

CARBON BUDGET

Fall 2023 Update



CITY OF EDMONTON

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CARBON BUDGET IN BRIEF

Setting the Context

As presented in the Community Energy Transition Strategy, the City of Edmonton's community emission reduction targets are 35 per cent by 2025, 50 per cent by 2030 (both from 2005 baseline levels) and becoming a carbon neutral community by 2050.

The Community Energy Transition Strategy needs to stand on a foundation where the City of Edmonton demonstrates climate solution leadership in its own decision-making, actions and advocacy. The City of Edmonton is demonstrating climate solution leadership in several ways:

- Establishing the corporate target of becoming an emissions neutral corporation by 2040, a decade ahead of the community's target.
- Procurement of a green electricity contract that will come into effect in 2024, effectively transitioning all corporate electricity to green electricity.
- Adoption of City Policy C627 Climate Resilience Policy requires all new City-owned construction to be built to an emissions neutral standard, limiting emission increases while growing as an organization.
- Being one of the first municipalities to implement a carbon budget alongside financial budgets, to guide the organization and Council in understanding how the City's financial investment decisions impact the achievement of emission reduction targets.

On November 14, 2022, Council was presented with the City of Edmonton's first carbon budget in conjunction with the capital, operating and utility budgets to support Edmonton's transition to a low-carbon future.

The carbon budget helps guide decision-making and actions by providing additional carbon emissions information. GHG emission impacts for each budget request within the 2023-2026 capital, operating and utility budgets were available to inform financial investment decisions throughout the budget deliberation process. The carbon budget differs from the capital and operating budgets in that it is not deliberated or approved; rather it is presented for information to augment capital and operating budget decisions.

As part of the multi-year approach to budgeting, the 2023 Fall Carbon Budget Update provides the annual update to the 2023-2026 Carbon Budget. The carbon budget will be presented every four years with an annual update in the fall with the Supplemental Operating Budget Adjustments (SOBA) and Supplemental Capital Budget Adjustments (SCBA), the emission forecasts are also updated to include actual results from the prior year (and potentially any other changes to future forecast emissions). This fall update also includes assessments from the spring 2023 capital budget adjustments approved by Council.

Beginning in 2024, City Administration will include the assessments of potential GHG impacts for all proposed profiles being presented to council as an attachment to the spring SCBA and a complete carbon budget update to accompany the fall SOBA and SCBA.

All budget requests (capital profiles and operating service packages) in the fall SOBA, SCBA and utilities updates have been assessed for qualitative and more detailed quantitative carbon impacts where possible. The qualitative assessment links direct emission impacts to the four pathways in the Energy Transition Strategy and indicates indirect emission impacts. Indirect emission impacts would not have a direct impact on the pathways; rather they enable other work that either increase or decrease emissions. For example, for facilities built to support transit (e.g., new LRT station), the enabling impact will be transportation system usage; the direct impact would be related to the building's energy use and any land use impacts.

Spring and Fall 2023 Carbon Budget Update Highlights

While the City has direct control over corporate emissions, it represents only two per cent of community emissions; financial investment in corporate emission reductions alone is not enough. Municipal funding will have a limited impact to meet community emission targets. Climate change is a collective problem requiring collective action. Climate solution leadership through reduction of operational emissions is part of a much larger effort, one that involves policy development, collaboration and support from other orders of government, private investment and the actions of all Edmontonians to achieve the targets outlined in the Community Energy Transition Strategy.

The 2023-2026 Carbon Budget makes it clear that action is needed to achieve community and corporate carbon emission targets. Overall the impact of the proposed fall 2023 capital, operating and utility budget adjustments will have a negligible impact on current greenhouse gas (GHG) emission levels.

The approved spring SCBA also has a minimal impact on the carbon budget. The most significant quantifiable impact was the removal of funding for the Kinsmen Sports Centre rehabilitation project previously quantified in the 2023-2026 Carbon Budget. As a result of this decision the associated emissions reduction previously indicated (700 tonnes), has been added back to the forecast in this update, changes of 100 to 1,000 tonnes of CO₂e are assessed as "low". For context the medium-term corporate emissions forecast stabilizes around 200,000 tonnes CO₂e annually.

Two profiles relating to vehicles are included in the fall SCBA; \$600,000 for vehicles required for the Human Centered Engagement and Liaison Partnership (HELP) project and a \$245,000 transfer from operating to capital from Healthy Streets Operation Centre (HSOC) to EPS capital for vehicle replacements. HELP is acquiring 6 hybrid pickup trucks and HSOC is acquiring 2 hybrid pickups, 8 hybrid SUVs and 2 internal combustion engine vehicles (large pickup and SUV). These purchases align with City's commitment to a greener fleet included in the 2023-2026 Carbon Budget, with an expectation of improving the hybrid fleet from three per cent of the total fleet to 30-40 per cent hybrid vehicles by 2026.

A large majority of the adjustments brought forward within the spring and fall supplemental capital budget adjustment process are Project Development and Delivery (PDDM) adjustments to transfer approved funding between composite and standalone capital profiles; these transfers do not have an impact on the carbon budget unless funding for a project is increased or reduced resulting in scope changes.

Climate and Emission Trends

As reported in the November 1 Climate Strategies Update Council Report. Intergovernmental Panel on Climate Change (IPCC) AR6 report highlights that to date, emission reduction plans from around the world (formally called Nationally Determined Contributions) make it likely that warming will exceed 1.5 degrees Celsius between 2030 and 2052. Edmonton's 2022 greenhouse gas emission results show that Edmonton is contributing to this warming.

Based on annual emission reduction targets to reach the 2025 goal, Edmonton's community emissions were targeted to be 14.2 million tonnes of carbon dioxide equivalent (CO₂e) or less in 2022. This target was not met, as 2022 community emissions in Edmonton were calculated to be 16.1 million tCO₂e (14.8 tonnes per person). Based on this adjusted forecast, the year when the community carbon budget is forecasted to be depleted is now 2036, one year earlier than forecasted in the 2023-2026 Carbon Budget (see Table 4). This also applies to the corporate carbon budget which is now forecasted to be depleted in 2032 instead of 2033.

It is important to note, this shift is not caused by any of the budgetary decisions made over the past year but are primarily due to increases in energy use in buildings and the industrial and transportation sectors. These sectors were impacted by the COVID-19 pandemic, and their emissions have increased while pandemic recovery continues. 2022 emissions remained below pre-pandemic levels, with an eight per cent reduction from 2019. The largest decrease is due to decarbonization of the electricity grid, as zero or low carbon sources such as wind and solar power become accessible, and higher energy efficiency in buildings. This is further detailed in the Greenhouse Gas Emissions Update included in the Climate Strategies Update Council Report.

It is challenging to evaluate a discernible greenhouse gas emissions trend on an annual basis, as some actions take several years for greenhouse gas emission reductions to be realized. The 2022 annual reduction target, in order to achieve a 35 per cent reduction from 2005 levels by 2025 was 14.2 million tonnes of carbon dioxide equivalent (CO₂e). However, Edmonton's community emissions in 2022 did not achieve that reduction target, and instead were approximately 16 million tonnes of CO₂e, (14.8 tonnes per person). This is an 11.5 per cent reduction in emissions from Edmonton's 2005 baseline year, however, a 14 per cent reduction in emissions was needed to reach the annual target.

If Edmonton's 2022 emission trajectory continues, Edmonton's greenhouse gas reduction targets will not be achieved. In addition to greenhouse gas emissions, Edmonton also experiences the impacts of a changing climate caused by these emissions. According to the Insurance Bureau of Canada, severe weather in 2022 caused \$3.1 billion in insured damage across Canada, making it the third worst year for insured damages in Canadian history. Summer storms caused the most damage in Alberta, including damage from hail, tornados, and flooding. The number of hot days are also expected to increase from an average of 1 day per year over the 1961-1990 period to 16 days per year over the 2041-2070 period. In 2022, 15 extreme heat warnings were issued for the City of Edmonton. The average annual smoke hours observed in the 2020s is double what was observed in the 2010s, with 2023 reaching a new record of 299 total smoke hours. The previous record for annual smoke hours was in 2018, with 229 smoke hours observed. Climate modelling

for the Edmonton region suggests these types of events will become more frequent as Edmonton experiences the impact from climate change. Administration is exploring different data analytics to help decision makers factor climate change risks, and the ability to cope with those risks, into decisions.

Financial Pressures and Carbon Impacts

As the City looks for alternatives to address its significant financial pressures, the potential impacts of any proposed budget reduction measures on the carbon budget will need to be evaluated. Council will have opportunities to discuss implementation gaps and funding opportunities through the following:

- Operating Budget Amendment 12 (OP12) discussions - City Council directed Administration to reallocate or transition \$240 million over the four year budget cycle to focus on core services and Council priorities, with climate resilience being one of the priorities.
- Dedicated Climate Fund report - Administration is preparing a report in response to a motion to provide options for a multi-year Dedicated Climate Fund (FCS01782, scheduled for November 2023).
- Continued advocacy and partnership efforts - Administration and Council will continue advocacy and partnership efforts with other orders of government such as advocating for a \$3.2-billion Climate Action Fund delivered by the federal government directly to municipalities.

It should be noted, a significant portion of grants from the other orders or government have a GHG component to them, and prioritizing this work allows access to funds that would otherwise not be available.

FALL 2023 CARBON BUDGET

Overview

As part of the City's multi-year approach to budgeting, the 2023 Fall Carbon Budget Update provides this year's annual update to the 2023-2026 Carbon Budget. As such it presents changes and adjustments to the 2023-2026 Carbon Budget as well as updates to the forecasted emissions and previous years actual results.

The City has completed a GHG impact assessment of each budget request to provide decision-makers with a holistic view of the GHG impacts in the capital and operating budget adjustments. Refer to Appendix A: Listing of Proposed Budget Adjustments and GHG Impacts for a complete listing of individual budget requests and associated qualitative and quantitative GHG emission impacts.

The 2023-2026 Carbon Budget will support the transition to a low-carbon city by measuring and reporting progress towards short term and long term goals. This will allow Council and Administration to adjust strategies as necessary to achieve the targets outlined in the Community Energy Transition Strategy.






Process Updates

This first update to the 2023-2026 Carbon Budget includes a refined approach to the qualitative assessments.

The scoring methodology has been revised. Now, rather than comparing emission impacts to the prior year, the assessment was updated to reflect impact to achieving overall carbon reduction targets, acknowledging the carbon budget is depleted each year, and a project with “no change to emissions” does have a negative impact on achieving overall carbon reduction targets. Scoring was also updated to distinguish when projects are actively contributing to emission increases or decreases, versus not reducing, as well as identifying when the project has no impact on a pathway because it does not have related emissions impact.

The revised scoring adopts a “traffic light” approach, to indicate “green” for decreases in emissions, “yellow” as a warning for instances when emissions are not decreasing, and “red” for when emissions are increasing. Grey indicates that a project does not have the ability to impact emissions, and the black question mark indicates there are impacts but they are unknown.

Table 1: Revised Qualitative Scoring Methodology

Symbol	Description
	Decrease in emissions, which are favourable towards meeting emissions targets.
	Project is not changing emissions where there is the potential to reduce emissions, which does not contribute towards meeting emissions targets.
	Increase in emissions, which are unfavourable towards meeting targets.
	Project does not have the ability to impact emissions.
	Uncertain impact at this time, may have both increasing and decreasing impacts with the overall impact being unknown or the type of impact is unknown from the information available.

2023 Carbon Budget Adjustments (Spring and Fall)

The 2023-2026 Carbon Budget makes it clear, further action is needed to achieve community and corporate carbon emission targets. The proposed fall 2023 capital, operating and utility budget adjustments include limited investments in initiatives that will have a meaningful impact on current GHG emission levels. This is due to municipal funding pressures and other urgent priorities.

The following table outlines the capital, operating and utility budget adjustments with quantifiable community and corporate GHG emission impacts. Further details on approved budget requests, including those with unquantifiable impacts, are included in Appendix A: Listing of Approved Budget Requests and GHG Impacts.

emission reductions (bracketed) are considered favourable and emission reducing. Positive emissions are unfavourable, increasing emissions compared to 2022 levels.

Table 2: Proposed Fall Budget Requests with Quantifiable GHG Emissions Impacts

Name of Budget Request (Capital profile or Operating service package)	2026 Quantified Emissions Impact (tonnes) <i>Brackets indicates GHG Reductions</i>	Community /Corporate /Both	Proposed 2023 Fall Budget Request (\$000s)
Northern Lights & South Haven Cemetery Phase 1B (Capital Profile)	(<100)	Community	4,800
Fire Station #8 Relocation - Blatchford (Capital Profile)	0*	Corporate	5,144
Edmonton EXPO Centre Rehabilitation (Capital Profile)	0**	Corporate	5,000
Growth Hydrogen Buses (Capital Profile)	0***	Both	66,000

* *Blatchford fire station is set at zero emissions because it is a new building that is emission neutral, and therefore not contributing additional emissions*

***This is a solar photovoltaic project. While not having direct impacts on corporate GHG emissions, solar PV provides other benefits to the City. It contributes to decarbonizing the grid, leads to decreases in electricity demand from the grid and reduces costs for the City by reducing the need to purchase electricity.*

****The purchase of hydrogen buses would support transit service growth without increasing emissions.*

Table 3: Approved Spring Budget Requests with Quantifiable GHG Emissions Impacts

Name of Budget Request (Capital profile or Operating service package)	2026 Quantified Emissions Impact (tonnes) <i>Brackets indicates GHG Reductions</i>	Community /Corporate /Both	Approved 2023 Spring Budget Request (\$000s)
Kinsmen Sports Centre Facility Rehabilitation (Capital Profile)	700	Corporate	14,000 (Transfer to Peter Hemming way)
Northgate Lions Seniors Recreation Centre Rehabilitation	<100	Corporate	2,392
Warehouse Park (Capital Profile)	(<100)	Corporate	43,496

Overall the quantifiable impact of 2023 Spring and Fall budget adjustments will have a net negative impact on Corporate emissions of approximately 400 tonnes of CO₂e. This is largely driven by the removal of funding from the Kinsmen project resulting in increased Pathway 2 emissions. Due to not proceeding with the rehabilitation, the associated emission reductions previously communicated to Council (700 tonnes) must be added back to the projections. As well, the design for the rehabilitation of the Northgate Lions Senior Centre includes minimal energy savings installations and includes additional energy consuming loads resulting in increasing Pathway 2 emissions.

Not all budget requests have quantifiable impacts; the City has numerous initiatives underway that contribute to achieving GHG reduction targets, although not all are quantifiable with the tools available today.

2023 Community Carbon Budget Update

The following graph shows the community current state emission forecast and a revised forecast updated for the GHG impacts of budget requests proposed in the 2023 fall SOBA and SCBA, compared to Edmonton's reduction targets that align with the Paris Agreement, and the community "fair share" carbon emission targets.

Figure 1: Community Carbon Budget 2023 Updates

Community Carbon Budgeting - 2023 Budget Updates

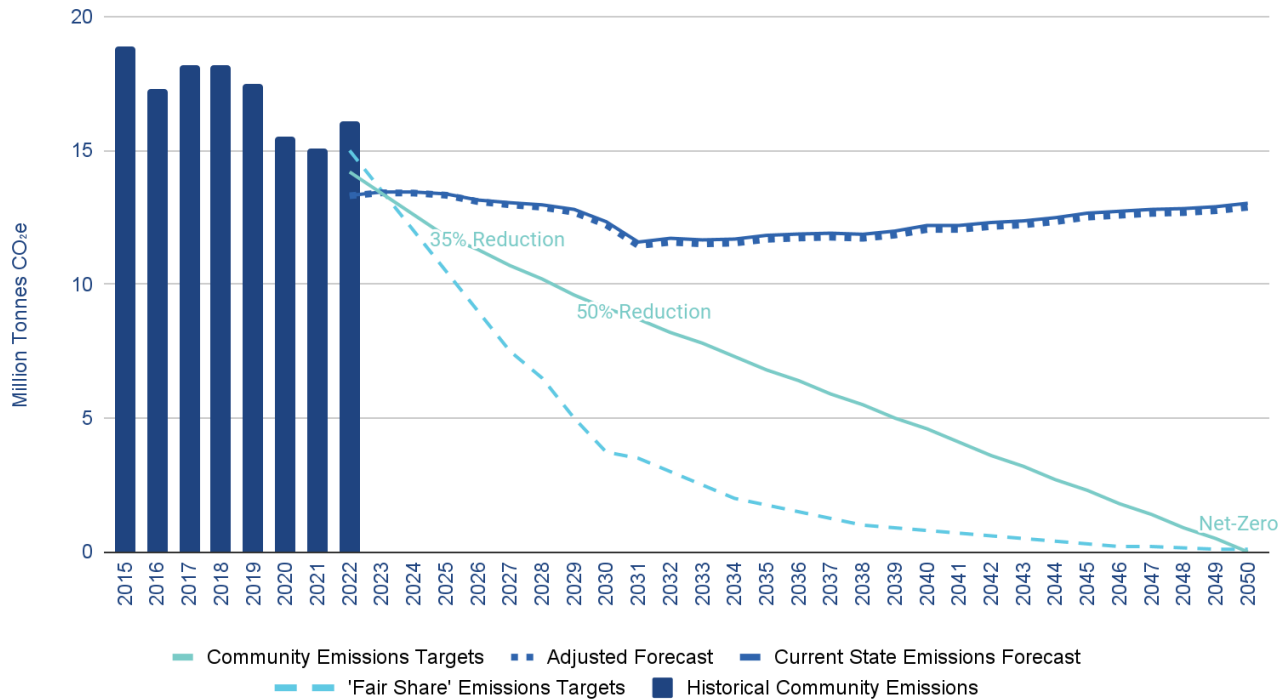


Table 4: Community Carbon Budget

	Carbon Budget 2023-2050 (Available GHG Emissions)	Year Carbon Budget is Depleted (Based on Adjusted Forecasts)
Community Carbon Budget <i>(targets that align with the Paris Agreement)</i>	160 million tonnes CO ₂ e	2036*

* This is one year earlier than reported in the 2023-2026 Carbon Budget, this shift is due to the 2022 actual emissions being higher than forecasted.

Table 5: Community Carbon Deficit

Annual tonnes CO ₂ e	2025	2030	2050
2023-2026 Carbon Budget Deficit (A)	1,530,000	3,120,000	12,880,000
2023 Budget Updates (B)	500	700	700**
2023 Updated Carbon Deficit (C) = (A + B)	1,530,000*	3,121,000*	12,881,000*

* The 2023 budget updates fall below the significance threshold for the community carbon budget, which is 10,000 tonnes. Therefore the resultant carbon deficit remains unchanged from the values reporting in the 2023-2026 Carbon Budget. Emission changes below the significance threshold continue to be tracked internally, such that the cumulative impact of small changes is accounted for in future carbon budget updates.

**Values presented in the table for GHG impacts of budget updates for 2050 are based on extrapolations and are subject to change.

2023-2026 Focus

Tables 4 and 5 above focus on the community targets from the Community Energy Transition Strategy from 2022 to 2050. This section provides insight specifically for the 2023-2026 budget period and how the approved budget requests impact the emissions forecast.

Table 6: 2023-2026 Community Carbon Targets and Deficit

	GHG Emissions (thousand tonnes CO2e) 2023-2026
2023-2026 Carbon Budget Forecast (A)	53,250
2023 Budget Updates (B)	1
Adjusted Carbon Budget(C) = (A + B)	53,250*
Community Emissions Target (D)	49,100
Carbon Deficit (C - D)	4,150

* The 2023 budget updates fall below the significance threshold for the community carbon budget, which is 10,000 tonnes. Therefore the resultant carbon deficit remains unchanged from the values reporting in the 2023-2026 Carbon Budget. Emission changes below the significance threshold continue to be tracked by the City, such that the cumulative impact of small changes is accounted for in future carbon budget updates.

Based on the current state emissions scenario and impacts quantified from the 2023-2026 Carbon Budget, the cumulative community emissions would be 53.25 million tonnes of CO2e over 2023-2026. The quantifiable impacts of the 2023 budget updates would increase emissions by 1,400 tonnes. These 2023 budget updates fall below the significance threshold for the Community carbon budget, and therefore the carbon deficit of 4,150 thousand tonnes remains unchanged.

2023 Corporate Carbon Budget Update

In contrast to the community carbon emissions, which relies primarily on policy, other orders of government and private investment, the City of Edmonton is able to have a direct impact on its corporate emissions with its investment decisions.

The following graph provides a summary of the preliminary annual corporate emission targets compared to the current state emissions. The corporate emissions target is to be net neutral by the year 2040, as indicated in the Community Energy Transition Strategy.

Although the City is close to achieving its corporate emissions reduction target over 2023-2026, more investment is required to achieve the emission reduction targets by 2040. The path forward to setting and achieving the corporate targets for becoming an emission neutral corporation by 2040 is discussed in the Looking Forward section of the 2023-2026 Carbon Budget.

Figure 2: Corporate Carbon Budget 2023-2026

Corporate Carbon Budgeting - 2023 Budget Updates

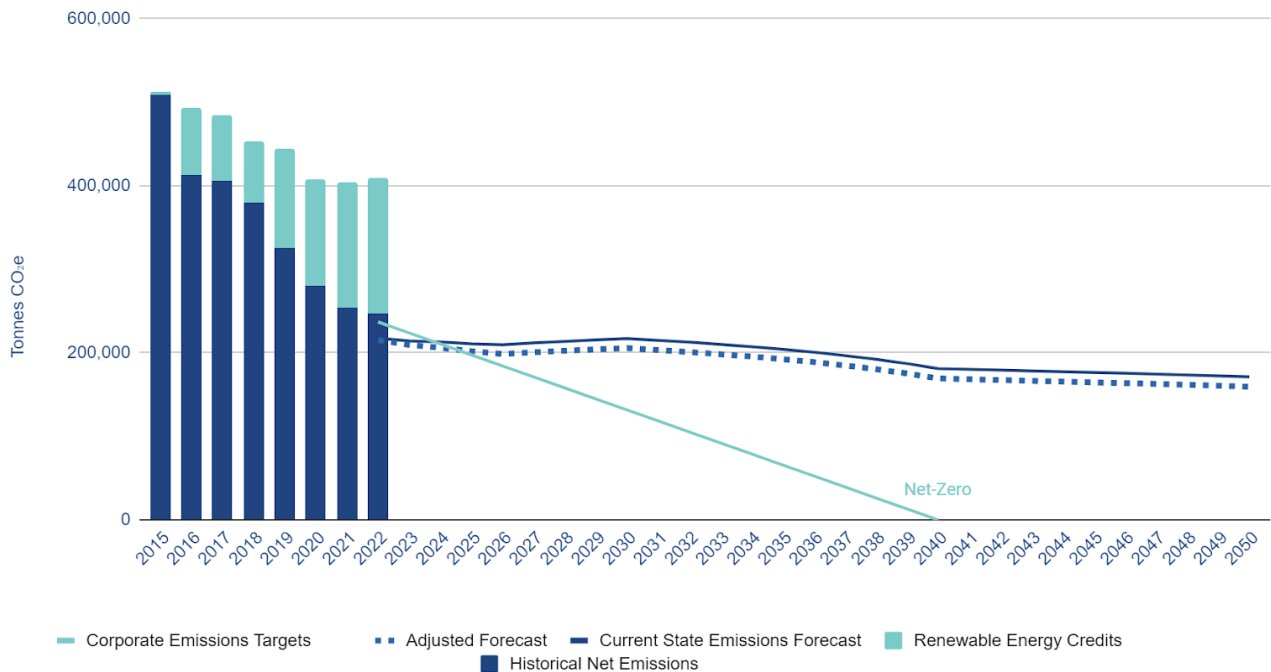


Table 7: Corporate Carbon Budget

	Carbon Budget 2023-2040 (Available GHG Emissions)	Year Carbon Budget is Depleted (Based on Adjusted Forecasts)
Corporate Carbon Budget	2.00 million tonnes CO ₂ e	2032*

* This is one year earlier than reported in the 2023-2026 Carbon Budget, this shift is due to the 2022 actual emissions being higher than forecasted.

Table 8: Corporate Carbon Deficit

Annual tonnes CO ₂ e	2040**
2023-2026 Carbon Budget Deficit (A)	169,000
2023 Budget Update Impacts (B)*	700
2023 Budget Update Deficit (C) = (A + B)	170,000*

*The Corporate Carbon Budget significance threshold is 1,000 tonnes, and therefore the 2023 budget update impacts are rounded up to 1,000 tonnes and increase the reported deficit from the 2023-2026 carbon budget.

**Values presented in the table for GHG impacts of approved budget requests for 2040 are based on extrapolations and are subject to change.

Table 9: 2023-2026 Corporate Carbon Targets and Deficit

	GHG Emissions (thousands of tonnes) 2023-2026
2023-2026 Carbon Budget Forecast (A)	816
2023 Budget Updates (B)	1
Adjusted Carbon Budget (C) = (A + B)	817
Preliminary Corporate Emissions Target (D)	816
Carbon Deficit (C - D)	1

Based on the forecasted current state emissions scenario (which includes the renewable electricity purchase) and impacts quantified from the 2023-2026 Carbon Budget, the corporate emissions would be 816,000 tonnes of CO₂e over 2023-2026. The quantifiable impacts of the 2023 budget updates would increase emissions by 1,000 tonnes, resulting in 817,000 tonnes CO₂e of emissions between 2023-2026. This exceeds the preliminary corporate emissions targets over the 2023-2026 time period of approximately 816,000 tonnes CO₂e, resulting in a carbon deficit of 1,000 tonnes.

Appendix A - Listing of Proposed Budget Adjustments and GHG Impacts

Spring 2023 Supplemental Capital Budget Adjustments

Profile ID	Profile Name	CETS Action	Pathway				2026 GHG Emissions Impacts (tonnes CO2e)	Enabling	Community /Corporate /Both	2023-2026 Budget Request	Description of GHG Impacts
			1	2	3	4					
Spring 2023 Supplemental Capital Budget Adjustments											
New Standalone Profiles Requesting Funding from Existing Approved Profiles											
23-30-9321	Warehouse Park	<input type="checkbox"/>	■	↑	↓	↓	-0.1	↓	Corporate	0	<p>This profile is expected to result in a increase in Pathway 2 emissions through the construction of a new washroom pavillion. There is an expected decrease in Pathway 3 and 4 emissions from reduced parking capacity and increased active travel pathways and through the planting of trees and other associated landscaping respectively. No impacts are expected in Pathway 1 emissions since the project does not include installation of any new energy generation systems.</p> <p>Direct emissions impact - Immaterial: associated with the net emissions impacts between the increase in emissions from the addition of washroom facilities and the decrease in emissions from park establishment, reduced parking, and increase active paths.</p> <p>Enabling emissions impact - Low: associated with the contribution of this profile to the green and walkable strategy and the expectation for increase active travel and decrease vehicle travel associated with the project.</p>
23-22-9704	Imagine Jasper Avenue (114 Street - 124 Street)	<input type="checkbox"/>	■	■	↓	↓	Not Quantified	↓	Community	8,700,000	<p>The work includes pavement markings, street lighting and traffic signal rehab, geometric improvements, active mode connections, and land acquisition. With enhancements to the public realm space, including wider sidewalks, landscaping, seating, and improved transit accessibility, and pedestrian crossings facility. The profile is expected to reduce emissions associated with Pathway 3. Additionally, the introduction of more greenery is expected to promote emissions sequestration, leading to a decrease in emissions associated with Pathway 4.</p>
23-22-9703	107 Avenue Revitalization	<input type="checkbox"/>	■	■	↓	↓	Not Quantified	↓	Community	50,000	<p>This profile seeks to revitalize the community by improving connectivity, upgrading sidewalk infrastructure, ameliorating lighting, etc. All these gear towards improving safety and hence make the neighbourhoods more attractive to pedestrians and bike-riders. This boost in pedestrian and bike flow will ultimately reduce the individual carbon footprint, thereby lowering Pathway 3. With improved streetscape including soil cells for healthy trees, this profile will lead to decrease in Pathway 4 emissions as well.</p>
23-12-9201	Northgate Lions Senior Centre Rehabilitation	<input type="checkbox"/>	■	↑	■	■	11	↑	Corporate	2,391,664	<p>This profile is for the rehabilitation of the Northgate Lions Senior Centre. Current design includes substantial reductions to electricity use through the installation of LED lighting and building envelope improvements. However operating hours of the facility are to be extended to the weekends and will result in increased natural gas use, with a net increase in total energy use expected. This will result in increased Pathway 2 emissions. No reductions expected from Pathway 1, 3 and 4. Profile enables an emissions increase due to rehabilitation of the parking lot and maintaining personal vehicle travel to the facility.</p> <p>Direct Emissions Impact: Immaterial - associated with increasing building energy use.</p> <p>Enabling Emissions Impact: Immaterial - related to the small area of parking rehabilitation.</p>
23-24-9401	23 Avenue over Whitemud Creek Pedestrian Bridge Replacement	<input type="checkbox"/>	■	■	■	?	Not Quantified	?	Community	0	<p>This profile focuses on replacing a pedestrian bridge to ensure that active travel routes remain accessible. The aim is to maintain existing routes for walking and cycling, without any direct impact on Pathway 3 emissions related to transportation. However, the plans may involve removing one tree, but efforts will be made to plant more trees given unknowns Pathway 4 emissions impacts are deemed uncertain.</p>
23-30-9320	Secord South Park Development	<input type="checkbox"/>	■	■	↓	■	Not Quantified	?	Community	0	<p>This profile is for the development of a park to accompany a new school site development. The land was previously undeveloped, and therefore development of the land does not reduce Pathway 4 emissions. Additional active travel and shared use paths likely to reduce Pathway 3 emissions. No buildings are on the lands or included in the project scope and therefore no impact to Pathway 2 emissions. No plan for installation of energy systems and therefore no reductions from Pathway 1. Uncertain enabling emissions impacts due to the development enabling construction of the school site with unknown energy demand.</p> <p>Direct Emissions Impacts: Low - associated with the additional active paths.</p> <p>Enabling Emissions Impacts: Low - associated with the potential emissions of a new school site, if not constructed to high performance standards. Performance of future building is uncertain at this time.</p>
23-10-9316	Edmonton Exhibition Lands Racetrack Infield Improvements	<input type="checkbox"/>	■	■	?	■	Not Quantified	?	Community	0	<p>This profile is related to improvements at the Edmonton Exhibition Racetrack. There are no new energy systems or tree planting included, and therefore no reductions in Pathway 1 or 4 emissions. No new energy consumption is expected, and therefore no impacts to Pathway 2. Uncertain impacts to Pathway 3 due to the inclusion of both new access roads and pedestrian paths. Uncertain enabling impacts.</p> <p>Direct Emissions Impacts: Low - related to the uncertain impacts to Pathway 3.</p> <p>Enabling Emissions Impacts: Low - related to the uncertain impacts to Pathway 3.</p>
Scope Change Increases Requesting Funding From Existing Budget											
21-12-0310	Peter Hemingway Fitness & Leisure Centre Rehabilitation - Phase 1	<input type="checkbox"/>	■	↑	■	■	700	■	Corporate	0	<p>This profile relates to funding scope changes for the Peter Hemingway Fitness centre rehabilitation. Funding is removed from the Kinsmen Spots Centre rehabilitation previously quantified in the 2023-2026 carbon budget. Removal of funding from the Kinsmen project results in increased Pathway 2 emissions due to not proceeding with the rehabilitation and the associated emissions reduction previously communicated to Council (700 tonnes). No reductions expected in Pathway 1 or 4 emissions. No impact to Pathway 3 emissions. No enabling emissions reductions.</p> <p>Direct Emissions Impacts: Low, associated with the elimination of reductions from the Kinsmen rehabilitation.</p> <p>Enabling Emissions Impacts: N/A</p>
15-21-6973	Fort Edmonton Park - Utilities & Enhancements	<input type="checkbox"/>	?	?	?	?	Not Quantified	?	Corporate	0	<p>No information available about the Fort Edmonton Train Station Redevelopment and therefore emission impacts are uncertain.</p>

Recosting Increases Requesting Funding from Existing Approved Budget												
19-18-1901	Information Security and Disaster Recovery Enhancements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Not Quantified	<input type="checkbox"/>	Corporate	0	<p>Recosting included increased demands for data storage and additional networking equipment that serve to increase energy load, and therefore increase Pathway 2 emissions. Pathway 1, 3 and 4 have no expected emissions impacts. No enabling emissions reductions.</p> <p>Direct Emissions Impacts: Immaterial, associated with additional energy loads.</p>
PDDM Re-cashflowing Adjustments												
CM-99-0060	Yellowhead Trail - 156 Street to St Albert Trail	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Not Quantified	<input type="checkbox"/>	Community	2,116,727	<p>The scope change is only related to drainage infrastructure related. No impacts on pathway emissions.</p>
CM-22-0000	Rossdale Road Reconstruction (103 Street to Low Level Bridge)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Not Quantified	<input checked="" type="checkbox"/>	Community	8,900,000	<p>The profile includes replacement of existing sidewalk with shared pathway, signalization of an intersection and rebuilding the streetlight system. the new LED streetlights will decrease Pathway 3 emissions.</p> <p>Direct Emissions Impact - immaterial: associated with existing streetlight rebuild, signalization of an intersection and replacement of existing sidewalk with shared pathway.</p> <p>Enabling Emissions Impact - immaterial: associated with induced active travel with the shared use path and walkability improvement.</p>

Fall 2023 Supplemental Capital Budget Adjustments											
Profile ID	Profile Name	CETS Action	Pathway				2026 GHG Emissions Impacts (tonnes CO2e)	Enabling	Community /Corporate /Both	2023-2026 Budget Request	Description of GHG Impacts
			1	2	3	4					
Fall 2023 Supplemental Capital Budget Adjustments											
23-30-9323	Northern Lights & South Haven Cemetery Phase 1B	<input type="checkbox"/>	■	■	■	↓	-1.9	?	Community	4,800,000	<p>The project scope includes expansion of the cemetery including new burial sites, servicing roads, earthworks and landscaping. Landscaping is identified as part of the project scope and it is expected that the additional landscaping, including planting of trees will lead to a decrease for Pathway 4 due to increased carbon sequestration. It is anticipated that 2,631 trees are to be planted (1,327 at Northern Lights Cemetery and 1,304 at South Haven Cemetery). Pathway 1 and 2 were assessed as No Impact as there are no new or upgraded energy systems or buildings associated with this project. Additionally, Pathway 3 was also assessed as No Impact as the service roads are internal and only intended to enable access to burial plots.</p> <p>Direct Emissions impact - immaterial reduction to Pathway 4 for the quantification period of 2023-2026</p> <p>Indirect Emissions Impact - uncertain but likely immaterial in size</p>
24-61-3622	Growth Hydrogen Buses	<input type="checkbox"/>	■	↑	↓	■	Not Quantified	↓	Both	66,000,000	<p>This profile will grow transit capacity with zero emissions buses, decreasing Pathway 3 emissions. The temporary garage renovations are expected to increase energy use resulting in increased Pathway 2 emissions. Decreases to emissions are enabled through the growth of transit use and the contribution of this profile to the mass transit strategy.</p> <p>Direct Emissions Impact - Low: associated with expected net reductions from increasing transit capacity</p> <p>Enabling Emissions Impact - Med: associated with the contribution of this profile to the mass transit strategy.</p>
23-40-9043	132 Avenue: Fort Road to 97 Street Reconstruction	<input type="checkbox"/>	■	■	↓	■	Not Quantified	↓	Community	2,759,180	<p>The profile includes removal of one travel lane in each direction, narrowing of the roadway, new sidewalks, curbs and gutters, low impact development facilities, new active transportation network, and street lights between 101 Street and 107 Street. The bike lane was already assessed under the Active Mode composite as part of the 2023-2026 carbon budget. Considering the volume of traffic on 132 Avenue, only qualitative assessment was completed.</p> <p>Direct Emission Impacts: Immaterial Pathway 3 emission reductions expected with the removal of travel lane.</p> <p>Enabling Emission Impacts: The cumulative impacts of wider side walk, narrower roadway cross section, and an active mode network will likely induce more use of active mode use (walk and bike) for the surrounding residents. However, impacts are expected to be immaterial.</p>
23-40-9041	Hairsine Neighborhood and Alley Reconstruction	<input type="checkbox"/>	■	■	↓	↓	Not Quantified	↓	Community	1,215,900	<p>Growth elements consist of: adding shared pathways, installing a traffic circle at a major intersection, creating new linear green space along 36th Street, establishing new seating areas and connecting missing sidewalk sections.</p> <p>Direct Emission Impacts - Immaterial - Pathway #3: Associated with replacement of 4-way stop control with traffic circle. Pathway #4: emissions sequestration through increased greenery, resulting in reduced emissions connected to Pathway 4.</p> <p>Enabling Emission Impacts - Immaterial - With addition of shared pathways, new seating areas, and completing missing sidewalk connections, will likely induce more pedestrian activities for the surrounding residents. However, impacts are expected to be immaterial.</p>
23-30-9322	Beaver Hills House/Michael Phair Parks Upgrades	<input type="checkbox"/>	■	↑	■	?	Not Quantified	↓	Community	936,948	<p>Project profile was previously assessed in the 2023-2026 carbon budget as part of the Capital City Downtown Plan's vision and includes the addition of green spaces that also allows and facilitates active frontages with adjacent buildings that promote active travel and enable decreased emissions. The project will also include the design and construction of a permanent washroom facility that will provide an essential service to those in the Downtown neighbourhood and increase Pathway 2 emissions. Pathway 4 was not assessed in the previous iteration but based on current project information, Pathway 4 emissions impacts will be uncertain as tree replacement of diseased trees is in scope. However, additional trees will be also planted above and beyond replacement but net increase is not known so quantification of carbon sequestration is not feasible at this time.</p> <p>Direct Emission Impacts: Immaterial - Associated with emissions generated from new washroom facility (no change from previous assessment)</p> <p>Enabling Emissions Impacts: Immaterial - Associated with promotion of active travel (no change from previous assessment)</p>
23-40-9040	Garipey Neighborhood and Alley Reconstruction	<input type="checkbox"/>	■	■	↓	↓	Not Quantified	↓	Community	250,000	<p>This profile includes active modes infrastructure, enhancing aesthetics through landscaping, adopting Complete Streets principles, and prioritizing safety through Vision Zero initiatives.</p> <p>Direct Emissions Impact - Immaterial - Associated with boost of active travel modes (Pathway #3) and alley conversion to natural turf and trees planting (Pathway #4)</p> <p>Enabling emissions impact - Immaterial - Associated with traffic calming measures, emphasizing lower/safer vehicular speeds, and increased connectivity and continuity of the active mode network may slightly affect emission levels (Pathway# 3)</p>
23-40-9039	Boyle Street Neighborhood Reconstruction	<input type="checkbox"/>	■	■	↓	↓	Not Quantified	↓	Community	129,950	<p>Project involves construction of new active mode connections, conversion of an alley to a shared street and streetscaping.</p> <p>Direct emissions impact - Immaterial - the introduction of the shared street along with the connections will be more inviting to cyclists and pedestrians. This increase in active travellers will lower Pathway #3. Also, the addition of streetscaping elements will decrease Pathway #4.</p> <p>Enabling emission impact - Immaterial - Associated with inducing more active mode use due to increased connectivity and continuity of the active mode network.</p>
23-40-9042	Meyokumin Neighborhood and Alley Reconstruction	<input type="checkbox"/>	■	■	↓	↓	Not Quantified	↓	Community	85,126	<p>By introducing growth elements such as shared pathways, raised crossings, widened breezeways and sidewalks, and completing missing sidewalk connections, the project aims to create a more walkable, bike-friendly, and attractive living environment. This may boost pedestrian activity and bike flow to ultimately reduce the individual carbon footprint; thereby lowering Pathway #3.</p> <p>Direct emissions impact - Immaterial - Associated with active travel modes (Pathway #3). The new trees by the boulevards will enhance emissions sequestrations (Pathway #4).</p> <p>Enabling emissions impact - Immaterial - Immaterial - Associated with inducing more active mode use due to increased connectivity and continuity of the active mode network.</p>
23-40-9044	Allendale Alley Reconstruction	<input type="checkbox"/>	■	■	■	↓	Not Quantified	?	Community	0	<p>The profile includes 1% of growth elements such as upgrading gravel alleys to paved ones and planting new trees.</p> <p>Direct emissions impact - Immaterial - Associated with emissions captured from new trees (Pathway #4)</p> <p>Enabling emissions impact - No sufficient information to assess the indirect or enabling emission impacts.</p>

Fall 2023 Supplemental Capital Budget Adjustments

Profile ID	Profile Name	CETS Action	Pathway				2026 GHG Emissions Impacts (tonnes CO2e)	Enabling	Community /Corporate /Both	2023-2026 Budget Request	Description of GHG Impacts
			1	2	3	4					
23-40-9046	Strathearn Alley Reconstruction	<input type="checkbox"/>	■	■	↓	■	Not Quantified	↓	Community	0	The growth plan involves changing gravel alleys to paved ones, upgrading existing alleylights to LED, and minor enhancements to improve pedestrian and bicycle movement. Direct emissions impact - Immaterial - Associated with use of energy efficient street lighting technologies (Pathway #3) Enabling emissions impact - Immaterial - Associated with inducing more active mode use due to increased connectivity and continuity of the active mode network.
23-25-9502	86 Street: 51 Avenue to 63 Avenue Rehabilitation	<input type="checkbox"/>	■	■	■	■	Not Quantified	↓	Community	0	Growth elements include finishing a missing sidewalk link for accessibility. Direct emissions impact - No direct impacts are expected due to the nature of improvements (e.g., missing sidewalk connection) Enabling emissions impact - Immaterial - Associated with finishing side walk connection for increased pedestrian opportunities.
23-24-9410	167 Street SW over Whitemud Creek Bridge (B453) Replacement	<input type="checkbox"/>	■	■	■	■	Not Quantified	■	Community	0	The work's tangible benefits involve maintaining bridge safety and longevity, minimizing unexpected service disruptions. Direct Emission Impact - No meaning impacts are expected. Enabling Emission Impact - No impacts are expected.
23-25-9503	95 Avenue: 163 Street to 170 Street Reconstruction	<input type="checkbox"/>	■	■	↓	↓	Not Quantified	↓	Community	0	The project involves rebuilding the entire road and adding a new shared pathway. It also includes redoing the road's streetlights, expanding sidewalks, consolidating access points, new landscaping, sitting area and bike parking. There may be some tree impacts, and options like planting new trees or shrubs as part of the landscaping will be considered. Direct Emission Impact - Immaterial - The new shared pathway along with the new sitting area and the bike parking will increase the ped and bike activity; thereby boosting alternative travel means and hence reducing Pathway #3. Enhanced lighting, and additional greenery will have immaterial Pathway #4 emissions. Enabling Emissions Impact - Immaterial - Sitting area and bike parking will increase the opportunities for active mode use.
23-12-9202	99 Street and Judy Padua Way Streetscape & Waterproofing	<input type="checkbox"/>	■	■	■	↓	Not Quantified	↓	Community	0	Funding is for crucial infrastructure maintenance and for streetscaping - enhancing the aesthetics and functionality of public streets, involving efforts like beautification, landscaping, and enhancing the overall look and usability of these streets. Direct Emission Impact - Immaterial - More possibilities for emissions sequestrations- thereby lowering Pathway #4. Enabling Emission Impact - Immaterial - Improving the streetscape could make it more appealing for walking and biking.
23-10-9317	Kennedale Snow Storage Site Upgrades	<input type="checkbox"/>	■	■	↓	■	Not Quantified	■	Corporate	0	This profile will improve equipment movement at the Kennedale snow storage site, reducing energy use and emissions associated with Pathway 3. No emissions impacts associated with Pathways 1, 2 or 4. No enabling emissions impacts. Direct Emissions Impacts - Immaterial: associated with improved equipment movement at the site, resulting in reduced fuel use.
23-25-9503	170 Street Pedestrian Bridge	<input type="checkbox"/>	■	■	↓	?	Not Quantified	↓	Community	1,089,631	This project profile was previously assessed as part of the 2023-2026 carbon budget. This profile is for the replacement of a pedestrian bridge to maintain available active travel routes, therefore no impact to Pathway 3 emissions. Pathway 4 emissions impacts remain uncertain as 19 trees were removed, though it is anticipated that trees will be replaced. However, the number of trees to be planted is unknown and TBD once Valley Line LRT construction is completed, thus quantification of carbon sequestration is not feasible at this time. Overall, this project enables emissions reductions through maintaining active travel routes while the population grows. Direct Emissions Impact - Immaterial: associated with uncertainty in tree planting related reductions (no change from previous assessment). Enabling Emissions Impact - Immaterial: associated with potential increased active travel use as population grows (no change from previous assessment).
21-12-0350	Edmonton EXPO Centre Rehabilitation	<input checked="" type="checkbox"/>	↓	■	■	■	<(100)	■	Corporate	0	This project includes the installation of solar PV at the Edmonton EXPO Centre with a capacity of 1.8MW and expected annual generation of 1,900 MWh. The project decreases emissions in Pathway 1 as a result of installing solar PV generation capacity. The project does not impact Pathway 2, 3 or 4. No enabling emissions impacts. Direct emissions impact - Low: based on the size and expected renewable energy generation from the system.
CM-12-0097	Facility: Service Delivery - Renewal	<input type="checkbox"/>	■	?	■	■	Not Quantified	↑	Community	13,608,000	The project scope comprises rehabilitation of the Rogers Place Arena and associated parkade. Rehab scope is typically for modern equivalent replacements, however an energy audit is being procured and energy efficiency measures may be added to the project scope upon completion. This results in Uncertain emissions impacts to Pathway 2. No expected impacts to Pathway 1, 3 or 4. The renewal and replacement of parking surfaces enables an emissions increase. Direct Emissions Impacts - Uncertain Enabling Emissions Impacts - Low: associated with enabling ongoing personal vehicle use through the parking surface renewal.
23-12-0360	Petrolia Housing Complex Demolition	<input type="checkbox"/>	■	↓	■	■	Not Quantified	↑	Community	5,900,000	Demolition of buildings which were not occupied as of March 2023 will decrease energy use and lead to reductions in Pathway 2 emissions. No expected impacts to Pathway 1, 3, or 4. The demolition of these buildings will enable the construction of new affordable housing units on the site which are assumed to not be emissions neutral. This will enable an emissions increase. Direct Emissions Impacts - Low: associated with the demolition of townhouse units that were previously occupied. Enabling Emissions Impacts - Low: associated with the construction and operation of new affordable housing units which are assumed to not be emissions neutral.
21-10-9105	Fire Station #8 Relocation - Blatchford	<input type="checkbox"/>	■	■	■	■	<(100)	■	Corporate	0	This project was assessed in the previous Carbon Budget. The scope of the project has been updated, with the new scope not including onsite renewable energy and now planned to connect to the Blatchford District Energy system. This results in an updated evaluation with the enabling emissions impacts evaluated as not reducing do to the elimination of the onsite renewable energy system.

Fall 2023 Supplemental Operating Budget Adjustments										
Service Package Name	CETS Action	Pathway				2026 GHG Emissions Impacts (tonnes CO2e)	Enabling	Community /Corporate /Both	2024-2026 Total Annual (\$000s)	Description of GHG Impacts
		1	2	3	4					
Fall 2023 Supplemental Operating Budget Adjustments										
Redeploy VLSE (Valley Line Southeast LRT) Hours/Buses	<input type="checkbox"/>	■	■	↓	■	Not Quantified	↓	Community	15,217	This service package includes re-deploying buses that were operational and therefore reflects a service increase without increased emissions. This is therefore a decrease in Pathway 3 emissions. Overall this will support growth of the transit network which will enable more use of public transit which can displace the use of personal vehicles. Direct Emissions Impacts - Medium: associated with increased service / transit use using existing fleet vehicles. Enabling Emissions Impacts - Medium: associated with the contribution of this profile to the Mass Transit Strategy.
Centre City Optimization	<input type="checkbox"/>	■	■	■	■	Not Quantified	■		8,928	No direct or enabling emissions impacts.
Expanded Snow Program	<input type="checkbox"/>	■	■	■	■	Not Quantified	■		2,521	The costs for the expanded snow program are related to staff time to liaise with applicants for snow removal assistance. No equipment purchases are associated with these funds, and therefore no significant GHG emissions are expected.
Traffic Enforcement	<input type="checkbox"/>	■	■	■	■	Not Quantified	■		11,920	No direct or enabling emissions impacts.
Landlord Licensing, Compliance and Registry Project	<input type="checkbox"/>	■	■	■	■	Not Quantified	■		377	No direct or enabling emissions impacts.
Satellite Garage and Transit Service Growth Operating Impact of Capital	<input type="checkbox"/>	■	↑	■	■	Not Quantified	↓	Both	31,813	This profile is for the operating impacts of capital investment that will grow transit capacity with zero emissions buses, decreasing Pathway 3 emissions. The temporary garage renovations are expected to increase energy use resulting in increased Pathway 2 emissions. Decreases to emissions are enabled through the growth of transit use and the contribution of this profile to the mass transit strategy. Direct Emissions Impact - Low: associated with expected net reductions from increasing transit capacity Enabling Emissions Impact - Medium: associated with the contribution of this profile to the mass transit strategy."
Ongoing Maintenance of Trees	<input checked="" type="checkbox"/>	■	■	■	↓	Not Quantified	↓	Community	7,442	This service package is for ongoing maintenance of urban forest assets, initiating tableland acquisitions as well as restoration opportunities to enhance natural areas. Protection of tableland natural assets (forests and other natural features) through acquisition and implementation of restoration activities on these lands will reduce Pathway 4 emission impacts. Renewal of the urban forest canopy will enable ongoing decreases to ongoing emissions decreases from the urban forest. Direct Emissions Impact - Uncertain: Impact is dependent on area of tableland acquisitions and restoration opportunities Enabling Emissions Impact - Uncertain: Impact is dependent on area of tableland acquisitions and restoration opportunities
Community Property Safety Team (CPST)	<input type="checkbox"/>	■	■	■	■	Not Quantified	■		1,392	No direct or enabling emissions impacts.
Explore Edmonton - Increased Mandate and Scope Funding	<input type="checkbox"/>	■	■	■	■	Not Quantified	■		27,771	No direct or enabling emissions impacts.
Heritage Valley Expansion	<input type="checkbox"/>	■	■	■	■	Not Quantified	■		935	No direct or enabling emissions impacts.
Temporary and Seasonal Workforce Review - Recalibrating the Workforce	<input type="checkbox"/>	■	■	■	■	Not Quantified	■		8,634	No direct or enabling emissions impacts.
Core Encampment and Unsheltered Homelessness Response	<input type="checkbox"/>	■	■	■	■	Not Quantified	■		16,931	No direct or enabling emissions impacts.
Enhanced Encampment and Unsheltered Homelessness Response	<input type="checkbox"/>	■	■	■	■	Not Quantified	■		21,864	No direct or enabling emissions impacts.
GEF Seniors Housing - Social Housing - Lodge Staffing Increase	<input type="checkbox"/>	■	■	■	■	Not Quantified	■		8,477	No direct or enabling emissions impacts.
Capacity Funding and Positions for Indigenous MOU Partners	<input type="checkbox"/>	■	■	■	■	Not Quantified	■		840	No direct or enabling emissions impacts.
Metro to Blatchford - Base	<input type="checkbox"/>	■	■	■	■	Not Quantified	■		13,157	No direct or enabling emissions impacts.

Fall 2023 Utility Budget Adjustments										
Profile Name	CETS Action	Pathway				2026 GHG Emissions Impacts (tonnes CO2e)	Enabling	Community /Corporate /Both	2023-2026 Budget Request (\$000s)	Description of GHG Impacts
		1	2	3	4					
Fall 2023 Utility Budget Adjustments										
Blatchford Renewable Energy Utility										
Blatchford Renewable Energy Utility Delivery - Growth	☑	↓	■	■	■	Not Quantified	↓	Both	0* (55,185 for next budget cycle)	<p>Profile to secure matching funds from NRCan grant program for waste heat recovery integration into the Blatchford district energy system. This system serves to reduce the emissions intensity of energy produced from the district energy system, and therefore reduces Pathway 1 emissions. Enables additional emissions reductions for buildings connected to the district energy system.</p> <p>Direct Emissions Impacts: Uncertain</p> <p>Enabling Emissions Impacts: Uncertain</p>

Appendix B - Description of Assumption Categories

The development of the carbon budget required various assumptions that can be categorised as follows:

1. **General assumptions:** these are assumptions that were made to help clarify and define the overall process that was developed. This may also include assumptions on how to deal with different types of profiles such as composites, strategy related profiles, and operating impacts of capital.
2. **Assumptions specific to PATHWAY 1: Renewable and Resilient Energy Transition**
3. **Assumptions specific to PATHWAY 2: Emission Neutral Buildings**
4. **Assumptions specific to PATHWAY 3: Low-Carbon City and Transportation**
5. **Assumptions specific to PATHWAY 4: Carbon Capture and Nature-Based Solutions**

<i>General Assumptions</i>	
Item	Assumption
General scope boundaries	<p>The community and corporate GHG inventories help to set the scope of the type of operational emissions that are considered in evaluation of the budget. Different sectoral emissions sources are provided to help clarify scope decisions.</p> <p>Community emissions align with the following sectors:</p> <ul style="list-style-type: none"> - Residential buildings - Agriculture, forestry and fishing activities - Manufacturing industries and construction - Non-specified sources - Commercial and institutional buildings and facilities - Energy industries - Fugitive emissions - On-road transportation - Transboundary transportation - Off-Road transportation - Aviation transportation - Rail Transportation - Waste - Agriculture, Forestry, and Other Land Use - Industrial Processes and Product Uses <p>Corporate emissions align with the following sectors:</p> <ul style="list-style-type: none"> - Buildings & Other Facilities - Streetlights & Traffic Signals - Vehicle Fleet - Transit Fleet - Waste Management

<i>General Assumptions</i>	
Scope of Emissions included in carbon budgeting	<p>The quantified carbon budget only includes Scope 1 (direct emissions) and Scope 2 emissions (electricity related emissions).</p> <p>The corporate GHG inventory includes those emissions sources that are directly within the operational control of the City. The community GHG inventory includes emissions sources within the City boundary.</p>
Projects substantially completed prior to 2023	<p>The carbon budget does not include GHG impact assessment for capital projects that were approved through previous capital budgets, that are substantially complete, with cash flow extending into 2023 and beyond. The GHG emissions of these projects will be incorporated into annual GHG emissions updates once they are in service.</p>
Boards and Commissions	<p>Capital profile requests for all Boards and Commissions have been assessed for GHG impacts. Operating service package requests for Boards and Commissions have not been assessed for GHG impacts, but will be incorporated into annual GHG emissions reporting if approved by City Council.</p>
Emissions quantified by pathway	<p>Pathway 1: relates to emissions associated with energy supply including Solar PV deployment, and capturing landfill gas for energy use</p> <p>Pathway 2: relates to emissions associated with energy use within buildings and facilities</p> <p>Pathway 3: relates to emissions from transportation and urban design including street lighting.</p> <p>Pathway 4: relates to emissions from land use change, and sequestration from tree planting. This would also include any industrial carbon capture equipment if included.</p>
Qualitative assessment benchmark	<p>The comparison for the qualitative assessment of the pathway emissions is the 2021 emissions inventory.</p>
Quantitative assessment benchmark (community current state emissions forecast)	<p>For the community carbon budget, the 'Business-as-Planned' Scenario from Edmonton's City Plan has been adopted as the current state emissions forecast, which reflects the most recent emissions forecast prepared for community emissions. This scenario assumes that growth occurs according to the City's approved statutory land use plans and historical growth patterns prior to adoption of The City Plan. Therefore the carbon budget impacts compared against the current state community emissions illustrate the progress towards carbon reductions as The City Plan is implemented.</p>

<i>General Assumptions</i>	
Quantitative assessment benchmark (corporate current state emissions forecast)	The corporate current state emissions forecast does not assume growth in the City's transit, waste or vehicle fleet, streetlighting electrical load and assumes modern equivalent replacement of any vehicles reaching their end of life. It assumes no new emissions producing facilities and decreasing emissions associated with the City's landfills.
Rounding	<ul style="list-style-type: none"> • All figures related to community emissions have been rounded to the nearest 10,000 tonnes. If less than 10,000 tonnes they will be presented as <10,000 tonnes. • All figures related to corporate emissions have been rounded to the nearest 1,000 tonnes. If less than 1,000 tonnes they will be presented as <1,000 tonnes. • Individual project quantifications are presented to the nearest 100 tonnes. If less than 100 tonnes they will be presented as <100 tonnes.
Materiality	<p>Description of the GHG impacts, as well as magnitude of direct and enabling GHG impact (if any). The direct and enabling GHG emissions impacts were assessed for:</p> <ul style="list-style-type: none"> • immaterial (<100 tonnes of CO2e), • low (100 to 1,000 tonnes of CO2e), • medium (1,000 to 10,000 tonnes of CO2e), • or high (10,000 or more tonnes of CO2e) impacts. <p>The impacts are not necessarily directional. For example there may be uncertain impacts that are considered "medium" because they could have emissions impacts in the 1,000 to 10,000 tonnes of CO2e range increasing and also have some impacts that are decreasing.</p>
City of Edmonton's green electricity procurement	The qualitative assessment does not consider the City of Edmonton's green electricity purchases as part of the evaluation. However, the quantitative calculation presented in the report does consider the City's green electricity purchases.
Operating impacts of capital (OIC)	Any related emissions from operations have been reported within capital GHG assessments.
Renewal (including fleet)	Renewal is considered to have no material emissions impact as this is not actively replaced with high energy efficiency equipment. In some cases there will be efficiency improvements due to modern equivalent standards, but these will not be quantified or evaluated. The general assumption is that renewal is

<i>General Assumptions</i>	
	considered business as usual, and any inherent efficiency improvements will be captured in future GHG inventories.
Quantification of capital project composites for the Neighbourhood Renewal Program and Energy Transition Strategy	<p>The scope of work included within the Neighbourhood Renewal Program and the Energy Transition Strategy Implementation composite profiles is vast. Due to the quantification limitations discussed in the 2023-2026 Carbon Budget, only portions of these composite projects were quantified for GHG emissions impacts. Once considering the full scope of the projects, and as more details become known, the projects will have more GHG emissions impacts than the amount reported.</p> <ul style="list-style-type: none"> • Neighbourhood renewal - only includes net impact of tree changes • Energy Transition Strategy Implementation composite - only includes estimate impact of Clean Energy Improvement Program
Profiles that involve enhancing data availability and use within the corporation	As per the foundation of the Community Energy Transition Strategy, data-driven decision making is critical to make informed decisions for energy use and emissions. Therefore any profiles or packages that result in improved data gathering and use will decrease enabling emissions.
<i>Pathway #1: Renewable and Resilient Energy Transition</i>	
Item	Assumption
Interaction of City installation of solar PV and green electricity procurement	In 2026 the City will have emissions neutral electricity. While solar PV will lead to a decrease in electricity requirements from the grid, that electricity will already be emissions neutral as per the City's green electricity contract and will therefore have no net impact.
Quantification of Landfill Gas to Renewable Natural Gas	Quantification of GHG impacts are estimated to align with the City's GHG Inventory methodology rather than other measurements and estimates taken related to Alberta's Technology Emissions Innovation Regulation.
<i>Pathway #2: Emission Neutral Buildings</i>	
Item	Assumption
Emissions impacts of City buildings designed prior to 2021 (when City Policy C627 was adopted)	These buildings meet the previous City Policy C532 that had a requirement that buildings would be designed with 40% lower emissions than energy code from 2011, but will still lead to an increase in emissions overall.

<i>General Assumptions</i>	
Solar PV generation in new City buildings that meet City Policy C627	Emissions associated with solar installations in new city owned buildings that adhere to City Policy C627 are included in the overall emissions neutrality of the building and are not broken out for quantification or qualifications. Pathway 1 emissions for any new City buildings adhering to City Policy C627 are ranked as 'no impact'.
Energy retrofits as part of renewal	Energy retrofits as a part of a facility renewal will be segregated into two pathways if the retrofit includes solar PV or other renewable systems. The emissions impact from the retrofit component will be reported as an emissions reduction within Pathway 2 and the solar component will be shown as a decrease for Pathway 1.
Retrofits to buildings that have not yet had any design or scoping work done	Retrofits to buildings that have not yet had any design or scoping work done, will not be going through construction this budget cycle, and have no land use changes will not be quantified until the scope and energy study are completed.
Energy "Plug Use" (Such as Computers)	Energy "Plug Use" (Such as Computers) directly impact Pathway 2 emissions similar to other building systems.
Open City Technology (IT) impacts	It is assumed that all budget requests related to Open City and Technology do not increase server room requirements. If at any point additional server space is required, this would be brought forward as a new growth or renewal profile and emissions increases associated with this growth would be assessed at that time.
Impacts of increased construction	Emissions from construction activities are considered 'embodied carbon' and are not currently assessed within carbon budgeting. Future iterations of this work may consider these impacts.
New emissions neutral buildings	Growth buildings are assumed to adhere to City Policy C627 and therefore be designed to be emissions neutral with renewable energy production. This neutrality means these buildings will have no impact to Pathway 1 or 2 emissions. In situations where a new emissions neutral building is constructed to replace an existing facility, the potential decreased emissions from the decommissioned facility is not assumed unless the decommissioning cost is specifically included as part of the capital profile request.
Building retrofits with increased emissions listed as part of the Community Energy	There are certain facilities that have not been operational for many years and will be undergoing retrofits that will improve energy efficiency, and therefore be in support of the Community Energy Transition Strategy's goals. However, there will also be a new overall emissions increase (low or immaterial) to the City

<i>General Assumptions</i>	
Transition Strategy	because the buildings have not been operational for the last few years.
New park facilities	New park facilities (bathrooms, pavilions, etc.) are expected to consume energy for their operation and lead to increases in pathway 2 emissions.
<i>Pathway #3: Low-Carbon City and Transportation</i>	
Item	Assumption
Quantification of transportation related projects	Transportation-related budget requests were combined as a composite to estimate travel demand and the resultant impacts of greenhouse emissions for the entire transportation system, which is a more accurate approach to quantifying GHG impacts rather than on an individual project basis. To provide further perspective of the emissions impacts related to different transportation modes, the Transit, Road, and Active mode composites were evaluated separately and quantified for GHG emissions impacts.
Transit, road, and active transportation profiles	<p>The direct emissions impacts of the transportation composite profiles were evaluated based on the changes in transportation system capacity and assumed use (e.g., increase or decrease capacity and use of each travel mode). For example, the direct impacts of a transit profile that expands transit capacity decrease pathway 3 emissions as the result of a shift of travel from personal vehicle use to transit. The decrease in automobile use results in decreased fuel consumption which in turn reduces pathway 3 emissions.</p> <p>Enabling emissions impacts of transportation composite profiles include the emissions impacts associated with potential induced travel on the respective mode considering the population and employment growth patterns as a result of the investments. For example, considering future population growth a new transit investment increases transit accessibility which could stimulate the Transit Oriented Development (TOD) along the related transit corridor. The expected growth of population and TOD typically provide opportunities for residents living in TOD to access amenities within a short distance by either transit or active modes. This would enable reduced automobile dependency for the residents living in TOD which in turn reduces the GHG emissions.</p>
New and renewed parking lots and bike racks	<p>New parking lots result in more personal vehicle trips. This would encourage driving and thus would increase pathway 3 emissions.</p> <p>New bike racks provide opportunities for safe/secure bike parking which would encourage more biking. This can shift driving trips to bike trips which would</p>

<i>General Assumptions</i>	
	<p>decrease pathway 3 emissions.</p> <p>Renewal work done to the active transportation network maintains current use, and considering future population growth this renewal enables emissions decreases.</p> <p>Renewal work done to parking lots maintains current use, and considering future population growth this renewal enables emissions increases.</p>
Transportation safety related profiles	<p>Enhancing and maintaining transportation safety can enable indirect emissions impacts and will likely reduce mobility/transportation related emissions. Programs or initiatives (such as automated enforcement, safe crossing or neighbourhood speed limits) tend to increase speed compliance, encourage use of active travel modes and thus reduce GHG emissions impacts.</p>
Bike paths and pedestrian paths (active network)	<p>Any addition to active transportation capacity (sidewalks, trails, etc.) results in direct emissions reductions for pathway 3.</p> <p>Renewal work done to the active transportation network maintains current use and enables emissions reductions when considering future growth of the City.</p>
Transit renewal	<p>Transit renewal profiles maintain use of the route and enables emissions reductions when considering future growth of the City.</p>
New transit garages	<p>These facilities are emissions neutral facilities. The assets (LRV and buses) are not included in the direct impact assessment. These facilities enable significant emissions reductions associated with mass transit access and future emissions neutral bus housing requirements.</p>
<i>Pathway #4: Carbon Capture and Nature-Based Solutions</i>	
Item	Assumption
Quantification for natural asset impacts of City owned development projects	<p>If there are projects that do not have a defined location or footprint, quantifications will not be completed as it is too early to provide an accurate assessment.</p>

<i>General Assumptions</i>	
Soccer fields and open space turf	Soccer fields and open space turf do not support emissions sequestration and would be considered the equivalent of developed land.
Natural asset protection	The assumption is that natural areas would have been developed if not protected. Ongoing enabling emissions are associated with the lands' increased ability to sequester carbon over time.
Naturalization, greenery, vegetation, landscaping, and low impact development (LID)	<p>Naturalization is considered to decrease pathway 4 emissions related to returning developed lands back to a natural state.</p> <p>Profiles including greenery, vegetation, landscaping, and low impact development are not considered as decreases to pathway 4 due to these aspects not currently being included in the current quantification methodology.</p>
Irrigation within capital profiles	Some capital projects include installation of irrigation. These were considered immaterial for assessment although increased water use and the associated energy of processing and pumping water do exist.
Trees added through development processes	<p>Only corporately owned trees will be calculated, in alignment with the current inventory.</p> <p>Trees that are planted by the City along the right of way for new development will be captured. Privately planted trees are not included.</p>
Transition to or from farmland or turf	Natural asset transitions to or from farmland or turf were not calculated in the quantifications. Farmland and turf cause emissions both from the land use and from the operations that maintain them. The City's natural asset calculation tool currently includes a factor for farmland that includes both the operations and the land use. However, the scope of the GHG inventory only includes the natural asset land use, not the emissions from operations to maintain. Since the inventory and the tool used to calculate emissions impacts are not aligned, the tool could not be used for quantification purposes.

Appendix C - Key Terminology

Adaptation - Lowering the risks and negative impacts and embracing potential opportunities associated with climate change so that communities and ecosystems are prepared to cope with new climate conditions.

Climate Resilience - The ability to prepare for, recover from and adapt to severe weather; ocean warming and acidification; extended periods of drought and extreme temperatures, and other deleterious effects of climate change.

Community Carbon Budget - The amount of GHG emissions permitted for the municipality of Edmonton based on emission targets over a period of time.

Community Carbon "Fair" Share Budget - The amount of GHG emissions permitted for the municipality of Edmonton, over a period of time, based on C40's methodology to assign a "fair" proportion of the global carbon budgets to C40 cities.

Corporate Carbon Budget - The amount of GHG emissions permitted from City-owned and operated assets and operations based on emission targets over a period of time.

Current State Emissions - The amount of GHG emissions inventory (emissions actuals for the years 2015 to 2021) plus the long term emission forecast amounts (for the years 2022 through to 2050).

Carbon Capture - A process where carbon dioxide (CO₂) is separated (captured) from industrial and energy sources, and can be either stored and used to create a new product.

Carbon Deficit/Surplus - The annual difference between GHG emissions and the emission targets. A deficit implies that the current state emissions are greater than the target emissions. For future forecast purposes the deficit/(surplus) is measured against the forecasted emissions.

Carbon Neutral - A carbon neutral community or corporation is where the net per-person greenhouse gas emissions is zero. Carbon neutral energy is energy with net zero greenhouse gas emissions.

Decarbonization - The process of stopping or reducing the release of greenhouse gases into the atmosphere.

District Energy System - Local, centralized energy systems that produce and distribute thermal energy (heating and/or cooling) for customer use.

Embodied Carbon - The total of all GHG emissions that result from the manufacture and supply of construction products and materials, as well as the construction process itself.

Energy Model - A study that is done on a building to estimate the proposed energy use of a building after construction or a retrofit. These are the most accurate way to determine the emissions associated with new construction or a retrofit project.

Emission Targets - Desired levels of maximum annual GHG emissions based on a percentage reduction from the 2005 baseline year to achieve GHG emission goals.

Emissions Neutral/Emissions Neutral Building - An Emissions Neutral building is a building that is highly energy efficient and: a) uses only Renewable Energy for its operations on an annualized average basis (this may include either on or offsite generated Renewable Energy), OR b) produces and supplies onsite Renewable Energy in an amount sufficient to offset the annual greenhouse gas emissions associated with the energy consumed for its operations.

Enabling - Refers to the indirect emissions impact of a project. A project or initiative that would not have a direct impact on GHG emissions within a pathway, but rather support other work to be done to either increase or decrease emissions.

Energy Transition - A risk management approach designed to: (1) diversify a community's energy mix and reduce its dependence on fossil fuels, (2) reduce greenhouse gas emissions to levels that are consistent with limiting the long-term rise in the average global temperature to 2°C, (3) ensure energy delivery systems (for electricity and natural gas) are resilient and durable to the forces of climate change, (4) increase self-sufficiency with respect to its electrical power and heating needs and (5) position itself to participate in what is potentially the largest economic opportunity humankind has ever experienced

Green Electricity - Electricity that comes from natural sources such as sunlight, wind, rain, tides, plants, algae and geothermal heat. These energy resources are renewable, meaning they are naturally replenished.

Greenhouse Gas (GHG) - Gases such as carbon dioxide, methane and nitrogen oxide which actively contribute to the atmospheric greenhouse effect. GHGs also include gases generated through industrial processes.

Low-Carbon Energy - Energy that is produced using significantly lower amounts of carbon dioxide emissions than is emitted from fossil fuel energy.

Nature-Based Solutions - Actions to protect, sustainably use, manage and restore natural or modified ecosystems, which address societal challenges, effectively and adaptively, providing human well-being and biodiversity benefits.

Emission reductions - emission reductions (or GHG removal) is the opposite of GHG emissions. Emission reductions refers to eliminating or reducing sources of emissions that currently exist or are expected to occur.

Net Zero - Net zero emissions are achieved when emissions of greenhouse gases are balanced by removals. Emissions should be reduced as close to zero as possible and remaining emissions would be balanced by an equivalent amount of carbon removal, through nature-based solutions or technology.

Renewable Energy - Energy that is obtained from natural resources that can be naturally replenished or renewed within a human lifespan. These resources include moving water, wind, biomass, solar, geothermal, and ocean energy.

Renewable Natural Gas - Renewable source of methane gas (the primary component of natural gas) created through the breakdown of organic matter in the absence of oxygen. There are many different processes and waste types that can be used to produce renewable natural gas.

Sequestration - Capturing and storing greenhouse gases in natural assets such as plants and vegetation, which reduces the amount of greenhouse gases in the atmosphere.

Social cost of carbon - An estimate of the economic damages associated with a small increase in carbon dioxide emissions (conventionally one metric tonne).

Solar PV - Photovoltaic cells (also known as solar panels) are semiconductors made up of silicon atoms that convert the sun's energy into electricity.