

# **SAULT AREA HOSPITAL ENERGY CONSERVATION AND DEMAND MANAGEMENT (ECDM) PLAN**



**2024 – 2029**

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## Introduction

The purpose of Sault Area Hospital's energy conservation and demand management (ECDM) plan and policies is to promote good stewardship of our environment and community resources. In keeping with our mission of Exceptional People Working Together to Provide Outstanding Care in Algoma, Sault Area Hospital's energy conservation and demand management program will reduce overall energy consumption, operating costs, and greenhouse gas emissions. It will also enable us to provide compassionate care to a greater number of patients in our community through Operational Efficiency.

Sault Area Hospital (SAH) is a community hospital approximately 600,000 square feet in area, located in Sault Ste. Marie, ON serving the residents of the Algoma District. With a modern building, having been constructed from 2007 to 2010, the hospital took occupancy and began operations at 750 Great Northern Road in March 2011.

SAH is party to a Project Agreement with Hospital Infrastructure Partners (HIP) consortium, which requires HIP to build, finance, and provide specified services (including maintenance, plant operations, and energy management) over a thirty-year term. The service provider partner in the HIP consortium is EllisDon Facilities Services.

As a recently built P3 (public-private-partnership) hospital, our infrastructure was designed and built to current standards. Most components will not reach end-of-life for quite a few years and premature replacement could not be justified, however, for those building components that will be life-cycled during this ECDM term, energy efficiency and total cost of ownership will be a key determinant.

This plan will be in effect until July 1, 2029, at which time an update will be prepared. The Project Agreement will be in effect until October 15, 2040.

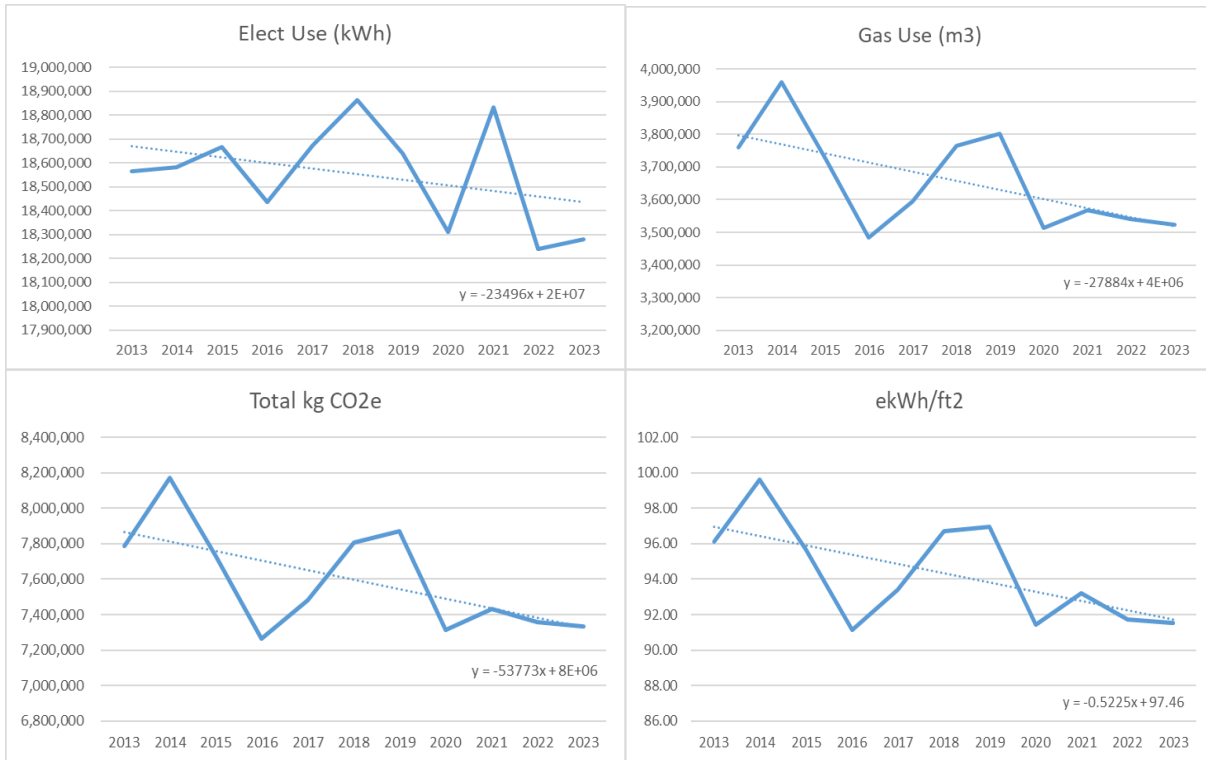
This plan has been approved by Sault Area Hospital Senior Leadership.

### 2018 vs. 2023 Energy Consumption and Energy Use Intensity:

Year	Electricity Consumption (kWh)	Gas Consumption (m3)	Total ekWh	Total kg CO2e	ekWh/ft2
2018	18,863,370	3,764,538	58,014,565	7,809,076	96.69
2023	18,280,533	3,524,125	54,931,436	7,332,133	91.55

Through past conservation and demand initiatives, from 2018 to 2023, Sault Area Hospital has achieved the following results:

- 3,083,129 ekWh (5.3%) reduction in overall annual energy use
- 582,837 kWh (3.1%) decrease in annual electricity consumption
  - The equivalent electrical consumption of 60 homes.
- 240,413 m3 (6.4%) decrease in annual gas consumption
  - The equivalent gas consumption of 100 homes.
- 477 tonne reduction in annual carbon dioxide equivalent (tCO<sub>2</sub>e) emissions
  - The equivalent of removing 104 cars off the road for the year.



Today, utility and energy related costs are a significant part of overall operating costs. Sault Area Hospital’s annual energy consumption and related costs/emissions for 2023 were:

- Utility costs were \$3.74M annually.
- The Hospital’s Energy Use Index (EUI) was 91.55 ekWh/ft<sup>2</sup>
- Energy related emissions for 2023 equaled 7,332 tCO<sub>2</sub>e.

With energy management an integral part of business decisions, Sault Area Hospital can expect to achieve the following targets by 2029:

- 10% reduction in energy use
- 733 tonne reduction in carbon equivalent emissions
- \$374K annual operating cost avoidance (\$1.87M over 5 years). With rising energy costs and federal carbon charges, it is likely that utility spending will continue to rise, however, energy conservation will avoid even higher increases in spending.

To further strengthen and obtain full value from energy management activities, a strategic approach will be taken: the organization will fully integrate energy management into its business decision-making, policies, and operating procedures.

Active management of energy related costs and risks in this manner will provide a significant economic return to the organization and will support other key organizational objectives.

## **Results of Previous Measures from ECDM Plan Posted July 2019**

In July 2019, Sault Area Hospital developed goals and devised green initiatives in an effort to decrease the facilities annual energy consumption and resulting greenhouse gas emissions. The following activities, completed between 2019 and 2024, are associated with managing overall energy consumption, lowering annual operating costs, and reducing greenhouse gas emissions. These activities may, or may not, have been included in the Sault Area Hospital's 2019 ECDM plan and include the following:

### **Past ECDM measures**

#### **Battery Energy Storage System and Demand Management: Cancelled**

- SAH had entered into a contract with a Battery Energy Storage System supplier and operator in March 2020 for a system that would provide power to the entire hospital for up to 3 hours. Unfortunately, COVID-19 caused delays and cost increases on the vendor-side that crippled the project.
- In April 2023, the vendor terminated the project. All construction and procurement that had taken place was the responsibility of the vendor. All contractual obligations to remediate the site were carried out at no cost to SAH.
- While this type of project may be examined in the future, there was no capacity at the time of project termination.

#### **Building Envelope and Brickwork Remediation: Completed**

- Several years ago, a white, salty substance called efflorescence was noticed on the exterior brickwork and blockwork of SAH. Through investigation and study, it was discovered that the vapour barrier underneath the bricks, blocks, and siding had many perforations. These were concentrated mainly around windows, shelf angles (where two floors come together), and exterior electrical connections where the vapour barrier was not properly sealed. As interior, warm, humidified air is pushed out through the perforations in the vapour barrier, it enters the bricks and blocks, carrying salt to the exterior of the brick, where it is left once the water evaporates.
- With the perforations in the vapour barrier, it was known that heated, cooled, humidified, and dehumidified air was being forced out of the building, causing increased energy use. Throughout the four-year project (2018-2022) SAH did experience a decrease in energy use, however, until the Building Pressurization Project is complete, most of the energy savings will not be realized.
- The original constructor completed the repair work at no cost to SAH.

#### **Building Pressurization: In Progress**

- As outlined above under the "Past CDM Measures" section, building over-pressurization has been a concern since the building systems were commissioned. Several attempts have been made to mitigate this problem with little success. SAH and Project Co have worked collaboratively to design a solution and share in the cost.

- A commercial agreement was signed in December 2023 that will see Variable Frequency Drives (VFDs) added to the supply fans of each air handling unit (AHU) that will work in conjunction with duct pressure sensors with new controls. This will reduce supply air to the CSA specified values, reducing energy at the fans, and through less heating, cooling, and humidifying. The retrofit will be completed in the fall of 2024 with optimization to follow. No energy savings were realized during the past ECDM period.

### **Air Handling Unit (AHU) Set-backs: Complete**

- While not forecasted in the 2019 ECDM, SAH undertook a review of all AHU's in 2022 as they were running 24/7 at full air volumes. Of the 23 AHU's, the 5 air handlers that serve only Type III spaces as defined in CSA Z317.2 had their schedules modified to shut down during various overnight areas, saving over 15,000 hours of fan time per year. Once the Building Pressurization project adds VFD's to the air handlers, future scheduling can occur without affecting relative pressures.

### **Steam Sterilizer Replacement and Fuel Switching: Complete**

- This was not contemplated in the 2019 ECDM. SAH had three steam sterilizers in the Medical Device Reprocessing Department that were operated using plant steam generated by use of the natural gas steam boilers. With the sterilizers nearing end of life and having dealt with wet-pack issues for years, the hospital made the decision to replace in 2023 with sterilizers integrating electric steam generators, saving 525 lbs/hr of plant steam or approximately 195,000 m3 of natural gas per year.

## **Energy Management Vision**

***“We consider our facilities a primary source of giving care, an integral part of the healing environment, and key to this equation is the ability to use our facilities efficiently and effectively.”*** (As borrowed from St. Charles Medical Center in Bend, OR)

## **Guiding Principles for Strategic Energy Management**

Sault Area Hospital's energy management will be guided by the following principles:

### ***Taking A Strategic Approach:***

While Sault Area Hospital actively manages energy costs by implementing opportunities as they are identified, by acting strategically, Sault Area Hospital can significantly improve its energy-related performance. Internalizing energy management into our organization's every-day decision-making, policies, and operating procedures will help assure substantial and long-lasting reductions in energy, operating costs, and environmental impact.

Sault Area Hospital is an active participant in the IESO's Strategic Energy Management (SEM) program that focusses on conservation through projects, recommissioning, and practice. Working with a cohort of healthcare facilities in Ontario, the SEM term runs from 2023 – 2025.

### ***Supporting Mission-Critical Goals:***

Strategic energy management will directly support Sault Area Hospital's mission-critical goals of caring for the environment and the community, improving the healing and working environment, and improving the hospital's management of operating costs by reducing unnecessary energy costs. It will also serve to optimize the capacity of existing energy systems to meet current and expanding operational needs, while improving the operational resiliency of the organization. The impacts of Sault Area Hospital's energy management efforts on those goals will be tracked and reported wherever possible.

### ***Pursuing Long-Term Change to Core Business Practices:***

The core of a strategic approach is the consistent incorporation of energy management into our organization's everyday practices and decision making. It also needs to be an integral part of the strategic planning and budgeting processes. Change in energy-related business practice will cover all applications of energy management – new construction and major renovations, existing facility operations and upgrades, and the economic analysis and procurement practices underlying these practices.

### ***Fostering Organizational Commitment and Involvement:***

Executive and organizational commitment and involvement is critical to successful strategic energy management. The Senior Leadership Team at Sault Area Hospital will work with Facilities, EllisDon Facilities Services, and other key staff to ensure that adequate organizational support and resources are provided to maximize the benefits of energy management to Sault Area Hospital. Energy management will also be integrated into the strategic planning and capital budgeting processes. As a recommendation from the IESO SEM program, an energy policy will be written to support the work of the newly formed Energy Team.

### ***Obtaining Solid Economic Returns:***

Energy management investments will yield solid economic returns that meet Sault Area Hospital's standard internal rate of return requirements applied through the hospital's capital budgeting process. Sault Area Hospital will apply consistent financial analysis methods, including life-cycle costing, in order to reduce total cost of facility ownership and operation.

### ***Using Available Resources and Assistance:***

Use of national, regional, and local sources of strategic, technical, and financial assistance to help to achieve the organization's energy management goals. These include utility, municipal, provincial and national government programs. It also includes established best practices through a community of practice approach.

## **The Business Case for Strategic Energy Management**

Below are the central business arguments for Sault Area Hospital's pursuit of strategic energy management. The following section then presents the business proposition – the results of analysis of the energy efficiency opportunities and their associated costs and internal rate of return.

### ***Strengthened Community Leadership and Environmental Stewardship***

Energy management is a visible, public commitment to the community and environment. Through energy management, the hospital can provide leadership in promoting sustainable communities, efficient business practices, and environmental stewardship. Faced with the continual challenge of doing more with less, this is an excellent opportunity to provide leadership and reduce costs at the same time.

### ***Enhanced Healing and Working Environment***

In existing facilities, efficient operating practices improve patient, as well as employee, comfort with more stable environmental control, and better indoor air quality and lighting. In new facilities more daylight and personal control of comfort contribute to a healing and patient-focused environment, for an improved environment of care. For instance, recent research has found that natural light eases surgical pain and contributes to substantial savings in pharmacy costs.

### ***Improved Financial Health and Operating Cost Reduction***

Strategic energy management presents a highly leveraged opportunity to reduce operating costs. Dollars of operating cost savings directly improve the hospital's ability to repurpose dollars to direct patient care. Further, investments in energy projects typically have a lower risk of performance over time, relative to other investments, and savings from energy projects are easier to forecast reliably than savings or revenue increases expected from more variable investments.

### ***Optimization of Capacity to Meet Current and Expanding Operational Needs***

Energy efficiency optimizes inefficient or poorly designed and operated equipment/systems so wasted energy system capacity can be reclaimed for current and expanding operational needs. This "free capacity" can eliminate the need to add major new energy capacity and be much less expensive.



## **Business Proposition**

Sault Area Hospital took occupancy of the new hospital in 2011 through a P3 dBFM project. The Project Agreement includes a Lifecycle Plan to ensure the Project Co will deliver a “new hospital” to SAH at the end of the 30-year Project Agreement. As equipment is changed out through the Lifecycle Plan, energy efficiency will be a guiding factor.

### **Boiler Optimization:**

- The hospital recently replaced three sterilizers that used plant steam (natural gas) with sterilizers utilizing on-board electric steam generators
- With plant steam no longer required for sterilization, it is only needed for humidification, domestic hot water, laundry, and dishwashing. This presents the opportunity to run only one boiler at a time during off-peak season without idling another boiler to ensure continuous sterilization uptime.

### **Building Pressurization: Ongoing**

- As outlined above under the “Past ECDM Measures” section, building over-pressurization has been a concern since the building systems were commissioned. With a commercial agreement now in place to resolve this issue, equipment is on order with installation to occur in the fall of 2024.
- All 23 AHU’s will have Variable Frequency Drives (VFDs) added so that they can be adjusted and the supply air controlled by the differential pressure monitors in the ducts.
- Following the upgrades to the air handling system, the entire hospital will have an updated air balancing to ensure proper supply and return air values, air changes per hour, and differential pressures.
- With fan power being the highest annual consumption of electricity, this project will have a significant impact on the hospital’s electricity consumption. In addition, with the proper amount of supply air, the amount of heating (natural gas boilers), cooling (electric chillers), and humidification (natural gas boilers) will decrease.
- As a significant additional benefit, resolving this issue has allowed the hospital and Project Co to move forward with the pain share/ gain share (PS/GS) arrangement as outlined in the Project Agreement. This has been on hold for the last 13 years as this issue remained outstanding. The PS/GS arrangement will drive innovation as it incentivizes Project Co when energy use decreases by sharing savings.

### **Lighting LED Retrofit**

- SAH was designed with an electronic lighting system controlling a mixture of fluorescent and halogen lights. Many diagnostic imaging rooms have been retrofitted to LED lights when replacing the diagnostic equipment. Recent capital projects (5,000 sq. ft. inside hospital and 17,000 sq. ft. in a community program) incorporated LED lighting throughout.
- Over the next few years, Project Co will be lifecycling lights throughout the hospital, converting areas to LED in an effort to reduce energy consumption and maintenance man-hours.

**Operational:**

**Independent Electricity System Operator (IESO) – Strategic Energy Management (SEM) Program:**

- As part of the 2-year SEM program, SAH took part in an Energy Management Assessment with representation from across the organization. Following the questionnaire that produced the full list of improvements, below, the IESO implementation representative lead the SAH team through a conversation to determine the top three priorities, as shown by checkmarks on the right.
- Many of the improvements not listed in the top three priorities will follow quite naturally out of the priority work as the hospital seeks to change the energy culture across the organization, while targeting prioritized projects.
- The priorities have been embedded into the goals section, below.

**RECOMMENDED ENERGY MANAGEMENT IMPROVEMENTS**

	Priority
1) Write a formal Energy Policy.	✓
2) Establish an Energy Team to lead energy efficiency efforts and promote strategic energy management.	✓
3) Establish a facility-level energy-reduction target.	
4) Establish and maintain a central list of identified energy efficiency opportunities.	
5) Establish regular communications to staff regarding energy efficiency initiatives and energy management progress.	
6) Engage staff in the generation of ideas to improve energy performance.	
7) Ensure the Energy Team meets at least monthly, even when other priorities arise.	
8) Establish an action plan (e.g. Opportunity Register) to prioritize and track the progress of energy-saving opportunities.	✓
9) Incorporate energy performance into the formal responsibilities and evaluation of key personnel.	
10) Incorporate specific objectives and commitments into your Energy Policy.	

## Energy Management Goals

The following are proposed measures that Sault Area Hospital intends to implement:

### **Goal: Energy Conservation and Demand Management Plan Approval**

- Executive approval and resources.
- Support from key staff (financial management, purchasing/procurement, construction, building operations, etc.).
- Creation of mechanisms/processes to make resources available.
- Clarification and communication of staff roles and responsibilities, performance goals, and energy management reporting.

### **Goal: Implement Financial Practices and Decision-Making Processes**

- Money spent to achieve energy efficiency is viewed as an investment, not a cost.
- Financial decision makers consistently use life cycle cost analysis (LCCA) on all new construction, major renovations, and equipment replacements over as part of the Variation Procedure outlined in Schedule 22 of the Project Agreement.
- Decisions about energy management investments will be part of Sault Area Hospital's high-level, long-range process of budgeting for capital and operations.

### **Goal: Implement Strategic Energy Management Practices from IESO SEM Program**

- Write a formal Energy Policy.
  - Incorporate specific objectives and commitments into the Energy Policy.
- Establish an Energy Team to lead energy efficiency efforts and promote strategic energy management.
  - Ensure the Energy Team meets at least monthly, even when other priorities arise.
  - Engage staff in the generation of ideas to improve energy performance.
- Establish an action plan to prioritize and track the progress of energy-saving opportunities.

#### ***Improve Building Operating Performance***

- Equipment tune-up and improved operations and maintenance (O&M) will achieve the following results while supporting patient care, and facility comfort and safety.
  - Achieve cost avoidance for existing facilities by an average of 10% over the five year term.
  - Reduce the system-wide Energy Use Intensity (EUI) from 91.55 ekWh/ft<sup>2</sup> to 82.4 ekWh/ft<sup>2</sup> by 2029.

#### ***Implement Cost-Effective Facility Upgrades***

- Implement equipment and system upgrades where justified by life-cycle cost analysis.
- Expand use of qualified service providers as needed. Develop standard RFP documents, contract terms, and reporting standards.

#### ***Actively Manage Energy Commodity***

- Minimize utility costs and exposure to market risks. Utility costs include natural gas, electricity, water, and sewer.
- Participate in the energy/utility regulatory process.

**Goal: Monitor, Track, and Reward Progress**

- Track progress on the CDM plan
- Track energy reductions annually.
- Reward staff for successes.