

KEMPTVILLE DISTRICT HOSPITAL

ENERGY CONSERVATION AND DEMAND MANAGEMENT (CDM) PLAN



2019-2024

KEMPTVILLE DISTRICT HOSPITAL ENERGY CONSERVATION AND DEMAND MANAGEMENT (CDM) PLAN 2019-2024

Prepared by: Tammy Buehlow, Building Services Manager

Approved by: Andrew J. Pinhey, CPA, CGA, CFO & VP of Operations

Date Approved: June 28, 2019



OUR HOSPITAL
OUR RESPONSIBILITY

Table of Contents

<i>Introduction</i>	4
<i>Results of Previous Measures from CDM Plan Posted July/2014</i>	5
<i>Energy Management Vision</i>	8
<i>Guiding Principles for Strategic Management</i>	9
Taking a Strategic Approach	9
Supporting Mission-Critical Goals	9
Pursuing Long-Term Change to Core Business Practices	9
Fostering Organizational Commitment and Involvement	9
Obtaining Solid Economic Returns.....	9
Using Available Resources and Assistance	10
Assess and Consider Climate Change Risks	10
<i>The Business Case for Strategic Energy Management</i>	11
<i>Business Proposition</i>	12
<i>Energy Management Goals</i>	13
Goal 1: Energy Conservation and Demand Management Plan Approval	13
Goal 2: Implement Financial Practices and Decision-Making Processes	13
Goal 3: Implement Strategic Energy Management Practices.....	13
Goal 4: Monitor, Track, and Reward Progress	15
<i>Timeline and Responsibilities for Plan Adoption and Implementation</i>	16
<i>Appendix</i>	17

Introduction

The purpose of Kemptville District Hospital's (KDH) energy Conservation and Demand Management (CDM) plan and policies is to promote good stewardship of our environment and community resources. In keeping with our core values of efficiency, respect and accountability, as well as financial responsibility, Kemptville District Hospital's energy Conservation and Demand Management program will reduce overall energy consumption, operating costs, and greenhouse gas emissions. It will also enable us to provide compassionate service to a greater number of persons in the community. Further, according to O.Reg. 507/18 for compliance, all public sector organizations *must* update their 5-year Energy Plans by July 1, 2019.

Through past conservation and demand initiatives, Kemptville District Hospital (KDH) has achieved the following results:

- 8.92% overall reduction in energy use since 2014
- \$30,000 saved annually from decreased energy consumption
- 120,264 kWh decrease in electricity consumption 2018 vs 2014
- 54,326 m³ decrease in gas consumption 2018 vs 2014
- 107.37 tonne reduction in carbon dioxide equivalent (tCO₂e) emissions

Today, utility and energy related costs are a significant part of overall operating costs. Kemptville District Hospital's annual energy consumption and related costs/emissions for 2018 were:

- Utility costs were \$356,888 annually
- The Hospital's Energy Use Index (EUI) was 79.457 ekWh/ft²
- Energy related emissions for 2018 equaled 978.028 tCO₂e
- Facility related O&M costs are \$1.67M annually
- Facility Capital project costs are projected at \$2.5M over 5 years

With energy management an integral part of business decisions, Kemptville District Hospital can expect to achieve the following targets by 2024:

- 10% reduction in energy use
- 97.80 tonne reduction in carbon equivalent emissions
- \$39,782 annually to the bottom line (\$198,910K over 5 years)

To further strengthen and obtain full value from energy management activities, a strategic approach will be taken: the organization will fully integrate energy management into its business decision-making, policies, and operating procedures. Active management of energy related costs and risks in this manner will provide a significant economic return to the organization and will support other key organizational objectives.

Results of Previous Measures from CDM Plan Posted July/2014

In July 2014, Kemptville District Hospital developed goals and devised green initiatives to decrease the facilities annual energy consumption and resulting greenhouse gas emissions. The following activities, completed between 2014 and 2019, are associated with managing overall energy consumption, lowering annual operating costs, and reducing greenhouse gas emissions. These activities may, or may not, have been included in the Kemptville District Hospital's 2014 CDM plan and include the following:

Installed New Roof with HIRF funding

Prior to 2014, Kemptville District Hospital's roof at 2675 Concession Road was below the standard insulation value and leaking, resulting in a large amount of the buildings heat to be lost. With help from the Hospital Infrastructure Renewal Fund program (HIRF), Kemptville District Hospital invested a total of \$321,327.00 + HST to install a new roof with an up to date insulation rating of R34. The construction began on late October 2016 and was completed early February, 2017.

Although unable to evaluate reduced energy consumption and/or reduction in total greenhouse gas reductions due to EUl impact of Capital Renovation Project started 2017, some additional benefits of the upgrade include:

- Increase in biosecurity as the new roof prevents leaks, decreasing risk of contamination in the hospital
- Reduced demand on building HVAC systems, which in turn reduced KDH's natural gas and electricity usage
- Enhanced patient experience & comfort

Completed Outpatient Clinic Modernization Project

In early 2017, construction began for our Outpatient Clinic Modernization Project, effectively doubling the array of outpatient services offered by KDH. These new clinic spaces have enabled KDH to meet the communities' needs for expanded outpatient services by providing new specialists' clinics, as well as introduce new services, such as chronic illness programming, and prevention, education and wellness programs.

The subsequent energy demands of onsite contractors and equipment required to complete the project briefly impacted our energy conservation objective, but we expect that updated technologies and efficiencies built into this renovation will quickly bring us back in line with our energy management objectives.

Some immediate benefits included:

- New energy efficient windows to help seal the building envelope
- Added newly renovated clinic space to Building Automation System (BAS)
- Enhanced patient experience & comfort

Modernized Existing Traction Elevator

Late fall 2018, KDH also underwent a full modernization of existing 2-storey traction elevator, installed circa 1959, to achieve compliance with all local and national building code requirements, and to take advantage of potential energy and cost savings.

Conscious that elevators of this era can use as much as half the building's energy consumption during peak hours and can account for 2-5% of energy use in multi-story buildings, KDH utilized *regenerative drive technology* as part of this modernization project – capturing power that is generated but unused and transferring it back to the building's electrical grid rather than wasting it as heat.

Other technical upgrades included efficient LED lighting in cab panels, overhead, and in floor indicators, as well as door drive motors that can enter a standby mode or efficiently recover from removal of power when not in use. These drive motors also backing variable door-open and door-close times, and their energy use is factored into the overall control strategy.

Utilizing more efficient, sustainable technologies such as these, we will reduce energy costs and increase the building's efficiency.

The Elevator Modernization Project was completed March 2019, anticipated results of the upgrade include:

- Energy consumption decrease of 40% for that unit
- Hydro required to cool the location decrease of 25%
- Total greenhouse gas emissions decrease of 4,292 kg as a direct result of the decrease in energy usage
- Increase in biosecurity as the newly sealed pit prevents leaks, decreasing risk of contamination in the hospital
- Enhanced patient experience & comfort

Additional past CDM measures

- LED lighting installation project in parking lot, designated corridors & stairwells
- Added Pharmacy and clinic areas (Legacy building) to BAS
- Brick façade repair to help seal the building envelope
- Occupancy sensors installations where possible
- Installed programmable thermostats
- Installed low-flow toilets where possible
- Replaced outdated tornado units w/ new vortex macerators utilizing less water, less energy
- Pharmaceutical fridge monitoring system which alarms if left open
- Replaced non-compatible Energy Star appliances
- Promoting energy awareness / initiatives to all patients, staff, and the community

*Planned CDM measures**

- Exterior window replacement to help seal the building envelope
- Boiler room renovation
- Replace shell & tube heat exchangers
- Testing, adjusting, balancing (TAB) partially complete and /or complete spaces
- Replace dietary condenser unit
- Install VFD on boiler pumps
- Install VFD on designated AHU & MAU's

*It should be noted that successful completion of some projects will be dependent on government funding.

Energy Management Vision

As a community leader, Kemptville District Hospital recognizes that we have a responsibility to minimize our ecological impact while providing quality healthcare services in a manner that ensure a safe and healthy environment for our patients, visitors, and staff – an ideal to which we’ve aligned our Organizational Commitment statements:

OUR MISSION

Building Healthier Communities

OUR VISION

Your leader and partner for healthy communities.

OUR CORE VALUES

Patients and families at the centre of coordinated care. An environment of compassion, respect and accountability.

Quality, safe, efficient, evidence-driven care. A culture of collaboration, professionalism, and innovation.

OUR ENVIRONMENTAL MISSION

A demonstrated commitment within to operate in an environmentally responsible manner today, for a better tomorrow.

It is critical to our mission, vision and values that KDH facilities model an efficient, effective environment of care for our community. Enhancing efficiency in our use of facility resources will enable our Hospital to direct more resources towards disease prevention and management. Accordingly, by reducing our ecological footprint, we are doing our part to create a healthier environment for all, which is essential to our community’s health and in inspiring progress toward a healthier future. The key to this equation is the ability to use our facilities efficiently and effectively.

Thus, our internal mandate remains to be accountable for organizational sustainability, as below:

OUR ENERGY MANAGEMENT VISION

Kemptville District Hospital will promote energy management by eliminating waste wherever possible through education, employee engagement, progressive policy and process changes, ongoing infrastructure improvements, and utilizing best practices and technology wherever possible.

Our Hospital, our responsibility.

Guiding Principles for Strategic Management

Kemptville District Hospital's energy management will be guided by these principles:

Taking a Strategic Approach

While Kemptville District Hospital Health actively manages energy costs by implementing opportunities as they are identified, by acting strategically, Kemptville District Hospital can significantly improve its energy-related performance. Internalizing energy management into our organization's every-day decision-making, policies, and operating procedures will help assure substantial and long-lasting reductions in energy, operating costs, and environmental impact.

Supporting Mission-Critical Goals

Strategic energy management will directly support Kemptville District Hospital's mission-critical goals of caring for the environment and the community, improving the healing and working environment, and improving the hospital's financial bottom line by reducing unnecessary energy costs. It will also serve to optimize the capacity of existing energy systems to meet current and expanding operational needs, while improving the operational resiliency of the organization. The impacts of Kemptville District Hospital's energy management efforts on those goals will be tracked and reported wherever possible.

Pursuing Long-Term Change to Core Business Practices

The core of a strategic approach is the consistent incorporation of energy management into our organization's everyday practices and decision making. It also needs to be an integral part of the strategic planning and budgeting processes. Change in energy-related business practice will cover all applications of energy management – new construction and major renovations, existing facility operations and upgrades, and the economic analysis and procurement practices underlying these practices.

Fostering Organizational Commitment and Involvement

Executive and organizational commitment and involvement is critical to successful strategic energy management. Executive Management at Kemptville District Hospital will work with facility managers and other key staff to ensure that adequate organizational support and resources are provided to maximize the benefits of energy management to Kemptville District Hospital. Energy management will also be integrated into the strategic planning and Capital budgeting processes.

Obtaining Solid Economic Returns

Energy management investments will yield solid economic returns. Kemptville District Hospital will apply consistent financial analysis methods, including life-cycle costing, in order to reduce total cost of facility ownership and operation.

Using Available Resources and Assistance

Use of national, regional, and local sources of strategic, technical, and financial assistance to help to achieve the organization's energy management goals. These include utility, municipal, provincial and national government programs. It also includes established best practices through a community of practice approach.

Assess and Consider Climate Change Risks

Determine life cycle and criticality of the physical asset and required operations to be housed in the facility, evaluate environmental and /or climate change impacts based on life cycle and criticality, and implement action plans to mitigate climate and environmental risks.

The Business Case for Strategic Energy Management

Below are the central business arguments for Kemptville District Hospital's pursuit of strategic energy management. The following section then presents the business proposition – the results of analysis of the energy efficiency opportunities and their associated costs and internal rate of return.

Strengthened Community Leadership and Environmental Stewardship

Energy management is a visible, public commitment to the community and environment. Through energy management, the Hospital can provide leadership in promoting sustainable communities, efficient business practices, and environmental stewardship. Faced with a tough market that has forced cut backs on hospital support for community activities, this is an excellent opportunity to provide leadership and reduce costs at the same time.

Enhanced Healing and Working Environment

In existing facilities, efficient operating practices improve patient, as well as employee, comfort with more stable environmental control, and better indoor air quality and lighting. In new facilities more daylight and personal control of comfort contribute to a healing and patient-focused environment, for an improved environment of care. For instance, recent research has found that natural light eases surgical pain and contributes to substantial savings in pharmacy costs.

Improved Financial Health and Operating Cost Reduction

Strategic energy management presents a highly leveraged opportunity to reduce operating costs and positively impact Kemptville District Hospital's bottom line. Dollars of operating cost savings directly improve the operating margin. Further, investments in energy projects typically have a lower risk of performance over time, relative to other investments, and savings from energy projects are easier to forecast reliably than savings or revenue increases expected from more variable investments.

Optimization of Capacity to Meet Current and Expanding Operational Needs

Energy efficiency optimizes inefficient or poorly designed and operated equipment/systems so wasted energy system capacity can be reclaimed for current and expanding operational needs. This "free capacity" can eliminate the need to add major new energy capacity and be much less expensive.

Business Proposition

The following are considerations to be included in Kemptville District Hospital's business philosophy and budgetary process. The business proposition is as follows:

- If energy management considerations are integral to relevant business practices, policies, procedures, and decision-making processes, Kemptville District Hospital's energy-related costs can be reduced by an additional 5% over a 5-year period.
- Based on 2019 utility rates, this will result in \$16K in annual value to the bottom line, or a total \$80K over a 5-year period. Integration of energy management into organizational decision making and business practices will continue to produce value annually for a much longer period.
- Given Kemptville District Hospital's current operating margin of 0%, Kemptville District Hospital would have to generate \$80K of gross revenue to achieve the same amount of net dollar benefit.
- To support the achievement of these financial benefits, Kemptville District Hospital plans to invest up to \$950K in energy-related capital and operating improvements.

Energy Management Goals

The following are proposed measures that Kemptville District Hospital intends to implement:

Goal 1: Energy Conservation and Demand Management Plan Approval

- Executive approval and resource allocations to support initiatives
- Support from key staff (Executive Team and other key stakeholders, purchasing/procurement, construction, maintenance, etc.)
- Creation of mechanisms/processes to make resources available
- Clarification and communication of staff roles and responsibilities, performance goals, and energy management reporting

Goal 2: Implement Financial Practices and Decision-Making Processes

- Money spent to achieve energy efficiency is viewed as an investment, not a cost
- Develop customized life cycle cost analysis (LCCA) tool
- Train staff on the KDH LCCA tool and financial requirements and decision-making process
- Financial decision makers consistently use life cycle cost analysis (LCCA) on all new construction, major renovations, and equipment replacements over \$1,000
- Decisions about energy management investments will be part of Kemptville District Hospital's high-level, long range process of budgeting for capital and operations

Goal 3: Implement Strategic Energy Management Practices

Establish Purchasing Specifications for Energy Efficient Equipment & Services

- Establish and consistently use purchasing specifications that minimize life-cycle costs for energy efficient equipment and services.
 - Establish efficiency specifications for standard equipment routinely replaced (e.g. lights, motors, and unitary HVAC equipment)
 - Establish efficiency guidelines that apply LCCA for custom equipment purchases (e.g. chillers)
 - Establish efficiency standards for design and construction, and for building operations and maintenance services

Implement Enhanced Design & Construction (D&C) Practices

- Implement improved new construction practices in all projects over \$1 million that specify early team collaboration and “integrated design” (ID).
 - Integrated design required for funding.
 - RFPs, contract terms & conditions, & fee structures will support ID
 - Apply LCCA and financial hurdle rates described above to design decisions
 - Apply established purchasing procedures and specifications
 - Include incentives and tax credits wherever available
 - Educate all owner’s project managers or construction managers and contractors on integrated design and their respective roles in master planning pre-design, design, construction, testing, commissioning, and monitoring
- Set and meet clear energy performance targets for new buildings; measure and improve over time.
 - Establish baseline for measuring performance goals (e.g. code, or national reference standards like ASHRAE 90.1)
 - Set target for each building at 25% less than MNEC for buildings
 - Measure performance and improve over time
- Specify commissioning as a standard procedure.
 - Retain the services of an independent third-party commissioning agent
 - 100 percent of fundamental building systems and elements will be designed, installed, and calibrated to operate as designed
 - Design team, commissioning agent, and building operators will work closely throughout the design process and occupancy to ensure good transition

Improve Building Operating Performance

- Equipment tune-up and improved operations and maintenance (O&M) will achieve the following results while supporting patient care, and facility comfort and safety.
 - Achieve reductions in operating costs for existing facilities by an average of 1% over 5 years and continue to improve by 1% per year for 5 years thereafter
 - Reduce the system-wide EUI from 79.457ekWh/ft² to 71.512ekWh/ft² by 2024. The EUI will be adjusted for variances in patient days and IT intensity
 - Reduce energy consumption by 146,726 kWh per year equivalent to yearly savings of \$17,945 at 2019 rates

Implement Cost-Effective Facility Upgrades

- Implement equipment and system upgrades where justified by life-cycle cost analysis.
- Expand use of qualified service providers as needed. Develop standard RFP documents, contract terms, and reporting standards.

Actively Manage Energy Commodity

- Minimize utility costs and exposure to market risks. Utility costs include natural gas, electricity, water, and sewer.
- Participate in the energy/utility regulatory process.

Goal 4: Monitor, Track, and Reward Progress

- Track progress on the CDM plan.
- Track energy reductions quarterly.
- Reward staff for successes.

Timeline and Responsibilities for Plan Adoption and Implementation

Goal 1: Energy Conservation and Demand Management Plan Approval

- Timeline: Year 1
- Primary Responsibility: Executive Team; Sustainable Lead

Goal 2: Implement Financial Practices and Decision-Making Processes

- Timeline: Year 1-2
- Primary Responsibility: Executive Team

Goal 3: Implement Strategic Energy Management Practices

- Timeline: Year 2-4
- Primary Responsibility: Building Service Manager / Sustainable Lead, Maintenance Team Lead, Purchasing

Goal 4: Monitor, Track, and Reward Progress

- Timeline: Year 1-5
- Primary Responsibility: Sustainable Lead

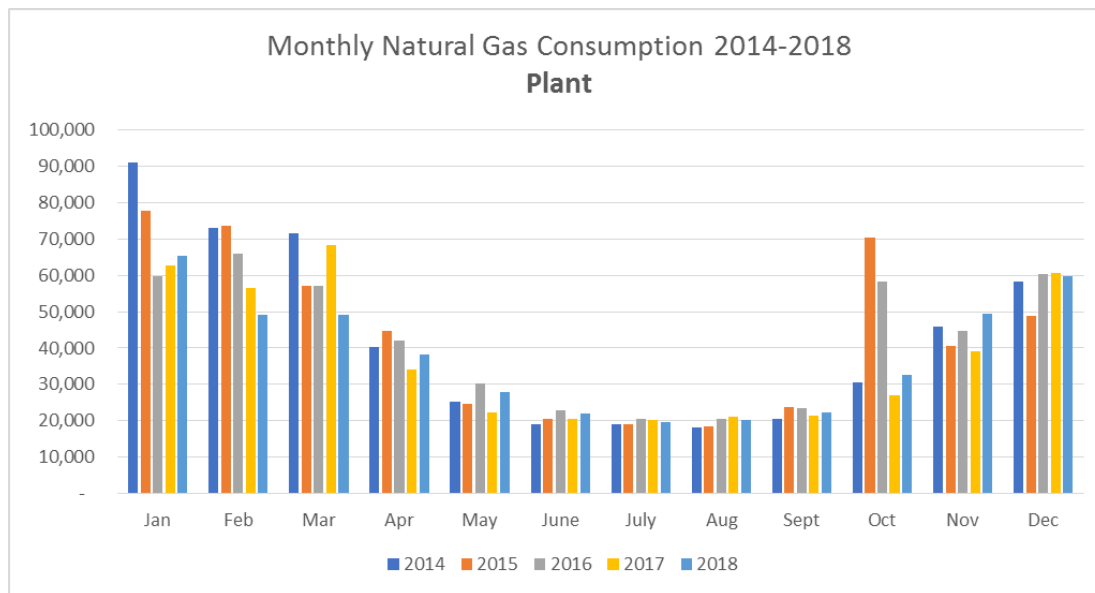
Appendix

Kemptville District Hospital's annual consumption values for electricity and natural gas have been included below:

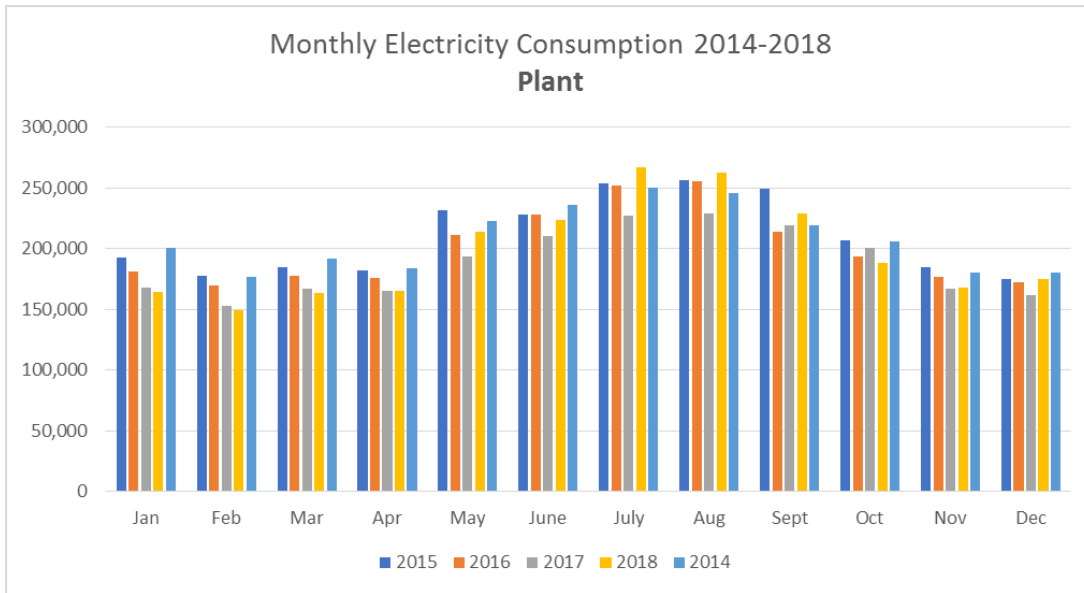
Year	Electricity [kWh]	Natural Gas [m ³]
2013	2,618,043	571,431
2014	2,572,768	524,147
2015	2,588,237	530,535
2016	2,476,005	513,836
2017	2,334,020	465,703
2018	2,370,590	469,821

Graphs below indicate illustrate KDH energy consumption 2014-2019:

MONTHLY GAS CONSUMPTION – FIVE YEAR TREND

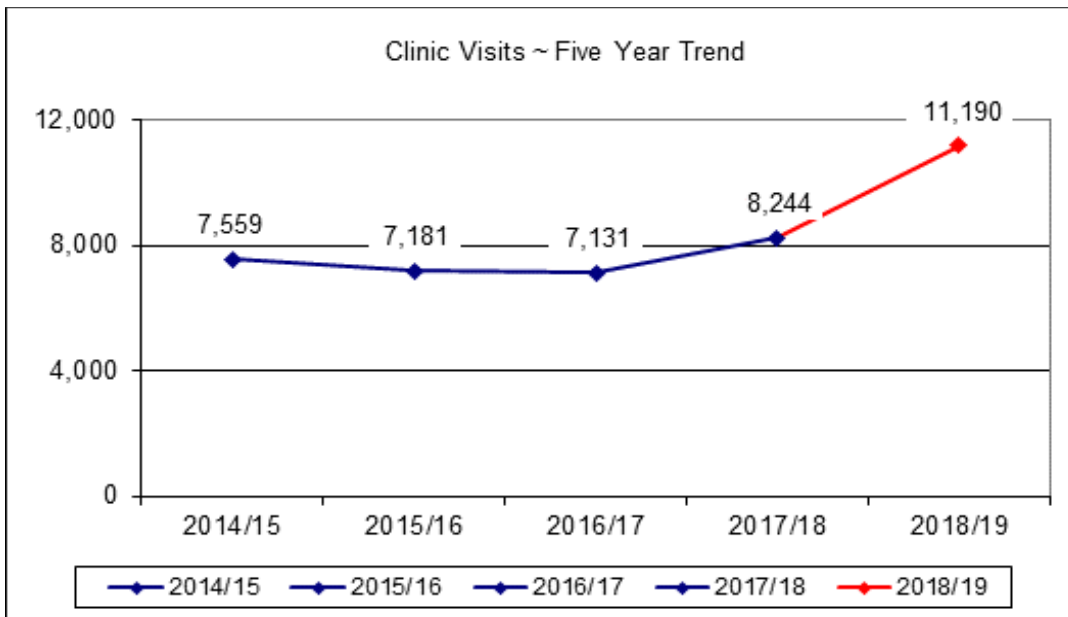


MONTHLY ELECTRICITY CONSUMPTION – FIVE YEAR TREND



Graphs below illustrate Outpatient Clinic Modernization Project impact on client contact to KDH:

TOTAL CLINIC VISITS – FIVE YEAR TREND



TOTAL CONTACTS – FIVE YEAR TREND

