

Five Year Conservation and Demand Management Plan 2014-2018

 **Deep River & District Hospital**

Prepared June 2014 by:





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1 EXECUTIVE SUMMARY

The Ontario Provincial Government has committed to help public agencies better understand and manage their energy consumption. As part of this commitment, **Ontario Regulation 397/11** under the **Green Energy Act 2009** requires public agencies, including municipalities, municipal service boards, school boards, universities, colleges and hospitals to report on their energy consumption and greenhouse gas (GHG) emissions annually beginning in 2013, and to develop and implement energy Conservation and Demand Management (CDM) Plans starting in 2014.

The purpose of the Deep River and District Hospital (DRDH) energy Conservation and Demand Management Plan is to develop a framework for Deep River and District Hospital to understand the historical impact of its operations on greenhouse gas (GHG) emissions, and to take action by setting GHG reduction targets. The first objective of this report was the development of an energy Conservation and Demand Management Plan that addressed the facets of energy consumption in the Hospital. This included the development of a GHG emissions inventory, benchmarking Deep River and District Hospital's existing energy intensity performance relative to other hospitals, identifying potential energy efficiency projects, and establishing a GHG emissions reduction target. This strategic approach to energy management ("energy Conservation and Demand Management Plan") supports Deep River and District Hospital's **2012-2015 Strategic Directions**.

Energy efficiency and the wise use of energy are two of the lowest cost options for meeting energy demands, while providing many other environmental, economic and social benefits, including reducing greenhouse gas (GHG) emissions, cost avoidance and savings. Along with the aforementioned benefits, energy efficiencies and the wise use of energy also promote local economic development opportunities, energy system reliability, improved energy supply security, and reduced price volatility.

There are a variety of low cost/no cost initiatives available to Deep River and District Hospital, which can jump-start energy consumption and dollar savings. Simple actions such as turning lights and appliances off, shutting off heaters in the summer, establishing efficient usage times, efficient production requirements, and many other actions can result in energy savings. Such actions, along with energy efficient capital and operating process improvements and project implementation, are key components which are outlined within the energy Conservation and Demand Management Plan (CDM Plan).

This CDM Plan is the culmination of a non-linear process involving the:

- Integration of establishing a baseline for performance to be measured against,
- Setting of future performance goals and objectives,
- Continuous improvement through identification of energy conservation potential,
- Strategic alignment of measure implementation and fiscal constraints, and

- Evaluation, measurement and communication of results achieved.

This CDM Plan contains three perspectives: historical, current and future. It looks at “what we have done”, “what we are doing”, and “what are we planning to do”.

2 KEY COMPONENTS

The Big Picture

Sustainability is a concept which meets the needs of the present without compromising the ability of future generations to meet their own needs. This is sometimes referred to as the “triple bottom line”.

- Environmental Sustainability: Managing the effects of human activity so that it does not permanently harm the natural environment.
- Economic Sustainability: Managing the financial transactions associated with human activities so that they can be sustained over the long term without incurring unacceptable human hardship.
- Social/Cultural Sustainability: Allowing human activity to proceed in such a way that social relationships between people and the many different cultures around the world are not adversely affected or irreversibly degraded.

An energy Conservation and Demand Management Plan is the sum of measures planned and carried out to achieve the objective of using the minimal possible energy while maintaining the comfort levels (in offices or dwellings) and production rates (in factories). It can be applied to any process or building where energy use is required. To make an efficient use of the energy and, as a consequence, to save it, the actions are focused on:

- Energy Conservation,
- Energy Recovery,
- Energy Substitution,
- Corporate Goals and Objectives, and
- Corporate Fiscal Management.

Analysis and Benchmarking

It is important to recognize the value of benchmarking and comparison as a starting point. By examining the Hospital’s current energy consumption patterns and comparing them with others, a better understanding of the opportunities and the pitfalls of energy conservation and sustainability planning as experienced by other public agencies is gained. This exposure, combined with the information gleaned from the energy audits, will allow DRDH to focus on strategies that have been proven successful elsewhere and can be tailored to the unique nature of the Hospital.

It is apparent that energy conservation is being considered and implemented in most Public Sectors across Ontario and Canada. As well, the insights gained through their experiences with energy conservation can be used as a springboard to further the DRDH’s sustainability strategies to encompass both operational and policy improvements. Many public agencies are taking their understanding of environmental issues

and conservation beyond energy consumption and recycling, by addressing the more complex issues of water management, heat island effect, and light pollution, to name a few.

Regulatory Requirements

Under Ontario Regulation 397/11 (Part of the **Green Energy Act**, 2009), all public sector agencies must now comply with mandatory reporting requirements. By 2013, all energy consumption at Hospital facilities will have to be recorded and submitted to the Ministry annually. By 2014, the requirements become more stringent as the Hospital will have to submit a CDM Plan, which encompasses measures taken to date with results, as well as a five year plan for further energy conservation measures to be implemented. DRDH is well positioned to meet this requirement as audits have been completed at most facilities, resulting in a compiled list of energy reduction projects, some of which are already implemented. The full list is reviewed throughout this Plan while the implementation program is outlined later in this report. This Plan itself is meant to serve as DRDH's CDM Plan and will help assist DRDH to meet all of its mandatory reporting requirements.

Key Factors and Constraints

It is important to both DRDH's future and to its image in the public at large to understand the value of a comprehensive CDM Plan. Many people around the world are beginning to embrace the notion that the earth's environment and precious resources need to be conserved. However, the necessary changes will not happen overnight. To be successful, a comprehensive energy management plan should embrace long-term thinking, taking advantage of "low hanging fruit" to achieve immediate cost savings which will be redirected to more complex projects involving higher initial costs with larger net benefits.

Public agencies should realize that each of their circumstances is unique and may not lend themselves to 'boiler plate' solutions used in many private sector segments. Those who have met their goals have utilized the advantages of the unique physical and non-physical attributes of their facilities, including green power generation on large flat roofs and community gardens on their large properties. While it is easy to be focused on the larger solutions, even seemingly small efforts can make a major long-term impact on the overall goal. A good example of this is Energy Awareness training which encourages Staff to take simple and effective actions such as turning off lights and computers when not in use.

Ongoing professional development is also a key factor in the success of a CDM Plan to ensure that Staff Members understand their role in the greater goal. The CDM Plan and accompanying education should be a required part of their daily activities.

While realities of budget restrictions are an important consideration in any planning activity, it is possible to achieve energy savings while adhering to the financial constraints of a publicly-funded Hospital system. It is clear that new technology and ideology changes have produced continued operational cost reductions

while improving indoor comfort and environmental sustainability. These cost saving projects can often fund themselves by avoiding the use of previously allocated funds. As long as the savings are reinvested, these improvements can continue for the foreseeable future, ensuring a sustainable process. Many industries have had environmental programs running for over a decade and continue to hit their 3%-5% intensity reduction goals without sacrificing product quality.

3 HISTORICAL ENERGY MANAGEMENT

Historically, DRDH has addressed Energy Conservation and Demand Management on a project-by-project basis through the activities of the Manager of Support Services. Capital projects were implemented based on equipment's expected useful life or in response to equipment emergency breakdowns. Utility savings, realized as a result of the implementation of these individual projects, have not historically been uniquely reported formally, but have been considered as a component of general operations. Thus, they have been reported through utility expenses in the Accounting System. Sustainability and long-term energy reduction goals, through this CDM Plan, will become integral components of the business reporting system.

Utility costs were viewed as a fixed overhead cost. The management of these costs relied on an exception-based investigation approach. In other words, utility costs were only reviewed if a utility bill was much higher, or lower, than typical.

In 2014, DRDH will embark upon a strategic energy auditing project. The purpose of these audits will be to identify and analyze potential energy conservation and demand management opportunities. These efforts have been instrumental in assisting DRDH in aligning the CDM Plan with the Hospital's **2012-2015 Strategic Directions**.

4 CURRENT STATE OF CORPORATE ENERGY

Energy Data Management

While DRDH has an admirable history of managing its energy consumption, the Ontario government has required an increase in Hospital energy management practices. This has resulted in the need to enhance current practices and develop new approaches. To meet this need, DRDH will design a comprehensive program for collecting and analyzing monthly energy billing information, and ensuring Staff is informed about energy consumption. This effort will produce an energy costs and consumption database that will be used for monitoring excessive variations, targeting facility follow-up evaluations, and highlighting areas that could be candidates for improved conservation. These monitoring enhancements will improve DRDH's understanding of the bottom line impact of energy management.

Energy Supply Management

DRDH has currently adopted a strategy of procuring its electricity from Hydro One Networks Incorporated. The Hospital has chosen to contract its natural gas through Enbridge Gas and Distribution Incorporated. This strategy is reviewed annually during the budgeting process.

Energy Use in Facilities

DRDH Staff Members have retained a great deal of knowledge with regard to their facility's energy use. This knowledge base has been enhanced by a series of comprehensive audits completed at the DRDH's facility. Through the deployment of energy management software, DRDH Staff will be equipped with the information necessary to make effective energy management decisions. This will make it possible to implement an effective energy procurement process, pursue appropriate capital projects, and implement successful conservation and demand management programs.

Equipment Efficiency

DRDH has pursued many measures to improve the energy efficiency of the Hospital's equipment. Some of these measures include:

- Heating and cooling equipment retrofits,
- Building envelope improvements,
- Electrical systems upgrade, and
- The pursuit of the feasibility of solar thermal and solar photovoltaic applications.

As the understanding of corporate energy consumption improves, DRDH Staff will be equipped with the knowledge necessary to make informed decisions. This improved understanding will also reveal how

simple actions like commissioning and maintenance procedures can improve existing equipment efficiencies.

Organizational Integration

Day to day management of energy has been primarily the responsibility of the DRDH Manager of Support Services. Current practices will be enhanced with future plans including:

- The creation of an interdepartmental energy management team,
- Improved energy monitoring and feedback, and
- Interactive energy training and awareness.

Staff across all departments will be given the necessary tools to address corporate energy concerns such as budgeting, procurement, conservation, and generation.

Prior to the development of the CDM Plan, VIP assessed DRDH's energy management practices. This assessment was completed by speaking to DRDH Staff and reviewing relevant Hospital material. Upon completion of this review, VIP determined that DRDH had provided Staff Members with a mandate to pursue proper energy management, and through DRDH Staff ingenuity, DRDH was able to direct resources to energy management. However, VIP also noted that if DRDH is to achieve the Ministry's mandate, it will require the development of this CDM Plan that will address DRDH's energy management needs.

5 CURRENT ENERGY CONCERNS

Environmental, societal, and fiscal pressures accentuate the need for an energy Conservation and Demand Management Plan (CDM Plan).

Environmental

Concerns surrounding energy consumption with regard to climate change and air pollution have been well documented. Since 1990, Ontario's greenhouse gas emissions have increased 14%. The Government of Ontario estimates that 75% of Ontario's greenhouse gas emissions are associated with the consumption of fossil fuels for energy purposes. Increased smog and air pollution are also connected to the consumption of energy. Ontario's electricity generation is the Province's second largest source of sulfur dioxide and the third largest source of nitrogen oxides. These pollutants can cause irreparable harm to human health.

Societal

The 2003 Blackout heightened societal concerns surrounding the stability and security of our energy supply. Energy has been imbedded into most societal practices. If energy consumption is not managed appropriately, the frequency of energy interruption and the subsequent societal disruption will increase.

Fiscal

The fossil fuels traditionally used for the generation of energy are no longer financially accessible or environmentally acceptable. This has resulted in the promotion of renewable energy generation which comes with an additional expense. Energy costs are also anticipated to increase as Ontario's existing energy infrastructure is taken off-line or refurbished. Coming off of the lows of the 2009 recession, national electricity and natural gas prices are 27% and 21% greater than they were at the start of the decade. It is not anticipated that this upward trend will be altered in the short to medium future. The Province of Ontario has recently projected an annual 3.5% to 7.9% increase in electricity costs over the next 20 years. Natural gas is also projected to trend upward.

In recent years, DRDH has experienced substantial patient growth and is projected to grow into the future. Currently, the Hospital is in the process of adding a 12,000 ft² family health building. As DRDH grows so will the Hospital's environmental, societal, and fiscal energy concerns. DRDH recognizes that proper energy management must be pursued if these concerns are to be addressed

6 SCOPE OF THE CDM PLAN

The Deep River and District Hospital is a rural hospital serving the population of the Upper Ottawa Valley since 1974. We provide 24 hour emergency services, active medical and specialized cardiac care services, lab and diagnostic imaging services, physiotherapy as well as, long-term care services. We are accredited with the Canadian Council on Health Services Accreditation and are a member of the Champlain Healthcare Network. We are also linked with the Children's Hospital of Eastern Ontario (CHEO), and the Ottawa Heart Institute.

Deep River and District Hospital Facilities - General Information					
Building Name	Operation Type	Address	City	Postal Code	Total Floor Area (m ²)
The Deep River & District Hospital - Hospital	Facilities used for hospital purposes	117 Banting Drive	Deep River	K0J 1P0	3,173
The Deep River & District Hospital - Administrative	Administrative offices and related facilities	117 Banting Drive	Deep River	K0J 1P0	79
					3,252

7 ENERGY BASELINE AND CURRENT ENERGY PERFORMANCE

Effectively managing energy requires implementing appropriate energy monitoring procedures. The establishment of an accurate energy baseline is essential in this process. It will assist 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. DRDH, like many Hospitals, relies on its utility bills to establish its energy baseline.

BASELINE PERFORMANCE (2011)

DRDH has elected to utilize the consumption data from 2011 to represent its baseline energy consumption performance.

Deep River and District Hospital Facilities - 2011 Energy					
Building Name	Total Electricity Consumption (kWh)	Total Natural Gas Consumption (m ³)	GHG Emissions (kg)	Energy Intensity (ekWh/ft ²)	Energy Intensity (GJ/m ²)
The Deep River & District Hospital - Hospital	653,048	92,889	227,862.29	48.03	1.86
The Deep River & District Hospital - Administrative	13,327	1,896	4,651	39	1.53
	666,375	94,785	232,513	48	1.85

CURRENT PERFORMANCE (2012)

It is imperative to understand the energy characteristics of each facility. By understanding these values, baselines can be established and future retrofits and improvements to the buildings can be monitored and tracked to ensure that the intended benefits are fully realized. DRDH's most recent energy consumption inventory was completed in 2012. This inventory took into account the electricity and natural gas consumption of the DRDH facility. In 2012, DRDH's total energy use, including electricity and natural gas, was 2,000,558 equivalent kilowatt hours (ekWh). This total consisted of 806,379 kWh of electricity and 101,154 m³ of natural gas, which is equivalent to 1,194,179 ekWh.

Deep River and District Hospital Facilities - 2012 Energy					
Building Name	Total Electricity Consumption (kWh)	Total Natural Gas Consumption (m ³)	GHG Emissions (kg)	Energy Intensity (ekWh/ft ²)	Energy Intensity (GJ/m ²)
The Deep River & District Hospital - Hospital	786,308	98,636	249,389	54	2.08
The Deep River & District Hospital - Administrative	20,071	2,518	6,366	55	2.13
	806,379	101,154	255,755	54	2.08

In all, DRDH has increased its energy intensity from 2011 to 2012 indicating a slight degradation in energy utilization from 1.85 GJ/m² to 2.08 GJ/m².

BENCHMARKING

Market Sector

Energy Intensity (ekWh/ft ²)				
Sector	Minimum	Average	Maximum	No. of Organizations
Hospital	1.0	61	350	141

DRDH's facilities have an average 48 ekWh/ft² energy intensity, slightly below the industry average based on the Ministry of Energy's 2011 Public Sector Energy Consumption Data. DRDH ranks 44th amongst all Hospitals in Ontario for energy intensity.

8 MISSION AND VISION

Mission:

To provide a broad range of high-quality health care services for our local communities.

Vision:

Every client's healthcare experience will be exceptional.

The CDM Plan has been developed to address the fiscal, societal, and environmental costs and risks associated with energy consumption. Proper energy management will allow DRDH to display leadership, improve the delivery of services, and enhance the overall quality of life with respect to the patient services provided.

This CDM Plan outlines key actions that must be pursued to make this vision a reality. The completion of these actions will assist DRDH to meet its energy conservation targets and its greenhouse gas emission reduction commitment. Achieving these goals will assist DRDH in securing a strong energy management reputation and will allow for cost savings that can benefit DRDH, its employees, and its patients.

It is acknowledged that, for this vision to come to fruition, energy management at DRDH must become an inclusive process. Recognizing that energy affects everyone differently, this Plan was created to address a variety of energy related concerns, while capturing innovative and relevant actions that will lead to meaningful change.

This CDM Plan will allow energy management to be incorporated into all DRDH activities, including organizational and human resource procedures, procurement practices, financial management and investment decisions, and facility capital, operations, and maintenance.

Overview

This CDM Plan is designed to meet the current energy needs and obligations of DRDH. The intent is to guide DRDH in the development of an energy management foundation. This will be a living Plan that will evolve as DRDH's energy needs are revealed and better understood.

DRDH's approach to energy management is three pronged. It begins with:

- Elimination of waste,
- Improving efficiencies, and
- Optimizing energy supply.

Prior to pursuing these actions, DRDH must be aware of the facility and Staff behaviours that influence energy consumption. Once encapsulated, this knowledge must be dispersed throughout the organization, allowing for the development of a culture of sustainability.

An improved understanding of corporate energy consumption will require improvements in energy management and awareness. Energy awareness campaigns will strive to make energy a tangible asset that Staff Members can appreciate when it is being consumed or wasted. In addition to increasing energy awareness, this energy Plan will integrate energy efficiency into the capital and operational decision making of the organization.

9 GOALS AND OBJECTIVES

It is of critical importance to improve energy efficiency and reduce our operating costs. Equally important is displaying our commitment to the environment through the reduction of greenhouse gases, while improving our air quality. It is also important that these actions are carried out without adversely impacting DRDH's operations. All DRDH Staff will have an essential role in the success of this energy management Plan. It will be the responsibility of the Energy Management Team to ensure that energy management measures are properly communicated and effectively implemented. An Energy Mandate for DRDH has been developed and is an integral component of this CDM Plan.

DRDH's CDM Plan was completed to help support the following goals:

- Encourage reduced greenhouse gas emissions and energy consumption in the Hospital by promoting building systems that create more sustainable, efficient, healthy, and livable patient environment,
- Maximize the use of operational budgets by ensuring that the Hospital facilities are operating in as energy efficient manner as possible,
- Ensure that minimizing energy use is considered throughout the various aspects of Hospital operations including purchasing where financially viable,
- Recognize the importance of the input and participation of Hospital employees, patients and visitors in supporting energy conservation and sustainability initiatives through education, awareness and training.

The primary objective of this Plan is to improve the management of DRDH's energy consumption. Part of this objective is setting a conservation target that will see DRDH reduce its 2011 energy consumption by 5% by the end of 2015. Recognizing that DRDH has a growing patient load, DRDH's energy conservation target will be intensity based. It is also the objective of this Plan to improve DRDH's understanding of energy consumption which is essential for DRDH to meet its corporate energy management goals.

Measurements of Success

The measurements of success will be based on a variety of indicators:

- Reaching the CDM Plan's energy conservation target,
- Assisting with the corporate greenhouse gas reduction target,
- Achieving the savings outlined in the Plan's budget section, and
- Imbedding energy management in DRDH's capital and operations decision making process.

Reporting Standards

The CDM Plan will allow for the monitoring and reporting that is necessary for DRDH to meet the regulatory requirements of the **Green Energy Act** and DRDH's greenhouse gas reduction targets. Regular energy monitoring and feedback to the Ministry and DRDH Management and Staff will improve knowledge and help make energy consumption a tangible asset, making possible appropriate behavioural changes. The intent of monitoring and reporting on energy consumption is to make energy management transparent and the consumer accountable. The Ministry will be provided with annual updates on the state of energy management at DRDH. Energy consumption feedback provided to Staff will be imbedded into DRDH's regular business.

10 ENERGY MANAGEMENT TEAM

Historically, DRDH addressed Energy Conservation and Demand Management on a project-by-project basis through the activities of the Building Services Group. Strategic directives have been provided by the Hospital's Board of Directors and the Senior Executive Team.

This CDM Plan outlines a commitment to integrate Energy Conservation and Demand Management into the operations of the Hospital, as indicated in the covering letter from the Chief Executive Officer. Within the duration of the CDM Plan, CDM planned activities will become an integral component of the annual budgeting process. A collaborative effort will be undertaken to achieve this integration, involving:

- Internal Staff (which may include but will not be limited to Facilities Management, Finance, and Procurement),
- Advisement from the Ministry of Energy Ministry of Health, and
- Consultations with Energy Management experts.

Currently, the energy management team is comprised of:

- The Manager of Support Services,
- A Charge Nurse,
- A Maintenance Leader,
- The Chief Executive Officer, and
- A representative from the Environmental Services Department.

11 FINANCIAL ASSESSMENT

The energy Conservation and Demand Management Plan's financial assessment philosophy is to treat fiscal resources as if they were energy assets. Therefore, financial investments follow the same three pronged approach used for the management of energy:

- Elimination of waste,
- Improving efficiencies, and
- Optimizing energy supply.

The initial cost and saving estimates for the proposed process improvements, program implementation, and projects are broken down as follows:

Deep River and District Hospital			
Opportunity	Annual Savings (\$)	Estimated Installation Cost (\$)	Payback Period (years)
Detailed Energy Audit	\$0	\$7,500	N/A
Heat Recovery – Server Relocation	T.B.D.	T.B.D.	N/A
HVAC Upgrades	T.B.D.	T.B.D.	N/A
Window Replacement	T.B.D.	T.B.D.	N/A
Wall Insulation	T.B.D.	T.B.D.	N/A
Freezer/Refrigeration Units Upgrade	T.B.D.	T.B.D.	N/A

If initiated and monitored effectively, it can be anticipated that savings can be sustained. It should also be noted that the price of energy is anticipated to increase, whereas the costs of capital projects will likely decrease with advancements in technology. This could potentially lead to increased savings and decreased costs in the later years of the plan. The potential for avoided costs adds to the relevance of a plan of this nature.

This fiscal assessment does not take into account the economic benefits of achieving all of the corporate energy management goals. Due to the difficulty in quantifying the economic value of extended equipment longevity, improved comfort and productivity, and climate change mitigation, it should not be discounted.

12 ENERGY MANAGEMENT ACTIONS

The economic feasibility of proposed actions played a large role in the prioritization of the processes, programs, and projects. Equally important in this prioritization exercise was the evaluation of DRDH's internal capacity to complete the proposed initiatives. Recognizing the need to develop DRDH's internal capacity, the initial years of the Plan focus heavily on processes and programs. The implementation of the recommended processes and programs will result in an improved understanding and awareness of energy consumption. This will allow for improved decision making and greater success with future energy projects. As these actions are completed, the Energy Management Team will meet to discuss monitoring results and how they can be used to enhance the Plan. The CDM Plan is intended to be a living document. Anticipated improvements in knowledge and capacity will result in enhancement of the proposed actions.

Annual Reporting

An Annual Conservation and Demand Management Plan Update Report will be provided that details DRDH's activities and results relating to this 2014-2018 Energy Conservation and Demand Management (CDM) Plan. The Report will describe the CDM Plan related activities that have happened in the previous year and will focus on linking actions to results. In addition, the Report will take a forward view of the upcoming year to lay out the roadmap and identify any changes or adjustments that should be considered based on what the current market conditions are. The overarching goal of the report is to make the 5 year CDM Plan a living document that is reviewed and updated on a yearly basis.

Future Energy Projects

Energy projects at DRDH were evaluated prior to the development of the CDM Plan. DRDH Staff Members have advocated for some ambitious energy initiatives that were investigated and determined to be not feasible for a variety of reasons. It is anticipated that as DRDH grows and energy management practices improve, these actions will be reassessed.

Renewable Energy

Feasibility and promotion of renewable energy technologies were examined throughout the development of the CDM Plan. These technologies have been incorporated into the CDM Plan where it made sense to do so, strategically or fiscally.

Purchasing Practices

Traditionally, purchasing practices in the public sector were designed to favour equipment or physical retrofits at the lowest cost in order to ensure the highest possible financial responsibility. As energy conservation best practices emerged, it was revealed that there is a major issue in doing this. Almost all

wasteful energy consuming equipment is less expensive than their energy conserving counterparts. The practice in itself does not encourage energy efficiency, as most energy intensive alternatives such as standard efficiency motors are less costly than their higher efficiency counterparts. When dealing with energy intensive hardware, the initial capital cost is only a fraction (5%-10%) of the total lifecycle cost.

The practice of 'low bidder wins' purchasing limits the Staff when trying to make the right environmental decision. Making a specific amount of money available to include the conservation upgrades allows the Hospital to take advantage of necessary investments in order to reduce their impact on the bottom line after the cost of purchase. For example, when purchasing a motor, all suppliers will specify standard efficiency motors. An energy smart buyer will know that 90%+ of the motor's lifecycle cost is in its energy use. Therefore, buying a premium efficiency motor at a small incremental cost has a payback of less than three years. Missing this opportunity translates into a long-term financial increase. In fact, the incremental cost between a less efficient and a more efficient alternative is often less than 5% of the capital cost. That 5% capital cost difference is often recuperated in less than three years. This allows Staff to make the right environmental decision based on industry best financial practices.

Energy Management and Information Systems

An Energy Management and Information System (EMIS) is an important element of a comprehensive Energy Management Program (EMP), as it helps to ensure that the full benefits of other energy conservation efforts are achieved and sustained. In fact, a quality EMIS can reduce energy use and cost by at least 5%. (Ref: Office of Energy Efficiency, National Resources Canada). Current industry and international standards, such as the International Performance Measurement & Verification Protocol (IPMVP), use an average of an 8%-10% reduction in energy consumption and costs. VIP Energy Services has documented a conservation average of 17% over customers served to date. However, in order to be as conservative as possible in its financial calculations, VIP generally uses NRCan's conservative numbers (5%) to ensure objectivity in the investment matter. The savings from an EMIS result from the following measured impacts:

- Early detection of poor performance,
- Support for optimal decision making,
- Effective performance reporting,
- Auditing of historical performance,
- Identification and justification of energy projects,
- Evidence of implementation success,
- Support for energy budgeting and accounting, and
- Provision of energy data to other systems (such as Building Automation Systems, BAS).

When looking at performance reports, an EMIS facilitates ensuring that upgrades or changes actually meet forecasted savings, as well as the quantification of losses or gains. However, it is important to note that placing meters to isolate individual retrofit projects determined by their scope is generally cost ineffective and typically does not allow incorporation of out-of-scope project factors that directly affect equipment performance.

A one-time, comprehensive metering solution allows for a much more cost effective view, while enabling accountability to 90% of the planned projects budgeted to date. Reporting can be the most essential part of this plan as multiple portions of the organization rely on this data to make periodic decisions. The Finance Team can use this information to verify billing accuracy and other potential costs, such as construction back-charges. Energy Conservation Managers generally look at this data for building performance, future opportunity and functional trending. Project Managers rely on this information to ensure that vendors are supplying and meeting contractual obligations. Collecting the information in any EMIS program is really only the first step, as the data must then be used to instigate change and push action. This can only be done through analysis and warning systems built on baseline information. In order for an EMIS system to function properly, communication loops must also be established between departments in order for the maximum benefit to be realized.

Building Re-Commissioning

Building re-commissioning, or retro-commissioning, refers to the optimization of the current automation, controls and energy consuming systems. As buildings age, both the functionality of the equipment and the functions that they serve can undergo significant changes. A re-commissioning program generally focuses on ensuring that the equipment operations are modified to include any new or deleted duties. The following is a list of common problems found in re-commissioning projects that result in increased energy costs:

- Inefficient scheduling of HVAC equipment,
- Simultaneous heating and cooling,
- Economizer sequences not optimized,
- Incorrect airflow and water balance,
- Malfunctioning sensors or incorrect calibration,
- Fan VFD control overridden,
- Supply air static pressure set-points not optimized,
- Boiler controls not operating efficiently,
- Balancing dampers and valves not installed or installed in poor or unusable locations,
- Incorrectly piped water coils,
- Process or space classification changes (lab space to office, etc.),

- Incomplete or incorrect control component installation,
- Control sequence incorrectly implemented,
- Substituted control components,
- Incomplete installations (missing control valve, actuators, etc.), and
- Testing, adjusting, and balancing (TAB) not completed or only partially completed.

National Resources Canada (NRCan) has published several guidelines for costing and expected returns from re-commissioning projects. Building re-commissioning is an increasingly important practice, not only from an energy standpoint, but also from a comfort and safety perspective as well. The more complex building controls and ventilation become, the more risk there is that one or more components will fail or deliver incorrect measurements.

Current practices in re-commissioning indicate that the cost to complete these initiatives is between \$2.90 and \$4.50/m². Expected savings from the projects are typically between \$1.00 and \$4.00/m², depending upon the starting efficiency of the building, thus creating very attractive paybacks in this area.

Energy and Resource Awareness (ERA) Programs

Independent studies done by organizations such as Natural Resources Canada (NRCan) and the Ontario Hospital Association (OHA) show that initiatives directed at Staff and facility users, in particular ERA Programs, can lead to significant savings on their own. In fact, NRCAN reports indicate that dedicated, consistent Energy Awareness Programs are proven to be the most effective way to reduce energy usage with no capital costs and minor operational expenses. A conservative estimate of savings for an effective ERA Program can be as high as 5% -7% of annual utilities spending.

An effective ERA Program is designed to assist organizations to attain energy savings by promoting a fundamental shift in the personal philosophies of Staff and facility users towards reducing their energy use. The Program utilizes community-based social marketing to develop influential communication materials and in-house displays that are carefully designed to inform and motivate employees to effectively decrease energy consumption. In many cases, an ERA Program has proven to be the most effective way to lower energy usage without any capital costs and minimal operational expenses. A typical ERA Program would include features such as:

- A detailed ERA Program written plan including a GANTT chart,
- The creation of a program email address for suggestions and concerns and access to ERA experts to answer questions,
- A customized identity and marketing program ,
- Training and support for an Energy Steward Team,
- ERA displays with various relevant conservation themes, and

- Annual Marketing Effectiveness Reports and Feedback system.

A continuous and consistent ERA Program is not only an effective way to lower energy use within a facility, but can also serve to be an effective marketing tool to spread the word that the Hospital is a community leader in energy conservation and environmental sustainability.

APPENDIX A

Energy Data

ENERGY CONSUMPTION

Deep River and District Hospital – Energy Consumption				
Building Name	2011 Electricity (kWh)	2011 Natural Gas (m³)	2012 Electricity (kWh)	2012 Natural Gas (m³)
The Deep River & District Hospital - Hospital	653,048	92,889	786,308	98,636
The Deep River & District Hospital - Administrative	13,327	1,896	20,071	2,518
TOTAL	666,375	94,785	806,379	101,154

APPENDIX B

Energy Use Breakdown

ENERGY USE BREAKDOWN

