City of Peterborough
Corporate Energy Management Plan Update 2024-2028

peterborough

Table of Contents

Tables and Figures

Introduction

In 2013, the Province of Ontario mandated that all public sector agencies develop a recurrent five-year conservation and demand management (CDM) plan to establish and pursue facility energy reduction goals by 2018. The City of Peterborough completed its inaugural Corporate Energy Management Plan 2014-2018 (CEMP1.0) in 2014 to guide energy consumption reductions from corporate buildings. The second iteration of the CDM reporting cycle required public sector agencies to propose additional energy conservation strategies with the City creating its Corporate Energy Management Plan Update 2019-2023 (CEMP2.0). The City has fulfilled provincial reporting requirements with this revised plan, the Corporate Energy Management Plan Update 2024-2028 (CEMP3.0).

Hard copies of this plan are available at City Hall located at 500 George St N.

Background

The Province of Ontario instituted annual energy reporting for all public sector agencies under the Green Energy Act (O. Reg 397/11). Annual reporting entailed submitting the energy consumed (e.g., electricity, natural gas, propane, and heating oil) to determine greenhouse gas (GHG) emissions and energy intensity per facility. The Province also mandates that all public sector agencies, which includes municipalities, to develop CDM energy plans every five years that target energy conservation through mechanical, organizational, and staff behaviour changes. Facility energy performance is evaluated over the preceding five-years to determine energy trends and if progress was achieved in limiting building energy consumption. In addition, each CDM iteration requires new energy conservation strategies to be proposed to curtail facility consumption. In 2023, the Province replaced O. Reg 397/11 with O. Reg. 25/23[1]

In 2014, the CEMP1.0 targeted a 5 percent reduction in energy consumption by 2018. A variety of initiatives were developed to support the CEMP1.0 goal that included:

- Create a culture of awareness for staff to enable energy conservation,
- Complete energy audits for each facility,
- Improve energy efficiency through equipment maintenance and monitoring,
- Recommission facilities,
- Establish a Corporate Green Team, Facilities Management Team, and Fleet Management Team to track energy performance; and

[1]O. Reg 25/23: Broader Public Sector: Energy Reporting and Conservation and Demand Management Plan. (2023). Province of Ontario. https://www.ontario.ca/laws/regulation/r23025

- Commitment to launching renewable energy projects.

The CEMP2.0 targeted a 10 percent decrease in energy use from 2019 levels by 2023 to counteract the increase in energy consumption observed within the timeframe of the CEMP1.0 assessment. Several actions were proposed to limit growth in energy usage and GHG emissions, such as:

- Establish climate lens reporting,
- Develop climate change and energy staff training,
- Submit annual climate and energy reporting to City Council,
- Investigate reducing phantom electrical loads,
- Complete a renewable energy survey,
- Research passive lighting sources,
- Form a natural gas reduction working group,
- Apply for corporate building GHG pathway study funding; and
- Explore reductions in hot water usage.

Methodology

A detailed review of each corporate building category was undertaken to evaluate energy trends from 2019 to 2023. Facility electricity and natural gas data were accessed using EnergyCAP utility data management software. Total facility energy use was calculated from electricity and natural gas consumed by each building per year. Energy intensity in gigajoules of energy per square metre (GJ/m^2) was determined using the calculated facility energy use and facility floor area on file within EnergyCAP. This level of analysis allowed staff to discern which facilities were high energy users across each facility class type. Lastly, GHG emissions were evaluated using certified annual emission factors[2] provided by the federal government and non-certified emission factors[3] in 2023 to calculate emissions linked with consuming electricity and natural gas per building category in metric tons of carbon dioxide equivalent (tCO_2e).

The CEMP3.0 analyzed Corporate Facilities that included 29 heated and cooled buildings, 12 facilities transporting wastewater, as well as the wastewater treatment plant as per O. Reg 25/23 (Table 1). The following facilities did not meet the reporting criteria and were omitted which include airport outbuildings, Harper Buildings, Peterborough County-City Waste Management Facility Buildings, and the King Street

[2] National Inventory Report 1990-2022: Greenhouse Gas Sources and Sinks in Canada. (2024). Government of Canada. https://publications.gc.ca/collections/collection_2024/eccc/En81-4-2022-1-eng.pdf
[3] A Clear View of Ontario's Emissions – Updated Electricity Emissions Factors and Guidelines. (2021). The Atmospheric Fund. https://taf.ca/custom/uploads/2021/11/20211116_TAF_Emissions-Factors-Guidelines.pdf

Parkade. Lastly, two new facilities were added to the CEMP3.0 inventory that were not previously assessed in CEMP2.0 that includes the Simcoe Building and Marina Building.

Table 1. Corporate Facilities Included in Energy Reporting

Category	Corporate Buildings
Offices	City Hall, Community Services, Court House, Police Station, Provincial Offences, Wastewater Treatment Plant Administration Building, and Simcoe Building
Arenas & Sport Complexes	Healthy Planet Arena, Kinsmen Arena, Memorial Centre, Northcrest Arena, and Peterborough Sport & Wellness Centre
Libraries & Community Centres	Art Gallery, Daycare, Delafosse Library, Main Library, Morrow Building, Museum and Archives, and Queen Alexandra
Fire Stations	Carnegie, Clonsilla, and Sherbrooke
Public Works & Transit	Airport Maintenance, Public Works Townsend Facility, Municipal Operations Centre, Bus Terminal, and Transit Bus Barns
Other	Airport Terminal, Marina Building
	Wastewater Infrastructure
Pumping Stations	Airport, Ashburnham, Burnham, Engleburn, Landfill, Monaghan, Montgomery, Park, Parkhill 43, Parkhill 1100, Simcoe, and Valleyview
Wastewater Treatment Plant	Wastewater Treatment Plant excluding Administration and Energy buildings

Energy Consumption and GHG Emission Assessment

The review determined that 134,027 Gigajoules (GJ) of energy was consumed by Corporate Facilities in 2023, marking a decrease of 4 percent from 2019 levels. Greenhouse gas emissions increased by 532 tCO_2e from the 2019 baseline (Table 2).

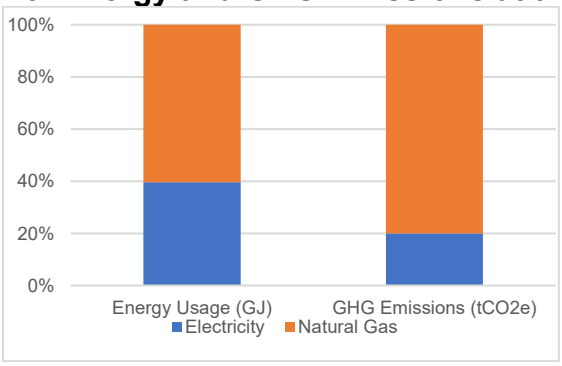
Table 2. Total Corporate Facilities Energy Consumption and GHG Emissions

Year	Electricity (kWh)	Natural Gas (m^3)	Energy (GJ)	GHG Emissions (tCO_2e)
2019	20,654,137	1,715,654	139,302	3,944
2020	18,987,481	1,667,357	131,476	3,703
2021	18,013,884	1,711,668	129,653	3,815
2022	18,675,615	1,732,430	132,805	4,037
2023	19,080,219	1,743,498	134,027	4,476*
% difference	**-8%**	**2%**	**-4%**	**13%**
Difference	**-1,573,918**	**27,844**	**-5,274**	**532**
Average	**19,082,267**	**1,714,121**	**133,453**	**3,995**
* Estimated GHG emissions				

Corporate Facilities GHG emissions increased substantially in 2023 as a result of two factors: the jump in the projected electricity emission factor and the rise in natural gas consumption. First, the assessment utilized an electricity emission factor projection developed by The Atmospheric Fund to estimate GHG emissions due to the unavailability of certified emission factors. The rise in GHG emissions in 2023 corresponds in part to the change in the electricity emission factors from 37 gCO_2e/kWh in 2022 to 70 gCO_2e/kWh in 2023[4]. Despite lower facility electricity consumption in 2023, the higher projected emission factor lessened the decline in electricity-associated GHG emissions. Second, natural gas for facility space heating contributed to the increase in corporate emissions as a direct result of year-over-year growth in the fuel consumed since 2020. The rise of natural gas does include new facilities added in the corporate inventory such as the Simcoe Building.

To note, the ratio of GHGs linked to electricity and natural gas usage is heavily skewed toward natural gas consumption, as presented in Figure 1. To demonstrate this, the Memorial Centre is provided as an example, where natural gas was observed to contribute four times more emissions than electricity in 2023. Despite the high emission factors estimated for the Ontario electricity grid, electricity contributed 20 percent to the total facility GHG emissions even though 40 percent electrical energy was used at the arena. Alternatively, natural gas emitted 80 percent GHG emissions while contributing to 60 percent of the total energy consumed. The rise in year-over-year natural gas use has resulted in corporate facility emissions increasing.

Figure 1. Proportion of Energy and GHG Emissions at the Memorial Centre



During the CEMP3.0 evaluation timeframe, the COVID-19 pandemic (March 13, 2020, to April 13, 2022) occurred and significantly impacted corporate operations that limited

[4] A Clear View of Ontario's Emissions – Updated Electricity Emissions Factors and Guidelines. (2021). The Atmospheric Fund. https://taf.ca/custom/uploads/2021/11/20211116_TAF_Emissions-Factors-Guidelines.pdf

staff working in facilities and altered community programming in buildings. Specifically, the pandemic resulted in mandating working from home for many office-based staff that directly reduced the amount of electricity consumed from interior office lighting and electronics in corporate offices. Additionally, less space cooling in the summer was needed due less staff working in offices. As policies to limit the spread of COVID-19 evolved and the threat of spreading the illness decreased due to the development of vaccines, corporate restrictions were lifted. However, the flexibility bestowed by telecommuting carried on after the public health emergency was lifted in March 2022 with fewer staff working in office fulltime as compared to pre-pandemic levels. This reduction in office work corresponded with the observed slow rise of electricity use in 2022 and 2023.

Although staffing levels and community programming altered electricity use due to the pandemic, natural gas consumption was only curtailed in 2020 and surpassed 2019 levels in 2022. A possible explanation for this rise is attributed to buildings still being heated at the same set temperatures and schedules to accommodate the few City staff that were required to work at facilities during the pandemic.

Corporate Buildings Analysis

A targeted analysis was performed that explored the energy consumed from heated and cooled buildings (see Table 1 ‘Corporate Buildings’ category). This subset of corporate facilities encompasses 29 buildings that include offices, arenas, community centres, libraries, transit facilities, transportation hubs, public works facilities, and emergency service buildings. This subcategory of facilities was found to have decreased energy usage by 5 percent but corresponded with GHG emissions increasing by 528 tCO_2e in 2023 from 2019 levels (Table 3). The average energy intensity decreased by 13 percent as a result of a 14 percent drop in electricity use but higher observed natural gas usage of 4 percent.

Table 3. Corporate Buildings Energy Consumption, Energy Intensity, and GHG Emissions

Year	Electricity (kWh)	Natural Gas (m^3)	Energy (GJ)	Avg. Energy Intensity (GJ/m^2)	GHG Emissions (tCO_2e)
2019	13,182,723	1,552,777	106,255	1.16	3,402
2020	11,854,796	1,530,066	100,617	1.01	3,258
2021	11,164,829	1,546,882	98,773	1.02	3,305
2022	11,163,794	1,581,657	100,072	1.03	3,468
2023	11,278,920	1,662,158	101,367	1.00	3,920*
% difference	**-14%**	**4%**	**-5%**	**-13%**	**16%**
Difference	**-1,903,803**	**69,381**	**-4,887**	**-0.15**	**528**
Average	**11,729,012**	**1,566,708**	**101,417**	**1.04**	**3,472**

Year	Electricity (kWh)	Natural Gas (m^3)	Energy (GJ)	Avg. Energy Intensity (GJ/m^2)	GHG Emissions (tCO_2e)
* Estimated GHG emissions					

Offices

The office building category was greatly impacted by the COVID-19 pandemic as observed with significant energy intensity decline in 2020. Work from home policies was particularly pronounced in 2020 and 2021 at City Hall with the flexibility of telecommuting and off-site work remaining in 2023. Other facilities returned to 2019 energy levels in 2021 as observed at the Simcoe Building, Provincial Offences Office, and Court House. The sizable decrease in energy intensity at the Provincial Offences Office is a result of additional plug-in space heaters not being used while the building was unoccupied during 2020. The Community Services building underwent an extensive renovation and changed its function as an office to become an overnight shelter in 2021. The Wastewater Treatment Plant Administration Office replaced electric roof top HVAC units with natural gas units in 2021 which doubled the amount of natural gas being consumption in 2022. The Police Station recorded a steady reduction in energy consumption; however, an explanation could not be determined at this time.

Figure 2. Energy Intensity of Office Buildings from 2019 to 2023

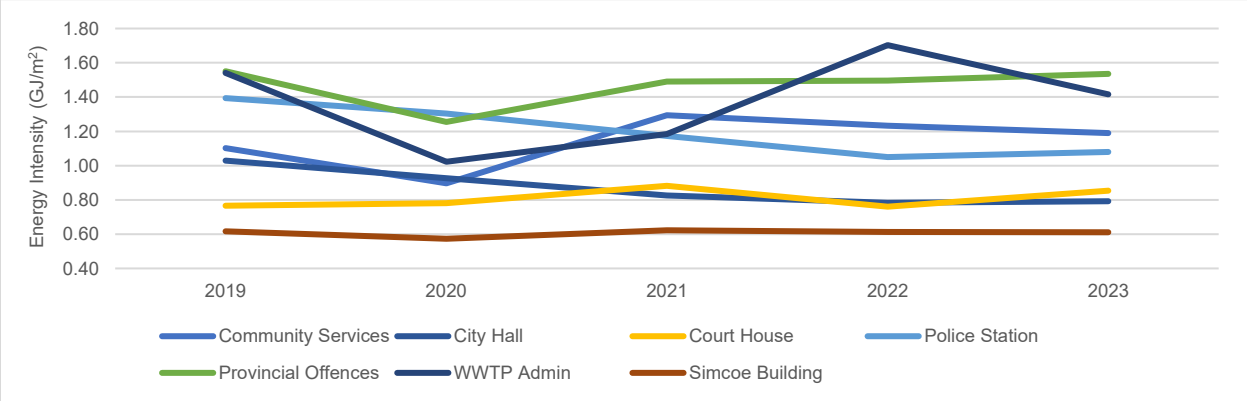
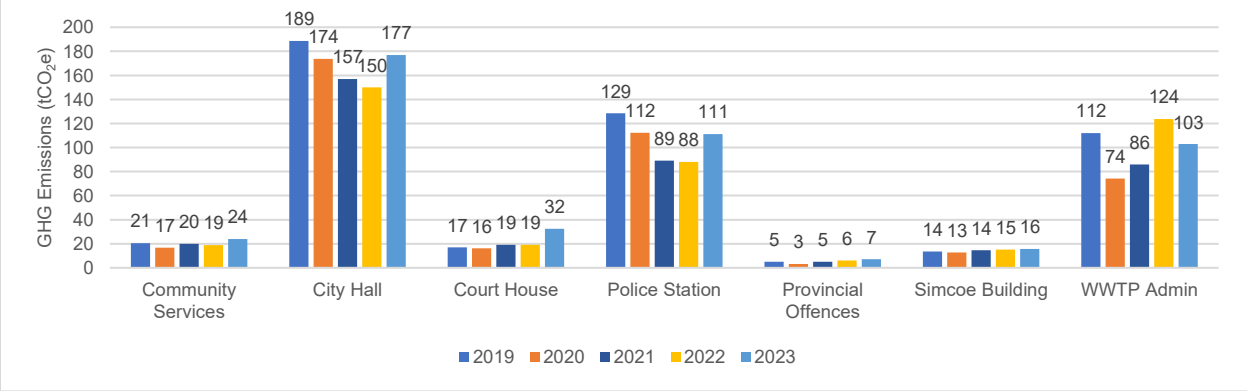


Figure 3. GHG Emissions from Office Buildings from 2019 to 2023



Arenas & Sports Complexes

Arena programming was impacted by the pandemic, but significant renovations also occurred during the evaluation timeframe. The Healthy Planet Arena (HPA) underwent a replacement of an ice pad in 2022. The closure of the HPA ice pad required the Kinsmen Arena to offer new recreational programming with the addition of summer ice starting in 2022. In addition, HPA also completed an HVAC and lighting upgrade in 2020 and 2023, respectfully. The Peterborough Sports & Wellness Centre replaced its dehumification system in 2021 and 2022 which curtailed facility energy usage during the renovation. The Memorial Centre experienced its highest ticketed sporting and entertainment events in 2022 and 2023, with an extended OHL playoffs resulting in ice making till May 2023. Lastly, the Northcrest Arena closed in 2021 and was demolished in 2022.

Figure 4. Energy Intensity of Arenas & Sports Complexes from 2019 to 2023

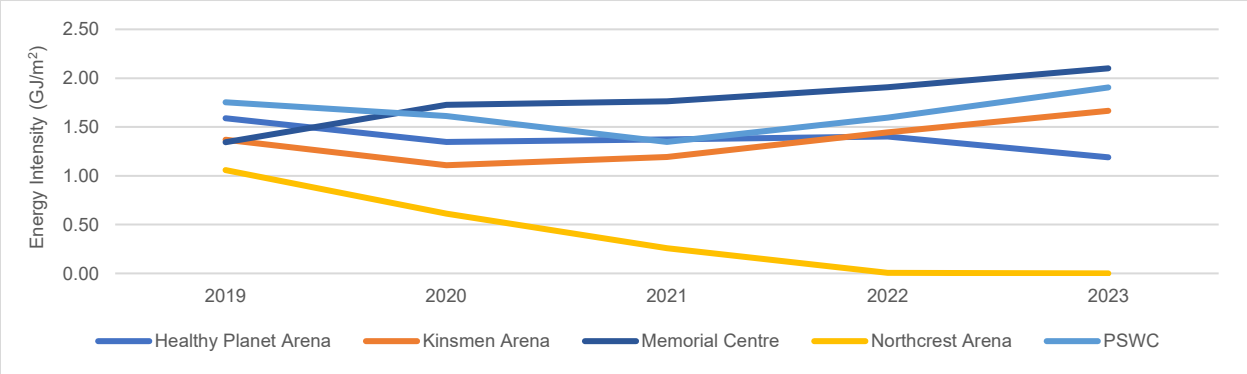
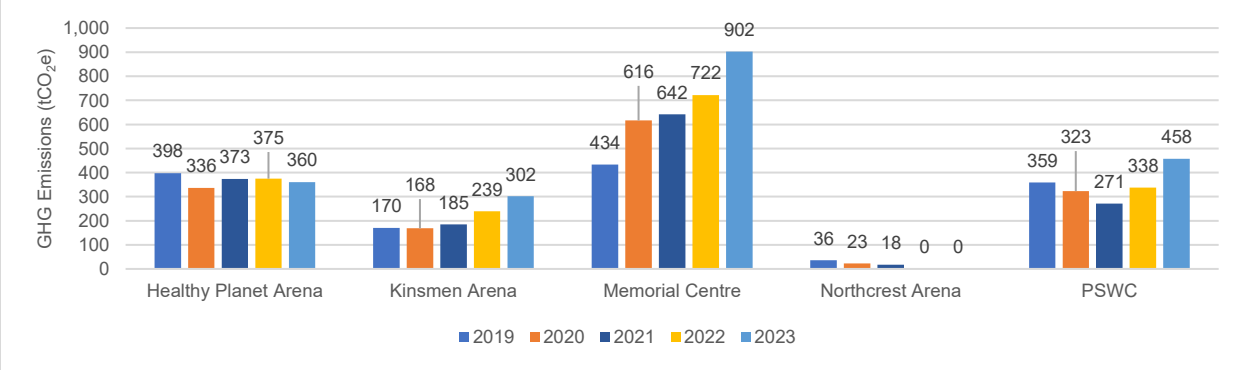


Figure 5. GHG Emissions from Arenas & Sports Complexes from 2019 to 2023



Libraries & Community Centres

The libraries and community centre class of buildings were all impacted by the pandemic that reduced programming in 2020. The Main Library experienced reduced service hours in 2020 with partial service beginning in 2021. Many library staff worked remotely or staggered on-site shifts till public health restrictions were lifted during this time. Regular service levels and staffing returned in the fall of 2021. In May 2022, the Main Library switched operational hours from 57 hours per week to 64 hours per week.

Alternatively, the Delafosse Library closed in March 2020 due to the pandemic but never reopened. The age of the building and plans to replace the library resulted in permanent closure and selling of the building in 2023. The Morrow Building which houses the regional farmer's market and other events was also impacted by the pandemic. Due to health guidelines, the farmer's market moved outdoors as well as scheduled events being cancelled. The Art Gallery underwent an extensive LED lighting retrofit in 2022 that lowered electricity. Similarly, the Peterborough Museum & Archives received an LED lighting upgrade in 2022. Lastly, the Daycare and Queen Alexandra Community Centre did not record any energy changes or undergo any energy renovations.

Figure 6. Energy Intensity of Libraries & Community Centres from 2019 to 2023

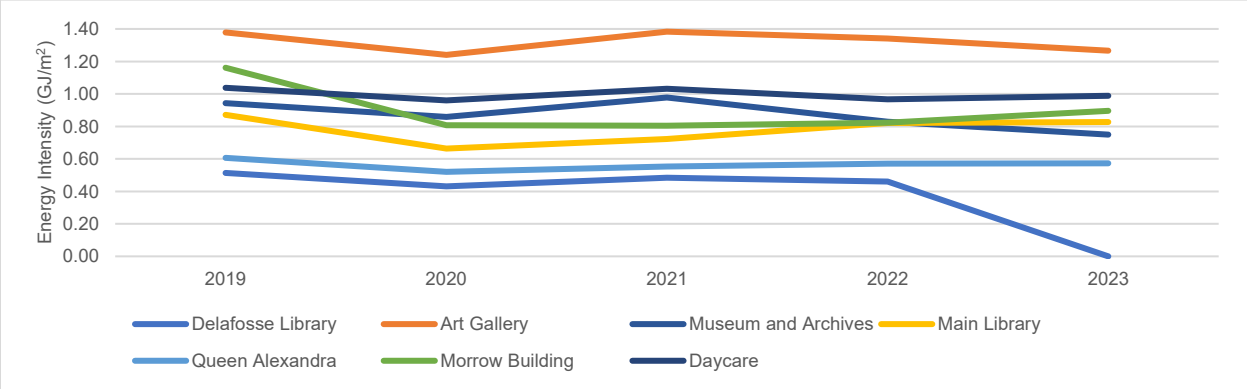
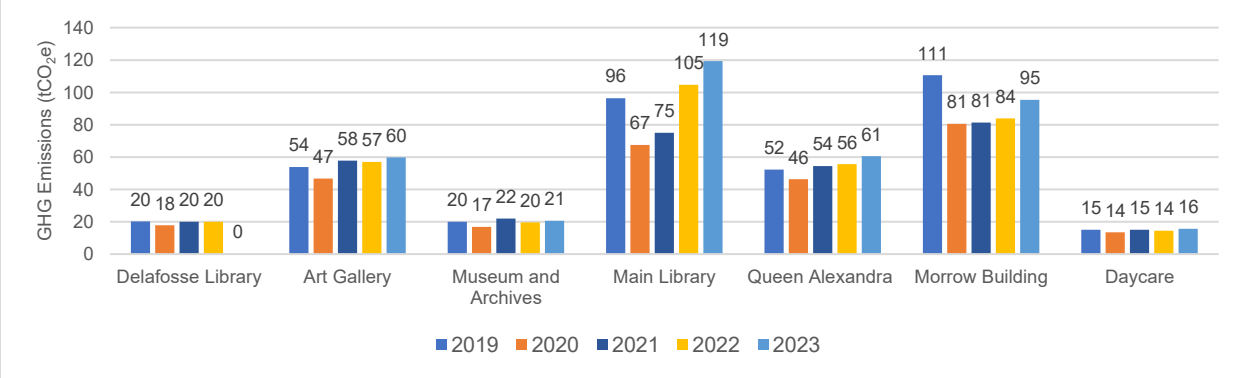


Figure 7. GHG Emissions from Libraries & Community Centres from 2019 to 2023



Fire Stations

The operations at the fire stations were not impacted by the pandemic and continued to provide 24-hour emergency services. The Sherbrooke and Carneige Fire Stations did not have any mechanical or operational changes during the reporting timeframe. However, a significant rise in energy intensity at the Clonsilla Fire Station was observed which corresponded with a significant spike of 7,208 m^3 in natural gas usage in July 2023. Fire Services was not able to provide an explanation for the rise and a review of the Enbridge Gas bills in 2023 revealed an overcharge and missing bill periods of natural gas in August and December. To rectify this issue, the four-year average from

2019 to 2022 was taken to correct for the missing months billing. Lastly, no mechanical or operational changes occurred at Clonsilla.

Figure 8. Energy Intensity of Fire Stations from 2019 to 2023

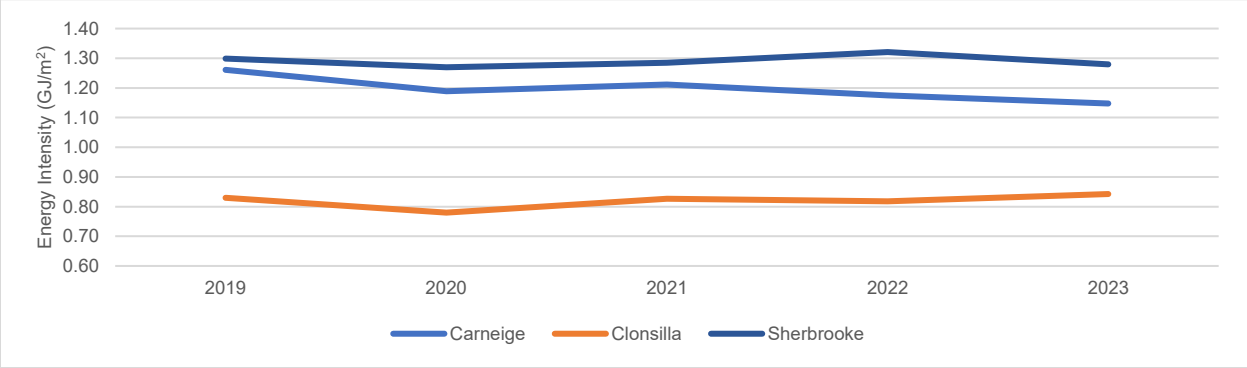
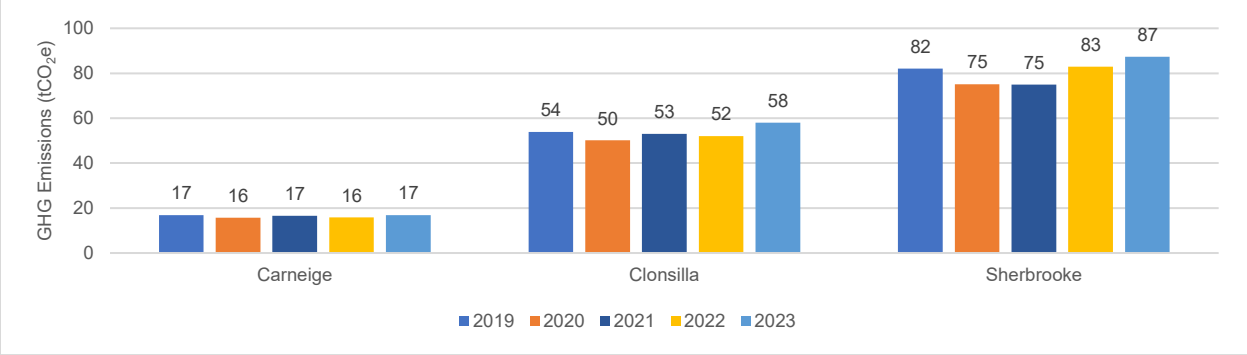


Figure 9. GHG Emissions from Fire Stations from 2019 to 2023



Public Works & Transit

In 2019, the Public Works Townsend facility reduced its operational function at the site and shifted operations to Public Works Webber facility, completing the transition in 2021. Transit Services moved into the vacated public works building and undertook some renovations, specifically, replacing several old electric heaters, reducing lighting schedules, lowering interior set temperatures, repairing holes in the exterior wall, and resealing around windows and doors. In addition, the facility's garage doors are now closed 90 percent of the time when storing buses as opposed to being open during occupation by public works. Installation of exterior LED lighting was completed in 2022. The Transit Bus Barns building shifted some of its service to the former Public Works Townsend building as renovations were completed. The Airport Maintenance building had its overhead door opened more often in 2022 which resulted in the space heaters running extra hard. Lastly, the Simcoe Bus Terminal and Public Works Webber building did not undergo any notable operational changes or renovations.

Figure 10. Energy Intensity of Public Works & Transit from 2019 to 2023

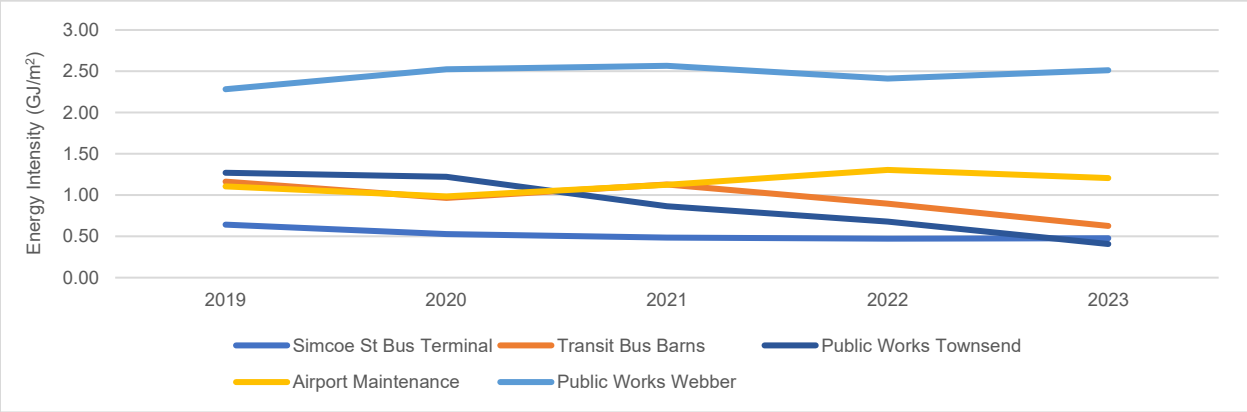
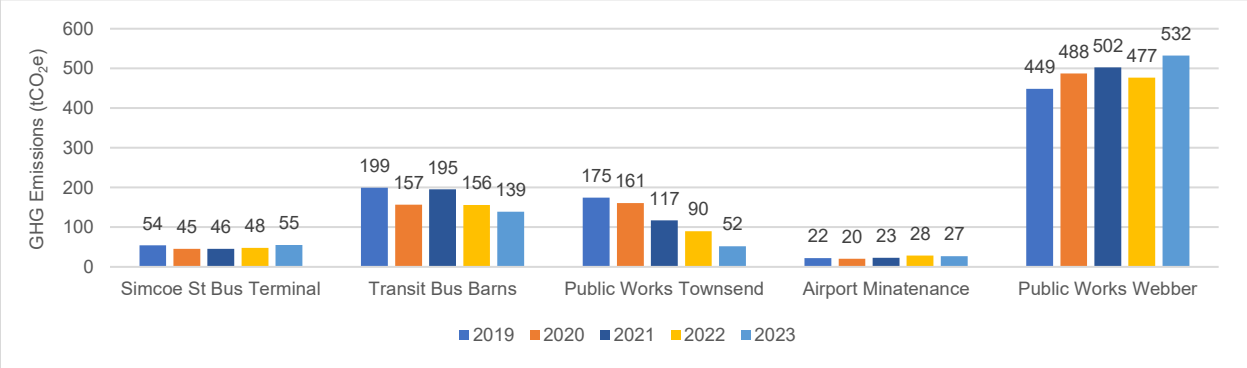


Figure 11. GHG Emissions from Public Works & Transit from 2019 to 2023



Other

The Airport Terminal building was directly impacted by the pandemic with international travel restrictions and operational changes at the airport. The Terminal restaurant closed in 2020 and did not resume operation during the timeframe of this report. Air traffic was inhibited, and the airport has not fully recovered with the number of scheduled flights from pre-pandemic levels. Similarly, the Marina Building also experienced restrictions due to the pandemic which limited the amount of hours for the tenant restaurant at the marina. Also, the marina provides power to the adjacent Del Crary Park which hosts outdoor festivals. The Peterborough MusicFest was cancelled in 2020 and in 2021 shifted to a virtual and drive-in format before returning to the park in 2022. The Marina Building undertook some renovations in 2019 and 2020 when exterior lighting was replaced with LEDs and aging domestic hot water tanks were upgraded to more energy efficient units.

Figure 12. Energy Intensity of the Airport Terminal & Marina Building from 2019 to 2023

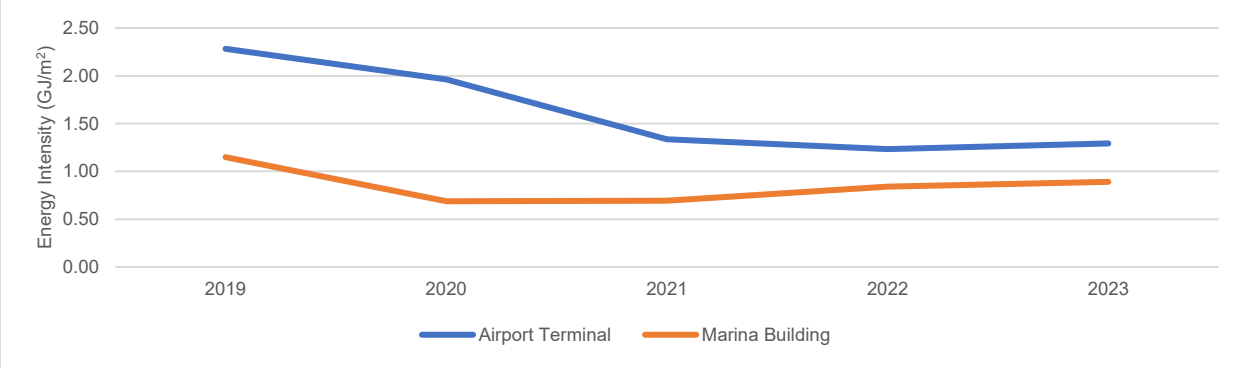
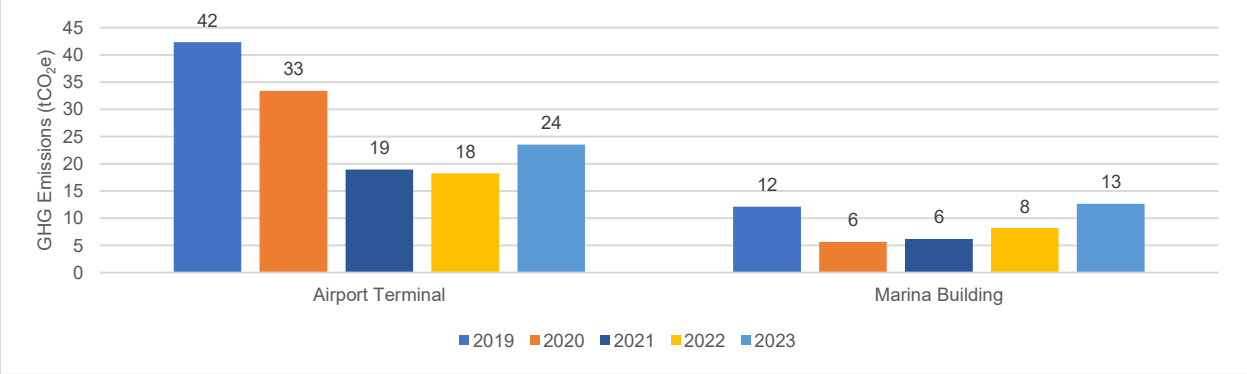


Figure 13. GHG Emissions from the Airport Terminal and Marina Building from 2019 to 2023



Wastewater Infrastructure Analysis

A subcategory of the CEMP3.0 is for wastewater infrastructure, comprising 12 pumping stations and the wastewater treatment plant as per O. Reg 25/23. Energy consumption for wastewater infrastructure was found to have decreased by 1 percent while GHG emissions negligibly increased by 0.7 percent or 4 tCO_2e in 2023 from 2019 levels (Table 4).

Table 4. Wastewater Infrastructure Energy Consumption, Energy Intensity, & GHG Emissions

Year	Electricity (kWh)	Natural Gas (m^3)	Energy (GJ)	GHG Emissions (tCO_2e)
2019	7,471,414	162,877	33,047	542
2020	7,132,685	137,291	30,859	445
2021	6,849,055	164,786	30,881	510
2022	7,511,821	150,773	32,734	569
2023	7,801,299	121,340	32,660	546*
% difference	**4%**	**-26%**	**-1.17%**	**0.70%**
Difference	**329,885**	**-41,537**	**-387**	**4**
Average	**7,353,255**	**147,413**	**32,036**	**523**
* Estimated GHG Emissions				

Pumping Stations

Pumping stations are distributed across Peterborough to facilitate the movement of wastewater to the treatment plant. No substantial renovations to the pumping station network occurred besides regular maintenance during this timeframe. However, a significant windstorm weather event occurred in May 2022 that knocked out power to sections of the city for multiple days. As a result, key pumping stations have backup natural gas generators that automatically switch on when electricity is lost. Several pumping stations utilized their generators which explains the spike in energy usage in 2022.

Figure 14. Combined Energy Usage of Pumping Stations from 2019 to 2023

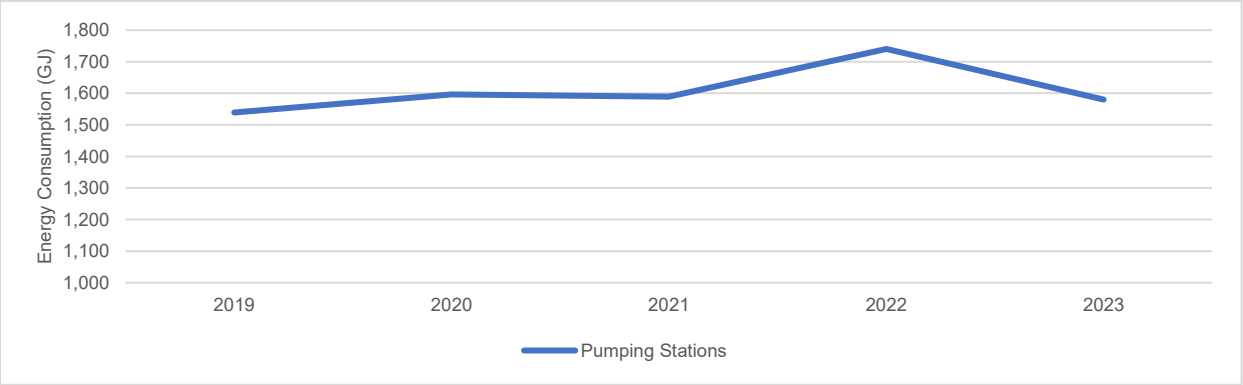
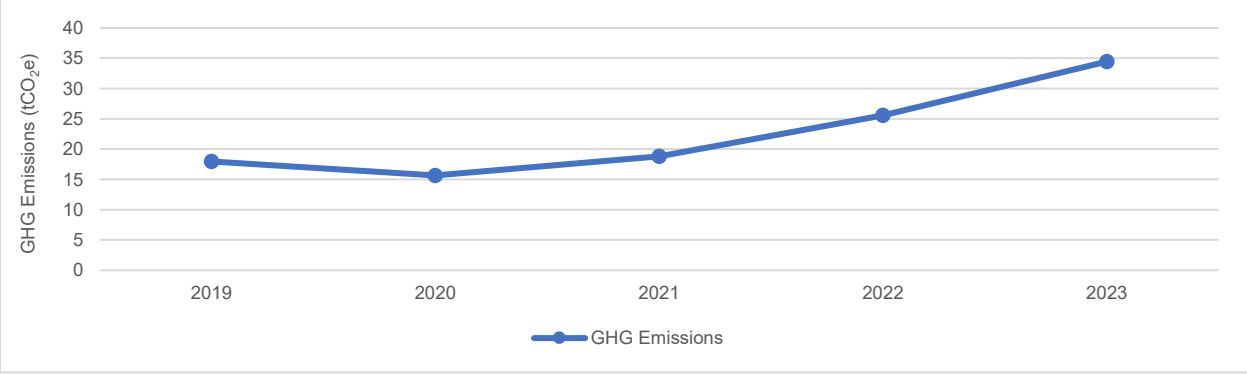


Figure 15. Combined GHG Emissions of Pumping Stations from 2019 to 2023



Wastewater Treatment Plant

The Wastewater Treatment Plant (WWTP) experienced below normal flows to the plant which resulted in reduced use of equipment run times in 2020 and 2021. The WWTP also underwent construction of new tanks and equipment which did impact some operation capacity during this timeframe.

Figure 16. Combined Wastewater Treatment Plant Energy Usage from 2019 to 2023

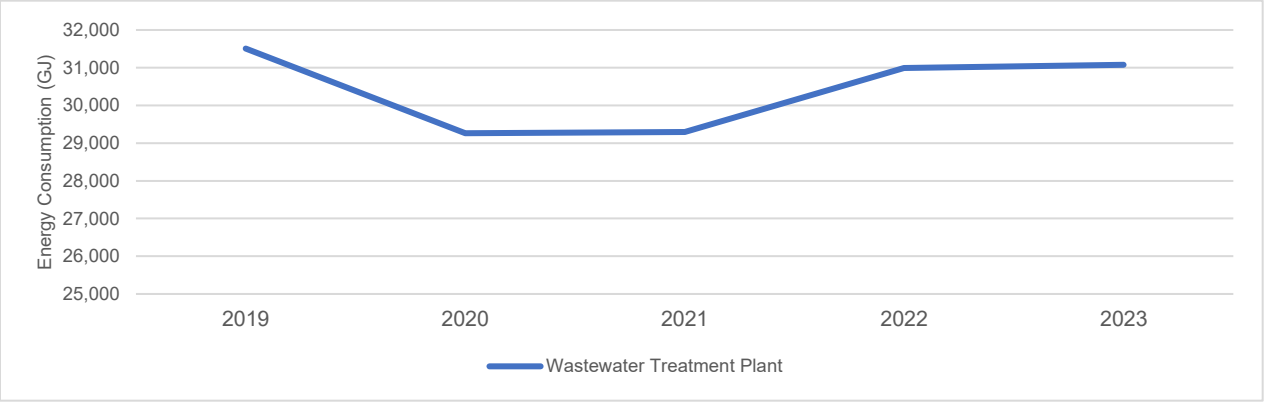
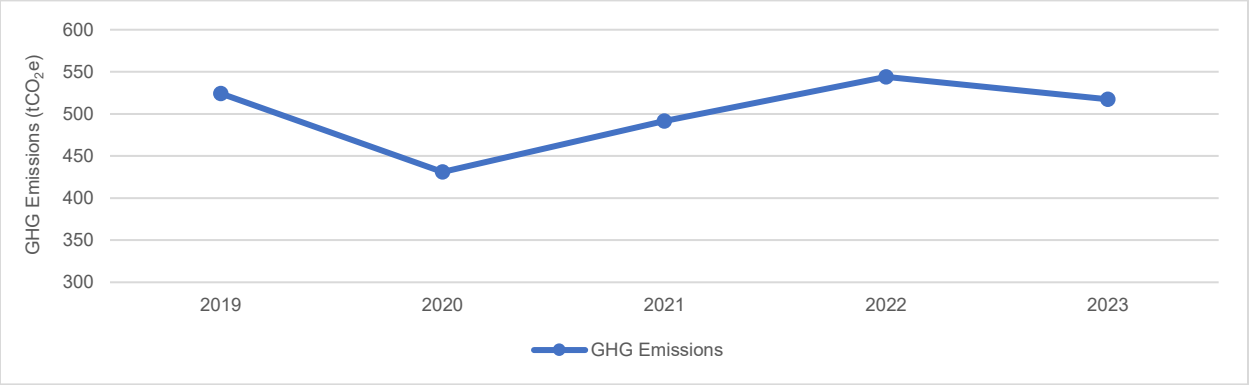


Figure 17. Combined Wastewater Treatment Plant GHG Emissions from 2019 to 2023



Benchmark Energy Performance of Corporate Buildings

An analysis was performed that compared the energy intensity and GHG emission intensity of Corporate Buildings with its corresponding national benchmark per architype to determine how facilities ranked in Canada (Table 5). The assessment utilized national building class median energy consumption per floor area (GJ/m^2) and median GHG emission in $kgCO_2e$ per floor area to approximate the impact of facilities. National commercial, institutional, and arena surveys from 2023 were compiled to generate the energy intensity benchmark while GHG intensity used the Ontario emission factors in the federal National Inventory Report (2022) for locating building emissions. The benchmarked values represent the mid-point 50th percentile value for each building architype and does not reflect best-in-class.

Table 5. Comparing Facility Energy & GHG Intensities to Canadian Building Benchmarks

Facility	Address	Energy Intensity (GJ/m^2) 2019-2023			Benchmarked Median Energy Intensity (GJ/m^2) *	Median GHG Emissions ($kgCO_2e/m^2$)			Benchmarked Median GHG Emissions ($kgCO_2e/m^2$) ǂ
		2019	2023	%Δ		2019	2023	%Δ	
Community Service	210 Wolfe St	1.10	1.19	8%	1.25	38	43	13%	33.2
City Hall	500 George St	1.03	0.79	-23%	1.25	32	30	-6%	33.2

Facility	Address	Energy Intensity (GJ/m^2) 2019-2023			Benchmarked Median Energy Intensity (GJ/m^2) *	Median GHG Emissions ($kgCO_2e/m^2$)			Benchmarked Median GHG Emissions ($kgCO_2e/m^2$) ǂ
		2019	2023	%Δ		2019	2023	%Δ	
Provincial Court House	70 Simcoe St	0.77	0.85	10%	1.25	10	19	90%	42.9
Police Station	500 Water St	1.39	1.08	-22%	1.21	40	34	-15%	42.9
Provincial Offence Office	99 Simcoe St	1.55	1.53	-1%	1.25	38	53	39%	33.2
Simcoe Building	249 Simcoe St	0.62	0.61	-1%	1.25	24	27	13%	33.2
WWTP Admin Office	425 Kennedy Ave	1.54	1.42	8%	1.25	79	72	-9%	33.2
Healthy Planet Arena ǂ	911 Monaghan Rd	1.59	1.19	-25%	1.75	50	46	-8%	38.5
Kinsmen Arena ǂ	1 Kinsmen Way	1.37	1.67	22%	1.75	34	60	76%	38.5
Memorial Centre ǂ	151 Lansdowne St	1.34	2.10	57%	1.78	39	81	108%	38.5
Northcrest Arena ǂ	-	1.06	0.0	-100%	1.27	16	0	-100%	38.5
PSWC	775 Brealey Dr	1.75	1.90	9%	0.95	59	75	27%	50.7
Delafosse Library	-	0.51	0	-100%	1.89	22	0	-100%	58.4
Art Gallery	250 Crescent St	1.38	1.27	-8%	1.19	45	50	11%	58.4
Daycare	127 Aylmer St S	1.04	0.99	-5%	0.97	37	39	5%	27.8
Museum and Archives	300 Hunter St E	0.94	0.75	-20%	0.65	18	19	6%	58.4
Main Library	345 Aylmer St N	0.87	0.83	-5%	1.89	26	32	23%	58.4
Queen Alexandra	180 Barnardo Ave	0.61	0.57	-7%	0.95	19	22	16%	37.2
Morrow Building	155 Lansdowne St	1.16	0.89	-23%	1.19	48	41	-15%	32.9
Carnegie Fire Station	161 Carnegie Ave	1.26	1.15	-9%	1.89	48	48	0%	41.5
Clonsilla Fire Station	839 Clonsilla Ave	0.83	0.84	1%	1.89	36	33	-8%	41.5
Sherbrooke Fire Station	210 Sherbrooke St	1.30	1.28	-2%	1.89	47	50	6%	41.5
Simcoe St Bus Terminal	190 Simcoe St	0.64	0.48	-25%	1.19	13	14	8%	35.6
Airport Maintenance	570 Skyway Dr	1.10	1.21	10%	1.19	43	53	23%	32.9
Transit Bus Barns	130 Aylmer St N	1.16	0.63	-46%	1.19	46	34	-26%	32.9
Public Works Webber	791 Webber Ave	2.28	2.51	10%	1.19	92	109	18%	32.9
Public Works Townsend	182 Townsend St	1.27	0.41	-68%	1.19	49	14	-71%	32.9
Airport Terminal	590 Skyway Dr	2.28	1.29	-43%	1.19	69	39	-43%	35.6
Marina Building	92 George St	1.15	0.89	-23%	1.19	22	24	9%	35.6

* Energy Star Portfolio Manager Technical Report – Canadian Energy Use per Property Type (2023): https://portfoliomanager.energystar.gov/pdf/reference/Canadian%20National%20Median%20Table.pdf
ǂ Energy Star Portfolio Manager Technical Report – Canadian Regional Median GHG Emissions Intensity (2022): https://natural-resources.canada.ca/sites/nrcan/files/energy/pdf/2GHGI_-_English19_0(1).pdf
ǂ Ontario specific arena dataset used for selected arenas (2014): http://www.statcan.gc.ca/daily-quotidien/160830/dq160830d-eng.htm

Energy Conservation Initiatives Completed from 2019 to 2023

The City completed several energy conservation initiatives proposed in the CEMP2.0. Projects include the implementation of mechanical, operational, and decision-making processes to limit energy consumption, that include the following actions:

- Several buildings underwent LED lighting upgrades between 2019 to 2023 that included the Marina Building, Peterborough Museum & Archives, Art Gallery, Healthy Planet Arena, and the Transit Bus Barns/Townsend Public Works.

- In 2020, high efficiency domestic hot water tanks were installed at the Marina Building.

- In 2020, the Healthy Planet Arena replaced its HVAC system with an energy efficient system.

- In 2021, City staff initiated annual GHG emission reporting to City Council. Corporate inventory reports include the amount of energy consumed and its associated GHG emissions for facilities, wastewater treatment, pumping stations, outdoor lighting standards, fleet, and waste.

- In 2021, a community-wide solar photovoltaic evaluation was completed that determined the potential for solar energy production from solar arrays on rooftops. The survey captured City facilities as part of the evaluation that can be used for preliminary identification of suitable rooftop solar arrays.

- In 2021, insulation was added to exterior walls, doors, and windows at the Townsend Public Works and Transit Bus Barns.

- In 2022, the City initiated the Community Buildings Retrofit Feasibility Study, funded by the Federation of Canadian Municipalities' that evaluated how to reduce GHG emissions from nine high energy intensive facilities. The Study included recommendations for dozens of energy conservation measures to incorporate over a 20-year replacement schedule in the selected facilities. The Study was completed in 2024.

- In 2023, the City started construction of a net-zero fire hall to replace the Carneige Fire Hall. The new fire hall includes many energy efficiency features such as ground source heating, heat recovery, automated controls, solar panels, water use controls, and mass timber framing reclaimed lumber from the demolition of the Northcrest Arena. The fire hall will open in Fall 2024.

Proposed Energy Conservation Measures in 2024 to 2028

The City of Peterborough did not reach its 10 percent energy reduction goal by 2023 from 2019 levels. However, the City did mitigate energy use by 5 percent from Corporate Buildings from 2019 levels. The revised goal of the updated CEMP3.0 is to strive to achieve another 5 percent reduction in energy consumption from Corporate Buildings in 2028 from 2023 levels. Proposed energy efficiency measures presently planned to be implemented to target electricity and natural gas use across Corporate Buildings by 2028 are presented in Table 6.

Table 6. Proposed Energy Conservation Measures at Corporate Buildings

Year	Facility	Project Description	Est. Project Cost
2024	Sherbrooke Fire Station	Interior lighting replacement	$120,000
2024	Sherbrooke Fire Station	Building automation system	$150,000
2024	Sherbrooke Fire Station	Replace windows	$625,000
2024	Clonsilla Fire Station	Building automation system	$150,000

Year	Facility	Project Description	Est. Project Cost
2024	Court House	Replace baseboard & fan force heaters	$125,000
2024	Healthy Planet Arena	Replace refrigeration room & south pad	$3,990,000
2024	Daycare	Mechanical upgrades	$75,000
2025*	Art Gallery	Air sealing and windows	$170,000
2025*	Sherbrooke Fire Station	Replace HVAC	$450,000
2026*	City Hall	Replace windows	$525,000
2026*	Sherbrooke Fire Station	Replace boilers	$150,000
2027*	Kinsmen Arena	Replace refrigeration plant and ice pad	$6,875,000
2027*	Morrow Building	Replace HVAC	$50,000
2027*	PSWC	Replace windows	-
2028*	Art Gallery	Replace windows	$100,000
* Dependent on approved annual budgets			

Proposed Supporting Energy Conservation Measures

The City is proposing additional supportive energy conservation measures to reduce energy usage at existing and planned facilities. The following proposed measures are anticipated to be implemented during the next five years.

Corporate Buildings Retrofit Capital Funding

Apply to the Federation of Canadian Municipalities' Community Buildings Retrofit Capital Program to fund energy conservation measures recommended in the Community Buildings Retrofit Feasibility Study. The selected measures would target projects identified to be undertaken from 2024 to 2028. The capital funding would provide 20 percent grant and the remainder loans up to $5 million for a portfolio of energy conservation measures if the application is successful. Potential capital projects at study facilities the City may proceed with in the next five years include:

- Low-flow water fixtures at multiple facilities
- Wash bay fan mechanical upgrade at the Municipal Operations Centre
- Solar photovoltaic rooftop and canopy arrays at multiple facilities
- Building automated systems at multiple facilities
- LED lighting retrofits at multiple facilities

Turning off Boilers in the Summer at Specific Facilities

Initiate no-cost energy conservation at specific facilities like City Hall and the Main Library by turning off building boilers in the summer months to conserve energy. In doing so, selected facilities will benefit from lower energy use when heating demand and seasonality does not necessitate running the boilers.

Police Station Energy Conservation and Resiliency

Incorporate energy conservation measures and resiliency feature designs into the planned Police Station renovation. Energy measures could include low-carbon heating systems like air source heat pumps, heat recovery units, LED lighting, triple pane windows, solar canopy arrays, energy storage, and back-up generators. Undertaking an energy conservation feasibility study at the Police Station to inform decision-making is planned.

Project Level Climate Lens

Implement a project-based climate lens that evaluates GHG emissions estimates of facility projects to determine best options to decarbonize projects. Project level climate lens will grant City staff the ability to assess whether a planned project is considering the emissions impact of a project and what alternatives are available. The climate lens will also allow for the opportunity to describe why a project could not accommodate decarbonization into the project. Specifically, utilizing RETScreen as an evaluation tool for facilities will be considered.

Comprehensive LED Lighting Retrofits

Complete corporation-wide LED lighting retrofits at all Corporate Buildings to ensure that all lighting is replaced within the same time period to avoid piecemeal installation over multiple years.

Introduce Insulated Window Curtain at Offices

Install low-cost insulated window curtains to limit the heat loss transferred from interior spaces to the outside that can curtail the space heating requirement of the building. Insulation would also coincide with mandating that curtains be closed after business hours and throughout the weekend at select offices.

Interior Temperature Set Points

Adjust interior temperature schedules to decrease the energy use at Corporate Buildings by setting temperature to 21ºC to 23ºC in the winter and 22ºC to 24ºC in the summer.

Save On Energy Applications

Apply to the Save On Energy program for energy conservation funding. Multiple applications are planned for converting lighting at facilities as well as for mechanical upgrades at the Healthy Planet Arena.

Update Sustainable Procurement Policy with Enhanced Sustainability Indicators

Amend the current Sustainable Procurement Policy to contain language for procuring goods and services with enhanced sustainability indicators. The revised language should consider seeking goods and services with low energy consumption attributes and low-carbon GHG emission ratings as compared to standard benchmarked goods and services available on the market.

Annual Corporate Building Energy Consumption Reporting to City Council

Initiate annual reporting to City Council on the energy usage of Corporate Buildings to keep elected officials and the public aware of energy conservation projects and facility energy trends. The report would evaluate the City's progress towards achieving the 5 percent energy reduction target to the 2023 baseline. Additionally, energy conservation measures implemented or being planned at Corporate Buildings will be incorporated into the report.

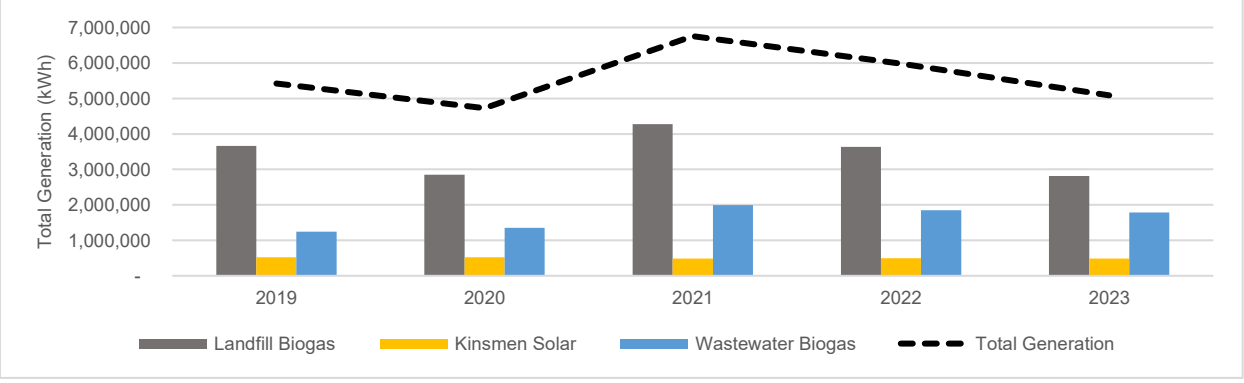
Sustainability and Energy Management Meetings

Establish quarterly meetings with the energy management team to discuss progress on energy project implementation and how sustainability staff can support projects. Output of meetings will be incorporated into annual Corporate Building Energy Consumption Reporting.

Renewable Energy Generation

The City generates renewable energy in partnership with Peterborough Utilities Inc. at three facilities (Figure 18). The 1.6 MW Landfill Biogas Generator produces electricity from incinerated methane gas created as a by-product of anaerobic decomposition of organic waste captured in the landfill. Additionally, the 380 kW Wastewater Treatment Plant Biogas Generator creates electricity from methane gas produced from the anaerobic digestion of sewage. Lastly, the Kinsmen Arena Solar Array has an installed capacity of 438 kW rooftop unit. Total renewable energy generated from all three facilities from 2019 to 2023 was 27,965 MWh.

Figure 18. Renewable Energy Generation



The soon-to-be commissioned new Net Zero Fire Hall will have a rooftop solar array installed with the capacity to generate 110 MWh per year. However, no additional renewable energy projects are currently in the planning stage to be implemented before 2028.

Proposed Technology

The City is installing a water source heat pump system at the new Net Zero Fire Hall under construction to provide space heating and cooling. The Fire Hall will be operational in late 2024.

Plan Approval

The Corporate Energy Management Plan 2024 to 2028 was approved by senior management on June 26, 2024.

Appendix

Table 7. Corporate Buildings Energy Consumption in 2023

Facility	Address	Total Floor Area (m^2)	Type of Building	Hours Occupied per Week	Total Energy Used (GJ)	Total GHG emissions (tCO_2e)
Airport Terminal	590 Skyway Dr	612	Other	40	792	23
Art Gallery	250 Crescent St	1,193	Art gallery	52	1,511	60
Carneige Fire Hall	161 Carneige Ave	353	Fire station	168	405	17
City Hall	500 George St N	5,831	Administrative office	60	4,623	177
Clonsilla Fire Hall	839 Clonsilla Ave	1,612	Fire station	168	1,358	58
Community Servies Bldg	210 Wolfe St	557	Other	168	662	24
Daycare Building	127 Aylmer St S	408	Community Centre	55	403	16
Healthy Planet Arena	911 Monaghan Rd	7,899	Indoor sports arena	126	9,392	360
Kinsmen Arena	1 Kinsmen Way	5,017	Indoor sports arena	126	8,355	302
Main Library	345 Aylmer St N	4,181	Library	76	3,457	119
Marina Building	92 George St N	553	Other	40	492	13
Memorial Arena	151 Lansdowne Ave	11,150	Indoor sports arena	126	23,423	901
Morrow Building	155 Lansdowne Ave	2,327	Other	20	2,083	95
Museum & Archives	300 Hunter St E	929	Museum	60	696	21
Police Station	500 Water St	3,252	Police station	168	3,508	111
Provincial Court House	70 Simcoe St	1,673	Court	50	1,428	32
Provincial Offences Office	99 Simcoe St	132	Administrative office	40	203	7
Public Works Townsend	182 Townsend Ave	3,076	Vehicle storage	168	1,253	52
Public Works Webber	791 Webber Ave	4,865	Vehicle storage	168	12,230	532
Queen Alexandria Comm. Centre	180 Barnardo Ave	2,787	Community centre	40	1,597	61
Sherbrooke Fire Hall	210 Sherbrooke Ave	1,744	Fire station	168	2,232	87
Simcoe St Building	249 Simcoe Building	590	Administrative office	40	360	16
Simcoe St Bus Terminal	190 Simcoe Building	4,024	Other	74	1,923	56
Sports & Wellness Centre	775 Brealey Dr	6,108	Indoor aquatic and sports centre	114	11.634	458
Transit Bus Barns	130 Aylmer Ave	4,045	Vehicle storage	86	2,533	139
WWTP Admin Building	425 Kennedy Ave	1,425	Administrative office	168	2,017	103

Table 8. Wastewater Infrastructure Consumption in 2023

Facility	Address	Type of Building	Total Energy Used (GJ)	Total Volume of Sewage Treated (m^3)	Total GHG emissions (tCO_2e)
Airport PS	319 Mel O'Brien Way	Related to sewage treatment	244	72,756	5
Ashburnham PS	1880 Ashburnham Dr	Related to sewage treatment	651	2,713,690	16
Burnham Point PS	64 Edgewater Blvd	Related to sewage treatment	119	55,170	3
Engleburn PS	279 Engleburn Ave	Related to sewage treatment	13	119,452	0.5
Landfill PS	1260 Bensfort Rd	Related to sewage treatment	92	N/A	2
Monaghan PS	506 Monaghan Rd	Related to sewage treatment	122	151,721	3
Montgomery PS	95 Montgomery St	Related to sewage treatment	74	116,681	2
Park St PS	588 Park St S	Related to sewage treatment	105	N/A	2
Parkhill PS #1	43 Parkhill Rd W	Related to sewage treatment	23	24,833	0.5
Parkhill PS #2	1100 Parkhill Rd W	Related to sewage treatment	365	364,866	7
Simcoe PS	73 Simcoe St	Related to sewage treatment	80	97,901	2
Valleyview PS	850 Valleyview Dr	Related to sewage treatment	28	21,887	0.5
Wastewater Treatment Plant	425 Kennedy Ave	Sewage treatment	31,080	16,493,707	746

* PS = Pumping Stations, N/A = Not available