



CORPORATE FACILITIES DEPARTMENT MEMORANDUM

TO: MAYOR J. LEHMAN AND MEMBERS OF COUNCIL

FROM: A. MCMULLIN, MANAGER OF ENERGY MANAGEMENT

NOTED: R. PEWS, P.ENG, DIRECTOR OF CORPORATE FACILITIES
D. MCALPINE, GENERAL MANAGER OF COMMUNITY AND CORPORATE SERVICES
M. PROWSE, CHIEF ADMINISTRATIVE OFFICER

RE: MAYOR'S MEGAWATT CHALLENGE AND ENERGY MANAGEMENT BRANCH YEAR-END REPORT

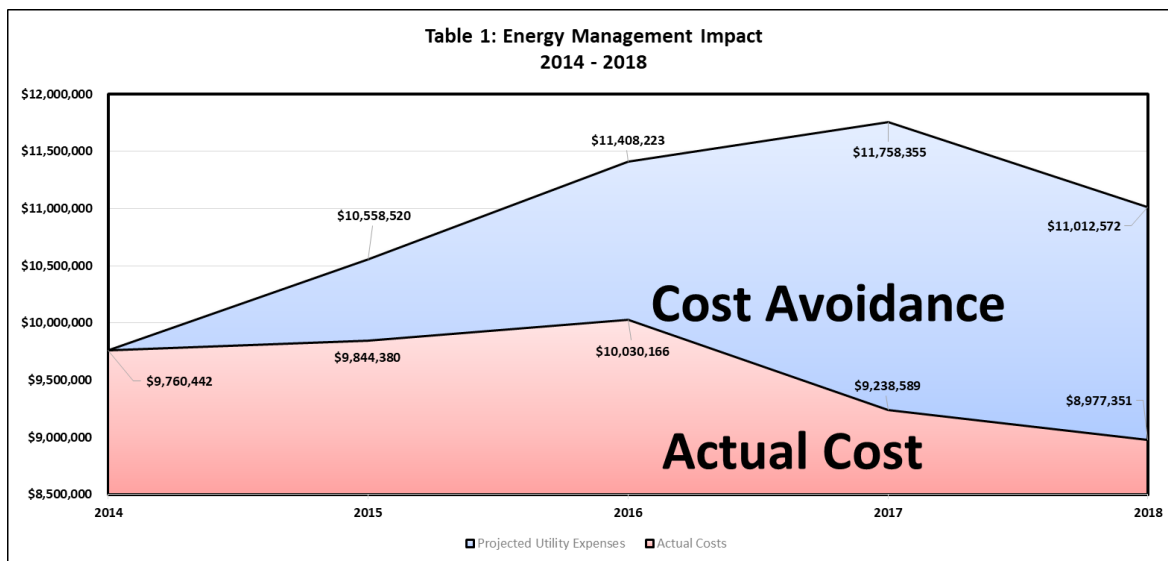
DATE: MARCH 25, 2019

The Energy Management 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.

In 2018, City operations achieved a favourable utility budget variance of \$768,589 (7.9%) and an annual cost reduction of \$261,238 (2.8%) compared to 2017 expenses. These savings were driven by moderation in electricity rates and reduced utility consumption for the majority of City facilities. These consumption reductions are achieved through a collaborative effort between the operations staff and the Energy Management Branch.

Overall, the 2018 annual corporate-wide utility costs were \$8.97 million dollars. This total was lower than the City's 2013 utility expenses of \$9.33 million dollars, the year the Energy Management (EM) Branch was established! Since the EM Branch inception, the City has realized a utility cost avoidance of \$6.64 million dollars.

Table 1 illustrates the actual utility costs by year compared to projected costs over the same period.





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2018 Highlights

The following items highlight the successes achieved within the Energy Management program in 2018.

Mayor's Megawatt Challenge Award Recipient – City Hall

The City received an award from the Mayor's Megawatt Challenge (MMC) Program on November 7th 2018. The awarded is granted to facilities that reduce energy consumption by 10% compared to the previous year. City Hall exceeded this threshold by achieving an energy reduction of 16%.

Establishment of Water Optimization Group

Water Operations and Energy Management Staff launched an optimization team that collaboratively works to identify conservation opportunities at the Surface Water Treatment Plant. The team met six times and developed eight priority areas to focus on. These efforts have begun to have a significant impact, whereby one implemented project has reduced electricity consumption 20% through January and February of 2019 realizing a cost avoidance of \$20,000.

Innovative Capital Planning & Implementation

In 2018 the EM branch was allocated \$300,000 in capital funding to implement conservation initiatives that achieve a minimum rate of return of 10% over the lifetime of the asset. This innovative approach has provided flexibility to maximize capital funding dollars to realize more value for City operations. For example, if material pricing is lower than estimated (which is often the case when purchasing LED technology), Staff utilize the unspent monies on additional measures.

In 2018, Staff targeted lighting retrofits with the majority of these funds. Below is a summary of the projects completed and the associated energy savings, cost avoidance and incentives received:

Table 2: 2018 Energy Capital Program Summary						
Facility	Project Description	Project Cost (\$)	Energy Savings (kWh)	Cost Avoidance (\$)	Incentive (\$)	Simple Payback (Years)
Allandale Recreation Centre	Lighting Retrofit	\$ 20,411	102,000	\$ 15,300	\$ 7,600	0.8
	Condenser VFD Installation	\$ 6,250	9,860	\$ 1,479	\$ 1,070	3.5
Holly Community Centre	Lighting Retrofit (T8 Conversion)	\$ 26,094	106,544	\$ 15,982	\$ 6,952	1.2
	Parking Lot Lighting Retrofit	\$ 25,405	20,420	\$ 4,782	\$ 3,945	4.5
East Bayfield Community Centre	Lighting Retrofit (T8 Conversion)	\$ 27,042	76,335	\$ 11,450	\$ 10,160	1.5
Surface Water Treatment Plant	Lighting Retrofit (T8 Conversion)	\$ 55,225	134,635	\$ 20,195	\$ 18,360	1.8
Total:		\$ 160,426	449,794	\$ 69,188	\$ 48,087	1.6

The remaining funds are earmarked for additional lighting projects to be implemented in 2019.

Electric Vehicle Charge Station Deployment

In 2018, Energy Management Staff leveraged a partnership with Tesla to install fifty-four electric vehicle (EV) charging stations at four City owned locations, with no capital cost to the City. These included:

- Marina (twelve EV stations)
- Heritage Park (twelve EV stations)
- Library (six EV stations)
- Parkade (twenty-four EV stations)

The parkade chargers were energized on February 22, 2018 followed by the Heritage Park and marina locations on July 1, 2018, with usage increasing over the course of the summer as their existence became more commonly known. The library location chargers were brought online on September 15, 2018.

This partnership provided an opportunity to enhance service to residents and visitors, promote community sustainability and deploy infrastructure at no capital expense to the City.



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Incentives

The Energy Management branch works to maximize incentives and grant funding associated with conservation initiatives that are available from the local utility companies, provincial and federal jurisdictions. In 2018 a total of \$154,000 in incentives revenue was collected. Since 2015 over \$1.6 million dollars in incentives have been collected in support of energy conservation initiatives.

Energy Consumption Summary

In 2018 City operations saw a 1.1% reduction in electricity consumption, a 10% increase in natural gas usage and a 13% rise in water consumption from 2017.

Table 3 summarizes the five year consumption trend for electricity and natural gas.

There are a number of drivers that influence the 2018 energy performance throughout the City. These include growth in services, utility rate variances, weather impacts, and conservation and efficiency efforts.

1) Growth

Generally there is incremental growth in the number of utility services added every year, typically from new Parks that have opened or additional traffic signals that are installed. Further, new facilities that are purchased, leased or constructed can potentially add significant utility costs. These added services are considered growth to the baseline utility expenses.

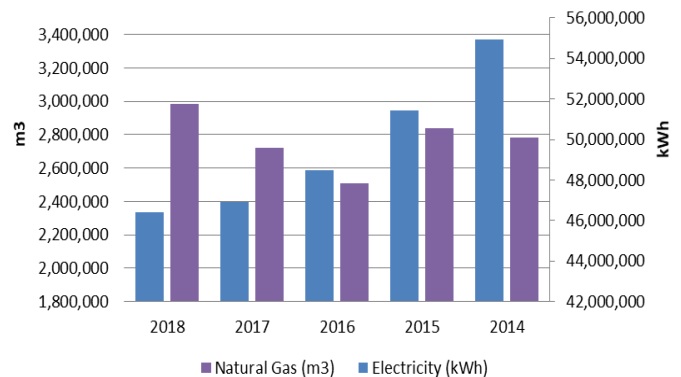
In 2018, a number water services that were previously operational, but now have been fully metered, have come online. These serve parks and ground water infrastructure and had a significant impact of utility costs in 2018, adding \$185,362 in expenses. For Parks operations, an additional 9,426 m3 (\$79,982) of water was utilized while the ground water pumping infrastructure consumed 24,471m3 (\$105,380), nearly the same amount of water as the Wastewater Treatment Facility.

This growth alone represents a 2% increase to the total 2017 utility expenses. Excluding this growth, the water utility costs in 2018 would have realized a cost decrease of 7% (\$83,469) from 2017. Table 4 highlights the water consumption trending for the entire corporation from 2016 – 2018.

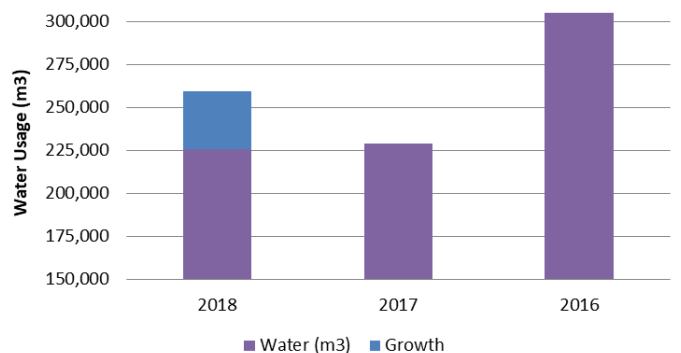
2) Utility Rate Changes & Weather Impacts

After realizing significant rates increases for electricity from 2013 to 2016, electricity rates have moderated more recently. For 2018, Electricity and natural gas rates were down 8% and 3% respectively from 2017 values. This rate benefit was partially offset by a colder winter, requiring more natural gas usage (10%) for heating and a hotter summer which increase electricity demand for cooling. Even with increased air conditioning requirements, electricity consumption was still down 1.1% year over year.

**Table 3: Energy Usage Trend
2014 - 2018**



**Table 4: Water Consumption Trend
2016 - 2018**



3) Conservation & Efficiency Efforts

Conservation activities serve as the number one tool in managing the City's energy performance. There are a myriad of efforts that drive energy efficiency within the corporation. These include Staff engagement and awareness, commissioning energy audits / studies, low cost optimization efforts and the implementation of capital intensive energy efficiency projects.

There are a number of success stories that arose throughout 2018, summarized as follows:

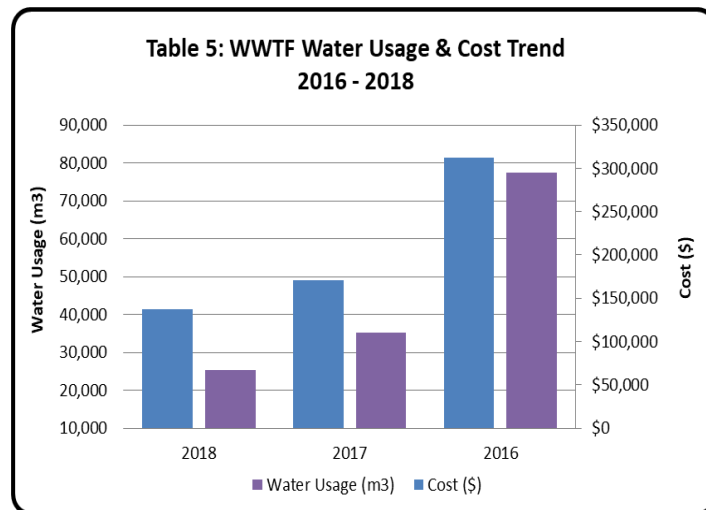
Wastewater Treatment Facility (WWTF – 249 Bradford Street)

Electricity

The WWTF qualifies for a different electricity billing class (Class A) due to the monthly peak electricity demand of the facility. Working with Wastewater Operations Staff, the Energy Management group chose to participate in the Class A billing structure, reducing the rate by 25% and associated costs by \$157,873 in 2018.

Water

Wastewater Operations Staff have focused on water conservation as part of their optimization efforts. Their efforts have been wildly successful reducing water consumption by 67% and shrinking the annual water bill by \$175,666. Table 5 summarizes this trending data.



Downtown Library (60 Worsley St.)

The heating ventilation and cooling (HVAC) system of the library reached end of life and was replaced over 2017/2018 with a modern system. The new equipment was right-sized and redesigned to improve both occupant comfort and energy efficiency. The energy impact was larger than anticipated as electricity consumption was reduced 36% resulting in a cost avoidance of \$55,000 in 2018.

East Bayfield Community Centre (80 Livingstone St. E.)

The East Bayfield Community Centre staff have dramatically improved the operational efficiency since replacing the building automation system last year. The innovative original building design that utilizes a ground source geothermal system has provided the ideal opportunity to optimize energy savings on site. Improved operational control over all of the equipment has reduced electricity consumption 8% from 2017 generating a \$43,000 cost avoidance.

City Hall (70 Collier Street)

The City Hall parking garage and ramp flooring were replaced due to wear in late 2018. The parking garage ramp is heated for safety and Staff replaced the radiant heating system as part of the project with a modulating, responsive system that significantly reduces the cost to operate the system. During the final four months of the year, City Hall realized a cost avoidance of \$12,000 due to this project.

Moving Forward

Energy Management staff are focusing on the following activities in 2019.

- Update / Renewal of the City's Conservation and Demand Management Plan
- Initiation of a Community Greenhouse Gas Inventory and Reduction Strategy
- Energy conservation capital project implementation
- 2020 Utility Budgeting and Capital Plan Development
- Recommissioning work (Chiller Plants / Boiler System / Refrigeration Plants / Natatorium Spaces)

Should you have any questions regarding these or other initiatives, please do not hesitate to contact me at extension 5097.