

Strategic Energy Management Plan For Ross Memorial Hospital 2014





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Introduction

Ontario Regulation 397/11 in the Green Energy Act requires Ontario public agencies including hospitals to develop and implement Energy Conservation and Demand Management plans which are to be made publicly available by July 1, 2014. These plans must contain the following:

- a summary of annual energy consumption and greenhouse gas emissions
- a description of previous, current and proposed measures for energy reduction including forecasts of the expected results of proposed measures
- goals and objectives for conserving and otherwise reducing the amount of energy consumed and managing energy demand

To comply with this regulation, Ross Memorial Hospital has developed this Strategic Energy Management Plan (SEMP). The SEMP outlines Ross Memorial Hospital's Vision and Commitment to energy management, guiding principles for energy management that the hospital will apply, energy management goals, and energy savings measures to be considered over the next 5 years. This plan formalizes in writing, the energy management strategies that Ross Memorial Hospital has already been actively engaged in and new strategies to be considered. It is an on-going, organization-wide goal at the Ross Memorial Hospital to be a responsible neighbor, a good corporate citizen and a community leader in environmental awareness. This plan will help Ross Memorial Hospital continue to promote good stewardship of the environment and community resources. This SEMP has the approval of Ross Memorial's Hospital Senior Leadership Team.

Effectively managing energy requires establishing an accurate energy use baseline. To maintain reporting continuity with the Green Energy Act, the hospital's 2012 energy consumption was used as the baseline for this plan. The cost and energy intensity were as follows:

- Utility costs in 2012 for Hydro and Natural Gas were \$904,915.
- The Hospital's Energy Use Index (EUI) was 55.4 ekWh/ft²

Based on our current environment and the factors influencing our base year 2012, we anticipate achieving the following targets:

- 2% reduction in energy use per year
- \$18,000 approx. annually to the bottom line (\$90,000 over 5 years at current prices)

Ross Memorial Hospital continues to actively pursue energy and waste reduction.

Recent activities have included the following:

- OHA Hospital Scorecard Survey participation and benchmarking report.
- Continued membership with Greening Health Care who provide workshops, training webinars, forums, collects hospital utility consumption data, supplies member hospitals with their specific energy use reports and benchmarks against all member hospitals.
- Completion in 2013 of a multiyear energy retrofit program with Honeywell.
- Completion of an infrastructure upgrade to air handling systems in the oldest section of the hospital including a new Building Automation System.



- In 2013 Ross Memorial Hospital submitted a presentation to the Canadian College of Health Leaders for their annual Energy and Environmental Stewardship award. The submission highlighted some of the work that Ross Memorial Hospital completed over the last number of years to save energy, reduce waste, increase recycling efforts and increase awareness of staff. A description of the Energy Retrofit and the Infrastructure project is included. The presentation is available on the RMH website.

Energy Management Vision

Ross Memorial Hospital's Vision statement is "Exceptional People committed to providing Exceptional Care".

We consider our facilities a primary source of giving care and an integral part of the healing environment. Key to this equation is the ability to use our facilities efficiently and effectively. By reducing our environmental footprint, we are also contributing to create a healthier environment.

Ross Memorial Hospital's energy management vision is to reduce and eliminate energy waste, wherever possible, through infrastructure improvement, process changes and policy changes and through the embracing of best practice and technology changes.

Guiding Principles for Strategic Energy Management

Ross Memorial Hospital's energy management plan will be guided by these principles:

Taking A Strategic Approach: Ross Memorial Hospital actively manages energy costs by implementing opportunities as they are identified. By acting strategically, the hospital can expect to significantly improve its energy-related performance. Internalizing energy management into the organization's daily decision-making, policies, and operating procedures will help assure substantial and long-lasting reductions in energy use throughout Ross Memorial Hospital.

Supporting Mission-Critical Goals: Strategic energy management will also support Ross Memorial Hospital's mission-critical goals of caring for the patients of the community. An energy plan can contribute to; optimizing the healing and working environment, improving the hospital's financial position by reducing unnecessary energy costs, optimizing the capacity of existing energy systems to meet current and expanding operational needs.

Pursuing Long-Term Change to Core Business Practices: The value of a strategic approach, is the consistent incorporation of energy management into our organization's core practices and decision making. This applies for both the strategic planning as well as budgeting processes. Strategic 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 prospects. The energy conservation goals extend beyond the short term view of annual operating budgets.

Fostering Organizational Commitment and Involvement: Executive and organizational commitment and involvement is critical to successful strategic energy management. Executive leaders at Ross Memorial Hospital will work with managers and other key staff to ensure that adequate organizational support and resources are provided to maximize the benefits of energy management. Energy management will be integrated into the strategic planning, budgeting processes and operating capital.

Obtaining Solid Economic Returns: Energy management investments should yield solid economic returns that meet Ross Memorial Hospital's expectations on Internal Rate of Return and Return on Investment. Ross Memorial Hospital will apply consistent financial analysis methods that consider full life-cycle to reduce total cost of facility ownership and operation.

Using Available Resources and Assistance: Ross Memorial Hospital will use national, regional, and local sources of strategic, technical, and financial assistance to help achieve our energy management goals. These include programs through Utility Suppliers, Ontario Power Authority, Canadian Coalition for Green Health Care, Ontario Hospital Association, EnerCan, Green Health Care, The Canadian Healthcare Engineering Society and ENERGYSTAR, saveONenergy.

Continuous Quality Improvement. CQI is a core business practice that applies to energy management/practices.



The Business Case for Strategic Energy Management

Below are the central business arguments for Ross Memorial Hospital's pursuit of strategic energy management.

Strengthened Community Leadership and Environmental Stewardship

Energy management is a visible, public commitment to the community and environment. Through aggressive energy management, the hospital can provide leadership by promoting sustainable communities, efficient business practices, and environmental stewardship. Faced with a tough fiscal environment that has forced reductions of 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 air temperature, 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, and an improved working environment. Recent research has found that daylight 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 Ross Memorial Hospital'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

Prior to the development of this plan, Ross Memorial Hospital pursued a range of progressive energy management actions and projects. We believe that there is much more that can be achieved and the development of this SEMP is intended to provide guidance for future energy projects. Based on work completed to date, past experience and by following this plan, we anticipate being able to achieve the continued reductions as follows:

- If energy management considerations are integral to relevant business practices, policies, procedures, and decision-making processes, Ross Memorial Hospital's energy-related usage can be reduced by an *additional* 10% over a 5-year period.
- Based on 2012 utility rates, this will result in \$18,000 in annual value to the bottom line based, or a total \$90,000 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 period of time.
- To support the achievement of these financial benefits, Ross Memorial Hospital will consider investments in energy-related capital and operating improvements, meeting an Internal Rate of Return (IRR) that is acceptable to its Board of Directors and Executive Officers.

Energy Management Goals

The following outlines some of the energy management goals that will be adopted by Ross Memorial Hospital. They include but are not limited to the following.

1) Goal: Strategic Energy Management Plan (SEMP) Approval

- Executive approval of strategic directions and forecasts.
- Agreement in principle of using Internal Rate of Return to fund investments.
- Clarification and communication of staff roles and responsibilities, performance goals, and energy management reporting.

2) Goal: Implement Financial Practices and Decision Making Processes

- Financial decision makers consistently use life cycle cost analysis (LCCA) on all new construction, major renovations, and equipment replacements over lowest purchase price.
 - Internal rate of return analysis will be presented for all proposed energy management investments.
 - Train staff on Life Cycle Cost Analysis (LCCA) and financial requirements and decision making process.
- Decisions about energy management investments will be part of Ross Memorial Hospital's high-level, long range process of budgeting for capital and operations.

3) Goal: Establish Purchasing Specifications for Energy Efficient Equipment and 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 HVAC equipment).
 - Establish efficiency guidelines that apply LCCA for custom equipment purchases (e.g. chillers).
 - Establish efficiency standards for design and construction, and for building operations and maintenance services.

4) Goal: Improve Facility Operating Performance

- Establish new baseline following major construction project and evaluate impact of recent upgrades.
- 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 10% over 5 years and continue to improve by 1% per year for 5 years thereafter.
 - Reduce the system-wide EUI from 55.4 ekWh/ft² to 53 ekWh/ft² by 2019. The EUI will be adjusted for variances in patient days and IT intensity.

5) Goal: Implement Cost-Effective Facility Upgrades

- Evaluate impact of recent facility upgrades in 2013/14 that should reduce energy consumption.
- Implement equipment and system upgrades where justified by life-cycle cost analysis

6) Goal: 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.

7) Goal: Monitor, Track, and Reward Progress

- Track progress on Strategic Energy Master Plan
- Track energy reductions.
- Reward staff for successes.

Baseline Energy Use

The Ontario Green Energy Act requires reporting of annual energy consumption and for 2014 all public facilities must supply their 2012 consumption data. For the purpose of this plan, the baseline energy profile has been selected to coincide with this requirement therefore the following data is the 2012 calendar year consumption information.

This baseline was used to calibrate energy end-use estimates and as the reference case for calculating energy savings. Exhibit 1 presents the baseline energy use and costs; Exhibits 2 and 3 present the data in graphic format.

Key Observations:

A review of the baseline energy cost profile reveals that:

The 2012 calendar year total cost for electricity and natural gas was \$904,915. Electricity costs accounted for 74% of this total with natural gas costs making up the other 26%.

The annual electrical consumption was 6,126,969 kWh, and the annual gas consumption was 11,049,939 ekWh resulting in a total site energy intensity of 55.4 ekWh/ft². This compares well to the average energy intensity of 61.6 ekWh/ft² based on a survey of 48 acute care hospitals. Therefore, Ross Memorial Hospital has already made progress (compared to peers) related to energy management. Total GHG emissions equate to 2,803.6 tonnes of CO₂.

Exhibit 1 Baseline Energy Consumption

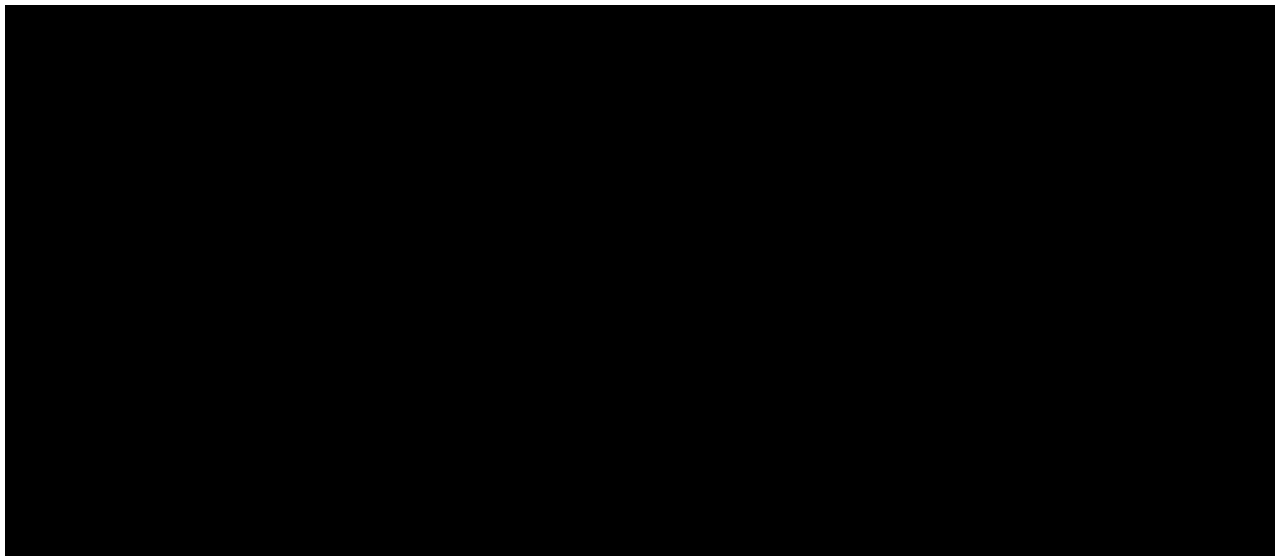


Exhibit 1 shows the actual monthly consumption of Electricity and Natural Gas for the 2012 **calendar** base year. This information was obtained directly from the hospital's utility bills. The additional columns break down the consumption into Intensity and GHG Emissions. The bottom row shows the totals for the base year.



Exhibit 2 Baseline Electricity Use Profile

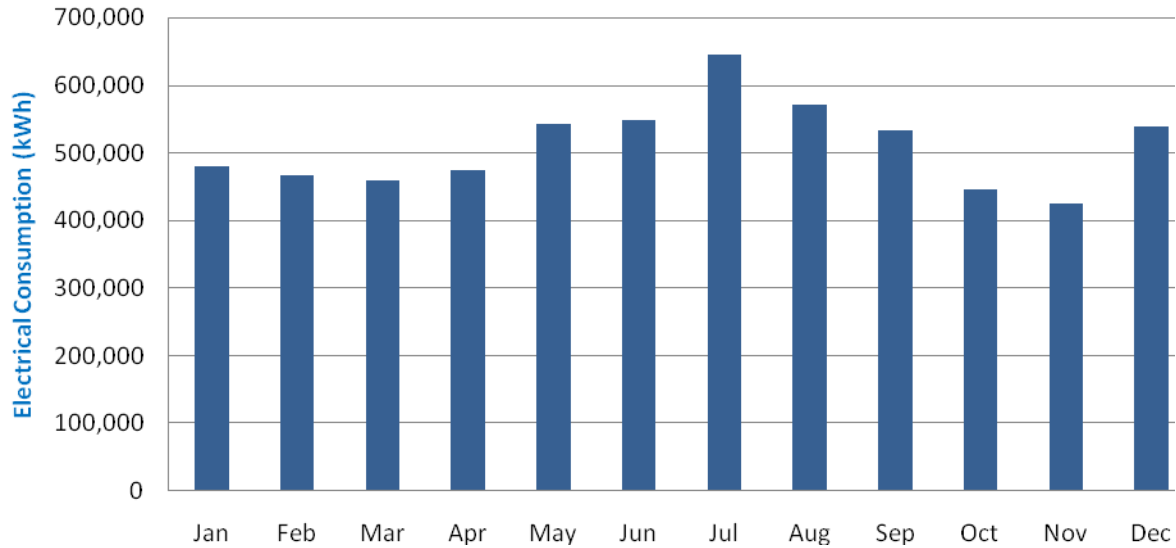


Exhibit 2 shows the monthly Electricity use profile. The majority of the electricity consumption is baseload with a summer peak due to cooling, and a smaller winter extra that is the result of increased pumping energy associated with the heating system and some electric reheat for rooms equipped with this.

Exhibit 3 Baseline Natural Gas Use Profile

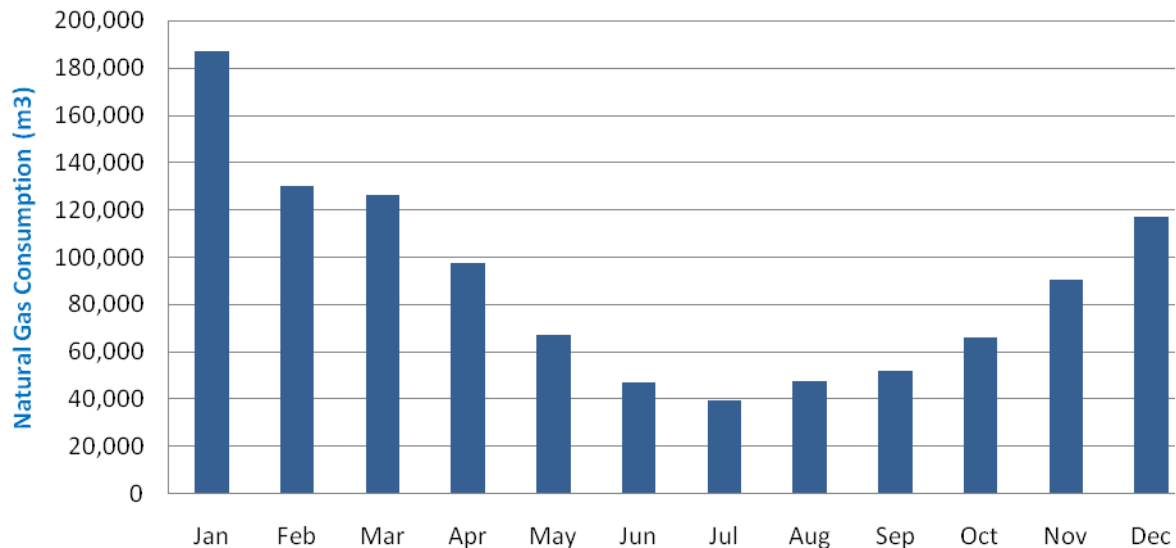


Exhibit 3 shows the monthly natural gas use profile. Less than half of the monthly gas consumption is baseload with a predictable winter increase that corresponds well with the heating demand.



Energy Saving Measures

Energy and Environmental Stewardship has been an ongoing commitment for Ross Memorial Hospital for many years. Each year, the hospital has identified projects and programs to save energy and reduce waste and approval to proceed was based on the economic feasibility. Recently, a major infrastructure and energy project upgrade was completed in 2013/14. The actual results of these retrofits and upgrades will become known over the next few years as the energy consumption data is gathered and compared to the baselines. One of the goals of this plan is to identify over time what the actual savings are that these upgrades will produce. This information will result in an improved understanding of the new systems allowing us to make further changes and improvements.

Future Energy Projects for Review

Listed below are measures that are in consideration for review and life cycle analysis over the next 5 years:

- A survey of insulation on steam and chilled water lines, reinsulated as required
- Ongoing steam trap surveys and repairs on steam lines
- Re-commissioning of Air Handlers and rebalancing of Air Flows
- Optimization of Building Automation System automatic controls
- Optimization of heating/cooling/humidity systems throughout facility
- Survey to determine optimum lighting levels throughout facility
- Upgrade of low pressure boilers
- Feasibility of installing heat reclaim chillers
- Main entrance doors redesigned for draft issues
- Window replacement in 1960 era East wing.

Over the years, many energy savings measures that were reviewed were discounted due to feasibility, high costs, poor ROI or immature technology. As technology advances and improvements are made, some of these earlier discounted measures can be revisited. The measures that are in consideration for revisiting over the next five years are the following:

- Co-generation
- Roof mounted Solar panels and or Solar walls
- LED lighting for external parking lot, building lights, bollard lighting.
- Internal lighting retrofit with new LED fluorescent style lamps