



CORPORATE FACILITIES MEMORANDUM

Page: 1
File: E11
Pending #:
(17-G285) &
(20-G-029)

TO: MAYOR J. LEHMAN AND MEMBERS OF COUNCIL

FROM: A. MCMULLIN, MANAGER OF ENERGY MANAGEMENT, EXT. 5097

NOTED: R. PEWS, DIRECTOR OF CORPORATE FACILITIES

D. MCALPINE, GENERAL MANAGER OF COMMUNITY AND CORPORATE SERVICES

M. PROWSE, CHIEF ADMINISTRATIVE OFFICER

RE: ENERGY MANAGEMENT 2020 YEAR-END REPORTING, ALL WARDS

DATE: MARCH 29, 2021

The purpose of this Memorandum is to provide members of Council with an update on Corporate Energy Performance and Energy Management initiatives during the 2020 fiscal year.

Energy Management Mandate

The Energy Management (EM) Branch mandate is focused on reducing utility consumption and associated costs for all City owned and operated infrastructure. Utility costs are comprised of electricity, natural gas, propane and water that are used to service our facilities, water and wastewater infrastructure, parks, street lighting and traffic signals.

Cost Savings & Impacts

The pandemic has significantly impacted City services in 2020. The temporary closing of facilities and changes in service hours and operations throughout the year reduced the consumption and demand for energy. The EM Branch operations were impacted from the COVID disruption, as typical capital project delivery, facility optimization efforts and staff engagement activities were limited. With these restrictions, the EM Branch pivoted to focus on optimizing building automation systems, deploying data loggers and submetering equipment and employing alarming protocols. These activities enhanced the capacity of the EM Branch to track, monitor and analyze the energy performance of the City's building portfolio. This was particularly effective in minimizing utility usage for our closed buildings during the initial lockdown of the pandemic.

The following summarizes the energy, utility budget and other economic impacts realized in 2020 from both EM action and COVID related influence on City operations:

- 1) An annual utility cost reduction of \$773,458 (9%) compared to 2019 expenses
- 2) A favourable utility budget variance of \$1,477,004 (15%)
- 3) An annual utility cost avoidance of \$1,181,021
- 4) Obtained \$81,707 in incentive revenue
- 5) Invested \$108,660 in capital funding which is estimated to generate an annual cost avoidance of \$43,805



CORPORATE FACILITIES MEMORANDUM

Page: 2
File: E11
Pending #:
(17-G285) &
(20-G-029)

Table 1 summarizes the annual utility expense for the City from 2014 – 2020.

Year	Actual Cost	Difference from previous year (%)	Difference from previous year (\$)
2014	\$ 9,760,442		
2015	\$ 9,844,380	0.9%	\$ 83,938
2016	\$ 10,030,166	1.9%	\$ 185,786
2017	\$ 9,238,589	-7.9%	\$ (791,577)
2018	\$ 8,977,351	-2.8%	\$ (261,238)
2019	\$ 8,620,747	-4.0%	\$ (356,604)
2020	\$ 7,847,289	-9.0%	\$ (773,458)

2020 Highlights:

The following items highlight the successes achieved within the Energy Management program in 2020.

High Performing Facilities Awards

Two City facilities, City Hall and East Bayfield Community Centre, received awards in 2020 for achievements in energy efficiency from the Mayor's Megawatt Challenge (MMC) Program. The award is granted to facilities that reduce energy consumption by 10% in 2019 compared to the previous year.

East Bayfield Community Centre

For two consecutive years, the East Bayfield Community Centre has received recognition from the MMC program. This is particularly impressive because consecutive awards means that these savings are being achieved in a building that has already substantially improved its energy performance. In 2019 EBCC achieved a 17% energy reduction from 2018. This performance eclipses previous award result whereby EBCC energy usage was reduced by 14% from 2017 levels. Utility costs have been reduced by over \$100,000 annually during this period, despite an escalation in energy rates.

Capital investment in new energy efficient equipment, in particular lighting improvements, boilers and heat exchangers, as well as the continued optimization of the building automation system control by Recreation Services operational staff, have generated these outstanding results.

City Hall

City Hall received recognition from the MMC program for achieving a year-over-year energy reduction of 10% in 2019 compared to the previous year. These savings were realized through continual optimization efforts of facility operations staff. Utility costs have been reduced by 24% since 2016.



**CORPORATE FACILITIES
MEMORANDUM**

Page: 3
File: E11
Pending #:
(17-G285) &
(20-G-029)

Capital Program Investment Summary and Impact

In 2020, the Energy Management Branch invested \$108,660 in capital funding to implement conservation initiatives achieving a minimum rate of return of 10% over the lifetime of the asset. These activities focused on lighting retrofits, HVAC and control system optimization, and enhanced investment in equipment renewal projects.

Table 2 provides a summary of the projects completed and the associated energy savings, cost avoidance and estimated incentives.

Project	Facility	Energy Management Investment	Energy Savings (ekWh)	Cost Avoidance (\$)	Incentive (\$)	Simple Payback (Years)
Lighting Retrofit	Sadlon Arena	\$ 8,350	26,506	\$ 3,976	\$ 2,200	1.5
Domestic Hot Water Boiler Replacement	East Bayfield Community Centre	\$ 31,749	279,843	\$ 7,373	\$ 7,293	3.3
Pool Unit Heat Exchanger	East Bayfield Community Centre	\$ 9,769	110,240	\$ 2,968	\$ 1,060	2.9
Supply Fan DCV Optimization	Sadlon Arena	\$ 25,440	203,971	\$ 11,936	\$ 8,151	1.4
Building Automation Optimization	Holly Community Centre	\$ 22,868	109,974	\$ 13,265	\$ 12,558	0.8
HVAC Demand Control Ventilation	Surface Water Treatment Plant	\$ 5,037	6,726	\$ 3,198		1.6
Lighting Retrofits & Optimization Activities	Various	\$ 5,448	7,264	\$ 1,090		5.0
Total:		\$ 108,660	744,524	\$ 43,805	\$ 31,262	1.8

This investment is estimated to have a payback of just under two years, generated \$31,262 in incentive revenue and produce a cost avoidance exceeding \$43,000 annually.

Development of community energy and greenhouse gas emission reduction plan

With funding support from the Ministry of Energy, Northern Development and Mines, the EM Branch is leading the development of a community plan that targets energy and greenhouse gas emissions reductions. Significant progress has been made with the plan through the development of an energy and emission baseline and 'business-as-usual' projection into the future. Additionally, a stakeholder advisory group (SAG) has been established that is guiding the plan development. Currently, the SAG has developed the plan's visions and principles and identified the major strategies required to reduce emissions and energy usage. Further work is required to finalize the plan's targets and the framework for future implementation. The plan will be presented to Council for adoption in the fall of 2021.

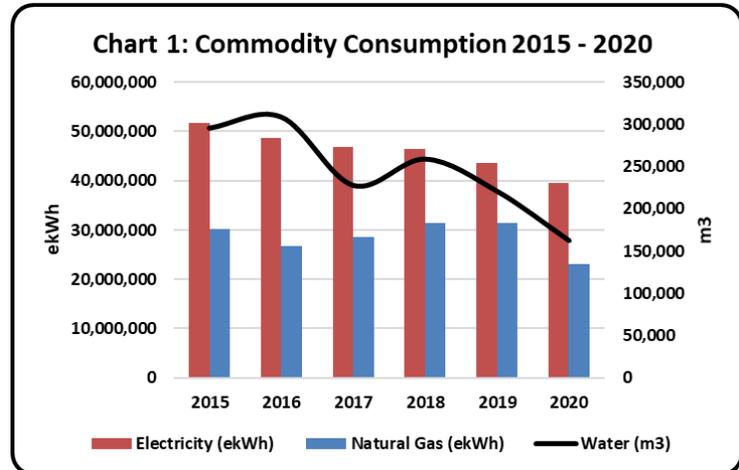


Energy & Water Consumption Summary – 2020

In 2020 City operations realized an overall reduction in energy usage of 16% from the previous year. This decrease was driven by a 10% reduction in electricity usage, 26% reduction in natural gas consumption. Water consumption decreased by 26%, for a total of 58,434m³.

As noted, service reductions resulting from the pandemic response is the key driver of the energy reduction trend seen in 2020. In particular, closing of recreational facilities accounts for 73% of this reduction.

Chart 1 summarizes the consumption trend for these commodities since 2015.



Key Performance Indicators (KPI)

The EM Branch utilize four key performance indicators to measure the efficiency of the City. Two of these track the energy efficiency associated with water and wastewater operations, whereby the total energy consumed is compared to the volume of water produced or wastewater that is processed. For all other building operations, a KPI that measures the energy consumed for all facilities compared to the total combined facility footprint (in square footage) provides a benchmark for evaluation. Finally, an economic KPI, cost avoidance, is used to measure the annual value associated with energy conservation. Cost avoidance refers to any action that avoids having to incur costs in the future. They represent potential costs that are averted through specific preemptive actions. For energy management purposes, reducing utility consumption means not having to pay for that energy in the future. However, actual costs can still increase because of inflation impact.

Table 3 summarizes the EM branch KPI results for 2020.

Key Performance Indicator	2019 Actual	2020 Plan	2020 Actual	2021 Plan
Facility Energy Consumption per Square Foot (ekWh/ft ²)	30.04	29.2	22.6	28.8
Cost Avoidance (Annual)	\$390,337	\$350,000	\$1,181,021	\$457,115
Wastewater Energy Consumption per Megalitre (ekWh/mL)	396	399	396	391
Water Energy Consumption per Megalitre (ekWh/mL)	1,177	1,097	1,024	1,119



CORPORATE FACILITIES MEMORANDUM

Page: 5
File: E11
Pending #:
(17-G285) &
(20-G-029)

All KPI targets for 2020 were exceeded. Cost avoidance and facility energy consumption KPIs were heavily impacted by the pandemic's effect on service levels and are not reflective of typical operation. Wastewater operations slightly exceed the KPI target as energy consumption remained stable, even though there was a slight increase in production (processed wastewater). Water operations exceeded the KPI target by 6%, driven by a reduction in natural gas consumption at the Surface Water Treatment Plant. This reduction is attributed to the optimization of the HVAC system and building automation control improvements.

Electric Vehicle Charge Station Usage Summary

The City has 54 electric vehicle charge stations at four locations in the City. These include the Downtown Library, Collier Street Parkade, Heritage Park and Marina. Table 4 provides a summary of the annual consumption and cost of electricity associated with the use of these charge stations.

Table 4: EV Charge Station Usage Summary 2018 - 2020

Year	Usage (kWh)	Cost (\$)
2018	17,413	\$2,308
2019	56,662	\$8,022
2020	8,141	\$1,202
Total:	82,216	\$11,532

Pandemic restrictions related to waterfront parking had a significant impact on the usage for electric vehicle charge stations in 2020 in comparison to 2019 figures.

Home Energy Retrofit Investigation Update

The Federation of Canadian Municipalities (FCM) has recently launched a Community Efficiency Financing (CEF) program with funding from the federal government to help Canadian municipalities plan, implement and scale up innovative financing models for residential energy projects.

The City has partnered with the Clean Air Partnership (CAP) and a cohort of up to 10 Ontario municipalities to apply to the FCM CEF Feasibility Stream to undertake energy and building analysis of municipal residential building stock to identify the building archetypes and opportunities for energy efficiency reductions. There is no cost to participate outside of in-kind staff time (over a 6-month period) to collect data, secure data sharing agreements, review workplan and project outputs.

Undertaking this work will enable the municipality to meet the requirements that FCM has for applying to the capitalization and grant fund for program delivery that was just recently launched in March of this year. It is anticipated that work will commence on the study beginning in April (if the funding application is successful).

The study will provide insight into the opportunity and potential framework of a CEF program and position the City to access available grant funding to support a future program.

Moving Forward

Energy Management staff are focusing on the following activities in 2021:

- Completion of community energy and greenhouse gas emission reduction plan
- Developing a corporate carbon neutrality strategy for Council's consideration
- Implementation of energy conservation capital projects
- 2022 utility budgeting and capital plan development
- Conducting net zero emissions studies and analysis

Should you have any questions about the activities of the branch or the contents of this memo, please do not hesitate to contact Adam McMullin at extension 5097.