2019

Waypoint Centre for Mental Health Care

ENERGY CONSERVATION AND DEMAND MANAGEMENT PLAN

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Reporting Requirements

Waypoint's 2019 Energy Conservation and Demand Management Plan is a reporting requirement of the Ontario Regulation 507/18: Broader Public Sector: Energy Reporting and Conservation and Demand Management Plans.

The regulation requires:

1. A summary of annual energy consumption and greenhouse gas emissions provided to the ministry and made available online and in hard copy.
2. An Energy Conservation and Demand Management Plan updated every five years. Plans will be made available online and in hard copy.

This document was prepared by Waypoint Centre for Mental Health Care to meet these requirements.

An Introduction to Our Organization

About Waypoint Operations

Waypoint Centre for Mental Health Care (Waypoint) is a mental health hospital serving residents from Penetanguishene, Midland, Barrie, Orillia, Collingwood, Parry Sound, Muskoka and surrounding communities on their path to mental health wellness. The main campus is comprised of 11 main buildings on approximately 200 acres, has over 300 patient beds and is the area's largest employer.

The main Waypoint campus includes six regional specialized inpatient programs (Acute Assessment, Dual Diagnosis, Concurrent Disorders, Geriatrics, Transition and Recovery, and Regional Forensics) where patients benefit from an environment focused on caring, compassion, and hope. There are also three community-based programs (HERO Centre, Outpatient Services, and Specialized Geriatrics Service) providing a variety of services to seniors, adults and youth mental health in Simcoe County.

Waypoint's campus is also home to the Ontario's only High Secure Forensic Program, providing assessment and treatment to clients served by both the mental health and justice system.

The hospital is also home to the Waypoint Research Institute, formally launched in 2013, building on over 40 years of internationally recognized research committed to providing excellence in mental health care rooted in the best scientific evidence.

Our Commitment to Responsible Energy Use

Waypoint is committed to consuming energy in an efficient, cost effective, environmentally responsible manner. It is recognized that utilities and related costs are necessary to operate the facility but do not directly contribute to the quality of services offered at the Hospital. As utility costs rise, it is imperative to reduce energy consumption in an effort to control costs and continue to preserve customer service to our patients.

Waypoint's commitment to energy efficiency will employ the following key energy management principles:

Informed decision making – Energy will be monitored and tracked. Waypoint will develop, understand and communicate the key metrics so that informed decisions leading to efficient energy use can be taken. Energy audits will be undertaken to ensure optimal building operations and to determine successes of energy initiatives, ongoing monitoring and auditing of building systems.

Retrofit Program - Advance toward internal operational efficiency through a process of continuous improvement. Energy efficiency will be a key driver for retrofits and will be considered in all renovations and retrofits. Waypoint will annually take steps to reduce its footprint.

Operator Training - An ongoing commitment to continuously train and upgrade Building Operators' knowledge and understanding of building systems. Waypoint will adopt a program for re-commissioning and tuning of building systems for optimal operation.

Comfort Guidelines – Adopt industry accepted standards for building operations regarding temperature, humidity and CO2 levels to ensure optimal patient and staff comfort.

Procurement - Purchase utilities to ensure that lowest cost is achieved. Procurement will support the acquisition of energy efficient devices and technologies for the hospital.

Partnerships - Partner with industry and the public to improve energy conservation explore and develop economically viable alternative fuel sources.

Awareness & Education - Foster awareness to reduce the environmental impact of hospital activities and support realization of the hospital's Energy goals. Effectively communicate the progress and success of energy initiatives.

Building and Equipment Profiles

The following is a brief description of current systems employed at Waypoint.

Regional Buildings

Building	Approximate Gross Floor Area	Heating System(s)	Cooling System(s)	Ventilation System(s)	Hot Water System(s)
Administration	6,659 m^2 (71,675 ft^2)	Three boilers supplying radiators and fan coils	Portable spot cooling as required	Variable volume AHU with VFDs	Two hybrid electric heat pump water heaters
Toanche	13,761 m^2 (148,126 ft^2)	Three boilers supplying radiators, panels, and fan coils	One chiller and cooling tower supplying MUA units	Air handling units equipped with VFDs, VAV	Storage tanks heated by the boilers
Bayfield	2,930 m^2 (31,535 ft^2)	Three boilers supplying radiators and fan coils	Air handler and condensing unit	Air handling units equipped with VFDs, VAV	Storage tanks heated by the boilers
House 1 (Pineview)	799 m^2 (8,598 ft^2)	Two boilers supplying radiators	Two split DX units	Operable windows	Residential gas water heater
House 2 (Beacon House)	257 m^2 (2,770 ft^2)	Natural gas furnace	Split DX unit	Operable windows	Residential gas water heater
House 6	138 m^2 (1,485 ft^2)	Natural gas furnace	Split DX unit	Operable windows	Residential gas water heater
House 8	395 m^2 (4,252 ft^2)	One boiler supplying radiators	Window mounted AC	Operable windows	Residential gas water heater
Power House	549 m^2 (5,905 ft^2)	Two boilers supplying radiators and force flow units	None	Thermostat-controlled exhaust fans and exhaust interlocked with the diesel generators	One electric water heater
Environmental Services	2,273 m^2 (24,466 ft^2)	Two boilers supplying reheat coils and unit heaters	DX with rooftop condenser	Air handling unit equipped with VFDs, VAV	Storage tanks heated by the boilers

Storage	706 m^2 (7,602 ft^2)	None	None	None	None

Provincial Building

Building	Approximate Gross Floor Area	Heating System(s)	Cooling System(s)	Ventilation System(s)	Hot Water System(s)
Atrium	31,732 m^2 (341,579 ft^2)	Ground source heat pump with boilers providing peak capacity	Ground source heat pump with chillers providing peak capacity	Air handling units equipped with VFDs, VAV	Storage tanks heated by the boilers

The Atrium Building receives heating and cooling through a ground source heat pump system with chillers and boilers providing peak cooling and heating capacity, respectively. The ground source system operates to provide simultaneous heating and cooling when the outside air temperature is above -12°C.

In total, the ground source heat pump provides 296 kW of peak heating and 222 kW of peak cooling. At outside air temperatures below -12°C, the heat pumps can be switched back to cooling mode for cooling the IT rooms, for a total peak capacity of 230 kW. The heat rejected in this mode from the heat pumps can be used for building heating as needed or rejected to the ground. The chillers provide 5,950 kW of supplemental cooling, coupled with a two-cell induced draft cooling tower (5,451 kW total). The chilled water side of the system includes an economizer cycle that allows chilled water to be produced directly through the cooling tower when outside conditions permit, reducing the number of operating hours for the chillers.

Two near condensing boilers (3,212 kW total) and one condensing boiler (1,225 kW) provide supplemental heating. Energy consumption on both sides of the heat pump is measured to quantify the amount of energy this device is diverting from boiler and cooling tower consumption.

Energy Consumption

There are two sources of energy purchased for operations at Waypoint. Electricity is provided by Alectra Utilities while natural gas is provided by Enbridge. The following section summarizes the energy consumption for all buildings at Waypoint's main campus.

The following table summarizes the most recent year of energy use (2018).

Energy Utility	Consumption	Cost
Electricity	10,158,683 kWh	$ 1,301,352
Natural Gas	1,053,663 m^3 (10,952,827 ekWh)	$ 137,666
Total	21,111,510 ekWh	$ 1,439,018

Electricity Consumption

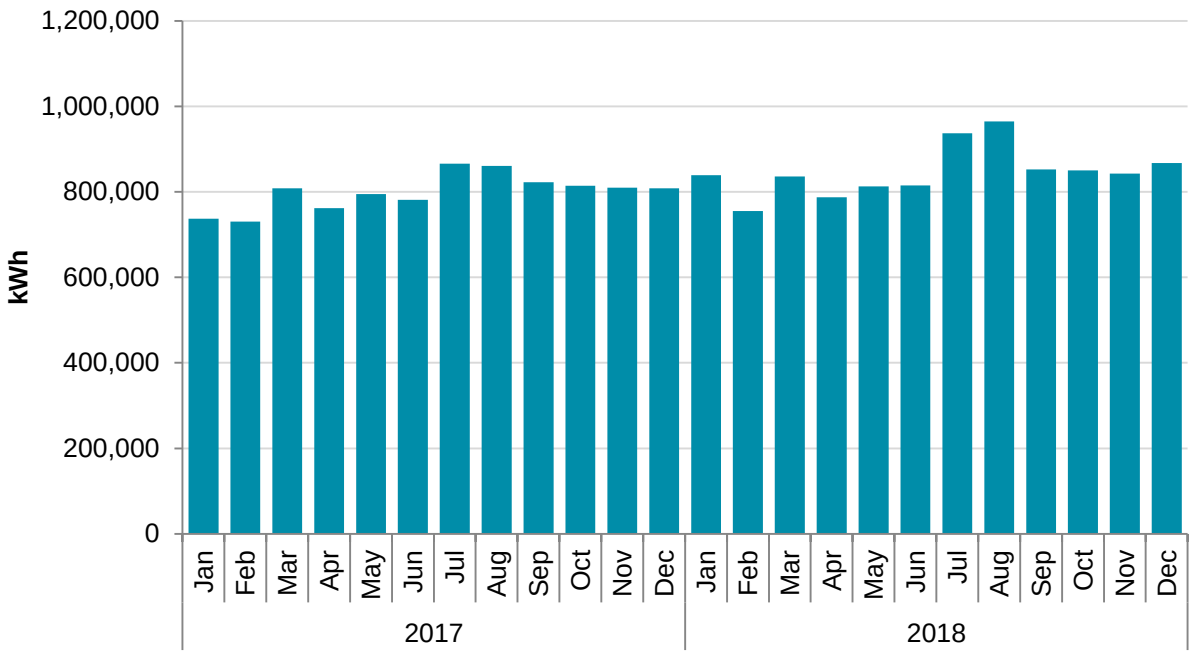
Electricity Metering

There is only one billed electricity meter which services the entire campus.

Building	Account Number	Meter Number
Site	2768520000	PWST265574

Electricity Consumption History

Past consumption is illustrated in the following graph. The two most recent complete years are shown.



The following table further summarizes electricity consumption at Waypoint from year to year.

Building	Total Consumption (kWh)				Electrical Intensity (kWh/ft^2)		
	2017	2018	Change		2017	2018	Change
Entire Site	9,594,792	10,158,683	563,891	6%	14.8	15.7	0.9

As illustrated, electricity use increased in 2018 when compared to the previous year. This may be explained, in part, by the increased need for cooling between the two summer seasons. When comparing cooling degree days (CDD) in the summer of 2018 to 2017 or historical climate norms, the summer of 2018 was warmer than both.

Natural Gas Consumption

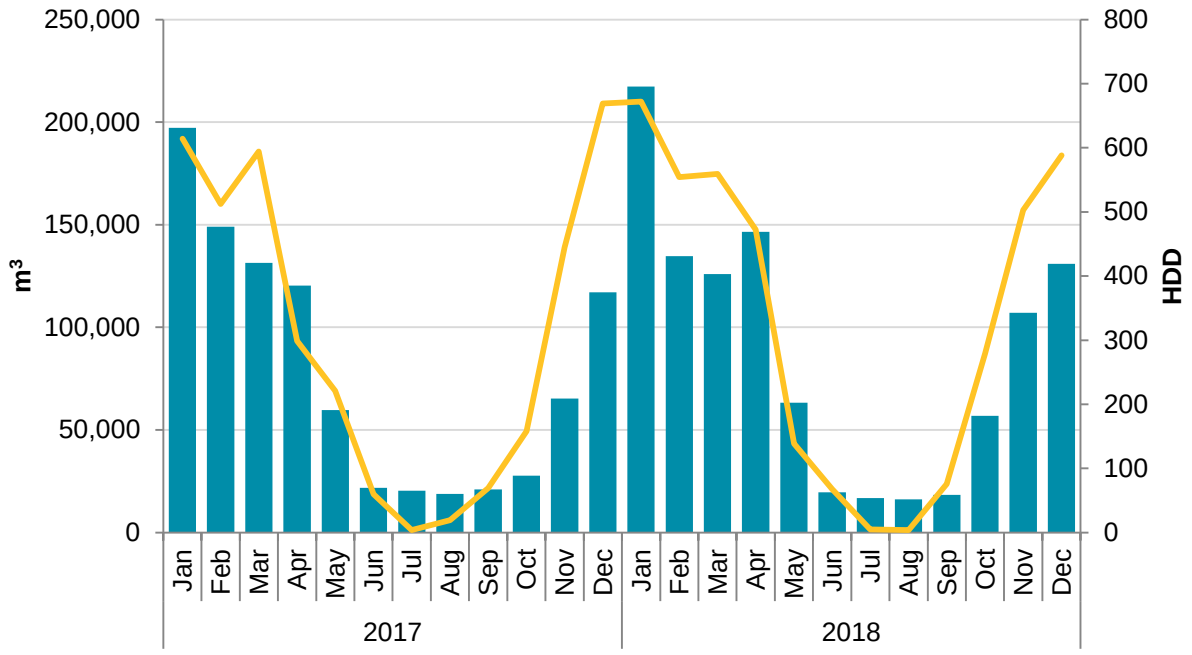
Natural Gas Metering

There are several natural gas meters at Waypoint; they are summarized in the following table.

Building	Account Number	Meter Number
Bayfield	910006687762	950124
Environmental Services	910004132686	946940
Administration	853387629990	345731
Atrium	930610077021	1005477
Toanche	853098819994	1005507
Power House	75345784532	909099
House 1	75345371010	1098368
House 2	75345370011	3318764
House 6	910004097711	3219521
House 8	75345376012	2064473

Natural Gas Consumption History

Past actual consumption is illustrated in the following graph. The two most recent complete years are shown.



The chart illustrates the correlation between heating degree days (HDD) and natural gas consumption. It appears that natural gas consumption is closely related to weather conditions. As the need for heating increases (HDD) so does consumption. This is expected as there is very little consumption related to uses other than space heating. The increase between 2017 and 2018 can then be explained, as there were approximately 8% more HDD in 2018.

The following tables further summarize natural gas consumption at individual buildings at Waypoint and the overall site consumption from year to year.

Building	Total Consumption (m^3)				Energy Intensity (m^3/ft^2)		
	2017	2018	Change		2017	2018	Change
Toanche	392,193	405,156	12,963	3 %	2.6	2.7	0.1
ESB	48,605	46,586	(2,019)	(4 %)	2.0	1.9	(0.1)
Bayfield	46,450	74,516	28,066 *	60 %	1.5	2.4	0.9
Admin	103,563	105,780	2,217	2 %	1.4	1.5	0.1
Atrium	315,222	369,654	54,432	17 %	0.9	1.1	0.2
Other **	46,136	51,971	5,835	13 %	2.0	2.3	0.3
Entire Site	952,169	1,053,663	101,494	11 %	1.5	1.6	0.1

** The increase in consumption at Bayfield requires further investigation. During the creation of this report it was noted that the meter readings at Bayfield have been estimated for over two consecutive years, rendering the data unreliable. Upon investigation it appears as though the issue may be related to a piece of hardware owned by Enbridge and will be addressed moving forward.*

*** Other includes Houses 1, 2, 6, 8, and the Power House.*

Notable Completed Projects

Envelope	1	**Insulation Installation** House 1 (Pineview) Administration	2014	Insulation was added to the attic spaces in both buildings to decrease the heat loss and improve energy efficiency.
	2	**Window Replacement** Administration Building	2015-2016	The existing windows were single pane and were replaced with new more efficient double pane windows fashioned to preserve the historic requirements of the building. The new windows are double hung.

HVAC	3	**Variable Frequency Drive (VFD) Installation** Administration Building Bayfield Building	2014	This project consisted of installing VFDs on the air handling unit in Bayfield and the pumps in the Administration Building. VFDs are able to reduce the speed of electric motors when full speed is not required, which reduces electrical draw.
	4	**Return Air Systems** Administration Building	2015	The Administration Building was previously exhausted at 100% so had no return air being recycled. Return air was introduced and reduced the amount of fresh air being conditioned and introduced to the building.

Lighting	5	**Roadway/Parking Lot Lighting** Hospital Campus	2015	Exterior lighting (400 W in most cases) was either replaced or retrofit with LED fixtures and lamps (120 W). Wall packs were also part of the project.
	6	**Bedroom Lighting** Toanche Building	2017	This project involved replacing existing linear fluorescent lighting in patient bedrooms (Predominantly 23 W T8) with dimmable LED panel fixtures (30-40-50 W) with warmer colour characteristics. There were approximately 160 total fixtures replaced. In addition to anticipated energy savings, the change to a warmer coloured light is expected to improve patient comfort, sleep, and mood.

	7	**Lighting Replacement** Bayfield Building	2019	There were ceiling fixtures in the Bayfield Building containing predominantly 13 W CFL lamps. Over time these lamps became inconsistent in colour when replacements took place. The fixtures have been replaced with 11 W LED fixtures. In addition to a limited amount of electricity savings, the occupants will benefit from better and consistent output colour in their living space and maintenance should see a decrease in the costs associated with individual lamp replacements after failures.

DHW	**8**	**Hot Water Tank Replacement** Administration Building	2016	The existing gas fired water heater has been replaced with two electric heat pump style water heaters. The new design is more efficient and should reduce overall energy use.

Process	**9**	**Motor Upgrades** Toanche Building (Main Kitchen)	2015	A total of 19 motors were replaced with new more efficient models.
	10	**Steam Boiler Replacement** Toanche Building	2018	The boiler plant supplying steam for kitchen processes was replaced. The existing high pressure boilers were replaced with low pressure steam boilers.

A more detailed summary of all completed projects affecting energy use can be found in **Appendix A**.

Notable Ongoing Projects

Envelope	11	**Window Replacement** House 1 (Pineview)	The current renovations to House 1 (Pineview) include a replacement of existing single pane windows with double pane wood frame windows. It is anticipated the replacements will reduce heat loss and improve occupant comfort.
	12	**Window Replacement** Administration Building	This is a continuation of the Administration Building window project replacing the remaining single pane windows with more efficient alternatives.

HVAC	13	**Building Automation Tuning** All Buildings Controlled By BAS	The BAS fine tuning involves adjusting set-points, reprogramming algorithms, modifying schedules and controls and ensuring proper operation resulting in more efficient operations.
	14	**Toanche Air System/Radiant Panel Integration** Toanche Building	The current heating system is a mixture of radiant and air systems which often do not work together. This measure involves a modification to building controls to better regulate two different heating systems to improve operations.

Lighting	15	**Fluorescent Lighting Retrofit** Toanche Buildings Administration Buildings Bayfield Buildings	Replace existing linear fluorescents lamps (various T8) with LED replacements. Most retrofits will reduce each lamp from approximately 25W to 15W. In addition to electricity savings, replacements will also result in less maintenance since the new lamps should have a greater lifespan.
	16	**Exit Sign Replacement** Toanche Building Administration Building Bayfield Building	The current signs used in the buildings identified are older technology of various vintages and are no longer considered efficient. Most existing exit signs are either 7 W or 14 W incandescent lamps. In addition to being dated, these lamps fail on a regular basis, causing staff to require changing the lamps. The existing models will be replaced with LED units with battery backups using approximately 4 W. This change will improve reliability, reduce energy and maintenance costs, and give a more professional appearance to the buildings.

Other	17	**Load shedding Project** Hospital Campus	Waypoint has embarked on a project with the utility company consisting of installing a battery bank connected to the main incoming power line. The goal is to be able to go “OFFLINE” approximately 20 days per year, including the 5 highest days of electrical demand to reduce the stress on utility infrastructure. The benefit to Waypoint would be that the global adjustment on future electricity invoices will be eliminated as long as the requirements are met.
	18	**Sub-Metering Project** Hospital Campus	The hospital currently only receives one monthly electricity invoice for the entire campus making it difficult to determine where energy is being used. There are currently a limited number of sub-meters installed whose intention was to better understand where energy is being sent; however, the electrical systems underwent a significant change during site redevelopment including the Atrium Building construction and the meters no longer measure as intended. A redesign and installation of additional meters would help Waypoint in informed decision making moving forward.
	19	**Repair Bayfield Meter (Enbridge)** Bayfield Building	The current Enbridge natural gas meter at Bayfield does not seem to be functioning properly. There are no readings visible on the meter and all available invoices from the past two years are estimated.

A more detailed summary of all completed projects affecting energy use can be found in **Appendix B**.

Load Shedding Project Details

Waypoint Centre for Mental Health is always looking for ways to reduce energy costs. Specifically, to reduce Electricity costs, Waypoint is looking to enter into a low risk Battery Storage solution with a vendor.

The Global Adjustment (GA) charge for Class A participants is calculated based on the demand used by the campus during the 5 peak hours of the Ontario electrical grid. To reduce the GA charge using Class A, there is motivation to reduce our demand during the 5 peak days. The issue is that the 5 peak days are not known in advance, so Waypoint needs to forecast when these peak days occur, and then load shed accordingly. In order to increase the probability of capturing any of the peak days, the participant is forced to load shed for serval days in order to capture those peaks.

Load shedding implies using methods, technology and strategies to avoid consuming electricity when market prices are the highest

Endorsement

Waypoint Centre for Mental Health Care's senior management has reviewed and approved this Energy Conservation and Demand Management Plan.

David Griffin Director, Hospital Services	/ / Date

Contact Information

For additional information regarding Waypoint's Energy Conservation and Demand Management Plan, please contact:

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Appendix A – Completed Project Details

#	Project Name	Annual Energy Savings	Annual Cost Savings ($) Energy + Operations	Implementation Cost ($)	Incentive ($)	Simple Payback (Years)	Status
1	Insulation Installation	Uncertain	-	91,000	-	-	Completed 2014
2	Window Replacement	Uncertain	-	680,000	-	-	Completed 2016
3	VFD Installation	68,140 kWh	6,810	25,159	7,972	2.5	Completed 2014
4	Return Air Systems	Uncertain	-	-	-	-	Completed 2015
5	Roadway/Parking Lot Lighting	64,328 kWh	6,433	60,000	24,000	5.6	Completed 2015
6	Bedroom Lighting	Uncertain	-	36,000	-	-	Completed 2017
7	Lighting Replacement	Uncertain	-		-	-	Completed 2019
8	Hot Water Tank Replacement	Uncertain	-	10,000	-	-	Completed 2016
9	Motor Upgrades	17,000 kWh	1,700	4,950	1,746	1.9	Completed 2015
10	Steam Boiler Replacement	Uncertain	-	250,000	-	-	Completed 2018

Appendix B – Ongoing Project Details

#	Project Name	Annual Energy Savings	Annual Cost Savings ($) Energy + Operations	Implementation Cost ($)	Incentive ($)	Simple Payback (Years)	Status
11	Window Replacement						In Progress
12	Window Replacement						Scheduled
13	Building Automation Tuning						In Progress
14	Toanche VAV/Radiant Panel Integration						In Progress
15	Fluorescent Lighting Retrofit						In Progress
16	Exit Sign Replacement	187	767	3,700	-	4.8	Planning
17	Load shedding Project	-					Implementation
18	Sub-Metering Project	Indirect					Planning
19	Repair Bayfield Meter (Enbridge)	Indirect					In Progress