2024-2029

HUMBER RIVER HEALTH

Conservation and Demand Management Plan

Humber River Health
Lighting New Ways in Healthcare™

Humber River Health
1235 Wilson Ave
North York, Ontario
M3M 0B2

RE: RENEWAL OF 5-YEAR CONSERVATION AND DEMAND MANAGEMENT (CDM) PLAN

December 2024

The Senior Team at Humber River Health is excited and pleased to present the enclosed five-year Energy Conservation and Demand Management (CDM) plan. This plan renews our 2019 CDM plan while providing an update on our successes and outlining possible opportunities for future conservation.

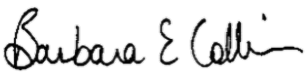
Our organization realizes that conservation takes many forms and provides benefits which include but are not limited to:

- Improved patient and employee experience
- Reduced operating and maintenance costs
- Improved efficiency of equipment and staff
- Limiting our carbon footprint

In line with our most recent CDM Plan in 2019, this document will act as a foundation for procurement, operational, and behavioural efforts over the coming years.

We look forward to providing an update on our efforts via our annual reporting and 2029 CDM Plan.

Sincerely,



Barbara E. Collins
President & CEO

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About Humber River Health

Humber River Health serves the community of the residents of North West Toronto and is committed to becoming a community academic hospital via our affiliation with both the University of Toronto and Queen's University's medical programs.

Over time, we have expanded our services from those provided at our hospital to include the Schulich Centre for Family Medicine, a Research Institute, Reactivation Care Centres at both our Finch and Church Campuses, and the construction of Humber Meadows Long-Term Care Home on our Finch site. We continue to grow our partnerships, programs, and collaborations with healthcare service providers in the Jane and Finch community, including with the North Western Toronto Ontario Health Team to establish a health hub that strengthens community services, and with LOFT Community Services to convert six residential homes in the Jane and Finch area into supportive housing units.

Our Vision:

Lighting New Ways in Healthcare

Our Mission:

Working together with our community to deliver innovative, safe and equitable healthcare

Our Values:

Compassion
Professionalism
Respect

Humber River Health Lighting New Ways in Healthcare

Overview of Our Plan

The management team, staff and patients of Humber River Health are committed to energy conservation to promote responsible stewardship of natural resources. We recognize the environmental, economic and social benefits that energy management initiatives can bring our hospitals. This includes the reduction of greenhouse gas (GHG) emissions, the lowering of the demand on the electrical network, the reduction of operating costs and the ability to re-invest resources into our provision of care.

This CDM Plan will provide an overall picture of the energy usage an intensity for all of Humber River Health along with insight into each of the three sites (Wilson, Finch, and Church). In general, Humber River Health's electrical energy is used to operate most of the hospital's systems including lighting, ventilation, air conditioning, pumps, appliances and other equipment. While natural gas is used for heating, producing domestic hot water, food preparation and the production of steam for sterilization and humidification.

Over the past five years, Humber River has seen many changes and upgrades to our care-giving capacity. In particular, the legacy Church and Finch Campuses have changed their overall offering of care which directly impacts energy intensity levels. This would include the addition of new medical equipment which has been added to our growing list of technologies to provide better services to our patients. With these additions, comes a greater demand on electricity to power the equipment.

Through ongoing conservation initiatives, Humber River has succeeded in reducing overall utility usages along with carbon emissions. In total, we have managed to keep electricity consumption increase to less than 1% and while our natural gas demand has decreased by almost 27% resulting in a 21% drop in total carbon emissions. A comparison of our 2018 to 2023 annual consumption, GHG emissions and Energy Use Intensity (EUI) has been included below.

Site	Year	Electricity (kWhs)	Natural Gas (m3)	GHG (tCO2e)	EUI (ekWh/ft2)
Wilson Site	2018	40,043,139	3,348,074	7,769	40.77
	2023	40,489,982	1,952,816	5,045	33.16
Finch Campus	2018	5,646,258	1,369,864	2,856	58.68
	2023	4,974,348	1,183,714	2,471	50.99
Church Campus	2018	4,812,593	1,113,597	2,329	42.24
	2023	5,338,073	1,122,366	2,362	43.83
Total	**2018**	**50,501,990**	**5,831,535**	**12,954**	**43.36**
	2023	**50,802,403**	**4,258,896**	**9,878**	**37.13**
		-0.59%	**26.97%**	**23.74%**	**14.37%**

Over the past 5 years, Humber River Health's conservation efforts have not gone unnoticed. All three sites have been recognized for their successful efforts, some of the notable achievements are outlined below.

Greening Health Care:

- Finch Campus - 5% Club Award (2022)
- Church Campus 5% Club Award (2023)
- Named the Green Hospital of the year in the academic peer group category for the Silver-level Green Hospital Scorecard.
- Feature Publication "Humber River Hospital: "A Case Study in World-Class Energy Efficiency"

Health Care Without Harm:

- 2023 Health Care Climate Action Winner.

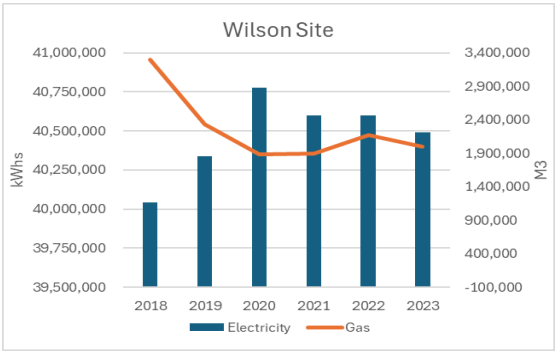
As we move toward 2029, Humber River Health will continue build off these successes and incorporating green practices into our everyday decisions.

To further strengthen and obtain full value from energy management activities, we will take a strategic approach that will fully integrate energy management into our business decision-making, policies, and operating procedures.

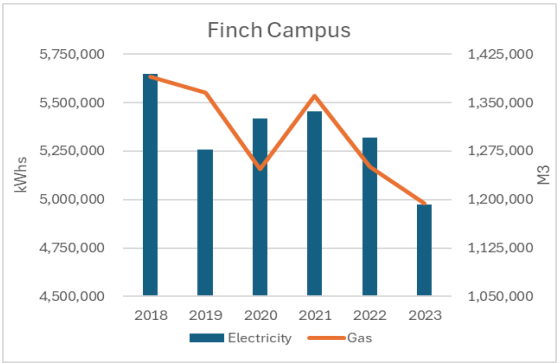
Broader Public Sector Reporting

As part of Ontario Regulation 25/23, public hospitals along with the Broader Public Sector are required to report their energy consumption and GHG emissions for each of the public agency's facilities by July 1st. Humber River Health has been reporting our annual values each year since the regulation came into Ontario Legislature in 2011 under the Green Act. We recognize the importance of continuous conservation and energy awareness and the regulations' role in encouraging energy conservation, expansion of renewable energy generation, reduction of GHG emissions and promotion of a green economy. Below are Humber River's reporting values for 2018 (the benchmark year for our first plan) to 2023.

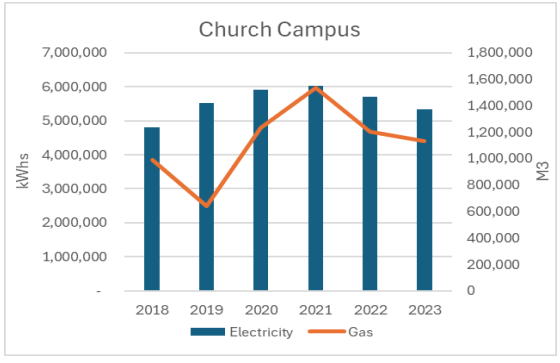
Year	Electricity [kWh]	Natural Gas [m^3]	GHG Emissions [tCO2e]	EUI [ekWh /ft^2]
Wilson Site				
2018	40,043,139	3,348,074	7,769	40.77
2019	40,338,108	2,373,304	5,825	35.45
2020	40,779,122	1,991,768	5,049	33.45
2021	40,597,819	1,875,790	4,897	32.79
2022	40,597,544	2,268,387	5,667	35.00
2023	40,489,982	1,952,816	5,045	33.16



Finch Campus				
2018	5,646,258	1,369,864	2,856	58.68
2019	5,257,797	1,420,982	2,940	59.09
2020	5,418,637	1,430,843	2,958	59.87
2021	5,452,792	1,375,328	2,861	58.27
2022	5,318,084	1,289,209	2,688	55.24
2023	4,974,348	1,183,714	2,471	50.99



Church Campus				
2018	4,812,593	1,113,597	2,329	42.24
2019	5,511,568	1,230,164	2,573	47.16
2020	5,913,169	1,241,568	2,601	48.51
2021	6,021,868	1,442,171	3,010	54.15
2022	5,700,013	1,300,747	2,722	49.54
2023	5,338,073	1,122,366	2,362	43.83



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 bas 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 each of the Humber River locations. 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. 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.

The table below summarrizes the avearge annaul savings from 2019-2023 normlizing for weather at all three Humber River locations. Although there is a slight increase in power usages, the net decrease in carbon intensive natural gas has yeilds a significant drop in emissions and provides savings of just under $400,000/year.

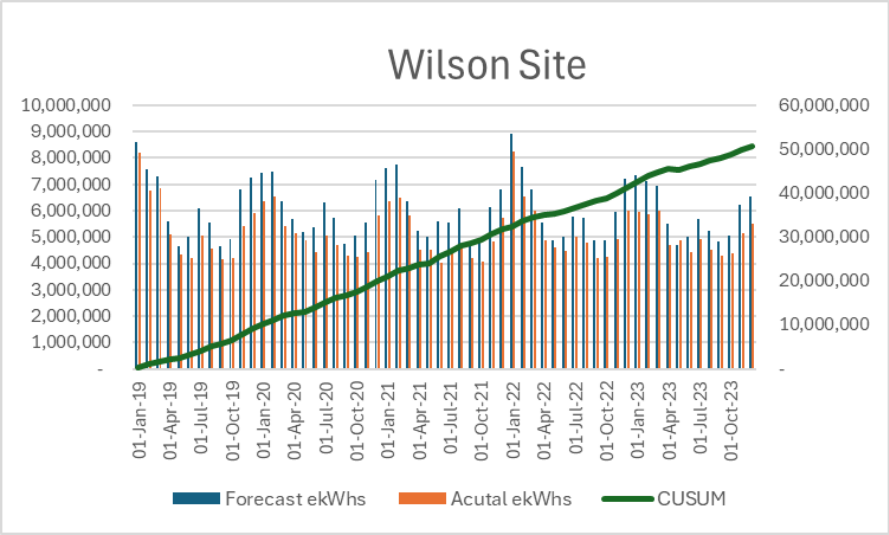
	Wilson Site	Finch Campus*	Church Campus*	Total	Total Savings ($)	GHG Reduction (tCO2e)
Natural Gas (m3)	1,137,775	151,095	(44,385)	1,244,485	472,904	2,441
Electricity (kWh)	(985,959)	138,309	191,453	(656,197)	(83,337)	19.96
Total (ekWhs)	**470,934**	**331,711**	**134,640**	**936,745**	**389,567**	**2,461**

*Note average annual numbers based on a 2020 base year compared to actual usages 2021 through 2023.

Below is a more detailed look by site of the weather normalization data summarized in the table above.

Wilson Site

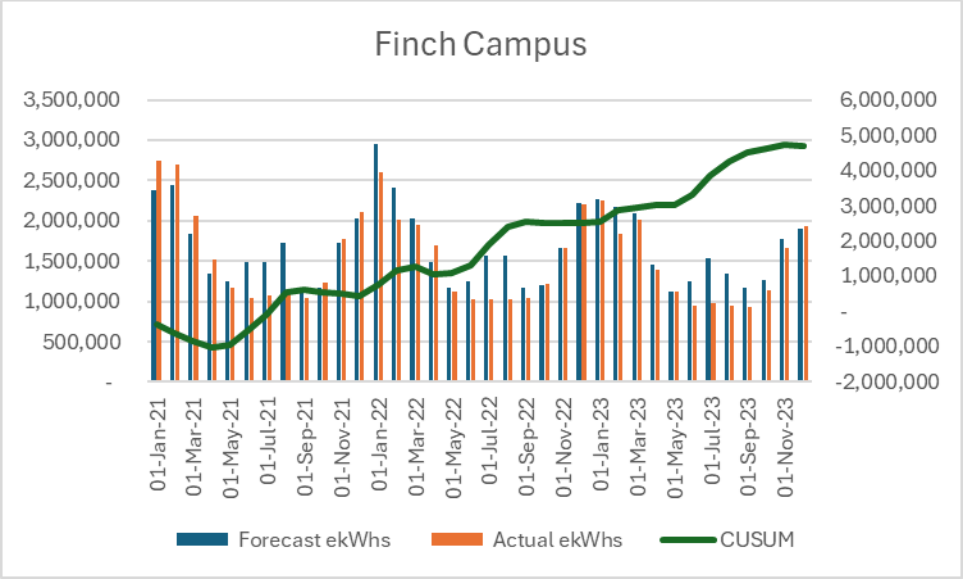
Using 2018 as the base period, the Wilson Site has seen significant decreases in their overall energy intensity as illustrated by the updward sloping CUSUM line in the graph below. The rate of improvement is also consistent indicating the conervation measures implemented since the last CDM plan continue to provide similar results. Of particular interest is the improved heat recovery project as described below where the Wilson Site dramatically reduced (35.22%) carbon intensive natural gas usage with a slight increase (2.49%) in cleaner electricity netting an overall reduciton (14%) in total ekWhs. This improvement is inspite of other projects that would have increaesed energy consumption such as the expansion of Medical Device Processing (MDR) in 2022, which would have netted a slight increase in Natural Gas consumption for the site.



Finch Campus

With the ramp up of the Wilson Site, the Finch Campus underwent a transformation from an acute care hospital to a Reactivation Care Centre (RCC) which is a collaborative and innovative approach designed to help patients who no longer need acute care services, but often find themselves waiting for an alternate care facility, such as a convalescent or long-term care facility. Due to this transformation the facility was in flux of redevelopment in 2018 and 2019. For this reason, energy usages for calendar 2020 are used as the baseline for weather normalization as it was the first full year of operation as a RCC (see graph below).

Since reopening, the facility has seen continued reduction in overall energy intensity as illustrated by the upward sloping green CUSUM line. This trend is consistent with both natural gas and electricity usages as they have seen decreases of 10.54% and 2.57% respectively. The significant decrease in natural usages is a direct result of the new high efficiency boilers coming online in 2020. Also of note is the wavey nature of the CUSUM line which indicates changes it the rate of efficiency relative to the 2020 base year. One possible explanation for these changes is the more gradual ramp of services at the facility. For example, as new services are offered at the facility, heating and cooling, new equipment, lighting and plug loads will inevitably increase energy usage (leveling or decreasing CUSUM line), while conservation measures such as the ones outlined below improve efficiency and move the CUSUM line upward again.

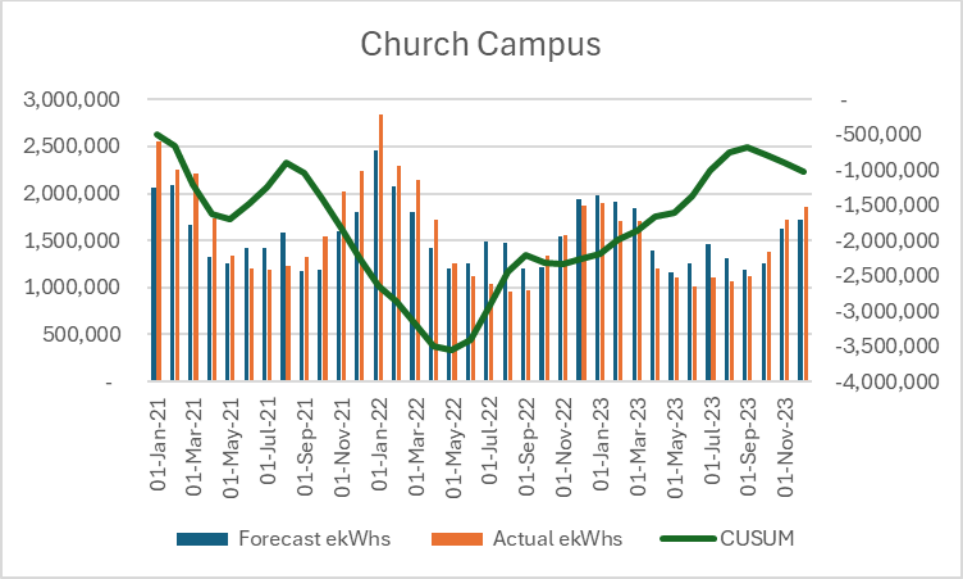


Church Campus

Similar to the Finch Campus, the Church Campus also underwent significant redevelopment from an acute care hospital to a Reactivation Care Centre (RCC) in 2018 and 2019. As such, calendar 2020 was also used as the base period for weather normalization in the graph below. However, unlike the Finch, the Church Campus has experienced a different trajectory in energy intensity over the past three years. You will note from January 2021 through May of 2022 the CUSUM line has mainly a downward slope indicating efficient use of energy. This is primarily driven by increased natural gas usage per HDD relative to the 2020 base period. Electricity consumption during this time was mainly consistent with 2020, relative to CDDs.

Moving past the spring of 2022 the efficiency of both natural gas and electricity improve to the point where the CUSUM starts it upward trend. This is primarily a result of conservation measures being implemented, like the new Building Automation System (BAS). The new BAS allows for better control of the buildings HVAC systems ensuring optimal use of energy.

Although moving in the right direction, increased services continue to apply pressure on utility usages as mentioned above. Overall energy intensity (ekWhs) from 2021 to 2023 ended up 1.85% higher than the base year 2020, however since the implementation of the new BAS ekWhs are down 8.93%.



Humber River Health Lighting New Ways in Healthcare

A Reflection on Conservation Efforts

Over the past 5 years Humber River Health has implemented considerable measures to decrease the facilities annual energy consumption and resulting greenhouse gas emissions. Most of the implemented projects directly resulted in energy savings (electricity, natural gas, or both) while others allowed Humber River to monitor usages and better identify opportunities for conservation projects. For example, the Wilson Site implemented a data analytics solution which tracks energy consumption allowing operators to audit, manage, report, and identify energy savings. Similarly, both the Church and Finch Campuses have implemented new Building Automation Systems (BAS) which provide a direct line of sight to energy usages while also allowing for specific control of the buildings systems such as heating and cooling.

As projects were identified, Humber River was able to prioritize, and implement the projects based on factors such as expected reduction in energy usage and emissions while ensuring financial viability or payback of the project. An important aspect of the financial viability relies on funding and incentives through various steams such as the provincial Hospital Infrastructure Renewal Fund (HIRF) and incentives from our local utility partners Enbridge and the IESO.

Since the completion of our last plan in 2019, over a dozen projects were successfully completed across the three sites. A summary of the types of projects implemented, and their overall impact for each location.

Lighting Upgrade

Humber River Health has worked to identify hundreds of inefficient lighting fixtures across all three locations which can be converted to more energy efficient LEDs. Not only are LEDs more efficient than traditional blubs they also provide better lighting quality. In some instances, two older traditional fixtures were replaced with one new LED. It is important to note the conversion to LEDs also provides reduced maintenance hours as LEDs typically last much longer than traditional bulbs. The aggregate impact of over 1 Million kWh represents a significant reduction in electricity usage and annual dollars saved.

Site	Electricity Saved (kWhs)	GHG Reduction (tCO2e)	Dollars Saved ($)
Wilson	500,000	15.01	63,500
Finch	436,176	13.09	55,394
Church	441,176	13.25	56,083
Total	**1,377,352**	**41.35**	**174,978**

Steam Trap Audit and Repair

Capitalizing on the funding available from Enbridge Gas, Humber River Health was able to undertake a full audit across all three locations representing 453 traps with an extremely low failure rate of 1.7%. In fact, all the steam traps at the Finch Site were functioning correctly at the time of the audit. By repairing the malfunctioning traps, the hospitals were able to reduce their natural gas usage by a combined 21,919m3 per year. This savings also represents a reduction in emissions of 43 tC02e/year and just over $8,300/year of reduced spend.

Window Replacement
Similar to insulation, windows can account for a significant (up to 25%) source of heat and/or cooling loss, impacting both gas and electricity usage. The measure of how well a window insulates is measured by the U-Factor but in this case the lower the value the better it insulates. In addition, new window installation if done correctly can reduce air leakage. Typically, when looking to procure replacement windows, looking for the ENERGY STAR certification ensures the product adheres to strict energy performance standards. NRCAN states "ENERGY STAR certified windows are about 20% more energy efficient than the average window."

As part of ongoing redevelopment, the Church and Finch Campuses to provided expanded services, failing windows were replaced to provide improved protection against the elements. In addition, these extensive window replacement projects will significantly improve the energy efficiency of both buildings. For added benefit, an additional film was added to the windows in the B Wing to reduce the suns UV rays and infrared light which produces heat in the facility. Below is a summary of the completed window replacement projects over the past 5 years.

Church Campus

- ✓ All windows in B & C Wing.
- ✓ A 200 North and South 6.

Finch Campus

- ✓ 4th, 5th and 6th floor windows.
- ✓ 2 patient rooms on the 3rd Floor.
- ✓ 17 windows B300

Equipment Upgrades
As part of the ongoing efforts to replace aging infrastructure with newer and more energy efficient equipment, the Finch Site replaced the failing boilers in 2019. The new high efficiency boilers contributed to the net reduction of just over 10% or 151,000m3 per year in natural gas usages.

Operational Changes and Optimization
A major source of energy usage within the facility, heating and cooling continues to pose a large opportunity for conservation. Through changes in operations and optimizing the use of existing equipment, Humber River Health has driven additional savings is a cost-effective way which impacts energy usage in a substantial way. Fine tuning how existing HVAC equipment runs, ensures systems are working in harmony versus against each other, for example, simultaneously heating and cooling the same space.

One project undertaken at the Wilson Site saw a significant reduction in overall energy intensity and emissions. The key components to this project were as follows:

- ✓ AHU Controls - Enhancement of the air handling unit control sequences improving energy recovery opportunities via additional set-points, control logic, and prioritization of the enthalpy wheels.
- ✓ AHU Controls - Implementation of departmental schedules on VAVs/CAVs and on AHUs throughout the facility.
- ✓ Central utility plant control - Enhancement of the central utility plant control sequences improving heat recovery chiller energy recovery opportunities. This measure focused on prioritizing energy recovery.

Overall, this project resulted in a significant reduction in carbon intensive natural gas usage with only a nominal increase in clean electricity. The table below provides a total 5-year impact in utility consumption, costs, and emissions. Note negative reflects an increase in usage while positive numbers reflect a decrease.

Site	Change in Usage	% Change	GHG Reduction (tCO2e)	Dollars Saved ($)
Electricity (kWhs)	(4,929,793)	(2.49%)	(147.95)	(626,084)
Natural Gas (m3)	5,688,887	35.22%	11,160.04	2,161,773
Total Equivalent kWhs	**50,782,446**	**14.06%**	**11,012.09**	**1,535,689**

Benefits of Strategic Energy Management

Effective energy management identifies areas that can be improved, resulting in a decreased energy consumption. This in turn reduces the amount of GHG emissions released by a facility, thus minimizing the environmental impact that its services have. However, many additional benefits can be realized from CDM practices and are the central business arguments for Humber River Health's pursuit of strategic energy management. This includes:

1. Strengthened community leadership and environmental stewardship which sees the hospital providing leadership in promoting sustainable communities, efficient business practices and environmental stewardship.
2. Enhanced healing and working environment as internal environmental controls are stabilized, the indoor air and lighting qualities are improved, and patient's/staff's comfort is maximized. All these aspects contribute to a healing and patient-focused environment and improves the level of care.
3. Improved financial health and operating cost reduction resulting from the typically lower risk of performance and savings realized from energy projects. Strategic energy management presents a highly leveraged opportunity to reduce operating costs and positively impact our bottom line.
4. Optimization of capacity to meet current and expanding operational needs of our hospital. Energy efficiency optimizes inefficient or poorly designed and operated equipment/systems which can eliminate the need to add major new energy capacity.

Initiatives and Measures for the Next Five Years

In 2019, Humber River Health developed an extensive list of objectives that we wished to achieve over the five-year term of the CDM Plan. Moving forward, we 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.

Behavioral

To see long-term changes in energy management and overall consumption, human behavior needs to reflect the goals and visions of Humber River Health. Our Senior Team and hard-working staff are committed to changing day-to-day routines and energy wasting habits to further improve the efficiency of our hospital. We will encourage patients, family and visitors to partake in these behavioural changes and help teach our community about how we all can reduce our environmental footprint.

In addition to this, the following behavioral changes will be implemented:

- A "lights off" program to encourage staff, patients, and visitors to turn off lights in areas not in use. While we recognize that healing areas of the hospital need to be continuously lit, certain areas such as offices, board rooms, and bathrooms do not need constant illumination.
- We will encourage staff, patients, and visitors to leave room temperatures at the pre-set values.
- We will make use of visual displays including simple posters and computer screen savers to remind staff about facility energy conservation goals.
- Humber River Hospital will utilize windows with shades to take advantage of solar heat gain in the winter and cooling in the summer.
- We will work towards being a leader in energy management and environmental stewardship by encouraging staff, patients, and visitors to continue practicing energy management and conservation at their homes.

Further to promoting energy conservation awareness among stuff, HRH has incorporated control measures in the building system and Standard Operating Procedure (SOP) to address behavioral patterns that may increase energy consumption:

- Wilson site has deployed occupancy sensors to turn off lights when the space is not used. Finch and Church sites are currently working through this initiative for implementation;
- At Wilson site, each department has lighting schedule programmed in the BAS to implement automatic lights off at scheduled hours;
- Local temperature control is restricted within the band in the CSA standards. Any out of range temperature adjustment requests are subject to management review and approval and must be supported by Occupational Health assessment.

Organizational

Humber River Health has been effective in taking energy efficiency into consideration when replacing and upgrading hospital infrastructure and equipment. To continue this success, the following initiatives/measures will continue to be used:

- Maintain mechanisms and processes to make resources available to fund energy projects.
- Use life cycle cost analysis (LCCA) on all new construction, major renovations and equipment replacement.
- Decisions about energy management investments will be part of Humber River Hospital's high level, long-range process for budgeting and capital investment.
- Continue to use purchasing specifications for energy efficient equipment and services and enforce efficiency guidelines that apply LCCA for custom equipment purchasing.
- Have suppliers provide reporting on the impact energy for all projects/purchases
- Enforce efficiency standards for design and construction, and for building operations and maintenance including LEED standards for future construction and retrofit programs.

Technical

Some of the most effective measures used in the past will continue to be focus for Humber River Health in the future. Primarily, energy conservation projects can be grouped into two categories:

Replacing end of life/antiquated equipment with more energy efficient models is often an effective way to reduce overall energy intensity. In most cases, not only is a reduction in energy usage achieved but performance and safety are also improved.

For example, the continued efforts to upgrade traditional lighting to LED will provide significant reduction in electricity usage with improved lighting conditions. In particular, the lighting retrofit activities at the Church Site will continue while the Wilson Site considers replacement of the aging T5 lamps throughout the facility with LED to achieve marginal gains on their already stellar energy intensity.

Beyond lighting upgrades, Humber River Health will be looking for opportunities to improve other building equipment and infrastructure which will reduce energy usage and overall operating costs. Projects like the boiler exhaust re-engineering and stack removal at the Finch site will support the new boiler configuration.

Optimizing the use of existing equipment and systems to ensure optimal performance. As illustrated above with the savings achieved with the Wilson Site's central utility plant control sequencing, optimization projects can deliver significant savings while maintaining safer comfortable spaces. Moving forward, Humber River Health will look to optimize the Finch and Church Sites as expanded services put added demands on the facility. While newer projects like Operating room occupancy control are considered, modelled, and implemented where applicable.

Each of these technical projects will be implemented for the duration of their operational life, then replaced with newer and higher efficiency models when their service life nears its end.

The behavioural and operational measures will be ongoing efforts. These measures may change as our hospitals needs and capacity grow and will be updated and revised on an as need basis.

It is important to note, the projects that we can complete between 2024 and 2029 will be dependent on the funding received from programs such as HIRF and available incentives from all levels of government.