

CITY OF FREDERICTON

CORPORATE ENERGY AND EMISSIONS PLAN

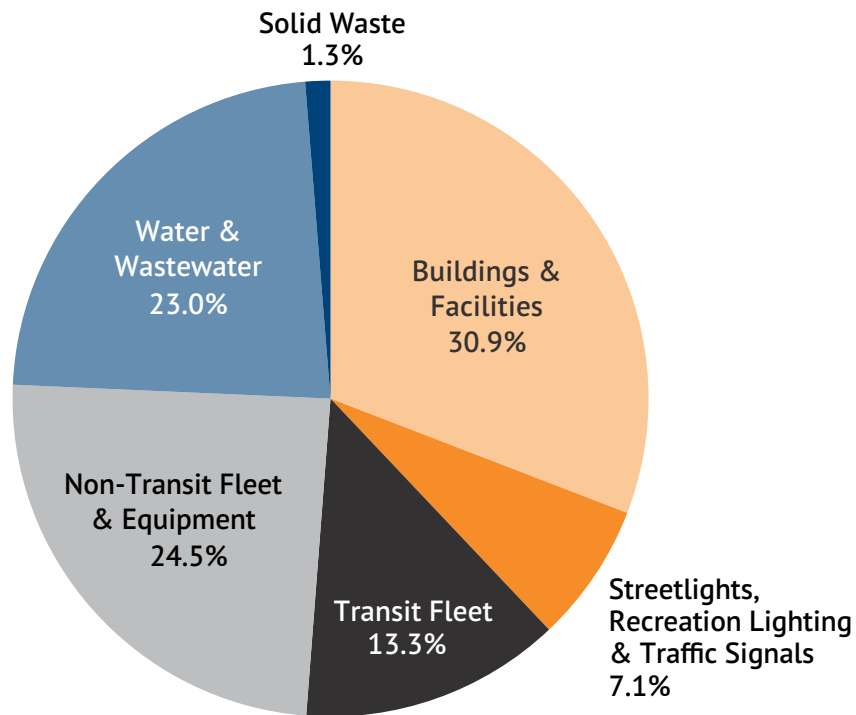
CITIZEN SYNOPSIS



An understanding of climate change and a focus on reduction of greenhouse gas (GHG) emissions has long been a priority for the City of Fredericton (the City) having reported on corporate GHG emissions since 2004. Energy consumption and associated GHG emissions arise as a result of the provision of key services by the City, which include the operation of buildings, fleet, transit, equipment, wastewater treatment, outdoor lighting, and the disposal of solid waste. In 2021, the City’s corporate energy consumption and GHG emissions amounted to 163,574 Gigajoules (GJ) and 11,662 tonnes of carbon dioxide

equivalent (tCO₂e) – a reduction of 34 percent from the 2004 base reporting year.¹ For the 2021 reporting year, approximately 31 percent of the City’s corporate GHG emissions came from buildings and other facilities like recreation centers and pools; 38 percent came from transportation related activities which includes corporate service vehicles as well as transit fleet; 23 percent came from the operation of water and wastewater pumping and treatment systems; 7 percent came from the operation of streetlights and traffic signals; and just over 1 percent came from the decomposition of waste at landfills.

GHG Emissions By Source

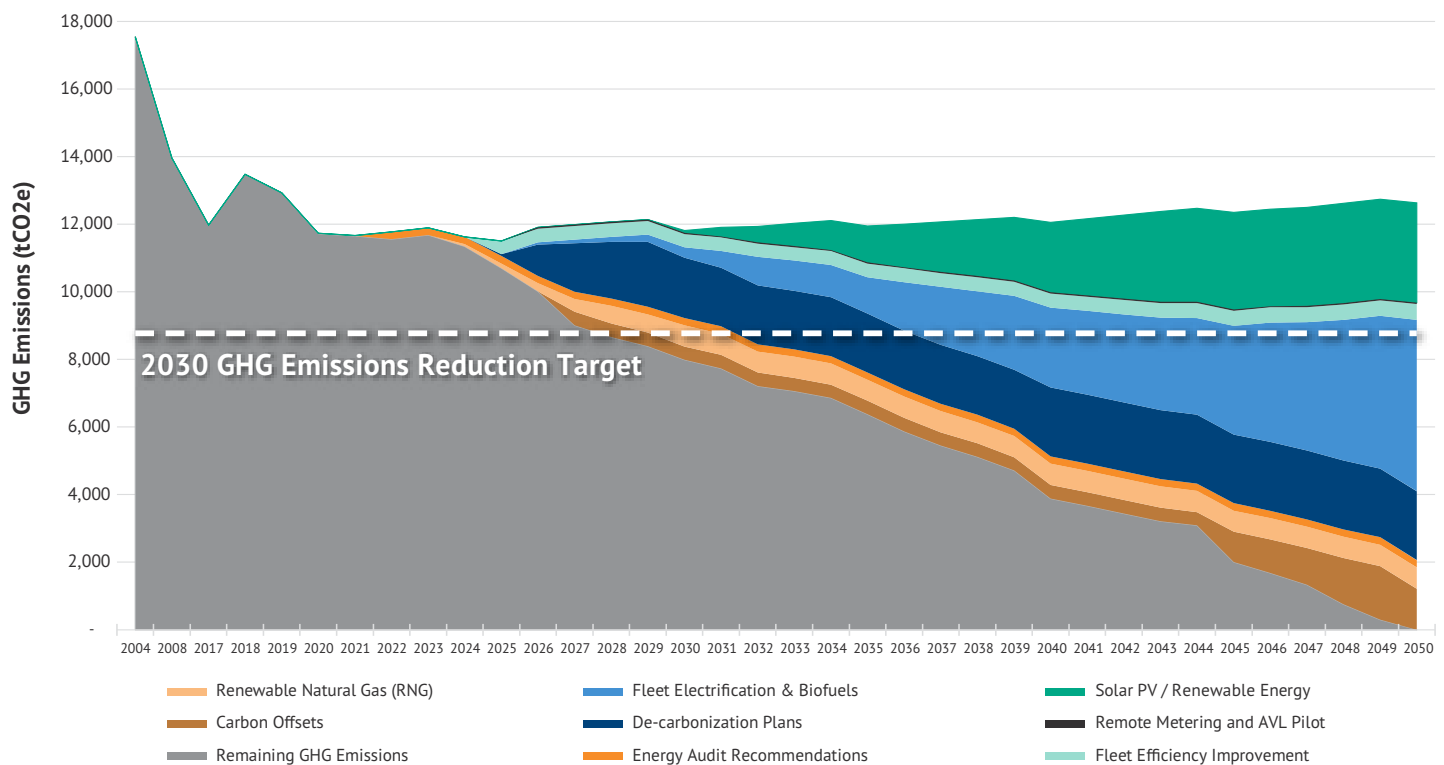


¹ Details on the 2019 GHG inventory and forecast assumptions are included in the 2019 GHG Emissions Inventory Report.

While the City’s progress towards reducing GHG reduction is a notable achievement, it is not enough to combat the effect that the estimated 3 to 4°C global warming trajectory and the associated impacts that global GHG emissions may have on our global climate system. To substantially reduce the risks and effects of climate change, scientists and policy makers have come to the agreement that global society must stabilize and reduce GHG emissions to levels to limit global temperatures from rising beyond 1.5°C over the next 30 years. This translates to reducing GHG emissions 50–60 percent by 2030, 80 percent by 2040, more than 90 percent by 2050 with the remaining emissions being offset or neutralized (e.g. direct air capture, reforestation, etc.) and be net negative in the second half of the century. If the current global GHG emissions trajectory continues, scientists estimate that global temperatures could rise by 4 to 6°C this century, resulting in irreversible environmental, social, and climatic changes, and economic losses ranging from 5 to 20 percent of global Gross Domestic Product (GDP) annually.²

As centers of communication, commerce, and culture, cities organizations play an important role in the reduction of GHG emissions and the impacts that climate change can have on a community. They have a leadership role that influences their communities beyond their organization’s carbon footprint. On this basis, the City is undertaking additional efforts to align with Federal GHG reduction targets. In 2020, the City prepared a Corporate Energy and Emissions Plan (CEEP) which proposed actions to put the City on a path towards reducing GHG emissions 80 percent by 2050. To align with Canada’s new GHG targets, in February 2022, City Council has adopted new GHG reduction targets of 50 percent by 2030, and net zero operations by 2050 (reductions from 2004 levels). Achieving a net-zero claim means that little to no GHG emissions are being emitted from operations; this is different from carbon neutrality where the intent is to allow GHG emissions to be released to the atmosphere and “balance” them out by procuring carbon offsets. This means that no organization can wait until 2050 to achieve its GHG reduction target – actions to reduce operational GHG emissions must begin to be implemented immediately. The figure below presents the City’s pathway towards net zero operations.

Example Pathway to Net Zero



² mudancasclimaticas.cptec.inpe.br/~rmclima/pdfs/destaques/sternreview_report_complete.pdf

CORPORATE ENERGY AND EMISSIONS PLAN AT A GLANCE

This CEEP update reflects these new GHG targets and has been updated to reflect the City’s 2021 operational GHG emissions and additional energy and GHG reduction initiatives. The CEEP’s energy and GHG emission forecasting was based on corporate energy and GHG emissions available for the most representative year, 2021 and trends from 2018-2021 as well as anticipated growth to 2050. The identification of initiatives for incorporation into the CEEP was done through a combination of staff engagement, a best-in-class review of other local government and regional districts, and input from internal and external subject matter experts. The CEEP covers a time-year horizon from 2022 to 2030, but also considers longer-term actions that will be needed to achieve the proposed GHG targets.

To achieve the 2030 GHG reduction target, before 2030, the City will need to focus on the following actions:

→ **Prepare and implement building decarbonization plans to achieve at least a 50 percent reduction in GHG emissions for its high emitting facilities**, which include:

- Grant Harvey Centre (Arena)
- Willie O’Ree Place
- Barker ST WWTP - Blower Building
- Fredericton Police Station
- City Hall
- Two Nations Fire/EOC
- Lady Beaverbrook Arena
- Barker ST WWTP - Operation Building
- York Arena
- St Mary’s Depot
- Fredericton Public Library
- St Mary’s New Transit
- York Fire Station
- Transit Garage
- Parks & Trees Depot

→ **For other facilities or infrastructure, seek out energy projects to reduce energy and GHG emissions** when there is new construction, renovations, and/or mechanical system and equipment replacements.

→ **Implement a building commissioning and monitoring program** to maintain energy conservation and GHG emissions reductions.

→ **Implement technological and behavioral energy efficiency reduction programs, and monitor progress** using EnergyStar Portfolio Manager.

→ **Reduce fleet size by at least 10 percent by 2025.**

→ **Accelerate the conversion to electric and low-carbon fuels** using the cost of carbon to support the life cycle replacement cost and by developing a fleet electrification strategy.

→ **Explicitly define and recognize natural assets as an asset class in the financial accounting systems** and establish obligations to operate, maintain, and replace natural assets alongside traditional capital assets.

→ **Seek opportunities to invest in local nature-based solutions / projects** (e.g., reforestation) to be able to recognize the future carbon benefit.

→ **Utilize carbon offsets to reduce GHG emissions to meet the required 2030 GHG target.**

To meet the net-zero target, the City will need to eliminate 90 percent of its GHG emissions through the full electrification of buildings and light duty fleet, the installation and use of renewable power sources (e.g., PV solar), the use of biofuels in all fleet and equipment that cannot be converted to electric, the investment in nature-based solutions, and likely adjusting various business models and service levels. The residual emissions that remain (10 percent) will need to be neutralized via offsets or investments in technological removals (e.g., direct air capture) and / or neutralization projects like conservation / reforestation projects.

The table below presents the CEEP 2021, 2025 and 2030 GHG emissions required to transition towards and reach the 2030 GHG reduction target. The forecasted GHG emissions are based on the estimated potential of the initiatives proposed. As these values can be used as interim targets to track progress against, the reductions for each reporting sector are presented in the table below.

Reporting Year (2021) and Estimated 2025 and 2030 GHG Emissions By Sector

Reporting Sector	2021	2025	2030
Buildings & Facilities Emissions (tCO ₂ e)	3,598	2,836	1,250
Lighting & Traffic Signals Emissions (tCO ₂ e)	827	800	803
Transit, Fleet & Equipment Emissions (tCO ₂ e)	4,403	4,296	3,638
Water & Wastewater Emissions (tCO ₂ e)	2,685	2,743	2,827
Solid Waste Emissions (tCO ₂ e)	149	152	155
Total GHG Emissions (tCO₂e)	11,662	10,828	8,674
Change from 2004 Base Year	-34%	-38%	-51%

Notes to Table: 2004 Base Year = 17,549 tCO₂e

CORPORATE ENERGY AND EMISSIONS PLAN INITIATIVES

The proposed initiatives included in the CEEP support the completion of the actions listed above and ultimately the 2030 and 2050 GHG reduction targets. The initiatives have been organized into five key categories: Buildings and Facilities, Transit, Fleet and Equipment, Solid Waste, Water and Wastewater, and Corporate Leadership and are summarized below.

CATEGORY	INITIATIVE	DESCRIPTION	IMPLEMENTATION STATUS
Buildings & Facilities	B1: Develop a Green Building Policy	Develop Green Building Policy and technical standards that establishes operational energy performance requirements for when existing facilities undergo major renovations and when new facilities are constructed.	Underway
	B2: Implement Energy Audit Recommendations	Complete recommendations from comprehensive energy audits already recommended by MCW, implement the recommendations, and track the progress of energy audits and projects. Leverage external funding opportunities to implement energy reduction initiatives with longer payback periods.	Underway
	B3: Develop De-Carbonization Plans for Buildings & Facilities	Develop a unifying de-carbonization plan for each major City building and facility. De-carbonizing existing buildings will require deep energy retrofits that upgrade or replace equipment and building envelopes (e.g., roof, walls, windows) to achieve large energy and greenhouse gas emission reductions. A decarbonization plan for City Hall has been established, but plans for Regent Depot, St. Mary's Depot, and the Transit Depot Admin Office are required in the short-term.	Underway
	B4: Implement a Building Commissioning Program	Prepare and implement an ongoing building commissioning and retro commissioning plan.	Underway

CATEGORY	INITIATIVE	DESCRIPTION	IMPLEMENTATION STATUS
Buildings & Facilities	B5: Complete Buildings Utilization Assessments	Review service delivery requirements and needs with consideration to facility operational demands with the objectives of identifying operational and service delivery efficiencies. Establish KPIs that relate building / facility energy consumption to operational parameters (e.g., energy consumption (GJ) / operating hour, # of community programs per day by facility, etc.) to better understand what energy and GHG drivers and to identify related reduction / conservation opportunities	Underway
	B6: Provide Net-Zero and Renewable Energy System Training to City Staff	Support the training of City staff to gain skills unique to net-zero emission buildings, and renewable energy systems.	Proposed
	B7: Implement an Energy Performance Monitoring & Benchmarking Program	Utilize Energy Star Portfolio Manager to track and assess energy and water consumption. Report annually on building energy ratings. Provide City staff resources with training.	Proposed
	B8: Implement Technological and Behavioral Energy Efficiency (BEE) Reduction Programs	Implement energy saving changes in buildings and facilities through behavioral improvements, and through changes to the software of buildings.	Proposed
Transit, Fleet and Equipment	F1: Implement Review of Fleet	Complete asset management report for fleet assets including a review of capital and operating costs	Underway
	F2: Optimize and Right-Size Fleet	Implement the results of the fleet asset management report with a focus on optimizing and rightsizing the fleet for the City's needs	Proposed
	F3: Opportunistically Switch Light Duty Fleet to Hybrid / Electric	Monitor hybrid vehicle trial that is underway and apply learnings to other departments with light duty vehicles and trucks when the opportunity arises.	Underway
	F4: Monitor Renewable Energy and Fuel Technologies	Monitor the development and implementation of practical research, technologies, and investment in the area of renewable energy and fuels (e.g., B100, hydrogen, RNG).	Underway

CATEGORY	INITIATIVE	DESCRIPTION	IMPLEMENTATION STATUS
Transit, Fleet and Equipment	F5: Opportunistically Switch Off-Road and Hand-Held Equipment to Electric	Continue to opportunistically switch off-road and hand-held equipment to electric powered where health and safety and performance is not compromised.	Underway
	F6: Develop an EV Strategy	Develop an EV strategy so that EVs can be incorporated into the light duty non-transit fleet as part of the City's vehicle replacement lifecycle.	Proposed
	F7: Develop a Fleet Electrification Financing Strategy	Develop a three-tiered approach to finance investment in fleet electrification using an internal cost of carbon, a levy and vehicle electrification fund.	Proposed
	F8: Develop Anti-Idling Policy	Develop an appropriate anti-idling policy applicable to all staff while recognizing the needs of emergency and essential services. Educate staff on an ongoing basis about the vehicle anti-idling systems, policies and the importance of not idling vehicles unnecessarily.	Proposed
	F9: Expand Automatic Vehicle Location (AVL) Telematics Program Across Fleet	Expand telematics program to all City owned fleet to optimize and reduce fleet size, maximize vehicle use, and adjust fleet composition which will result in reduced fuel consumption and GHG emissions.	Proposed
	F10: Implement a Sustainable Commuting Program	Expand active transportation programs and facilities for City staff by providing employee transit programs, access to electric bikes, access to vehicles for sharing, secure bike racks, end of trip facilities, etc.	Proposed
	T1: Monitor Cold-Weather City EV Bus Programs	Monitor other cold weather City electric and hybrid bus initiatives (e.g., the City of Edmonton) to gain insights into the resources required and the lessons learned in order to inform future pilot hybrid / EV transit projects that could be implemented as City buses are replaced.	Underway

CATEGORY	INITIATIVE	DESCRIPTION	IMPLEMENTATION STATUS
Transit, Fleet and Equipment	T2: Complete an On-Demand Transit Feasibility Study & Implement the Recommendations.	Complete an on-demand transit feasibility study to understand how shared, on-demand transit (micro-transit) can successfully complement the fixed-route bus transit system currently in place and result in operational and energy efficiencies.	Underway
	T3: Complete an Alternative Propulsion Study for the Transit Fleet	Explore alternative propulsion systems for the transit fleet including electric, CNG, hydrogen, hybrid-diesel, etc. considering the impacts to operation, maintenance, and costs.	Underway
	T4: Implement an Alternative Fuel-Powered Bus Pilot Project.	Based on the outcome of Initiative T3, implement a pilot alternative fuel-powered bus project.	Proposed
Solid Waste	SW1: Develop Solid Waste Management Plan	Develop a corporate and community solid waste management plan that aligns with the 7R's of zero waste.	Proposed
Water & Wastewater	P1: Complete a City-Wide Sewer-shed Study	Complete a City-wide sewer-shed study to find opportunities to reduce infiltration and reduce energy.	Underway
	P2: Assess the Feasibility of a Large Solar PV Array	Complete a more detailed analysis of large solar array to reduce the GHG intensity of energy consumption at the WWTP. Financial viability can be improved by accessing external funding sources (i.e., FCM).	Underway
	P3: Implement Energy Audit Recommendations	Excluding the solar PV recommendations, complete recommendations identified in the comprehensive MCW energy audits, and track the progress of energy audits and projects.	Underway
	P4: Assess the Energy and Revenue Potential of the Bio-Materials Generated at the Barker Street PCC	Engage a Subject Matter Expert (SME) to quantify the potential of bio-material use as fuel and income generating potential from organic material discharged from the Barker Street Pollution Control Centre.	Underway
	W1: Expand Pilot Remote Water Metering Program	Based on the results of the remote / electronic water metering pilot program, implement the learnings and expand the program to the rest of the City.	Underway

CATEGORY	INITIATIVE	DESCRIPTION	IMPLEMENTATION STATUS
Water & Wastewater	W2: Implement Pilot GPS AVL Study on Vehicle Fleet	Implement a pilot AVL project on the water department fleet with the objective of monitoring the fuel reduction benefit from the Remote Water Metering Program and from changing driver habit programs.	Underway
Corporate Leadership	C1: Establish Energy and GHG Reduction Targets	Establish corporate energy and GHG emission reduction targets for 2030 and 2050.	Complete
	C2: Continue to Enhance FTE Capabilities and Increase Staff Capacity for Implementing CEEP	Expand staff capability and capacity to implement and maintain the initiatives presented within the CEEP Update. The expansion should be focused on developing a cross functional team.	Underway
	C3: Update Asset Management Plan and Policy	Update Asset Management Policy and associated Plan to include the objective of investing in assets to mitigate and adapt to climate change, as part of asset management planning. An update to the Municipal Plan should also be considered after the update to the Asset Management Plan as they need to be consistent.	Underway
	C4: Pilot the Use of LCA Tools When Making Capital Purchases	Pilot the use of publicly available or low cost LCA tools (e.g., RETScreen) to account for energy and GHG emissions in budget and capital planning and asset management. For example, when considering the need for new municipal facilities or retrofits to existing facilities, a lifecycle analysis will provide information about the amount of energy used over the entire span of a building's life – from planning and design, to construction, through operation, to decommissioning. The LCA should include all of the energy inputs, including those used to create building materials at the outset, and to dispose of them at the end of the building's life.	Underway

CATEGORY	INITIATIVE	DESCRIPTION	IMPLEMENTATION STATUS
Corporate Leadership	C5: Develop A Corporate Energy Savings Policy and Terms of Reference (ToR)	Formalize an energy savings policy and terms of reference that recognizes and makes available any operational budgets saved, as a result of energy conservation and demand initiatives. Savings in budget would be available to any department with an energy reduction opportunity that meets the requirements of the ToR.	Proposed
	C6: Create Sustainable Purchasing Policy	Update Sustainable Purchasing Policy to clearly prioritize products and services that reduce / conserve operational energy use and GHG emissions.	Underway
	C7: Establish Departmental GHG Accounting & Reporting Program	Develop a methodology to assign energy consumption and GHG emissions to each department.	Underway
	C8: Develop Alternative Work Strategies and Supportive Policies	A cost-effective energy and GHG measure that can be deployed is to implement policies that allow for more flexible work environments and dis-incentivize travel.	Underway
	C9: Explore Meeting the Taskforce for Climate Related Disclosures (TCFD) Reporting Requirements.	Explore the evolution and efficacy of TCFD reporting (e.g., review and engage with other cities such as Edmonton, Vancouver, Ottawa) to understand pros and cons and to prepare for what eventually may become a mandatory reporting framework.	Proposed
	C10: Advocate to NB Power to Change Net Metering Rules	Advocate to NB Power to change net metering rules (i.e., to allow electricity generation in one area to offset consumption in another).	Proposed
	C11: Complete a Review Of City Services	Complete a review of City services and associated service levels to determine where there could be a modification to service levels (e.g., frequency of mowing, changes to fleet and bus services, etc.) resulting in reduced energy / fuel use and GHG emissions.	Proposed

CATEGORY	INITIATIVE	DESCRIPTION	IMPLEMENTATION STATUS
Corporate Leadership	C12: Develop an Internal Cost of Carbon (ICC) Policy	Establish an ICC which would be used to calculate the value (expressed as a cost) of GHG emissions associated with decision-making in respect to all City assets and infrastructure. It is recommended that the policy require that City departments internalize the cost of corporate GHG emissions in their respective budgets and pay into an internal carbon reserve fund that can be used to support climate mitigation and adaptation projects at both the corporate and community level. It is also recommended that the ICC start at \$170/tCO ₂ e.	Proposed
	C13: Recognize Natural Assets as an Asset Class	Explore means and methods to define and recognize natural assets as an asset class in the City's financial accounting systems (follow trends on best practice, examples from other communities). This will also require the establishment of obligations to operate, maintain, and replace natural assets alongside traditional capital assets.	Proposed
	C14: Seek Opportunities To Develop Nature Based Solutions / Carbon Offsets On City Lands.	Assess the carbon stored and sequestered by city lands in order to establish policies to maximize carbon stored, and possibly generated carbon offsets, from city-owned land by converting, acquiring, protecting, and restoring lands.	Proposed
	C15: Investigate Sustainable Infrastructure Rating System Policy	Investigate a policy that requires all City infrastructure or building / facility capital projects over \$100,000 be assessed under the Envision ISI Framework.	Proposed
	C16: Incorporate Contracted Emissions Into Corporate GHG Emissions Inventory	Incorporate fuel use reporting requirements in all new and renewed City service contracts post 2022.	Proposed



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