



# ENERGY USAGE & CONSERVATION-DEMAND MANAGEMENT PLAN 2014-2019

June 30, 2018 Update



Thunder Bay Regional  
**Health Sciences  
Centre**

healthy  
together

En santé  
ensemble

Table of Contents	
Introduction	1
Facility Information	2
Energy Consumption	3
Previous & Current Measures	4
Goals & Objectives	5
Future Proposed Measures	5
Endorsement	7

# ENERGY USAGE AND CONSERVATION - DEMAND MANAGEMENT PLAN

July 1, 2014 to June 30, 2019

## Executive Summary

Thunder Bay Regional Health Sciences Centre is committed to the path of efficiency in all aspects of our health care facility.

Energy management initiatives can produce environmental, economic and social benefits, including reducing greenhouse gas 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. Energy efficient capital and operating process improvements are key components to utilize our resources wisely and provide an optimal environment for patient care.

Ontario's Green Energy Act was created to expand renewable energy generation, encourage energy conservation and promote the creation of clean energy jobs. The following Energy Conservation and Demand Management Plan is written in accordance with the Green Energy Act, 2009, O. Reg. 397/11.

### TBRHSC Mission, Vision, Values

**Mission:** To advance world-class Patient and Family Centred Care in an academic and research-based, acute care environment.

**Vision:** Healthy Together

**Values:** Patients ARE First - Patients First, Accountability, Respect, Excellence

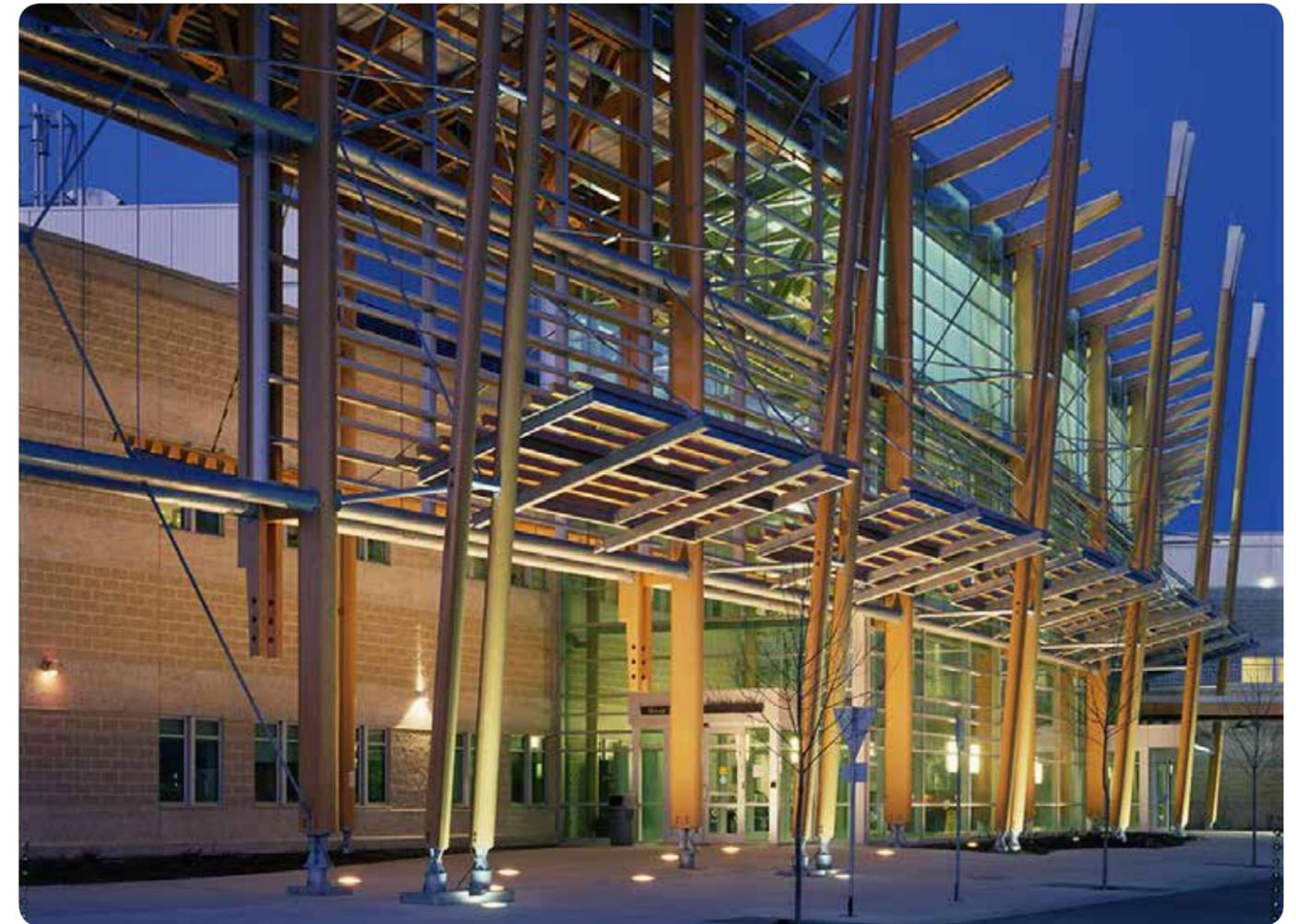
### Energy Management Mission

At Thunder Bay Regional Health Sciences Centre, we recognize the critical relationship between environmental health and public health, and we aim to limit any impact on the environment resulting from the operation of our health care facility. Our energy management plan will address the interconnected issues of indoor environmental quality, energy use, and efficient facility operations.



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## INTRODUCTION

The purpose of Thunder Bay Regional Health Sciences Centre's (TBRHSC) energy management plan is to promote sustainable stewardship of our environment and community resources. TBRHSC's energy management program will aim to reduce

operating costs while enabling us to provide excellent, efficient, and compassionate service to all those we serve in the community and region. The plan will also meet the requirements outlined in the Green Energy Act, 2009, O. Reg. 397/11.

## FACILITY INFORMATION

Thunder Bay Regional Health Sciences Centre is a state-of-the-art acute care facility serving the healthcare needs of people living in Thunder Bay and Northwestern Ontario. The facility serves as the hub for a population base of approximately 250,000 people. An architectural showpiece situated

on a landscaped site of nearly 70 acres, the Regional Health Sciences Centre is a stunning award-winning design that is functionally efficient. The Thunder Bay Regional Health Centre was constructed in 2004. The facility houses 386 beds within 686,000 net square feet over three floors and a full-size penthouse.

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

Type of Facility:	Hospital
Facility Use:	The facility provides both acute and chronic patient care.
Facility Name:	Thunder Bay Regional Health Sciences Centre
Address:	980 Oliver Road, Thunder Bay, Ontario
Year of Construction:	2004
Number of Buildings:	1
Gross Area (Sq. ft.)	716,657
Net Area (Sq. ft.)	686,000
Number of Floors:	4 (3 for patient services and 1 full-size penthouse)
Hours of Operation:	24/7 - 168 hours per week

## ENERGY CONSUMPTION

Based on NRCan's 2007 summary report of commercial and institutional consumption of energy survey, hospitals ranked the highest energy intensity by sector. High energy consumption 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 Energy Utilization Index (EUI) of 73.0 kWh/ft<sup>2</sup> (or 2.83 GJ/m<sup>2</sup>). NRCan segregated this by province and in Ontario the average annual EUI for hospitals is 67.1 kWh/ft<sup>2</sup> (or 2.60 GJ/m<sup>2</sup>).

TBRHSC is a regional trauma centre

- the Emergency Department is one of the busiest in the country - with over 100,000 visits per year. TBRHSC also features integrated Cancer Care with High Dose Brachytherapy, Linear Accelerators, Chemotherapy, a large inpatient oncology unit, and a developed supportive regional program. TBRHSC further includes a large renal program that reaches out to assist patients in Sioux Lookout and Fort Frances. TBRHSC is the regional data centre for a shared clinical information system to 11 other hospitals in the region. The facility also contains many patient care services, a large number of diagnostic imaging services as well as a full service

commercial grade laundry and full service kitchen and servery. Technology and innovation has been included within the design to include: negative pressure rooms for patient isolation; articulating arms featured in all the ICU rooms, Operating Rooms, the Emergency Department, and elsewhere; an Electronic Medical Records system; Diagnostic Picture, Archive and Communication system; Telehealth for regional communication; and wireless computer systems.

TBRHSC purchases natural gas and electricity for its energy needs. The greenhouse gas (GHG) emissions are calculated based on the energy consumption data.

Table: Utility Consumption for Thunder Bay Regional Health Sciences Centre

Energy/Utility Source	2016	2015	2014	2013	2012	2011
Electricity (kWh)	6,025,259*	22,174,704	20,970,576	20,964,914	24,013,912	23,796,188
Natural Gas (m <sup>3</sup> )	6,475,915	4,115,556	4,539,765	4,304,445	4,849,247	5,370,790
Energy Intensity kWh/ft <sup>2</sup> (ft <sup>2</sup> of net space)	109	96.1	100.9	97.2	110.1	117.9
Total GHG Emissions - (CO <sub>2</sub> tonnes)	12,476	8668	9422	9732	11474	11460

\*The hospital also produces some of its own power and heat from an on-site cogeneration facility as of December 2015. (15,554,365 kWh for 2016)

Based on 365 days annual consumption - January 1 to December 31

Note: GHG based on yearly emission factors





## PREVIOUS & CURRENT MEASURES

### Commodities Management

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 natural gas procurement.

### Energy Retrofit Project 2012-14

To better understand the energy use for the facility, an energy review was completed in 2011 - 2012. The largest contributors to energy use are associated with the heating-ventilation-air-conditioning (HVAC) loads in the form of heating loads, fans and pump energy. TBRHSC, issued a Request For Proposals

(RFP) to request proposals for an "Energy Management Assessment". Johnson Controls Canada LLP (JCI) was selected through this process as a partner. Evolving from that, a multi-staged process was proposed for a path forward to assess and implement changes to realize energy savings at TBRHSC.

- Phase 1 Implementation: Boiler Controls and Heat System & Recovery: 2012
- Phase 2 Implementation: Air Handling Systems & Ventilation: 2012 - 2013
- Phase 3 Implementation: Chiller Plant Optimization: 2013 - 2014
- ✓ Estimated Savings: Natural Gas: 1,205,500 m<sup>3</sup>; Electricity: 5,247,100 kWh (source: JCI)

### Steam Trap Survey & Repairs 2013 and ongoing

TBRHSC has implemented a steam trap survey program that will be completed over a three year cycle. A steam trap plays an extremely large role in the overall efficiency of a steam system.

- ✓ 2013 Savings: 13,820 m<sup>3</sup>/yr (source: Union Gas)

### Building Exterior Lighting Upgrade 2013

TBRHSC commenced replacement of older fixtures and installed LEDs which are more efficient and less maintenance intensive.

- ✓ 2013 Savings: 1,000 kWh (source: TBRHSC Maintenance)

## GOALS & OBJECTIVES

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. We will continuously monitor our practices, so that maximal operating

efficiency can be reached and resources can be allocated more appropriately to serve our community and region.

TBRHSC is committed to continuing its efforts in energy reduction and environmental stewardship. All strategic and facility capital projects

considered will be evaluated for energy reduction and environmental opportunities. Projects will be assessed relevant to 1) improving quality of care; 2) impact on the internal and external environment; and 3) pay-back or net-present value.

## FUTURE PROPOSED MEASURES

### Policies & Processes

#### Environmental Policy

TBRHSC will finalize its overall environmental policy, which will formally include its commitment to the "Three R's", adoption of such in hospital processes, and subsequent staff education.

- ✓ Estimated Costs: no additional costs
- ✓ Estimated Annual Savings: not measureable
- ✓ Duration: refreshed every five years

COMPLETE

#### Apply for an Energy Manager with the IESO

The IESO has incentives for energy reduction - one of which is the support of funding for an energy manager to help identify and execute energy savings opportunities within an organization.

- ✓ Estimated Costs: no cost for the application
- ✓ Estimated Annual Savings: to be determined
- ✓ Duration: 1 year contract

IN PLANNING

#### Capital Projects

The capital projects that follow are being submitted for implementation at TBRHSC - following budget approval, the projects will proceed.

#### Review Computer Settings & User Education

The use of 'sleep mode' will be further implemented on computers which are used infrequently. As well, user education to turn off their computers after hours should be refreshed.

- ✓ Estimated Costs: no additional costs
- ✓ Estimated Annual Savings: 3,000 kWh
- ✓ Duration: indefinite - re-education as required

IN PLANNING

#### Energy Retrofit Project - continued 2014-2016

Study: Cogeneration / Combined Heat and Power (CHP) Study 2014 - an application was made to the Ontario Power Authority to support this project's detailed engineering study.

- ✓ Estimated Costs: \$100,000 study costs
- ✓ Estimated Annual Savings: none
- ✓ Duration: study will last one year; capital project to be determined
- ✓ Capital project approved and implemented

COMPLETE

#### Upgrade Ambulance Bay Lighting to LED 2014

To reduce temperature induced failures and increase energy efficiency, the lighting fixtures will be upgraded to LED.

- ✓ Estimated Costs: \$10,000
- ✓ Estimated Annual Savings: 1,000 kWh
- ✓ Duration: life expectancy 10 years

COMPLETE

### Install an Air Curtain at the Main Emergency Department Entrance 2015

To reduce the loss of heated air from the frequent opening and closing of the main Emergency Department sliding doors, an air curtain will be evaluated and installed if suitable.

- ✓ Estimated Costs: \$3,000
- ✓ Estimated Annual Savings: 10,000 m3 of natural gas per year
- ✓ Duration: life expectancy 10 years

COMPLETE

### Investigate Installation of Steam Economizers 2015 - 2016

This would allow for partial recovery of the heat from the steam boilers' flue gas, as preheat for a portion of the building heating water.

- ✓ Estimated Costs: \$175,000
- ✓ Estimated Annual Savings: 90,000 m3 natural gas per year once installed
- ✓ Duration: 20 years with appropriate preventative maintenance

COMPLETE

### Other Future Projects for Evaluation

#### Interior Lighting Audit and Upgrade

Due to the long operational hours of hospitals, lighting makes up a significant portion of electricity consumption at TBRHSC. Therefore, there is further opportunity to upgrade the existing lighting with new LED options. As a part of the upgrade, occupancy controls will be reviewed and further implemented as appropriate.

IN PLANNING

#### Evaluate Building Automation System (BAS) Upgrade and Further Controls

Some of the BAS upgrades that will be reviewed include further review of occupancy scheduling, review of heating for ambulance bay, re-commissioning of system elements, and tuning of controls.

IN PROGRESS

### New Computerized Preventative Maintenance Management System

TBRHSC will investigate new technology for its preventative maintenance management system which will allow better maintenance, and thus operation, of building system equipment - which in turn will utilize less energy and experience less deterioration or breakdowns.

COMPLETE

### Commence a Study on Water Usage and Reduction Opportunities

TBRHSC has the opportunity to further reduce its use of utilities through examination of its water usage and opportunities for reductions.

COMPLETE



## ENDORSEMENT

We consider our facility an enabler for providing Patient and Family-Centred 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 Thunder Bay Regional Health Sciences Centre, I approve this Conservation & Demand Management Plan.

Peter Myllymaa

Executive Vice President - Corporate Services & Operations

## ACKNOWLEDGMENTS

This report was prepared through collaboration between the Thunder Bay Regional Health Sciences Centre management and facilities staff, and the Blackstone Energy team.

Information on Green Energy Act  
<http://www.energy.gov.on.ca/en/green-energy-act/>

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