

# ***Five Year Conservation and Demand Management Plan 2014-2018***



Prepared June 2014 by:





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## 1 EXECUTIVE SUMMARY

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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 Kemptville District Hospital (KDH) energy Conservation and Demand Management Plan is to develop a framework for Kemptville District Hospital to understand the historical impact of its operations on greenhouse gas (GHG) emissions, and to take action by setting greenhouse gas 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 greenhouse gas emissions inventory, benchmarking Kemptville District Hospital's existing energy intensity performance relative to other hospitals, identifying potential energy efficiency projects, and establishing a greenhouse gas emissions reduction target.

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 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 Kemptville 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

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### *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 KDH 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 KDH’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. KDH 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 KDH's CDM Plan and will help assist KDH to meet all of its mandatory reporting requirements.

### ***Key Factors and Constraints***

It is important to both KDH'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

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Historically, KDH has addressed Energy Conservation and Demand Management on a project-by-project basis through the activities of the Building Services Group. 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, KDH 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 will be instrumental in assisting KDH in aligning the CDM Plan with the Hospital's strategic direction.

## 4 CURRENT STATE OF CORPORATE ENERGY

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### *Energy Data Management*

While KDH 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, KDH 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 KDH's understanding of the bottom line impact of energy management.

### *Energy Supply Management*

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

### *Energy Use in Facilities*

KDH Staff Members have not yet retained a great deal of knowledge with regard to their facility's energy use. This knowledge base will be enhanced by a series of comprehensive audits completed at the KDH's facilities. Through the deployment of energy management software, KDH 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*

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

## 5 CURRENT ENERGY CONCERNS

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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*

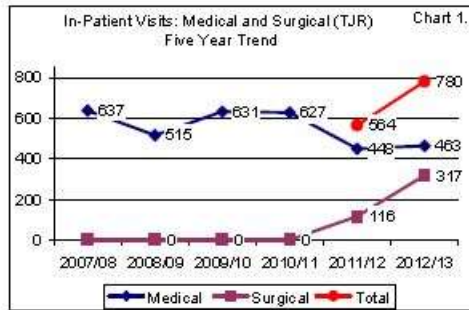
The 2003 Blackout heightened societal concerns surrounding the stability and security of our energy supply. Energy has been imbedded into most societal practices. If energy consumption is not managed appropriately, the frequency of energy interruption and the subsequent societal disruption will increase.

### *Fiscal*

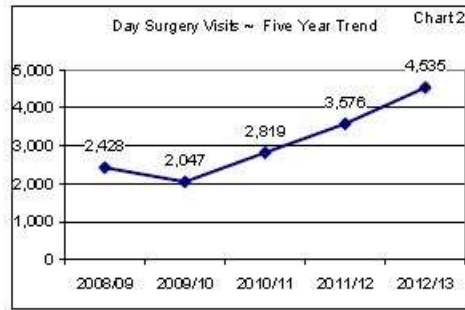
The fossil fuels traditionally used for the generation of energy are no longer financially accessible or environmentally acceptable. This has resulted in the promotion of renewable energy generation which comes with an additional expense. Energy costs are also anticipated to increase as Ontario's existing 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, KDH has experienced substantial patient growth and is projected to grow into the future. As KDH grows so will the Hospital's environmental, societal, and fiscal energy concerns. KDH recognizes that proper energy management must be pursued if these concerns are to be addressed

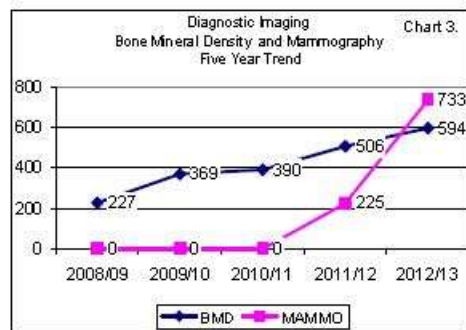
# Kemptonville District Hospital<sup>1</sup>



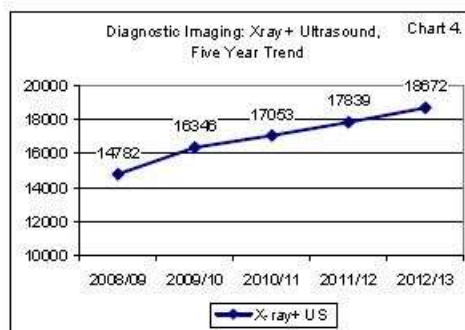
In-Patient Visits include Medical and Surgical (TJR).



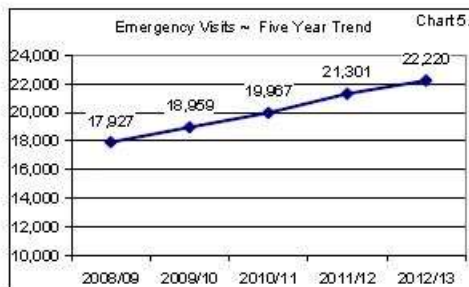
Day Surgery visits surpassed the HSAA and PCOP target of 4,348. The New Endoscopy room was necessary to meet these volumes.



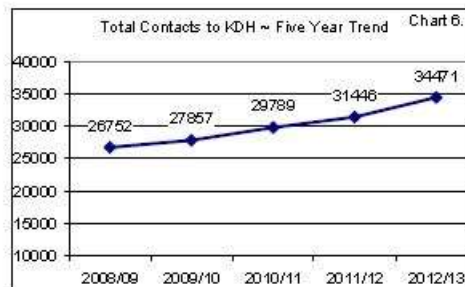
Bone Mineral Density and Mammography are growing. Public awareness for these services are ongoing.



Diagnostic Imaging volumes for x-ray and ultrasound continue to grow.



Emergency Visits are steadily increasing.



Total Visits are all the people who come to KDH for treatment. This includes Emergency, Out Patient clinics, In-Patients, TJR, and Day Surgery. Not including OP x-rays, ultrasounds, mammography and bone mineral density.

<sup>1</sup> Taken from the Kemptonville District Hospital Annual Report 2012-2013

## 6 SCOPE OF THE CDM PLAN

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We are a multi-site health services organization serving the health needs of North Grenville and South Ottawa in partnership with the Champlain Local Health Integration Network (LHIN).

| Kemptville District Hospital Facilities - General Information |                                       |                     |            |             |                                    |
|---|---------------------------------------|---------------------|------------|-------------|------------------------------------|
| Building Name   | Operation Type                        | Address             | City       | Postal Code | Total Floor Area (m <sup>2</sup> ) |
| Kemptville District Hospital                                  | Facilities used for hospital purposes | 2675 Concession Rd. | Kemptville | K0G 1J0     | 7,319                              |
| Public Health Unit  | Administrative offices                | 2675 Concession Rd. | Kemptville | K0G 1J0     | 272                                |
| KDH Health Centre   | Administrative offices                | 2671 Concession Rd. | Kemptville | K0G 1J0     | 714                                |
|   |                                       |                     |            |             | 8,305                              |

## 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. KDH, like many Hospitals, relies on its utility bills to establish its energy baseline.

### BASELINE PERFORMANCE (2011)

KDH has elected to utilize the consumption data from 2011 to represent its baseline energy consumption performance. Based on this information, and normalizing for weather conditions, the baseline energy performance may be represented by a normalization analysis.

| <b>Kemptonville District Hospital Facilities - Energy 2011</b> |  |  |                           |   |  |
|--|--|--|---------------------------|---|--|
| <b>Building Name</b>   | <b>Total Electricity Consumption (kWh)</b> | <b>Total Natural Gas Consumption (m<sup>3</sup>)</b> | <b>GHG Emissions (kg)</b> | <b>Energy Intensity (ekWh/ft<sup>2</sup>)</b> | <b>Energy Intensity (GJ/m<sup>2</sup>)</b> |
| Kemptonville District Hospital                                 | 2,455,823                                  | 388,679  | 931,313                   | 84  | 3.24                                       |
| Public Health Unit   | 91,370                                     | 5,415  | 17,547                    | 51  | 1.97                                       |
| KDH Health Centre  | 128,663                                    | 4,845  | 19,453                    | 23  | 0.91                                       |
|  | 2,675,856                                  | 398,939  | 968,313                   | 77  | 3.00                                       |



## 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. KDH's most recent energy consumption inventory was completed in 2012. This inventory took into account the electricity and natural gas consumption of KDH facilities. In 2012, KDH's total energy use, including electricity and natural gas, was 7,812,956 equivalent kilowatt hours (ekWh). This total consisted of 2,700,442 kWh of electricity and 433,060 m<sup>3</sup> of natural gas, which is equivalent to 5,112,514 ekWh. The 2012 combined total cost of electricity and natural gas was \$422,848.

| <b>Kemptonville District Hospital Facilities - 2012 Energy</b> |  |  |                           |   |  |
|--|--|--|---------------------------|---|--|
| <b>Building Name</b>   | <b>Total Electricity Consumption (kWh)</b> | <b>Total Natural Gas Consumption (m<sup>3</sup>)</b> | <b>GHG Emissions (kg)</b> | <b>Energy Intensity (ekWh/ft<sup>2</sup>)</b> | <b>Energy Intensity (GJ/m<sup>2</sup>)</b> |
| Kemptonville District Hospital                                 | 2,525,468                                  | 422,698  | 1,001,202                 | 89  | 3.45                                       |
| Public Health Unit   | 93,961                                     | 5,646  | 18,191                    | 53  | 2.04                                       |
| KDH Health Centre  | 81,013                                     | 4,716  | 15,397                    | 17  | 0.66                                       |
|  | 2,700,442                                  | 433,060  | 1,034,790                 | 82  | 3.17                                       |

In all, KDH has increased its energy intensity from 2011 to 2012 indicating a slight shift in energy utilization from 3.00 GJ/m<sup>2</sup> to 3.17 GJ/m<sup>2</sup>.

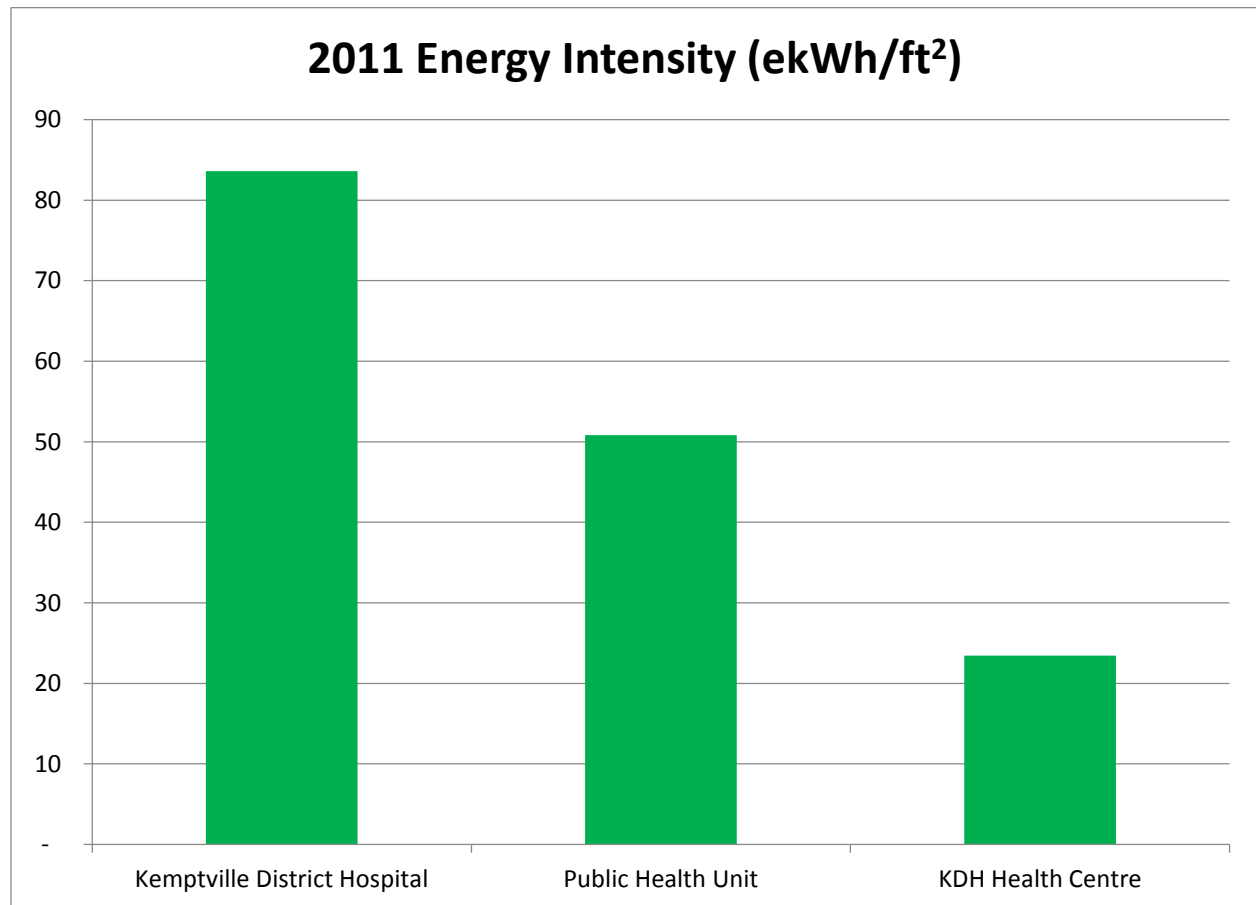
## BENCHMARKING

### Market Sector

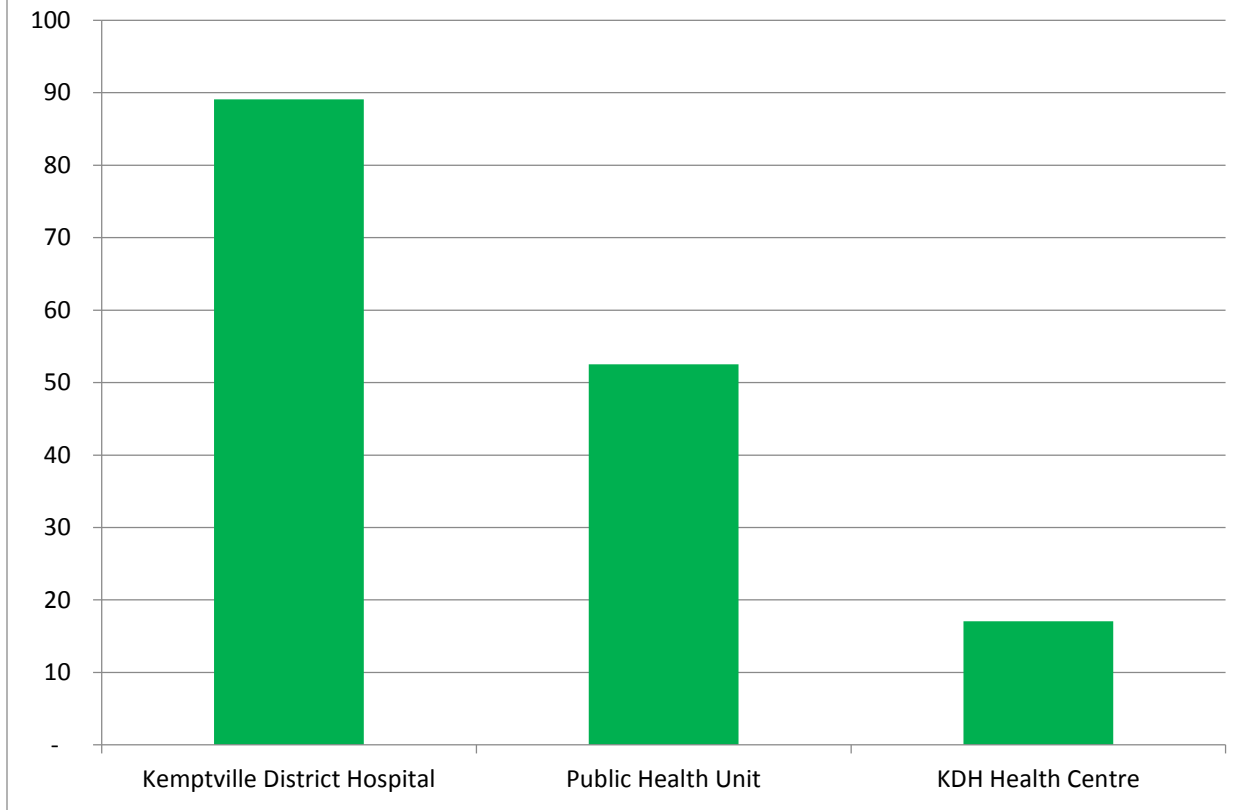
| Energy Intensity (ekWh/ft <sup>2</sup> ) |         |         |         |                      |
|--|---------|---------|---------|----------------------|
| Sector                                   | Minimum | Average | Maximum | No. of Organizations |
| Hospital                                 | 1.0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

KDH's facilities have an average 82 ekWh/ft<sup>2</sup> energy intensity, higher than the industry average based on the Ministry of Energy's 2011 Public Sector Energy Consumption Data. KDH ranks 108<sup>th</sup> amongst all Hospitals in Ontario for energy intensity. The elements of this CDM Plan are intended to improve this ranking throughout the five year period.

### KDH Facilities



## 2012 Energy Intensity (ekWh/ft<sup>2</sup>)



## 8 MISSION AND VISION

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Mission:

***To build healthier communities.***

Vision:

***A world of healthy communities.***

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 KDH 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 KDH to meet its energy conservation targets and its greenhouse gas emission reduction commitment. Achieving these goals will assist KDH in securing a strong energy management reputation and will allow for cost savings that can benefit KDH, its employees, and its patients.

It is acknowledged that, for this vision to come to fruition, energy management at KDH 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 KDH 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 KDH. The intent is to guide KDH in the development of an energy management foundation. This will be a living Plan that will evolve as KDH's energy needs are revealed and better understood.

KDH'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, KDH 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 strategic, capital and operational decision making of the organization.

## 9 GOALS AND OBJECTIVES

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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 KDH's operations. All KDH 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 KDH has been developed and is an integral component of this CDM Plan.

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

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

The primary objective of this Plan is to improve the management of KDH's energy consumption. Part of this objective is setting a conservation target that will see KDH reduce its 2011 energy consumption by 2% by the end of 2018. Recognizing that KDH has a growing patient load, KDH's energy conservation target will be intensity based. It is also the objective of this Plan to improve KDH's understanding of energy consumption which is essential for KDH 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 KDH's strategic, capital and operations decision making process.

### *Reporting Standards*

The CDM Plan will allow for the monitoring and reporting that is necessary for KDH to meet the regulatory requirements of the **Green Energy Act** and KDH's greenhouse gas reduction targets. Regular energy

monitoring and feedback to the Ministry and KDH 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 KDH. Energy consumption feedback provided to Staff will be imbedded into KDH's regular business.

## 10 ENERGY MANAGEMENT TEAM

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Historically, KDH addressed Energy Conservation and Demand Management on a project-by-project basis through the activities of the Building Services Co-ordinator. 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 and the Ministry of Health, and
- Consultations with Energy Management experts.



## 11 FINANCIAL ASSESSMENT

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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.

In the inaugural year of this process, KDH will embark upon a strategic Energy Audit project. The purpose of these facility audits will be to identify and analyze potential energy conservation and demand management opportunities. Once initiated and monitored effectively, it can be anticipated that these savings can be sustained as a result of the implementation selected projects. 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 CORPORATE ENERGY BUDGET

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Prior to requesting funding for energy actions, KDH will consult with utility representatives and/or energy consultants, allowing KDH to schedule project launch dates in parallel with applicable incentive funding programs. The projects may be moved forward or delayed based on changes to incentive programs as well as changes to the CDM Plan. However, KDH will not make significant alterations to the Plan in a quest for incentive funding. This is not a prudent approach to planning. Actions will be pursued only when they coincide with the KDH's objectives and are appropriate to be pursued at that time.

As KDH continues to evolve and its energy needs become greater, it will be essential to reassess and clarify, as necessary, the financial indicators that are applied to investment analysis and prioritization of proposed energy projects. Energy efficiency projects must be weighted appropriately relative to other investment needs. There will also be a need to develop procedures for the annual allocation of capital resources for energy efficiency measures in the capital budget.

## 13 ENERGY MANAGEMENT ACTIONS

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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 KDH's internal capacity to complete the proposed initiatives. Recognizing the need to develop KDH'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. 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 KDH'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 KDH will be derived from the Energy Audit process initiating this five-year CDM Plan.

### *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. The following figure illustrates how the Hospital could use an EMIS system and the associated data collected in an efficient manner, thereby maximizing the impact of the EMIS system. These systems can be as simple as an online Data Storage, Retrieval and Reporting System using billing data to form the basis and baselines for future comparison.

### ***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/m<sup>2</sup>. Expected savings from the projects are typically between \$1.00 and \$4.00/m<sup>2</sup>, 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

| <b>Kemptonville District Hospital – Energy Consumption</b> |                                       |   |                                       |   |
|--|---------------------------------------|---|---------------------------------------|---|
| <b>Building Name</b>                                       | <b>2011<br/>Electricity<br/>(kWh)</b> | <b>2011 Natural<br/>Gas (m<sup>3</sup>)</b> | <b>2012<br/>Electricity<br/>(kWh)</b> | <b>2012 Natural<br/>Gas (m<sup>3</sup>)</b> |
| Kemptonville District Hospital                             | 2,455,823                             | 388,679                                     | 2,525,468                             | 422,698                                     |
| Public Health Unit   | 91,370                                | 5,415                                       | 93,961                                | 5,646                                       |
| KDH Health Centre  | 128,663                               | 4,845                                       | 81,013                                | 4,716                                       |
| TOTAL  | 2,675,856                             | 398,939                                     | 3,463,595                             | 488,198                                     |

# APPENDIX B

## Energy Use Breakdown



**ENERGY USE BREAKDOWN**

