BLANCHE RIVER HEALTH
SANTÉ RIVIÈRE BLANCHE

Blanche River Health Kirkland Lake Site

5-Year Corporate Energy Conservation and Demand Management Plan

July 2019

Prepared in co-operation with:

VIP energy services, inc.

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Our Commitment to Energy Conservation

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July 1, 2019

Sean Conroy
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In the spirit of reducing the impact of rising energy costs, and in response to current regulatory requirements, Kirkland and District Hospital has developed a new 5-Year Energy Conservation and Demand Management (ECDM) Plan. This Plan outlines our progress against our original 2014 Plan as well as our planned conservation actions forward to 2023. This new plan and its related strategies and initiatives is supported by senior hospital management.

This new Energy Conservation and Demand Energy Management Plan (ECDM Plan) has been updated in response to Ontario Regulation 507/18 made under the Conservation and Energy Efficiency section of the Electricity Act, 1998, requiring all public agencies to prepare, publish and implement an ECDM Plan. Our ECDM Plan fulfils the reporting requirements of the above regulations and provides a framework to support continued energy and sustainability initiatives within the built environment, operations and programs. The Plan further identifies opportunities for continued energy conservation measures and sustainability initiatives to build on our existing plans and conservation efforts. Implementation of all initiatives is subject to future funding availability and budget approvals.

Our ECDM Management Plan has also been developed to address the fiscal, societal, and environmental costs and risks associated with energy consumption. Appropriate energy management will permit Kirkland and District Hospital to display leadership, improve the delivery of services, and enhance the overall quality of care.

Warmest Regards,

Sean Conroy
VP Corporate Service and CFO

Working Together To Meet YOUR Health Care Needs

Introduction

Background

The Blanche River Health's Energy Conservation and Demand Management (ECDM) Plan was developed in response to Ontario Regulation 507/18 requiring all public sector organizations to complete an update to their original 2014 ECDM Plan by July 1, 2019. In response to this regulatory requirement, as well as rising energy costs, Blanche River Health has developed this Energy Conservation and Demand Management (ECDM) Plan. This comprehensive Plan is an effective method of identifying energy conservation opportunities, selectively implementing the best projects and then measuring the results. The Plan has been developed to protect the interests of our patients and families and ensure that the Hospital obtains the best possible value from our operating budgets. In addition to meeting our regulatory obligations, the Hospital believes that a strong commitment to energy conservation and a reduction of energy use is demonstrated evidence of our belief in becoming a more sustainable community while operating in a cost-effective manner that respects the value of taxpayer dollars.

Purpose of the Plan

This 5-Year Corporate Energy Conservation and Demand Management Plan is designed to guide Blanche River Health(BRH) – Kirkland Lake Site towards a more energy-efficient future. The policies, practices and energy conservation measures identified illustrate the importance the Hospital places on acting responsibly towards energy consumption through the wise use of resources in Hospital operations.

To enhance our understanding of energy use and return on investment through conservation, this document contains a review of the results of measures implemented since the creation of the original plan, issued on July 1, 2014. Since then, the Hospital has initiated several substantial energy projects, yielding significant savings results including:

- Building Envelope and Roof replacements/upgrades
- LED lighting retrofits
- HVAC upgrades/retrofits
- Operations equipment upgrades (throughout Plan period)

The savings from these efforts are elaborated on in the Energy Conservation Project Successes section of this plan document.

The wise and efficient use of energy are two of the best options for meeting energy demands. They also provide many other environmental, economic and social benefits, including reducing greenhouse gas (GHG) emissions, cost avoidance and savings.

Following the path of our previous ECDM Plan, this document is a continuation of a process involving the:

- Integration of establishing and evaluating a baseline for performance to be measured against;
- Reviewing the effectiveness of previous conservation efforts while setting future performance goals and objectives;
- Continuous improvement through identification of energy conservation potential;
- Strategic alignment of improvement measure implementation and fiscal constraints; and,
- Evaluation, measurement and communication of results achieved.

The following report summarizes the significant efforts applied by the BRH- Kirkland Lake site to create a Plan that can be implemented responsibly, over time, to create lasting results. The Plan takes advantage of internal expertise as well as all available external financial incentives and rebates currently being offered to support the implementation of energy savings ideas. The current energy picture for BRH-Kirkland Lake Site and our future Vision, Goals and Objectives as shown in the Corporate Energy Conservation and Management Policy, are outlined. Our strategic focus areas are discussed in detail and our 5-year Action Plan is also laid out.

1.0 Historic Energy Performance

Historical Energy Usage

Effectively managing energy requires the creation of an energy monitoring strategy. Establishing an accurate energy baseline is an essential first step in this process. This baseline assists with energy conservation and greenhouse gas reduction target setting, energy procurement and budgeting, bill verification, energy awareness, and the selection and assessment of potential energy projects. BRH- Kirkland Lake Site, similar to many other hospitals, relies on utility bills to establish this energy baseline.

To evaluate the effectiveness of the Hospital's previous energy conservation measures, the year 2013 was chosen as the base year for measurement; this aligns with the Ministry of Energy's Regulation 507/18 requirements for reporting. Overall, the Hospital's consumption in 2013 was 3.9 million kWh of electricity and 1.2 million m^3 of natural gas. This usage equates to spending $424,000 for electricity and $295,000 for natural gas for the year (2013).

For comparative purposes, the raw energy consumption breakdowns by month since the original baseline for the Hospital are as follows:

Figure 1-1 – Electricity Use (2013 – 2018)

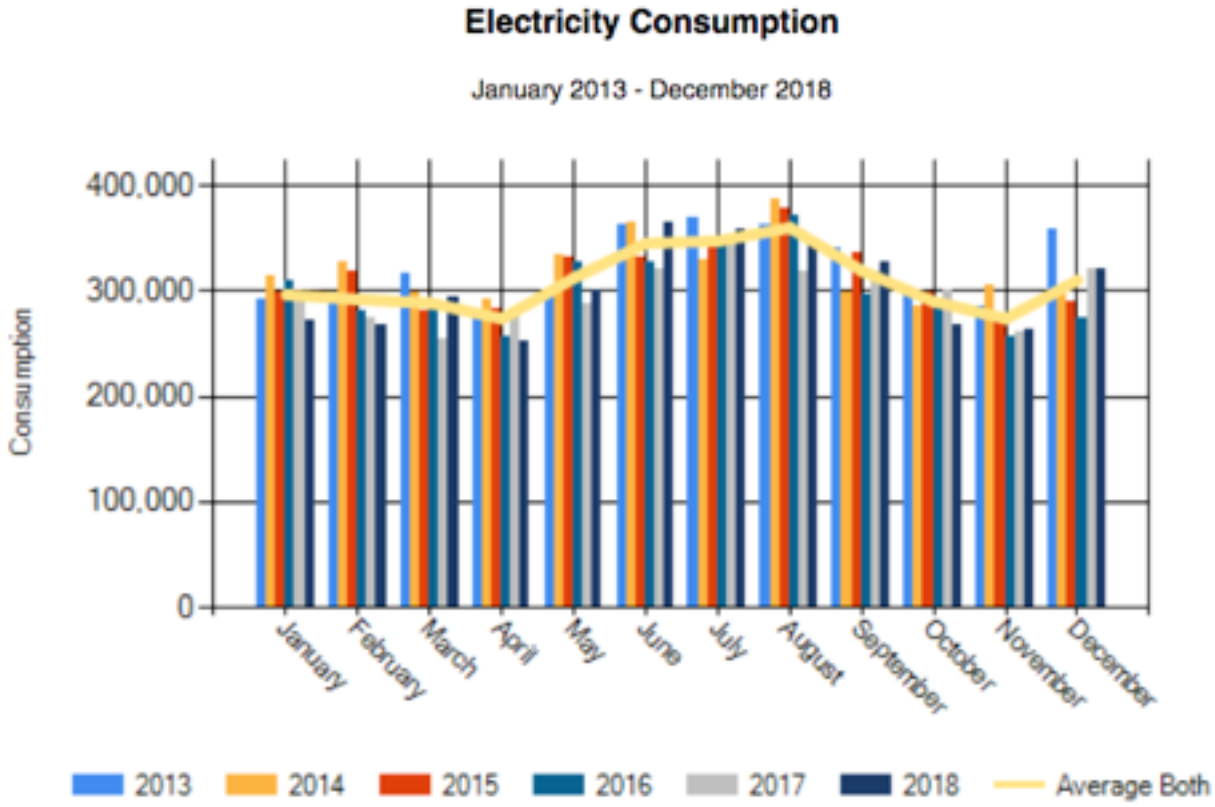
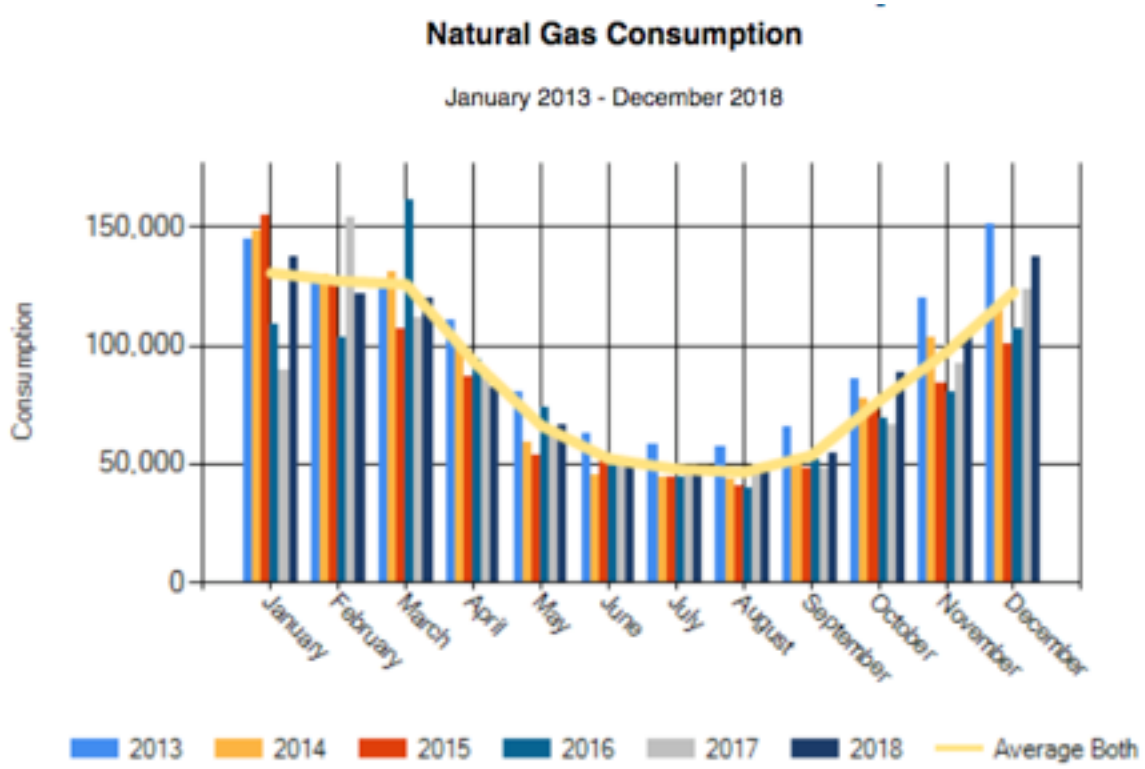


Figure 1-2 – Natural Gas Use (2013-2018)

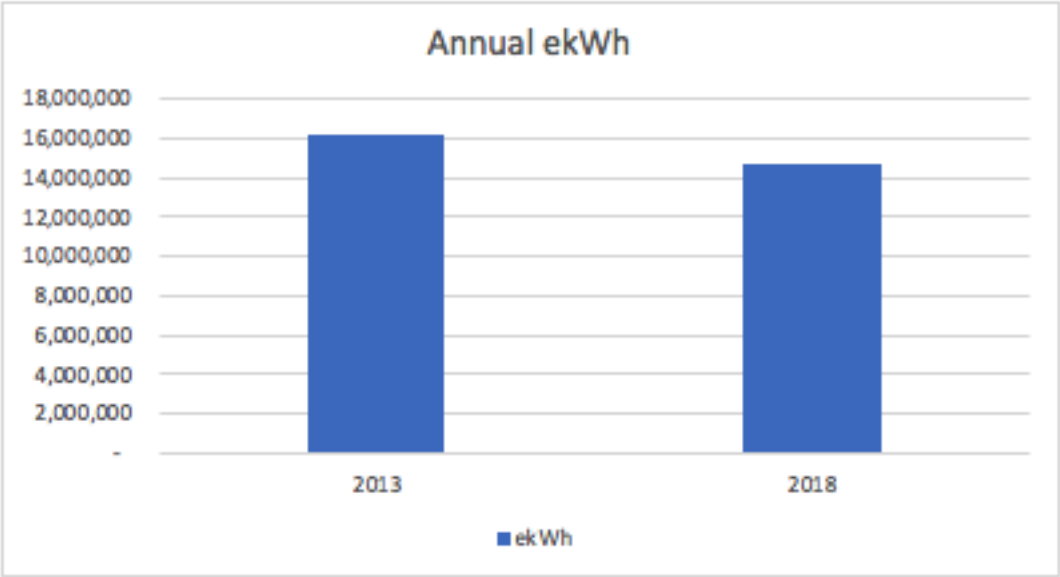


BRH- Kirkland Lake site Energy Baseline Analysis

The following analysis uses RETScreen analysis of consumption data for the base year (2013) forward. This type of review allows for an objective evaluation of conservation progress by removing the variables that can independently affect energy consumption and are largely out of the Hospital's control (i.e. weather, temperature, cooling or heating degree days).

In the original ECDM Plan, the Hospital set a target of a 3% reduction in energy consumption over the 5-year term of the Plan (2014-2019). The graph below illustrates that the Hospital not only met this target but exceeded it with an overall 9.5% reduction in ekWh over the 5-year period when compared to the original base year of 2013.

Figure 1-3 Energy Intensity (ekWh/m^2)



	2013	2018
ekWh	16,201,038	14,659,147
GAS (m3)	1,188,156	1,060,130
ELECTRICITY (kWh)	3,850,156	3,639,096

Energy Conservation Project Successes

Since the creation of the last 5-Year ECDM Plan, the Hospital has initiated significant investments in energy efficiency and energy-cost reduction. These projects include:

Facility-Related Projects Since 2014

Lighting:

- Emergency light and power systems retrofitted to LED

Building Envelope:

- 127 windows replaced with triple glaze, fibre glass frame. (2016)
- Roof replaced – increasing R-value as sections were replaced with 5” and 6” rigid insulation (total building completed 2014-15)
- HVAC and Controls:
- 2 new air conditioning units installed in new server room; units are monitored and climate controlled (in old server room cooling was supplied by a mix of portable floor units)
- New heating coil for F16 Fan
- Heater coil rebuilt for constant air temperature
- Phase II upgrade of BAS system (March 2019)

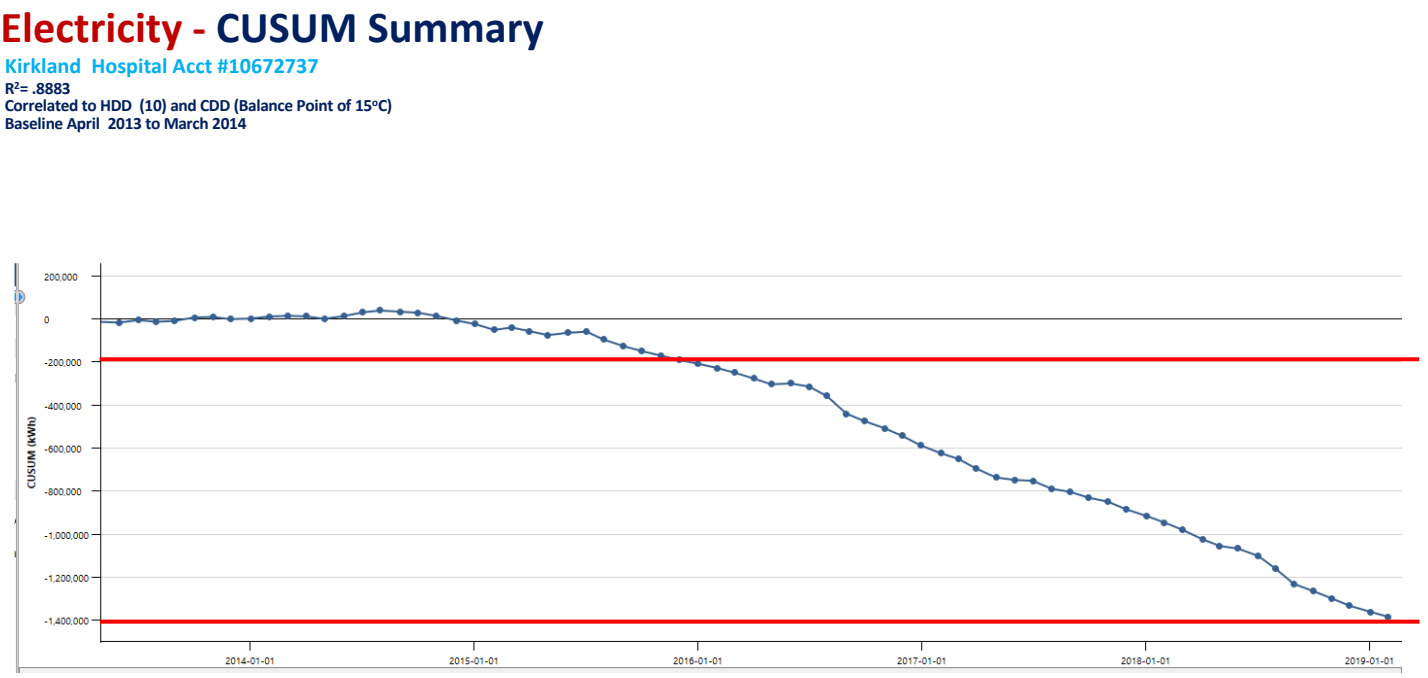
Equipment Upgrades:

- Total main electrical room replacement, including feeds from transformer
- Power factor study completed, improving from an average of 83% to 99%
- Bulk oxygen tank replacement, reducing energy usage by eliminating leaks and increasing tank size to fill every 6-8 weeks rather than monthly
- Bedside medical gases connector upgrade – approx. 185 connectors replaced to eliminate leaking
- 25 new LCD patient TVs
- 2 new UNIMAC 120LB natural gas industrial dryers
- 1 new UNIMAC 100LB washer with steam kit
- Coil cleaning kit for steam coils
- 2 new steam tables, 4 wells, converted from steam to natural gas
- 1 freezer – Plasma 23.3 CU FT
- 1 refrigerator 72 CF, glass doors
- 1 new Aplio 500 ultrasound machine
- 1 new portable x-ray machine
- Branch wiring upgrades – MCCs on mechanical floor replaced
- 1 under counter vaccine refrigerator replaced
- Building monitoring upgrades (Phase I)
- Replaced chemohood exhaust motor – from constant to variable speed direct drive with secondary redundancy
- 1 new hot water Leslie heater
- Hot and cold water line replacement on mechanical floor; hot water lines now encapsulated with insulation
- Completed replacement of fire alarm system; new system has all new inline mac address detectors and enunciators
- March 2019 replaced one xray suite with an all-digital system including new transformer and LED lighting

Energy Consumption Baseline

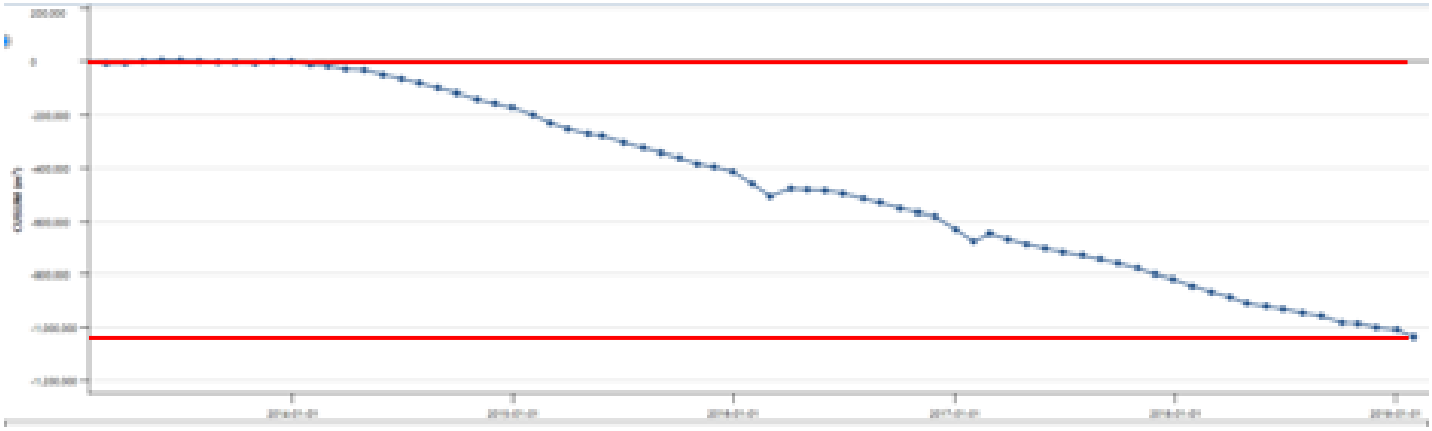
To fully understand the impact of energy conservation projects on the overall BRH-Kirkland Lake site energy consumption, it is necessary to establish a normalized energy baseline. Creating a baseline illustrates the impact that temperature and weather fluctuations have in determining the true net impact of energy conservation measures. For the purposes of this ECDM Plan, we have used 2013 as the baseline to highlight the net positive influence that conservation has had on overall Hospital energy use since the 2014 ECDM Plan.

Figure 1-4 Electricity Baseline CUSUM Analysis



A baseline was created for BRH-Kirkland Lake site in order to determine how the facility was performing over the period of the original ECDM Plan. A number of retrofits and upgrades have been completed at this facility, resulting in significant energy savings over the predicted consumption baseline pattern. In all, the Hospital reduced electricity consumption by almost 1.4 million kWh over the 5-year period. This is illustrated in the area between the two red lines.

Figure 1-5 Natural Gas Baseline CUSUM Analysis



Similar to electricity, significant reductions in natural gas usage were also achieved at this facility. Over the five-year period, a total savings of over 1,000,000 m^3 of natural gas was realized.

This type of analysis is a key element in tracking the realized savings of energy projects completed by the Hospital. By establishing a baseline and then monitoring it using a CUSUM analysis, the Hospital is assured that expected savings are achieved and maintained.

2.0 Energy Conservation and Management Policy

Our Commitment

BRH-Kirkland Lake site is committed to allocating the resources necessary to develop and implement a strategic Energy Conservation and Demand Management (ECDM) Plan to reduce energy consumption and its related environmental impact. As an organization, we value the notion of efficient operations and creating a more sustainable hospital.

We are committed to managing energy responsibly and will use energy efficiency practices throughout our facilities, operations and equipment wherever it is cost effective to do so.

Our Vision

BRH-Kirkland Lake site will endeavour to minimize energy consumption, related costs, and carbon emissions by continuously improving its energy management practices without compromising the level of service delivery to the Hospital community.

Our Goals and Objectives

As part of our 2019 ECDM Plan, the Hospital created several strategic avenues to achieve specific goals and targets with regards to energy management. We have re-examined our past objectives and are re-committing to this updated version.

1. Reduce energy consumption in the Hospital by 3% by 2024 compared to our revised base year (2018). This is in addition to the 9.5% reduction the Hospital achieved during its last plan cycle.

2. Enhance our culture of conservation within the Hospital through training and outreach to staff and patients. All employees will have the appropriate knowledge and training to be empowered to reduce energy consumption.

3. Expand upon our comprehensive corporate energy management practices by enhancing key existing business practices to include energy efficiency standards and energy management best practices.

4. Expand our monitoring and tracking program for energy use by providing access to our energy management system to make energy consumption visible to everyone in the hospital and support facility/management decision making.

5. Deliver energy cost savings through the identification and implementation of processes, programs and projects that will reduce energy consumption.
    - Re-assess and benchmark the top energy consuming facilities in the Hospital (2019)

- Review the potential previously identified energy savings opportunities through review of past energy audits and plan to renew energy audits and analysis of the capital asset renewal program (Ongoing)
- Review and/or enhance standard operating and maintenance procedures to include energy conservation best practices (Ongoing)
- Seek funding for energy-related projects from various sources to enhance the payback and reduce implementation costs. (Ongoing)

Strategic Action Plan

To achieve our new ECDM Plan, the Hospital will employ the following strategies designed to ensure a positive outcome over the next 5 years. These key strategies support the delivery of our Goals and Objectives.

Strategy 1. Corporate Practices

Develop corporate policies and practices that support the energy conservation effort and show leadership and commitment within the Hospital.

- Energy Management Team: Roles, Responsibilities and Accountability
- Energy Procurement

Strategy 2. Education, Awareness & Outreach

Provide the guidance, leadership and framework necessary to empower employees and develop a culture of conservation.

- Energy Skills Training Program
- Energy Awareness Training
- Outreach, Engagement and Recognition Programs
- Feedback System for Employee Suggestions
- Employee Brainstorming Sessions

Strategy 3. Energy Conservation Action Plan and Energy Information Management

Continually identify and deliver energy conservation processes, programs and projects in all areas of the Hospital. Demonstrate sound operating and maintenance practices to complement the energy efficiencies implemented through the capital asset renewal program. Employ a robust Energy Information Management System to ensure that all conservation activities are measured and verified to ensure the Hospital receives and maintains specified energy reductions and savings.

Energy Conservation Action Plan

- Key facility energy audits and re/retro-commissioning studies (currently on-going)
- Asset renewal plan and energy conservation project delivery
- Standard facility operations procedure review

Energy Information Management

- Maintenance of the energy monitoring and reporting system (electricity, natural gas)

- Regular Energy Use Review presentations for the accountable staff and energy users
- Energy bill verification and rate optimization
- Reporting requirements for Regulation 507/18 (formerly 397/11)
- Consistent update and review of key performance indicators (KPIs) / Benchmarking
- Standardize and implement project measurement and verification

3.0 STRATEGY 1: Energy Management Corporate Practices

BRH-Kirkland Lake site has implemented essential corporate practices, including key personnel deployment, to ensure a strong focus on energy management and savings. These efforts remain a key component of our renewed ECDM Plan.

The Energy Management Team: Roles and Responsibilities

Energy Leader: Director of Facilities

The Energy Leader is ultimately responsible for creating budgets, securing spending authority and resources for the program. This role is responsible for setting and/or legitimizing the program's high-level goals and objectives, keeping track of major project activities and approving resources and funding for the team and its approved projects.

The Energy Leader has direct knowledge of the Hospital's major energy-using systems and is responsible for developing and maintaining the focus for the Energy Management Team. This role also creates the program vision, coordinates meetings, sets agendas, and delegates and manages tasks related to the Energy Management Team and will help the program maintain momentum, particularly when barriers arise.

Energy Champion: Building Services Team Lead

The Energy Champion has direct knowledge of the Hospital's major energy-using systems and is responsible for ensuring that the monitoring and tracking systems for energy are accurate, up-to-date and available for use by Hospital employees.

The Energy Champion should have a technical background and is responsible for supporting and reporting on the technical aspects of the energy projects. This role may also lead energy conservation projects as the project manager.

Actions: Continue to seek cross-departmental membership and support for the Energy Management Team. Continue to meet to discuss the Energy Management Program to ensure implementation of new savings ideas as well as maintain the positive momentum built over the past 5 years.

Energy Procurement

The Hospital continues to utilize the natural gas procurement service provided by ECNG. This program provides options for fixed-price energy procurement services permitting the Hospital to maintain predictable natural gas commodity costs. The program also permits the Hospital to work together with a large number of other Hospitals throughout the province to create bulk-buying power to leverage aggregated energy purchasing opportunities.

Actions: Continue to review the procurement program annually and evaluate the Hospital's level of participation. Review potential alternative programs for merit and analyze the net result of participation annually.

4.0 STRATEGY 2: Education, Awareness and Outreach

The Hospital's Education, Awareness and Outreach program will assist with the maintenance of the Hospital culture of conservation. This will be achieved by raising the level of awareness, understanding and general knowledge amongst staff regarding energy spending, usage and conservation. The Hospital will utilize a successful combination of program engagement, direct awareness marketing and hands-on training to enhance our energy reduction efforts to support the achievement of our energy conservation goals and objectives. As well, energy will continue to be a regular agenda item at team meetings to solicit new ideas for reduction of energy use, promote continued awareness of the cost of energy and ensure that energy conservation remains a key consideration for all Hospital employees.

The Education, Awareness and Outreach program provides guidance, leadership and the framework to empower staff and foster our culture of conservation. The program informs the organization of current energy use, operational practices as well as improvement opportunities, while ensuring that all staff have an opportunity to remain informed of the Hospital's energy reduction efforts. This continued practice will foster the greatest possible impact of education and awareness.

The program is comprised of the following focus areas:

Energy Skills Training Program

The Energy Skills Training Program is a vehicle for employees to develop a general awareness and understanding of current energy use within the Hospital as well as skills to identify opportunities for improvement. The Training Program combines both general knowledge training and hands-on experience to gain maximum benefit.

Employee Brainstorming Sessions are an important part of the Energy Skills Training Program and are encouraged during the Energy Team meetings as a way of generating new ideas for energy conservation. As regular users and managers of Hospital departments, our employees are one of the our most valuable resources to both generate and implement our energy conservation strategies.

Outreach, Engagement, Recognition and Energy Awareness Training Program

The BRH-Kirkland Lake site will engage all users of the Hospital (both staff and patients) and recognizes that this is essential to the continued success of the energy management program. Our energy program will continue to employ a comprehensive approach to both engaging employees and recognizing the efforts of staff who provide important support and ideas.

The Energy Awareness Training Program has been developed to provide consistent energy conservation messaging throughout all departments using Community-Based Social Marketing (CBSM) techniques to engage all users of Hospital facilities. Specific methods used to date include conservation tips, eye-catching posters and

other relevant marketing tools. It is the intention of this plan to expand our ability and focus to enable the Hospital to become a 'clearinghouse' of information for local residents to discover ideas and incentives to improve their own energy usage practices.

Feedback System for Employee Suggestions

The BRH-Kirkland Lake site will employ a feedback system to encourage employees to provide input and ideas. The suggestions are submitted to members of the Energy Management Team in order to ensure prompt response. The Energy Team members can engage relevant employees to ensure that all suggestions are captured and explored.

Actions: Review available energy training opportunities both generally (i.e. all staff) and for specific departments. Establish and maintain at least annual Outreach and Engagement efforts to keep energy conservation 'top-of-mind' for staff and stakeholders.

5.0 STRATEGY 2: Education, Awareness and Outreach

Energy Conservation Action Plan

The Energy Conservation Action Plan (Appendix A) forms the blueprint for implementing energy conservation and cost saving measures. The Hospital has created a list of potential projects based on previous facility energy audits. The attached action plans have been created to guide this process based on a prioritized implementation schedule. All available incentives and funding sources will be considered to minimize the implementation cost of each measure. In addition to the measures shown, the Hospital anticipates that further energy audits, completed over the next 5 years, will augment the list of available energy conservation measures.

Appendix A shows a year-by-year implementation strategy and highlights the measures that will be completed as part of our on-going maintenance program.

In all, the measures will achieve:

Additional measures will be added as funding becomes available on an annual basis. In general terms, our actions are expected to yield the following results:

- Education, Awareness and Outreach: 1-2% annual energy savings
- On-going regular reviews of consumption and baselines: 0.5 to 1% annual energy savings
- Re/retro Commissioning: 2-7% annual energy savings within the facilities where it is implemented (estimated to be 1 to 2% overall potential total annual savings)

Actions: Maintain a schedule of energy audit and re-retro-commissioning renewals to ensure that our list of measures is up-to-date and that previous measures are still functional and providing savings. Perform periodic reviews of available incentives and stay up-to-date on potential sources of money to offset the implementation costs of the proposed future measures. Review the list of measures at least annually and update as necessary.

Energy Information Management

Energy Monitoring and Reporting System

The BRH-Kirkland Lake site has implemented a system for managing and reporting on its energy consumption (electricity and natural gas). The motivation for this effort is the notion that "you can't manage what you are not aware of". By making our energy usage visual, and keeping the information up-to-date, all personnel with access to the information can benefit from understanding the nature of energy use in their facilities, as well as the impact their actions or inactions have on the Hospital's overall energy cost and budgeting. This information is also key in evaluating the potential of new conservation projects as well as measuring the effectiveness of initiatives already taken.

Actions: Continue to gather and upload energy data into the Energy Information Management System regularly and analyze the data for patterns and savings opportunities.

Energy Management Presentations for Accountable Staff and Energy Users

To gain traction for the initiatives within this Plan and ensure that the Hospital reaches its stated reduction targets, it is imperative that information regarding energy usage and cost, as well as the Hospital's energy conservation plans and projects, are well understood and top of mind of everyone from front-line staff to senior management. This broad awareness will lead to additional buy-in and support for the Hospital's continued efforts to reduce its energy usage and spending.

Actions: Make energy a key topic at staff and senior management meetings as well as provide an update on energy use and conservation to senior management, at least annually.

Key Performance Indicators (KPI's) and Monitoring and Verification

To ensure momentum continues, and the Hospital receives value-for-money with regards to its energy conservation efforts, a rigorous program of establishing KPI's and then monitoring and verifying ongoing savings is an essential element of this Plan. By establishing agreed upon KPI's (as suggested in the table below) and then performing regular and frequent monitoring, not only will Hospital personnel be able to verify that savings expected from various projects is achieved, but that the savings continue for the duration of the project or retrofit's useful life. This practice will protect the Hospital's investments as well as provide transparency and support for successful savings initiatives

Actions: Review all conservation initiatives to understand the most appropriate monitoring and verification process. Review the project savings at pre-defined regular intervals and report outcomes to senior management.

Bill Verification and Rate Optimization

A consistent, periodic review of the Hospital's energy invoices is important to ensure that rates and recorded consumption values on energy bills is accurate. This ensures that the invoices presented by utilities are correct and are providing appropriate and relevant data to the Hospital's Energy Management Platforms.

Actions: Perform a rationalization check on monthly invoices and conduct at least annual detailed billing reviews to ensure accuracy.

Ongoing Ontario Regulation 507/18 Reporting

In addition to completing this Plan, the BRH-Kirkland Lake site is required to submit annual energy consumption and greenhouse gas emissions templates to the appropriate Ministry of Energy portal. Gathering and recording monthly energy invoices are necessary to complete these reports.

Actions: Complete all required regulatory reporting by July 1 of each year.

APPENDIX A: Energy Conservation Action Plan Measures Summary

Opportunity		Annual Energy Savings			Annual Cost Savings				Implementation			
ECM	Summary	Average Monthly Electricity Demand (kW)	Electricity Energy (kWh)	Natural gas (m^3)	Electricity Demand	Electricity Energy	Natural Gas	Total	ECM Cost	Potential Incentives	ECM Cost after Incentives	Simple Payback (Years)
ECM-1	Replace Interior Lighting with LED	43.3	165,550	0	$5,702	$20,337	$0	$26,039	$66,320	$17,210	$49,110	1.9
ECM -2	Exterior Lighting Upgrade	3.2	17,485	0	$0	$2,148	$0	$2,148	$9,841	$1,288	$8,553	4.0
ECM-3	VFD Retrofit for F3&F4 and F18&F19	0	139,788	0	$0	$17,172	$0	$17,172	$49,140	$13,979	$35,161	2.0
ECM-4	Ultrasonic Reverse Osmosis Humidifier	0	-67,060	120,235	$0	-$1,769	$20,440	$18,671	$170,000	$0	$170,000	9.1
ECM-5	Outside Air Damper Replacement	0	5,056	84,598	$0	$621	$14,382	$15,003	$30,129	$8,460	$21,670	1.4
ECM-6	Heating Coils in AHUs	0	0	34,964	$0	$0	$5,944	$5,944	$48,750	$3,496	$45,254	7.6
ECM -7	Ozone Laundry System	0	0	29,808	$0	$0	$5,067	$7,027	$52,149	$10,100	$42,049	6.0
ECM-8	Electricity Generator Running with Natural Gas	200.0	1,752,000	-464,550	$26,503	$215,226	-$78,974	$162,756	$250,344	$0	$250,344	1.5