Holland Bloorview
Kids Rehabilitation Hospital

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STRATEGIC ENERGY MANAGEMENT PLAN (SEMP) FOR 2013 TO 2018

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Introduction

When Holland Bloorview opened in February 2006, it was recognized by the International Academy for Design and Health. Many “green” features are present in this state-of-the art facility. Some of these features include the 52kW solar panel installation for green energy production; a 157,000 litre collection system to collect roof rainwater and re-use it for irrigation; low “e’ windows; variable speed drives for all fans and pumps and a low voltage lighting control system.
The facility was truly was designed with conservation as one its goals.

The overall purpose of Holland Bloorview Kids Rehabilitation Hospital’s energy management plan and policies is to promote good stewardship of our environment and community resources. In keeping with our core values of Efficiency and Financial Responsibility, Holland Bloorview Kids Rehabilitation Hospital’s energy management program will continue to assist in the reduction of operating costs and enable us to provide a high level of quality service to a greater number of children in the community. The Strategic Energy Management Plan places Holland Bloorview Kids Rehabilitation Hospital in compliance with Ontario Regulation 397/11.

- Utility and energy related costs are a significant part of overall operating costs
    - Utility costs in 2013 were approximately $1.27 million dollars annually.
    - The Hospital’s average Energy Use Index (EUI) was 2.09492 GJ/m2 or 53.86 ekWh/ft^2
    - Facility related O&M costs are $1.36 million dollars annually
    - Facility capital project costs are projected at $1.5 million over 5 years

- With energy management continuing as an integral part of business decisions, Holland Bloorview Kids Rehabilitation Hospital can expect the following:
    - 1 to 2 % reduction in energy use
    - $20,000 annually in savings to help offset expected cost increases for utilities

- Planning for upgrading activity associated with energy management began in 2009.
- Recent activity has included a variety of initiatives within the facility as well as on the entire property. Lighting retrofits have had the largest focus and impact on net savings to our energy spending.
- The Facility Management team takes great pride in the operation of the building. Along with the maintaining the safety and comfort of our clients, families and staff, improving the energy efficiency in all areas of operations is our mandate.

Lighting Retrofits

A re-lamping project in early 2010 enabled the Team to install lower wattage T8 lamps, replace MR 16's with LED lamps, as well as reduce the wattage of other fixtures. Overall, more than 10,000 lamps were replaced and recycled and a rebate of nearly $23,000 was received.
Additional re-lamping and light fixture replacements took place in 2012 and 2013. These projects focused on the cafeteria, our two-storey ceilings in the lobbies and gym, external lighting in entrance canopies, sidewalk up-lighting and the Receiving ceiling area. The incentive granted for these projects was over $9,000.

Solar Panel Additions

In keeping with our reputation as a leading green healthcare institution, the Building Services Department installed a sleek array of 60 Mitsubishi Photovoltaic modules on our West roof top in October 2010. These panels added an additional 13 kW of solar power capacity to our system, increasing our system's total by 33%.

Expanding the scope

While the lighting retrofit project was underway, all aspects of the HVAC systems were being assessed in-house. Utilizing the current Metasys building automation system, the control schedules and operating parameters were in place for the natural gas hot water boilers, supply & return fans, chillers, cooling towers, pumps and lighting. By analyzing each component based on the time of day use, Building Services was able to improve the quality of the system's operation. This lead to energy savings, increased satisfaction of building occupants and reduced maintenance calls.

Specific improvements

As a result of the analysis of the various systems, number of specific projects were undertaken to improve the facility's infrastructure:

- Ultra-violet light systems were installed on the two swimming pools in order to provide another level of disinfection that works above and beyond traditional chemical methods. This has reduced the need for routine water shocking and has reduced chemical use
- A linkage less fuel/air ratio control system was installed to replace each boiler's original burner controls. This enabled the boilers to use natural gas more efficiently and burn less fuel. The payback is one year and the estimated savings are approaching a target of 10% ($25,000). Enbridge Gas Distribution's Commercial Energy Efficiency program supported this project with a rebate of $3,672.
- To improve the heating and cooling efficiency of facility's supply air systems, Facility Management teamed with technicians from Johnson Controls. The 16 air handling unit's supply and exhaust air volumes were measured and then recalibrated to achieve maximum energy usage for the heating and cooling seasons. Adjustments were made to improve efficiency by reducing the excess air intake and the volume of conditioned air being exhausted.The overall volume of air required to be heated/cooled was reduced by 11,600 litres/second. This equates to an estimated savings of 1,060 GJ or approx. $7,300 per year.
- Water consumption is closely monitored by the Building Services Department. One of the largest uses of water is during the cooling season for the cooling towers. The department monitors the building requirements outside of the daytime business schedule and adjusts the chiller schedules through the building automation system. The changes made to these schedules have resulted with reductions in:
    - Hydro consumption
    - Treated water discharged to the sanitary sewer system
    - Water lost to evaporation in cooling towers
    - Water treatment chemicals required for the cooling system
- The recreational pool and a therapy pool each require filtration/circulation systems to operate 24/7. Variable frequency drives were installed on these systems to reduce hydro consumption
- An additional heat exchanger was added to the 30 ton chiller condenser water. This additional heat is used to pre-heat the domestic hot water system.
- Variable frequency drives were installed for the Pharmacy cytotoxic room and the main electrical vault room exhaust fans
- 60 Photovoltaic modules were added in a new solar panel array on the west roof. Analysis of our original inverter capacity and roof space identified available potential. Facility Management took advantage of the opportunity to increase our solar by 33%. Our system now

annually returns a $40,000 rebate through the OPA Standard Offer Program to the hospital.

Results through 2013

- Since the hydro-savings projects were started in 2009, our efforts have resulted in an average reduction in consumption at 1.5% per year, through 2013.
- Holland Bloorview was recently chosen as 1 of 5 finalists for OHA's 2013 Green Hospital Scorecard Water Conservation and Protection Award for the various systems, fixtures and staff efforts within the facility.

- Rainwater collected from the roof areas, balconies and from the north side of the building in an underground tank with a capacity of 114,000 litres. The water is pumped into the facility's underground irrigation system for use in the perennial beds and turf areas. The system will continue to help save costs on water/sewer charges and assist in our water conservation stewardship for the healthcare system.

2014 and Beyond

While the facility is no longer new, the work accomplished by the Building Services Team has kept the original goal of energy conservation as important today as it was during design and construction.

Facility Management is proud of the energy savings efforts achieved in 2013 and will continue to seek new opportunities in 2014.

- Two audits are planned to help identify further energy reductions the will help to reduce the facility's environmental footprint and increase overall energy savings.

- 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.

Energy Management Program Vision

Our Mission at Holland Bloorview Kids Rehabilitation Hospital is to provide specialized programs and clinical care for children and youth with rehabilitation and complex care needs to enable them to participate in life to the fullest.
We are Canada's leading pediatric rehabilitation teaching hospital, dedicated to being at the forefront of clinical care, research and education. As a key resource for Ontario, we are committed to partnerships to build clinical, academic and community capacity to enhance the quality of life for children with rehabilitation and complex care needs and their families.
Our Vision is a World of Possibility.
We strive to operate our facility in an environmentally responsible manner through the efficient use of utilities. We are effectively serving our clients and the community by redirecting energy savings and limited resources towards client care and effectively meeting increasing service expectations.

Guiding Principles for Strategic Energy Management

Holland Bloorview Kids Rehabilitation Hospital's energy management will be guided by these principles:

Taking A Strategic Approach: Holland Bloorview Kids Rehabilitation Hospital actively manages energy costs by implementing opportunities as they are identified. By acting strategically, Holland Bloorview Kids Rehabilitation Hospital will continue to improve its energy-related performance. Energy management is internalized by the Facility Management team into our organization's every-day decision-making, policies, and operating procedures. This will help assure substantial and long-lasting reductions in energy use throughout the hospital.

Supporting Mission-Critical Goals: Strategic energy management directly supports Holland Bloorview Kids Rehabilitation Hospital's mission-critical goals of caring for the environment and the community; optimizing the healing and working environment; improving the hospital's financial bottom line by reducing unnecessary energy costs; optimizing the capacity of existing energy systems to meet current and expanding operational needs. The impacts of Holland Bloorview Kids Rehabilitation Hospital energy management efforts on those goals is tracked and reported. Any usage out of the ordinary is investigated and action is taken where necessary.

Pursuing Long-Term Change to Core Business Practices: The core of a strategic approach is the consistent incorporation of energy management into our hospital's core practices and decision making and planning. 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. Senior Management at Holland Bloorview Kids Rehabilitation Hospital works with Facility Management to ensure that adequate organizational support and resources are provided to maximize the benefits of energy management to the hospital. Energy Management will be integrated into the Facility Management's strategic planning and capital budgeting processes.

Obtaining Solid Economic Returns: Energy management investments will yield measurable economic returns that meet Holland Bloorview Kids Rehabilitation Hospital's accepted Return on Investment requirements. The hospital's capital budgeting process will be used for all major energy improvements. Holland Bloorview Kids Rehabilitation Hospital will apply consistent financial analysis methods that consider life-cycle to reduce total cost of facility ownership and operation.

Using Available Resources and Assistance: Holland Bloorview Kids Rehabilitation Hospital will use national, regional, and local sources of strategic,

technical, and financial assistance to help achieve our energy management goals. These include utilities, government, suppliers and manufacturers.

The Business Case for Strategic Energy Management

Below are the central business arguments for Holland Bloorview Kids Rehabilitation Hospital's pursuit of strategic energy management. Section VI 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 aggressive 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 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.

Improved Financial Health and Operating Cost Reduction

Strategic energy management presents a highly leveraged opportunity to reduce operating costs and positively impact Holland Bloorview Kids Rehabilitation Hospital's bottom line. Dollars of operating cost savings directly improve the operating margin. Holland Bloorview Kids Rehabilitation Hospital's current operating margin is 1% while spending on energy amounts to 2% of revenues. 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

Holland Bloorview Kids Rehabilitation Hospital opened in 2006 as a state of the art facility. As noted earlier, many energy-efficient systems were designed into the facility. Over the last 8 years, many additional energy reducing initiatives were implemented. If energy management considerations are integral to relevant business practices, policies, procedures and decision-making processes, Holland Bloorview Kids Rehabilitation Hospital's energy and utility related consumption will continue to be reduced between 1 to 2 % per year over the next five year period. Assuming commodity costs remain stable, these savings can be utilized for other needs within the facility.

Based on 2014 utility rates, this will result in approximately $20,000 in annual value to the bottom line based, or a total $100,000 over a 5-year period. Continued integration of energy management into organizational decision making and business practices will continue to produce value annually for a much longer period of time.

Holland Bloorview Kids Rehabilitation Hospital will continue to invest capital funding into the newest proven technology to assist the Facility Management team's pursuit of energy savings. Government funding has been, and will continue to be, integral to our planning. Rebates received for proven savings will be re-invested in future projects.

Energy Management Goals

- SEMP Approval, Resources to Implement
- Implement Financial Practices and Decision Making Processes; Establish Funding Resources
- Implement Strategic Energy Management Practices
    - Purchasing/Procurement Procedures and Specifications
    - Enhanced Design & Construction Practices
    - Enhanced Facility Operating Practices
    - Cost-Effective Facility Upgrades
    - Active Commodity Management
- Monitoring, Track, & Improve Performance

Goal: SEMP Approval, Resources to Implement

- Executive approval from VP Corporate Services for all initiatives
- Support from key staff (financial management, purchasing/procurement, construction, building operations, etc.).
- Creation of mechanisms/processes to make resources available.
- Continued monitoring of 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 lowest cost.
    - Internal rate of return (IRR) as defined by VP Corporate Services qualifies for “pre-approval.”
- Decisions about energy management investments will be continue to be part of Holland Bloorview Kids Rehabilitation Hospital’s high-level, long range process of budgeting for capital and operations.

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.

Goal: Implement Enhanced Design & Construction (D&C) Practices

- Implement improved new construction practices in all projects that specify early team collaboration and “integrated design” (ID).

  - Integrated design required for funding.
  - 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 owner’s 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 energy consumption targets for each building
  - 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.

Goal: Improve Building Operating Performance

- Equipment tune-up and continued improvements in operations and maintenance (O&M) as identified by energy audits, 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 1% per year over 8 years.
  - Reduce the system-wide EUI from 2.09492 ekWh/ft^2 to 1.990174 ekWh/ft^2 by 2019. The EUI may vary due to variances in temperature, service hours and IT equipment intensity.
  - Reduce hydro consumption by 76,000 kWh per year equivalent to yearly savings of $9,880 at 2013 rates of approximately $0.13/kWh
- Improve ENERGYSTAR rating as applicable

Goal: 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. Utilize standard RFP documents, contract terms, and reporting standards as provided by Plexxus.

Goal: Actively Manage Energy Commodity

- Minimize utility costs and exposure to market risks. Utility costs include natural gas, electricity, water, and sewer. Continue use group purchasing for electricity and natural gas to attain the best possible pricing for supply and delivery.
- Participate in the energy/utility regulatory process.

Goal: Monitor, Track, and Reward Progress

- Track progress on SEMP
- Track energy reductions quarterly and report annually
- Reward staff involved with energy reduction projects for successes.

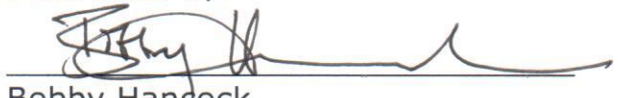
BASELINE ENERGY USE

The baseline energy profile has been selected using the most recent calendar year with available utility data, which is 2013.
MOE reporting is done on an annual basis for hydro & natural gas consumption.

KEY OBSERVATIONS:

- The total utility costs for calendar year 2013 were;
  Natural Gas: $251,863; Hydro: $941,159; Water & Sewer: $81,356
- Hydro consumption was reduced 3.3 % or 266,890 kWh
- In spite of the extremely long & excessively cold winter, natural gas usage was only up 6 % or 57,413 m3. Boiler efficiency upgrades in 2012 were very timely for the winter of 2013.
- Revenue from Toronto Hydro for our 52 kWh solar installation rebate under the Ontario Power Authority's FIT Program was $41,187. Our system consists of a 39 kW capacity system on our east roof and a 13 kW capacity system on our west roof. Together they produced 58,719 kWh of hydro. This hydro is used on-site.
- A 5 kW solar array is in operation on our exterior storage building. The small amount of hydro produced is used on-site; it is not part of the FIT program as it is not metered.
- Sewer rebate from the city of Toronto for consumed water evaporated for cooling/steam processes was 25.7% or approximately $12,300.
- The facility has two swimming pools that require circulation & heating/cooling 24/7
- The 5th floor has ten motel units for parent rental; coin operated laundry and main kitchen available 24/7. Units require 24/7 ventilation & heating for 5 west.

Submitted by:



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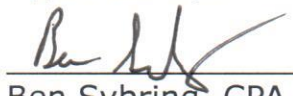

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