City of Peterborough

To:	**Members of the General Committee**
From:	**Blair Nelson, Commissioner, Infrastructure, Planning and Growth Management**
Meeting Date:	**April 7, 2025**
Report:	**Climate Change Action Plan 2.0 – Pathway to Net Zero 2050, Report IPGACP25-002**

Subject

A report to provide Council with the completed Climate Change Action Plan 2.0 – Pathway to Net Zero 2050 strategy to reduce community greenhouse gas emissions.

Recommendations

That the Council approves the recommendations outlined in Report IPGACP25-002, dated April 7, 2025, of the Commissioner of Infrastructure, Planning and Growth Management, as follows:

a) That Council receives the presentation by Sustainability Solutions Group outlining the Climate Change Action Plan 2.0 – Pathway to Net Zero 2050 findings.

b) That Council adopts the Climate Change Action Plan 2.0 – Pathway to Net Zero 2050 as the official community emission reduction strategy to achieve net zero by 2050 in Peterborough, thereby replacing the previous community Climate Change Action Plan endorsed by Council in 2016.

c) That staff be directed to pursue implementing the recommended actions assigned to the City to support community emission reduction subject to future budget approvals.

d) That staff be directed to explore opportunities to partner with external organizations to develop and implement the recommended actions, where applicable.

e) That, subject to future budget approvals, staff be directed to utilize the Climate Change Reserve and seek external funding from Provincial and Federal governments and utilities in support of the City's assigned actions to facilitate community emission reductions.

f) That staff be directed to engage with higher orders of government, utilities, and other responsible bodies for implementation of decarbonization measures and policies outside the authority of the City of Peterborough to enact.

g) That staff be directed to report annually on implementation progress of the Climate Change Action Plan 2.0 – Pathway to Net Zero 2050 as a dedicated section in the annual Community GHG Inventory Report to Council.

Executive Summary

- The Climate Change Action Plan 2.0 is now aligned with the Climate Emergency Declaration (2019) to reduce community greenhouse gas emissions to achieve net zero emissions by 2050.
- Three decarbonization scenarios were modelled that identified the emission reduction trajectory and estimated costs for realizing net zero.
- Project consultants conducted extensive research, computational modelling, and stakeholder engagement to develop seven Big Moves to decarbonize Peterborough.
- Big Move recommendations pertain to land use, buildings, energy production, transportation, industry, waste, and urban forestry.
- The Net Zero 2050 reduction pathway was determined to be the most optimal pathway to reduce community emissions and incur high net investment savings by 2050 when compared to the other decarbonization scenarios.
- The City will be responsible for investing in enabling infrastructure, the development of plans and policies as well as convening various working groups as recommended per Big Move to enable the community to achieve net zero.

Background

The Climate Change Action Plan 2.0 – Pathway to Net Zero 2050 (CCAP2.0) was initiated as a forward-thinking municipal plan to reduce greenhouse gas (GHG) emissions created in Peterborough over the next 25 years. Community climate plans are essential planning tools needed to guide decision-makers in selecting evidenced-based measures to mitigate pollution effectively. The City of Peterborough

demonstrated leadership in 2016 when, in partnership with the surrounding local governments, developed a Climate Change Action Plan (CCAP1.0) that laid the foundation for community mitigation. The CCAP1.0 was essential in the advancement of climate initiatives that introduced opportunities for community GHG abatement such as Green Economy Peterborough and a Solar Photovoltaic Community Map.

In 2019, City Council passed the Climate Emergency Declaration (CED) as a result of the overwhelming scientific evidence indicating that immediate mitigation action be taken to significantly curtail GHG emissions. The CED heightened community emission targets to align with science-based recommendations, with reductions from 2011 levels of 45 percent by 2030 and net zero by 2050. The CED also directed staff to add new mitigation actions and identify the budgetary implications of proposed measures. However, City staff determined that the CCAP1.0 mitigation measures were not sufficient to achieve the net zero target identified in the CED. As a direct result of this gap in mitigation measures, the CCAP2.0 was created to provide the pathway needed for community net zero decarbonization.

Goal of the CCAP2.0

The CCAP2.0 was designed to be a measure-based community plan that investigated the impact of policies and programs to foster the deployment of low-carbon buildings and mobility solutions to attain the CED mitigation targets. Project consultants from Sustainability Solutions Group (SSG), a leading Canadian GHG modelling and net zero planning organization, were retained to develop the CCAP2.0 to address the following project parameters:

- Oversee CCAP2.0 engagement to receive community and City input from a variety of stakeholders using several engagement tools and techniques to inform the selection of mitigation measures;
- Develop three GHG pathway reduction models to assess the interactive impact of various mitigation measures to reach net zero, specifically:
    - Net Zero 2050 Pathway (NZ50) – achieving the target by 2050,
    - Net Zero 2040 Pathway (NZ40) – achieving the target by 2040; and
    - Alternative Fuels Pathway (AF50) – achieving the target by 2050 with a combination of low-carbon hydrogen and renewable natural gas;
- Identify big decarbonization moves, key actions and supporting initiatives, and enabling measures with the associated GHG reduction potential per action;
- Calculate the estimated costs to be incurred by the City and the community-at-large to implement the measures by 2050; and
- Consider the co-benefits for each measure, key progress tracking indicators, implementation timelines, actors involved in implementation, and the role of the City.

Project Overview

The CCAP2.0 commenced in July 2023 and wrapped up in December 2024 with the following key tasks completed during the project:

- City shared current plans, policies, and documents to ensure that the CCAP2.0 aligned with existing corporate directives such as the Transportation Master Plan and Official Plan. Documents collected were used to inform the GHG modelling;
- Catalogue of Actions and Policies Report informed by a jurisdictional scan of other mid-sized municipalities' community climate change plans. The internal report identified several mitigation or enabling measures that might be applicable in Peterborough. The suggested actions were used as a jumping-off point for initial public engagement to accelerate discussions;
- Modelled the Business-as-Usual (BAU) and Business-as-Planned (BAP) GHG pathways to understand what the emission implications would be of each scenario by 2050. The BAU projected minimal intervention by the City or higher orders of government while the BAP charted existing City plans and programs as well as higher orders of government policies till 2050;
- Modelled the NZ40, NZ50, and AF50 scenarios with the identified actions from the Catalogue of Actions and Policies Report as well as stakeholder engagement output. Each scenario included its cumulative emissions, emission gap, relation to the Paris Agreement 1.5°C drawdown trend, and relation to net zero grid electrification;
- Financial and economic analysis was completed for each identified measure to determine the cost to the City and the community-at-large to implement each action. Marginal abatement costs were developed for each measure to identify the action's overall cost. A cost database was used to estimate costs to 2050 that included capital, maintenance, carbon pricing, and energy pricing assumptions (see Data, Methods, and Assumptions Manual in Appendix B for more details). Community economic and social equity co-benefits were also considered in the analysis;
- Implementation actions that described the role of the municipality that included supporting measures, timelines, actors, indicators, costs, and enabling supports were created for each Big Move action; and
- A final CCAP2.0 report with the following supporting documentation: Data, Methods, and Assumptions Manual, Engagement Summary of Findings and Recommendations, and Climate Action Plan Community Priorities – Phone Survey Report submitted by SSG.

A Pathway to Net Zero Community Emissions

The outcome of the CCAP2.0 was seven 'Big Moves' that addressed decarbonizing key community sectors to afford Peterborough the ability to realize its net zero goal. Within each Big Move, key actions and supporting measures are outlined (see Table 2). Co-

benefits such as health, economic prosperity, and social equity were characterized for each category to identify the additional positive impact of mitigation in Peterborough.

The Big Moves target the following areas:

- **Land Use**: transform urban design and land use to implement sustainable actions to achieve higher densification
- **Green Buildings**: built environment minimizing energy usage through swapping out fossil fuel energy sources for space heating and cooling, water heating
- **Energy Supply**: shift away from fossil fuels to renewable energy generation via local energy production
- **Sustainable Transportation**: public transit and active transportation are expanded with the use of electric and hydrogen vehicles for commuting as well as for freight and off-road vehicles
- **Industry**: reduce energy intensity of the sector
- **Waste**: accelerate waste diversion and incorporate circular economy principles into the waste sector
- **Forestry and Carbon Capture**: enhance urban forests and implement carbon capture strategies when feasible

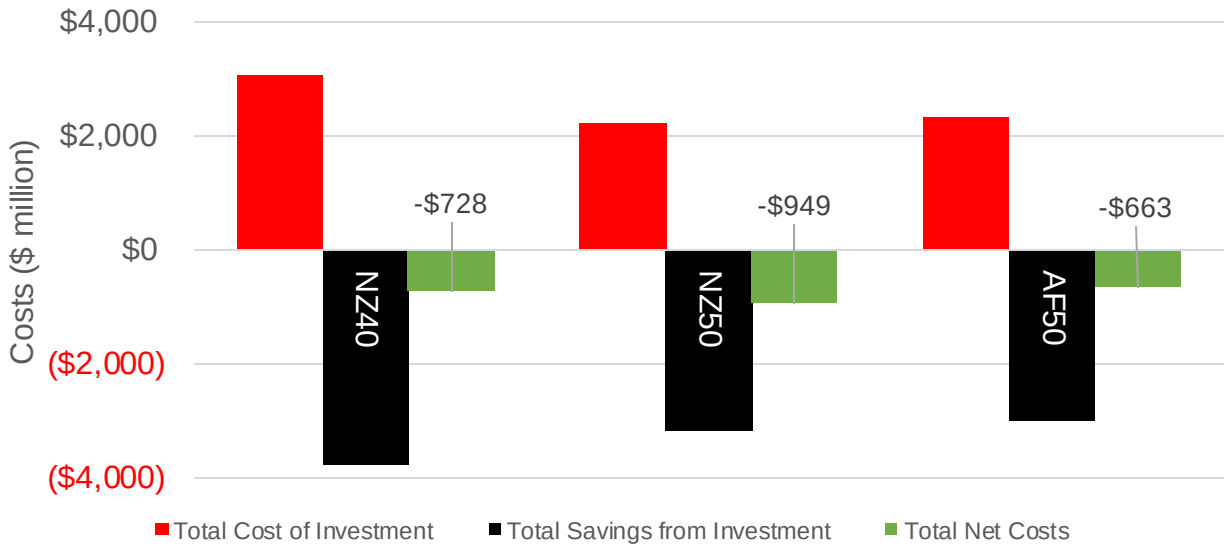
Community-at-large total costs and savings to implement the Big Moves actions by 2050 were calculated through modelling (Table 1). Five aggregate categories were modelled to track the financial performance of Big Move actions that included capital, energy, operation & maintenance, and carbon pricing expenditures, as well as revenue generation. Administrative costs for program implementation, required energy infrastructure upgrades, and avoided health and damages to property stemming from extreme weather were not included in the costs. Overall costs are primarily derived from private investment, but the City will be tasked with funding to implement programs and projects delineated in **Table 2**. Savings originate from energy reduction costs resulting from building efficiency upgrades or conversion to electric vehicles with lower-tiered overnight refuelling costs. Additionally, carbon pricing savings are associated with not paying the carbon levy by shifting to low-carbon energy sources. Revenue is created via renewable energy sales and transit fares.

Table 1. Total Financial and GHG Implications of NZ40, NZ50, and AF50 Pathways

Total	NZ40	NZ50	AF50
Total cost of investment ($ billion)	$3.06	$2.22	$2.35
Total savings from investment ($ billion)	-$3.79	-$3.17	-$3.01
Total net costs ($ billion)	**-$0.73**	**-$0.95**	**-$0.66**
Benefit rate (benefit/costs)	1.2	1.4	1.3
Marginal abatement costs ($/t$CO_2$e)	-$127	-$209	-$122
Total GHG emission reduction (tCO_2e)	**6,193,000**	**4,859,000**	**5,144,000**

The financial analysis revealed that the NZ50 pathway was the most cost-effective option with the lowest marginal abatement cost of -$209/tCO2e, meaning that for each metric ton of carbon dioxide equivalent (tCO2e) removed results in $209 in savings. Moreover, the NZ50 pathway is projected to have the best total net investment savings of all three pathways with an estimated total net investment saving of $949 million by 2050 (Figure 1). Total GHG emission reductions are less in the NZ50 than the other pathways due to the steady reduction in emissions as opposed to the more rapid decarbonization in NZ40 which imparts more community carbon savings by 2050. Alternatively, AF50 reduces more pollution than NZ50 but is costlier due to the current high price of hydrogen and renewable natural gas to offset electricity for space heating and transportation fuel. As a result, SSG recommends that the City pursue actions aligned with NZ50, especially targeting Big Moves relating to Green Buildings and Sustainable Transportation as the means to achieve success.

Figure 1. Total Net Costs of Investments by 2050



To facilitate the community reaching its net zero target, the City will need to make investments through capital projects and policy development over the near term to stimulate community-scale decarbonization. The financial implications for the City by 2030 are presented in **Table 2**. The analysis revealed the estimated cost to the City is $20.5 million with $16 million of that projected total attributed to recapitalizing and expanding the scope of the Home Energy Efficiency Program (HEEP) beyond its current 2029 program end date[1]. In addition to capital projects, the City is tasked with collaborating with external parties to support capacity building such as bolstering the skilled trades locally to accelerate the greening of buildings and transportation.

[1] City staff will seek to leverage provincial or federal funding support to reduce the overall financial burden of the HEEP on the City

Furthermore, the City will need to convene businesses together to chart a pathway forward over the next 25 years to decarbonize trucking, commercial vehicle fleets, construction equipment, and heavy industrial emitters. Lastly, fully implementing existing City plans such as the Transportation Master Plan will enable the community to realize its mode share targets.

The remaining total cost of investments and subsequent savings will be borne by residents or businesses in Peterborough over the following 25 years. The total net savings projected in NZ50 will begin to be realized by 2046 after sustained capital expenditures are made throughout the community. Energy savings through shifting to low-polluting energy sources will be the primary avenue for residents and businesses to recoup their investments. Even if the carbon pricing framework is revoked, paused, or capped at a price other than $\$170/tCO_2e$, net savings will still occur before 2050. Moreover, the co-benefits of local decarbonization, which are not fully accounted for in NZ50 financial projections, among others will improve the health of residents and lower the burden on the health care system through the reduction of pollution. Lastly, even without considering the damaging effects of climate change, implementing energy efficiency and pollution control measures would still provide overall savings and benefits to residents.

Next Steps

The City will review the proposed key Big Move actions and supporting measures to determine which areas the City should proceed with as a first course of action. Upon selection, the City will develop comprehensive work plans to actualize the measures. Actions and supporting measures that require approval through the annual budgeting process will be proposed commencing with Budget 2026. Other measures that can be accommodated within existing budgets will be moved forward accordingly.

Several actions require the City to convene task forces of organizations and businesses to establish the groundwork and create connections before meaningful decarbonization can begin in Peterborough. Specifically, supporting the transition of local businesses in becoming low-carbon enterprises is integral to the success of the CCAP2.0.

The City will seek assistance from higher orders of governments for financial support to fund the transition locally. In areas outside the purview of the City to enact mitigation measures community-wide, the City will advocate to higher orders of government to make the necessary policy amendments to realize the changes in Peterborough.

The CCAP2.0 actions will provide City staff with direction to develop the required policy environment in Peterborough over the next few years. By 2030, a CCAP3.0 will need to be created that identifies current gaps and opportunities to decarbonize community assets, maintaining the net zero target.

The following table is a summation of the Big Move sections commencing on pages 88 to 208 in the CCAP2.0, located in Appendix A. For additional detail per Big Move, the page reference has been provided.

Table 2. Proposed City Actions to Decarbonize Community by 2050

Big Move	Theme	Estimated Total NZ50 GHG Reduction (tCO_2e)	Proposed Key City Actions to Enable Community GHG Reductions	Proposed Key Supporting Action	Estimated Capital Costs to the City‡	Actors Involved	CCAP2.0 Page Reference
Land Use	Low-carbon zones and eco-districts	Not quantified	Secondary Plan for Strategic Growth Areas	Green Development Standard	To be determined	City, developers, community members	88
	Urban densification	18,000	Parking and Land-use Studies	N/A	$200,000	City	94
Green Buildings	Increase Energy Efficiency	2,467,000	Design Voluntary Green Development Standard	Market Readiness Study	$400,000	City, developers, community members	112
	Switch to Clean Fuels	525,000	Expand the Home Energy Efficiency Program Offering	Market Analysis Study	$200,000	City, financial institutions, business assc., FCM	114

Big Move	Theme	Estimated Total NZ50 GHG Reduction (tCO_2e)	Proposed Key City Actions to Enable Community GHG Reductions	Proposed Key Supporting Action	Estimated Capital Costs to the City‡	Actors Involved	CCAP2.0 Page Reference
			Local Green Trades Capacity Building	N/A	To be determined	City, trade schools, developers, community members	116
Energy Supply	Community Scale Solar Generation	45,000	Solar Adoption Outreach Task Force	Engagement Strategy	$20,000	City, PUI, CoPHI, H1, solar suppliers, solar co-operatives,	130
	Building On-Site Solar Generation	261,000	Municipal Facilities Solar Generation	Feasibility Study for Ground Mounted Solar Array	$3,350,000	City, PUI, solar suppliers	131
Sustainable Transportation	Commercial Fleet Fuel Switching	776,000	Freight & Commercial Fleet Task Force	Commercial Fleet Vehicle Mitigation Strategy	$100,000	City, GEP, Chamber of Commerce, industrial assc.	159
	Off-road Vehicle Emissions	255,000	Engage Contractors to Reduce Off-road Emissions	Low Emission Construction Equipment Procurement Policy	$20,000	City, developers, builders	161

Big Move	Theme	Estimated Total NZ50 GHG Reduction (tCO_2e)	Proposed Key City Actions to Enable Community GHG Reductions	Proposed Key Supporting Action	Estimated Capital Costs to the City‡	Actors Involved	CCAP2.0 Page Reference
	Private Vehicle Fuel Switching	39,000	Electro-mobility Strategy	N/A	$100,000	City	162
	Existing City Transportation Plans and Studies below						
	Increase Active Transport	6,000	Implement the Transportation Master Plan	-	-	City	145
	Increase Public Transit Mode Share	11,000	Implement the Transportation Master Plan	-	-	City	140
	Public Transit Fuel Switching	112,000	Implement the Alternative Fuel Study for Transit Vehicles	-	-	City	142
Industry	Increase Industrial Efficiency	263,000	Industrial Sector Energy Efficiency Working Group	Industry Energy Efficiency Challenge	To be determined	City, GEP, Chamber of Commerce, industry assc., academic institutions	175
Waste	Waste Prevention & Diversion	59,000	Business Composting Collection	Business Composting Working Group	To be determined	City, waste management operator, business assc. businesses	189

Big Move	Theme	Estimated Total NZ50 GHG Reduction (tCO_2e)	Proposed Key City Actions to Enable Community GHG Reductions	Proposed Key Supporting Action	Estimated Capital Costs to the City‡	Actors Involved	CCAP2.0 Page Reference
			Multi-unit Residential Buildings (MURB) Composting Collection	MURB Composting Working Group	To be determined	City, waste management operator, MURB property owners	190
			Waste Management Outreach & Education	Zero Waste Business Challenge	$25,000	City	192
Forestry & Carbon Capture	Increasing Urban Forest	19,000	Establish Annual Equity-based Tree Planting Targets	N/A	To be determined	City, property owners	206
			Green Infrastructure Guide for Development	N/A	$25,000	City, developers	207
			Urban Forestry Outreach Planting Program	N/A	$50,000	City, community members	208

‡ City staffing capacity not included

⍰ The City will seek to pursue external funding opportunities to recapitalize and expand the HEEP services which are estimated to cost $16 million

Strategic Plan

Strategic Pillar: Community & Well-being

Strategic Priority: Demonstrate strong leadership in environmental stewardship by proactively addressing issues and challenges of climate change and the environment.

Approval of this report links to the City's strategic priority pillar of Community and Wellbeing through the eventual implementation of the new CCAP2.0 that ensures that Peterborough will be able to realize net zero GHG emissions by 2050.

Engagement and Consultation

Community engagement was key to the development of the CCAP2.0 which provided critical input to creating decarbonization actions. Engagement commenced in August 2023, with SSG completing pre-engagement activities to identify stakeholders to consult and be involved in the development of the project. Numerous local stakeholders from several sectors, such as non-profits, businesses, equity-denied groups, utilities, public health, and community organizations, were interviewed by SSG to create a foundational understanding of Peterborough's unique community needs in relation to climate action. Pre-engagement allowed SSG to determine if there were any issues with the planned engagement approach, if any key stakeholders were not identified that could be contacted, and the most important aspects that the CCAP2.0 should consider. As well, the City also initiated contact with Curve Lake First Nation and Hiawatha First Nation via the Mayor's Office during the pre-engagement phase. However, the City did not receive a response for participation from either First Nation.

SSG created an Engagement Plan informed by the pre-engagement interviews which detailed the strategy of how engagement would be conducted for the duration of the project. The Engagement Plan included several activities to capture community and stakeholder perspectives to support the refinement of the GHG abatement measures. The International Association of Public Participation guidelines were embedded in the Engagement Plan to ensure that stakeholders had the opportunity to be involved in influencing project decision-making.

In addition to community stakeholders, SSG met with several City staff from Asset Management & Capital Planning's Transportation Planning and Climate Change sections and Planning, Development & Urban Design to ensure that the proposed climate actions complemented existing City plans and policies. Staff were involved throughout the project by participating in stakeholder meetings and reviewing project documents to provide a municipal lens to the CCAP2.0 development process. Additional

City staff from Building Services, Permit Services, Water Resource Systems, Urban Forestry, Waste Diversion, and Peterborough Utilities Inc. also reviewed and commented on the recommended CCAP2.0 implementation actions.

The following engagement activities were completed by SSG and City staff during the engagement phase of the CCAP2.0:

- A Connect Peterborough CCAP2.0 project page was developed and published in November 2023. The page was the landing site for residents to learn more about the project. The site contained background information about the CCAP2.0, climate change, interactive polling, open forums for participants to upload responses, and the project timeline. The project page received 579 views in total.

- A community questionnaire embedded in the Connect Peterborough CCAP2.0 project page collected input from 68 individuals from November 2023 to February 2024. The results were not statistically representative due to individual self-selection. The feedback was used in concert with other engagement activities to determine potential community mitigation actions.

- In November, City staff spoke to the Youth Leadership in Sustainability class to discuss the goal of the CCAP2.0 and how community climate action planning is critical to lowering GHG emissions.

- In December, a community phone survey was conducted by Environics Analytics to gather feedback from a statistically representative sample of residents to reflect the population distribution in Peterborough. The landline and cell phone survey captured 500 responses in total from December 8 to 18 with a margin of error of ± 4.4 percentage points at the 95% confidence level. SSG used the resident input to frame potential climate action measures that reflected the general population's perspectives on climate action measures. The phone survey results are located in Appendix D – Climate Action Plan Community Priorities: Phone Survey Report.

- The first Community Working Group (CWG) out of three sessions was held in December. The CWG was composed of multisectoral stakeholders, Peterborough Environmental Advisory Committee members, and City staff identified during the pre-engagement phase. SSG presented the completed community GHG scenario models of the Business-as-Usual and Business-as-Planned scenarios to the CWG. Virtual breakout sessions allowed working group members to interact and discuss what mitigation actions would need to be considered to decarbonize across community sectors. The CWG output was collected by SSG and used to inform the next phase of the CCAP2.0.

- In January 2024, City staff presented to sustainability students at Trent University about how community climate action planning is conducted. Details about the CCAP2.0 project were provided and feedback was gathered from students.

- In February, an equity-deserving focus group composed of advocacy and community-benefit organizations was convened by SSG. The focus group sought to address how the CCAP2.0 could incorporate measures to improve the outcomes for disadvantaged community members when it comes to mitigating GHG emissions. The input captured was used to identify supporting implementation measures that actively addressed equity climate solutions.

- The second CWG was hosted in person in February and presented the jurisdictional scan of municipal abatement measures and preliminary GHG scenario modelling. Breakout group roundtables were set up that focused on specific topics with working group members providing critical input. The CWG helped select new mitigation actions to achieve net zero that best fit the Peterborough context.

- City staff submitted Report IPGACP24-003 Climate Change Action Plan 2.0 Update in April to provide Council with chronicled project activities from July 2023 to February 2024.

- In May, the last CWG was a hybrid session in which SSG presented the final GHG modelling and preliminary implementation actions. Breakout groups were formed to receive feedback that SSG captured that was incorporated into the CCAP2.0.

- In June, an expanded cadre of City staff from multiple sections reviewed the proposed implementation actions and provided comments to align the measures with existing plans and policies. Some targets and mitigation actions were right-sized to fit the local context after staff recommendations. The implementation actions were used in the final version of the CCAP2.0.

- In June, SSG presented the CCAP2.0 project findings and actions to the Peterborough Environmental Advisory Committee.

- In November, SSG presented the completed final report to the Senior Leadership Team for final feedback.

A full list of engagement activity outcomes during the development of the CCAP2.0 is presented in Appendix C – Engagement Summary of Findings and Recommendations.

Budget and Financial Implications

At present, there are no budgetary or financial implications associated with the recommendations. However, to fulfill the responsibilities identified by SSG to enable the community to reach net zero, multiple projects and initiatives will need to be developed that will have a financial impact on the City. The majority of City investments in community mitigation will require the completion of various studies, projects, and policies that will be included in the annual budget for Council consideration as the work plan advances.

The projected Council investments for community climate action include $1.14 million for identified studies, $3.35 million for municipal solar PV installation, and $16 million for the recapitalization and expansion of services for the Home Energy Efficiency Program. Additional investments in alternative fuels for the transit fleet would also be necessary but were outside the scope of this analysis. The forthcoming Alternative Fuels Study will identify actions and investment required to decarbonize transit fleets. The City will strive to access external funding opportunities to support as many projects as possible to decrease the estimated $20.5 million financial burden to the City, especially seeking funding for the Home Energy Efficiency Program and on-site solar PV generation.

Attachments

Appendix A: Climate Change Action Plan 2.0 – Pathway to Net Zero 2050

Appendix B: Data, Methods, and Assumptions Manual

Appendix C: Engagement Summary of Findings and Recommendations

Appendix D: Climate Action Plan Community Priorities – Phone Survey Report

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