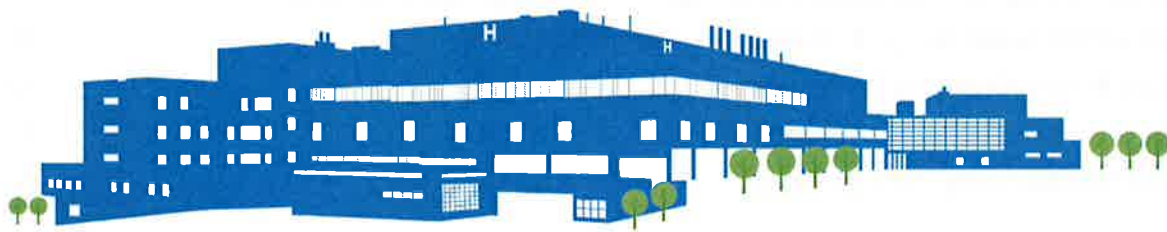


**Peterborough Regional Health Centre**

**ENERGY CONSERVATION AND  
DEMAND MANAGEMENT (CDM) PLAN**

**2019-2024**



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## Introduction

Peterborough Regional Health Centre (PRHC) is a regional hospital delivering acute healthcare to a rapidly growing population of more than 300,000 in Peterborough and the surrounding communities. The Health Centre has a proud local history extending back over a century.

The hospital has more than 400 inpatient beds and offers a wide range of services, including specialized programs in renal, stroke, cardiac, cancer care, vascular surgery and mental health & addictions.

Located in Peterborough, Ontario, Canada – a 90-minute drive north-east of Toronto. We are the region's largest employer with more than 2,500 staff, 400 physicians with privileges, and a core team of 500 volunteers.

## Energy Management Vision

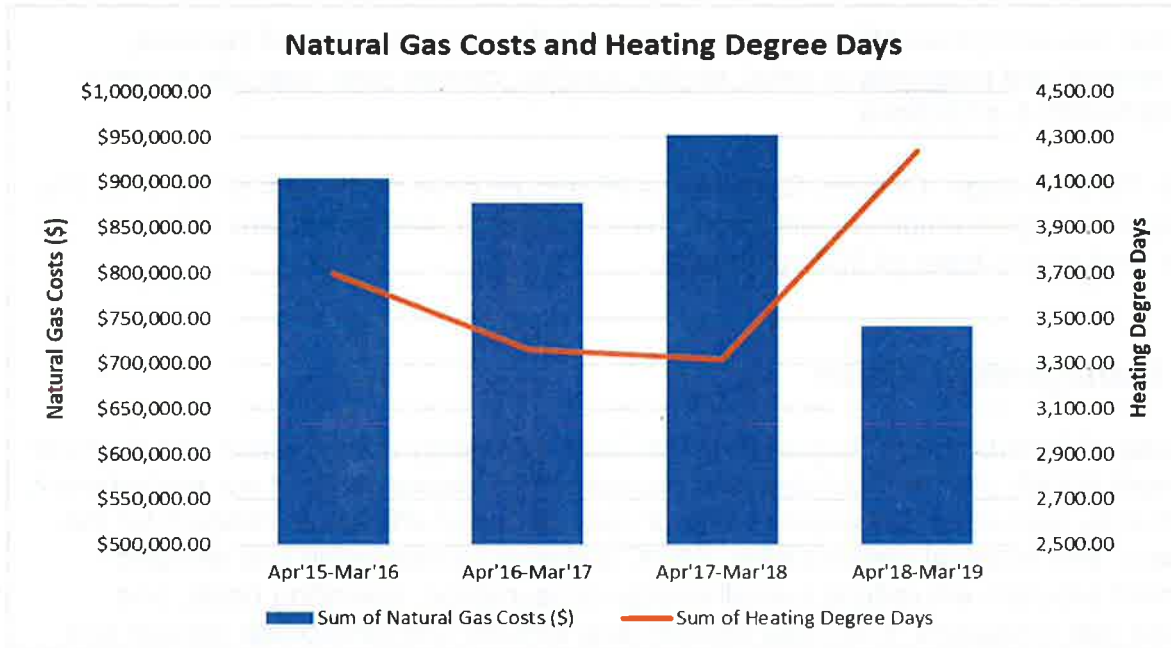
The purpose of Peterborough Regional Health Centre's energy conservation and demand management (CDM) plan and policies is to promote good stewardship of our environment and community resources. In keeping with our core values of efficiency, concern for the environment, and financial responsibility, PRHC's 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 service to a greater number of persons in the community. The implementation of energy saving designs and strategies must minimally be compliant with the following external regulations:

<b>O.Reg 507/18</b>	Broader Public Sector: Energy Reporting and Conservation and Demand Management Plans
<b>CSA Z317.2-19</b>	Special Requirements for Heating, Ventilation and Air Conditioning Systems in Healthcare Facilities
<b>CSA Z8000-18</b>	HealthCare Facilities The nationally recognized baseline for the design and construction of hospitals and care facilities
<b>CSA Z8002-11</b>	Operations and Maintenance of Healthcare Facilities
<b>CSA Z32-15</b>	Electrical Safety and Essential Systems in Healthcare Facilities
<b>CSA Z317.1 -16</b>	Special Requirements for Plumbing Installations in Healthcare Facilities
<b>CSA Z317.5 -17</b>	Illumination design in health care facilities
<b>AODA</b>	The Accessibility for Ontarians with Disabilities Act The Ontario Building Code

## Previous Measures from CDM Plan Posted July 2014

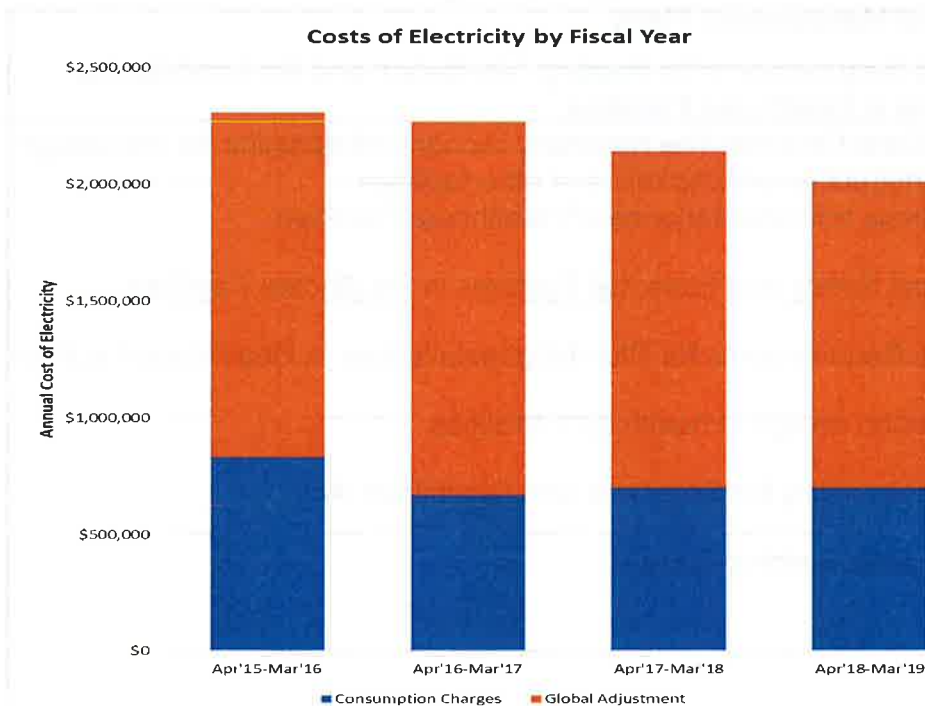
Through past conservation and demand initiatives, PRHC has achieved the results as illustrated in the following charts:

### Natural Gas



Note: Natural gas consumption is significantly lower in 2018/2019 in comparison to the heating degree days.

### Electricity



- 15% reduction in electricity costs
- \$663,596 saved annually from decreased energy costs
- 134,770 average kWh decrease in electricity consumption

Today, utility and energy related costs are a significant part of overall operating costs. PRHC's annual energy consumption and related costs/emissions for 2017 were:

- Utility costs were \$3,092,386 annually.
- The Hospital's Energy Use Index (EUI) was 88.28 ekWh/ft<sup>2</sup>
- Energy related emissions for 2017 equaled 8,622,265 tCO<sub>2e</sub>.
- Facility related Operations and Maintenance (O&M) costs are \$6.6 million annually
- Facility capital project costs are projected at \$25 million over 5 years

With energy management an integral part of business decisions, PRHC can expect to achieve the following targets by 2024:

- 5% reduction in energy use
- 430,000-tonne reduction in carbon equivalent emissions
- \$726,594 annually to the bottom line (\$3.64 million over 5 years)

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.

## **Projects completed by the close of 2014-2019 Energy Conservation and Demand Management Plan**

In July 2014, PRHC developed goals and devised green initiatives designed to decrease the facilities annual energy consumption and resulting greenhouse gas emissions. The following activities, completed between 2014 and 2019, are associated with managing overall energy consumption, lowering annual operating costs, and reducing greenhouse gas emissions:

- Creation of the Energy Analyst position
- Replacement of six (6) Variable Frequency Drives (VFD) for heating pumps and revised control strategy
- Occupancy/vacancy lighting controls in rooms
- Additional light switches at nursing stations
- Heating boiler controls and optimization
- Domestic boiler burner and linkageless controls upgrade
- Building operator training
- Parking lot and Exterior lighting LED retrofit
- Building automation systems upgrades and optimization
- Hands free faucets
- Steam trap audit and repairs
- Energy awareness campaign for staff
- Chiller plant optimization project including:
  - Installation of three (3) VFDs for chilled water pumps
  - Recommissioning of chiller VFDs
  - Cooling Tower control optimization

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

PRHC's energy management will be guided by these principles:

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

While PRHC actively manages energy costs by implementing opportunities as they are identified, by acting strategically, PRHC can significantly improve its energy-related performance. In 2018 PRHC implemented the Energy Conservation & Demand Management Steering Committee. 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.

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

Strategic energy management will directly support PRHC's mission-critical goals of caring for the environment and the community, improving the healing and working environment, and improving the hospital's financial bottom line 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 PRHC'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 via the Energy Conservation & Demand Management Steering Committee. 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. PRHC's Energy Conservation & Demand Management Steering Committee at will work with facility managers and other key staff and physicians to ensure that adequate organizational support and resources are provided to maximize the benefits of energy management to PRHC. Energy management will also be integrated into the strategic planning and capital budgeting processes.

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

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

***Utilizing Available Resources***

Use available 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**

There are four key business arguments for PRHC's pursuit of strategic energy management. These are presented, followed by the business proposition – the results of analysis of the energy efficiency opportunities and their associated costs.

### ***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 a tough market environment that has forced cut backs on hospital support for community activities, 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 and positively impact PRHC's bottom line. Dollars of operating cost savings directly improve the operating margin. 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

If energy management considerations are integral to relevant business practices, policies, procedures, and decision-making processes included in PRHC's business philosophy and budgetary process:

- PRHC's energy-related costs can be reduced by an *additional* 10% over a 5-year period. Based on 2018 utility rates, this will result in \$275 thousand in annual value to the bottom line based, or a total \$1.375 million over a 5-year period. Integration of energy management into organizational decision-making and business practices will continue to produce value annually for a much longer interval
- The recently implemented Energy and Demand Management Steering Committee has committed to review all recommended energy-related projects and provide recommendations to the Senior Administration Team.
- To support the achievement of these financial benefits, PRHC will invest in energy-related capital and operating improvements, meeting an Internal Rate of Return (IRR) that is deemed acceptable to its Board of Directors and Administration.

## **Energy Management Goals**

### **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 \$25,000.
  - Internal rate of return (IRR) as pre-approved by the hospital board and administration
  - Train staff on RETScreen and financial requirements and decision-making process.
- Decisions about energy management investments will be part of PRHC's high-level, long range process of budgeting for capital and operations.

### **Goal: Implement Strategic Energy Management Practices**

#### ***Establish Purchasing Specifications for Energy Efficient Equipment & Services***

- Establish and consistently use purchasing specifications that minimize life-cycle costs for energy efficient equipment and services.
  - Establish efficiency specifications for standard equipment routinely replaced (e.g. lights, motors, and unitary Heating, Ventilation, and Air Conditioning (HVAC) equipment).
  - Establish efficiency guidelines that apply Life Cycle Cost Analysis for custom equipment purchases (e.g. chillers).
  - Establish efficiency standards for design and construction, and for building operations and maintenance services.

## ***Implement Enhanced Design & Construction (D&C) Practices***

- Implement improved new construction practices in all projects over \$1 million that specify early team collaboration and “integrated design” (ID).
  - Integrated design required for funding.
  - Request for Proposal (RFPs), contract terms & conditions, & fee structures will support ID.
  - Apply LCCA and financial hurdle rates described above to design decisions.
  - Apply established purchasing procedures and specifications.
  - Include incentives and tax credits wherever available.
  - Educate all owners, project managers or construction managers and contractors on integrated design and their respective roles in master planning pre-design, design, construction, testing, commissioning, and monitoring.
  
- Set and meet clear energy performance targets for new buildings; measure and improve over time.
  - Establish baseline for measuring performance goals (e.g. code, or national reference standards like ASHRAE 90.1).
  - Set target for each building at 25% less than the Model National Energy Code for buildings.
  - Measure performance and improve over time.
  
- Specify commissioning as a standard procedure.
  - Retain the services of an independent third-party commissioning agent.
  - 100 percent of fundamental building systems and elements will be designed, installed, and calibrated to operate as designed.
  - Design team, commissioning agent, and building operators will work closely throughout the design process and occupancy to ensure good transition.

## ***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 reductions in operating costs for existing facilities by an average of 5% over 5 years and continue to improve by 1% per year for 5 years thereafter.
  - Reduce the system wide EUI from 86.1 ekWh/ft<sup>2</sup> to 53.1 ekWh/ft<sup>2</sup> by 2024. The EUI will be adjusted for variances in patient days and IT intensity.
  - Establish an ENERGYSTAR rating and strive to improve the rating over the next 5 years.
  - Introduce the use of analytics to further maximize building performance.

### ***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.
  - Explore the option and possibility of partnering with an Energy Services Contractor to plan and implement energy conservation measures.

### ***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.

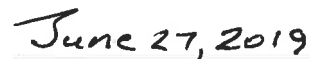
### **Goal: Monitor, Track, and Reward Progress**

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

### **Signature**



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Dr. Peter McLaughlin

Date

President & CEO

Peterborough Regional Health Centre