Bridgepoint Active Healthcare

2019 Energy Conservation & Demand Management Plan

Sinai Health System

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1. Executive summary

Bridgepoint Active Healthcare (Bridgepoint) is an internationally-recognized rehabilitation and complex care hospital located in Toronto, providing inpatient and outpatient rehabilitation, palliative care, dialysis and other specialized complex care functions. Associated annual costs for electricity and natural gas at the facility are approximately $2.6M.

As part of fulfilling Ontario Regulation 507/18 of the Electricity Act (1998), a detailed review of energy consumption at Bridgepoint has been performed, and an updated Energy Conservation Demand Management Plan (ECDMP) has been generated to cover the 5-year period of Jan-2019 to Dec-2023.

A number of potential energy conservation measures (ECMs) have been identified, along with a forecast of total energy savings resulting from implementation. The annual savings for these initiatives total over $200k and 8% of annual utility expenditure, as summarized below:

ID #	Energy Conservation Measure	Electricity Savings (kWh/year)	Demand Savings (kW)	Natural Gas Savings (m3/year)	Total Cost Savings ($/year)	Estimated Project Cost ($)	Estimated Capital Incentive ($)	Simple Payback Inc. Incentive (years)	Measure Life (years)	Savings as % of Site Cost
1)	Lighting LED Retrofits	602,355	119	-	$73,997	$271,000	$43,360	3.1	5	2.8%
2)	Lighting Controls Upgrade	234,365	40	-	$25,699	$150,500	$23,436	4.9	> 5	1.0%
3)	Steam boiler economizer	-	-	67,710	$12,042	$90,000	$10,886	6.6	> 5	0.5%
4)	Extending small chiller operating range	143,743	-	-	$3,813	$5,000	$0	1.3	5	0.1%
5)	Wintertime free cooling	187,895	-	89,711	$20,938	$120,000	$0	5.7	> 5	0.8%
6)	AHU setback and optimization	1,743,222	-	228,324	$86,846	$150,000	$0	1.7	> 5	3.3%
7)	Parking garage AHU setpoint optimization	102,205	-	-	$2,711	$5,000	$0	1.8	5	0.1%
	Total	**3,013,786**	**159**	**385,745**	**$226,046**	**$791,500**	**$77,682**	**3.5**		**8.6%**

Bridgepoint Active Healthcare's central energy conservation goal is to reduce energy consumption, energy demand, operating costs and greenhouse gas emissions without impacting the high standard of patient care. Specific goals for Bridgepoint are electricity and natural gas usage reduction through capital project implementation and improved employee awareness and training.

This report subsequently provides analysis of each of the major utilities, their usage and potential savings measures, along with a summary of the previous ECDMP and details of each project identified as part of the updated ECDMP.

2. Background

2.1 Total utility consumption and costs

Bridgepoint Active Healthcare (Bridgepoint) is an internationally-recognized rehabilitation and complex care hospital located in Toronto, providing inpatient and outpatient rehabilitation, palliative care, dialysis and specialized complex care functions.

Total site utility usage, expenditure and associated GHG emissions for the period of January to December 2018 are provided in the table below:

Utility	Unit	Total Consumption	Total Cost (Ex. Tax)	Average Utility Unit Cost	GHGs Emitted (tCO2e)
Electricity	kWh	15,788,175	$ 2,006,470	$ 0.13	632
Natural Gas	m3	3,006,990	$ 615,038	$ 0.20	5,677
		TOTALS	**$ 2,621,507**		**6,309**

Figure 1: Jan-18 to Dec-18 utility consumption summary

Trending for utility usage, cost and GHG emissions over this same time period is provided below:

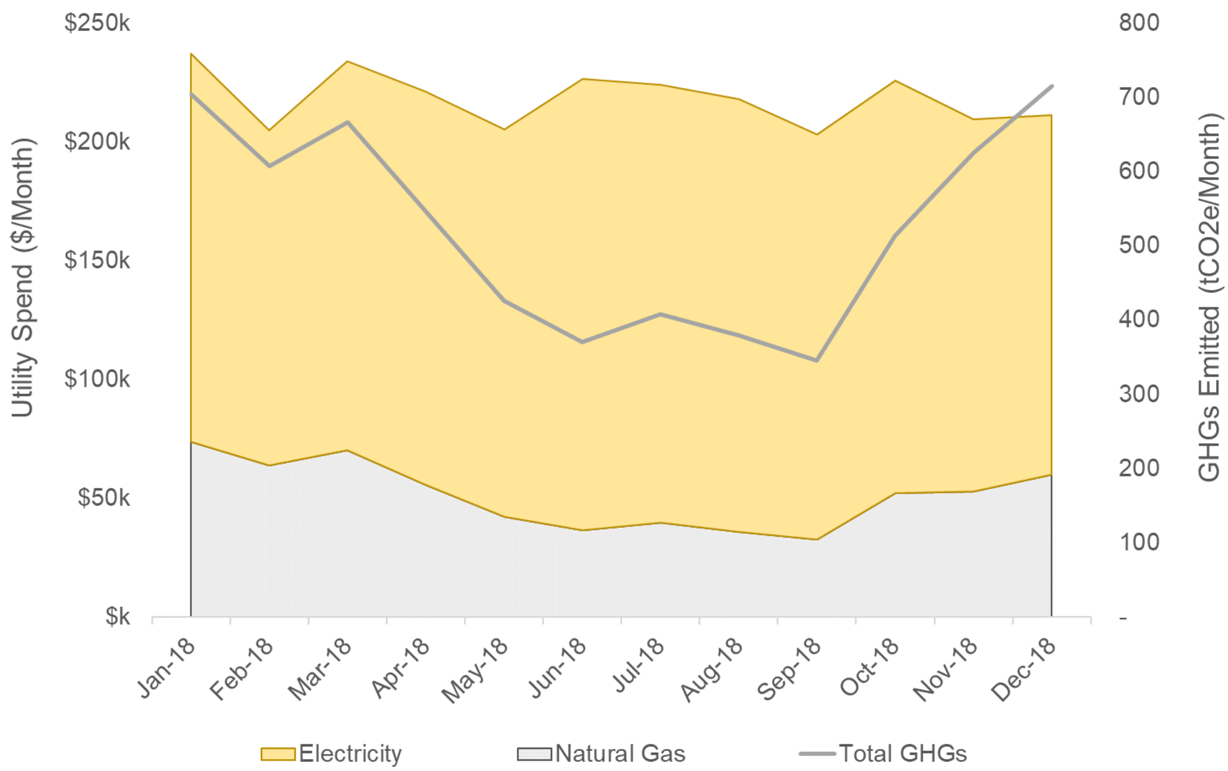

Figure 2: Utility spend and GHGs emissions trend, Jan-18 to Dec-18

2.2 Historical utility consumption

Utility consumption and costs for the most recent periods with available data are shown below for electricity and natural gas:

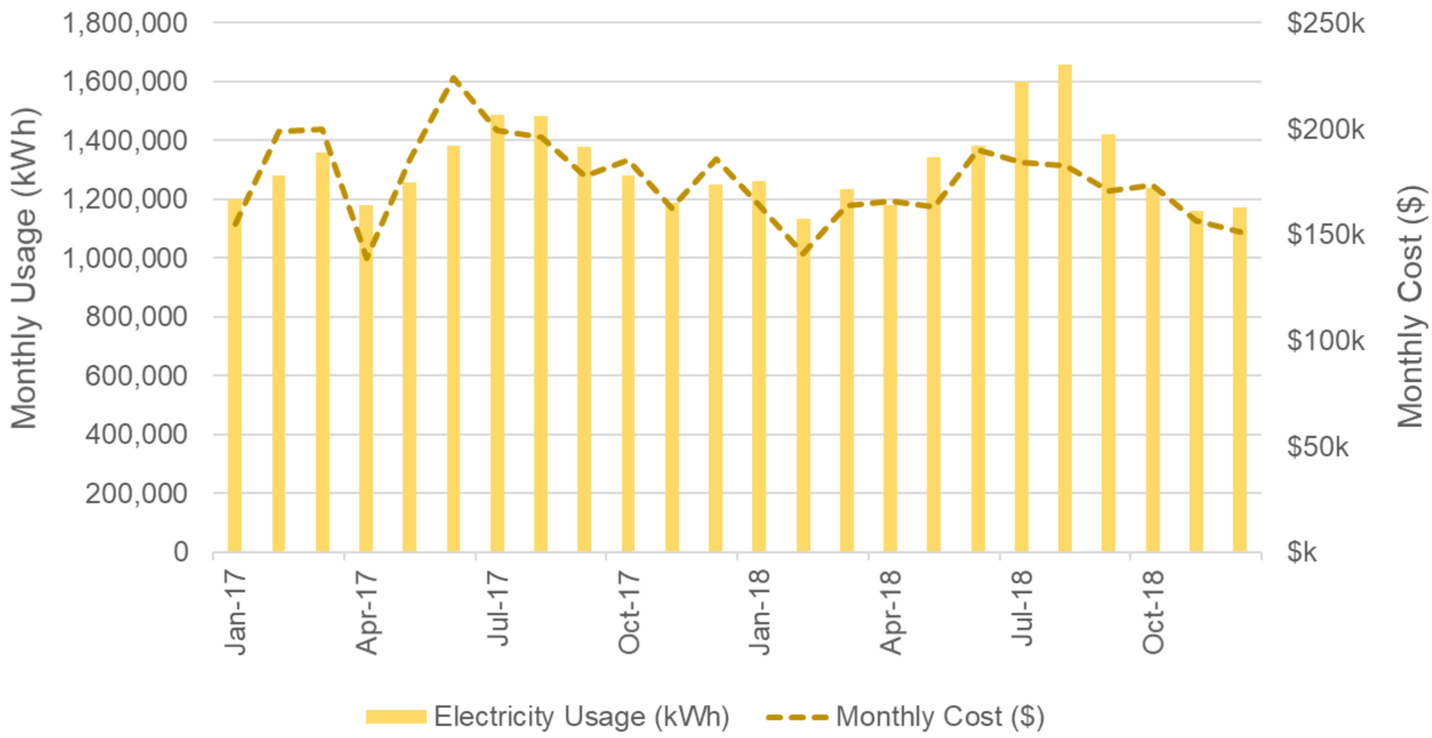

Figure 3: Historical electricity usage and cost

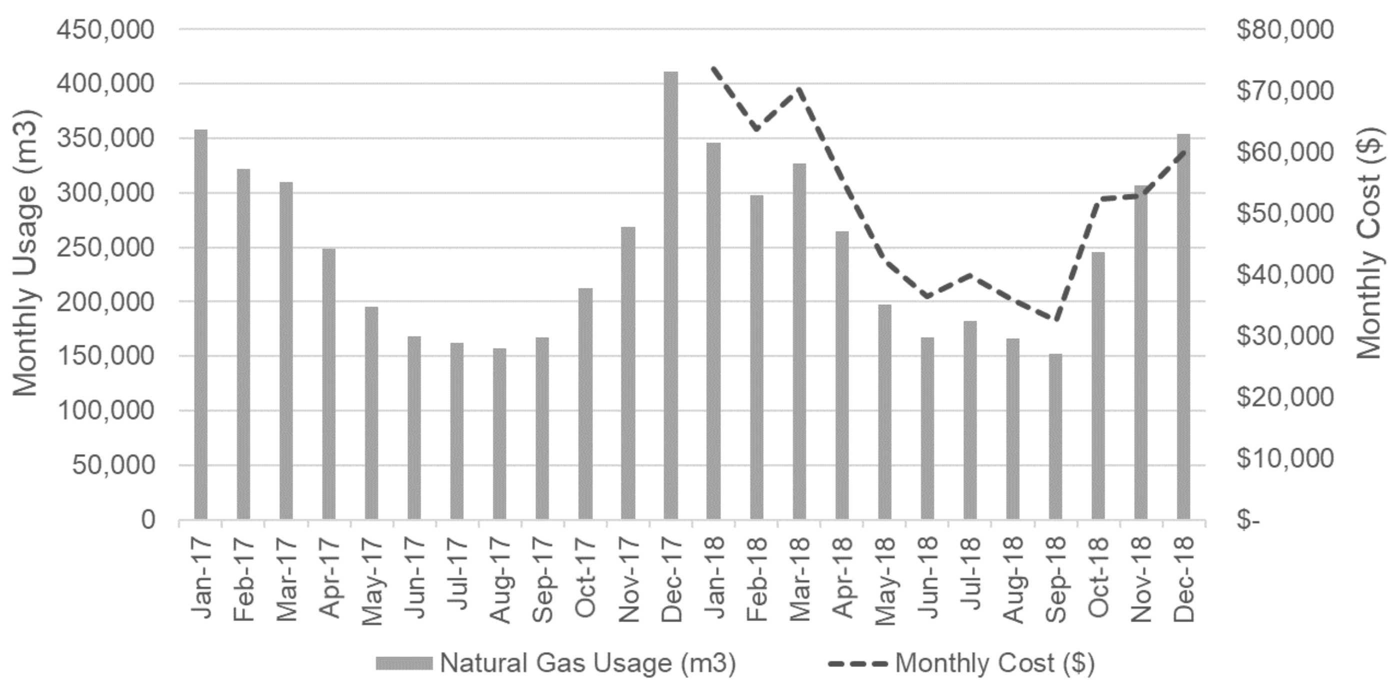

Figure 4: Historical natural gas usage and cost

Both natural gas and electricity usage appear to vary cyclically with outdoor air temperature, with gas usage increasing during colder months, and electricity usage increasing during warmer months. This high-level trend is expected given the site's significant space heating and cooling loads, as gas is used to generate steam and water, which is then used to heat and humidify incoming air during colder months, while electricity is used to operate a chiller system to cool incoming air during warmer months.

2.3 Additional energy sources

Bridgepoint Active Healthcare does not currently operate any renewable energy generation systems. No ground source or solar energy is harnessed at this time via systems operated by the public agency.

At present there are no plans to operate heat pump technology, thermal air technology or thermal water technology in the future outside of those noted in this report's proposed measures.

3. Utility consumption review

3.1 Electricity

3.1.1 Consumption and cost breakdown

Electricity consumption in 2018 was around 15.8GWh at a cost of ~$2M before tax. Most of this cost (64%) was for Global Adjustment charges, as shown below:

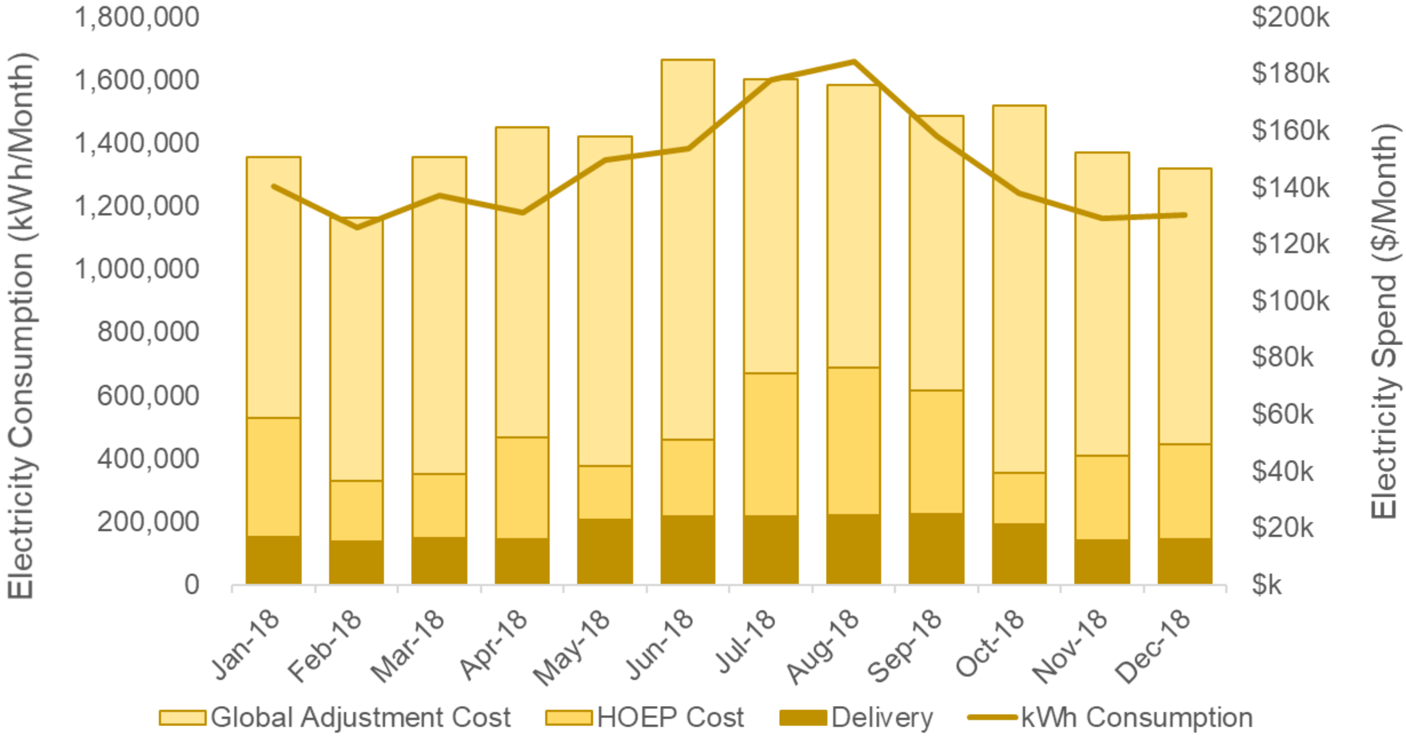

Figure 5: Electricity cost breakdown and consumption

Electricity for Bridgepoint is currently distributed by Toronto Hydro on the 1,000 kW to 4,999 kW rate tariff, with the commodity component purchased from ECNG. Electricity charges are broken out below:

Description	Cost ($)	Cost Basis
Commodity Cost	Spot	per kWh
Global Adjustment	Variable	Previous Year's PDF (Class A)
Transmission Network	$2.5677	per Peak kW per 30 days
Transmission Connection	$2.3030	per Max kW per 30 days
Customer Charge	$983.72	per 30 days
Distribution Volumetric Rate	$6.3766	per kVA per 30 days
Transformer Discount	-$0.62	per kVA per 30 days

Note: Data from Toronto Hydro 1,000 kW to 4,999 kW Tariff (May 1, 2019), Ex. Rate Riders

Table 1: Electricity cost breakdown, 1,000 kW to 4,999 kW rate tariff

3.1.2 Electricity use drivers

Given the large apparent effect of site cooling load on total electricity it was assumed that variation in hourly outdoor temperature (represented as cooling degree hours) would significantly explain variation in electricity consumption at the facility. A regression analysis was performed against this variable yielding the following equation:

Regression	Unit	Y-intercept	Coeff. #1	Coeff. #1 Value	R2
Electricity vs. CDHs	kWh	1,182,150	CDHs	43.56	91.05%

Table 2 : Electricity regression results

Predicted electricity usage based on the above equation is plotted against actual site electricity consumption below for the period of April 2017 to December 2018:

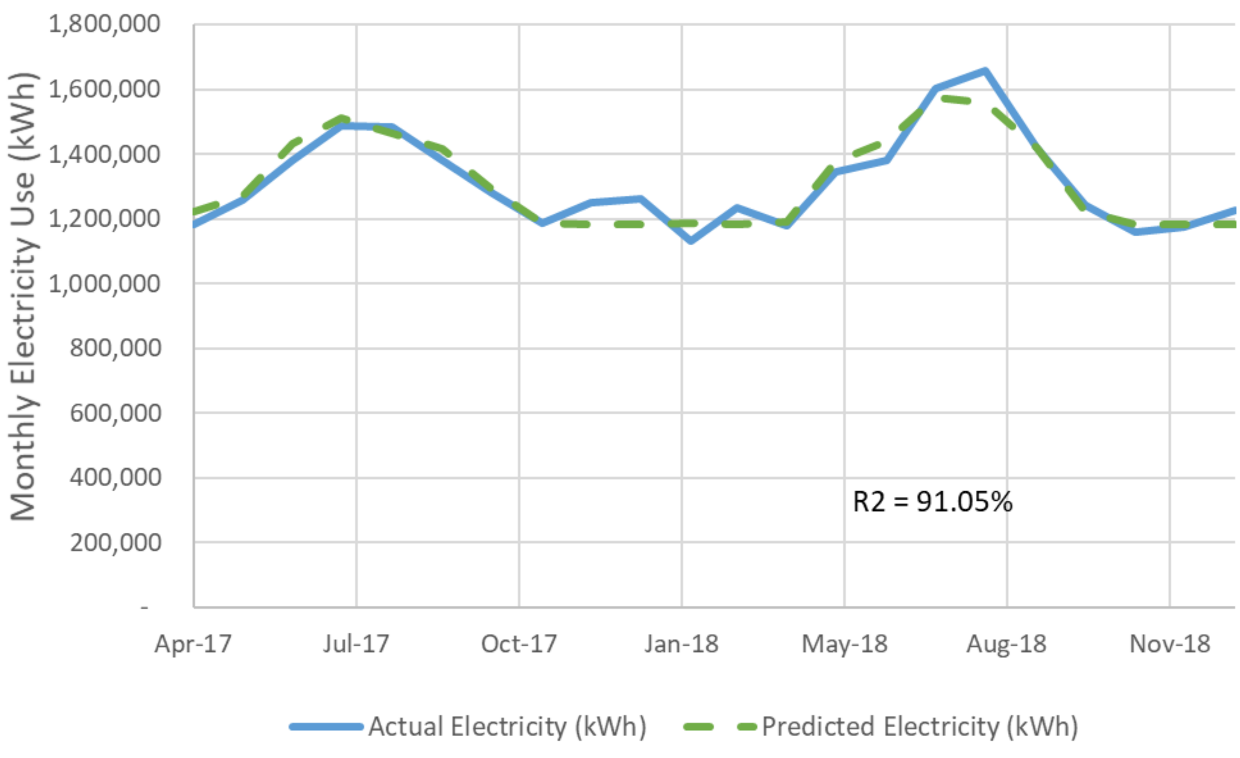

Figure 6 : Actual vs. predicted electricity consumption

The high coefficient of determination (R2) of 91.0% along with other statistical measures demonstrates that this equation can be used to model baseline electricity consumption moving forward and allow high-level savings quantification resulting from any electricity-reduction initiatives.

3.1.3 End-use breakdown

Approximately 45% of total electricity at Bridgepoint is consumed in the supply, exhaust and return of air through multiple distributed air handling units. A further 24% of electricity consumed at the site is for operating a chilled water supply system, which provides cooling for all incoming air during warmer months. The remaining electricity consumption on site is split between other pumps (including the heating system) lighting, air compressors, general hospital loads, and other site systems.

Electricity end-use consumptions have been calculated based on spot measurement data taken from the local building automation system, along with motor sizes, live VSD loading data and estimated loading/run hour data gathered during site visits. The calculated electricity end-use breakdown for 2018 is provided below, broken out by asset class:

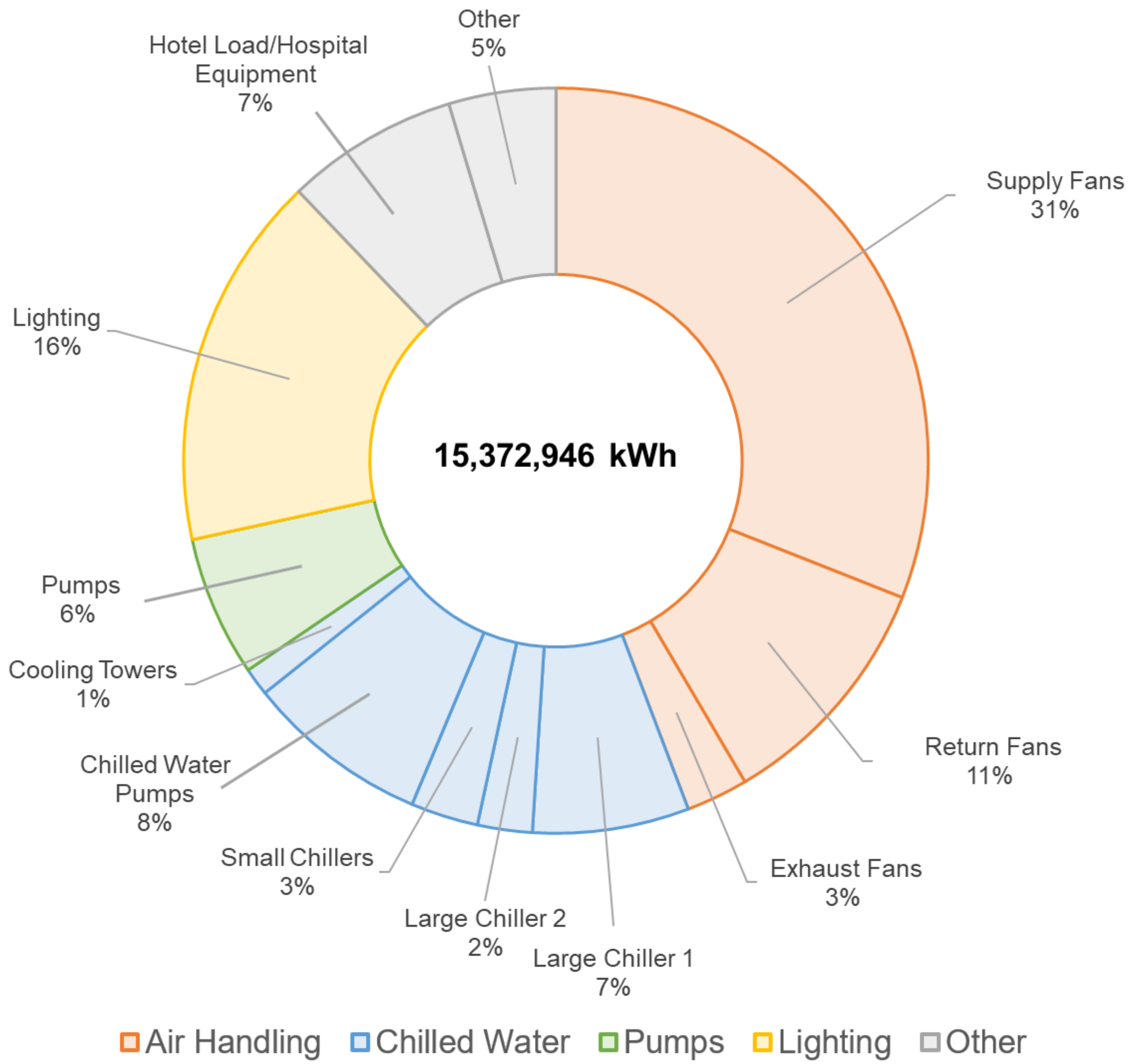

Figure 7 : Estimated 2018 electricity end-use breakdown

3.2 Natural gas

3.2.1 Consumption and cost breakdown

Natural gas consumption in 2018 was around 3 million m3 at a cost of ~$600k before tax. Approximately 66% of this charge is for natural gas commodity cost, with the remainder made up of various delivery, transportation and other fees:

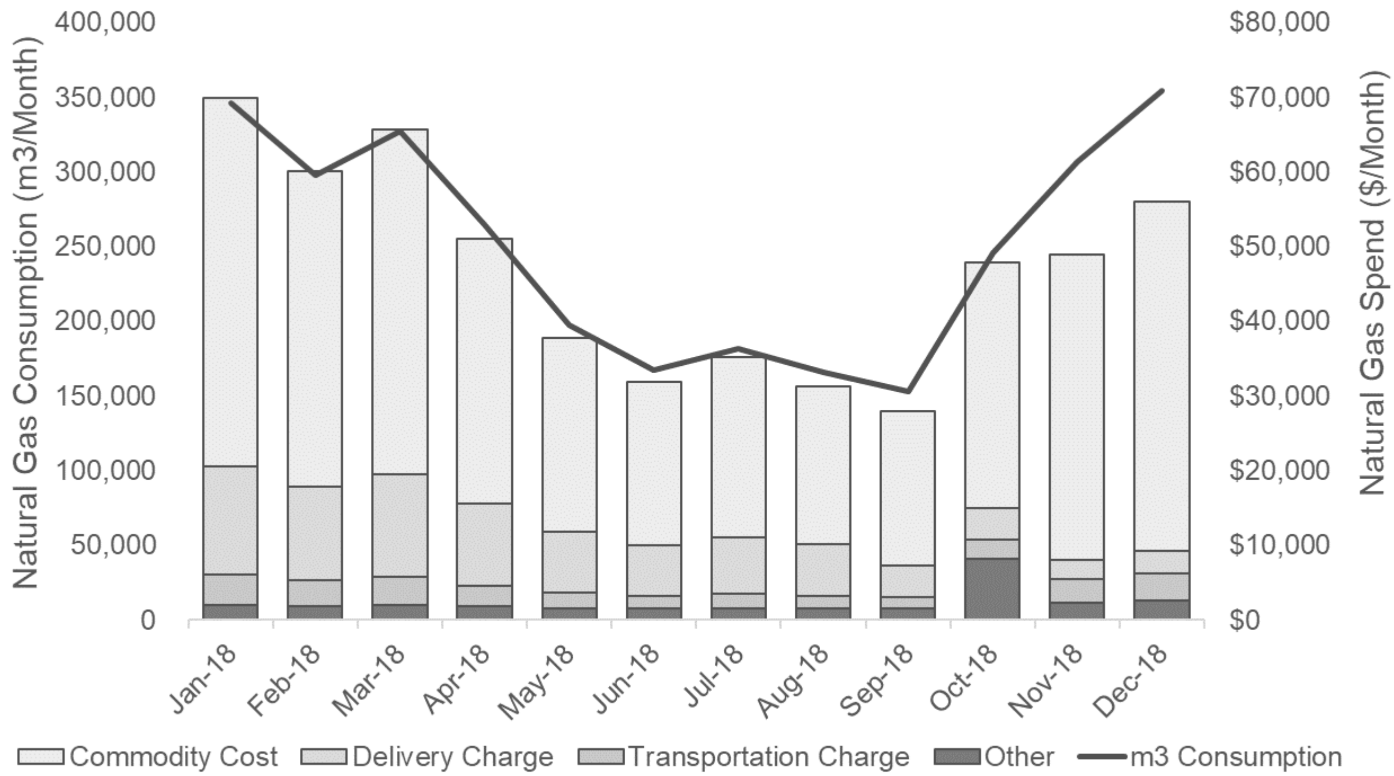

Figure 8: Natural gas cost breakdown and consumption

Natural gas for Bridgepoint is currently provided by Enbridge on the "Rate 110" rate tariff, with commodity purchased from ECNG; natural gas charges are broken out below:

Description	Cost ($)	Cost Basis
Customer Charge	$587.37	per month
Contract Demand	$0.229100	per m3 of Contract Demand
Delivery to You	$0.008545	per m3 up to 1,000,000
Load Balancing Charge	$0.002586	per m3
Transport to Enbridge	$0.041979	per m3
Gas Supply Charge	ECNG	per m3
Cost Adjustment	$0.017010	per m3

Note: Data from April 2019 Enbridge tariff

Table 3 : Natural gas cost breakdown

3.2.2 Natural gas use drivers

Regression analysis was performed against hourly outdoor temperature (represented as heating degree hours) to explain variation in steam consumption at the facility throughout the year. This analysis yielded the following equation:

Regression	Unit	Y-intercept	Coeff. #1	Coeff. #1 Value	R2
Natural Gas vs. HDHs	klb	157,172	HDHs	12.508	94.40%

Table 4 : Natural gas regression results

Predicted natural gas usage based on the above equation is plotted against actual site gas consumption for the period of January to December 2018:

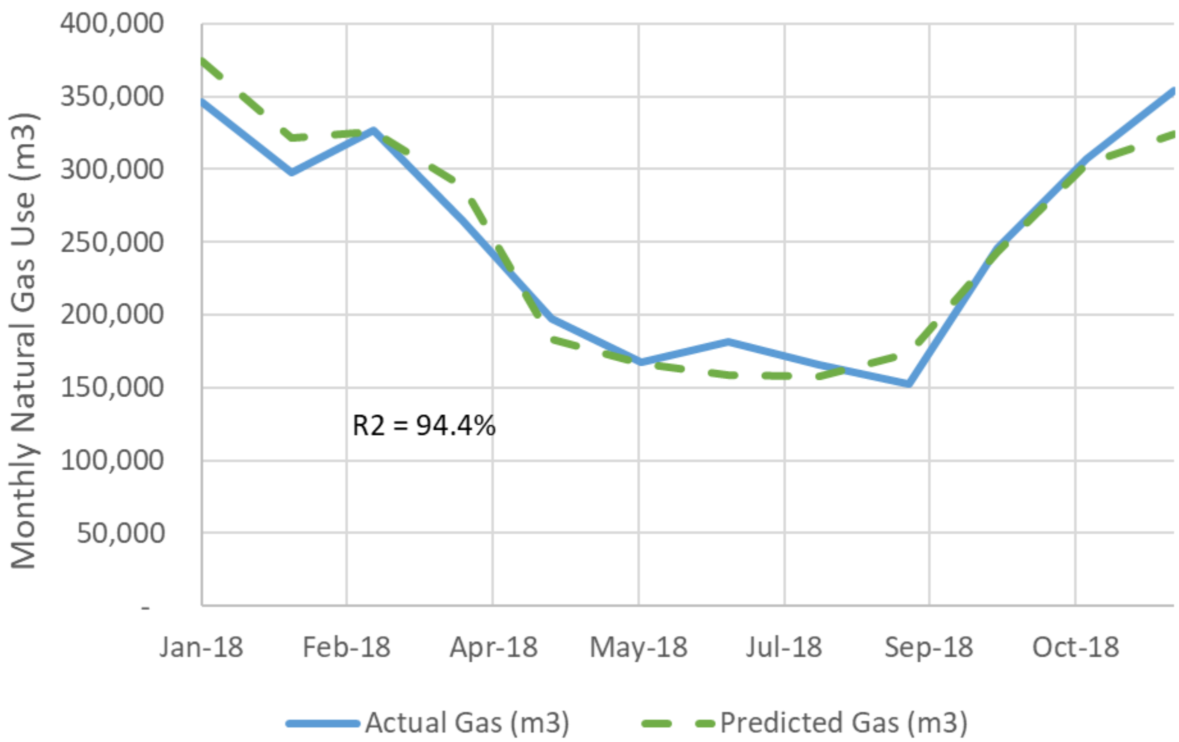

Figure 9 : Actual vs. predicted natural gas consumption

The high coefficient of determination (R2) of 94.4% along with other statistical measures demonstrates that this equation can be used to model baseline gas consumption moving forward and allow high-level savings quantification resulting from any natural gas-reduction initiatives.

3.2.3 End-use breakdown

Natural gas at Bridgepoint is primarily used to generate steam and hot water, through two distinct steam boiler and hot water boiler generation and distribution systems. Steam at site is used to generate domestic hot water, humidify incoming air and other small distributed uses. Hot water is used for heating incoming air (via hot water to glycol heat exchangers) and various other distributed heating loads.

A detailed hourly simulation has been generated for all known air handling units using air flow, relative humidity, return air % and temperature setpoint data gathered during site visits to estimate steam consumption. The calculated natural gas end-use breakdown for 2018 is provided below with gas energy converted to kWh, broken out by general area served and asset class:

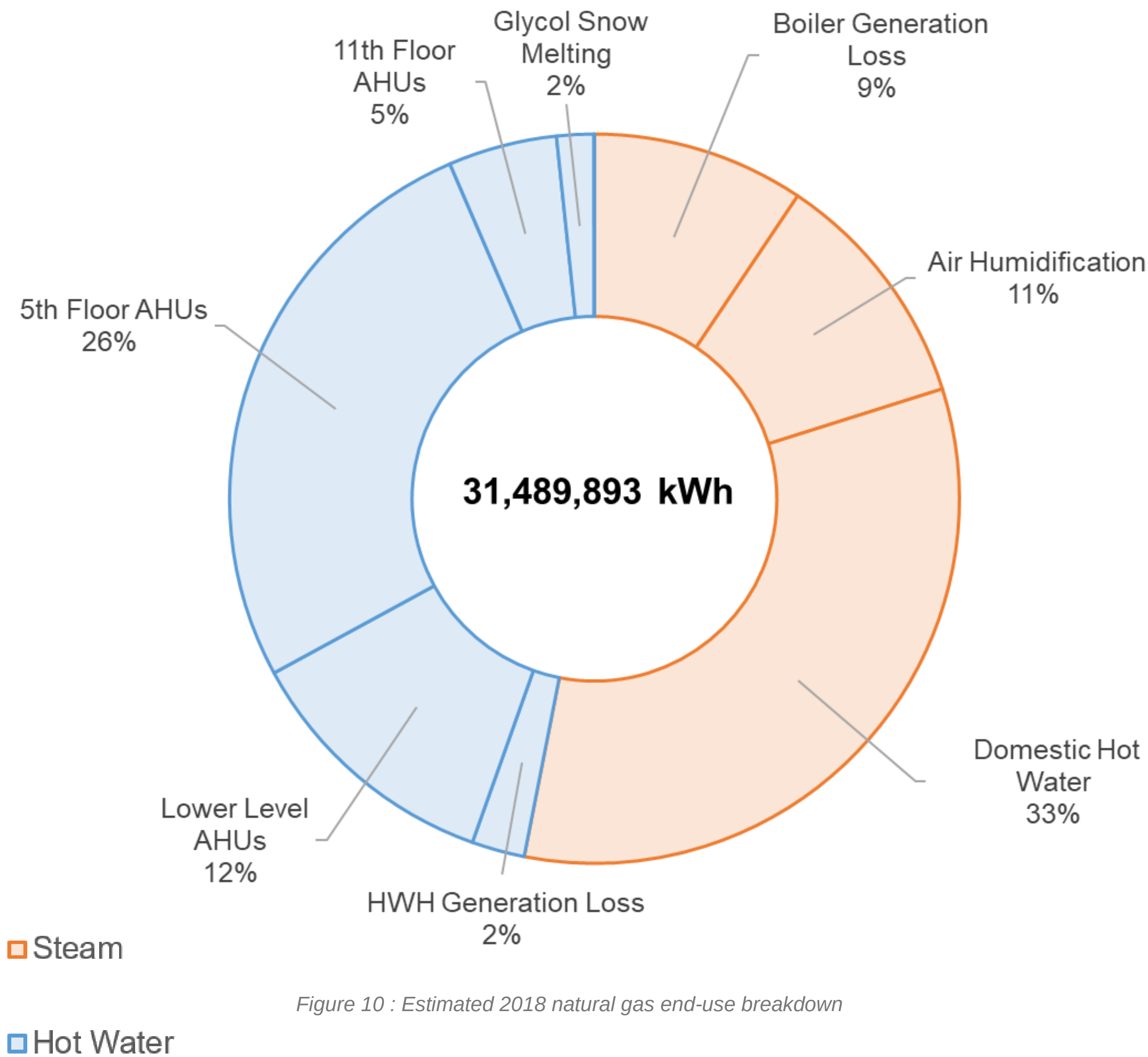

Figure 10 : Estimated 2018 natural gas end-use breakdown

4. Previous ECDMP (Jan-2014 to Dec-2018)

As part of fulfilling Regulation 397/11 of the Green Energy Act (2009), an Energy Conservation Demand Management Plan (ECDMP) was generated for Bridgepoint Active Healthcare in July 2014, covering the 5-year period of January 2014 to December 2018. Energy conservation measures (ECMs) were identified in this report and proposed for implementation.

4.1 Past ECMs Proposed

Bridgepoint Active Healthcare underwent a significant re-development ending in 2013, during which the current facility was built and began operation. As such there was not enough baseline information available to identify ECMs in the previous ECDMP. At the time, the building was state-of-the-art and built with efficient operation and sustainability in mind. As a result, no savings targets were identified and no future ECMs were identified or implemented.

The previous ECDMP instead focused on ECMs incorporated into the construction of the hospital, and setting a framework for energy and demand management and conservation for the hospital. The previous ECDMP noted that Bridgepoint's energy intensity was 7% lower than industry average despite excluding correction for extreme weather conditions during the period in question, and that energy usage at Bridgepoint according to an energy use model was 30% lower than the industry average hospital in Canada. ECMs included in the construction of Bridgepoint can be seen below:

Measure	Description	Utility
Green Roof	Green roof covering 50% of building's roof surface provides extra layer of insulation	Electricity and Natural Gas
High Efficiency Windows	Double glazed, argon filled, low-e coated windows with thermally broken frames	Electricity and Natural Gas
High Efficiency Boilers	Boilers are 88% efficient	Natural Gas
High Efficiency Chillers	Variable-speed centrifugal chillers have a COP of 6	Electricity
Lighting	Lighting system has occupancy sensors installed in office areas, staff washrooms, and storage rooms	Electricity
VFDs	Pumps and fans are controlled with VFDs so they can tune down and up as needed	Electricity
High Efficiency Pumps	Pump motors are High Efficiency	Electricity
Heat Recovery on Exhaust Air	Located in patient rooms, performs at 77% efficiency	Natural Gas
Low Flow Water Fixtures	Fixtures perform 35% better than MNECB fixtures	Water

Table 5 : Past ECDMP noted measures

5. Updated ECDMP (Jan-2019 to Dec-2023)

As part of fulfilling Ontario Regulation 507/18 of the Electricity Act (1998), a detailed review of energy consumption at Bridgepoint has been performed, and an updated ECDMP has been generated to cover the 5-year period of January 2019 to December 2023. A number of ECMs have been identified, along with a forecast of total energy savings resulting from implementation.

5.1 Energy Conservation Measures

5.1.1 Lighting technology upgrade

Lighting is estimated to account for approximately 16% of Bridgepoint's electricity consumption. A detailed lighting count has been performed for the building and identified that the majority of lighting currently consists of fluorescent light fixtures, with the exception of certain non-fluorescent areas of the hospital and the Don Jail building.

Upgrading these to LED equivalents using "swap-in" fixtures would provide ongoing electricity demand and consumption savings. The preliminary economics of this project are shown below:

ID #	Energy Conservation Measure	Electricity Savings (kWh/year)	Demand Savings (kW)	Natural Gas Savings (m3/year)	Total Cost Savings ($/year)	Estimated Project Cost ($)	Estimated Capital Incentive ($)	Simple Payback Inc. Incentive (years)	Measure Life (years)	Savings as % of Site Cost
1)	Lighting LED Retrofits	602,355	119	-	$73,997	$271,000	$43,360	3.1	5	2.8%

Figure 11 : Lighting technology upgrade preliminary economics

A number of options exist for a potential LED lighting retrofit project, from simply swapping the existing fluorescent bulbs out with LED replacement lamps to a full ballast and fixture replacement. LED swap-out is the most cost-effective and least obtrusive option, however existing ballast vs. new lamp lifespan must be considered; in some cases a life cycle analysis will determine that full fixture replacement is more cost-effective than lamp replacement if existing ballasts are near end of life.

The above savings assume an installed cost of $50 per two-lamp fixture for fluorescent swap-in lamps. The lifetime of this measure largely depends upon the LED fixture type chosen; swap-in lamps can have a rated life of up to 50,000 hours. A lifetime of 5 years can be assumed for this measure.

5.1.2 Lighting controls improvement

Lighting at Bridgepoint is already centrally controlled via the building automation system (BAS), ensuring nighttime lighting circuits are switched on according to a pre-set clock. Based on evaluation of the site's hourly electricity demand profile and feedback from staff, it is estimated that a significant portion of lighting switch-off which can be performed during overnight hours is already done.

There is an opportunity for significant light harvesting during daytime hours in certain areas, although the current lighting technology and control system does not allow for this type of adaptive control. Upgrading to LEDs (as noted in ECM 1) and installing local light level sensors would be required for any type of daylight harvesting or switch-off.

Installing lighting controls and light sensors in key areas, linking the controls back to the facility's building automation system and controlling based on light level or setback schedule would reduce electricity consumption during sunny days and overnight. The preliminary economics of this project are shown below:

ID #	Energy Conservation Measure	Electricity Savings (kWh/year)	Demand Savings (kW)	Natural Gas Savings (m3/year)	Total Cost Savings ($/year)	Estimated Project Cost ($)	Estimated Capital Incentive ($)	Simple Payback Inc. Incentive (years)	Measure Life (years)	Savings as % of Site Cost
2)	Lighting Controls Upgrade	128,796	15	-	$10,554	$25,000	$12,880	1.1	> 5	0.4%

Figure 12 : Lighting controls improvement preliminary economics

This measure is expected to last over five years, however some level of ongoing review of the system will be required to ensure occupant comfort and energy savings are both optimized. This measure will require LED upgrades noted in ECM 1 to be implemented to enable dimming of each light fixture; as such the project cost noted above is a marginal cost to ECM 1. Scheduling may also need to be updated periodically if and when the function of areas change.

5.1.3 Steam boiler economizer

The current steam boiler system consists of two Thermogenics MOG 400 EAX Thermocoil boilers with integral economizers; details on the units are included below:

Steam Boiler	Manufacturer	Model No.	Fuel	Max. Input (BTUH)	Min. Input (BTUH)	Economizer
1	Thermogenics	MOG 400 EAX	Natural Gas	16,739,000	2,400,000	Integral
2	Thermogenics	MOG 400 EAX	Natural Gas	16,739,000	2,400,000	Integral

Figure 13 : Steam boiler model information & capacity

The integral economizers on each unit consist of internal pipework at the back of the boiler through which feedwater passes prior to being converted to steam, preheating the feedwater with flue gas which would otherwise be exhausted from the unit. The rated boiler efficiency increase for a Thermogenics integral economizer is approximately 2-3% vs. no economizer, however the boilers at Bridgepoint have bypassed their economizers due to maintenance difficulties. Economizer fouling requiring permanent bypass is a common issue with integral economizers and is expensive to clean or replace to return the economizer to normal operation.

Installing external stack-mounted non-condensing economizers would allow the steam boilers to achieve up to 5% efficiency increase with improved longevity and easier maintenance vs. the current internal economizer. The preliminary economics of this project are shown below:

ID #	Energy Conservation Measure	Electricity Savings (kWh/year)	Demand Savings (kW)	Natural Gas Savings (m3/year)	Total Cost Savings ($/year)	Estimated Project Cost ($)	Estimated Capital Incentive ($)	Simple Payback Inc. Incentive (years)	Measure Life (years)	Savings as % of Site Cost
3)	Steam boiler economizer	-	-	94,303	$16,771	$90,000	$12,215	4.6	> 5	0.6%

Figure 14 : Steam boiler economizer preliminary economics

Savings associated with this measure have been calculated assuming a 5% boiler efficiency improvement with the installation of an external non-condensing economizer. Costs have been calculated assuming economizer installation on both boilers. A preliminary investigation of the area indicates that there is currently enough space to allow for installation on the stack of each boiler. This measure is expected to last over five years.

5.1.4 Small chiller optimization

The current chilled water generation system at Bridgepoint consists of two small 438 ton chillers and two large 875 ton chillers; these systems run alternately, with the small units operating in the wintertime when chilled water demand is low, and the large units operating during the summertime to handle peak chilled water demand.

Analysis of building automation system data along with feedback from site staff indicates that the small chiller system is likely oversized for wintertime demand, and must run in “Hot Gas Bypass” mode to simulate load on the chiller and allow it to operate above its minimum turndown. Site staff have indicated that hot gas bypass begins to occur at approximately 35% loading on the units.

This simulated load could be reduced operationally by changing setpoints on the units to allow Hot Gas Bypass only at or below 15% of small chiller loading, which is the minimum turndown provided by the manufacturer for these units. The preliminary economics of both projects are shown below:

ID #	Energy Conservation Measure	Electricity Savings (kWh/year)	Demand Savings (kW)	Natural Gas Savings (m3/year)	Total Cost Savings ($/year)	Estimated Project Cost ($)	Estimated Capital Incentive ($)	Simple Payback Inc. Incentive (years)	Measure Life (years)	Savings as % of Site Cost
4)	Extending small chiller operating range	143,743	-	-	$3,813	$5,000	$0	1.3	5	0.1%

Figure 15 : Small chiller optimization preliminary economics

Savings associated with this measure have been calculated via annual hour simulation based on data collected from the site’s BAS, staff and manufacturer feedback. This measure assumes that the proposed operational change is possible with the current setup; for various reasons the manufacturer’s setup may no longer be viable and this operational measure is not possible. Installation of a new smaller chiller unit which is capable of handling the facility’s low chilled water demand during these times was also investigated but not recommended due to long payback.

The operational measure is expected to last five years, however may require periodic investigation to ensure savings are still being achieved.

5.1.5 Free cooling

During wintertime significant heating energy is expended to heat incoming cold winter air for use throughout the facility; likewise chilled water energy is used to cool certain areas such as the IT room on the facility's lower level. An opportunity may exist to take advantage of incoming cold air to achieve "free cooling" by exchanging heat from the IT room and other wintertime chilled water loads with incoming cold air, to offset both cooling and heating demand.

Further design and analysis would be required to properly understand the implementation potential for this measure, however it may be possible to exchange heat between the chilled water system and the 11th floor AHU to achieve this, or to install a new heat exchanger to utilize cooling tower capacity during the wintertime. A similar system is currently in use at Sinai Health System's 25 Orde Street facility in downtown Toronto, which eliminates chiller system consumption completely during the wintertime (including all peripheral loads). The preliminary economics of this measure at Bridgepoint are shown below:

ID #	Energy Conservation Measure	Electricity Savings (kWh/year)	Demand Savings (kW)	Natural Gas Savings (m3/year)	Total Cost Savings ($/year)	Estimated Project Cost ($)	Estimated Capital Incentive ($)	Simple Payback Inc. Incentive (years)	Measure Life (years)	Savings as % of Site Cost
5)	Free cooling	187,895	-	89,711	$20,938	$120,000	$0	5.7	> 5	0.8%

Figure 16 : Free cooling preliminary economics

Savings associated with this measure have been calculated via annual hour simulation based on data collected from the site's BAS, staff feedback and operational experience from 25 Orde. The costing assumes new coils and piping will have to be installed to achieve this with one unit. This measure is expected to last over five years.

5.1.6 Air handling unit setback

Detailed information on the quantity, layout and scheduling of the main air handling units (AHUs) at Bridgepoint has been gathered from the site's building automation system (BAS). This has been combined with BAS logging data, as-builts, and site visit data to confirm or update BAS data, and understand general air flow, heating, humidifying and cooling trends throughout the year.

A detailed hourly simulation for each main AHU (with the exception of the Admin building) has been performed by applying motor size, setpoint temperatures, return air percentage, current heat reclaim savings and average air flow against outdoor temperature and relative humidity data for 2018; a summary of the results and other pertinent information is provided below:

Air Handling System	Annual Motor kWh	Annual Heating / Humidifying kWh	Annual Cooling kWh	Setback Enabled?	Outside Air %
AHU LL-01 A/B	172,848	-	-	No	0%
AHU LL-02	235,259	461,765	148,289	No	33%
AHU LL-03	182,979	344,287	110,563	No	33%
AHU LL-04	313,678	554,161	177,961	No	33%
AHU LL-05	235,259	412,673	132,524	No	33%
AHU LL-06	130,699	1,050,441	337,334	No	100%
AHU LL-07	287,538	459,836	147,669	No	33%
AHU LL-08 A/B	172,848	-	-	No	0%
AHU-05-01	705,776	1,146,462	368,310	No	33%
AHU-05-02	313,678	954,592	306,671	No	60%
AHU-05-03	496,657	1,275,048	409,620	No	33%
AHU-05-04	653,496	1,146,462	368,310	No	33%
AHU-05-05	705,776	1,146,462	368,310	No	33%
AHU-05-06	287,538	428,591	137,689	No	33%
AHU-05-07	862,615	1,360,757	437,155	No	33%
AHU-11-01	601,216	1,360,757	437,155	No	33%
TOTALS	**1,270,721**	**2,823,329**	**906,670**		

Figure 17 : Current simulated energy consumption by air handling system

The main hospital currently has AHUs split between the Lower Level (denoted "LL"), the 5th floor and the 11th floor. The majority of units utilize return air, with only AHU LL-06 requiring 100% outside air.

The site currently has variable frequency drives installed on most AHUs and associated infrastructure to allow setback, however none of the facility's AHUs currently perform setback. This is mainly due to the end uses for each AHU and their current setup; site staff indicates that the facility's ducting consists of vertical supply columns feeding multiple areas with various uses and classifications, including multiple areas which are occupied 24/7. A detailed air balancing study has not yet been performed to identify the possibility of reducing air changes in certain areas to confirm that this is possible and ensure that it can be achieved without violating the site's pressure setpoint thresholds.

It may be possible to reduce air changes for certain areas during low occupancy hours by changing setpoints at point of use. The preliminary economics of this project are shown below:

ID #	Energy Conservation Measure	Electricity Savings (kWh/year)	Demand Savings (kW)	Natural Gas Savings (m3/year)	Total Cost Savings ($/year)	Estimated Project Cost ($)	Estimated Capital Incentive ($)	Simple Payback Inc. Incentive (years)	Measure Life (years)	Savings as % of Site Cost
6)	AHU setback and optimization	1,743,222	-	228,324	$86,846	$150,000	$0	1.7	> 5	3.3%

Figure 18 : Air handling unit setback preliminary economics

Savings associated with this measure have been calculated via simulation, assuming a 30% air flow reduction through each eligible AHU between 7 PM and 6 AM. Determining the exact setback flow percentage and timing possible on each AHU along with an exact implementation strategy for this project will require significant detailed air balancing, including an analysis on each affected room to ensure minimum air change and other regulatory thresholds are met. Analysis should include both nighttime setback investigation, as well as setpoint changes if it is determined that current air supply is in excess of what is required.

It should also be noted that the existing HVAC system has a Constant Air Volume (CAV) configuration as opposed to a Variable Air Volume (VAV) configuration. This setup, combined with the duct layout mentioned above means that special consideration must be made when making HVAC adjustments to avoid affecting other areas of the hospital. Achieving the above savings will likely require significant further investigation and capital expenditure not included in the above.

This measure is expected to last over five years, and periodic rebalancing assessments are recommended to ensure the system is performing as expected.

5.1.7 Parking garage AHU setpoint optimization

Two AHUs noted above (AHU LL-01 A/B and AHU LL-08 A/B) serve the parking garage exclusively, providing air changes and warm air during winter months. Based on information gathered during site visits it is likely that these units are setup to run at a lower-than-required temperature thresholds.

Air changes for the parking garage could likely be scaled back through controls optimization to reduce fan electricity consumption. The preliminary economics of this project are shown below:

ID #	Energy Conservation Measure	Electricity Savings (kWh/year)	Demand Savings (kW)	Natural Gas Savings (m3/year)	Total Cost Savings ($/year)	Estimated Project Cost ($)	Estimated Capital Incentive ($)	Simple Payback Inc. Incentive (years)	Measure Life (years)	Savings as % of Site Cost
7)	Parking garage AHU setpoint optimization	102,205	-	-	$2,711	$5,000	$0	1.8	5	0.1%

Figure 19 : Parking garage AHU setpoint optimization preliminary economics

This measure could be implemented gradually to ensure changes do not affect wintertime parking garage operation. This measure is expected to last over five years, and periodic assessments of the system are recommended to ensure heat reclaim is performing as expected.

6. Approval for ECDMP

X

Andrew Blair
Senior Director, Building Operations

X

Dr. Gary Newton
Chief Executive Officer

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Title:	Bridgepoint Active Healthcare 2019 ECDMP
Reference:	Final
Revision Date:	March 17th, 2021

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