Conservation & Demand Management Plan

Lake Of The Woods District Hospital www.lwdh.on.ca 397-11: Phase 2 2014-06-26

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 Lake Of The Woods District Hospital community is committed to the path of sustainability, in *all* aspects of our health care facility.

Our Mission

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.



2 Table of Contents

1	Executive Summary2				
2	2 Table of Contents				
3	Ont	ario's Green Energy Act – Overview4			
	3.1	Promoting Energy Conservation4			
4	Intr	oduction5			
5	Bui	ding Survey6			
	5.1	Industry Comparative7			
	5.2	Sustainable Measures Summary8			
6	Ene	rgy & Water Use9			
	6.1	Utility Consumption for Lake Of The Woods District Hospital9			
	6.2	Utility Consumption for Morningstar Detox Centre9			
7	End	Use - Energy			
	7.1	ekBtu Overview10			
	7.2	Energy End Use – Lake Of The Woods District Hospital11			
8	Ene	rgy Utilization Index			
9	Gre	en House Gas Emission Reporting13			
1	0 C	Conservation & Demand Management Plan14			
	10.1	Current Energy & Water Saving Initiatives14			
	10.2	Energy Commodities Management15			
	10.3	Conservation Measures			
	10.3	3.1 Priority Levels Overview			
	10.3	3.2 Overview of Effected Utilities			
	10.4	Cleaning, Sanitization and Disinfection18			
1	1 (losing Comments			

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 Lake of the Woods 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**, Lake of the Woods 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

Lake of the Woods District Hospital consists of 2 health care facilities that have been audited for sustainability. Lake of the Woods District Hospital is an integrated facility, providing programs serving the community of Kenora 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 Lake of the Woods District Hospital

Facility Information				
Facility Name:	Lake Of The Woods			
Type of Facility:	Hospital			
Address:	21 Sylvan Street West			
Building Use	Building is used for Hospital use nurnoses			
Summary:	building is used for hospital use purposes			
Facility Age (Year	1020			
Constructed):	1929			
Gross Area (Sq. Ft)	221,000			
Hours of Operation:	24h a day			
Number of Floors:	4			

Table 2 Morningstar Detox Centre

Facility Information				
Facility Name:	Morningstar Detox Centre			
Address:	6 Matheson St. S., Kenora, ON			
Gross Area (Sq. Ft)	10,000			
Number of Floors:	1			
Year Constructed:	1972			

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 3	3 Energy	&	Water	Consumption	Summary
---------	----------	---	-------	-------------	---------

Lake of the Woods District Hospital	Annual Consumption
Energy (ekBtu)	47,518,920.5
Water (m³)	50,310
Morningstar Detox Centre	Annual Consumption
Energy (ekBtu)	1,179,806.3
Water (m³)	1,035

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

Annual Energy Consumption Annual Energy Consumption 120 230 220 100 £ 210 ekBtu/Sq.ft. 001 ekBtu/Sq. 12 130 80 229 60 40 63 170 160 20 150 0 Lake of the Woods District Hoodpistarly Average Industry Average Morningstar **Detox Centre**

Figure 1 Energy Use Intensity



5.2 Sustainable Measures Summary

The following table summarizes the recommended energy and water efficiency measures discovered throughout the auditing process; and it outlines the impacted utility for each category. The timelines and costs associated with each measure will be addressed in detail further in the report.

Table 3: Sustainable Measures Summary

Sustainable Measures	Electricity	Demand	Nat Gas	Water
Staff Sustainable Culture Program	Х	Х	Х	Х
Sub-metering & Monitoring	Х		Х	
Exterior Lighting Upgrade	Х			
Exhaust Fan Control	Х	Х		
VSD on Remaining Fans and Pumps	Х	Х		
Chiller Plant Optimization	Х	Х		
Heating Reflector Panels			Х	
Geothermal	Х	Х	Х	
Lighting Upgrade with Control	Х	Х		
Recommission Heat Reclamation System			Х	
Reinsulate Building Envelope			Х	
Window Maintenance & Upgrade	Х			
E-time Energy Coating			Х	
Energy Misers			Х	
Economizer			Х	
Air Curtain			Х	
Building Automation System	Х	Х	Х	
Fume Hood Control	Х			
Air Curtain			Х	
Building Automation System	Х	Х	Х	

Page 8 of 19

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 Lake Of The Woods District Hospital

Current utilities supplied for Lake Of The Woods 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 4: Utility Consumption for Lake Of The Woods District Hospital

Energy/Utility Source	365 Day - Annual Consumption in Units
Electricity (kWh)	3,115,357.5
Gas (m3)	965,125.47
Water (m3)	50,310

6.2 Utility Consumption for Morningstar Detox Centre

Current utilities supplied for the 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 5: Utility Consumption for Morningstar Detox Centre

Energy/Utility Source	365 Day - Annual Consumption in Units
Electricity (kWh)	120,646
Gas (m3)	21,138
Water (m3)	1,035



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.



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 - Lake Of The Woods District Hospital

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

Table 5: Annual Energy Breakdown

End Use	Estimated Energy Use [ekBtu/Year]	% of Total Energy Use	Notes
Space Heating	610,851.36	5.35%	
Space Cooling	1,982,406.12	17.36%	
Water Heating	157,291.91	1.38%	
Auxiliary Equipment - Plug Load	943,748.96	8.27%	Including computers, etc.
Auxiliary Equipment - Significant Energy Users	1,329,499.45	11.65%	Medical Equipment
Auxiliary Motors	2,478,198.74	21.71%	Including fans and pumps.
Lighting	3,310,519.20	29.00%	
Servers	604,333.44	5.29%	
Totals	11,416,849.18	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 249.19 ekBtu/ft². NRCan segregated this by province and in Ontario the average annual EUI for hospitals is 2.60 GJ/m²—or 228.94 ekBtu/ft².

The Morningstar Detox Centre is compared to facilities that specialize in outpatient rehabilitation and physical therapy. The average annual EUI of this type of facility is $1.5 \text{ GJ/m}^2 - \text{ or } 63 \text{ ekBtu/ft}^2$.

The EUI for the facilities are as follows:

Facility	EUI (ekBtu/ft ²)	Comparison to Industry Average
Lake Of The Woods	220.26	Lake of the Woods District Hospital has an EUI that is Less than
District Hospital	220.50	the Ontario hospital industry average
Morningstar Detox	110.0	Lake of the Woods District Hospital has an EUI that is More
Centre	118.0	than the Ontario industry average

9 Green House Gas Emission Reporting

The greenhouse gas emissions are calculated based on the energy consumption data analyzed for both Lake of the Woods District Hospital and Morningstar Detox Centre

Table 6: Energy Related Green House Gas Emissions

Utility Type	Units/Year	Tons of CO2
Electricity (kWh)	3,236,004.01	586
Natural Gas (m3)	986,263.47	2122
	Total 2011 CO2 Emissions	2708

Figure 3: Baseline & Target Greenhouse Gas Emissions



Page 13 of 19

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

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

Figure 7: Current Energy& Water Saving Initiatives

Item	Utilities Affected	Description
Replaced Cooling Tower	Electricity	Cooling tower has been replace with a more efficient model.
Lighting	Electricity	Lighting was upgraded throughout the facility from T12s to T8s. LEDs are used with dimmers. 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.
Motors with VSDs	Electricity	Electrical load is reduced.
Window Upgrade	All Utilities	70% of the buildings windows were upgraded or retrofitted.
Steam Trap Audits	Natural Gas	Annual steam trap audit are performed.
Recycling Community	Sustainability	The LOTW community proactively recycles within the community.

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. The 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.

10.3.2 Overview of Effected 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.

Lake of the Woods District Hospital

Measure	Impacted Facility	Priority Level
Staff Sustainable Culture Program	Electricity	1
Sub-metering & Monitoring	All Utilities	4
Exterior Lighting Upgrade	Electricity	1
Exhaust Fan Control	Electricity	2
VSD on Remaining Fans and Pumps	Electricity	3
Chiller Plant Optimization	Electricity	4
Heating Reflector Panels	Natural Gas	1
Geothermal	All Utilities	5
Lighting Upgrade with Control	Electricity	4
Recommission Heat Reclamation System	Natural Gas	4
Reinsulate Building Envelope	All Utilities	5
Window Maintenance & Upgrade	All Utilities	1
E-time Energy Coating	All Utilities	2
Upgraded Cleaning System (Microfibre Clothes)	Sustainability	1
Energy Misers	Electricity	4
Economizer	All Utilities	3
Air Curtain	Natural Gas	4
Building Automation System	All Utilities	1

Morning Star Detox Center

Measure	Impacted Facility	Priority Level
Exterior and Interior Lighting Upgrade	Electricity	1
Boiler Upgrade to High Efficiency	Natural Gas	1
Upgrade Windows	Natural Gas	1
Reinsulate Building Envelope	All Utilities	5
BAS System Installation	All Utilities	2
Energy Star Electrical Equipment as equipment reaches end of life.	Electrical	4

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 Lake of the Woods 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 Lake of the Woods District Hospital, we approve this Conservation & Demand Management Plan.

