



**ENERGY CONSERVATION &
DEMAND MANAGEMENT PLAN
2019**



**L'HÔPITAL
DU DISTRICT DE
GERALDTON
DISTRICT
HOSPITAL**

Executive Summary

The purpose of this Energy Conservation and Demand Management (ECDM) Plan from Geraldton District Hospital (“Geraldton”) 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 Geraldton’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, Geraldton has achieved the following results:

- 279,234 kwh reduction in electricity use
- 860,727 m3 reduction in natural gas use
- >22% 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:

- SJHCG’s Energy Use Index (EUI) was 58 ekWh/ft²
- Energy-related emissions equaled 169 tCO₂e

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

- ~ 7% reduction in electricity consumption
- 1 tCO₂e 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.

Geraldton District Hospital views health care as a partnership between patients and their caregivers and is committed to providing a safe and healthy environment for clients, staff, volunteers and visitors. Our logo was constructed with our mission in mind – the color white symbolizes purity and is the international colour used by persons in the field of medicine; the different blues symbolize the blue water and the blue sky; the tree symbolizes the tree of life and the geographical region the hospital serves; and the circle symbolizes a protective space.

Our Mission

We are committed to delivering Quality, Coordinated, Patient and Family Centered Care

Our Vision

Partnering for a Healthier Community

Our Values

- **Respect:** We respect and promote the dignity of each individual
- **Excellence:** As a team we provide quality inspired and seamless care to our patients/residents and their families
- **Accountability:** We are accountable to the communities we serve through ensuring that available resources are utilized efficiently and appropriately

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 Geraldton District Hospital



Picture 1. Geraldton District Hospital

Geraldton District Hospital is a progressive health care organization committed to providing high quality services. We serve the residents of Greenstone (Geraldton, Longlac, Nakina, Beardmore, Caramat) and surrounding First Nations communities. We strive to continuously change and grow to meet the needs of our community. We are committed to healthy living and quality of care and are inspired by our patients.

Facility Overview	
Facility Name	Geraldton District Hospital
Type of Facility	Healthcare Services
Address	500 Hogarth Avenue, Geraldton, ON
Gross Area (ft²)	53,520

Table 1. Geraldton District 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),

Annual Consumption (EUI)						
Year	2013	2014	2015	2016	2017	2018
Geraldton District Hospital	79	52	64	59	66	58

which was found to be **63.23 ekWh/sq. ft.**

Table 2. Historic Energy Intensity

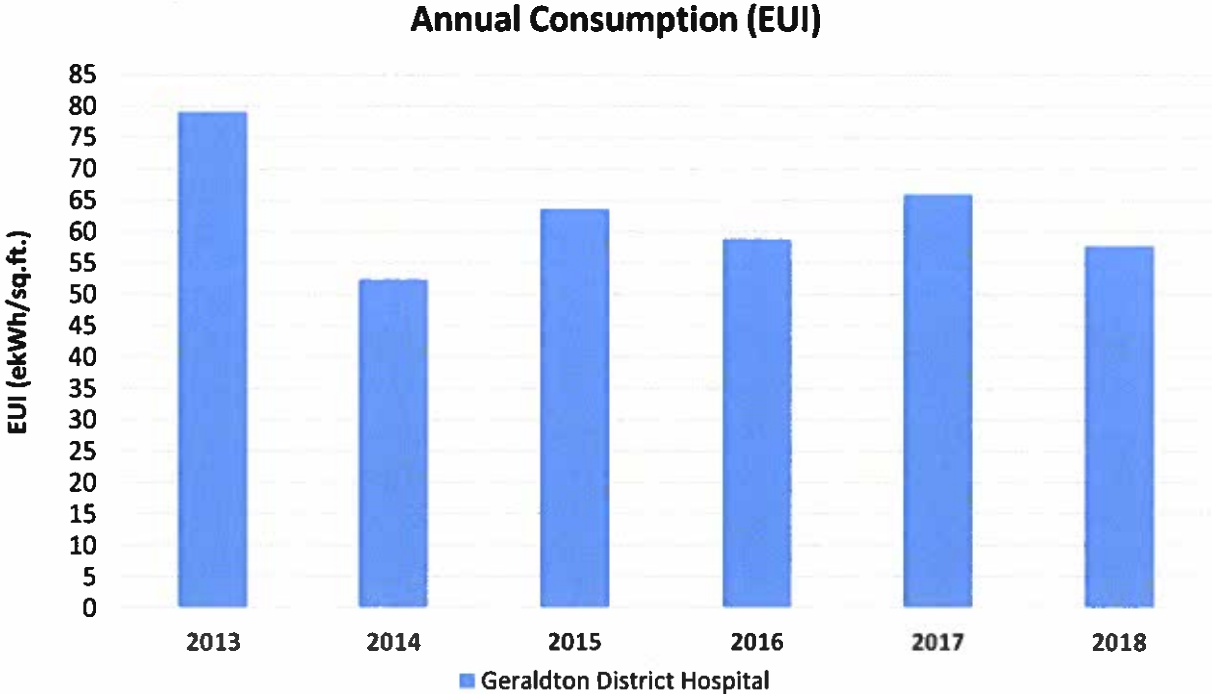


Figure 1. Historic Energy Intensity



3.2 Sustainability Strategies to Date

Geraldton District Hospital regularly reviews opportunities to improve hospital operations and conserve energy. Below are some of the energy conservation measures that have been completed since 2014.

- The original electrical panel that was installed in 1962 has been completely replaced. Six electrical panels in total have been upgraded to newer models.
- In 2015, the hospital completely retrofitted the roof of the facility and increased the insulation value which will result in a decrease in electricity and natural gas consumption.
- The hospital recently undertook an LED retrofit of the hospital fluorescent lighting system. The Team is hoping to complete the project in 2019.

4 Site Analysis



Picture 2. Geraldton District Hospital

Facility Information	
Facility Name	Geraldton District Hospital
Address	500 Hogarth Avenue, Geraldton, ON
Gross Area (Ft.²)	53,520
Average Operational Hours in a Week	168
Number of Beds	49
Number of Floors	2

Geraldton District Hospital was built in 1963. We are a fully-accredited facility with 23 acute care beds, 26 long-term care beds and a 24-hour emergency department. We provide many services including clinical nutrition, diagnostic imaging (x-ray & ultrasound), laboratory, outreach chemotherapy, rehabilitation (PT & OT), social work and telemedicine. We strive to ensure access to high quality health care and information to help build a healthier community.

Table 3. Geraldton District 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)	1,242,130	923,597	1,107,460	876,960	967,712	962,896
Natural Gas (m³)	289,210	181,836	221,970	219,815	247,824	205,887

Table 4. Historic Annual Utility Consumption

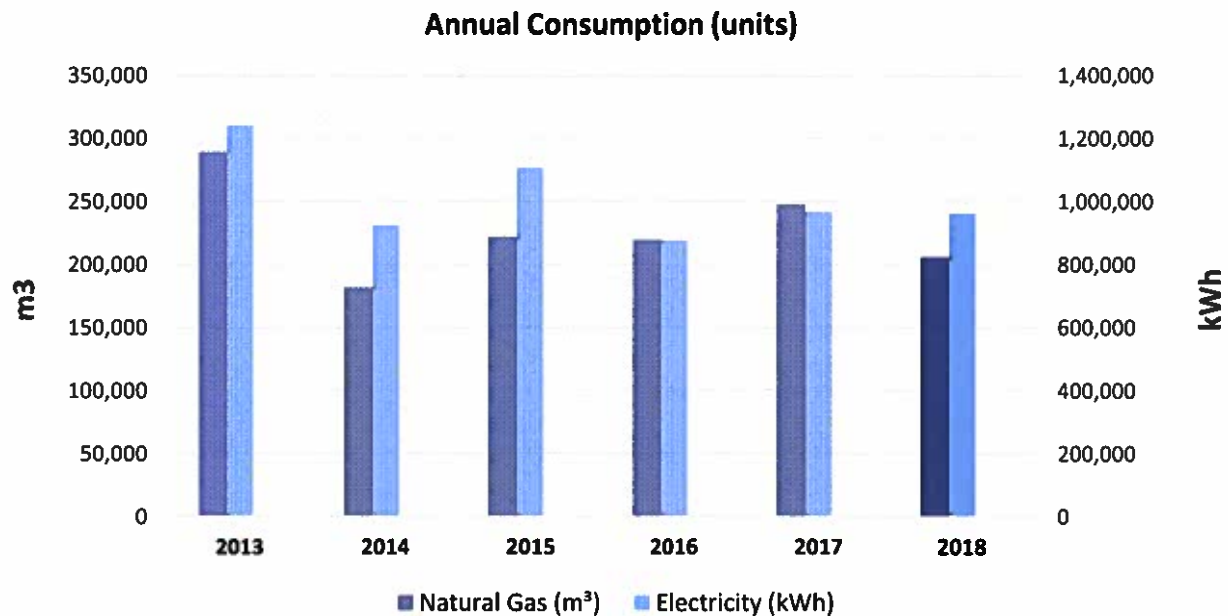


Figure 2. Historic Annual Utility Consumption

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) 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

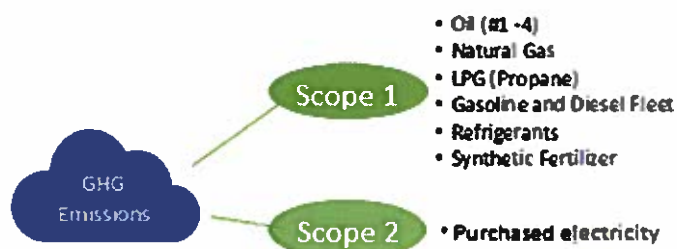
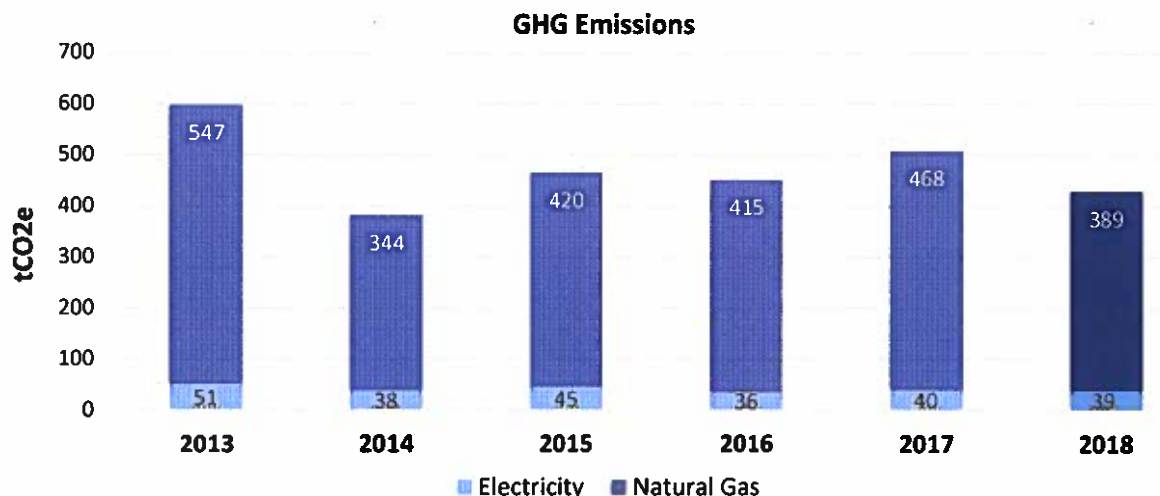


Figure 3. Examples of Scope 1 and 2

generated upstream from the institution.

Table 5. Historic Greenhouse Gas Emissions

GHG Emissions	2013	2014	2015	2016	2017	2018
Electricity	51	38	45	36	40	39
Natural Gas	547	344	420	415	468	389



4.3 Proposed Conservation Measures

Our energy analysis has revealed several conservation strategies for the facility. Geraldton'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 (kWh)	Simple Payback (years)	Year of Implementation
Chiller Upgrade (70 tonnes) and (50 tonnes)	Electricity	30,909	63.21	2021
Kitchen Hood Replacement	Electricity	4,574	41.36	2022
1962 Electrical panel replacement - 4 panels	Electricity	9,292	25.16	2019
Replacing Chiller Compressor	Electricity	17,814	5.54	2019
Totals		62,589		

Table 6. 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	Units	% Change	Units	% Change		
Electricity (kWh)	962,896	0%	935,790	3%	904,882	6%	900,308	6%	900,308	6%	900,308	6%	900,308	6%	900,308	6%		
Natural Gas (m ³)	205,887	0%	205,887	0%	205,887	0%	205,887	0%	205,887	0%	205,887	0%	205,887	0%	205,887	0%		

Table 7. Forecast for Annual Utility Consumption

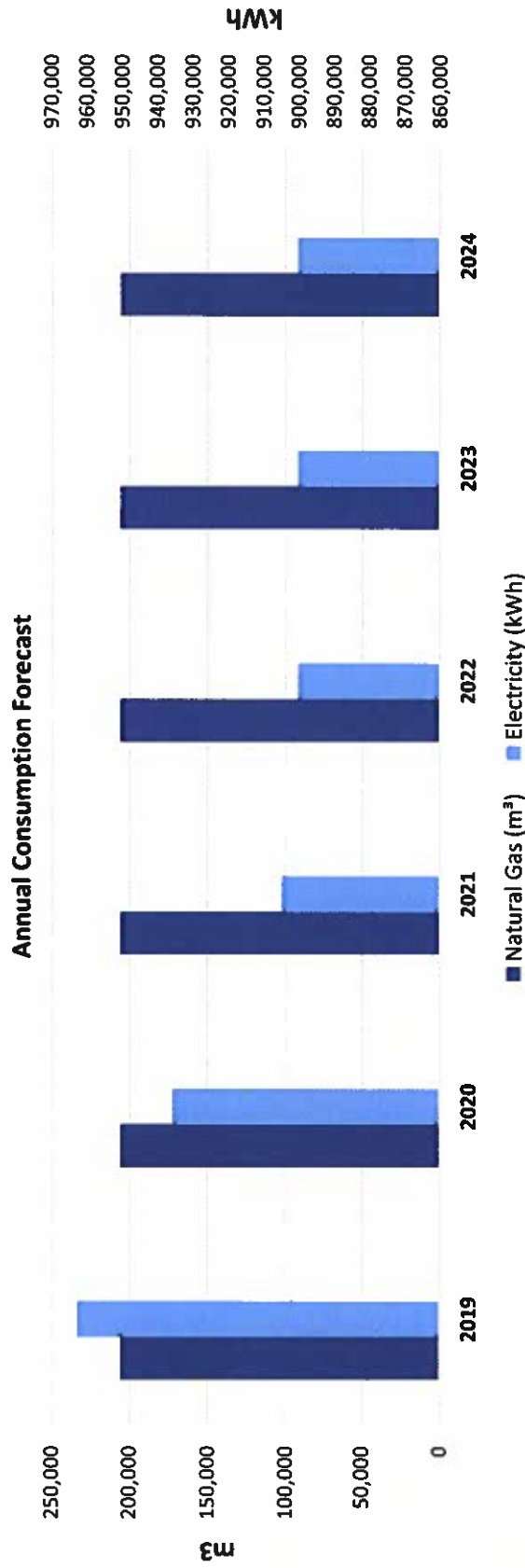


Figure 5. Forecast for Annual Utility Consumption

4.5 GHG Emissions Forecast

The forecasted greenhouse gas emissions for Geraldton 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	39	38	37	37	37	37
Natural Gas	389	389	389	389	389	389
Totals	429	427	426	426	426	426
Reduction from Baseline Year (2018)	0.00%	0.26%	0.55%	0.60%	0.60%	0.60%

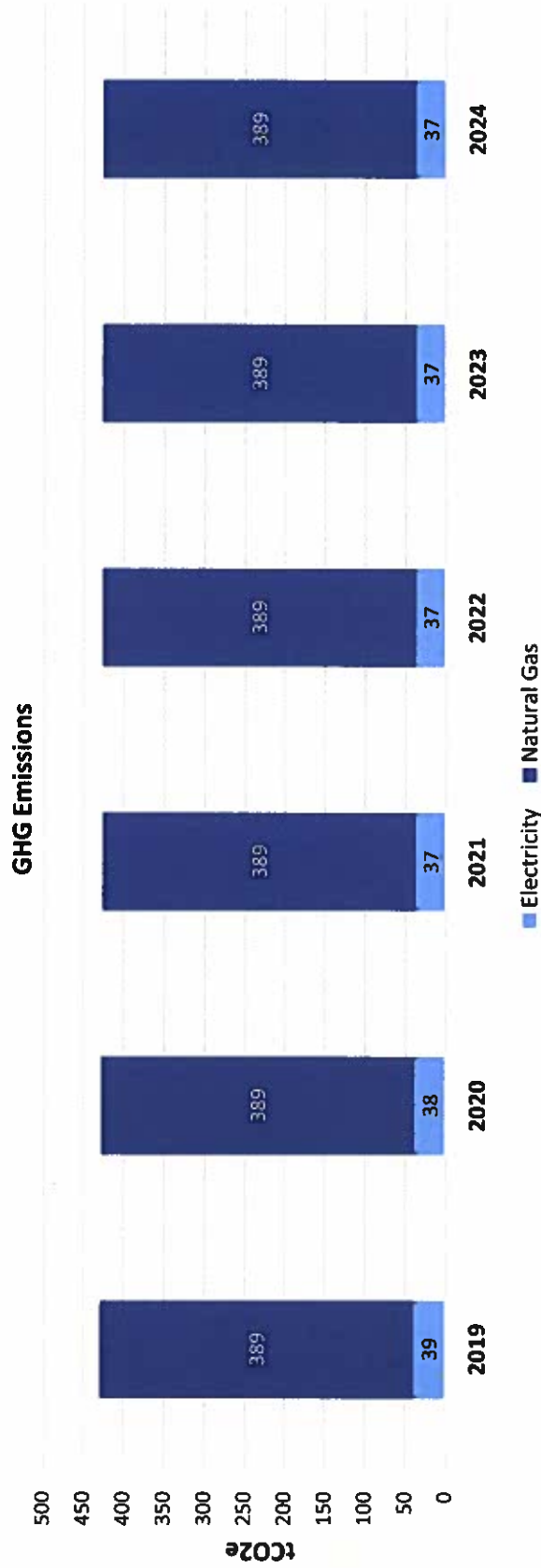


Table 8. Forecast for Annual Greenhouse Gas Emissions

Figure 6. Forecast for Annual Greenhouse Gas Emissions



5 Closing Comments

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

This ECDM plan was created through a collaborative effort between Geraldton District 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 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 <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.

6.2 List of Figures, Tables and Pictures

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