

Staff Report 2020-0200

Meeting Date: June 30, 2020

Subject: Annual Energy Reporting and 2020 Revolving Fund Projects

Submitted By: Craig Stephens, Specialist, Energy and Environment, Finance and Infrastructure Services

RECOMMENDATION

That the Town's 2018 Energy Consumption and Greenhouse Gas Emissions Report, attached as Schedule A to Staff Report 2020-0200, be submitted to the Ontario Ministry of Energy, Northern Development and Mines in accordance with the *Electricity Act 1998*, *Ontario Regulation 507/18*; and

That a new 2020 capital project be established in the amount of \$101,079, funded from the Corporate Energy reserve, for projects outlined in Table 2 of Staff Report 2020-0200.

REPORT HIGHLIGHTS

- As required by the *Electricity Act, 1998 Ontario Regulation 507/18*, by July 1, 2020, the Town, and all public agencies, must submit 2018 data on their facility energy consumption and associated greenhouse gas (GHG) emissions to the Ontario Ministry of Energy, Northern Development and Mines, attached as Schedule A to Staff Report 2020-0200;
- In 2018 the Town's building portfolio consumed 8,735,167 kWh of electricity, 904,406 m³ of natural gas and 2,146 L of heating fuel, equating to 1,998,204.55 kg of greenhouse gas (GHG) emissions. A detailed summary of the energy consumption of Town-owned facilities is provided in Schedule A;
- In 2015, Council approved the establishment of a Corporate Energy Revolving Fund to support the Corporate Energy Team in the implementation of energy retrofit projects throughout the Town; and,
- The Corporate Energy Team is recommending the release of \$101,079 from the Corporate Energy Revolving Fund to support LED retrofit projects at the Mayfield Recreation Complex in the arena and various interior areas; and an ice rink resurfacing water treatment retrofit at the Caledon East Community Complex.

DISCUSSION

The *Electricity Act, 1998, Ontario Regulation 507/18* requires that all public agencies must:

1. Provide a summary of the public agency's annual energy consumption and GHG emissions for its operations for the 2018 reporting year to the Provincial Ministry of Energy, Northern Development and Mines; and,
2. Implement a five-year energy conservation and demand management plan.

Council approved the Town's Corporate Greenhouse Gas (GHG) Reduction Framework (2019-2024) in 2019 as per Staff Report 2019-73 to align with the *Electricity Act* requirements. The objective of the Framework is to reduce the Town's corporate GHG emissions (inclusive of Town facilities and Town-owned vehicles) by 24% or 853 tCO₂e

below 2017 levels by 2024. According to the Town's 2017 corporate GHG emissions inventory, energy consumption in Town facilities is responsible for the largest source of corporate emissions (54%). Accordingly, the Town has also adopted a target to conserve 15% or 2,306,555 ekWh of facility energy use below 2017 levels by 2024.

Facility Energy Consumption and GHG Emissions Reporting (2018)

The Town is required to report on its annual energy consumption for facilities that have a heating and/or cooling load and is responsible for its energy utility costs. A summary of the Town's 2012-2018 reporting of facility energy consumption and associated GHG emissions are provided in Table 1 below. The Town's 2018 report (Schedule A) will be submitted to the Ontario Provincial Ministry of Energy, Northern Development and Mines, by July 1, 2020, upon Council approval.

Table 1: Summary of the Town of Caledon's Annual Provincial Energy Reporting							
Year	Electricity (kWh)	Natural Gas (m³)	Fuel Oil (L)	Propane (L)	Total equivalent kWh (ekWh)	O. Reg 507/18 GHG Emissions tCO₂e*	Absolute Energy % Change from the 2012 Reporting Year
2012	9,271,334	999,861	5,777		19,959,900	2,797	--
2013	9,961,325	1,069,915	7,725		21,415,396	2,801	+7.24
2014	8,481,855	1,048,558	8,455		19,716,714	2,345	-1.22%
2015	8,637,382	957,150	2,138		18,832,802	2,161	-5.65%
2016	8,459,874	935,430	3,606	3,556	18,478,481	2,085	-7.42%
2017	8,507,939	933,002		2,570	18,441,741	1,915	-7.61%
2018	8,735,167	904,406		2,146	18,362,081	1,971	-8.01%

**Note: there is a slight difference between the Province's quantification of emissions and the Town's due to a difference in the methodology of the emissions factors used for electricity and natural gas*

In 2018, the Town's corporate facilities used 8.01% less energy (non-weather normalized) compared to the 2012 reporting year.

Staff have identified and prioritized the top energy consuming buildings as the 'Big 7', outlined in Figure 1 below. These facilities are responsible for 81% of the Town's building energy portfolio and have been subject to energy audits and associated retrofits.

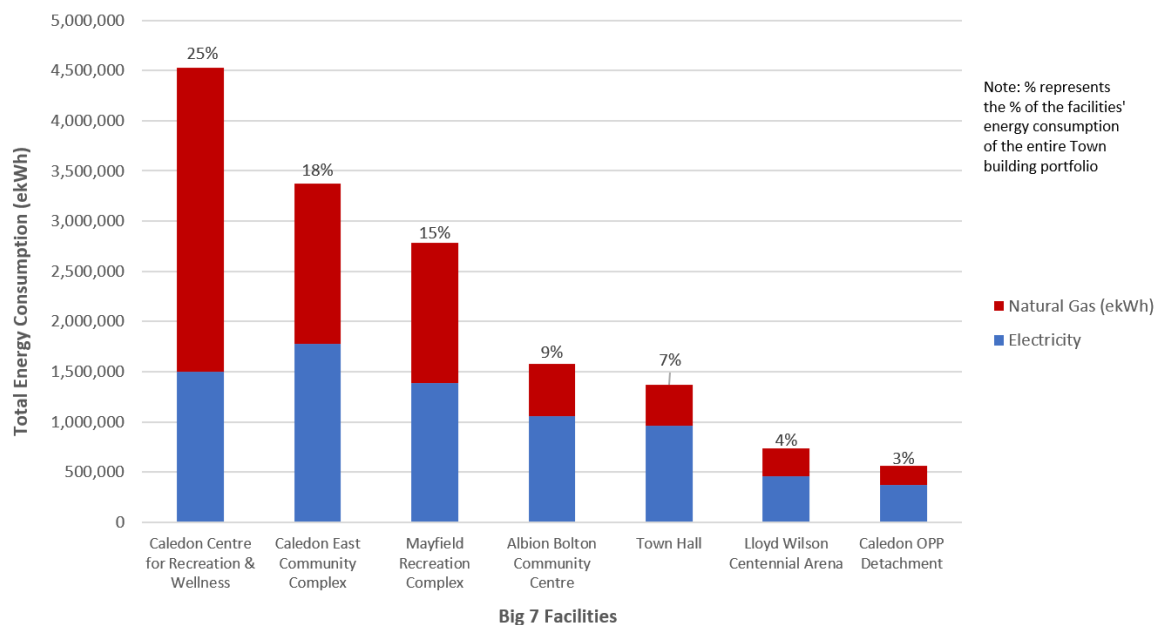


Figure 1: Breakdown of the Town's Big 7 2018 Energy Consumption

A breakdown of energy consumption by facility type is outlined in Figure 2 below. Recreation and administrative facilities make up 80% of the Town's total corporate energy consumption. Recreation facilities are responsible for the largest proportion of facility energy consumption in the Town's building portfolio due to the volume of facility users; energy intensive equipment (i.e. pools, ice, rinks, etc.); facility size; and, extended operating hours.

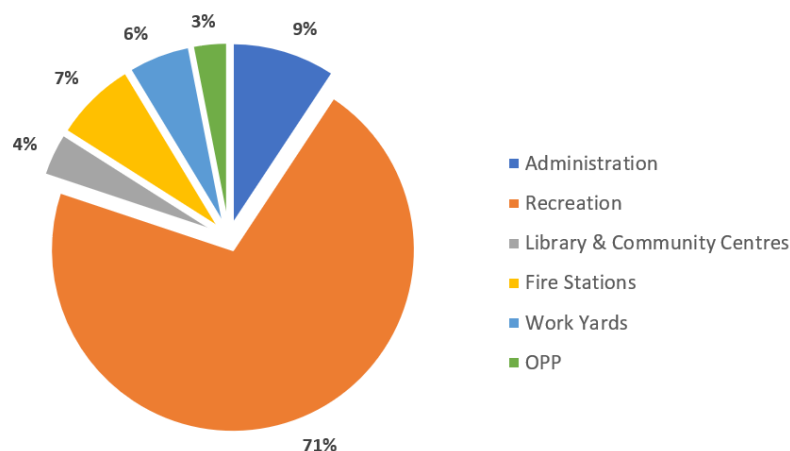


Figure 2: Total Facility Energy Use (ekWh) by Facility Type (2018)

2020 Corporate Energy Management Program Priorities

To build on the Town's energy management progress and successes, Energy and Environment staff, in partnership with the Corporate Energy Team, have determined the following priorities for 2020:

- Corporate Green Building Standard (CGBS) Update: The CGBS update is intended to provide a renewed standard for the construction of Town facilities and major renovations or expansions that will help meet the Town's corporate GHG reduction targets, provide flexibility in pathways to achieve prescribed targets, and improve Town building resilience to future climatic conditions. The CGBS update is currently in progress and will serve as an update to the 2012 CGBS.
- Building Benchmarking: The Town's energy benchmarking initiative was established to track, monitor, peer review, and develop a more comprehensive understanding of the Town's building energy performance. The Town's building benchmarking energy models have been updated to align with the Corporate GHG Reduction Framework's energy target baseline year of 2017. Staff will work with a third-party expert to peer-review the updated energy models and provide updated energy performance reports to the Corporate Energy Team.
- Net Zero Emissions Study: The Town has joined a cohort of municipalities through the Climate Challenge Network (formerly the Mayors Megawatt Challenge), to undertake a study to bring an existing Town facility to net zero emissions.
- Corporate Energy Team (CET): The CET will meet twice this year to discuss the CGBS update, to provide information regarding building energy performance, and to discuss future energy project priorities.

2020 Energy Revolving Fund

The Energy & Environment Division accepts project submissions from the Corporate Energy Team on an annual basis for proposed Corporate Energy Revolving (CER) Fund projects. The CER Fund is used as a mechanism to implement energy retrofit projects that conserve energy and reduce emissions, contributing to the Town's 2024 reduction targets.

The CER Fund was approved by Council in 2015 and is supported by the Town's three ground-mounted solar microFIT projects that generate approximately \$25,000 annually; energy incentives received by the Town; and, twenty-five percent of energy retrofit savings from previous CER funded projects.

The concept of the CER Fund is to establish a method to financially support energy retrofits that is both independent of the annual budget process and does not directly result

in a tax increase. The structure of the Town's CER Fund is explained below and illustrated in Figure 3.

1. **Revolving Fund Base:** The Fund's base is supported by three microFIT solar projects that generate approximately \$25,000 annually. Through the microFIT program, the Town has a contract with the Province to sell the energy generated from its three ground-mount solar microFIT sites for a 20-year period.
2. **Business Case:** The Corporate Energy Team submits energy conservation project ideas to the Energy and Environment Division that save energy and have a ten-year simple payback or less. Energy and Environment staff consolidates the project ideas and request that Council supports funding the proposed projects through the Revolving Fund.
3. **Energy Retrofit:** Funds are then released from the CER Fund, and approved energy saving retrofit projects are implemented by the end of the calendar year.
4. **Energy Savings:** The energy retrofit results in energy savings in the facility's utility operation budget.
5. **Savings Paid Through Utility Budget:** Annual savings, based on the simple payback are diverted from the applicable utility budget line (natural gas, electricity, or water) back to the CER Fund.

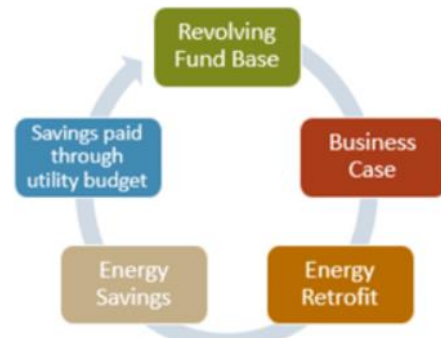


Figure 3: Revolving Fund concept

2020 CER Fund Submissions

In March of 2020, the Corporate Energy Team, comprised of staff from various departments, submitted business cases for projects that will save energy in the facilities that they manage. These submissions had to satisfy the following criteria:

- ✓ Projects must save energy and money;
- ✓ Projects must be completed in the same calendar year of awarded funds;
- ✓ Projects must have a simple payback of 10 years or less; and,
- ✓ Projects must support the Town's Corporate GHG Reduction Framework

The current, unaudited balance of the CER Fund is \$227,711.74, with \$127,711.74 available for 2020 projects to ensure that the CER Fund does not fall below a minimum balance of \$100,000.

Staff recommend that the proposed retrofit projects described below be funded by the CER Fund in 2020. It is estimated that these projects will save 291,271.72 equivalent kWh

of energy, annual operating cost savings of \$22,853.32 and result in 31.68 tonnes of carbon dioxide equivalent (CO₂e) avoided.

(1) Mayfield Recreation Complex: Arena LED Retrofit

This project proposes to retrofit all 79 fluorescent light fixtures (or 422 lamps) in the arena and arena walkways at the Mayfield Recreation Complex with LED light fixtures. Retrofitting to LEDs will provide better lighting levels which will improve occupancy comfort, reduce energy consumption, and result in operating and maintenance cost savings, as LEDs use less electricity and have a longer operational life of up to 100,000 hours before replacement.

This project will result in estimated annual electricity savings of 47,775 kWh or \$6,688.50 in operating costs, as outlined in Table 2 below.

(2) Mayfield Recreation Complex: Various Interior Areas LED Retrofit

Various interior areas in the Mayfield Recreation Complex, such as the main lobby, washrooms, administrative offices, stairwell, snack bar and maintenance rooms, contain a variety of fluorescent light fixtures and pot lights (a total of 98 fixtures or 263 lamps). This project proposes to improve lighting levels, reduce energy consumption and reduce operating and maintenance costs by retrofitting the lights to LED.

The fluorescent light fixtures above the stairwell are challenging for facility staff to access and maintain due to the height and location of the fixtures. LEDs have a longer operational life, providing minimized maintenance for the stairwell lights. The existing lights in these areas contain multiple different light types, where an added co-benefit of this project will be consistency amongst lighting fixtures that will improve lighting levels and ease for staff when lights are due for replacement.

This project will result in estimated annual electricity savings of 28,537 kWh or \$3,995.23 in annual operating costs, as outlined in Table 2 below.

(3) Caledon East Community Complex: Ice Rink Resurfacing Water Retrofit

This project involves the installation of a water-treatment device that will save energy by allowing facility operations staff to resurface the ice rink using colder water temperatures. Traditionally arenas use heated water to remove the impurities in water, such as minerals and gases, before resurfacing the ice rink to achieve a high-quality ice surface. The traditional process requires energy to heat the water to high temperatures and increases the amount of energy used by the refrigeration plant to remove the heat from the ice surface due to the application of the warm water.

This technology was piloted at the Mayfield Recreation Complex, as one of the 2019 CER Fund projects, and has proven to be successful. Staff worked with a third-party engineering firm to verify the savings associated with this project, which is an annual reduction of 84,188 kWh of electricity and 2,800 m³ of natural gas and \$10,775 operating cost savings. As a result of the verified savings and successful installation from the Mayfield Recreation Complex, the Caledon East Community Complex is recommended to install the device to save energy for its dual ice pads.

The proposed retrofit water-treatment device is a wall system that will be integrated into the existing Zamboni filling station piping to remove the impurities in the water before it enters the ice resurfacing machine, eliminating the need to heat the arena resurfacing water.

This retrofit project is estimated to save 14,364 cubic metres (m³) of natural gas and 62,302 kWh of electricity due to reduced water heating requirements and reduced energy consumption from the refrigeration plant. The avoided natural gas and electricity consumption will result in annual operating cost savings of \$12,169.64 and 29.39 tonnes of CO₂e, as described in Table 2 below.

Table 2: 2020 Recommended Energy Revolving Fund Projects and CER Fund Repayment						
Site & Project	Recommended 2020 Fund Disbursement with non-recoverable HST	Energy Savings (ekWh)	GHG Emissions Savings (tCO₂e)	Annual Energy Cost Savings & CER Fund Repayments	Simple Payback (years)	Estimated Incentive
MRC Arena LED Retrofit	\$44,489.47	47,775	1.43	\$6,688.50	6.65	\$2,920
MRC Interior Areas LED Retrofit	\$18,221.78	28,537	0.86	\$3,995.18	4.56	\$1,160
CECC Resurfacing Water Retrofit	\$38,367.85	214,959.72*	29.39	\$12,169.64	3.15	\$9,230
Total:	\$101,079.10**	291,271.72	31.68	\$22,853.32	4.42	\$13,310

*Savings converted into equivalent kWh is as follows: 62,302 kWh + (14,364 m³ x 10.6278) = 214,959.72 ekWh

**\$101,079.10 is rounded to \$101,079 for the purpose of this Council Report.

FINANCIAL IMPLICATIONS

Staff recommend that a new 2020 capital project, in the amount of \$101,079 be established for the LED retrofit projects at the Mayfield Recreation Complex and the ice rink resurfacing water treatment retrofit at the Caledon East Community Complex funded by the Corporate Energy Reserve account 08-00-900-35012-000-25000.

Subject to Council approval of this report, it is anticipated that all CER Fund projects will be completed in 2020. The projected annual energy savings will be reduced from the utility

budget line for each respective facility and will be shown as a contribution to the Corporate Energy Reserve in 2020 as outlined in Table 3 below.

Table 3: Energy Reserve Repayment Terms				
Site & Project	GL Accounts of Projected Utility Savings	Recommended 2020 Fund Disbursement	Annual Energy Cost Savings & CER Fund Repayments[∞]	Fund Repayment Terms in years (Simple Payback)
MRC Arena LED Retrofit	01-08-465-73020-460-62216	\$44,489.47	\$6,688.50	6.65
MRC Interior Areas LED Retrofit	01-08-465-73020-460-62216	\$18,221.78	\$3,995.18	4.56
Caledon East Community Complex (Electricity)	01-08-465-73020-430-62216	\$38,367.85	\$8,722.28	3.15
Caledon East Community Complex (Gas)	01-08-465-73020-430-62215		\$3,447.36	
Total:		\$101,079.10	\$22,853.32	4.42

After the capital cost of the projects are repaid in full to the reserve, 75% of the projected utility savings will be used to reduce the Town's future operating budget as budget efficiency. The remaining 25% will continue as a contribution to the Corporate Energy Reserve to grow the fund to ensure sustainability.

Any energy incentives received by the Town for energy retrofits will be allocated to the Corporate Energy Reserve. The estimated energy incentives as outlined in Table 2 are \$13,310.

COUNCIL WORK PLAN

Connected Community – Develop a five-year Corporate Greenhouse Gas Reduction Framework including energy consumption in facilities, corporate fleet and fuel use, water conservation strategies in facilities and parks and waste diversion strategies.

ATTACHMENTS

Schedule A: Corporate Energy and Greenhouse Gas Emissions Reporting (2018)