Minute No. 604
Reports – Standing Policy Committee on Water, Waste and Environment – June 23, 2023

Item No. 3 Winnipeg Climate Action Plan – 2022 Annual Report

COUNCIL DECISION:

Council concurred in the recommendation of the Standing Policy Committee on Water, Waste and Environment and adopted the following:

1. That the report be received as information.

2. That the Winnipeg Climate Action Plan – Annual Report be received each year in June to allow for the data gathering and analysis required for the annual Corporate GHG inventory.

3. That the Proper Officers of the City be authorized to do all things necessary to implement the intent of the foregoing.

Reports – Standing Policy Committee on Water, Waste and Environment – June 23, 2023

DECISION MAKING HISTORY:

Moved by Councillor Mayes,

That the recommendation of the Standing Policy Committee on Water, Waste and Environment be adopted.

Carried

Councillor Wyatt asked to be recorded as having voted against the Item, in accordance with Rule 47(7) of the Procedure Bylaw.

EXECUTIVE POLICY COMMITTEE RECOMMENDATION:

On July 5, 2023, the Executive Policy Committee concurred in the recommendation of the Standing Policy Committee on Water, Waste and submitted the matter to Council.

David Grant submitted a communication with respect to the matter.

STANDING COMMITTEE RECOMMENDATION:

On June 23, 2023, the Standing Policy Committee on Water, Waste and Environment concurred in the recommendation of the Winnipeg Public Service and submitted the matter to the Executive Policy Committee and Council.

COUNCIL DECISION:

On May 30, 2023, Council concurred in the recommendation of the Standing Policy Committee on Water, Waste and Environment and adopted the following:

1. That an extension of time of up to 60 days be granted for the Winnipeg Public Service to report back with the Winnipeg Climate Action Plan Annual Report, including the following:

    A. Review the Climate Action Plan to highlight the specific areas and strategic directions where the City needs to invest, and improve departmental coordination under the Office of the CAO to help meet our long-term targets.

    B. Provide an update on the collaboration with other levels of government for increasing investment in programs supporting climate action, and any other initiatives that will help the City meet its targets.

Reports – Standing Policy Committee on Water, Waste and Environment – June 23, 2023

DECISION MAKING HISTORY (continued):

COUNCIL DECISION (continued):

2. That the Proper Officers of the City be authorized to do all things necessary to implement the intent of the forgoing.

EXECUTIVE POLICY COMMITTEE RECOMMENDATION:

On May 16, 2023, the Executive Policy Committee concurred in the recommendation of the Standing Policy Committee on Water, Waste and Environment and submitted the matter to Council.

STANDING COMMITTEE RECOMMENDATION:

On May 1, 2023, the Standing Policy Committee on Water, Waste and Environment submitted the following to the Executive Policy Committee and Council:

1. That an extension of time of up to 60 days be granted for the Winnipeg Public Service to report back on the matter.

2. That the Proper Officers of the City be authorized to do all things necessary to implement the intent of the foregoing.

David Grant submitted a communication with respect to the matter.

COUNCIL DECISION:

On June 21, 2022, Council concurred in the recommendation of the Standing Policy Committee on Water and Waste, Riverbank Management and the Environment, and adopted the following:

1. That the Winnipeg Public Service be directed to report back on the following during its annual report on the Winnipeg Climate Action Plan in 2023:

    A. Review the Climate Action Plan to highlight the specific areas and strategic directions where the City needs to invest, and improve departmental coordination under the Office of the CAO to help meet our long-term targets.

Reports – Standing Policy Committee on Water, Waste and Environment – June 23, 2023

DECISION MAKING HISTORY (continued):

COUNCIL DECISION (continued):

B. Provide an update on the collaboration with other levels of government for increasing investment in programs supporting climate action, and any other initiatives that will help the City meet its targets.

2. That the Proper Officers of the City be authorized to do all things necessary to implement the intent of the forgoing.

On September 20, 2018, Council adopted the recommendation of the Standing Policy Committee on Water and Waste, Riverbank Management and the Environment, which included the following:

6. That the Winnipeg Public Service report back annually to Council on the Winnipeg Climate Action Plan beginning in 2019.

ADMINISTRATIVE REPORT

Title: Winnipeg Climate Action Plan – 2022 Annual Report

Critical Path: Standing Policy Committee on Water, Waste and Environment – Executive Policy Committee – Council

AUTHORIZATION

Author	Department Head	CFO	CAO
B. Raddatz, RPP, MCIP Manager, Office of Sustainability	T. W. Shanks, M. Eng., P. Eng. Director, Water and Waste Department	N/A	M. Jack

EXECUTIVE SUMMARY

This report provides an outline of climate action and policy development in 2022. 2022 marked the end of the Winnipeg Climate Action Plan (WCAP) short term actions, and significant updates to the City's climate goal through OurWinnipeg 2045. In alignment with federal and international targets, OurWinnipeg 2045 targets net zero emissions by 2050. This replaces previous climate targets from 2018 identified in the WCAP.

The Community Energy Investment Roadmap (CEIR) is the most recent update to the City's climate policy, and updates both corporate and community greenhouse gas (GHG) inventories. Council directed the Public Service to implement CEIR on July 21, 2022.

As the end of 2022 marks the end of the short-term actions of the WCAP, the modelling results, GHG inventory, and implementation framework of the CEIR will be used to inform a planned update to the WCAP and develop a Climate Resiliency Strategy. This update will begin in 2023.

Appended to this report are the 2021 and 2022 Corporate GHG inventories.

RECOMMENDATIONS

1. That this report be received as information.

2. That the Winnipeg Climate Action Plan – Annual Report be received each year in June to allow for the data gathering and analysis required for the annual Corporate GHG inventory.

3. That the Proper Officers of the City be authorized to do all things necessary to implement the intent of the foregoing.

REASON FOR THE REPORT

On June 23, 2022, Council concurred in the recommendation of the Standing Policy Committee on Water and Waste, Riverbank Management and the Environment that the Winnipeg Public Service report back on the following during the annual report on the Winnipeg Climate Action Plan in 2023:

1. Review the Climate Action Plan to highlight the specific areas and strategic directions where the City needs to invest, and improve departmental coordination under the Office of the CAO to help meet our long-term targets.

2. Provide an update on the collaboration with other levels of government for increasing investment in programs supporting climate action, and any other initiatives that will help the City meet our targets.

On September 20, 2018, Council concurred in the recommendation of the Standing Policy Committee on Water and Waste, Riverbank Management and the Environment that the Winnipeg Public Service report back annually to Council on the Winnipeg Climate Action Plan beginning in 2019.

IMPLICATIONS OF THE RECOMMENDATIONS

There are no implications associated with the recommendations of this report.

HISTORY/DISCUSSION

This report provides an outline of climate action and policy development across the organization in 2022. 2022 marked the end of the Winnipeg Climate Action Plan (WCAP) short term actions, and significant updates to the City's climate goal through OurWinnipeg 2045. As such, this report is organized in alignment with the Community Energy Investment Roadmap (CEIR) key areas of action, to showcase both overarching climate policy and actions.

In May 2022, OurWinnipeg 2045 received final approval by Council and included an updated climate target of net zero emissions by 2050 to align with federal and international targets. This replaced previous climate targets identified in the WCAP in 2018.

The CEIR is the most recent update to the City's climate policy, and updates both corporate and community greenhouse gas (GHG) inventories. The CEIR uses state-of-the-art modelling to identify City and community-wide systems level actions and investments to achieve net zero emissions by 2050. It fulfills Council direction to undertake detailed financial energy and emissions modeling to understand the costs and benefits of implementing climate action. Council directed the Public Service to implement CEIR in July 2022.

The financial assessment in the CEIR shows how meeting our climate target will require community-wide investment of $23 billion over 28 years (from 2022–2050), averaging $800 million per year. The CEIR also shows how this investment pays for itself two times over within that timeframe. These investments in climate action will generate savings of $53.7 billion from avoided carbon costs, reduced energy costs, and avoided maintenance costs. The net benefit to the community is $35.6 billion over 28 years, a climate dividend that averages $1.2 billion per year. Furthermore, the savings and benefits from these investments will continue beyond 2050.

As the end of 2022 marks the end of the short-term actions of the WCAP, the modelling results, GHG inventory, and implementation framework of the CEIR will be used to inform a planned update to the WCAP and develop a Climate Resiliency Strategy. This update will begin in 2023.

A Whole City Approach

Climate action requires systemic transformation, where climate considerations are embedded into all policy and spending decisions within government and across the city. The City of Winnipeg can continue to show leadership in this area by leveraging its physical, financial and human assets to support full implementation of the CEIR. This section outlines the corporate actions taken in 2022 to embed climate action into internal decision-making processes.

In 2022, the City continued the process of employing a climate lens in decision-making for the South Winnipeg Recreation Campus and St. James Civic Centre expansion projects. A climate lens aligns projects with climate goals by considering GHG and resiliency impacts in decision-making at all stages of the project, including design, construction and operation.

In January 2022, the Asset and Project Management team hired an Energy Analyst, as approved by Council in April 2021. This role analyzes energy use in City facilities to improve energy efficiency and conservation.

Council approved a new Climate Action Reserve Fund in March 2022 to finance strategy and policy development for achieving net zero emissions goals, in alignment with the City's strategic plans.

The Sustainable Procurement Action Plan (SPAP) was approved in July 2022. The Plan includes four pillars, including one focused on environmental considerations. An overarching goal of the SPAP is to have the City's procurement practices fully consider relevant social, economic, cultural and environmental impacts related to the goods and services purchased and the suppliers who deliver them.

The City updated construction specifications to allow for General Use Limestone cement, which is a more sustainable, lower carbon cement that reduces CO_2e emissions by up to 10 percent while still producing concrete of equivalent performance. Additionally, the updated specifications allow for increasing fly ash dosage based on concrete type and updating the Concrete Mix Design to decrease the carbon intensity of concrete used in City projects.

Council approved the creation of the Climate Action and Resilience Committee in September 2022 to formalize engagement with sector-based experts on climate action. A steering committee at the senior management level was also established in 2022 to oversee

implementation of the City's high-level climate policy through budget, reporting and strategic planning processes and steer updates to the Winnipeg Climate Action Plan.

A Green Meetings Guide was also developed in 2022 to support meeting and events at City facilities which are organized in a way that all aspects (location, transportation, food/drinks, and supplies) are eco-friendly and encourages ways to be more sustainable before, during, and after an event.

Green Buildings

Buildings represent one of the largest sources of GHG emissions in Winnipeg, accounting for 44.4 percent of community-wide emissions in 2022. Corporately, City facilities accounted for 34 percent of overall energy use and 21 percent of emissions. Most building emissions at the community-wide and corporate levels come from the use of natural gas for heating purposes.

The Green Building Policy has been directing sustainability requirements for new City-owned buildings and major additions since 2010. The City applied CEIR findings to three facilities in 2022 to go beyond the Green Building Policy and provide alignment with the OurWinnipeg 2045 climate target. Energy efficiency and carbon reduction were the focus of these requirements. Targeted facilities included the South Winnipeg Recreation Campus, St. James Civic Centre Facility Expansion and the Winnipeg Fire Paramedic Service Amalgamated Station 9. Energy efficiency upgrades for existing City buildings, including those for lighting, building envelope, HVAC and related operations controls, and custom energy solutions, also received financial support through Efficiency Manitoba programs in 2022.

Creating Affordable Housing Opportunities in Housing Improvement Zones Program - Local Energy Access Program (LEAP) was expanded in February 2022 to include Energy Poverty and High Poverty Areas. These City-owned lots are available to non-profit housing providers for $1 to construct net zero energy efficient housing. Program energy performance requirements were developed to provide a clear definition of net zero development and to provide alignment with Efficiency Manitoba's New Homes Program.

The Building Energy Disclosure Project (BEDP) completed its second year. Winnipeg commercial and institutional building owners, representing 161 total buildings, gained better understanding of the energy performance of their buildings while supporting overall reductions in greenhouse gas emissions and energy consumption.

Zero-Emissions Transportation

Transportation represents the largest source of GHG emissions in Winnipeg. This sector accounts for 48 percent of community-wide emissions, comprising of personal vehicle use, commercial operations, transit, heavy transportation and off-road vehicle use. Personal vehicle use accounts for most community-wide emissions. Corporately, fuel use for operations, including fleet, equipment and waste hauling contractors, accounted for 42 percent of overall energy use and 58 percent of emissions.

Funding was received at the federal and provincial levels in 2022, in support of various Winnipeg Transit initiatives, including the Transition to Zero Emissions Bus Program. As part of

the Program, a tender was issued and awarded for the initial supply and delivery of battery electric and fuel cell electric buses. Preliminary work on the design and development of charging and hydrogen infrastructure was also initiated.

The Winnipeg Fleet Management Agency completed the two-year Electric Vehicle (EV) Fleet Pilot program. The EV Fleet Pilot program assessed the operation and maintenance costs of two vehicles and two charging stations, and the full life cycle value of EVs compared to internal combustion engines (ICE). Operation and maintenance costs were lower with the EVs than for comparable ICEs and saved 10.5 tonnes of CO_2e over the course of the pilot program.

The EV Public Charger Pilot Program was launched in 2022 to build operational experience with EV charging infrastructure and assess usage of charging stations at City facilities. The stations became available in March 2022 at St. Vital Park, Kildonan Park, Seven Oaks Pool and the Bill and Helen Norrie Library and are free to use for a two-year period, ending in March 2024. In 2022 the chargers had over 1,760 charging sessions and dispensed over 15 gigawatt-hours of electricity, resulting in 15.6 tonnes of CO_2e avoided.

Several active transportation programs continued in 2022. The Neighbourhood Greenway Reduced Speed Pilot established neighbourhood greenways as on-street routes for active transportation with reduced speeds and traffic calming measures for motor vehicles. The Enhanced Summer Bike Route Program similarly provided more cycling opportunities for recreational and commuting users. Implementation of the Pedestrian and Cycling Strategies is also ongoing. Projects underway in 2022 included the construction of approximately 1,850 metres of pathways and 1,320 metres of protected bicycles lanes.

Local Renewable Energy

CEIR identifies that after reducing the need for energy and increasing energy efficiency, electrification of heating and transportation is key to meeting our climate targets. Overall need for electricity can be supplemented by local production, including solar generation. By supplementing the current electricity grid in this way, the need to build new grid-scale generating capacity is reduced.

An “Energy Twin” study was completed in 2022 as part of the Transition to Zero-Emissions Bus Program. This study analyzed different design configurations to optimize a battery-electric bus facility for grid resilience, GHG emissions reductions and operational cost savings. The study recommended a battery-electric bus facility powered by Manitoba Hydro generated electricity, supplemented with roof-mounted solar, a battery energy storage system and a microgrid controller to optimize design.

Solar energy opportunities at the Pan Am Pool were reassessed in 2022 with the intent of reducing operating costs and GHG emissions. Based on the assessment, it was determined that replacing five of the original air handling units with solar ventilation air heating systems would result in a GHG reduction of approximately 184.5 tonnes of CO_2e.

As part of the Winnipeg Electrical By-law No. 72/2022, a previous requirement for electrical engineering and certification for solar photovoltaic (PV) below 10 kilowatts (kW) for single detached dwelling units was eliminated.

Sustainable Waste Management

Community GHG emissions from waste come from both City-owned and private landfills. Organic matter in landfills decays over time and can continue to release GHGs long after it is buried. Waste accounts for six percent of community-wide emissions, and 13 percent of corporate emissions.

In January 2022, Council approved a compost support grant which awarded $65,000 to Compost Winnipeg to assist in developing new programs and expand its existing food waste collection service to Winnipeg residents starting in 2023.

The 18-month Residential Food Waste Collection Pilot Project ended in September 2022. The pilot provided weekly curbside green cart collection to approximately 4,000 households across five pilot areas. Approximately 743 tonnes of residential food waste were diverted from landfill throughout the duration of the project, equivalent to 170.89 tonnes of CO_2e avoided.

The Landfill Gas Expansion Project was completed at the Brady Road Resource Management Facility (BRRMF), with the installation of 18 dual-purpose wells to collect landfill gas and leachate, bringing closed landfill area covered by gas collection up to 80 percent.

For the second consecutive year, 100 percent of biosolids were beneficially used through soil fabrication and land application. In total, 54,307 tonnes were diverted from landfill, equivalent to 12,567 tonnes of CO_2e avoided.

Resilience

The Winnipeg Climate Action Plan update starting in 2023 will include the development of a Climate Resilience Strategy. Resilience refers to actions taken to address the impacts of climate change and to respond to the local risks and opportunities climate change may bring. Projected climate impacts include more extreme heat days, fewer but more intense summer precipitation events, and an increased risk of drought. Winters will be more moderate, with increased freeze-thaw events, and winter, spring and fall are expected to get more precipitation. This section outlines the actions the City is already taking to increase climate resiliency.

In May 2022, Council approved the Winnipeg Parks Strategy and Winnipeg Recreation Strategy. Climate resilience in the Recreation Strategy prioritizes support for municipal emergency and disaster response, such as providing warming and cooling centres for residents during extreme weather in addition to improving energy efficiency of current and future facility inventory. It also includes policies requiring the utilization of climate-sensitive design principles, the pursuit of opportunities to reduce GHG emissions and developing or retrofitting recreation facilities to be low or zero carbon facilities. The Parks Strategy aims to increase residential proximity to parks, supporting active transportation goals, clean air zones, reduced emissions and overall improved quality of life.

The draft Winnipeg Comprehensive Urban Forestry Strategy underwent a public comment period in 2022 and revisions are currently in progress through to spring 2023. Work on the Master Greenspace and Natural Corridors Plan also began in 2022, with project scoping

anticipated to be completed in late Spring 2023. Also, the City reviewed green infrastructure opportunities in the Armstrong combined sewer district, including opportunities for urban agriculture that can support stormwater management.

In 2022, the City initiated a five-year enhanced tree planting program branded “Home Grown” in partnership with the Government of Canada as part of their 2 Billion Trees program (2BT). The City has planted 4,333 trees in 2022 and will be planting approximately 70,000 trees over the course of the program which includes direct community participation to grow the urban canopy.

In 2022 the Winnipeg Food Council completed the Food System Snapshot report that outlined actions for the City of Winnipeg to support the creation of a sustainable and equitable urban food system. The Winnipeg Food Council also established its first urban agriculture and community garden small grants program to increase urban food production.

In 2022 the City of Winnipeg partnered with seven community centres across Winnipeg to offer cooling spaces and water during extreme heat. Additionally, three bottle filling stations were installed for residents to access cool, clean drinking water throughout the summer. City facilities were also available during operating hours as warm up spaces during the winter.

In September 2022, the City approved $130,000 funding from Health Canada Air Quality for a Clean Air Spaces project. This project will develop a facility assessment tool to identify clean air spaces in existing community facilities for possible use during wildfire smoke events. The project will be completed in March 2023.

Community and Corporate Greenhouse Gas Inventories

Winnipeg’s Community GHG Inventory was updated as part of preparing the CEIR, replacing the 2011 inventory. GHG inventories at both Community and Corporate levels are used to support climate action planning and performance tracking. The updated Community inventory uses the Global Protocol for Community-Scale GHG Emissions (GPC), a globally accepted standard for municipal emissions, to compile 2016 emissions with projections into 2022 and beyond.

Community-wide emissions for 2022 are estimated at 4.76 million tonnes of CO_2e. This includes emissions from residential, commercial, institutional and industrial buildings. It also includes emissions from transportation, the decomposition of waste, the transmission of electricity and natural gas, and some agricultural processes.

The Corporate GHG inventory is updated annually, following the Partners for Climate Protection (PCP) protocol for municipal GHG accounting. The PCP protocol was developed to provide a more appropriate method for analyzing the scope of annual operations undertaken in a municipality, and is the protocol used for all Corporate GHG inventories produced to date.

This annual report contains both the 2021 and the 2022 Corporate GHG inventories. The Corporate GHG Inventory relies on departmental reporting of emissions-related data. This data is cleaned, validated, and used by the departments to meet their own reporting requirements. It becomes available for inclusion in the Corporate GHG Inventory in Q2 of the following year.

The Corporate GHG Inventory includes energy use and emissions from buildings, vehicles, equipment, water and waste infrastructure, and streetlights to measure the energy used and CO_2e emitted in providing the services and infrastructure for Winnipeg. In 2022, the City emitted almost 122,000 tonnes of CO_2e and used over 2.5 million gigajoules of energy. This energy use is comprised of 212.4 million kWh of electricity, 18.4 million cubic meters of natural gas, 21.1 million litres of diesel fuel, and 7.2 million litres of gasoline.

The COVID-19 global pandemic continues to impact corporate emissions, though emissions levels are rising as activity levels continue to rebound. In 2020 emission levels fell eight percent from 2019 levels. 2021 was the first full year of the pandemic and emissions fell a further seven percent for a total decrease of 14 percent from 2019 levels. 2022 saw emissions increase by 11 percent coinciding with pandemic restrictions decreasing and City operations beginning to return to pre-pandemic levels. Additionally, a relatively colder winter season increased the need for space heating, which caused an increase in natural gas use.

Appendix A contains Corporate GHG inventories for 2021 and 2022.

FINANCIAL IMPACT

Financial Impact Statement **Date:** May 11, 2023

Project Name:

Winnipeg Climate Action Plan - 2022 Annual report

COMMENTS:

There is no Financial Impact associated with the recommendation of this report.

Lucy Szkwarek, CPA, CGA

Lucy Szkwarek, CPA, CGA
Manager of Finance and Administration

CONSULTATION

This Report has been prepared in consultation with:

Assets and Project Management
Chief Financial Office
Community Services Department
Planning, Property and Development
Public Works Department
Winnipeg Fire Paramedic Services
Winnipeg Fire Paramedic Services – Office of Emergency Management
Winnipeg Fleet Management Agency

OURWINNIPEG POLICY ALIGNMENT

OurWinnipeg Goal: Leadership and Good Governance
Objective 1. **Establish and implement priority actions through evidence-informed decision-making processes.** Evidence-informed actions require transparent and accountable decision-making to determine the long-term public interest and the appropriate trade-offs in levels of service, taxation, and budget priorities.

WINNIPEG CLIMATE ACTION PLAN ALIGNMENT

Strategic Opportunity #1: Corporate Leadership
Key Direction #1.1 Cultivate a Corporate Culture That Values Climate Action

Strategic Opportunity #7 Community Climate Resiliency
Key Direction #7.1 Implement Opportunities to Improve Winnipeg's Resilience and Adaptability to the Effects of a Changing Climate

WINNIPEG POVERTY REDUCTION STRATEGY ALIGNMENT

The Winnipeg Climate Action Plan aligns with the Winnipeg Poverty Reduction Strategy as both place focus on building a more resilient, sustainable, and equitable city for all residents. The Plan and the Winnipeg Poverty Reduction Strategy both represent the intention for increased resiliency of our communities, municipalities, and the city as a whole, while also placing emphasis on providing increased support to residents experiencing poverty related to the effects of climate change.

SUBMITTED BY

Department: Water and Waste Department
Division: Office of Sustainability
Prepared by: Jeanette Sivilay
Date: May 11, 2023

File No: O-005

Attachments:
Appendix A: City of Winnipeg Corporate Greenhouse Gas Emissions 2021 – 2022

Appendix A: City of Winnipeg Corporate Greenhouse Gas Emissions 2021 – 2022

City of Winnipeg Corporate Greenhouse Gas Emissions

2021 – 2022

INTRODUCTION

This report provides an update on the City's corporate greenhouse gas (GHG) inventory for 2021 and 2022. The tracking and measurement of GHG emissions is called for in OW2045:

> Good Governance Objective 1 - Establish and implement priority actions through evidence-informed decision-making processes.
>
> Environmental Objective 1 - Prioritize the transition to a resilient, low-carbon future through demonstrated organizational and community leadership, and collaborative actions that mitigate and adapt to a changing climate.

The Corporate inventory follows the Partners for Climate Protection (PCP) protocol for municipal GHG accounting. The PCP Inventory protocol focuses on municipal operations and is consistent with the Corporate GHG inventories produced to date. The scope of data collected has increased since the first inventory for 1998. The collection process has been also refined to improve the accuracy and completeness of the inventory.

Energy used for operations comes in different forms, usually litres of vehicle fuel, kilowatt hours of electricity, and cubic meters of natural gas. To allow comparisons between these energy sources the volume of each is converted to the amount of work each unit of fuel does. This translates these different fuel types into gigajoules (GJ) of energy. With this, 30 litres of gasoline, 26 litres of diesel, 26 m^3 of natural gas, and 278 kilowatt hours (kWh) of electricity all contain the same amount of energy: 1 GJ.

Similarly, there are the three most significant GHGs causing climate change, with different strengths of impacts. These are carbon dioxide, nitrous oxide, and methane (CO_2, NO_2, and CH_4). The impacts of these last two GHGs are expressed in equivalent CO_2 levels, and the sum of the three is expressed in "CO_2 equivalent", or CO_2e.

2021 Inventory

Energy use in 2021 from City operations decreased 2% while GHG emissions decreased 7% compared to 2020. The change in energy use was primarily the result of a 4% decrease in Vehicle & Equipment fuel use. Decreases in energy consumed in the Buildings, and Water & Wastewater sectors were smaller, at 1%. Emissions dropped more than energy use as stricter fuel emissions regulations came into effect, requiring higher ethanol content in fuels.

2022 Inventory

Energy use and emissions increased in all sectors in 2022. Total energy use increased 8% and total emissions increased 11% compared to 2021. Use of natural gas increased 20% while electricity increased 6%.

CORPORATE GHG INVENTORY (2021-2022)

Source	2021			
	Energy GJ	%	CO_2e tonnes	%
Buildings	761,654	33%	21,660	20%
Vehicle Fleet	1,020,711	44%	68,846	63%
Streetlights	109,849	5%	37	0%
Water & Wastewater	442,117	19%	7,713	7%
Corporate Waste	-	-	11,324	10%
TOTAL	2,334,332	100%	109,580	100%

Table 1 - Energy Use and GHG Emissions for City Operations 2021

Source	2022			
	Energy GJ	%	CO_2e tonnes	%
Buildings	857,176	34%	25,890	21%
Vehicle Fleet	1,056,257	42%	70,560	58%
Streetlights	110,042	4%	37	0%
Water & Wastewater	504,396	20%	9,246	8%
Corporate Waste	-	-	16,259	13%
TOTAL	2,527,871	100%	121,991	100%

Table 2 - Energy Use and GHG Emissions for City Operations 2022

	Buildings	Vehicle Fleet	Streetlights	Water & Wastewater	TOTAL
2019	970,583 (↓ -1%)	1,147,662 (↑ 12%)	112,776 (↓ -16%)	575,004 (↑ 1%)	2,806,025 (↑ 4%)
2020	770,193 (↓ -21%)	1,056,530 (↓ -8%)	109,565 (↓ -3%)	445,962 (↓ -22%)	2,382,249 (↓ -15%)
2021	761,654 (↓ -1%)	1,020,711 (↓ -3%)	109,849 (↑ 0%)	442,117 (↓ -1%)	2,334,332 (↓ -2%)
2022	857,176 (↑ 13%)	1,056,257 (↑ 3%)	110,042 (↑ 0%)	504,396 (↑ 14%)	2,527,871 (↑ 8%)

Table 3 - Energy Use, in Gigajoules, by Sector, with Annual Change: 2019-2022

	Buildings	Vehicle Fleet	Streetlights	Water & Wastewater	Waste	TOTAL
2019	29,251 T (↓ -3%)	78,439 T (↓ 0%)	125 T (↓ -16%)	8,897 T (↓ -3%)	11,741 T (↓ -10%)	128,454 T (↓ -2%)
2020	22,376 T (↓ -24%)	72,010 T (↓ -8%)	37 T (↓ -71%)	7,070 T (↓ -21%)	16,126 T (↑ 37%)	117,619 T (↓ -8%)
2021	21,660 T (↓ -3%)	68,846 T (↓ -4%)	37 T (↑ 0%)	7,713 T (↑ 9%)	11,324 T (↓ -30%)	109,580 T (↓ -7%)
2022	25,890 T (↑ 20%)	70,560 T (↑ 2%)	37 T (↑ 0%)	9,246 T (↑ 20%)	16,259 T (↑ 44%)	121,991 T (↑ 11%)

Table 4 - GHG Emissions, in Tonnes CO_2e by Sector, with Annual Change: 2019-2022

ENERGY USE AND GHG EMISSIONS IN 2020 TO 2022

Between 2020 and 2022 energy use and emissions both rose. Energy use increased 6% over this time, with increases in all sectors. Emissions increased 4%, with 20% increases in the Buildings, and Water & Wastewater sectors and a 2% decrease in Vehicle & Equipment emissions.

Energy Use

In 2022, Diesel was the largest energy source at 32% of energy used and, owing to its high carbon content, was 45% of emissions. This is despite increases in ethanol content for diesel and gasoline which decreases the emissions per litre of fuel.

Electricity was the second largest energy source at 30% of total use, and just 0.2% of all GHGs. This is due to the low-carbon profile of Manitoba's electrical grid.

Natural gas use accounted for 28% of total energy use and 29% of emissions.

Gasoline (in an ethanol blend) accounted for 10% of energy use and 12% of emissions.

Aviation fuel's impacts were negligible.

The Waste sector's impacts are 13% of total emissions. GHGs from waste are estimated from volume of waste collected from City facilities and from incidental waste collected during operations. From 2019 to 2022 there was a 31% increase in reported waste and a similar increase in estimated emissions.

	2019	2020	2021	2022	Annual Change to 2021	Annual Change to 2022
Electricity	32%	31%	31%	30%	-1%	6%
Natural Gas	27%	25%	25%	28%	0%	20%
Gasoline	9%	11%	11%	10%	-7%	-1%
Diesel	32%	33%	33%	32%	-2%	5%
Aviation	0%	0%	0%	0%	-27%	31%

Table 5 - Fuel Type Proportion of Use and Annual Change - 2019-2022

Energy Type	Total Use (litres)	Energy (GJ)	% Energy	Total CO_2e (tonnes)	% CO_2e
Electricity	212,366,588	764,520	30%	262	0%
Natural Gas	18,399,552	707,095	28%	34,910	29%
Ethanol Blend (E10)	7,247,728	245,408	10%	15,225	12%
Biodiesel Blend (B5)	21,096,568	805,256	32%	54,947	45%
Aviation Fuels	156,309	5,593	0%	387	0%
Waste	-	-	-	16,259	13%
Total		2,527,871	100%	121,991	100%

Table 6 – 2022 Energy Use and CO_2e Emissions by Energy Source

Energy and Emissions by Sectors

Vehicle & Equipment fuel use was the largest energy user and CO_2e emitter in 2022 at 42% of total energy use and 58% of emissions.

Buildings (excluding those involved in providing water & wastewater services) were the second largest user of energy, using 34% of all energy, and producing 21% of emissions.

Water & Wastewater infrastructure was the third largest user of energy. In 2022 it used 20% of total energy and had the fourth highest GHG emissions at 8% of total.

Corporate waste accounted for 13% of all emissions but does not have an energy use component.

Streetlights & Traffic Signals used the least energy at 4% and were less than 1% of total emissions.

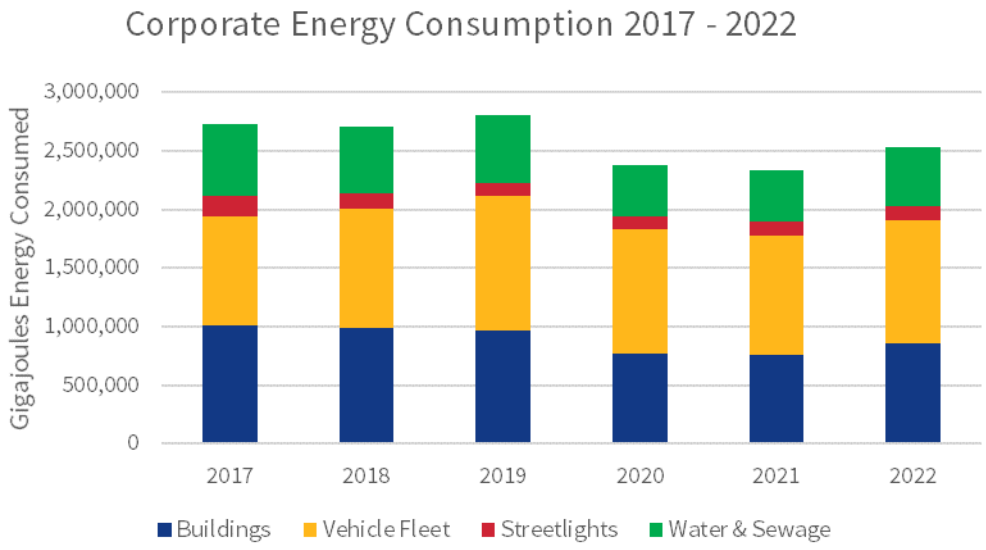

Figure 1 - Energy Use for Corporate Operations 2017 – 2022

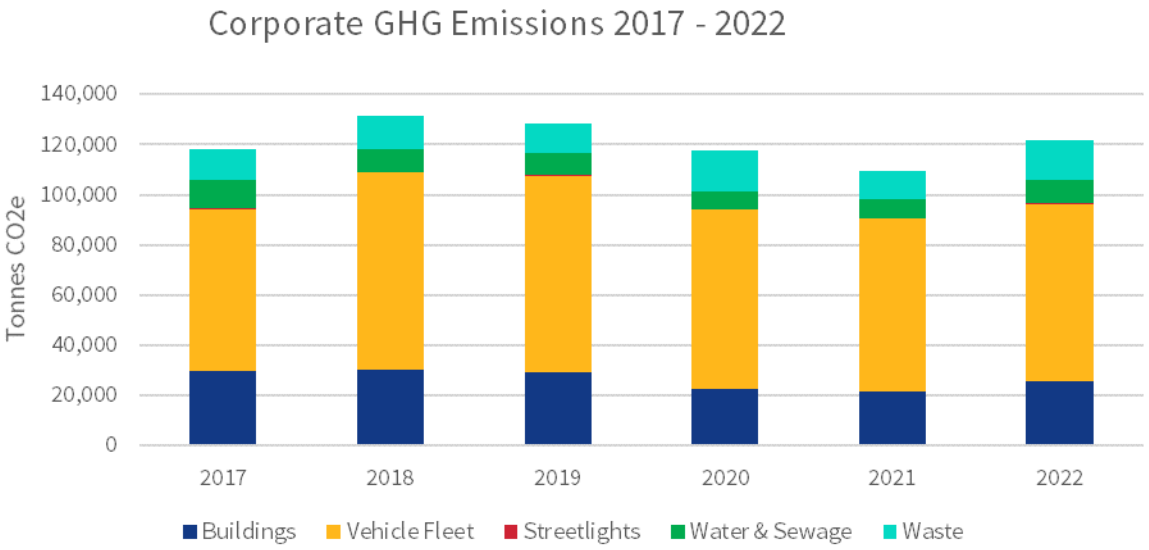

Figure 2 - GHG Emissions for Corporate Operations 2017 – 2022

Buildings

The COVID pandemic's effects on building energy use was apparent across most of the City's building portfolio. Energy use in the Buildings sector dropped 21% from 2019 to 2020 and declined again to 2021 by 1%. Energy use in the 2022 Buildings portfolio increased 13%.

The Buildings sector is heavily influenced by the weather; colder weather requires more energy for heating needs. However, the sector has shown efficiency gains over the last five years. From 2018 onwards, Buildings emissions drop relative to heating needs. 2020 shows a significant decrease relative to heating needs, with this difference decreasing slightly in 2021, but still noticeably continuing into 2022.

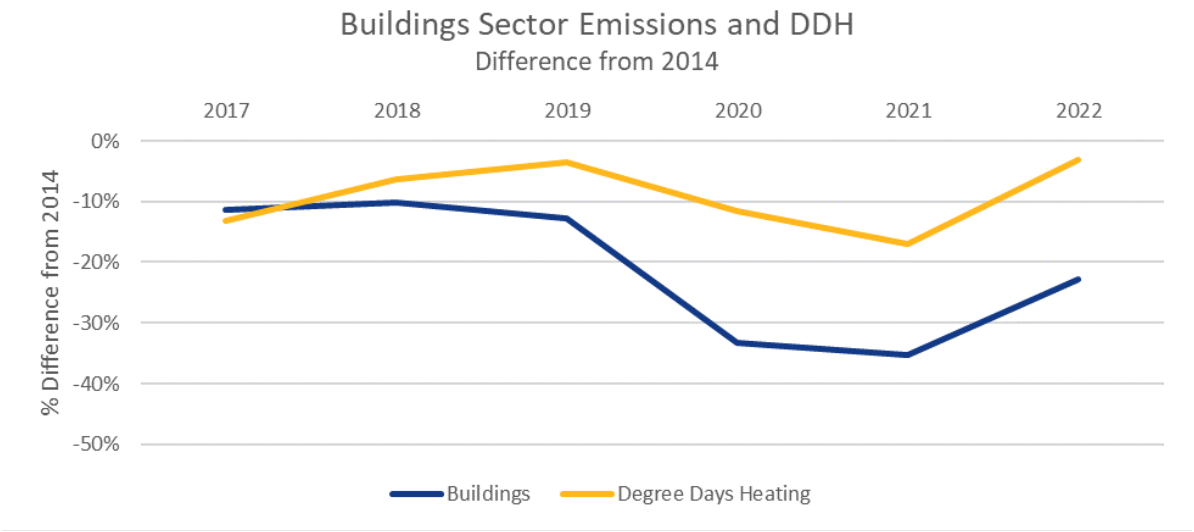

Figure 3 - Influence of Climate on Buildings Sector's Emissions

Vehicle Fleet

The Vehicle Fleet sector includes energy and emissions from vehicles and heavy equipment used in City operations. Generally, fuel use in 2021 and 2022 was significantly lower than levels seen pre-pandemic. Transit accounts for an average of 60% of all Vehicle Fleet energy use and emissions for City operations. Reduced bus service resulted in an average 8% lower fuel use for Transit and, consequently, emissions. This was the major contributor to the 11% decrease in emissions from 2019 to 2021. Between 2021 and 2022 there was a 5% increase in Transit emissions, contributing to a 3% increase in total Vehicle Fleet emissions.

The Corporate Operations category includes all fuel issued by Winnipeg Fleet Management Agency. This includes fuel for Public Works, Police Services, Water & Waste, Fire & Paramedic Services, and others. The Corporate Operations category accounts for an average of 22% of emissions from the Vehicle Fleet sector.

Provincial fuel regulations in the *Ethanol General Regulation (165/2007) and the Biodiesel Mandate for Diesel Fuel Regulation (147/2009)* required fuel suppliers to increase ethanol content in gasoline and diesel in 2021 and 2022. This raised the minimum proportion in gasoline from 8% in 2020 to 9.25% in 2021, and 10% in 2022. The minimum ethanol content in diesel increased from 2% to 3.5% in 2021 and 5% in 2022. This change decreased emissions by 1,254 tonnes CO_2e in 2021, and 2,158 tonnes in 2022.

Commuter emissions are based on the 2019 Employee Commuting survey and are kept constant.

	2019 CO_2e	2020 CO_2e	2021 CO_2e	2022 CO_2e	Average Proportion of Emissions
Corporate Operations	17,075	17,212	13,881	14,734	22%
Personal Vehicle Use (E8.5)	408	472	353	369	1%
Winnipeg Transit	47,062	40,975	42,008	42,638	60%
All Waste vehicles	5,395	4,692	4,315	4,446	7%
Helicopter - Insect Control	46	144	95	174	0%
Helicopter - WPS	261	260	199	214	0%
Commuter Generated Emissions	8,059	8,059	7,841	7,841	11%
Leachate Hauling	133	196	154	143	0%
Total	**78,439**	**72,010**	**68,846**	**70,560**	
Impact of changing ethanol percentage			-1,254	-2,158	

Table 7 - Total Vehicle & Equipment Emissions by Type, 2019-2022 (tonnes CO2e)

Streetlights

Streetlights only use electricity. In Manitoba this is a relatively clean energy source, so this sector produces only negligible emissions. Most Winnipeg streetlights have been switched to LED lights. This has decreased energy use substantially.

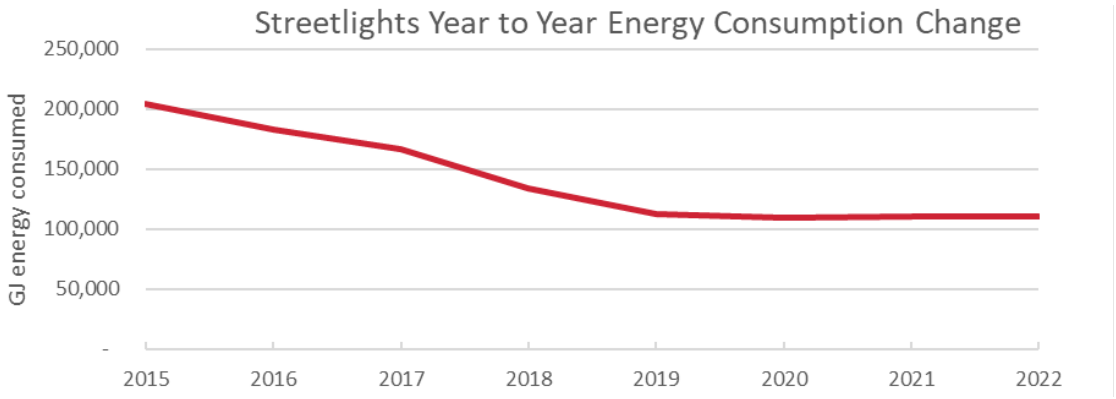

Figure 4 - Change in Streetlights Energy Use

Water and Wastewater

Water & Wastewater infrastructure energy use increased in 2021 by 22%, returning to 2019 levels. Energy use for the sector increased again in 2022, by 7%. This coincided with a total 90% increase in treated wastewater volumes. Treated wastewater volumes are significantly affected by spring flooding, and these energy use changes reflect the relatively dry springs of 2020 and 2021, and the much wetter spring of 2022.

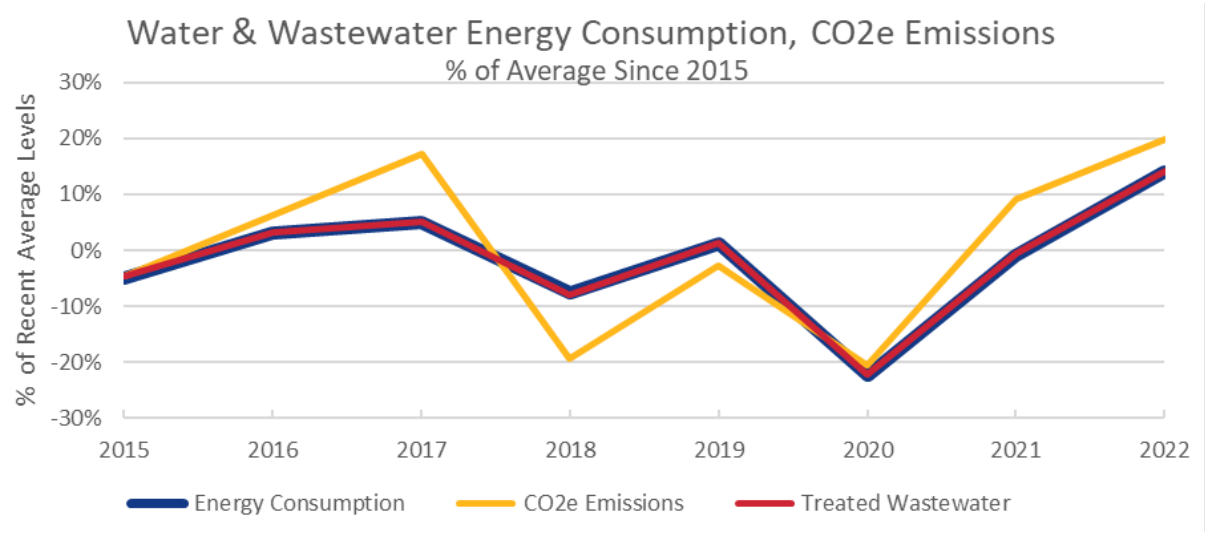

Figure 5 - Change in Water & Wastewater Energy Use, Emissions

Waste

Waste emissions are based on weighed tonnage of City Refuse, and waste collected from City facilities. City Refuse is materials from departments collected during operations.

From 2019 to 2020 there was a 37% increase in reported waste and a similar increase in estimated emissions. 2021 waste decreased 30% but rebounded in 2022 back to 2020 levels.



Figure 6 - Change in Waste Emissions, 2019-2022