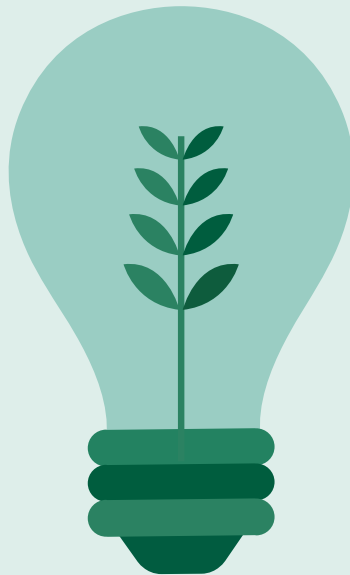


PETERBOROUGH REGIONAL HEALTH CENTRE

ENERGY CONSERVATION & DEMAND MANAGEMENT PLAN 2024 – 2029



PRHC
Peterborough Regional
Health Centre

One team, here when you need us most.

www.prhc.on.ca



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1. Regulatory Update

O. Reg. 397/11: Conservation and Demand Management Plans were introduced in 2013. Under this regulation, public agencies are 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 The Bill repealed the GEA and all its underlying Regulations, including O. Reg. 397/11.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.

As of February 23, 2023, O. Reg. 25/23: BPS: Energy Reporting and Conservation and Demand Management Plans was enacted under the Electricity Act, 1998 and the previous O. Reg. 397/11 and O. Reg. 507/18 were revoked.

2. Executive Summary

The purpose of this Energy Conservation and Demand Management (ECDM) Plan from Peterborough Regional Health Centre (PRHC) 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 PRHC's commitment to efficiency, environmental sustainability and financial responsibility, this plan outlines how we will reduce overall energy consumption, operating costs and greenhouse gas emissions. This ECDM Plan is written in accordance with O. Reg. 25/23 of the recently amended Electricity Act, 1998.

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

- 513,062 m³ reduction in natural gas use

Today, utility and energy related costs are a significant part of overall operating costs. In 2023:

- Energy Use Intensity (EUI) Index for included facilities was 83.11
- Energy-related emissions equaled 8,701 tCO₂e

To obtain full value from energy management activities, PRHC 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.

By implementing recommended initiatives, PRHC can expect to achieve the following:

- 20% reduction in electricity consumption
- 5% reduction in natural gas consumption
- 11% reduction in greenhouse gas (GHG) emissions

Energy Performance: Peterborough Regional Health Centre's Path Forward

The results and the progress of the ECDM activities implemented at PRHC over the past five years, and the projected impact of the new ECDM Plan is presented in the graph below.

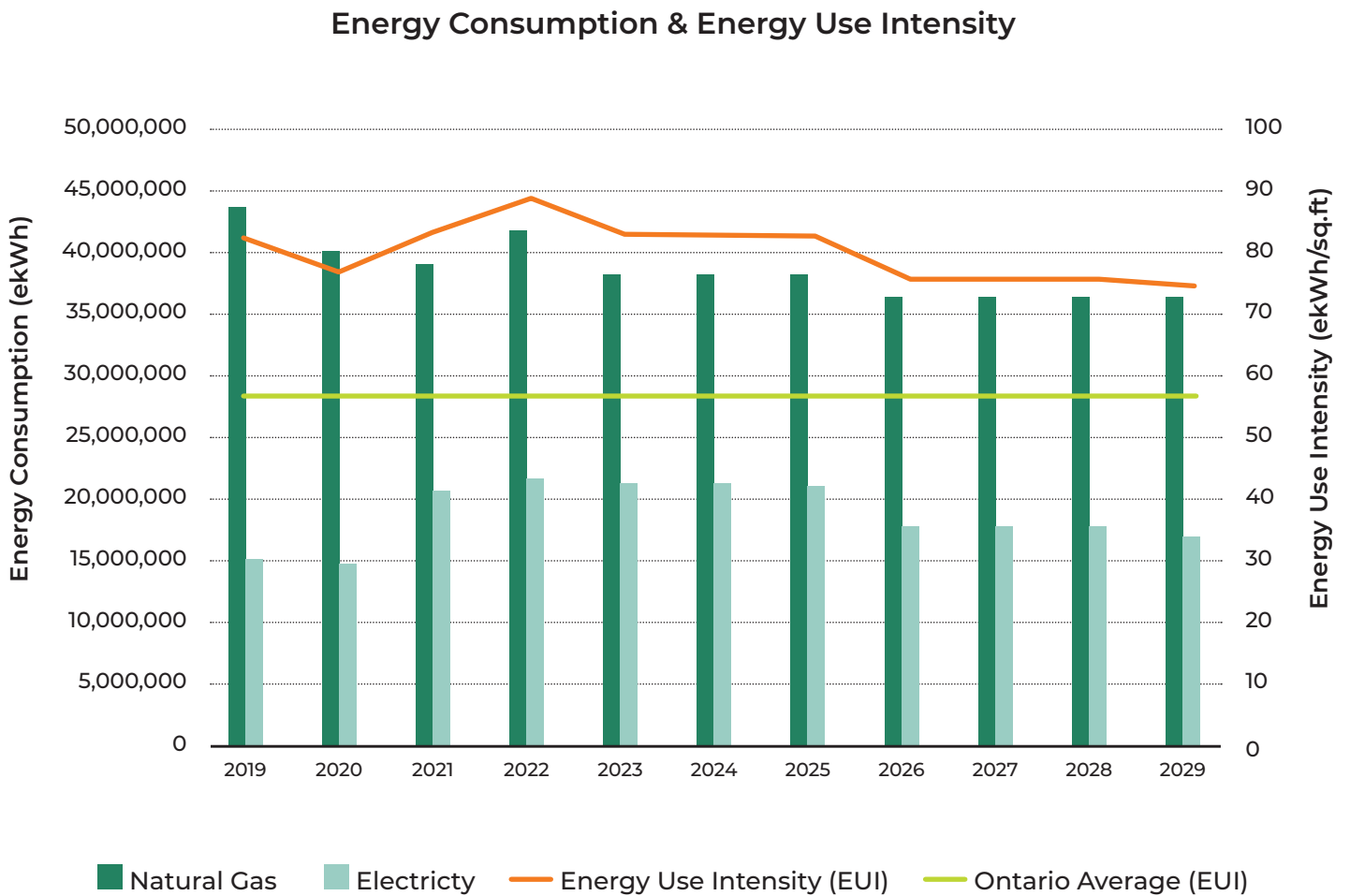


Figure 1. Energy Consumption Trends & Projections

3. About Peterborough Regional Health Centre

PRHC is a regional hospital delivering acute healthcare to a rapidly growing population of more than 300,000 in Peterborough and the surrounding communities, including the First Nations of Curve Lake, Hiawatha and Alderville.

With an annual budget of \$390 million, PRHC has nearly 500 inpatient beds and offers a wide range of services, including specialized programs in renal, stroke, cardiac, cancer care, vascular surgery and mental health & addictions and has a proud local history extending back over a century.

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.

PRHC has committed its focus on energy conservation through our strategic plan where we have committed to strengthen our focus on environmental stewardship.

Purpose statement:

One team, here when you need us most.

Values:

- Act with courage
- Embrace our community
- Find common ground
- Lead and learn
- Recognize and appreciate

Peterborough Regional Health Centre Facility Information	
Facility Name	Peterborough Regional Health Centre
Type of Facility	Hospital
Address	1 Hospital Drive Peterborough, ON K9J 7C6
Gross Area (Sq. Ft)	~730,000
Average Operational Hours in a Week	168
Number of Floors	6
Number of Beds	~500

Table 1. Facility Information

4. Historical Analysis

4.1. Historical Utility Consumption Analysis

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					
Year	2019	2020	2021	2022	2023
Electricity (kWh)	15,140,554	14,759,405	20,652,057	21,618,578	21,274,385
Natural Gas (m ³)	4,125,742	3,795,781	3,697,058	3,950,406	3,612,680

Please note: the jump in electricity between 2020-2021 was due to a discovery of a faulty meter that was not reporting correctly.

Table 2. Historic Annual Utility Consumption

Utility Consumption for Electricity and Natural Gas

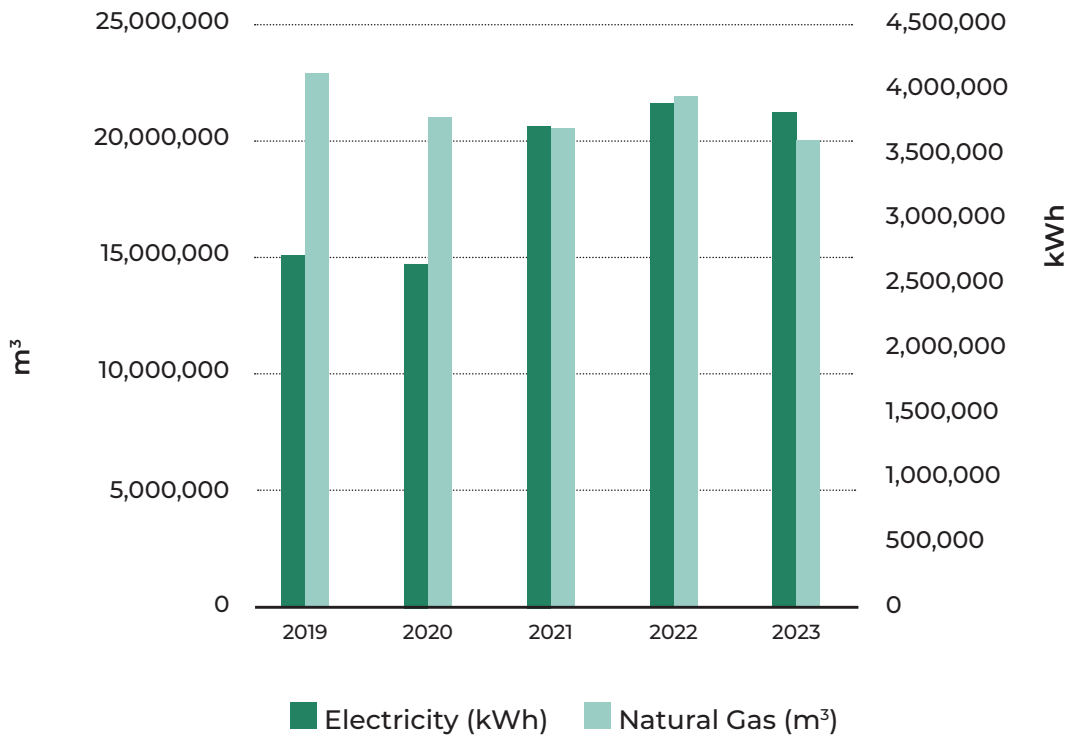


Figure 2. Historic Annual Utility Consumption

4.2. Historical Greenhouse Gas Emissions

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 (such as natural gas directly used in facilities) and Scope 2 (such as purchased 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.

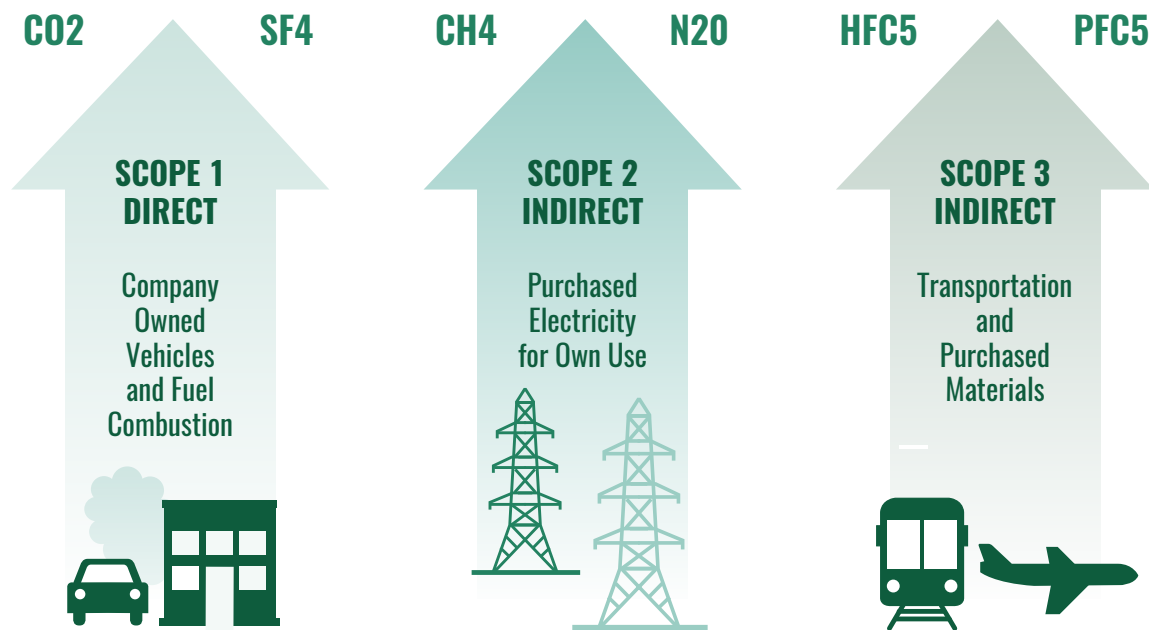


Figure 3. Examples of Scope 1 and 2

The GHG emissions for PRHC have been tabulated and are represented in the table and graph below.

GHG Emissions (tCO₂e)	2019	2020	2021	2022	2023
Natural Gas (scope 1)	7,926	7,292	7,102	7,589	6,940
Electricity (scope 2)	379	381	541	1,526	1,762
Total Scope 1 & 2	8,304	7,672	7,643	9,115	8,701

Table 3. Historic Greenhouse Gas Emissions

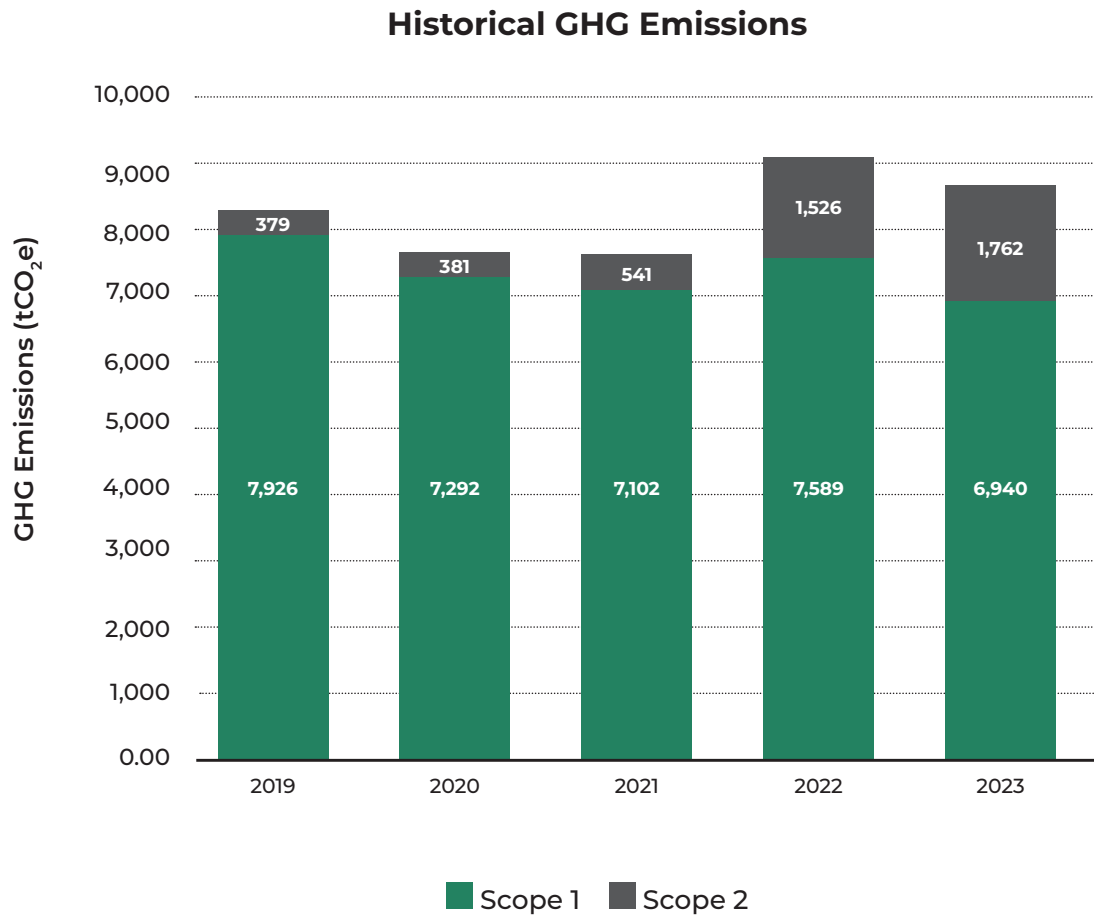


Figure 4. Historic GHG Emissions

5. Measures

5.1. Energy Conservation and GHG Reduction Strategies to Date

Over the previous years, PRHC has undertaken various energy conservation and demand management measures. The summary of the main activities is shown in the following table.

Measure Name	Scope/Results
Changing our anesthesia gas circuits	Previous circuits had to be changed everyday, new ones only changed once per week
Changed default anesthetic gas to sevoflurane	Reduced CO2 emissions
Started pre-warming fluids using warming cabinets	Reducing need for disposable fluid warming circuits
Shift from disposable trocars to reusable trocars	Reducing waste
Shift from disposable L-hooks to reusable L-hook's (electrosurgery instrument)	Reducing waste
Replaced Styrofoam™ cups with paper cups	Reducing environmental impact
Under the plastic ban we switched to disposable cutlery	Meeting industry standards for acceptable plastic dishware, Medication dispensing spoons are made of coffee beans
Installation of energy efficient dish machine	The new dish machine considerably reduces energy use and amp load requirements to provide the lowest annual operating costs of any flight type in the industry
Isolation gowns updated from single use to reuseable, laundered gowns	Reducing waste
Completed LED lighting retrofit for 15% of the hospital, targeting 'always on' areas	Reduction of energy consumption
Repaired window seals and air vapour barriers	Increased energy efficiency
Implemented dissolving chemical tablet to reduce waste in our cleaning process in our inpatient areas	Non-bleach, one-step cleaner and disinfectant and 100% biodegradable. This reduced the use of disposable wipes and plastic containers they were packaged in
Implemented new disinfectant, streamlining the chemicals used in outpatient areas	Sustainable product, as the hydrogen peroxide breaks down into oxygen and water after use, reducing the environmental impact
Eliminated fluorescent service stock and only install LED bulbs or replacement fixtures	Reduction in energy consumption
Install occupancy sensors on light switches in low traffic areas such as closets, electrical rooms, comm rooms etc.	Reduction in energy consumption
Optimize steam boilers	Reduction in natural gas usage
Install LEEDS certified automatic door controllers	Reduction in energy consumption
Install automatic sliding doors in place of swing doors to reduce door open to outside duration	Reduction in heat loss
Install window film solutions to reduce solar heat load in affected spaces	Increase energy efficiency

Table 4. Previously Implemented Energy Conservation and GHG Reduction Measures and Initiatives

5.2. Proposed Energy Conservation and GHG Reduction Measures

Our energy analysis has revealed potential for a number of conservation and GHG reduction strategies for the included facilities. Evaluated and proposed initiatives are summarized in the table on the following page outlining savings potential of the targeted utilities and estimated project costs, and a recommendation year of implementation for each measure, chosen to strategically sequence the work and investment while achieving meaningful GHG reductions.

Measure	Estimated Annual Savings			Implementation Year
	Electricity (kWh)	Natural Gas (m3)	Cost (\$)	
VFD for Chiller 3	301,655	-	\$39,216	2025
LED Lighting Retrofit	1,808,323	-8,562	\$233,198	2026
HVAC Optimization	1,382,835	180,634	\$219,508	2026
Solar Rooftop PV (647.6kW)	831,200	-	\$108,056	2029
Total	4,324,023	172,072	\$599,979	

Table 5. Proposed Measures

6. Peterborough Regional Health Centre Outlook

6.1. Utility Consumption Forecast

By implementing the recommended measures stated in the previous section, PRHC’s projected 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 on the data from the baseline year of 2023.

Fuel	2024		2025		2026	
	Units	% Change	Units	% Change	Units	% Change
Natural Gas (m3)	3,612,680	0%	3,612,680	0%	3,440,608	5%
Electricity (kWh)	21,274,385	0%	20,972,720	1%	17,781,562	16%

Fuel	2027		2028		2029	
	Units	% Change	Units	% Change	Units	% Change
Natural Gas (m3)	3,440,608	5%	3,440,608	5%	3,440,608	5%
Electricity (kWh)	17,781,562	16%	17,781,562	16%	16,950,362	20%

Table 6. Forecast of Annual Utility Consumption from 2024 to 2029

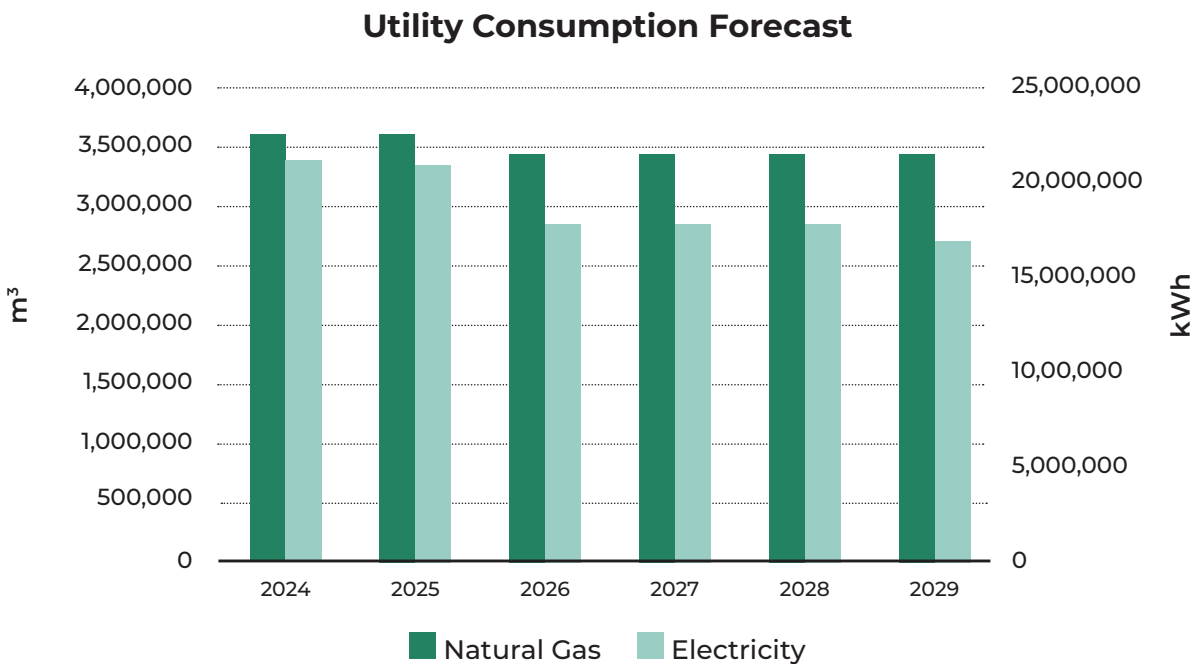


Figure 5. Forecast of Annual Energy Consumption

6.2. GHG Emissions Forecast

The organizational GHG emissions for PRHC are calculated based on the forecasted site-wide energy consumption data analyzed in the previous section and are tabulated in the following table. The percent of reduction is based on the baseline year of 2023.

Utility Source (tCO ₂ e)	2024	2025	2026	2027	2028	2029
Natural Gas (scope 1)	6,940	6,940	6,609	6,609	6,609	6,609
Electricity (scope 2)	1,393	1,841	1,364	1,549	1,341	1,175
Totals	8,333	8,781	7,973	8,158	7,950	7,784
Reduction from Baseline Year (2023)	4%	-1%	8%	6%	9%	11%

Table 7. Forecast of Annual Greenhouse Gas Emissions from 2024 to 2029

GHG Emissions Forecast

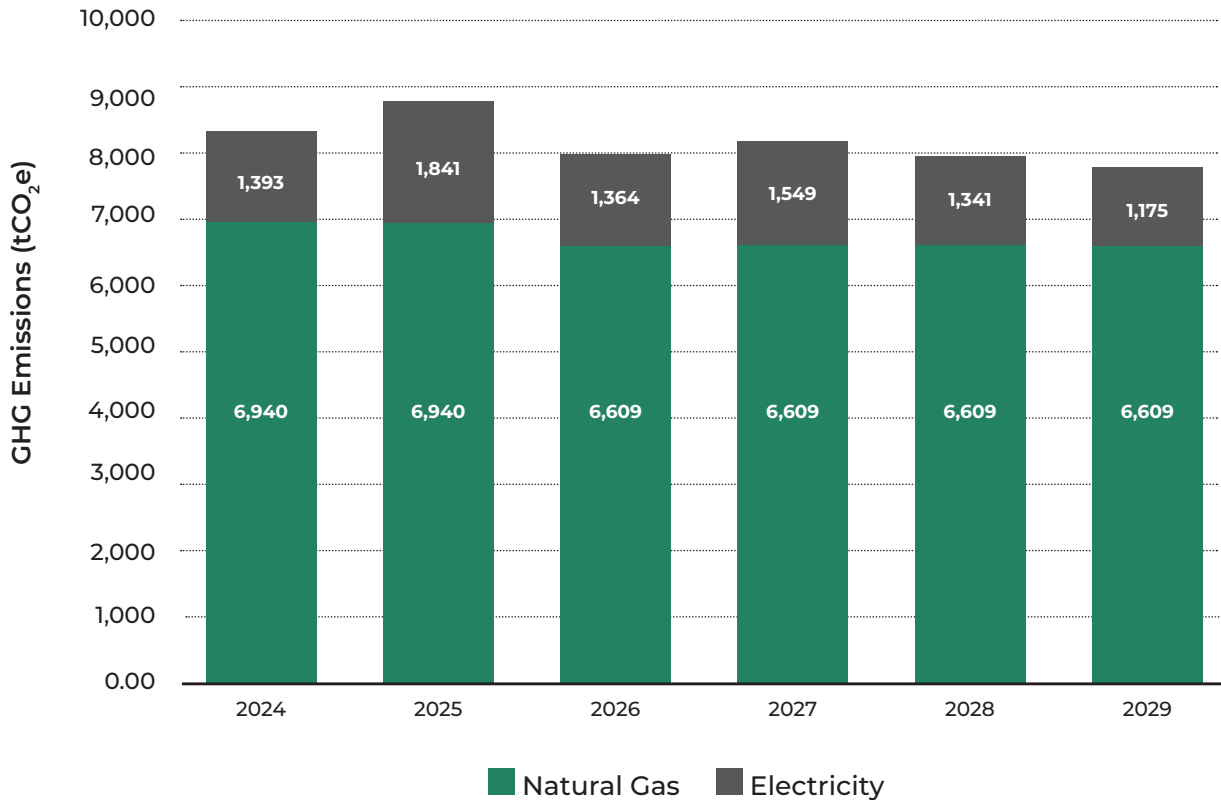


Figure 6. Forecast of Annual Greenhouse Gas Emissions

7. Closing Comments

Thank you to all who contributed to PRHC’s ECDM Plan.

PRHC is focused on supporting and enabling growth,innovation, people, technology and data to improve the care we provide. This ECDM Plan is an important part of that.

SIGNATURE



Dr. Lynn Mikula
President & CEO

21/06/24

DATE (DD/MM/YYYY)

This ECDM Plan was created through a collaborative effort between Peterborough Regional Health Centre and Blackstone Energy Services.

8. Appendix

8.1. Glossary

Word	Abbreviation	Meaning
Baseline Year		A baseline is a benchmark that is used as a foundation for measuring or comparing current and past values.
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 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
Variable Frequency Drive	VFD	A variable frequency drive is a device that allows for the modulation of an electrical or mechanical piece of equipment.
Sulfur Tetrafluoride	SF ₄	Is a chemical compound with the formula SF ₄ . It is a colorless corrosive gas that releases dangerous hydrogen fluoride gas upon exposure to water or moisture. Sulfur tetrafluoride is a useful reagent for the preparation of organofluorine compounds,[3] some of which are important in the pharmaceutical and specialty chemical industries.
Methane	CH ₄	A colorless, odorless flammable gas which is the main constituent of natural gas. It is the simplest member of the alkane series of hydrocarbons.
Nitrous Oxide	N ₂ O	N ₂ O Nitrous Oxide - a colorless gas with a sweetish odor, prepared by heating ammonium nitrate. It produces exhilaration or anesthesia when inhaled and is used as an anesthetic and as an aerosol propellant.
Hydrofluorocarbons	HFC ₅	Any of a class of partly chlorinated and fluorinated hydrocarbons, used as an alternative to chlorofluorocarbons in foam production, refrigeration, and other processes.
Perfluorochemicals	PFC ₅	Powerful greenhouse gas emitted during the production of aluminum and hydrophobic coatings

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