



Thunder Bay Regional Health Sciences Centre

Energy Conservation and Demand Management

2024 - 5 Year Plan

2025 Update



Thunder Bay Regional
Health Sciences
Centre

Exceptional **care** for
every patient, every time.

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Summary

Thunder Bay Regional Health Sciences Centre is committed to continuous improvement in all aspects of our health care facility.

Energy management and reduction initiatives can produce environmental, economic, and social benefits, including reducing greenhouse gas emissions, cost

avoidance, and increased savings. As costs continue to rise, an Energy Conservation and Demand Management plan is a proactive step towards an effective long-term solution. Energy efficient improvements to capital and operating processes are key components to leverage our resources and provide an optimal

environment for patient care.

The following Energy Conservation and Demand Management Plan is written in accordance with O. Reg. 25/23: Broader Public Sector: Energy Reporting and Conversation and Demand Plan for the period of July 2024 to June 2029.

Energy Management Mission

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

Introduction

The Thunder Bay Regional Health Sciences Centre's (TBRHSC) Conservation and Demand Management Plan (CDM Plan) is designed to optimize energy consumption, reduce greenhouse gas emissions, and enhance sustainability. Our plan implements strategic initiatives to conserve energy, reduce operating costs, mitigate environmental impact, and promote environmental stewardship, ensuring a greener and more efficient future for our organization and community.

STRATEGIC PLAN



MISSION:
We provide quality Care to Patients and Families, supported and advanced by research, innovation, and education that is responsive to the needs of the population of Northwestern Ontario.

VALUES:
Diversity
Compassion
Excellence
Innovation
Accountability

VISION:
Exceptional **care** for every patient, every time.

PHILOSOPHY:
Patients at the centre of everything we do.

OUR STRATEGIC DIRECTIONS:

Equity, Diversity, & Inclusion
We all belong

Patient Experience
Empathy, compassion, and respect in every encounter

Staff Experience
This is where we want to work, grow, and thrive

Research, Innovation, & Learning
Driven by the needs of our patients, our staff, and our communities

Sustainable Future Ensuring our Healthy Future

Goals & Objectives

TBRHSC is committed to enhancing operational efficiency through the adoption of energy-efficient technologies and practices, promoting a culture of sustainability and environmental stewardship among employees and stakeholders, and achieve cost savings through energy conservation measures. Our organization will integrate energy management in our practices by considering indoor environmental quality, operational efficiency, and sustainably sourced resources into major financial decision-making.

All strategic and capital projects will continue to be evaluated for energy reduction and

environmental opportunities. Projects will be assessed relevant to 1) improving the quality of care; 2) impact on the internal and external environment; and 3) pay-back or cost avoidance value.

TBRHSC is dedicated to establishing new partnerships and working with other public organizations to better manage energy use across our community and will continuously monitor our practices and leverage resources, so that maximum operating efficiency can be reached.

TBRHSC will strive to align with the provincial target of reducing levels of GHG emissions 30% from 2005 levels by 2030.

TBRHSC's 5 year and 10 year goals in energy and utility consumption are the following:

- Reduce overall energy consumption per square foot by **5%** over five years (2025-2029) and by **10%** by 2035.
- Reduce water consumption per square footage by **3%** over five years (2025-2029) and by **5%** by 2035.
- Reduce facility emissions by **10%** from 2011 levels by 2035.
- Reduce Natural Gas consumption by **10%** over five years (2025-2029) and by **20%** by 2035

Facility Information

Thunder Bay Regional Health Sciences Centre is a Tertiary acute Care facility serving the Healthcare needs of the people living in Thunder Bay and Northwestern Ontario. The Facility serves as the hub for a population base of approximately 250,000 people. The facility was constructed in 2004 and houses 425 beds.

TBRHSC is a regional trauma centre, the Emergency Department is one of the busiest in the country. The Hospital also features integrated Cancer Care with 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 cafeteria. 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.

ICR Discoveries is an Administrative, and Research facility. The facility houses TBRHSC and TBRHRI Staff, along with other tenants working in the health research field.

The tables below provides a brief site description of the facilities involved in this report.

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Facility Name
Thunder Bay Regional Health Sciences Centre



Facility Use
The facility provides both acute and chronic patient care

Address
980 Oliver Rd, 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 a Week

Facility Name
ICR Discoveries



Facility Use
Administrative, research, and related facilities

Address
290 Munro St, Thunder Bay Ontario

Year of Construction
Mid 1990
Renovations in 2006 - 2009

Number of Buildings
1

Gross Area (Sq. ft.)
51,787

Net Area (Sq. ft.)
43,485

Number of Floors
3

Hours Of Operation
8/5 - 40 hours per week

Baseline

Energy Consumption

Hospitals rank the highest energy intensity by sector. High-energy consumption is the result of specialized and sophisticated equipment, as well as long hours of operation.

TBRHSC purchases natural gas and electricity for its energy needs. Greenhouse gas (GHG) emissions are calculate based on the energy consumed. In 2015, TBRHSC installed an electricity and useful thermal energy cogeneration facility (CHP), producing a significant amount of its own power. Electricity and natural gas data is dependent on a multitude of external environmental and operational factors that influence the total demand.

Table 1: Summary of TBRHSC’s Annual Energy Consumption and GHG Emissions

	Electricity - Purchased	Electricity Produced by CHP	Total Electricity Consumed	Total Natural Gas Consumed	Energy Intensity Source EUI	National Median EUI*	Total GHG Emissions
980 Oliver Rd	kWh	kWh	kWh	m3	GJ/m2	GJ/m2	CO2 tonnes
2024	4,983,886	14,421,663	19,405,549	6,446,369	4.59	2.96	12,649
2023	6,131,596	12,536,790	18,668,386	6,243,427	4.61	3.92	12,297
290 Munro St							
2024	1,935,630	N/A	1,935,630	107,912	4.34	1.16	261
2023	1,922,348	N/A	1,922,348	139,971	4.56	1.22	322

Source: Source: Energy Star Portfolio Manager, June 2024 report

The following table identifies TBRHSC’s percentage reduction from the commencement of the prior Energy Conservation and Demand Management Plan, 2019 to 2024.

Table 2: TBRHSC’s Net Change from Prior Plan Commencement (2019)

	Total Electricity Consumed	Total Natural Gas Consumed	Energy Intensity	Total GHG Emissions
980 Oliver Rd	-9.7% ↓	-5.2% ↓	-4.4% ↓	-6% ↓
290 Munro St	-2.82% ↓	-35% ↓	-18% ↓	-14% ↓



Energy Conservation and Demand Management

Strategy to Achieve goals

As TBRHSC moves forward with energy conservation and demand management, the following strategies will help achieve our goals:

- Conduct a new comprehensive energy audit to identify areas of high-energy consumption and potential efficiency improvements.
 - Work with and benchmark other healthcare organizations in Ontario to compare results, share ideas, and help reach overall goals.
 - Continue our participation in the Canadian Coalition for Green Health Care, the Canadian Healthcare Engineering Society (CHES), and Independent Electricity System Operator (IESO) workshops and webinars
- to remain current with energy incentives and new emerging technology for energy reduction.

 - Embed the energy conservation ideology in the organization's culture.
 - Investigate the use of renewable energy sources such as solar or wind power to diversify energy supply and decrease reliance on fossil fuels.
 - Continue to establish energy management protocols and employee training programs to promote energy conservation behaviors.
- Monitor and track energy usage regularly to identify trends, measure progress, and adjust strategies accordingly.
 - Collaborate with suppliers and partners to prioritize sustainable practices throughout the supply chain.
 - Engage with the community through outreach programs and educational initiatives to raise awareness about energy conservation and emissions reduction.



Thunder Bay Regional Health Sciences Centre

Summary of Previous Measures

Table 3: The information presented below identifies the Previous Measures completed by TBRHSC from the previous Energy Conservation and Demand Management Plan, 2019 to 2024.

Project /Study/ Optimization	Type of Measure	Conservation Measure	Description	Cost	Savings/Results
Evaluate Green Projects	Organizational	Viability and Cost – effectiveness of projects	To evaluate green initiatives for potential viability and cost-effectiveness at our facility	\$ 100 K	To determine business viability of green initiatives to form the basis of a capital project recommendation
Hospital Peak Shaving and Load Shifting Evaluation	Technical	Electricity Usage During peak loads	To evaluate impact of the cost of the global adjust on the hospital	\$ 100 K	To determine a strategy to mitigate global adjust impact to form the basis of a capital project recommendation
Optimization of Cogeneration Operation	Technical	Electricity and Heat supply	Improving the operation of the current Cogen with Toromont – Improving Spark plugs, Natural Gas Valves	\$ 75 K	5% natural gas usage reduction form Cogeneration plant
Hospital Building Automation System(BAS) Upgrade and Control	Technical	Utility Usage	Upgrade the building automation system to improve process overview and control	\$ 250 K	Improve utility usage by 1-3%
Interior Lighting Upgrade	Technical	Electricity consumed	to complete an LED retrofit for the interior hospital fixtures	\$ 3.8 M	2100 MWh/yr
Kitchen Hood Controls	Technical	Reduction of Natural Gas	to install on-demand hood controls to reduce venting and heat loss	\$ 95 K	2500 MMBTU/yr
Shipping & Receiving Air Curtain Installation	Technical	Reduction of Natural Gas	to install full size air curtain for large shipping and receiving overhead doors	\$ 175 K	2500 MMBTU/yr
ICR Discoveries Retrofits	Technical	Electricity usage	New HVAC system for the lower level, south zone, upgrade existing AHUs/ERVs with VFDs, and retrofit interior lighting fixtures with LED	\$400 K	850 MWh/yr
Continued VFD Conversion	Technical	Electricity usage	Convert the hospital air-handling units to variable frequency drives to allow for reduced power usage	\$ 200K	97,000 kWh/yr per unit installed
Chiller Plan Optimization	Technical	Electricity consumed by the Chilled water plan	Upgrade measurement and control strategy for the Chiller plant. Installing new motors, VFDs and gauges	\$600 K	900,000 kWh reduction or savings \$160k electricity Costs
Removal of ESA Machine	Technical	Natural Gas	Removal of ESA machine used to neutralize medical waste and medication	\$10 K	30,797 m3 of Natural Gas save per year

Future and Ongoing Measures

Table 4: The following list outlines the methods TBRHSC will employ to reduce energy consumption, improve efficiency of the facility while reducing operating costs, and reduce emissions.

Project / Study/ Optimization	Type of Measure	Conservation Measure	Description	Est Cost	Anticipated Savings/Results	Project TimeLine
In Progress – Continued from 2019 Energy CDM Plan						
Metering and Energy Monitoring	Technical	Natural Gas, Electricity, and Water Consumption	To implement additional metering and monitoring to provide more data around energy usage at TBRHSC. This data to then be used in future energy studies	\$85K	To provide additional energy information to building operators and plant decision makers to inform additional projects/ Energy studies/	In Progress
Boiler Controls Upgrades	Technical	Efficiency of Boilers	Upgrading the current controls on Current boiler systems, to improve operating efficiency	\$125K	10% reduction in boiler Natural Gas usage	In Progress
Domestic Water Reduction	Technical	Water Usage	To implement low flow infrastructure renewals to reduce wastage.	\$975K	Reduce water consumption by 3%	In Progress
Develop Energy Retrofit Plan For ICR Discoveries	Technical	Natural Gas, Electricity, and Water Consumption	To develop a capital plan for facility infrastructure renewal and energy savings.	\$50K	Increase the energy efficiency of the building	In Progress
Power System Resiliency	Technical	Emergency Generator Run Time	To support the ability to transfer incoming electrical feeds to the cogeneration plant. During a power failure, the feed can switch with out waiting for the electricity supplier, reducing the amount of run time on the emergency generators. Also, enabling the hospital to be run normal power as an island on the CHP plant.	\$75K	Efficiency of generator usage	In Progress
Update Procurement Policies	Behavioural Organizational	Engagement from Users	To incorporate life cycle costing and prioritize energy efficiency considerations	\$ -	The formalization of this in the procurement process will entrench life cycle costs and energy efficiency in capital purchases.	In Progress
User Education	Behavioural Organizational	Engagement from Users	Think Green" - the Green Team will work to educate building occupants on opportunities to reduce use of power and water	\$10K	Staff and visitors are champions for energy reduction and will help save energy through awareness and actions	In Progress
Roof Upgrade	Technical	Heat and Cooling loads	Replace the Current Roof, will improve insulation at roof level, increasing R Value	\$15M	5% reduction in Heating/Cooling cost	In Progress

Project /Study/ Optimization	Type of Measure	Conservation Measure	Description	Est Cost	Anticipated Savings/Results	Project TimeLine
Studies and Audit						
Develop a Future Energy Plan	Technical, Organizational	Energy Consumption and Emissions	Work with a engineering/energy management firm to develop a roadmap for TBRHSC energy usage and emissions, aligned with the organization's targets. This will include: <ul style="list-style-type: none">• CHP Plant Operation Strategy• Boiler Efficiency• Energy Storage and Power System Resiliency• Exploring Renewable Energy Options• Heat Pump Technology Applications• Green House Gas Inventory	\$50K	A high-level CAPEX/OPEX, geared toward implementing projects that will achieve the organization's targets.	In Progress
Energy Study of CHP Plant	Technical	Natural Gas Consumption	A detail study to determine the best path forward for the CHP Plant Operating Strategy.	\$50K	TBD	Year 2-4
Micro Grid Study	Technical	Energy Efficiency and Reliability	Feasibility study of installing a micro grid for the TBRHSC Site	\$50K	TBD	Year 5+
Building Envelope Study	Technical, Organizational	Energy Efficiency of the Building	To determine energy leakage in the facility and mitigating strategies.	\$50K	TBD	Year 5+
Heat/Boiler Plant Study	Technical	Energy Consume by Heat/boiler plant	A detail study to determine the future of TBRHSC Heat/Boiler Plant and the best options for providing heat, steam and hot water to TBRHSC.	\$50K	TBD	Year 5 +
Feasibility of Alternative Energy Sources	Technical	Renewable Electricity	Feasibility study of utilizing renewable energy at TRBHSC.	\$75K	TBD	Year 5+
Capital Projects						
Roof Upgrade	Technical	Heat and Cooling loads	Replace the Current Roof, will improve insulation at roof level, increasing R Value	\$15M	5% reduction in Heating/Cooling cost	In Progress
Energy Study Recommendations	Technical	Heat and Cooling loads	To implement the recommendations from our 2022 Consultant Energy Report. This includes adding New VFDs, programing changes, VFD speed controllers, etc.	\$300K	Reduction 800,000 kWh, 76, 993 m3 of natural gas, saving 326.4 tCO2 per year	In Progress
Ozone Laundry	Technical, Behavioural	Heat savings	Implement Ozone Laundry, saving the amount of hot water required for laundry.	\$600K	TBD	Year 3-5
Complete Air Flow Upgrades	Technical	Heating and Cooling Loads	Implement control equipment and programming to improve airflow efficiency in sensitive areas with high air exchange rate requirements.	\$750K	Reduction of 210,000 kWh, 14,918 m3 of Natural Gas and 64.7 tCO2	Year 4-5
Micro Grid	Technical	Energy Efficiency and Reliability	Implement Micro Study grid study results	TBD	TBD	Year 5+
Heat/Boiler Plant upgrade	Technical	Natural Gas Consumption	Implement results from Future Energy Plan and Heat/Boiler plant Study – Install, heat pumps, new electrical boilers or best combination of heat plant information for TBRHSC	\$5M	TBD	Year 5+
Upgrade Building Envelop	Technical	Heat and Cooling loads	Upgrade windows and doors to more efficient and higher R value	\$2M	TBD	Year 5+
Optimization						
Cogen Strategy	Technical	Electricity and Heat Supply	To implement results from the Cogen Strategy Study. Peak shaving, emergency use, etc.	\$450K	TBD	Year 2-5
Hospital Peak Shaving and Load Shifting	Technical	Electricity Usage During Peak Periods	To implement the necessary equipment and controls necessary for peak shaving and load shifting.	\$100K	TBD	Year 2-5
Continued Optimization of BAS	Technical	Electricity and Heat supply	Energy savings from optimization of BAS controls.	\$50K	TBD	In Progress

Endorsement

We consider our facility an enabler of Patient and Family-Centred Care, and a vital component of the local community. It is essential that we utilize our facilities efficiently and effectively to enhance our capacity to deliver top-quality healthcare services, while embedding environmental

stewardship into every facet of our operations.

On behalf of the senior management team here at Thunder Bay Regional Health Sciences Centre, I approve this Energy Conservation & Demand Management Plan.



Justin Garofalo

Vice President, Facilities, Capital Planning and Support Services & Chief Financial Officer

Acknowledgements

This report was prepared by the Thunder Bay Regional Health Sciences Centre management and facilities staff.

Information on the Ontario Electricity Act
<https://www.ontario.ca/laws/regulation/r23025>

Ryan Sears, P.Eng.

Director, Capital and Facility Services

(807) 684-6423

ryan.sears@tbrhsc.net



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980 Oliver Road
Thunder Bay, Ontario,
Canada P7B 6V4
(807) 684-6000

www.tbrhsc.net

