Hawkesbury & District General Hospital

Conservation and Demand Management Plan

DUE DATE:
July 1, 2014

Hôpital Général de Hawkesbury
& District General Hospital Inc.

PREPARED BY:
Arborus Consulting
76 Chamberlain Ave., Ottawa, ON K1S 1V9
www.arborus.ca

EXECUTIVE SUMMARY

This Energy Conservation and Demand Management Plan has been developed in response to Ontario Regulation 397/11 – Green Energy Act, 2009. Under the act, public agencies are required to prepare, publish, make available to the public and implement energy conservation and demand management plans or joint plans in accordance with sections 6 and 7 of the Act and with this Regulation.

This is the initial Energy Conservation and Demand Management Plan, published in June 2014. The Plan is to be updated every five years, with the first updated version published no later than July 1, 2019.

H&DGH is preparing for a major facility expansion project that will commence construction in 2014 and complete in 2018. Three additions will be constructed in phased approach adding 124,286 sq.ft. to the existing 118,000 sq.ft. The project includes a number of energy efficiency upgrades to the existing facility. The savings impacts are outlined in this Plan. H&DGH will re-assess the energy conservation measures in satellite buildings and areas not upgraded in the expansion project upon completion of the construction in 2018.

The expansion project will include a new Building Automation System (BAS) that will control the new and existing equipment. Existing pumps and fan motors will be replaced with new and matched with variable speed drives and connected to the new BAS.

The installed lighting power density (LPD) of the hospital is 8.0 W/sq-m. This is somewhat low compared to ASHRAE 90.1-2010, a recent building energy standard, which allows 12.9 W/sq-m for the average hospital.

However, under the expansion project, some of the existing lighting will be replaced as follows:

- fluorescent light fixtures retrofitted with new addressable ballasts and 25W lamps,
- Exit signs replaced with LED type,
- Exterior metal halide fixtures replaced with LED

The expansion project will deliver electrical savings as follows:

Load	Demand Savings (kW)	Energy Savings (kWh)
Lighting	14.38	43,853
Motors	11.05	82,857
Total	25.43	126,710

Table i – Savings Summary

SENIOR MANAGEMENT ENDORSEMENT

This conservation & Demand Management Plan has been reviewed by senior management and are in support of the program to save energy under the expansion project.

TABLE OF CONTENTS

1 INTRODUCTION

This Energy Conservation and Demand Management Plan has been developed in response to Ontario Regulation 397/11 – Green Energy Act, 2009. Under the act, public agencies are required to prepare, publish, make available to the public and implement energy conservation and demand management plans or joint plans in accordance with sections 6 and 7 of the Act and with this Regulation.

This is the initial Energy Conservation and Demand Management Plan, published in June 2014. The Plan is to be updated every five years, with the first updated version published no later than July 1, 2019.

1.1 Background

H&DGH currently has four facilities as outlined in the following table

Building	Address	Building Area
Hospital	1111 Ghislain Street	118,000.000 sq.ft.
	352 Main Street West	4,200.00
	175 Main Street West	2,000.00
	444 McGill Street	4,500.00

Table 1 – Hospital Portfolio

1.2 Hospital Expansion Project

H&DGH is preparing for a major facility expansion project that will commence construction in 2014 and complete in 2018. Three additions will be constructed in phased approach adding 124,286 sq.ft. to the existing 118,000 sq.ft.

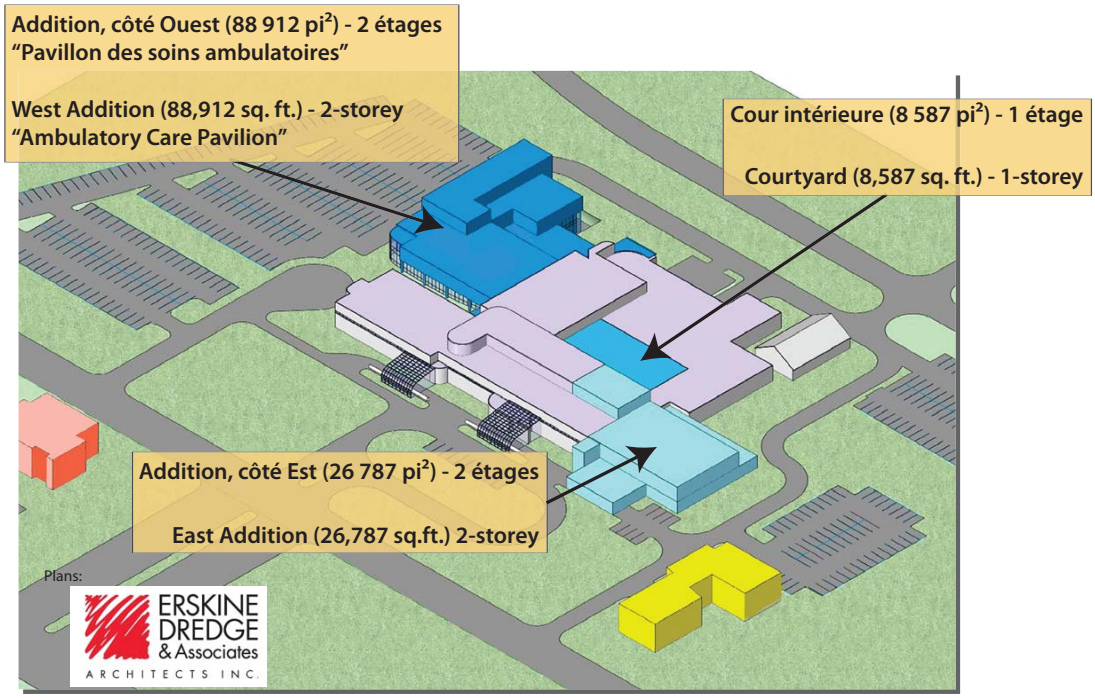

Figure 1 – Hospital Expansion Plan Rendering

The expansion project will include a new Building Automation System (BAS) that will control the new and existing equipment. Existing pumps and fan motors will be replaced with new and matched with variable speed drives and connected to the new BAS. Many light fixtures will be upgraded or replaced.

An addressable Lutron lighting control system will be installed all over the hospital. Lighting control panels will be installed in the electrical and telecom rooms. Most of the fluorescent fixtures will have Lutron ballast to be able to provide the dimming of the light fixtures. The LED fixtures will be provided with Lutron drivers. The Lutron system allows controlling all the lights, including the emergency lights.

2 ENERGY CONSUMPTION

Location	Natural Gas	Cost	Electricity	Cost
1111 Ghislain Street	376,890 M^3	$18,969	3,218,099 kWh	$376,511
352 Main Street W	2,700 M^3	$2,086	34,421 kWh	$4,206
175 Main Street W	2,894 M^3	$1331	12,428 kWh	$1,578
444 McGill Street	10,607 M^3	$3,230	78,426 kWh	$9,960

Table 2 – 2012 Energy Use

Location	Natural Gas	Cost	Electricity	Cost
1111 Ghislain Street	374,278 M^3	$18,911	3,006,900 kWh	$311,695
352 Main Street W	2,995 M^3	$1,074	31,732 kWh	$3,321
175 Main Street W	1,630 M^3	$1200	12,432 kWh	$1,211
444 McGill Street	7,035 M^3	$2,022	64,845 kWh	$6,787

Table 3 – 2011 Energy Use

3 ENERGY CONSERVATION & DEMAND MANAGEMENT

The expansion project will replace much of the lighting and all of the fan and pump motors in the existing building. The resulting energy and demand savings are outlined below.

3.1 Lighting Efficiency Measures

A complete lighting audit was performed as part of the energy audit. The indoor lighting is almost exclusively fluorescent tube, though the new warehouse addition contains several metal halide lamps. Patient rooms are lit with a 2-lamp fixture per bed, each containing 3' T8s (25 W per lamp), and 2' T8s (17 W per lamp) in the washrooms. Hallways are lit primarily with single bulb T8s (32 W), while offices and other functional areas are generally lit with 2-bulb T8s (2 x 32 W). Ballasts are generally Sylvania

QUICKTRONIC T8 Instant Starts, with a ballast factor of 1.20. The total installed building lighting power including ballasts is 76.6 kW.

The installed lighting power density (LPD) of the hospital is 8.0 W/sq-m. This is somewhat low compared to ASHRAE 90.1-2010, a recent building energy standard, which allows 12.9 W/sq-m for the average hospital.

However, under the expansion project, some of the existing lighting will be replaced as follows:

- fluorescent light fixtures retrofitted with new addressable ballasts and 25W lamps,
- Exit signs replaced with LED type,
- Exterior metal halide fixtures replaced with LED

Interior lighting schedules for spaces other than hallways & stairs are difficult to determine. For this assessment an average of 6hrs/day has been used to estimate the energy savings. Exterior lighting is controlled by photocells; estimated to be ON for 4000 hrs/yr.

Fixture Type	Demand Savings (kW)	Energy Savings (kWh)
Fluorescent	9.5	20,962
Exit Signs	0.7	6,171
Exterior HID	4.18	16,720
Total	14.38	43,853

Table 4 – Lighting Savings

3.2 Motor Efficiency Measures

The fan and pump motors will be replaced under the expansion project with new NEMA premium efficiency motors with matching variable speed drives. The majority of the systems operate 24/7 with some motor loads having a seasonal schedule. Given the extent of modifications to the building systems and occupancies, estimating the savings from application of the variable speed drives has an uncertain accuracy and has therefore been excluded form the assessment.

Motor Load	Demand Savings (kW)	Energy Savings (kWh)
Pumps	5.95	44,099
Fans	5.1	38,758
Total	11.05	82,857

Table 5 – Motor Load Savings

3.3 Summary of Energy and Demand Savings

Load	Demand Savings (kW)	Energy Savings (kWh)
Lighting	14.38	43,853
Motors	11.05	82,857
Total	25.43	126,710

Table 6 – Savings Summary