

Unity Health Toronto

Energy Conservation and Demand Management Plan Update 2020 - 2024

July 1, 2019

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A Message from Dean Martin and Michael Keen

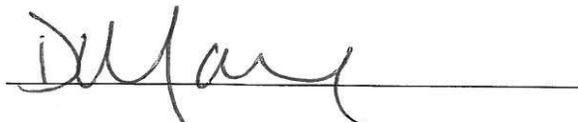
We are proud to present Unity Health Toronto's 2020-2024 Energy Conservation and Demand Management Plan.

Unity Health Toronto was founded on August 1, 2017, bringing Providence Healthcare (Providence), St. Joseph's Health Centre (St. Joseph's) and St. Michael's Hospital (St. Michael's) into one corporate entity. This plan presents our proposal for how Unity Health Toronto can successfully conserve energy-use while also managing its energy demand over the next five years.

Building on the success of Energy Conservation and Demand Management Plan 2014-2019 of the individual sites, this plan will ensure Unity Health Toronto formally addresses energy and environmental issues while continuing to seek new opportunities to decrease energy consumption.

Unity Health Toronto will continue to support existing energy conservation strategies and, over the next five years, will focus on obtaining energy savings through infrastructure renewal and behaviour changes.

Although this plan looks to the future, past successes should not go unnoticed. Within the past decade, the three Unity Health Toronto sites successfully completed major energy conservation and demand management projects. These experiences allowed Unity Health Toronto to identify additional energy conservation and demand management opportunities. The Unity Health Toronto 2020-2024 Energy Conservation and Demand Management Plan will allow Providence, St. Joseph's and St. Michael's to apply this knowledge as we continue to be a leader in energy conservation and demand management, while maintaining our vision: *The best care experiences. Created together.*



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1 Introduction

Unity Health Toronto was founded on August 1, 2017, bringing Providence Healthcare (Providence), St. Joseph's Health Centre (St. Joseph's) and St. Michael's Hospital (St. Michael's) into one corporate entity. The merger enables us to provide better and more accessible health care for all under the umbrella of a single health network.

Unity Health is mandated by the Ontario Regulation 507/18 to develop an Energy Conservation and Demand Management (ECDM) Plan and to update it every five years. Prior to the integration, Providence, St. Joseph's and St. Michael's each created their own ECDM Plan in 2014. In this ECDM Plan Update, Unity Health consolidated the ECDM plans from three sites into one centralized plan for the years 2020 to 2024.

Our Mission

Unity Health Toronto is a Catholic health care organization providing compassionate physical, emotional and spiritual care to all in need. We advance excellence in health care through world-class education, research and innovation.

Over the past five years, Providence, St. Joseph's and St. Michael's formally addressed energy and environmental issues through their own ECDM plans for the years 2014-2019. The integration provided us the opportunity to review and strengthen the three energy conservation strategies, distill the best practices from each site, and apply them to the entire network. Unity Health is confident in its ability to continue the successes achieved at each of the sites before integration, and further improve its environmental awareness, waste diversion and energy conservation.

While we are excited about what the three sites can jointly achieve, we are aware of the challenges. Unity Health strives to provide higher quality in patient care and to meet higher standards and codes. Equipment may be replaced by models providing higher capacity in order to achieve increased quality and service levels. As technology advancing in the healthcare sector, new equipment is installed to better serve patients. Consequently, the demand for overall energy is increasing although efficiency has improved.

All three sites are consistently undergoing capital redevelopment and infrastructure renewal projects. It is inevitable that construction activities along with increased service levels pose stress to overall energy use and greenhouse gas emissions. Unity Health's strategy is to apply a greening lens on all redevelopment and infrastructure renewal projects, ensuring greater energy efficiencies.

The updated ECDM plan will enable Unity Health to strengthen its goal in providing high-quality care in a more environmentally sustainable manner.

2 Review of 2014-2019

2.1 Annual Energy Consumptions

Unity Health’s sites each report their annual energy consumptions to the Ministry of Energy, Northern Development and Mines as required by O.Reg. 507/18¹. Annual energy consumptions as reported to the Ministry for each of the Unity Health sites are summarized in Table 2.1.1. We have also included 2018 annual energy consumptions to be reported to the Ministry on July 1, 2020.

Table 2.1.1 Annual Energy Consumption 2014 – 2018

Site	2014	2015	2016	2017	2018 ²
Providence Healthcare	25,064,987	24,863,929	24,076,425	23,563,661	24,410,585
St. Joseph’s Health Centre	63,689,606	61,098,963	61,028,003	57,389,630	59,809,977
Li Ka Shing Knowledge institute	19,087,987	20,342,368	20,293,235	19,679,737	23,228,837
Health Centre and Administration Offices (61 Queen)	1,702,010	1,625,370	1,485,682	1,448,873	1,569,737
St. Michael’s Hospital	68,649,585	73,833,826	73,743,693	71,177,362	70,746,280
Total Energy Use (ekWh)	178,865,834	182,405,127	181,230,072	173,881,494	179,765,416

2.2 Benchmark

Benchmarking is an effective tool to identify potential energy saving opportunities as well as setting energy saving target. Knowing where we stand among our peers allows us to learn from the strongest performers. Figure 2-1 displays the energy-use intensity benchmark for hospitals in Toronto.

¹ Annual reporting are published on <http://www.stmichaelshospital.com/about/greening/report.php>. Hard copies are available at 30 Bond St. B2 Project Engineering Office.

² Used 2017 reporting year equivalent kWh coefficient, provided by Ministry of Energy, Northern Development and Mines. 1 cubic meter Natural gas = 10.62777770 ekWh. District heating, 1 metric tonne – Steam = 647.2222270 ekWh.

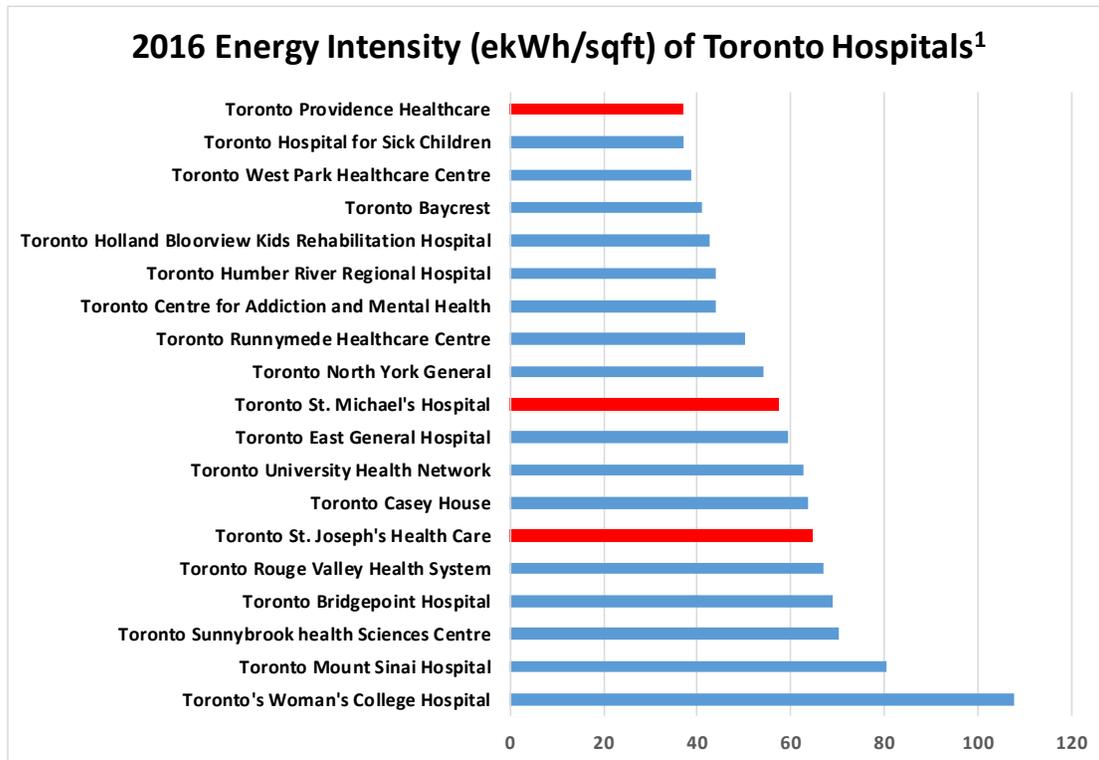


Figure 2-1 Energy Intensity of Toronto Hospitals, 2016³

2.3 Updates on Energy Efficiency Initiatives from 2014-2019

Our organization faces the challenge of competing priorities and limited funding opportunities. Our approach is to incorporate energy conservation measures into infrastructure renewal and new development, wherever possible. In the past five years, we were able to receive funding through the Healthcare Infrastructure Renewal Fund and the hospitals' capital budgets to improve energy efficiencies in our sites. Unity Health also actively seeks greening incentives through programs offered by SaveONEnergy, Enbridge and the City of Toronto.

SMH ECDM Plan, 2014 – 2019

SMH plans to continue supporting established strategies for infrastructure renewal, renovation projects and greening initiatives as part of our organizational commitment to energy conservation in day-to-day operations and planning.

³ Data retrieved on May 31, 2019 from Energy Use and Greenhouse Gas Emissions for the Broader Public Sector, <https://www.ontario.ca/data/energy-use-and-greenhouse-gas-emissions-broader-public-sector>

2.3.1 Infrastructure Renewal, 2014 - 2019

From July 2014 to June 2019, Unity Health invested approximately \$1.46 million in energy conservation capital projects. The subsequent savings amounted to \$939,000 per year. All implemented projects are in operation and are expected to be in service until the end of their lifespan. Table 2.3.1 summarizes previous projects that were completed between 2014 and 2019⁴.

Table 2.3.1 Summary of Previous Projects by Project Types, 2014 – 2019

Project Type	Project Cost	Electricity Savings (kWh)	Natural Gas Savings (m3)	Cost Savings	Simple Payback	Project Lifespan
AC Unit Replacement	\$ 67,800	14,093	0	\$ 1,691	40	15
Energy Audit	\$ 13,652	0	0	—	—	5
Geothermal Heat Pump Heat Exchanger Installation	\$ 13,250	35,802	0	\$ 4,296	3.1	20
Heat Pump Replacement	\$ 73,635	0	9,000	\$ 2,700	27.3	20
HVAC Control Upgrades	\$ 192,659	7,493	0	\$899	—	15
Installation of Equipment Controls	\$ 561,288	2,209,386	452,209	\$ 400,789	1.4	15
Lighting Retrofit	\$ 19,915	170,899	0	\$ 20,507	1.0	15
Pump Upgrades and VFD Installation	\$ 15,679	87,143	0	\$ 10,457	1.5	5
VAV Retrofit	\$ 104,047	616,917	0	\$ 74,030	1.4	10
	\$ 400,000	2,246,461	513,523	\$ 423,632	0.9	20
Total	\$ 1,461,927	5,388,195	974,732	\$ 939,003	1.6	—

2.3.2 Organizational Commitment, 2014 - 2019

Unity Health is committed to increasing awareness of its environmental impact across the three sites. A snapshot of the organization's various initiatives is summarized in Table 2.3.2.

Table 2.3.2 Unity Health's Energy Conservation and Greening Initiatives, 2014 - 2019

Locations	Initiatives
St. Michael's	Host a greening talk at the monthly orientation for new staff.
	Developed and launched new greening webpage at http://www.stmichaelshospital.com/about/greening/
	Implemented Greening Procurement Strategy in the Corporate Procurement of Goods and Services Policy.

⁴ Descriptions of selected projects are available at <http://www.stmichaelshospital.com/about/infrastructure-renewal/>.

Locations	Initiatives
Providence St. Joseph's St. Michael's	Host monthly greening meeting with key stakeholders including the Environmental Services team, the Project Engineering team and the Chief of Environmental Stewardship and Sustainability.
	Active member of Partners in Project Green. Participate in the Energy Leaders Consortium meetings approximately 3-4 times per year.
	Active member of Greening Health Care.
	Hiring of a full-time Energy Manager to monitor and implement energy conservation measures across the three hospitals.

2.3.3 Monitoring and Tracking

A Utility Review Program has been established across Unity Health. These reports tie energy efficiency to financial performances. Utility consumption reports are distributed to key players on a monthly basis.

At Providence, monthly energy meetings are held with the Facilities team to review utilities consumption and ongoing projects. Providence is part of the OpSaver program through Toronto Hydro. Under this program, Providence's energy performances and improvements are tracked and verified by Toronto Hydro, the OpSaver program administrator.

2.3.4 St. Michael's 3.0

The St. Michael's 3.0 redevelopment project⁵ began in 2015. The redevelopment enables St. Michael's to implement new energy efficient measures.

The new Peter Gilgan Patient Care Tower (PGT) includes a number of energy efficient elements to target LEED Gold certification, which will reduce electricity and natural gas consumption at PGT by approximately 18 per cent relative to the Ontario Building Code. The energy performance of the PGT will be evaluated by the High Performance New Construction Program. Unity Health expects to achieve cost avoidance in energy through implementing the voluntary new energy efficient measures.

St. Michael's ECDM Plan, 2014 – 2019

Over the next 6 years, St. Michael's is embarking on a series of projects to transform patient care at the hospital. St. Michael's 3.0 includes the construction of a new 17-storey patient care tower, a renovated Emergency Department, significant upgrades to improve the existing campus, and a reconstructed Shuter wing.

⁵ An introduction to St. Michael's 3.0 project is available at <http://www.stmichaelshospital.com/stmichaels3.0/>.

During the construction, steam-feeding the PGT resulted in an increased overall usage at St'. Michael's. Upon occupancy, the steam use at PGT will be sub-metered which allows us to assess energy efficiency of the existing space and PGT separately.

2.4 Measured Energy Savings from 2014 - 2019

Table 2.4.1 summarizes verified energy savings achieved through greening projects from 2014 - 2019. Savings from energy efficiency projects are verified by calculations submitted to incentive programs. For projects with larger savings, International Performance Measurement and Verification Protocol (IPMVP) was followed.

Table 2.4.1 Measured Energy Savings through Greening Projects

Description	2014	2015	2016	2017	2018
Electricity Savings (kWh)	62,342	41,288	2,471,769	49,895	534,684
Project Savings - Steam (ekWh)	—	—	—	5,457,608 ⁶	—
Total Savings (ekWh)	62,342	41,288	2,471,769	5,507,503	534,684

3 Goals and Objectives for 2020 - 2024

Unity Health has set up a unified goal: from 2020 – 2024, Unity Health is committed to reducing energy use by 2,000,000 ekWh per year. This goal aligns with the Energy Manager Program.

Unity Health Toronto, Strategic Plan 2019 – 2024

Coming together as Unity Health allows us to be more efficient in our work and to create opportunities for collaboration across the three sites.

4 Current and Future Energy Conservation Measures, 2020 - 2024

The integration of Unity Health's three sites allowed the organization to centralize resources for energy management. The integration has enabled the hiring of an energy manager, leveraging of best practices, sharing of knowledge and the replication of projects that have worked well across other sites. At Unity Health, management and staff have demonstrated eagerness to strive for efficiency through effective management of energy use.

⁶ Project savings were calculated by Enbridge Inc. in equivalent natural gas. Since St. Michael's uses Steam, the saved natural gas has been converted to steam.

4.1 Corporate Strategy and Policies 2020-2024

4.1.1 Organization Strategies and Integration

The recent integration of Providence, St. Joseph's and St. Michael's has provided the opportunity for a fresh look at our priorities as a single entity. Unprecedented support and interest in energy management has been demonstrated within the corporation. For example, a Key Performance Indicator (KPI) that focuses on energy efficiencies was initiated. The development of a KPI is intended to drive the organization to make improving energy efficiency one of the corporate objectives.

4.1.2 New Construction Standards

Unity Health reviews construction standards on a regular basis. These standards cover the area of lighting fixtures and bulbs, windows, low flow faucets and equipment that are used in retrofit and replacement projects. As mentioned above, the ongoing St. Michael's 3.0 redevelopment project is being designed to meet LEED Gold Certification standards.

4.2 Infrastructure Renewal, Current and Planned Measures

At Unity Health, we are continually innovating and modernizing our infrastructure, which allows us to implement new and emerging technologies along with models of integrated and specialized care. Given the constraints on funding opportunities, current and proposed measures are tied to infrastructure renewal plans. The organization's current and future projects are summarized in Table 4.2.1.

Table 4.2.1 Current and Planned Future Projects

Project Type	Project Cost	Electricity Savings (kWh)	Natural Gas Savings (m3)	Consumption Savings	Simple Payback	Project Lifespan
Energy Audit	\$ 12,500	0	0	\$0	—	5
Campaign	\$ 0	795,356	0	\$ 95,443	0	1
Condensate Tank	\$ 350,000	TBD	TBD	TBD	TBD	25
Cooling Plant Replacement and Upgrade	\$ 2,079,100	963,769	0	\$ 115,652	18	10
Installation of Equipment Controls	\$ 19,350	36,348	0	\$ 4,362	4	15
Lighting Retrofit	\$ 456,059	436,915	0	\$ 52,756	9	5
Operation Improvement	\$ 15,284	99,708	0	\$ 11,965	1	1
Pump Upgrades and VFDs	\$ 202,810	73,588	0	\$ 8,831	23	10
Steam trap Replacement and Insulation	\$ 53,540	43,991	0	\$ 5,279	10	4

Zoning Modifications	\$ 27,350	97,560	160,943	\$ 59,990	0	25
Total	\$ 755,042	751,762	0	\$ 138,821	5.4	—

4.3 Raising awareness, staff engagement and behaviour changes

Human behaviour has an impact on energy efficiency in our network. Examples of this include deciding which equipment to invest in, how we operate major equipment, and staff behaviours. From 2020 to 2024, our plan is to allocate resources to address behaviour changes in energy conservation, secure support from management, and influence staff to adopt energy-efficient behaviours in their daily work.

4.3.1 Monitoring, tracking and reporting

Unity Health will continue to utilize the Utilities Review Program to monitor energy consumption, raise awareness and evaluate the success of the ECDM plan. The review will be sent to internal stakeholders on a monthly basis to engage discussions on conservation. The Program will evaluate the effectiveness of energy conservation measures and obtain feedback from building operators and maintenance staff. Annual results will be compared to our peers' using data reported to the Ministry of Energy, Northern Development and Mines.

4.3.2 Energy Meetings

Monthly energy meetings will be held at Providence, where utility consumption and ongoing projects will be reviewed with the facilities team. Staff will investigate the feasibility of rolling out energy meetings to the facility operation team at St. Michael's and St. Joseph's. At the very minimum, stakeholders will be engaged in the Utilities Review Program which will lead to further engagement in the energy management initiatives.

4.3.3 Green Team meetings

Green team meetings will be hosted on a monthly basis. With the launch of the ECDM Plan, the meetings will inform attendees of the energy reduction targets outlined in this ECDM Plan. Meeting participants will be encouraged to brainstorm and identify savings opportunities and action plans through their daily work.

4.3.4 Campaigns and Staff Engagement

Our staff has demonstrated increasing awareness in energy savings for the organization. At Unity Health, we aim to engage energy champions who can influence staff to adopt more energy efficient behaviours. A recent example of staff engagement is a successful campaign named 'Turn Off Your Computer' which encourages staff to turn off their computers at the end of their work

day. Work is currently in progress to create more statistics, facts and best practices to support the campaign. These campaigns are planned in collaboration with the organization's Communications and Public Affairs team.

4.4 Renewable and Geothermal Energy

In the past five years, Unity Health has investigated the feasibility of harnessing renewable and geothermal energy at St. Michael's. In 2017, a geothermal heat pump on diesel generator heating blocks was installed at St. Michael's.

Hospital operations have many constraints including redundancy, fail-safes required, specific air quality requirements and the need to operate 24/7. Due to these constraints, there are no plans for renewable and geothermal energy.

We are committed to investigating renewable and geothermal energy opportunities and new technology as they arise in the market across the three hospital sites.

5 Conclusion and Next Steps

The success of past energy conservation projects implemented at Providence, St. Joseph's and St. Michael's has positioned Unity Health as a leader in energy conservation amongst its peers across Ontario.

The Unity Health Toronto ECDM Plan Update 2020-2024 outlines measures focusing on obtaining energy savings through infrastructure renewal and behaviour changes.

The next steps in implementing this updated ECDM plan is to engage all appropriate stakeholders to ensure the measures outlined in Table 4.2.1 are successfully executed.

Unity Health Toronto ECDM Plan Update 2020-2024 will further strengthen our commitments to reduce its ecological footprint. As Unity Health continues to be a leader in health care innovation, this plan will also enable Unity Health to be a leader in energy conservation and demand management.