KEMPTVILLE DISTRICT HOSPITAL

Building healthier communities

2024-2029 CDM PLAN

Kemptville District Hospital

2675 Concession Road

Kemptville, Ontario

K0G 1J0

KEMPTVILLE DISTRICT HOSPITAL

Building healthier communities

RE: Renewal of 5-year Conservation and Demand Management (CDM) Plan

July 2024

Kemptville District Hospital is pleased to present the enclosed five-year Energy Conservation and Demand Management (CDM) Plan, marking a significant milestone in our ongoing commitment to reducing energy consumption and minimizing our carbon footprint. This updated plan builds upon the foundation set by our 2019 CDM Plan, highlighting our achievements to date and identifying new opportunities for future energy conservation initiatives.

As our organization continues to expand in response to the growing needs of our community, we have remained dedicated to implementing energy management best practices. These efforts have not only enhanced our energy efficiency but have also contributed to improved experiences for both patients and staff, fostering a safer and more sustainable environment.

In alignment with the objectives outlined in our 2019 CDM Plan, this document serves as a strategic framework to guide our energy management initiatives over the next five years. We are committed to advancing our energy goals and will provide annual updates through our reporting process, culminating in the 2029 CDM Plan.

We look forward to continuing our efforts and sharing our progress in the years ahead.

Sincerely,

BR Rivard

Brittany Rivard
CFO and VP of Operations
Kemptville District Hospital

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Kemptville District Hospital

Kemptville District Hospital (KDH) is a 40-bed acute care facility situated in the rapidly growing municipality of North Grenville, located just 40 minutes south of Ottawa. Renowned as a regional leader in joint replacement, KDH has been recognized with the prestigious 'Leading Practice' designation by the Ontario Hospital Association for its exceptional patient care.

Our comprehensive range of services includes 24-hour emergency care, inpatient services, advanced orthopedic surgery, and a diverse array of outpatient clinics. As a steadfast advocate for building healthier communities, KDH is an integrated health services organization with strong, collaborative partnerships within both our local and regional healthcare networks. We are also a proud member of the Ottawa West Four Rivers Ontario Health Team.

Our Mission

Our mission is to be an excellent leader and partner in meeting people's diverse health needs and helping build healthier communities.

Our Vision

The Hospital's vision is a hospital that is much more than a place for treating illness: it is a vital and compassionate part of a larger, integrated health system, supporting the mental, physical, and social health and wellness of the people and communities we serve.

Our Values

- Individuals and their families at the centre of integrated and coordinated care.
- An environment of compassion, respect, and accountability.
- Quality, safe, efficient, evidence-driven care.
- A culture f collaboration, professionalism, and innovation.
- Organizational resilience, agility, and responsiveness to need.

About the Plan

In 2019, Kemptville District Hospital developed a second five-year Conservation and Demand Management (CDM) Plan, with the goal of actively reducing our overall energy consumption and greenhouse gas (GHG) emissions. The plan outlined specific objectives for the hospital to achieve over the five-year period and identified a range of initiatives designed to meet these targets.

This plan, completed in 2024, serves both as an assessment of our progress over the past five years and as a reaffirmation of our ongoing commitment to minimizing our environmental impact.

KDH is proud of the accomplishments we have made, including a 1.37% decrease in total electricity consumption and an almost 25% drop in natural gas which represents a total reduction of 198 tCO_2e or 20% decrease in our GHG emissions. A comparison of our total utility demands, GHG emissions and Energy Use Intensity (EUI) from 2019 and 2024 has been included below.

	Electricity [kWh]	Natural Gas [m^3]	GHG [kg CO_2e]	Energy Use Intensity [ekWh/ft^2]
2019	2,707,711	567,897	1,195	63.39
2024	2,671,175	456,309	997	54.52
2019 vs. 2024	1.37%	24.45%	19.91%	16.08%

By 2029, KDH can expect similar results if we obtain the funding and resources to implement all of our proposed future projects highlighted in this plan.

To maximize the effectiveness and value of our energy management initiatives, we will continue to deploy a strategic approach. The organization will continue to fully integrate energy management into its business decision-making processes, policies, and operational procedures.

A Reflection on KDH's Energy Management Vision

In 2019 KDH renewed our commitment to reducing its energy usage to decrease our greenhouse gas emissions and electrical/natural gas demand. As an integral part of this 2024-2029 plan KDH would like once again reaffirm our Environmental and Energy Management vision.

Environmental Vision

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.

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.

How We Will Achieve Success

From our success over the past five years, KDH will continue to apply our original guiding principles for energy management. These have been slightly revised to better match KDH's energy management vision.

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, 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.

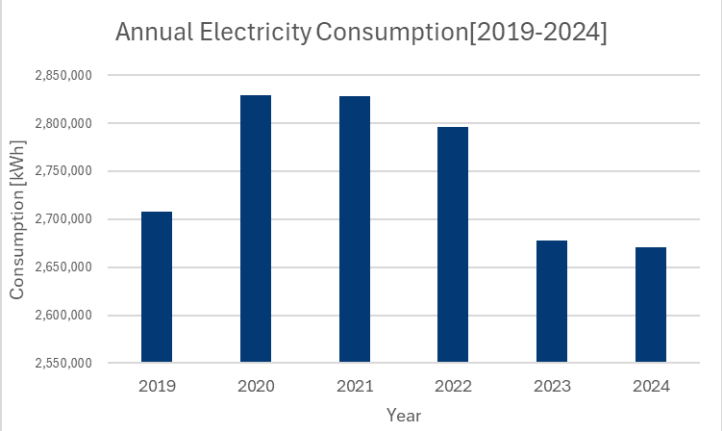
Annual Reporting Under Ontario Regulation 25/23

As part of Ontario Regulation 25/23 under the Electricity Act, 1998, KDH publishes and makes available to the public its annual energy consumption and resulting greenhouse gas (GHG) production. In addition, KDH actively tracks our monthly electricity and natural gas usages to help monitor our progress towards our energy management goals.

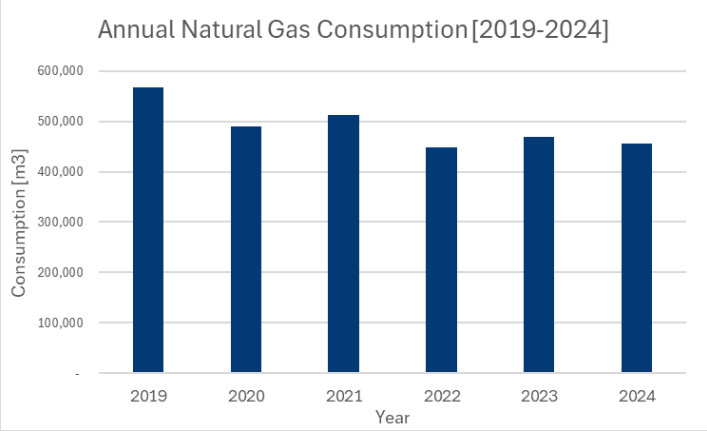
Year	Electricity (kWh)	Natural Gas (m^3)	GHG Emissions (tCO_2e)	Energy Use Intensity ($ekWh/ft^2$)
2019	2,707,711	567,897	1,195	63.29
2020	2,829,652	489,066	1,044	58.19
2021	2,828659	513,243	1,092	60.02
2022	2,759,979	448,702	964	54.86
2023	2,677,581	468,125	999	55.47
2024	2,671,175	456,309	997	54.52

KDH's total electricity and natural gas from 2019-2024 is plotted on the graphs below. Appendix A graphs the monthly usages for each commodity.

Electricity usages were up in 2020-2022, which is likely a combination of warmer temperatures, additional services being provided by KDH but also the increased airflow due to COVID. Usages in 2023/24 have dropped by pre-COVID levels despite ongoing warmer temperatures.

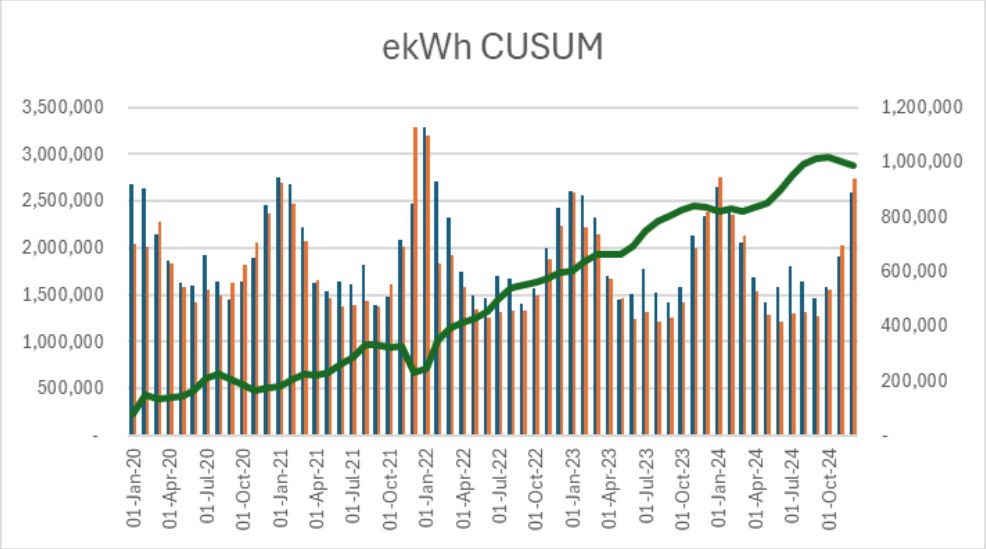


Overall, natural gas usages are down but have also benefited from two back to back warm winters 2022/23 and 2023/24.



Part of energy consumption analysis is taking weather, specifically Heating Degree Days (HDD) and Cooling Degree Days (CDD) into consideration when comparing year over year values. Weather normalizing utilizes a base year's consumption and degree days to model how utilities should be consumed given the number of degree days in a future year, assuming all else is equal. HDDs are used to adjust natural gas usages relative the amount of heating required in a given year while CDDs adjust electricity usage to how much cooling or air-conditioning is needed. Total Degree Days (TDD) add both HDDs and CDDs together and can be compared to equivalent kilowatt hours (ekWhs) consumed.

A weather normalization analysis was completed for KDH using 2019 as the base year. Natural gas consumption in m3 was converted to ekWhs allowing for a view of overall (electricity and natural gas) energy intensity of each location overtime and compared to the TDD's for the same period. The Cumulative Sum (CUSUM) of differences (green line below) illustrates the rate and direction of energy consumption relative to the base period. For example, an upward sloping CUSUM line reflects a reduction in energy intensity or savings relative to based period while a downward slope would indicate an increase in usage. The steeper the slope of the line the greater the decrease or increase in intensity.



As illustrated in the graph above, the impact of KDH's conservation efforts have resulted in positively sloping CUSUM which increases toward the end of calendar 2021. This increase in energy savings is likely a direct result of a couple key projects implemented at that time. The following section *Conservation Initiatives Undertaken Since 2019* provides a more detailed look at specific projects and their impact on natural gas and electricity usages.

The table below summarizes the average annual savings from 2020-2024 normalizing for weather. Although there is a slight increase in power usages in 2020, the net decrease in overall

energy use over the 5 years is just over 7% with a 9.35% reduction in in carbon emissions. These net reductions also provided a savings of just under $138,000.

Year	Electricity (kWh)	Natural Gas (m^3)	ekWhs	GHG tCO2e
2020	(16,957)	45,354	503,391	88.49
2021	17,718	9,113	171,066	18.41
2022	34,025	98,005	1,064,323	193.26
2023	118,169	54,369	693,958	110.20
2024	41,753	32,986	445,060	65.95
Total Savings	**194,707**	**239,826**	**2,877,799**	**476.31**
% Decrease	**1.45%**	**9.39%**	**7.21%**	**9.35%**

Conservation Initiatives Undertaken Since 2019

Over the past 5 years, KDH has invested almost $2.8 Million in improving the performance of the hospital. These investments not only reduce energy consumption and greenhouse gas emissions but provide a safer more comfortable environment for patients and staff. A summary of major projects grouped by project type are outlined below.

Building Automation System (BAS)

- ✓ Isolation Room Project – Building automation controllers and sensors were installed to regulate the humidifier, monitor room pressurization, and manage VFDs for exhaust fans through the BAS. The integrated air flow and pressure control system optimizes heating, cooling, dehumidification, humidification, and pressurization processes. It dynamically adjusts discharge air temperature and humidity levels to maintain predetermined conditions, ensuring efficient energy use and enhanced operational performance.

Building Envelope

- ✓ Exterior Wall Repair (2019/20) – Repairing the brick and mortar on the building façade reinforces the integrity of the building envelope, effectively preventing the intrusion of elements such as wind and precipitation. This preservation not only upholds the energy efficiency of the facility but also enhances the hospital's visual appeal.

- ✓ Exterior Window Replacement (2019/20)- Installed 85 (2,956 square feet) double glazed low e argon windows. Windows, much like insulation, can contribute significantly—up to 25%—to heat and cooling loss, which directly affects both gas and electricity consumption. The effectiveness of a window's insulation is assessed by its U-Factor, with a lower value indicating better insulation performance. Furthermore, when properly installed, new windows can effectively minimize air leakage.

Heating Ventilation and Air Conditioning (HVAC)

- ✓ Duct Cleaning (2021/22) - Cleaning ventilation exhaust systems as a proactive maintenance measure improves the performance and efficiency of HVAC components, ensuring optimal operation and prolonging the system's lifespan.

- ✓ Replaced Heat Exchanger (2020/21) - Replaced the outdated 1968 shell-and-tube heat exchanger with a more efficient model, leading to increased production capacity and reduced energy consumption. This upgrade significantly lowered carbon-intensive natural gas usages, resulting in a notable decrease in Greenhouse Gas (GHG) emissions.

- ✓ Upgraded Heating and Cooling Distribution Piping (2020/21) - Replaced the existing constant-flow cooling distribution piping and associated components to enhance cooling capacity, enabling the system to deliver the necessary chilled water to designated Air

Handling Units (AHUs). This ensures that temperatures and humidity levels remain within optimal comfort zones.

- ✓ Replaced AHU-1 (2021/22) – Replaced the end-of-life Air Handling Unit (AHU) with a new cooling system that offers substantial capital cost savings through reduced surface area, lower maintenance requirements, smaller footprint, weight reduction, and decreased installation costs. This advanced 4-stage cooling system, equipped with full Building Automation System (BAS) control, delivers improved performance and capacity, precise indoor environmental control to minimize temperature fluctuations all of which reduced electricity usages and ultimately operating costs.

- ✓ New Makeup Air (MUA)Unit (2021/22) – Installed a new energy-efficient 100% outside air MAU for the isolation room, which includes two exhaust packages, a humidifier, mechanical systems, ductwork, gas piping, and BAS integration. The unit features a fully modulating compressor for precise cooling control and full heating modulation using natural gas. Additionally, Variable Frequency Drives (VFD) are installed on all supply and exhaust fans to dynamically adjust and meet air change requirements through static control.

- ✓ Installed High Efficiency AC Units (2023/24)
  - IT Closet - Replaced end of life AC unit with a ductless single zone system to ensure efficient, year round cooling.
  - Fire Utility Room & Nursing Lounge - Installed a new ductless split systems to ensure efficient, year round cooling in designated spaces.

- ✓ Steam Boiler Replacement (2022/23) - The three outdated 1979 water tube steam boilers were replaced with newer, more efficient, linkage-free models. In addition to the boiler replacements, all ancillary equipment, including heat exchangers, booster pumps, and reverse osmosis (RO) systems, were upgraded to ensure optimal operation. The new system features automated controls that adjust heating demand according to seasonal needs—heating during winter and sterilization during summer—along with precise sequencing to extend the lifespan of equipment, improve air and fuel control, and enhance overall performance. This project results in significant reductions in gas and water consumption, leading to cost savings, reduced emissions, and improved building comfort.

Operational Improvements

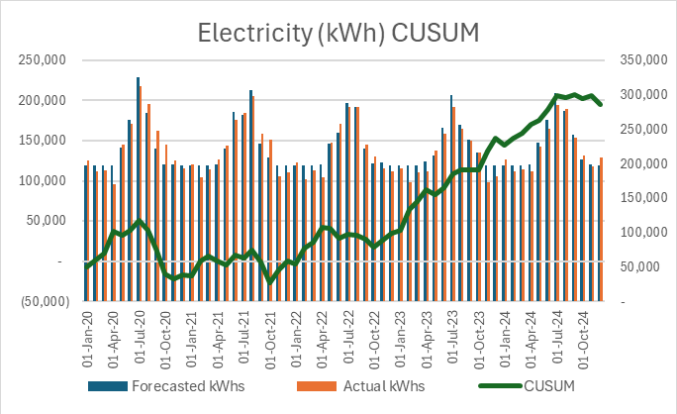
- ✓ Implemented financial practices and decision-making processes, (Training staff, Life cost analysis used)
- ✓ Ongoing staff training Building Automation System (BAS) to ensure optimal operation of each new tie-in.

- ✓ Established specifications that minimize life-cycle costs for equipment and services - Sustainability is a built-in process for all new service/equipment installs.
- ✓ Implemented Cost-Effective Facility Upgrades with energy efficient equipment installs.
- ✓ Minimize utility costs and exposure to market risks through participation in the HealthPRO Energy Management Program.
- ✓ Monitor, Track, and Reward Progress - Celebrate successful project implementations with project teams
- ✓ Implement Enhanced Design & Construction (D&C) Practices - Energy management opportunities is a built-in process for all new service/equipment installs.

The direct impact of these projects can be seen in the weather normalized graphs for electricity and natural gas below which use 2019 as the base year.

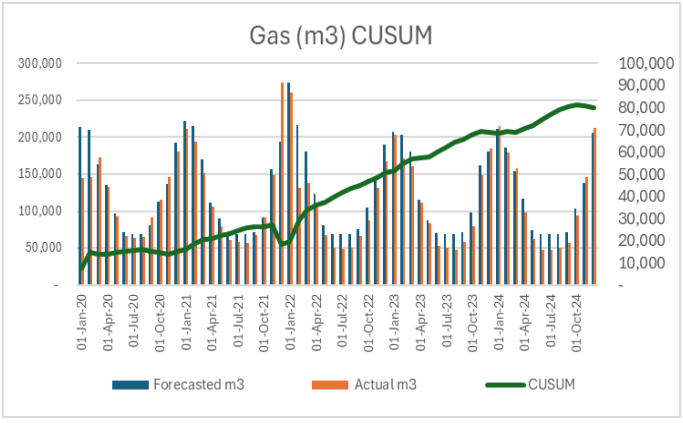
Electricity

The increased efficiency of electricity usage is illustrated by the upward sloping CUSUM line (Green) between October 2021 and 2022 before increase even further until the spring of 2024. This improvement is directly aligned with major projects as outlined above.
2020/21 – Piping upgrade and replacement of AHU-1.
2022/23 – New AC units in IT room, utility room and nursing lounge.



Natural Gas

Similarly, natural gas usages become more efficient in 2022 in tandem with the replacement of the heat exchanger and replacement of the boilers.



Combined

Some conservation measures also helped reduce electricity and natural gas usages such as, duct cleaning, expanding the BAS capabilities and new AHU.

Going Forward – Our Revised Goals and Proposed Measures

In 2019 KDH developed an extensive list of Energy Management Goals that we wished to achieve over our initial five-year CDM Plan. Moving forward, KDH would like to renew these efforts to include both old and new measures. These objectives and proposed measures are set to be implemented for, at minimum, the five years that this plan covers but most will be in place well beyond 2029.

Establish Organizational Commitment

- ✓ The Senior Leadership Team at KDH has formally approved our CDM Plans and continues to support our ongoing efforts to conserve energy and minimize our environmental impact.
- ✓ Engaging key departments (e.g., Purchasing/Procurement, Construction, Maintenance) through effective communication, education, and recognition of their contributions to reducing energy consumption will be essential to the success of our objectives and measures. Additionally, providing the necessary resources will play a critical role in achieving these goals.

Maintain Strategic Energy Management Practices

Purchasing Specifications for Energy Efficient Equipment & Services

- ✓ Use purchasing specifications that minimize life-cycle costs for energy efficient equipment and services.
- ✓ Maintain efficiency specifications for standard equipment replacement, along with design/construction, and for building operations/maintenance services.
- ✓ Enforce efficiency guidelines that apply LCCA for custom equipment purchases (e.g. chillers)

Enhanced Design & Construction (D&C) Practices

- ✓ Maintain 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 to design decisions
  - Apply established purchasing procedures and specifications
  - Capture 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

Continued Improvement of Building Operating Performance

✓ Equipment tune-up, improved operations and maintenance (O&M) achieve the following results while supporting patient care, and facility comfort and safety:
- Reductions in operating costs for existing facilities.
- Reduce the system-wide EUI.
- Reduce energy consumption.

Cost-Effective Facility Upgrades

✓ Implement equipment and system upgrades where justified by life-cycle cost analysis.

✓ Expand use of qualified service providers as needed. Utilize standard RFP documents, contract terms, and reporting standards.

Actively Manage Energy Commodity

✓ Continue participate in HeatlhPRO Energy Management Program to:
- Minimize utility costs and exposure to market risks.
- Participate in the energy/utility regulatory process.

Measure and Report on Results

✓ Track progress on the CDM plan.

✓ Track energy reductions quarterly.

✓ Reward staff for successes.

Proposed Measures

In addition to the above goals and objectives, KDH has several projects that we hope to complete within the next five years that will not only improve the hospital environment for both patients and staff, but also further improve the hospitals energy efficiency and performance. The following section summarizes several projects which are currently being considered for implementation. If implemented, these measures will be in place until the end of their service life, which is dependent available funding from sources such as HIRF.

✓ Chiller Replacement – Replace the outdated, inefficient chiller with a modern, high-efficiency water-cooled comfort and process cooling system model. By integrating Variable Frequency Drives (VFD) on the fan motors, this upgrade will reduce energy

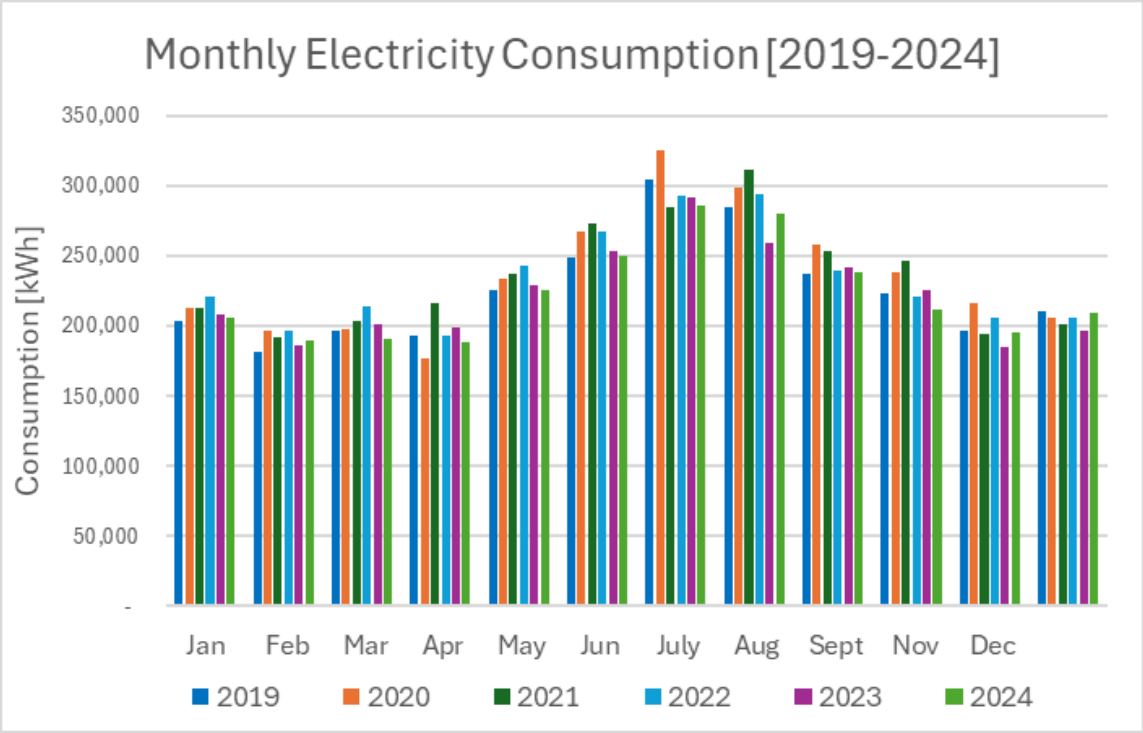
consumption by up to 30%. This reduction in energy usage will lower operational costs and significantly lessen the hospital's environmental impact, contributing to both public health and the protection of the planet.

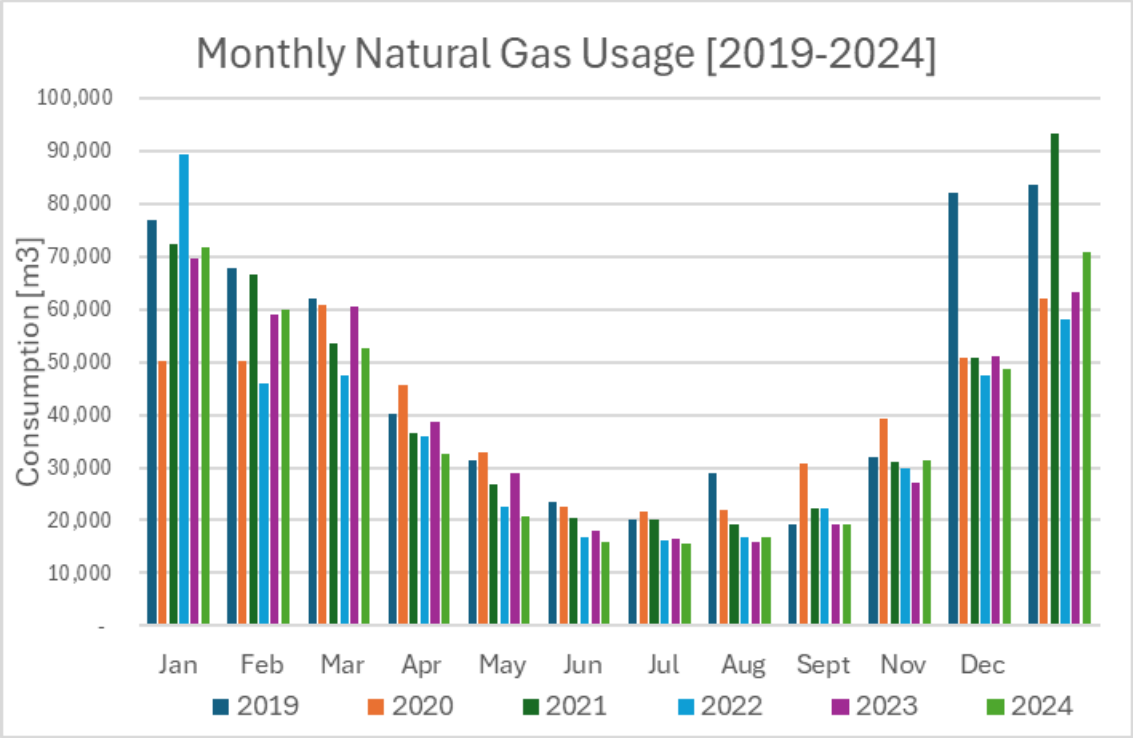
- ✓ Multi-Zone Air Conditioning Unit Replacement – Improving our HVAC technology will result in a significant reduction in capital costs through decreased surface area, reduced maintenance requirements, smaller footprint, weight reduction, and lower installation expenses. Operationally, transitioning from the current 40hp supply fan motor to a high-efficiency VFD will yield substantial savings. Additional benefits will include:
    - Improved performance and capacity
    - Precise control of indoor environmental conditions
    - Opportunities for online maintenance and monitoring

- ✓ Upgrade BAS – The integration of advanced Direct Digital Control (DDC) with our Building Automation System (BAS) will optimize temperature and humidity regulation, ensuring efficient airflow and pressure management. This upgrade will enhance energy efficiency and overall system performance. Additionally, the system will provide real-time and historical data for generating reports and graphs, enabling comprehensive analysis and informed decision-making to reduce energy costs through improved operational efficiency.
    - Key automated energy-saving features include:
    - Customizable and flexible scheduling
    - Motion detection
    - Demand Control Ventilation (DCV)
    - Optimum start
    - Monitoring and optimization of setpoints
    - Reduced maintenance and resource costs through decreased calibration and equipment servicing

  Furthermore, this project will incorporate a heat recovery wheel and steam humidifier, fully integrated with the BAS. These components will modulate to maintain return air setpoints, further enhancing system efficiency.

Appendix A





Note: Monthly gas usage during certain periods may appear exaggerated, as Enbridge uses estimated readings for extended durations before adjusting them in subsequent billing periods.