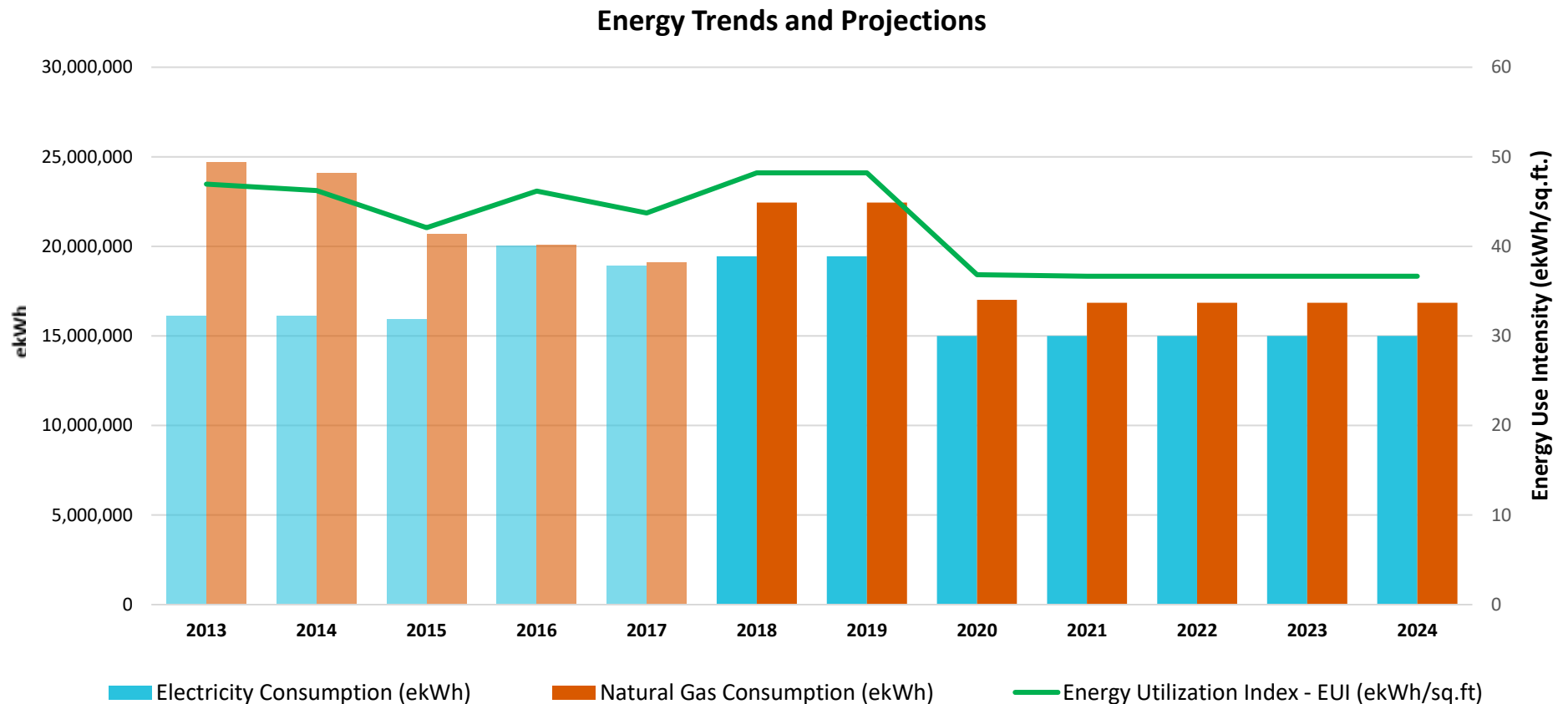


Figure 1. Energy Trends and Projections

Baycrest combines a comprehensive system of care for aging patients with one of the world's top research institutes in cognitive neuroscience. Our dedicated centres focus on mitigating the impact of age-related illness and impairment, bringing unmatched global knowledge exchange and commercialization capacity to the international marketplace.

Our Vision

A world where every older adult enjoys a life of purpose, inspiration and fulfilment

Our Mission

- We provide exemplary health and residential care by partnering with a diverse community of older adults, families and caregivers to compassionately address each individual's unique needs, ambitions, priorities and values.
- We deliver a highly personalized and comprehensive approach to wellness promotion and health care because of the dedication and talent of our staff and our passionate commitment to education, research, innovation and quality improvement.
- We bring unique value to our health care system as a dedicated collaborator offering novel solutions that address the challenges of an aging society, while providing opportunities to improve the lives of older adults.
- We are firmly guided by the deeply held values of our Jewish heritage and are inspired by the remarkable contributions of our diverse community of volunteers and generous donors.

Our Values

We value innovation, compassion, advocacy, respect and excellence

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, conservation and energy efficiency initiatives (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 Baycrest



Picture 1. Baycrest

Baycrest is a global leader in geriatric residential living, healthcare, research, innovation and education, with a special focus on brain health and aging. Founded in 1918 as the Toronto Jewish Old Folks Home, Baycrest continues to embrace the long-standing tradition of all great Jewish healthcare institutions to improve the well-being of people in their local communities and around the globe.

Facility Overview	
Facility Name	Baycrest
Type of Facility	Healthcare Services
Address	3560 Bathurst Street, Toronto, ON
Gross Area (sq.ft)	868,935
Gross Area (m2)	80,726

Table 1. Baycrest Overview

3.1 Historical Energy Intensity

The Energy Utilization Index (EUI) 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 a Rehabilitation Centre (derived from Natural Resources Canada’s Commercial and Institutional Consumption of Energy Survey), which was found to be 27 ekWh/sq. ft.

Annual Consumption (EUI)						
Year	2013	2014	2015	2016	2017	2018
Baycrest	47	46	42	46	44	48

Table 2. Historic Energy Intensity

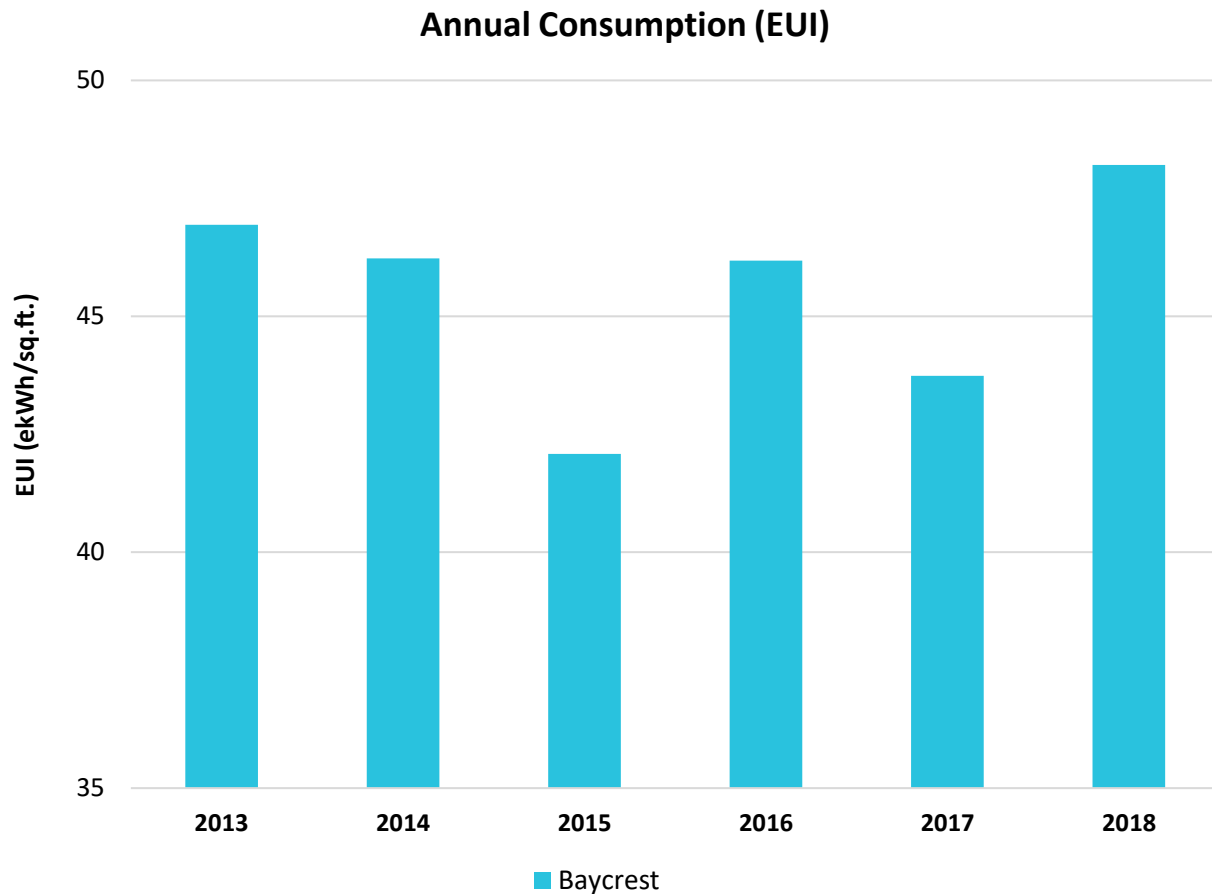


Figure 2. Historic Energy Intensity

3.2 Sustainability Strategies to Date

Baycrest has completed a significant amount of energy efficiency projects since 2014. The completed projects are listed in the table below.

2014-2015 Projects	2016-2017 Projects
Posluns Air Curtain and Door Replacement	DX Refrigeration Units – Kitchen 2000
Posluns Air Handling Units	Distribution Systems – Dryer Exhaust and Ventilation
Posluns Deep Storage Unit Heater and Pipe Insulation	Med-Gas Outlets Upgrade
Posluns Loading Dock Unit Heaters	Morgue Cooler Upgrade
Posluns Greenhouse Sprinklers	Compressor (Hospital) – Pneumatic Station Upgrade
Posluns Missing Covers and Exposed Conductors	Distribution Systems – Aged Central Posluns Air Handling Unit #1
Posluns Aged Exhaust Fans	General Fan Replacement
BHC Elevator Machine Room Air Handling Unit	Sanitary Sump Pump Retrofit
Hospital Storm Water Sump Pumps	Aged Washroom Exhaust Fans Replacement
Hospital Transfer Switch Upgrade	Air Handling Units S-1, S-2 & S-3 Replacement
Posluns Kitchen Waste Grinder	AODA Washrooms Upgrade
Hospital Dryer Exhaust and Equipment	2017-2018 Projects
Hospital Aged Air Handling Units (SAHU)	Hospital Elevator Modernization
Posluns Aged Air Handling Unit	Ice Maker Upgrade
Diesel Fuel System Upgrade	Hospital Sanitary Sump Pumps (S-7 & S-8) Replacement
2015-2016 Projects	Air Handling Units S-7, S-9 & S-10 Replacement
Hospital Transfer Switch Upgrade	Hospital Stairwell Pressurizations
BHC Aged Central Supply Fan #4	Kimel Pneumatic System Replacement
Bathurst Street Air Curtains Installation	Hospital Air Handling Unit 6 Replacement
Hospital Back Flow Preventers	Kimel, Posluns, Hospital Lighting Upgrades
Chimney Repair	2018-2019 Projects
Domestic Hot Water Upgrade	AODA Washrooms
	Domestic Cold-Water Booster Pump

Table 3. Completed Energy Conservation Measures

4 Site Analysis



Picture 2. Baycrest

Baycrest provides care to approximately 1,200 people daily, through a continuum of services that includes wellness programs, residential housing and outpatient clinics, a 472-bed nursing home and a 300-bed continuing care hospital facility with an acute care unit. We are located on a 22-acre campus affiliated with the University of Toronto. We have over 1,800 staff and 2,000 volunteers.

Facility Information	
Facility Name	Baycrest
Address	3560 Bathurst Street, Toronto, ON
Gross Area (sq.ft)	868,935
Gross Area (m2)	80,726
Average Operational Hours in a Week	168
Number of Beds	472-bed nursing home + 300-bed continuing care hospital facility

Table 4. Baycrest 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 include electricity and natural gas. The following table summarizes the accounts for each utility. Consumption for each respective utility has been adjusted for a typical calendar year (365 days).

Annual Consumption (units)						
Year	2013	2014	2015	2016	2017	2018
Electricity (kWh)	16,087,025	16,087,025	15,899,258	20,046,852	18,901,792	19,447,967
Natural Gas (m ³)	2,390,973	2,331,349	2,000,802	1,944,163	1,849,255	2,172,567

Table 5. Historic Annual Utility Consumption

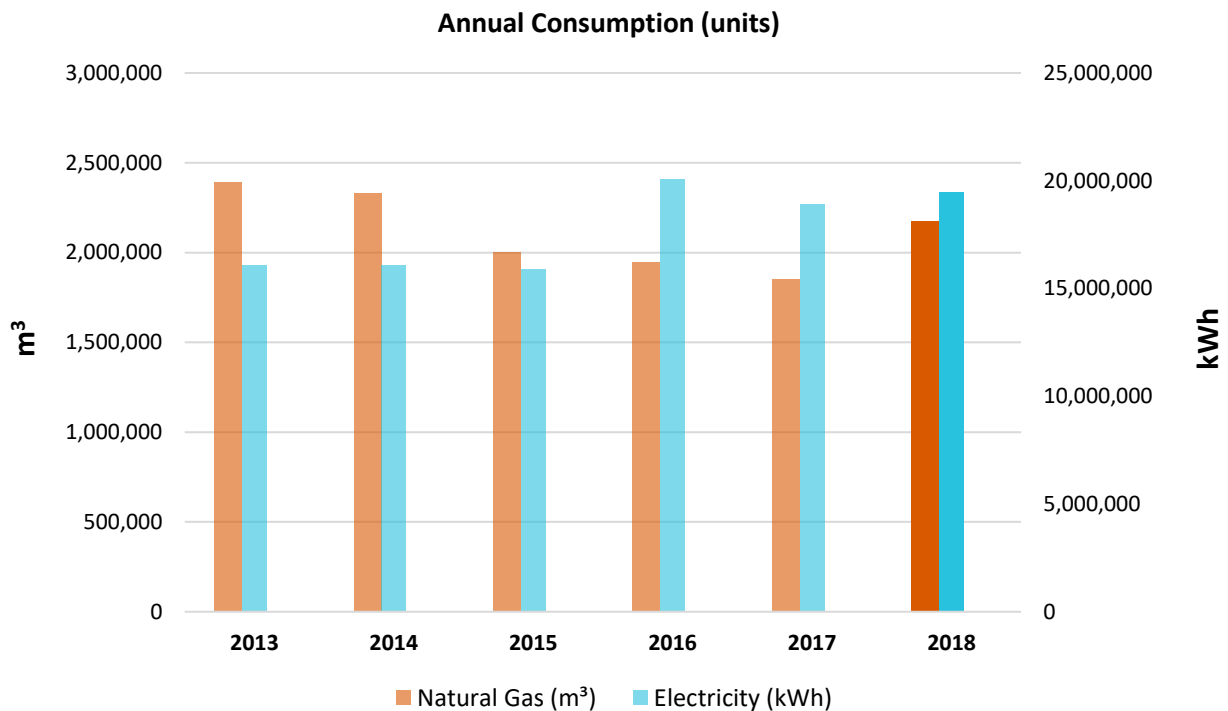


Figure 3. Historic Annual Utility Consumption

4.2 GHG Emissions Analysis

O.Reg 507.18 requires that Baycrest Health must report the greenhouse gas (GHG) emissions related to facilities utility consumption. 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.

The GHG Protocol Corporate Standard classifies an organizations GHG emissions into three ‘scopes’ outlined in Figure 4. Scope 1 represents the direct emissions from sources owned or controlled by Baycrest Health, and Scope 2 consists of indirect emissions from the consumption of purchased energy generated upstream from the organization (the Ontario grid). Scope 3 emissions are all indirect emissions (not included in scope 2) that occur in the value chain of the reporting company, including both upstream and downstream emissions. Only scope 1 & 2 emissions are included in the ECDM plan reporting.

Electricity from the Ontario grid is relatively “clean”, as the majority is derived from low-GHG hydroelectricity, and coal-fired plants have been phased out. In other jurisdictions, the grid could be more energy intensive if fossil fuels are burnt to produce the electricity. The Scope 1 (natural gas) and Scope 2 (electricity) emissions for Baycrest have been converted to their equivalent tonnes of greenhouse gas emissions in the table on the following page.

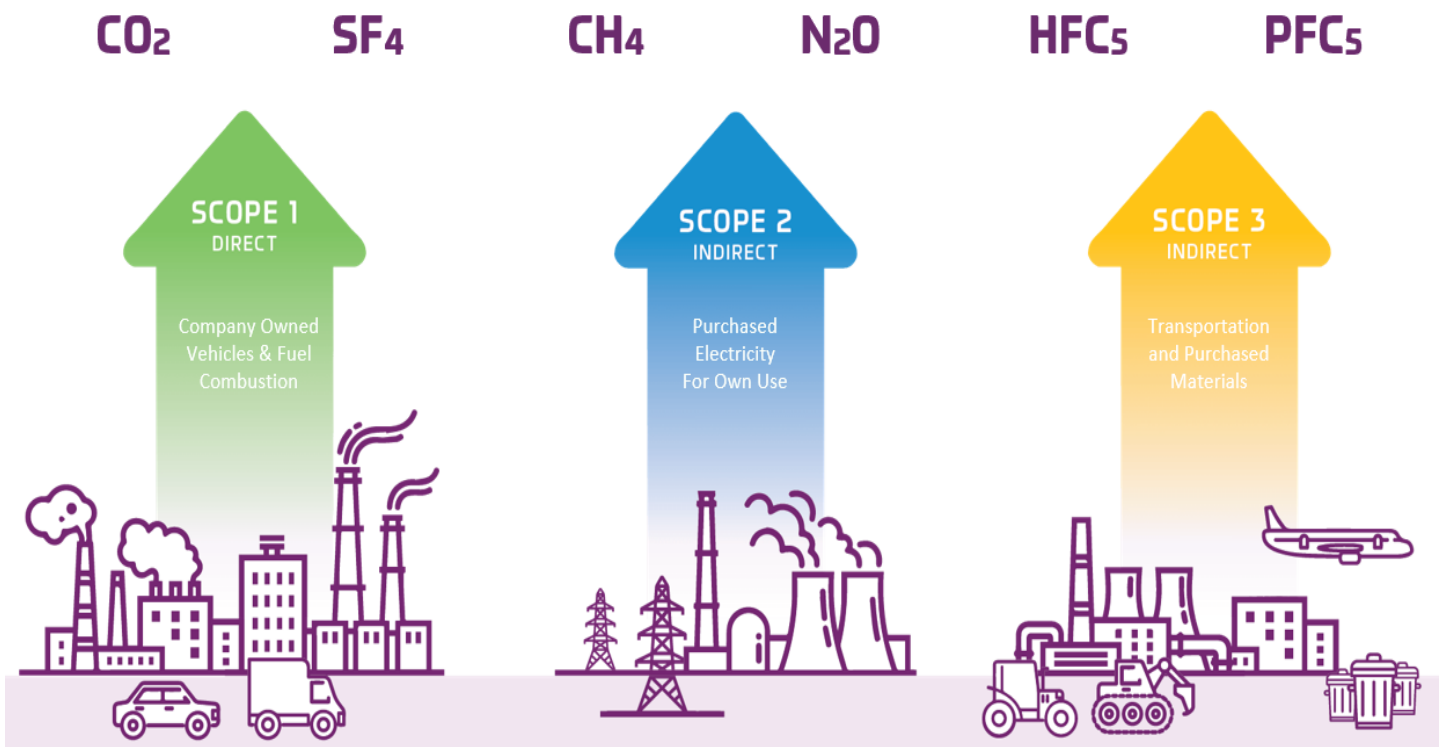


Figure 4. Examples of Scope 1, 2 and 3

Greenhouse gas emissions for Baycrest has been tabulated and are represented in the table and graph below.

GHG Emissions	2013	2014	2015	2016	2017	2018
Electricity (tCO ₂ e)	660	660	652	822	775	797
Natural Gas (tCO ₂ e)	4,519	4,406	3,782	3,674	3,495	4,106
Totals	5,179	5,066	4,433	4,496	4,270	4,904

Table 6. Historic Greenhouse Gas Emissions

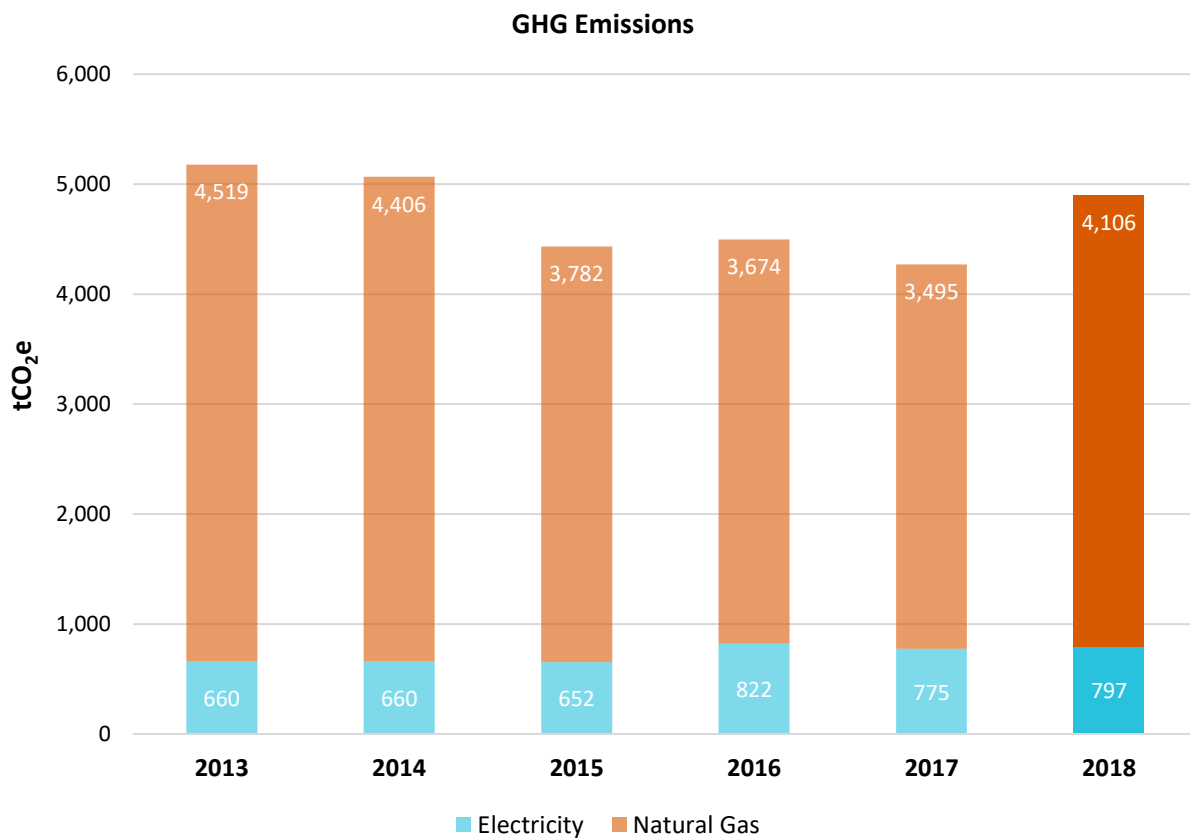


Figure 5. Historic Greenhouse Gas Emissions

4.3 Proposed Conservation Measures

Our energy analysis revealed several conservation strategies for Baycrest. The 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	m ³		
Energy Awareness	Electricity & Natural Gas	501,171	48,604	0.39	2019
Air Handling Unit (AHU) Scheduling	Electricity & Natural Gas	1,571,640	282,600	4.35	2019
Building Recommissioning (HVAC_ReCx)	Electricity & Natural Gas	1,127	15,416	3.95	2020
Building Automation Upgrade (DDC Upgrade)	Electricity & Natural Gas	2,014,685	194,416	12.28	2019
LED Lighting Retrofit	Electricity	353,464	0	6.65	2019
Terrace - HVAC Replacement & Retrofit of all units	Electricity & Natural Gas	TBD	TBD	TBD	2020
Terrace - Controls Upgrade Associated with	Electricity & Natural Gas	TBD	TBD	TBD	2021
Terrace - Elevator Modernization	Electricity	TBD	TBD	TBD	2021
Totals		4,442,087	541,036		

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. Change percentages are 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)	19,447,967	0%	15,007,007	23%	15,005,880	23%	15,005,880	23%	15,005,880	23%	15,005,880	23%
Natural Gas (m ³)	2,172,567	0%	1,646,947	24%	1,631,531	25%	1,631,531	25%	1,631,531	25%	1,631,531	25%

Table 8. Forecast for Annual Utility Consumption

Annual Consumption Forecast

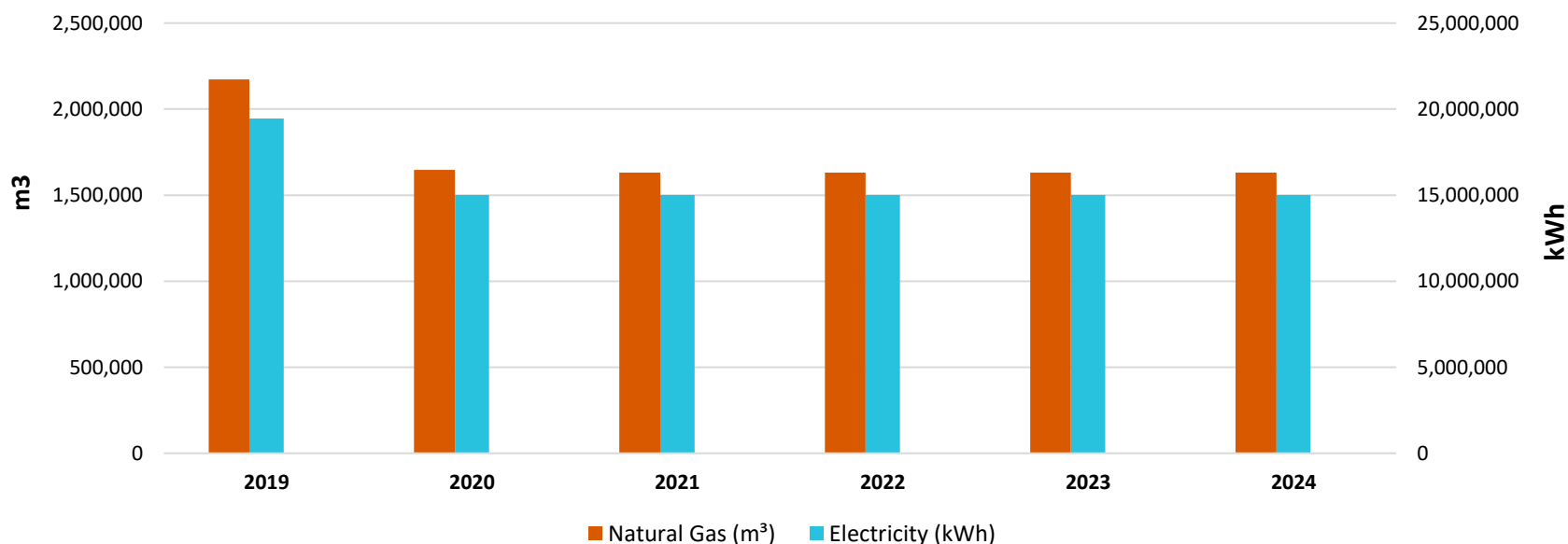


Figure 6. Forecast for Annual Utility Consumption

4.5 GHG Emissions Forecast

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. Reduction percentages are based off of data from the baseline year of 2018.

Annual Emissions Forecast (units)						
Utility Source	2019	2020	2021	2022	2023	2024
Electricity (tCO ₂ e)	797	615	615	615	615	615
Natural Gas (tCO ₂ e)	4,106	3,113	3,084	3,084	3,084	3,084
Totals	4,904	3,728	3,699	3,699	3,699	3,699
Reduction from Baseline Year (2018)	0.00%	23.97%	24.57%	24.57%	24.57%	24.57%

Table 9. Forecast for Annual Greenhouse Gas Emissions

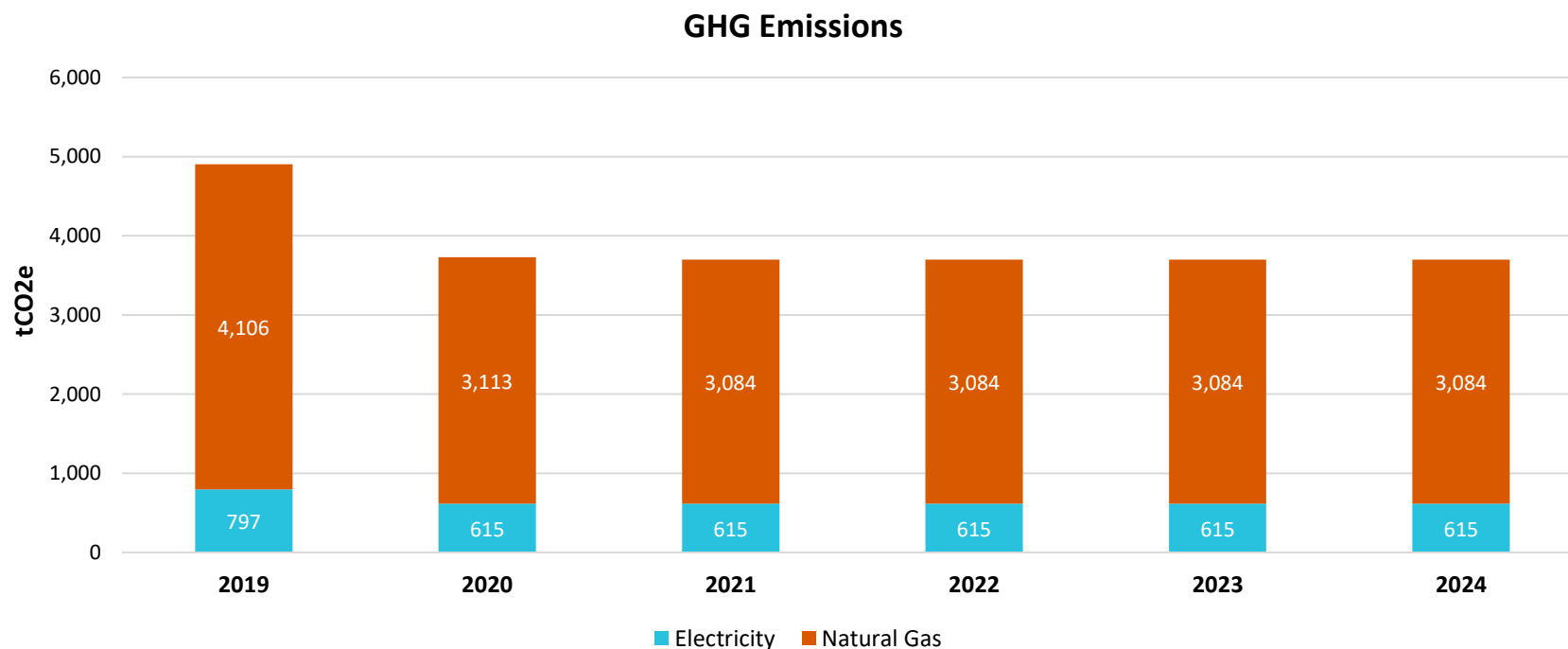


Figure 7. Forecast for Annual Greenhouse Gas Emissions

5 Closing Comments

Thank you to all who contributed to Baycrest'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 Baycrest, we approve this Energy Conservation & Demand Management Plan.

This ECDM plan was created through a collaborative effort between Baycrest 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	CO ₂	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 ₂ e	CO ₂ 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 with zero net 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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