



Conservation & Demand Management Plan

Geraldton District Hospital
www.geraldtondh.com
397-11: Phase 2
2014-07-07

1 Executive Summary

The following Energy Conservation and Demand Management Plan is written in accordance with sections 6 and 7 of the Green Energy Act, 2009, O. Reg. 397/11. Energy management initiatives can produce environmental, economic and social benefits, including reducing greenhouse gas (GHG) emissions, cost avoidance and increasing savings. As concerns surrounding energy availability and cost continue to rise, an energy management plan is a proactive step toward an effective long-term solution. Along with these benefits, energy efficiencies also promote local economic development opportunities, energy system reliability, and reduced price volatility. Our energy efficient capital and operating process improvements are key components to our success and will be outlined in our report. The Geraldton District Hospital community is committed to the path of sustainability, in *all* aspects of our health care facility.

Our Goals and Objectives

Our mission is to improve the health of the communities we serve. We recognize the critical relationship between environmental health and public health, and we aim to limit any impact upon the environment resulting from the operation of our health care facility. Implementing a strategic energy management plan will address the interconnected issues of indoor environmental quality, energy use, and facility operations. Our goal is to continuously monitor our current practices, so that maximal operating efficiency can be reached and resources can be allocated more appropriately to serve our community.



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3 Ontario's Green Energy Act – Overview

Ontario's Green Energy Act (GEA) was created to expand renewable energy generation, encourage energy conservation and promote the creation of clean energy jobs.

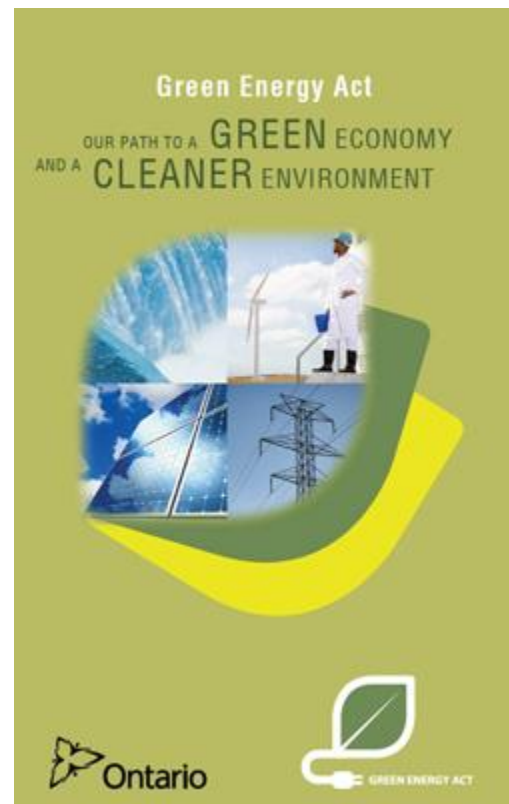
3.1 Promoting Energy Conservation

Conserving energy not only saves money for families and businesses, it also lowers demand on the electricity system and helps reduce greenhouse gas emissions.

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

The GEA continues to promote conservation by:

- *Making energy efficiency a key element of Ontario's building code*
- *Creating new energy efficiency standards for household appliances*
- *Working with local utilities to reach assigned conservation targets*
- *Protecting low-income Ontarians through targeted conservation programs*



4 Introduction

The purpose of Geraldton District Hospital's energy management plan is to promote sustainable stewardship of our environment and community resources. In keeping with our core values of **system efficiency** and **financial responsibility**, Geraldton District Hospital's energy management program will aim to reduce operating costs while enabling us to provide excellent and compassionate service to a greater number of persons in the community. The plan will also meet the requirements outlined in sections 6 and 7 of the Green Energy Act, 2009, O. Reg. 397/11.

To obtain full value from energy management activities, and to strengthen our conservation initiatives, a strategic approach will 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 into major financial decision-making.



5 Building Survey

Geraldton District Hospital consists of 1 health care facility that have been audited for sustainability. Geraldton District Hospital is an integrated facilities, providing programs serving the community of Geraldton in health promotion, prevention, diagnosis, treatment and patient care. Our facility provides a unique component of health care services to the Ontario's northwestern communities.

The chart below provides a brief site description of the facility involved in this report.

Table 1: Facility Information for Geraldton District Hospital

Facility Information	
Client Name	Geraldton District Hospital
Type of Facility:	Hospital
Total Number of Buildings being Audited:	1
	Facility
Facility Name:	Geraldton District Hospital
Address:	500 Hogarth Ave., Geraldton, ON
Gross Area (Sq. Ft)	53,520
Number of Floors:	1
Date of Construction	1962

5.1 Industry Comparative

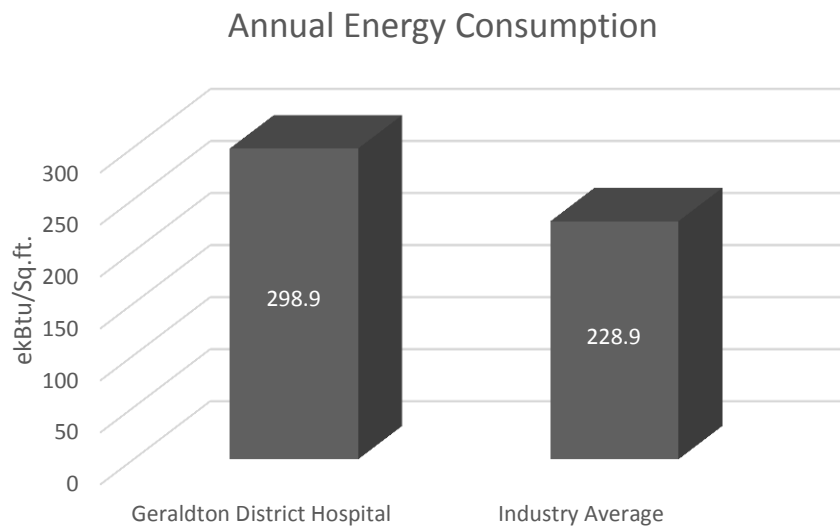
Energy, in cost and resource stewardship is a significant public policy issue. Hospital facilities are among the most energy intensive buildings in the public sector. Hospitals can substantially reduce energy costs while maintaining or improving the quality of patient care. Knowing where your facility stands in comparison to other buildings in the industry can provide insight into opportunities for improvement. Once a baseline is established, management can decide which energy efficient measures will best suit the needs of their facility.

Table 2: Energy and Water Consumption Summary

Geraldton District Hospital	Annual Consumption
Energy (ekBtu)	15,354,631.22
Water (L)	11,435,652.78

The figure below compares our annual energy consumption to the industry average provided by Natural Resources Canada (2007).

Figure 1: Energy Use Intensity (EUI) Comparison to Industry Average



6 Energy & Water Use

The following section outlines the energy and water consumption and use for each of the facilities.

6.1 Utility Consumption for Geraldton District Hospital

Current utilities supplied for Geraldton District Hospital consists of natural gas, electricity, and water. Utility consumption for each respective utility has been adjusted to fit a regular calendar year (365 days).

Table 3: Utility Consumption for Geraldton District Hospital

Energy/Utility Source	365 Day - Annual Consumption in Units
Electricity (kWh)	1,154,645.41
Natural Gas (m3)	315,089.05
Water (L)	11,435,652.78

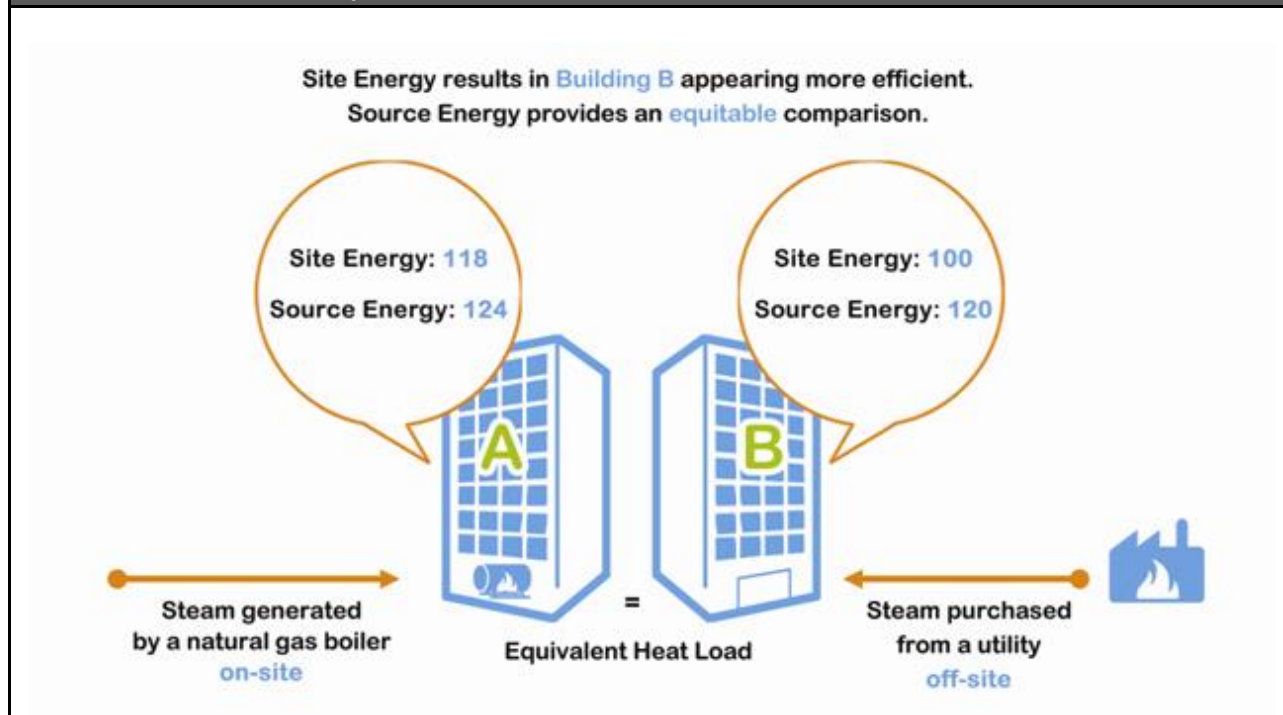
7 End Use - Energy

7.1 ekBtu Overview

An "ekBtu" is a means of converting each respective energy source into a measure of energy equivalent to one thousand British Thermal Units (ekBtu). To be as accurate as possible regarding energy conversions to each respective ekBtu value we provide ekBtu calculations for both Site ekBtu and Source ekBtu.

ekBtu Value	
Site	Convert energy sources to ekBtu based on their equivalent energy use within the facility.
Source	Convert energy sources to ekBtu based on their equivalent energy use within the facility and equivalent energy use required to generate a unit of energy at its source based on the raw fuel input.

ekBtu: Site vs Source Example



When analyzing energy consumption, data is shown using both site and source energy usage in order for the data to be representative of a buildings total output. For example, the picture above, illustrates two buildings, which are identical in their construction and operation and require 100 MBtu of steam for heating. Building A purchases natural gas from a utility to produce steam onsite, whereas Building B purchases steam directly from a utility. That is, Building A is purchasing primary energy while Building B is purchasing secondary energy, and both buildings provide the same amount of heat to meet the demands of the occupants.

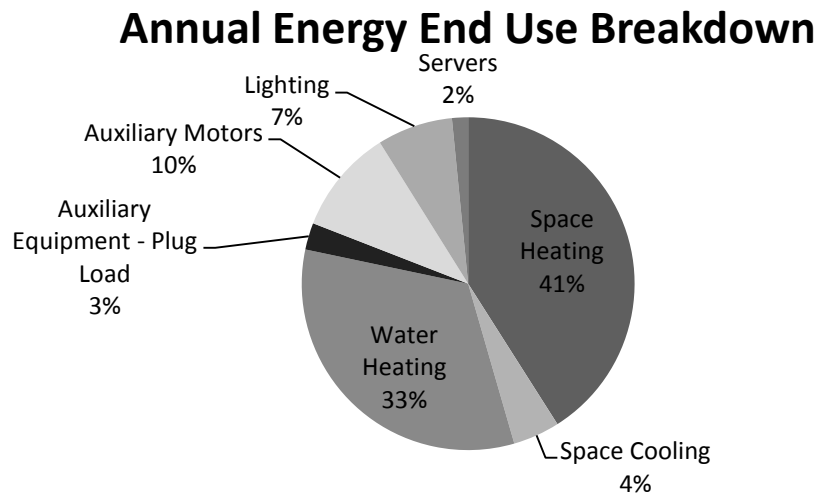
7.2 Energy End Use – Geraldton District Hospital

The following information outlines estimates of energy consumption in accordance with Natural Resources Canada’s Office of Energy Efficiency:

Table 4: Annual Energy Breakdown

End Use	Estimated Energy Use [ekBtu/Year]	% of Total Energy Use	Notes
Space Heating	6,326,726.63	40.99%	
Space Cooling	700,469.95	4.54%	
Water Heating	5,060,554.60	32.78%	
Auxiliary Equipment - Plug Load	402,880.43	2.61%	Including computers, etc.
Auxiliary Motors	1,573,039.92	10.19%	Including fans and pumps.
Lighting	1,132,319.42	7.34%	
Servers	240,445.28	1.56%	
Totals	15,436,436.24	100.00%	

Figure 2: Energy Breakdown by End Use



8 Energy Utilization Index

The Energy Utilization Index (EUI) is a measure of the facility's energy performance. The EUI is a statement of the number of GJ of energy used annually per square foot of conditioned space. Energy is the equivalent GJ for all energy sources used by the hospital in 2011.

Based on NRCan's 2007 summary report of commercial and institutional consumption of energy survey hospitals ranked the highest energy intensity by sector. Such an amount of energy consumed on site per square foot is the result of specialized and sophisticated equipment, as well long hours of operation.

NRCan surveyed the energy intensity of 703 hospitals in Canada and concluded with an average annual EUI of 2.83 GJ/m²—or 249.18 ekBtu/ft². NRCan segregated this by province and in Ontario the average annual EUI for hospitals is 2.60 GJ/m²—or 228.95 ekBtu/ft².

The EUI for the facility is as follows:

Facility	EUI (ekBtu/ft ²)	Comparison to Industry Average
Geraldton District Hospital	286.90	Geraldton District Hospital has an EUI that is MORE than the Ontario hospital industry average

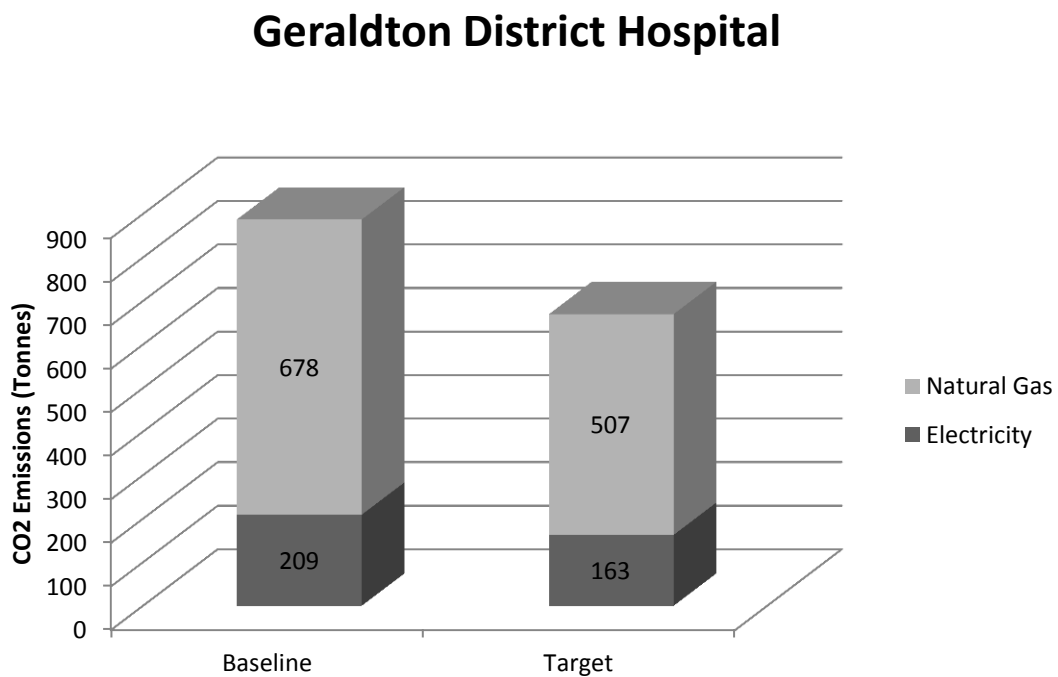
9 Green House Gas Emission Reporting

The greenhouse gas emissions are calculated based on the energy consumption data analyzed.

Table 5: Energy Related Green House Gas Emissions for Geraldton District Hospital

Utility Type	Units/Year	Tons of CO2
Electricity (kWh)	1,154,645.41	209
Natural Gas (m3)	315,089.05	678
Total 2011 CO2 Emissions		887

Figure 3: Baseline and Target Greenhouse Gas Emissions



10 Conservation & Demand Management Plan

Conservation & Demand Management requires adequate planning in order to produce long-term success. This section of the report outlines the following:

1. Current Conservation Strategies
2. Proposed Conservation Strategies

10.1 Current Energy & Water Saving Initiatives

Geraldton District Hospital's current energy and water saving initiatives are summarized in the table below outlining the targeted utilities:

Table 6: Current Energy Saving Initiatives

Item	Electricity and/or Gas	Description
VFDs	Electricity	All air handling units are controlled with a VFDs.
Lamps	Electricity	Lighting was upgraded through-out the facility from T12s to T8s. Light levels were maintained or improved and energy was greatly reduced with regards to the lighting load.
Motion Sensors	Electricity	Motion sensors were installed in a few areas through-out the facility. These sensors were installed in areas such as washrooms.
Ballasts	Electricity	All ballast have been upgraded from magnetic to electronic.
BAS	Electricity & Natural Gas	Installed a building automation system.
Chilled Water System	Electricity	Water is chilled at night during off-peak hours for space cooling during the day.
Boilers	Natural Gas	Replaced old low-efficiency boilers with high-efficiency condensing boilers.
Heat Recovery	Natural Gas	Laundry machines use indirect heat exchangers. Exhaust fans use glycol heat recovery

10.2 Energy Commodities Management

Energy management refers to both how energy is purchased and how energy is used for building operations. An important aspect of energy management is putting in place an adaptable energy commodities procurement strategy to be able to adjust to fluctuating commodity prices. We currently work with Blackstone Energy Management Services Inc. to assist us in our energy commodities procurement. Working with Blackstone allows us to meet or reduce our energy commodity budgets. This process ensures that resources can be properly allocated to energy and water saving programs.

Energy Commodities

- Electricity
- Natural Gas



10.3 Conservation Measures

The conducted energy audit has revealed several conservation strategies for the facility. The Proposed Conservation Strategies section will outline the following:

1. Priority Levels Overview
2. Overview of Effected Utilities
3. Strategic Conservation Investment Plan

10.3.1 Priority Levels Overview

In the following section there will be mention of Priority Levels with regards to each Conservation Measure (CM). Priority levels are assigned based on several factors including: paybacks and return on investment calculations, rebates and incentives, understanding facility sustainability goals, and analyzing existing equipment remaining life to assist in selecting appropriate sustainable alternatives.

Priority Levels	Definition
In Progress	Project is currently underway.
1	These CMs are the highest priority and the process to implementation should begin within the next 12 months.
2	These CMs are a high priority and should be reviewed with the intention of implementation within the next 24 months
3	These CMs are a medium priority and should be reviewed with the intention of implementation within the next 36 months.
4	These CMs are a low priority and should be reviewed with the intention of implementation within the next 36 - 60 months.
5	These CMs are the lowest priority and can be reviewed at a later date.

Conservation & Demand Management Plan

10.3.2 Overview of Affected Utilities

The following table summarizes the recommended conservation strategies that were discovered through the auditing process and outlines what utility costs would be avoided listed by category.

Measure	Impacted Facility	Priority Level
Computer Sleep Settings	Electricity	1
Monitoring	All Utilities	1
Filters for HVAC	Sustainability	1
Exterior Lighting	Electricity	1
VFD of Fans and Pumps	Electricity	2
Non Domestic Water Conservation Program	Water	2
Economizers	Natural Gas	2
Energy Misers	Electricity	2
Air Curtains	Natural Gas	2
Update Building Automation System	All Utilities	2
Exhaust Fan Replacement	Electricity	3
Upgraded Cleaning System	Sustainability	3
Domestic Hot Water Conservation Program	Natural Gas	3
Rooftop reinsulated	Natural Gas	3
Chiller Plant Optimization	Electricity	3
Heating Reflector Panels	Natural Gas	3
Building Envelope Reinsulated in Acute Care	Natural Gas	3
Fume Hoods Controls	Electricity	3
Heat Recovery on Laundry Dryers	Natural Gas	3

10.4 Cleaning, Sanitization and Disinfection

Cleaning, disinfection and infection control are important aspects of our hospital environment. As part of our Conservation and Demand Management Plan we believe that the right combination of housekeeping and infection control practices can further support our sustainable efforts while improving patient care. As part of our on-going commitment to sustainability, we are currently reviewing the use of different strategies such as microfiber cleaning systems, antimicrobial coatings, and environmentally friendly cleaning and disinfection products.

11 Closing Comments

Thank-you to all who contributed to Geraldton District Hospital's Conservation & Demand Management Plan. We consider our facility a primary source of giving 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 Conservation & Demand Management Plan.

APPROVED