



MANAGEMENT REPORT

Date: September 27, 2023
To: Infrastructure, Transportation and Safety Sub-committee
From: Sadaf Ghalib, Climate Change Programs Manager
Report #: ITS23-026
Attachments: Corporate Energy and Emissions Plan 2023

Title: Corporate Energy and Emissions Plan (CEEP) 2023

Objective: To present the Corporate Energy and Emissions Plan (CEEP 2023) for Council approval.

Background: Building on Stratford's Climate Emergency Declaration in 2020, and City Council's commitment to reduce greenhouse gas emissions city-wide, the Corporate Energy and Emissions Plan has been developed with a long-term vision to help identify actionable strategies that would need to be implemented to achieve its climate goals of net-zero emissions by 2050.

Corporate Energy and Emissions Plan 2023

The Corporate Energy and Emissions Plan (CEEP 2023) has been developed as a climate mitigation strategy with recommendations to strengthen climate action within all corporate operations.

This newly developed plan aligns with Council's Climate Emergency Declaration of 2020 and associated greenhouse gas (GHG) emission reduction targets below 2017 baseline emission levels:

- 30% by 2030
- 60% by 2040
- 100% by 2050

Recognizing that the path to attaining the 2050 net-zero targets may not always be a straightforward decline with linear emission reductions year over year, it is prudent to set an interim target for 2040 to help the City calibrate GHG emissions reduced as the transition to net-zero evolves. Monitoring the corporate emissions trajectory through annual reporting will help assess our progress, and course-correct when and where necessary. An interim target will translate to enhancing allocated resources and

adjusting spending requirements as identified. Staff recommend an interim target of 60% emission reduction by the year 2040, based on analysis of current emissions trajectory (2017 – 2022), future years' emissions modelling for the next 27 years (2023 – 2050) and ability to strategically plan around operationalizing the CEEP.

Continued commitment from Council along with periodic review of innovative emission reduction opportunities and the application of a Climate Lens throughout operations will help make strides toward the City's net-zero ambitions.

Within CEEP 2023 (refer to Appendix A), there are 31 strategies set out to accomplish the goals outlined below.

1. Demonstrate the City's leadership role in creating and facilitating change.
2. Maximize energy efficiency in the delivery of services.
3. Build new developments net-zero or net-positive with respect to energy and emissions.
4. Transition to a zero-emission fleet and low-carbon equipment.
5. Aggressively pursue local, renewable, low impact energy sources.
6. Partner with external organizations and agencies to advance common energy and emissions objectives.
7. Staff training, awareness, and internal capacity building.
8. Energy monitoring and reporting on emissions annually.
9. Develop a reiterative self assessment mechanism to monitor the emissions trajectory (on-track vs off-course) and ability to maximize integration of new technologies and approaches, as they become available.

The main body of the CEEP document identifies overarching strategies to integrate change management and achieve climate goals. It forms the foundation of the development of supplementary roadmaps that take strategies and transform them into operational actions.

Scope of Emissions

The CEEP is consistent with the reporting requirements under the Federation of Canadian Municipalities (FCM) Partners for Climate Protection (PCP) Program to consider Scope 1 and Scope 2 emissions of a reporting organization. While Scope 1 emissions are direct GHG emissions that occur from sources that are controlled or owned by an organization (e.g., emissions associated with fuel combustion in boilers, furnaces, vehicles), Scope 2 emissions are indirect GHG emissions associated with the purchase of electricity, steam, heat, or cooling. Although Scope 2 emissions physically occur at the facility where they are generated, they are accounted for in an organization's GHG inventory because they are a result of the organization's total energy use.

Scope 3 emissions include all indirect GHG emissions (not included in Scope 2) that occur in the value chain of the reporting organization such as leased assets, capital

goods and transportation and distribution. Although at this time, Scope 3 emissions are not mandated to be reported to senior levels of government, the City will strive to include them in monitoring frameworks and carbon reduction strategies as feasible.

Refer to Figure 1 for inclusions of mandatory reporting under Scope 1 and Scope 2.

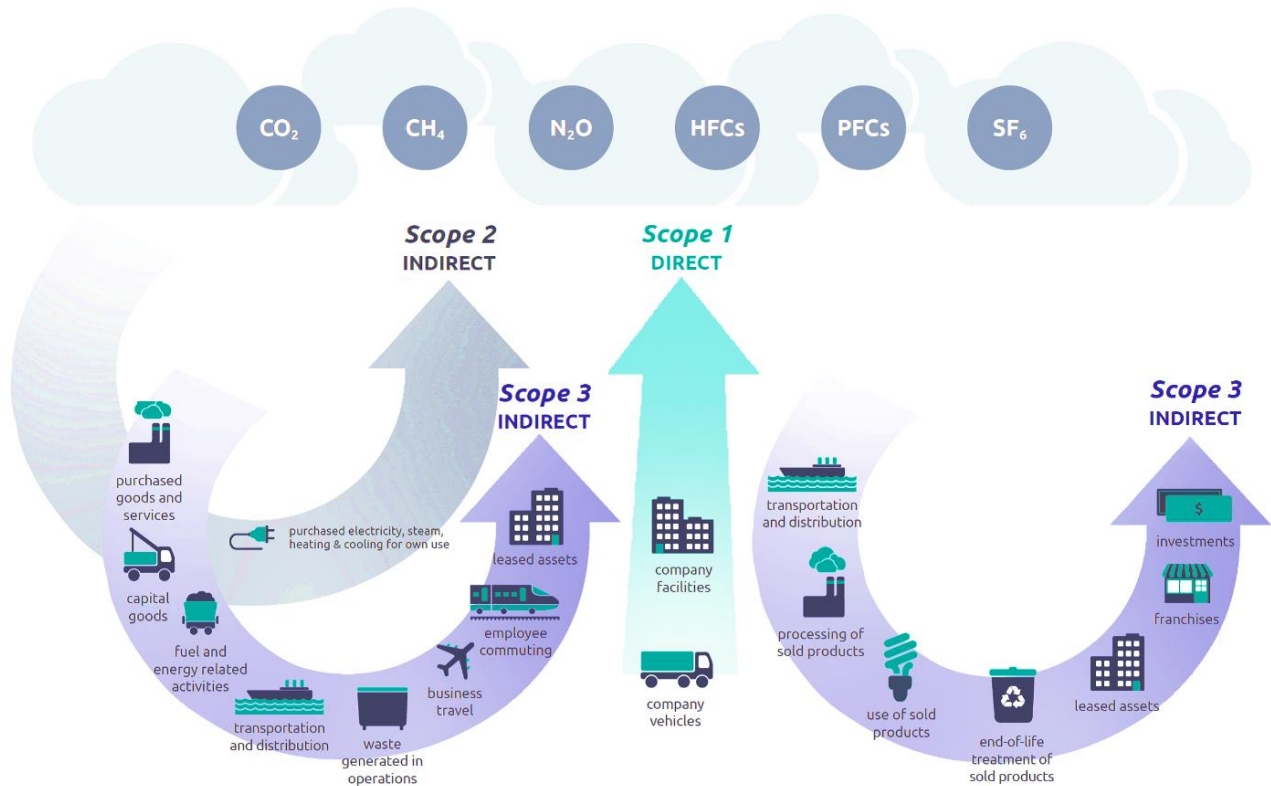


Figure 1 Scope of Emissions Reporting Scope 1 and Scope 2 (Source: Greenhouse Gas Protocol)

Analysis:

Breakdown of the City’s Asset Classes and Associated Emissions

Corporate emissions are measured relative to the 2017 Emissions Baseline of 5,114.41 tCO₂e. In CEEP 2023, energy and emissions inventories are categorized into five asset classes: Buildings, Fleet, Outdoor Lighting, Solid Waste and Water and Wastewater. Buildings (generating 2,252 tCO₂e) and Fleet (generating 1,902.25 tCO₂e) asset classes are the two most significant contributors to the City’s GHG emissions at 44% and 37% of total corporate emissions respectively. These two asset classes are the focus operational climate action as they provide the greatest opportunities and abilities to meet the City’s climate goals as explained further in this report.

Other asset classes including Outdoor Lighting, Solid Waste, Water and Wastewater (Figure 2) generate approximately 19% of corporate emissions. While there are

ongoing strategies in place to address the energy and emissions within these asset classes, Buildings and Fleet categories need to be prioritized due to their larger GHG reduction potential.

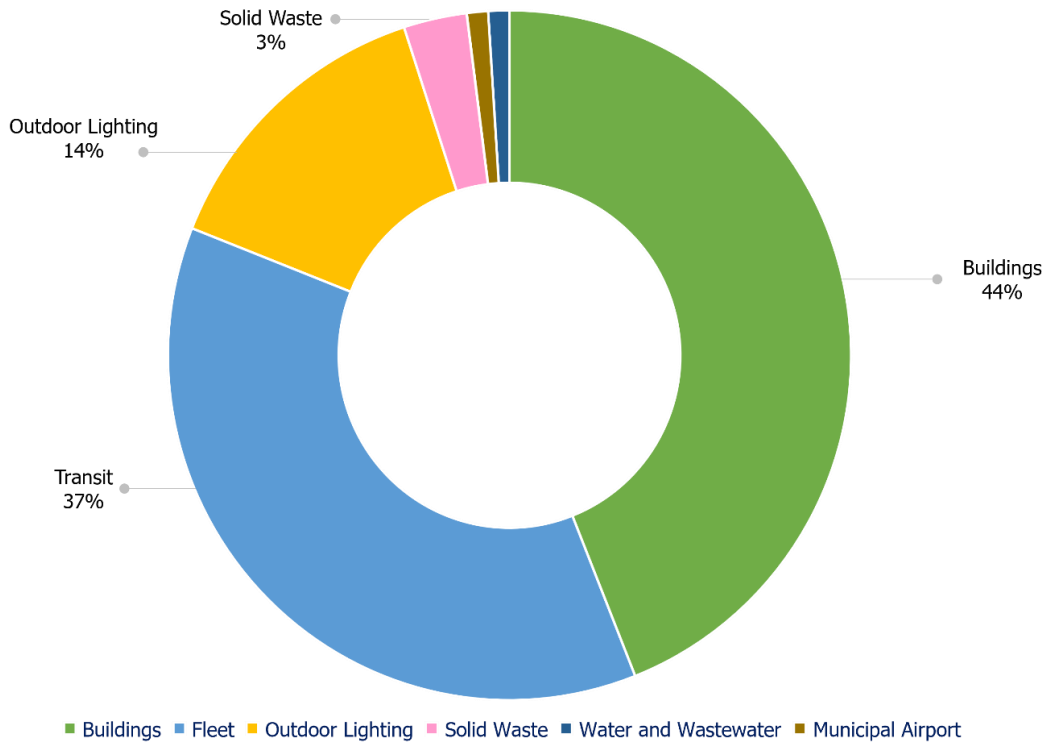


Figure 2 Corporate Emissions by Asset Class

Notes:

- Emissions from public transit, community-wide solid waste collection and transportation are considered Scope 3 emissions, therefore not included as a part of the reporting structure for CEEP.
- Public transit related emissions and its decarbonization strategy will be addressed in the Community Climate Action Plan (CCAP), currently being developed alongside other community-wide emissions.

Emissions Trajectory

If the City of Stratford took no corrective action in reducing its corporate emissions ('Business as Usual' or BAU scenario) while maintaining services to cater to anticipated population growth, it would see an average annual emission increase of 9% from 2017 to 2030. A suite of measures and actions contained within CEEP (Net-Zero Scenario) outlines a path to not only prevent this natural increase but reduce emissions by at least 30% by 2030 from 2017 levels, meeting the short-term target, on track to achieve near-zero emissions by 2050.

Tracking progress of CEEP and its 31 implementation strategies through key performance indicators (KPIs) will be integral to ensuring success. This will include annual monitoring of GHG emissions and financial planning to ensure resources for implementation are available.

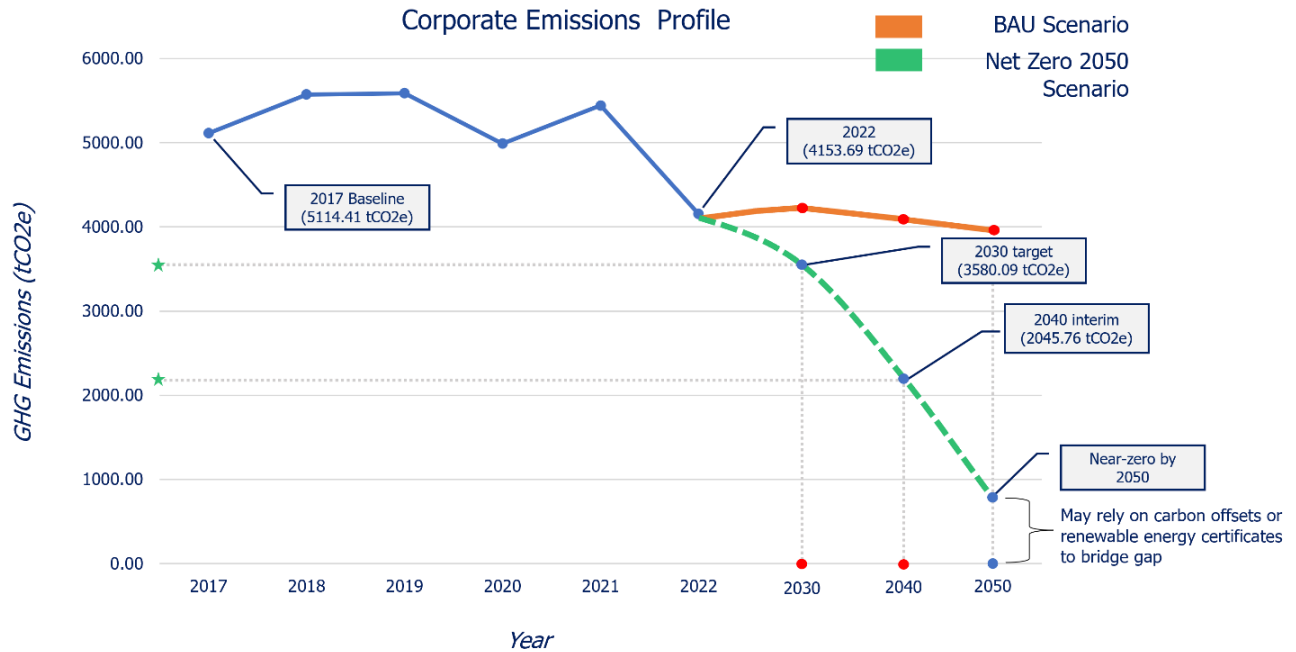


Figure 3 Impact of anticipated asset growth on the City's carbon footprint, from 2017 to 2030 and potential reductions needed to achieve climate targets.

Note: The above figure is a graphical representation of a low-carbon scenario and impact on emissions trajectory; it is not modelled to scale.

Buildings

Existing Facilities: It is anticipated that a large proportion of emissions reduction will be achieved through deep retrofits of existing facilities. In comparison to the other asset classes, technological advancements already exist to take significant action now. The ability to make immediate gains sets facilities as the primary focus of near-future climate initiatives.

Comprehensive energy audits will aid in analysing consumption patterns, identifying deficiencies in the building envelope and heating systems; and support recommendation of energy efficient upgrades relative to each facility and their emissions reduction potential.

New Builds: There is significant opportunity to integrate net-zero building strategies in any future new construction commissioned by the City. Incorporating such strategies

will support emission reduction and cost savings on utilities over the service life of the building, passing on the benefits to end-users.

Operational emissions generated as a result of new builds will be added to the overall corporate emissions. In order to mitigate this additional impact on the trajectory (Figure 3) it is paramount that any new construction is commissioned have net-zero or net-positive emissions.

Fleet and Equipment

The City's fleet is predominantly comprised of light-duty and medium-duty vehicles. In order to meet anticipated service level enhancements, the size of the corporate fleet is projected to increase between 3-5% over the next 10 years. The most prominent action to counterbalance the emissions growth related to the service level adjustment will be to switch from fossil fuels to electric power. Additional policy and Staff training measures have been identified for the fleet asset class to further reduce GHG emissions. These measures will be reviewed and updated periodically to ensure that the fleet roadmap remains in line with technological advancements in this sector.

To support widespread use of electric vehicles (EV) in municipal operations, EV charging infrastructure must be in place. Detailed analysis of the City's electrical system capacity at each facility must be conducted to understand feasibility and provide detail on infrastructure costs. It can also be used to determine where it may be possible to utilize 'shared use models' that integrate corporate electric charging needs with that of the community-at large to maximize benefits.

There will be a one-time cost associated with of the installation of major electrical infrastructure such as electric vehicle supply equipment (cost to be determined), however, the investment does need to be made upfront, with return on investment (ROI) expected over its service life.

Heavy-duty vehicles and off-road equipment also consume a considerable proportion of fossil fuel and decarbonization efforts for these assets will heavily rely on federal mandates, financial support, and technological advancements.

Due to the potential gains that can be made by Fleet, it will remain a primary focus of City initiatives. However, the significant limitations of decarbonizing larger vehicles and heavy equipment, the desired carbon reduction is not anticipated to be achieved until several years into the corporate plan implementation.

Achieving the 2030 Target

The 2030 target of 30% emissions reduction requires an emissions reduction of 1,535 tCO₂e. To advance efforts toward this goal, the focus should be on the largest emitters, both facilities and fleet.

Energy and emissions analysis of the City’s existing building stock has revealed opportunities for both energy and cost savings, and emissions reduction potential. Deep energy retrofits (an extensive overhaul of a building’s systems that can result in upper limit of 70 percent savings in energy costs, and resultant emissions), a proposed timeline of implementation, as well as budget implications have been identified in the Plan. Table 1 provides an excerpt from the internal buildings operational roadmap developed as a part of CEEP implementation. Preliminary analysis indicates a reasonable return on investment to the point that overall, several years additional upfront capital costs may be recovered.

Other facilities have been identified for future upgrades beyond 2030 and would be prioritized based on future energy audits.

Table 1 - Estimated Emissions Reduction from Buildings Roadmap (2023 – 2030)

Facility	2021 GHG emissions from NG use (tCO ₂ e)	GHG reduction expected through deep retrofits (tCO ₂ e)	Budget Implications (\$)	Proposed timeline	Cumulative emissions (tCO ₂ e)
Rotary Complex	441.11	264.66	\$5m-\$6m	2023-25	264.66
Burnside Agriplex Fieldhouse	210.05	126.03	\$1m - \$1.6m	2023-25	390.69
William Allman Arena	96.68	58.01	\$780,000-\$1.5m	2024	448.70
City Hall	106.84	64.10	\$1.5m-\$1.7m	2025	512. 80
Dufferin Arena	46.37	27.82	\$800,000-\$1m	2026	540.62
Public Works	62.44	37.47	\$600,000-\$1.2m	2027	578.09
Police Station	54.58	32.75	\$2m-\$2.75m	2026	610.84
Transit Office	47.93	28.76	\$500,000-\$800,000	2027	639.60
Public Library	43.99	26.39	\$1.5m-\$1.7m	2029	665.99
Annex Building	41.89	25.13	\$900,000-\$1.65m	2028	691.12
Airport Terminal	36.77	22.06	\$1.5m-\$1.75m	2029	713.18

Facility	2021 GHG emissions from NG use (tCO ₂ e)	GHG reduction expected through deep retrofits (tCO ₂ e)	Budget Implications (\$)	Proposed timeline	Cumulative emissions (tCO ₂ e)
Lions Pool	32.89	19.73	\$800,000-\$1m	2030	732.91

Avoided GHG emissions through deep retrofits by 2030 (60% reduction from baseline) = **732.91 tCO₂e**.

Tables 2, 3 and 4 provide a summary of the emissions reduction anticipated for Corporate Fleet, in accordance with the Fleet Replacement Schedule planned from 2023 – 2030.

Note that the following Fleet Replacement Schedule, would be subject to annual budget approval and CEEP implementation.

Table 2 - Light Duty Vehicles

Net GHG reduction expected by 2030 through replacement of conventional fossil fuel light-duty vehicles with low-carbon, or zero-emission options is approximately 400 tCO₂e.

Fleet type & Department	Vehicles (Units)	Full Capital Costs (for low-carbon option)	Planned Replacement Year	GHG Reduction Potential (tCO ₂ e)	GHG Emissions from hydro use (tCO ₂ e)
Public Works	11	\$1.01m-\$1.05m	2023-2030	64	22.96
Engineering	6	\$511,750-\$534,000	2023-2025	126.16	20.72
Community Services	19	\$2.4m-\$2.5m	2023-2028	169	48.72
Social Services	6	\$448,500-\$468,000	2023, 2026	49	15.12
Environmental Services	11	\$1.13m-\$1.18m	2023-2029	108	30.24
Buildings/Bylaw	3	\$138,000-\$144,000	2023, 2028	24	8.96
Clerks	1	\$51,750-\$54,000	2029	1.5	0.56

Table 3 - Medium Duty Vehicles (see note below)

For medium duty vehicles, net GHG reduction expected by 2030 is approximately 60 tCO₂e.

GHG emissions from hydro use based on assumptions is approximately 20 tCO₂e.

GHG reduction potential based on assumptions is approximately 70 tCO₂e.

Fleet type & Department	Vehicles (Units)	Full Capital Costs (for low-carbon option)	Planned Replacement Year
Community Services	12	\$756,700-\$789,600	2023-2028
Fire	1	\$32,200-\$33,600	2029
Public Works	8	\$365,500-\$372,000	2023-2030
Environmental Services/Water	2	\$172,500-\$180,000	2026, 2030

Table 4 - Heavy Duty Vehicles (see note below)

For heavy duty vehicles, net GHG reduction expected by 2030 is approximately 40 tCO₂e.

GHG emissions from hydro use based on assumptions is approximately 20 tCO₂e.

GHG reduction potential based on assumptions is approximately 40 tCO₂e.

Fleet type & Department	Vehicles (Units)	Full Capital Costs (for low-carbon option)	Planned Replacement Year
Public Works	17	\$8.51m-\$8.88m	2024-2029
Environmental Services	3	\$1.35m-\$1.41m	2024, 2025

Avoided emissions by 2030 through fleet upgrades = Approximately **500 tCO₂e**

Notes:

Decarbonization of medium and heavy-duty equipment is expected to rely heavily on financial support from senior levels of government (such as the 'Incentives for Medium-Duty and Heavy-Duty Zero-Emission Vehicles (iMHZEV) Program' offered by the federal government), innovation and technological advancements in low-carbon fuels and fuel-switching initiatives to align with provincial and federal mandates.

GHG emissions reduced by 2030 if decarbonization efforts are accelerated in the short-term for Buildings (732.91 tCO₂e) and Fleet (estimated 500 tCO₂e) will equate to

approximately 1,232.91 tCO₂e GHG emissions reduction. GHG emissions reduction from other asset classes may contribute approximately 80 – 100 tCO₂e toward the 2030 emissions reduction target.

Using the above estimates, total GHG emissions reduction by 2030 = Approximately 1,332.91 tCO₂e.

Calculated GHG emissions are 202.09 tCO₂e lower than 2030 emissions reduction target of 1,535 tCO₂e.

Aiming to close the gap between modelled emissions and our 2030 emissions reduction target warrants a proactive approach, deeper emission cuts, strategic financial planning and aggressive action toward decarbonizing all corporate asset classes.

Planning for the 2040 Target

Further, to align with a near-zero or low-carbon scenario, the interim target of 60% emissions reduction by 2040 requires an actual emissions reduction of approximately 3,069 tCO₂e and relies on further accelerated action. There is also a need to align long-term capital budget planning and consider the appropriate funds required to advance decarbonization strategies as outlined in the CEEP.

The CEEP has been developed as a living document that is subject to periodic updates based on our progress toward carbon reduction targets and updates to available innovations and technologies. Therefore, recommended strategies to achieve the 2040 target will be outlined in updates to CEEP and its roadmaps based on emissions reduction required at the time and availability of data.

Achieving Carbon Neutrality

The actions set out in this document outline how the City will be on track to achieve its GHG emissions reduction target of 30% relative to 2017 baseline by 2030, however, in order to push toward the ambitious aspirations of Council's climate emergency targets, the City will need to take more aggressive actions to reduce emissions, along with strategic financial planning to include pursuing funding opportunities to support implementation of these actions.

Within the next 2 – 5 years, the City will complete a fulsome analysis of all asset classes, including newly acquired assets which will help identify the biggest emitters and explore emissions reduction opportunities.

Recognizing that implementation of CEEP actions may not result in carbon neutrality or net-zero (due to gaps in technology or funding challenges) corporate emissions could potentially be balanced by exploring renewable energy sources (i.e., solar, geothermal, renewable natural gas), and investing in carbon offsets (i.e., land restoration or reforestation), as required to get to near-zero by 2050.

Monitoring and Reporting

Regular monitoring and reporting are an integral part of energy and emissions management. Tracking corporate energy consumption and GHG emissions can help assess progress, how energy is consumed and demonstrate the value of projects. Staff have initiated this process for 2022 and intend to bring forward an annual report to Council, outlining corporate energy consumption and emissions, with respect to climate action targets.

A comprehensive review of the CEEP 2023 implementation is anticipated to be undertaken every 3-5 years, to ensure that the City is on track to meet its goals. This review may include course correction if required, updating emissions reduction strategies as new technology allows and ensuring resources needed to implement these strategies are outlined in the next 10-year capital planning process. The supplementary roadmaps are anticipated to be updated more frequently, as they provide the operational specifics to make change.

Financial Implications:

Financial impact to current year operating budget:

There will be no financial impact in 2023 as a result of this report, should this Plan be approved and implemented

Financial impact on future year operating budget:

Decarbonization initiatives identified for corporate-owned asset classes come at a higher upfront cost, which will require increases to our reserve contributions for capital expenditures, than what was historically allocated to conventional fossil fuel options.

This increase to reserves will be identified by staff in subsequent reports along with options.

Referencing the facilities table in this report, and the recommended projects identified to assist the City in meeting their committed reduction targets it is expected that this will require Council commitment of additional capital investment in the form of deep retrofits using the mid-range for estimates of \$9.25 million in the 2024 budget and an additional \$9.75 million in the 5-6 years after that. Staff have reviewed the 10-year capital forecast, and these amounts are anticipated as over and above the amounts identified in the 10-year forecast.

It is anticipated that deep retrofits of facilities will greatly benefit from federal grants and the funding opportunities available, and as such these funds will supplement tax levy investments. However, waiting for grant opportunities or deferring planned projects until such grants become available will result in a much higher risk of not achieving the committed climate targets.

There may be some financial savings realized operationally but these will be offset entirely by carrying costs of the potential debt required to service these retrofits. More refined figures can come forward during 2024 budget, but the annual impact to carry debt of these amounts would translate into approximately \$1 million annually in 2024, increasing thereafter if debt financing is used for subsequent years. This is after factoring in any savings and will depend on interest rate environment to a degree.

This level of investment in retrofitting existing buildings is expected to translate into an estimated 60% reduction in building-generated emissions.

Referencing the fleet table, these figures are somewhat less daunting as some of the migration to hybrid and electrification has been part of the planning process, however it should be noted that the up-front costs still add to the existing budget allocation required and will also be further refined in the 2024 budget process. It is estimated that the costs are 15-20% higher than those currently captured in the fleet capital plan.

Savings realised through fuel switching from natural gas and diesel to other low carbon options, conforming to federal carbon pollution pricing, and through lower operational costs of assets over their life cycle are anticipated to provide offset in future years' operating budget and the effect of these, while smaller in the larger scheme of things may be more measurable in the shorter term.

Decarbonizing medium and heavy-duty fleet and equipment will also rely on funding from senior levels of governments and technological advancements that may become more available in years later in the commitment period.

Link to asset management plan and strategy:

The higher investment required to achieve the climate change initiatives results in higher replacement costs than are currently captured in the City's Asset Management Plan. Similarly, the future replacement costs therefore must also be planned at these higher costs, resulting in the requirement to increase future contributions to reserves and reliance on long-term debt if alternative funding sources cannot be secured. However, integrating a Climate Lens and aligning the Asset Management Plan with the Corporate Energy and Emissions Plan 2023 will enhance the City's resilience in the long-term while providing an opportunity to respond to climate change impacts through adaptation and mitigation strategies, in the context of sustainable service delivery.

Alignment with Strategic Priorities:

Strengthening our Plans, Strategies and Partnerships

Partnering with the community to make plans for our collective priorities in arts, culture, heritage and more. Communicating clearly with the public around our plans and activities.

Developing our Resources

Optimizing Stratford's physical assets and digital resources. Planning a sustainable future for Stratford's resources and environment.

Alignment with One Planet Principles:

Sustainable Water

Using water efficiently, protecting local water resources and reducing flooding and drought.

Material and Products

Using materials from sustainable sources and promoting products which help people reduce consumption.

Zero Waste

Reducing consumption, reusing and recycling to achieve zero waste and zero pollution.

Zero Carbon Energy

Making buildings and manufacturing energy efficient and supplying all energy with renewables.

Staff Recommendation: THAT the report titled "Corporate Energy and Emissions Plan (CEEP) 2023" (ITS23-026), be received for information;

THAT Staff be directed to:

- **Advance strategies in the CEEP 2023 that can be implemented within the existing staffing capacity and budget resources;**
- **Explore grant opportunities and develop a funding strategy for Council's consideration;**
- **Bring forward, as part of the annual budgeting process, funding requests for specific projects identified in the plan;**

THAT the interim target of reducing greenhouse gas emissions by 60% by 2040, be adopted;

AND THAT Staff report back on corporate GHG emissions monitoring on an annual basis.

Prepared by:

Recommended by:

Sadaf Ghalib, Climate Change Programs Manager

Taylor Crinklaw, Director of Infrastructure Services

Joan Thomson, Chief Administrative Officer