



COUNCIL REPORT

Report Date: November 13, 2023
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Meeting Date: December 5, 2023
[Submit comments to Council](#)

TO: Vancouver City Council

FROM: General Manager of Planning, Urban Design and Sustainability
General Manager of Finance, Risk and Supply Chain Management

SUBJECT: 2024 Climate Budget

Recommendations

- A. THAT Council receive the following Climate Budget report for information regarding the City's 2024 climate investments, expenditures and future investment needs, and direct staff to continue improving processes and reporting, aligning with best practices.
- B. THAT Council direct staff to continue seeking new revenue and senior government funding opportunities, and to prioritize the use of regulations and policies and pursue more cost-effective approaches in order to advance the climate work, as part of the updated Climate Emergency Action Plan and Climate Change Adaptation Strategy

Purpose and Executive Summary

Council directed staff in February 2023 to report back on climate-related investments. This report introduces a Climate Budget approach for the City of Vancouver for both climate mitigation and adaptation. The climate budget defines which items in the overall City budget are climate actions, and provides improved clarity for decision-makers and the public by consolidating information on climate-related budget investments and outcomes.

The 2024 Capital and Operating Budgets include \$63.5 million of Climate Priority capital investments and operating expenditures. The capital component (\$38.7M) represents 11% of the 2024 Capital Budget, and includes a variety of active transportation projects, EV charger deployment, park and street tree planting, and green infrastructure. The operating component (\$24.8M) represents 1% of the 2024 Operating Budget, and includes staffing costs across departments working specifically on climate initiatives.

This report includes projected investment needs to achieve the City's climate mitigation targets. Climate Emergency Action Plan investment need for 2024-2026 is estimated at approximately \$215M over 3 years. This results in a current "climate investment deficit" of \$97M, taking into account available funding over those three years. The opportunities to reduce the gap include prioritizing regulatory/advocacy tools, optimizing project delivery at a lower cost, advocating for funding from senior government and partners, and continuing to prioritize Climate Emergency Action Plan and Climate Change Adaptation Strategy investment needs in upcoming financial planning processes.

Staff have conducted a scan of cost of inaction research from other jurisdictions that showed investing in climate action now can lead to significant avoided costs in the future. Staff also conducted a scan of emerging best practices. There is currently no standardized approach for climate budgeting amongst local governments; however our approach aligns well with common themes and elements that are emerging. This report indicates next steps for enhancing future Climate Budgets to best inform Council decision-making, as we work with other municipalities to further develop Canadian local government guidance and best practices.

Council Authority/Previous Decisions

- On February 15, 2023, Council [directed staff](#) to report back with a restatement of Vancouver's current and anticipated spending on climate mitigation and adaptation, as well as benefits and avoided costs from climate action.
- On October 22, 2020, Council approved the [Climate Emergency Action Plan](#) ("CEAP"), which included a Financial Framework to achieve the City's climate mitigation targets.
- On November 6, 2018, Council approved the [Climate Change Adaptation Strategy](#) ("CCAS") containing priority actions to prepare Vancouver for current and future climate impacts.

City Manager's Comments

The City Manager concurs with the foregoing recommendations.

Context and Background

Two action plans govern the City of Vancouver's climate initiatives: the Climate Emergency Action Plan (CEAP), which is aimed at reducing community-wide carbon emissions (referred to as "mitigation"); and the Climate Change Adaptation Strategy (CCAS), which is focused on reducing the local risk and impacts of climate change (referred to as "adaptation"). See [Appendix A](#) for further definitions. These govern the work that comprises [City Council's Strategic Objective #6: Climate Emergency](#).

The City has a 4-year Capital Plan that establishes the overall strategy for the capital investment priorities within the financial capacity. The Capital Plan informs the City's short-term service and financial planning, striking a strategic balance with the City's need to maintain critical assets in an appropriate state of repair, enhance its network of infrastructure and amenities to support growth and economic development, and advance Council, Board and community priorities within the City's financial capacity. The Capital Budget provides Council authority to proceed with specific capital projects and programs and defines both Multi-Year Capital Project Budget and Annual Capital Expenditure Budget. The operating budget focusses

on delivery of important city services that residents rely upon daily. These planning processes are based on a set of financial sustainability principles and help guide the allocation of resources for operating and capital initiatives.

Council receives climate and financial information through various reports at different times of the year (see [Appendix B](#) for a schedule of climate-related reports). This report provides a consolidated climate budget: an evolving best-practice that the City along with other municipalities are increasingly delivering.

A climate budget is intended to provide improved clarity for Councils and the public by consolidating information on climate-related investments and outcomes. Vancouver's annual Climate Budget will include current climate-related investments in the Capital and Operating Budgets, prioritization criteria, as well as projected future needs in order to achieve the City's climate targets. The aim is to improve decision-making around investment, prioritization, and implementation by providing more fulsome and consistent information.

Best Practices Scan

Many cities in Canada and abroad are pursuing their own climate budget approaches, including Edmonton, Toronto, Montreal and others (See [Appendix C](#)). There is currently no standardized approach for climate budgeting. Most cities are focusing their climate budgeting efforts on identifying climate-related budget items, quantifying the current spend, and applying a basic prioritization framework. Common challenges include difficulty estimating the impact (e.g., carbon emission reductions) at the individual project level and consistently defining which projects are considered climate actions. The City is participating in the development of emerging Canadian local government guidance with other cities (see [Next Steps](#)).

An element of emerging best practices is using the potential costs of climate inaction and benefits of timely action to help prioritize climate work. There is a growing body of evidence showing that investing in climate action now can lead to significant avoided costs in the future. A Vancouver-specific study on total cost of inaction would require significant resources and may be undertaken in future. In the meantime, staff reviewed a number of reports from other cities, the federal government and other organizations as part of this report.

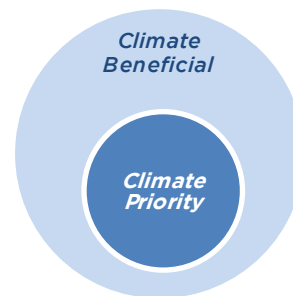
In terms of climate adaptation, low-income households in Canada could see a 23% loss in income by end-of-century, as economy-wide resources are diverted to recover from climate-related damage. Meanwhile, Canada's National Adaptation Strategy found that every dollar invested in early adaptation measures accrues \$13-15 in total benefits. Action on climate mitigation also showed significant benefits: \$850M in estimated annual savings for Vancouver households in 2030, in a scenario where all CEAP and provincial CleanBC actions are fully implemented, and \$215M in avoided carbon tax for Vancouver residents in 2030, in a scenario where all CEAP targets are achieved. See [Appendix C](#) for more findings.

Discussion

What is a “Climate Action”?

To identify the current level of investment in climate mitigation and adaptation, staff developed criteria to determine which projects and activities are included in the Climate Budget. This categorization is a foundational practice in all climate budgets. For a budget item to be tagged as “Climate Priority” and included in the Climate Budget, the majority of the investment must fund an initiative that meets these three criteria:

1. materially reduces carbon emissions and/or improves adaptation or resilience to climate impacts
2. exceeds compliance with existing regulations, requirements or core service/business-as-usual practice
3. is governed by CEAP and/or CCAS



Programs with climate benefits that are intended to meet regulatory requirements are tagged “Climate Beneficial”. These are reported separately to provide context, and represent material investments, but do not count towards Climate Budget totals. This is to focus tracking and prioritization on the investments projected to move us beyond business-as-usual practice and closer to our climate mitigation and adaptation goals. Also, items that do not have material climate benefits are excluded from the Climate Budget. Selected investment examples are shown below (see [Appendix D](#) for more discussion).

Table 1- Examples of Climate Priority and Climate Beneficial Investments

CLIMATE PRIORITY	CLIMATE BENEFICIAL
<ul style="list-style-type: none"> • Zero-emission buildings regulation development • Active transportation planning and implementation • EV-charging infrastructure • Initiatives that adapt Vancouver’s shoreline to projected sea level rise • Street tree planting and green infrastructure that results in less rainwater runoff, heat reduction, air quality or carbon sequestration benefit • Resilience programs to build neighbourhood capacity for extreme heat 	<ul style="list-style-type: none"> • Capital infrastructure required under regulation (e.g., combined-sewer separation, landfill gas capture system) • Rebuilds of City facilities with climate benefits where associated incremental costs cannot be split out

Prioritization of Climate Action

Climate initiatives are prioritized as part of the development and updating of CEAP and CCAS. Further prioritization of projects is done as part of the 4-year Capital Plan and Annual Budget processes (see [Appendix E](#) for more information). Staff use the following criteria:

- **Impact:** reductions in carbon emissions or risk from different climate hazards.
- **Cost to the City:** investment actions (e.g., heat pump incentives, active transportation infrastructure) tend to be relatively expensive, whereas regulation (e.g., building code requirements) are relatively low-cost for the City.

- **Alignment/Co-Benefits:** aligning with senior government priorities increases opportunities to leverage City investment; co-benefit examples include resident cost savings, reduced health impacts from air pollution, etc.
- **Equity:** the extent to which an action prioritizes equity-denied populations and/or allocates costs between populations based on their capacity to pay.

Current Investments and Future Needs

Climate Investments in 2024 Draft Annual Budget

Table 2 – 2024 Climate Budget

The 2024 Draft Annual Budget contains **\$63.5 million** of Climate Priority investments. See [Appendix F](#) for additional information.

	Capital	Operating	\$M
CEAP	\$25.0	-	-
CCAS	\$11.7	-	-
BOTH	\$1.9	\$24.8	
TOTAL	\$38.7	\$24.8	

In addition to these investments, staff resources are focussed on delivering existing approved multi-year project budgets, with project delivery expected in 2024 and beyond.

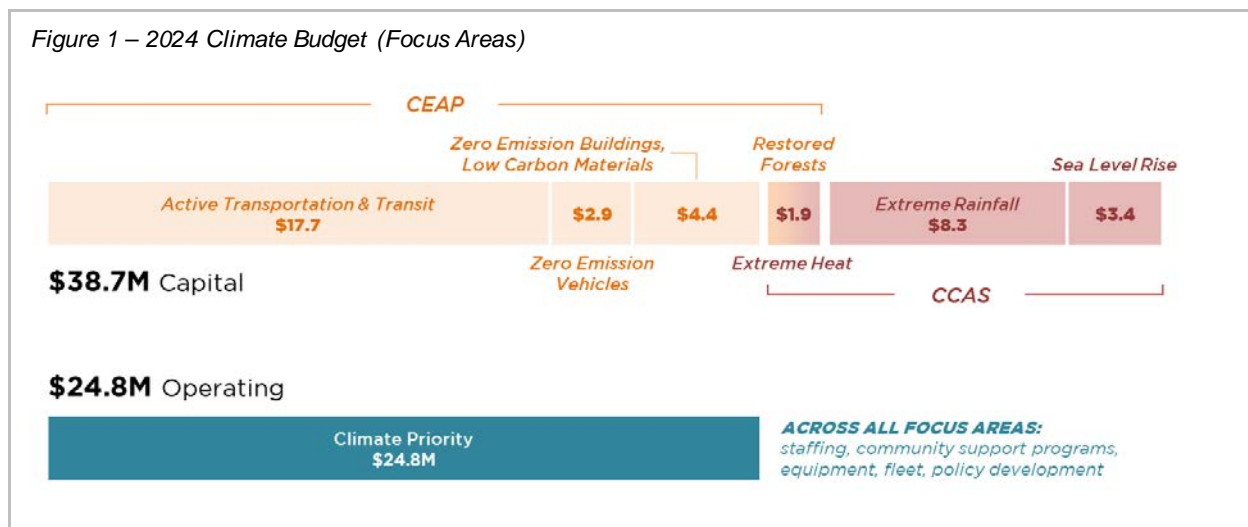
Within the \$38.7M capital portion (representing 11% of the total 2024 Draft Capital Budget), examples of Climate Priority investments include:

- \$10M for a variety of active transportation projects (Beatty St, Drake St, Portside Greenway)
- \$2.8M for EV charger deployment in the public-realm and in private rental buildings
- \$1.9M for planting park and street trees
- \$6.7M for green infrastructure planning, design and deployment

The \$24.8M operating portion (representing 1% of the total 2024 Draft Operating Budget) is largely made up of staffing costs across departments working on climate initiatives. Other examples of Climate Priority expenditures include community support programs for extreme heat; NEU and Park Board equipment and fleet; public bike-share operation; and staff developing policy and standards for priorities like zero-emission buildings.

Figure 1 breaks down the capital portion by focus area (see [Appendix A](#) for a list of CEAP “Big Moves” and CCAS hazards). Areas with more Infrastructure projects will require more investment compared to ones where regulations are the main City interventions; however, initiatives to support market/community readiness for adopting regulation would still require some investment. The operating portion supports operational expenses and includes staff resources working on all climate mitigation and adaptation focus areas.

The Climate Budget is funded from a variety of sources (e.g., development contributions, external partnership, property tax, utility/user fees, etc.). See [Appendix F](#) for more details.



Future Investment Needs (2024-2025)

Current investment levels are not sufficient to fund all of the climate priority projects to achieve CEAP and CCAS objectives. Initiatives shown below are the next-tier priority investments to be considered, and will be brought forward when additional funding becomes available, either through senior-government or other funding, or through City financial planning processes

Table 3 – Next-Tier Priority Climate Initiatives

Initiative	\$M	Budget
CEAP	Active Mobility Plan: Melville Route and Victoria-Central Valley Greenway Improvements	\$4.1 Capital
	Medium and heavy duty truck retrofit pilot	\$0.5 Capital
	Expanded work on transit priority corridors (bus lanes, etc.) (TransLink funding leverage)	\$0.4 Operating
CCAS	Social policy capital grants for resilient retrofits	\$3.0 Capital
	Impervious surface reduction pilot projects	\$2.0 Capital
	Heat pump retrofit of Kerrisdale Library	\$1.0 Capital
	Community resilience to extreme heat	\$0.5 Operating
	Coastal Asset Management inventory resilience guidelines (seawall)	\$0.5 Capital

The original CEAP report in 2020 estimated that \$500M in investments would be needed over five years (2021-2025) to achieve the target of reducing emissions by 50% by 2030. To date, investments have fallen short of that objective, though there has been meaningful increases in funding in certain areas (building retrofits for example). This CEAP future-needs estimate has also been helpful in leveraging senior funding for climate work.

Staff have prepared an updated estimate for CEAP investment need for 2024-2026 of approximately \$215M over 3 years. This results in a current “climate investment deficit” of \$97M, taking into account remaining Capital Plan allocations available and anticipated revenue over those three years (see [Appendix G](#) for further detail). This estimate was revised wherever CEAP actions have changed in scope or been removed from the plan. Revenue and cost assumptions, as well as cost of inflation, were reviewed and incorporated.

The CCAS does not currently have targets to base estimates for future investment needs. Staff will prepare a 2026-2030 investment estimate for both CEAP and CCAS, when both are updated in late-2025. This information can be used to inform the 2027-2030 capital plan.

Opportunities to Reduce Gaps between Current Investments and Future Needs

In 2025, one of the objectives in the future CEAP/CCAP updates will be to reduce the gap between our business-as-usual (Current Investments) and the level of investment needed to reach our climate targets (Future Needs). Opportunities to reduce the gap include:

- Prioritizing regulatory/advocacy tools over financial incentives/infrastructure investments
- Optimizing project delivery to achieve comparable climate outcomes at lower cost
- Advocating for and pursuing more sustained funding opportunities from senior government and partners, and exploring new sources of City revenue (in particular those that encourage choices aligned with CEAP and CCAS objectives) to fund new actions or expansion of existing ones to move further towards climate objectives¹
- Considering CEAP and CCAS priorities in the Mid-Term Capital Plan Update, the development of the next Capital Plan, and when allocating new revenue sources (such as the Growing Communities Fund)

Next Steps

Climate budgets are a new and evolving area of work. Staff anticipate ongoing improvements in the quality of information and how it is presented to Council and the public. Future Climate Budget reports will include updates on this progress and future directions for improvements. In particular, the City is an active participant the development of emerging local government guidance through the Net Zero Action Research Partnership (N-ZAP) Climate Budget Toolkit project by ICLEI Canada, University of Waterloo, and the Federation of Canadian Municipalities. Expected in 2024, City staff will use this guidance to inform future Climate Budgets.

Financial Implications

There are no financial implications for this report. This report outlines the current climate initiatives underway as well as future investment needs. There is a climate investment deficit of \$97M for the next three years. Staff will continue prioritize regulatory or advocacy tools over financial incentives or infrastructure investments, optimize project delivery, advocate for and pursuing more sustained funding opportunities and continue to prioritise climate initiatives within the capital planning processes.

Legal Implications

There are no legal implications associated with the recommendations in this report.

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¹ When received, external funding is added to the 4-year Capital Plan either as a net-new funding (if scope of work is new), or folded in to replace existing City funding (if scope of work already exists).

APPENDIX A Climate Definitions

Table 4- Definitions of Climate Terminology

<i>climate budget</i>	A system to enable the City to progress towards its climate goals by providing the information and structure necessary for decision-making about how to invest in the appropriate and highest-priority climate actions. It is a framework of governance structures, common terms, tools, processes, analyses and outputs. The aim is to consistently provide decision-useful spend and outcome information, embed climate considerations into financial processes, and enable decision-making at all levels.																			
<i>carbon budget</i>	A climate science and global equity-informed method of setting “fair-share” local reduction targets, based on the remaining amount of carbon that human activity can emit into the atmosphere while keeping global warming to a specified level. Vancouver’s Climate Emergency Action Plan targets are consistent with the Intergovernmental Panel on Climate Change’s global emissions reduction targets, and the City has identified actions to meet those targets; therefore Vancouver is not currently developing a separate carbon budget.																			
<i>climate mitigation</i>	Relates to activities that reduce greenhouse gas (GHG) emissions, aka the “carbon pollution” or “carbon emissions” that cause climate change. Mitigation can mean reducing fossil fuel use by improving energy efficiency; switching to renewable energy and fuels; developing nature-based solutions that sequester carbon; and policies that influence resident behavior and adoption of practices that result in the outcomes above.																			
<i>climate adaptation and climate resilience</i>	“Adaptation” relates to making changes to City operations, infrastructure, and the larger community in preparation for present and future impacts of climate change. “Resilience” relates to improving the City’s and the larger community’s ability to prepare for, respond to, and recover from shocks and stresses related to climate change. In City common practice, climate adaptation and resilience are differentiated by practitioners, but are often referred to collectively as “climate adaptation”.																			
<i>Climate Emergency Action Plan (“CEAP”)</i>	<p>The City’s climate mitigation plan as approved by Council in 2020.</p> <p>CEAP has a defined set of carbon reduction actions categorized by “Big Moves” (BMs):</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;">Big Move 1</td> <td style="width: 40%;">Complete, Walkable Neighbourhoods</td> <td style="width: 45%;">By 2030, 90% of people live within an easy walk/roll of their daily needs</td> </tr> <tr> <td>Big Move 2</td> <td>Active Transportation and Transit</td> <td>By 2030, two thirds of all trips in Vancouver will be made on foot, bike or transit</td> </tr> <tr> <td>Big Move 3</td> <td>Zero Emission Vehicles</td> <td>By 2030, 50% of the kilometres driven on Vancouver’s roads will be by zero emissions vehicles</td> </tr> <tr> <td>Big Move 4</td> <td>Zero Emissions Space and Water Heating</td> <td>By 2030, the carbon pollution from buildings will be cut in half from 2007 levels</td> </tr> <tr> <td>Big Move 5</td> <td>Low Carbon Materials and Construction Practices</td> <td>By 2030, the embodied emissions from new buildings will be reduced by 40% compared to a 2018 baseline</td> </tr> <tr> <td>Big Move 6</td> <td>Restored Forests and Coasts</td> <td>Focuses on the role Vancouver can play in removing carbon emissions from the atmosphere through sequestration actions, such as restoring forests and coasts</td> </tr> </table>		Big Move 1	Complete, Walkable Neighbourhoods	By 2030, 90% of people live within an easy walk/roll of their daily needs	Big Move 2	Active Transportation and Transit	By 2030, two thirds of all trips in Vancouver will be made on foot, bike or transit	Big Move 3	Zero Emission Vehicles	By 2030, 50% of the kilometres driven on Vancouver’s roads will be by zero emissions vehicles	Big Move 4	Zero Emissions Space and Water Heating	By 2030, the carbon pollution from buildings will be cut in half from 2007 levels	Big Move 5	Low Carbon Materials and Construction Practices	By 2030, the embodied emissions from new buildings will be reduced by 40% compared to a 2018 baseline	Big Move 6	Restored Forests and Coasts	Focuses on the role Vancouver can play in removing carbon emissions from the atmosphere through sequestration actions, such as restoring forests and coasts
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<i>Climate Change Adaptation Strategy (“CCAS”)</i>	<p>The City’s climate adaptation plan as approved by Council in 2012 and updated in 2018.</p> <p>CCAS currently has a defined set of actions to help the City adapt and become more resilient to the unavoidable changes in our climate. However, CCAS will be revised in February 2024 with a new set of strategies and actions to reduce risk and enhance resilience of people, the environment, infrastructure, and services to the main climate-related hazards facing Vancouver, informed by best climate science and centering equity:</p> <ul style="list-style-type: none"> • Extreme Heat • Air Quality • Sea Level Rise • Extreme Rainfall • Drought <p>The Strategy will include priority actions over 2024-2025 aligned with each climate-related hazard, as well as enabling actions to support and mainstream climate adaptation throughout the City.</p>																			

APPENDIX B

Climate Reporting Schedule

Beginning in 2024, Climate Budget, CEAP Annual Reports, and CCAS Annual Reports will be aligned in timing to give Council one overall view of climate initiatives, spends, and outcomes.

Council receives reports with climate performance and financial information at regular but different times of the year, in variously narrative and quantitative formats, either for information or decision. Links to the latest versions are given below. Some of this information will be consolidated into the Climate Budget; other reporting with climate-related content will continue to be aligned for consistency.

- **Four-Year Capital Plan ([2023-26](#))** [FOR DECISION]: climate related-investments reflected on service delivery in various areas; climate adaptation is included also as an Emerging Priority
 - **Mid-Term Capital Plan Update** (scheduled for 2024): recalibrate the Capital Plan to reflect changes to project delivery and fiscal reality and address the highest-priority emerging needs, including climate
- **Budget Outlook ([2024](#))**: risks to multi-year financial plan (including climate-related risk); senior government funding and partnerships review
- **Annual Budget and Five-Year Financial Plan ([2023](#))** [FOR DECISION]: climate as a Council and City priority; capital and operating budget available funding and information for all service areas
- **Statement of Financial Information ([2022](#))**: climate-risk governance, management, and metrics, aligned with Task Force for Climate Related Financial Disclosures (TCFD) recommendations
- **CEAP Annual Report ([2022 dashboard](#), [presentation](#))**: progress and performance on climate mitigation initiatives
- **Individual Council Reports** [FOR DECISION]: climate program/project budget requests contain impact discussions, where material

APPENDIX C

Emerging Best-Practice and Cost of Climate Inaction

Emerging Best-Practice

Many cities in Canada and abroad are implementing climate budgeting approaches. A scan² by City staff found the practice is still emerging, with different scope, prioritization methods, and reporting formats. Most cities focus on community-wide climate action, while some focus on corporate activities only. Some have attempted to quantify carbon reductions at the individual budget item level (see [Appendix F](#) for more discussion on this). Even the terms “carbon” and “climate” budget are used interchangeably. The City of Edmonton’s [Carbon Budget](#) fulfills much the same function as our Climate Budget; however, their approach focusses on carbon-reduction activities.

Vancouver’s Climate Budget approach, as well as continuing CEAP Financial Framework and regular reporting practices), put us within the forefront of emerging best-practice. Most cities are focussing on mitigation activities only; our approach includes climate adaptation and resilience investments as well. In current practice, definitions of “climate” projects vary considerably across cities; our Climate Taxonomy ([Appendix E](#)) sets a principles and criteria-based approach to determining categories of “climate”-eligible investments.

Cost of Climate Inaction

A scan³ by City staff found consensus that inadequate investment in climate action now will lead to worse impacts in the future, leading to increased costs. Likewise, *maladaptation* can occur if current City asset and infrastructure renewal does not factor in future climate impacts. An element of emerging best practices is understanding and using the potential costs of climate inaction and maladaptation to inform a risk-based approach to prioritizing and funding climate work. Some costs and avoided costs have been estimated specific to Vancouver’s context as a coastal city within British Columbia’s regulatory regime:

- **\$850M estimated annual savings** for Vancouver households in 2030, in a scenario where all CEAP and provincial CleanBC actions are fully implemented.⁴
- **\$215M avoided carbon tax** for Vancouver residents in 2030, if CEAP targets (50% reduction by 2030) are achieved.⁵

² In June 2023, staff conducted a review of climate budget approaches from a number of leading cities, including Montreal, Toronto, Saskatoon, Edmonton, Calgary, Ottawa, Halifax, Seattle and Oslo.

³ In June 2023, staff conducted a review of Canadian national and sub-national level studies into avoided costs and projected benefits from climate initiatives.

⁴ *Energy and Emissions Baseline Scenarios*, consultant study by Licker Geospatial for City of Vancouver, July 2023

⁵ City staff calculation based on projected sectoral carbon reductions realized by CEAP 50% target, and current Federal/BC carbon-tax rate 2030 target

The value of vulnerable assets and costs to protect have been estimated specific to Vancouver's context as a coastal city in the past:

- **\$28.6 billion of community and City land and buildings** (approximately 13 km², 2013 land-value assessment) are vulnerable to flooding in Vancouver in a scenario of one metre of sea level rise and a major storm surge. This includes City infrastructure and facilities in low-lying areas.⁶
- **\$1 billion estimated investment** in flood management infrastructure needed in Vancouver by 2100 to protect these vulnerable assets.

Other Canadian cities, senior government, non-profits and academia have studied rising losses from climate disasters, investments needed to reduce risks, and the potential *avoided* costs through climate action, both at the city level and nationally.

Rising losses

- **Nine of the 10 highest insured loss years on record in Canada occurred since 2011**, according to a 2023 analysis by the CBC.⁷
- **Loss of household income is already materializing** due to the opportunity cost of delayed action, also known as the “broken window” fallacy. Recovery from premature climate-related damage diverts economy-wide resources away from growth, impacting household income and business investment, while taxation increases and social service provision drops in order to maintain basic services and pay for climate-related clean-up and repair. An analysis by the Canada Climate Institute—a non-partisan climate-research non-profit—estimates a drop in per capita income of \$720 by 2025 compared to a stable-climate scenario, rising to \$1,890 to almost \$2,300 per capita by mid-century depending on the emissions scenario. **Low-income households will suffer the most**, with a 23% fall in income by end-of-century in a high-emissions scenario.⁸
- **Climate impacts on the city of Edmonton could increase by \$8.0 billion by the 2050s and \$18.2 billion by the 2080s** (compared to today). These ‘social’ costs include health costs, environmental costs and financial losses.⁹

Necessary investment

- **\$5.3 billion in annual average investment is needed at the local level**, in public infrastructure and adaptation measures, to adapt to climate change. This estimate represents the total costs of actions needed by municipalities, which would typically be cost-shared between different levels of government.¹⁰

⁶ *Vancouver Coastal Flood Risk Assessment Phase II*, consultant study by Compass Resource Management and Ebbwater Consulting for City of Vancouver, 2015; assumes 1:500 (0.2% annual exceedance probability) storm surge event

⁷ *As climate changes, insurance is becoming more complex—and pricey*, news article by CBC News, posted June 6, 2023, accessed October 16, 2023, [link](#)

⁸ *Damage Control: Reducing the costs of climate impacts in Canada*, Canadian Climate Institute, 2022, [link](#)

⁹ *Climate Resilient Edmonton: Adaptation Strategy and Action Plan*, City of Edmonton, 2018, [link](#)

¹⁰ *Investment in Canada's Future: The Cost of Climate Adaptation at the Local Level*, Federation of Canadian Municipalities and the Insurance Bureau of Canada, 2019, [link](#)

Benefits and avoided costs

- **Every \$1 invested on adaptation measures accrues \$13-15 in total benefits**, according to the Federal government's *Canada's National Adaptation Strategy*. This includes \$5-6 of direct avoided costs (reduced repair/replacement costs for damage) as well as \$6-10 of indirect benefits (avoided disruption, loss of productivity, and loss of income).¹¹
- **Climate-resilient building codes have a benefit-cost ratio of 12:1**, also according to the *National Adaptation Strategy*¹². Vancouver's green building policies are an exemplar nationally and internationally.

¹¹ *Canada's National Adaptation Strategy*, 2023, [link](#)

¹² *Canada's National Adaptation Strategy*, 2023, [link](#)

APPENDIX D

Climate Taxonomy

Staff have developed a “taxonomy”—a set of categories and screening criteria—to guide staff in tagging, classifying and tracking eligible City investments and expenditures for the Climate Budget.

Table 5- Climate Taxonomy Screening Criteria

Criterion	Budget Application	The majority of a spend item	Guiding questions
MATERIAL CLIMATE BENEFIT <i>mitigation and/or adaptation</i>	Capital, Operating	must materially reduce carbon emissions, and/or improve adaptation/resilience to climate impacts	<p>GATING QUESTION: Does this materially cut the City or community’s carbon emissions, or improve the City or community’s resilience or ability to adapt to climate impacts?</p> <ul style="list-style-type: none"> • Are the climate outcomes significant? If not, is this foundational to future climate action? <ul style="list-style-type: none"> ○ Is this something that will significantly remove barriers to achieving climate action (e.g., sewer mapping, inventories of ecological assets)? • Is this something where leading by example will catalyze or prove concept for future work?
EXCEEDS USUAL ACTION	Capital, Operating	must <i>exceed</i> compliance with existing regulations or requirements; must <i>improve</i> upon current climate mitigation or adaptation practices, not merely maintain current practice or business-as-usual	<p>GATING QUESTION: Does this go above-and-beyond current practice or compliance actions?</p> <ul style="list-style-type: none"> • Is this already a core City service (e.g., curbside recycling, road maintenance)? • Is this something the City is required to do under regulation/code (e.g., landfill gas capture, sewer separation)? • Is this common practice, and so embedded in standard City practice that no other reasonable way exists of reverting back to a less climate-friendly way of doing it?
CLIMATE POLICY-BASED	Capital	must be governed by Council-adopted climate policies, targets, and plans	<p>GATING QUESTION: Is this an action approved by Council as part of CEAP and/or CCAS?</p> <ul style="list-style-type: none"> • Does this contribute directly to an action listed in CEAP and/or CCAS? • Is progress on this action regularly tracked as part of CEAP or CCAS reporting?

Note, the “Additional Climate Action” criterion means that as initiatives become mandatory as new requirements or regulations impact City service delivery, or become established as common practice, initiatives can become business-as-usual and move from “Climate Priority” to “Climate Beneficial”. Their impact is then counted within the baseline/reference case for any modelling or projections around impact of climate policies on City climate targets.

Using these criteria, items can be tagged either as “Climate Priority” (and are included in the Climate Budget), or “Climate Beneficial”.

Table 6- Climate Taxonomy Categories

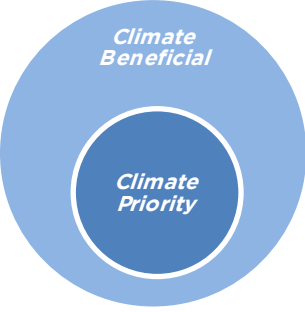

	 <p>Capital Budget</p> <p><i>Climate Priority items are governed and accelerated through Council-approved climate policies and funded through Capital Budgets. Meanwhile, Climate Beneficial programs and initiatives can have climate outcomes, but primarily address other City needs and therefore fall into other priority categories.</i></p>	 <p>Operating Budget</p> <p><i>Operating expenditures tend to be overhead (e.g., salary) related and ongoing in nature, and are generally not tracked at the initiative level, making classification more difficult than discrete, time-limited capital investments.</i></p>
<p>Climate Priority</p>	<p>Investments in actions and initiatives with material and additional climate impacts, and that are governed by the Climate Emergency Action Plan and the Climate Change Adaptation Strategy.</p>	<p>Expenditures associated with actions and initiatives that have material and additional and climate impacts.</p>
<p>Climate Beneficial</p>	<p>Investments for actions and initiatives that have material, but are compliance actions or common business practice, or are not explicitly directed through the City’s two Council-approved climate policies:</p> <ul style="list-style-type: none"> • Compliance actions: service delivery/operational practice the City is regulated to provide • Core services and other "business-as-usual" services or practices that the City would deliver even in the absence of a climate-priority mandate from Council • Unknown climate-related spend: budget items where the incremental investment associated with climate benefit is significant but cannot be split out 	<p>Not applicable</p>

Table 7- Climate Budget Investment Examples: Priority, Beneficial, Ineligible

CLIMATE PRIORITY	CLIMATE BENEFICIAL	INELIGIBLE
<ul style="list-style-type: none"> Decarbonized energy and cooling retrofits in City facilities NEU heat generation decarbonization Zero-emission buildings regulatory development, implementation, and supports for residents 	<ul style="list-style-type: none"> Rebuilds of City facilities with significant climate benefits where associated incremental costs cannot be split out NEU distribution network expansion 	<ul style="list-style-type: none"> Like-for-like replacement, retrofits, renewal or rebuilds of City facilities and equipment NEU investments in fossil-fueled heat generation
<ul style="list-style-type: none"> Active Mobility Plan investments that support CEAP-defined active transportation/transit objectives Planning for capital investments in active transportation and transit improvements Improvements to network resilience to climate change impacts 	<ul style="list-style-type: none"> Transportation and transit improvements or services with supportive climate benefit (e.g., neighbourhood traffic management and safety improvements, monitoring) 	<ul style="list-style-type: none"> Like-for-like replacement, retrofits, renewal or rebuilds of assets, infrastructure, pathways, sidewalks, etc. Improvements with primarily user-amenity objectives and do not serve a material climate function (e.g., public plaza, curb cuts)
<ul style="list-style-type: none"> EV-charging infrastructure deployment City fleet and equipment electrification 		<ul style="list-style-type: none"> Fossil-fueled vehicles and equipment
<ul style="list-style-type: none"> Pilot projects to adapt Vancouver's shoreline to projected sea level rise Street tree planting and green infrastructure that results in net rainwater, heat reduction, air quality or carbon sequestration benefit 	<ul style="list-style-type: none"> Combined-sewer separation (rainwater management a primary objective but required under Provincial regulation) 	<ul style="list-style-type: none"> Like-for-like replacement or renewal of shoreline assets, trees in existing parks and green spaces Natural asset provision (parks and green space, biodiverse and naturally managed features) with primarily resident-amenity or recreational objectives and that do not serve a material climate function
<ul style="list-style-type: none"> Resilience programs to build neighbourhood capacity for extreme heat and other emergencies 		<ul style="list-style-type: none"> Horticulture; food systems initiatives
<ul style="list-style-type: none"> Investments to support additional or exemplar climate impact beyond core City service levels (e.g., landfill gas capture system operations for beneficial reuse or capture beyond levels required by regulation) 	<ul style="list-style-type: none"> Capital investments in landfill gas capture system to maintain required capture rates 	<ul style="list-style-type: none"> Operational costs of typical or core City service delivery: <ul style="list-style-type: none"> Maintenance of street rights-of-way, boulevards, streets for vehicular use, existing pedestrian pathways Waste and organics-bin pickup Landfill/transfer station operations Sewer and waterworks operations Operation/maintenance of City facilities, parks, and properties

APPENDIX E

Prioritization of Climate Actions

Climate initiatives were initially prioritized during the development of CEAP and CCAS and will follow strategy update cycles (currently every 5 years). Actions are scored against criteria specific to CEAP and CCAS, recognizing that pathways to outcomes differ between mitigation and adaptation actions. Criteria themes are impact, capability, accountability, and urgency.

Funding and budget allocation to these prioritized initiatives occurs in two separate processes, the 4-Year Capital Plan and the City-wide Annual Budget process.

- **4-Year Capital Plan:** One of the key priorities in developing the 2023-2026 Capital Plan was advancing climate adaptation and mitigation work in accordance to CEAP and CCAS. The Plan reflects the City's commitment to addressing climate change by directing funding resources towards climate-related initiatives.
- **Annual Budget Process:** As part of this process, Budget Priority workshops convene CoV departmental GMs to identify and prioritize funded and unfunded initiatives that advance each Council Priority. Criteria to identify and prioritize climate-related initiatives are similar to those used in CEAP and CCAS strategy development (see Discussion below).

Discussion

The need to demonstrate return on investment is a key driver for rigorous prioritization. The link between City action and climate outcomes often involves societal adoption of interconnected, systems-level changes. These effects are community-wide and long-term, so the climate impact of individual initiatives can be hard to measure or even project.

Some cities pursuing climate budgets have attempted different measurement approaches, but reach similar conclusions. For instance, the City of Edmonton's climate budget states that transportation-related impacts should be represented at an aggregate level, as projects are interconnected and cannot be quantified on an individual basis.

Meanwhile, there is increasingly a greater need to ensure this work also advances other City priorities, such as equity, affordability, liveability and overall City risk management. An overly prescriptive prioritization based solely on quantifiable primary impact would fail to incorporate important benefits. City staff have adopted balanced multi-criteria approaches to insure these benefits are considered alongside climate outcomes. As an example, in the Budget Priority Workshop process, staff assess climate initiatives against four criteria:

- **Impact:** reductions in carbon emissions or risk from different climate hazards.
- **Cost (to the City):** investment actions (e.g., heat pump incentives, active transportation infrastructure) tend to be relatively expensive, whereas regulation (e.g., building code requirements) are relatively low-cost for the City.
- **Alignment/Co-Benefits:** aligning with senior government priorities increases opportunities to leverage City investment; co-benefit examples include resident cost savings, reduced health impacts from air pollution, etc.
- **Equity:** the extent to which an action prioritizes equity-denied populations and/or rebalances costs between populations with differing capacity to pay.

Climate Prioritization within Overall Risk Management

Climate risk reduction is also considered elsewhere in the Annual Budget process. As part of this process, Corporate Risk Management reviews the Annual Budget to identify and provide support for resource requests that reduce the largest risks to the City. Risk's budget review is then included as part of the overall budget process that balances multiple objectives, including risk management, in setting the budget. Some risks related to climate action are included in this review.

In addition, Risk reviews the actions tied to large risks to highlight where the actions are not resourced to the Risk Management Committee. The Risk Management Committee (RMC) can then decide to either require the resourcing to fund the mitigation action or decide to not resource the activity and accept the risk. As with most entities, the City cannot afford to pursue all priorities and must balance risk and City services to its available resources.

APPENDIX F Current Investments (2024)

The 2023-26 Capital Plan includes \$215M of Climate Priority investments, constituting approximately 7% of the overall Plan.

Table 8 – 2023-26 Capital Plan: Climate Budget (“Climate Priority”) Initiatives and Funding Sources

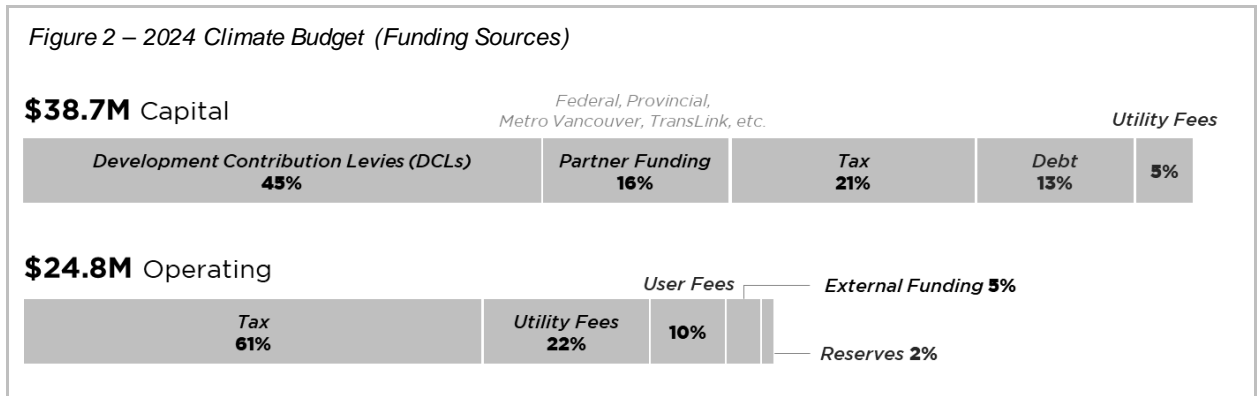
Goal Area	Service Areas	Capital Plan Program / Project Name	2023-26 Plan Investment, \$M				Funding Source				
			CEAP	CEAP/CCAS	CCAS	Grand Total	Tax	Debt	Utility Fees	Dev. Contrib.	Partner Funding
BM2	<ul style="list-style-type: none"> Active transportation corridors & complete streets Traffic signals Transportation safety & accessibility Commercial high street corridors Transit integration & reliability Streetscape amenities 	Active transportation & complete Streets	\$40.4			\$40.4				\$28.8	\$11.6
		New signals	\$8.4			\$8.4				\$6.7	\$1.7
		School program	\$3.2			\$3.2				\$3.2	
		West End public space & transportation improvements	\$1.0			\$1.0				\$1.0	
		Rapid transit office	\$6.9			\$6.9				\$5.4	\$1.5
		Bus transit improvements	\$5.0			\$5.0		\$1.5		\$1.5	\$2.0
		Public realm electrification (public e-bikes)	\$4.3			\$4.3		\$4.3			
BM3	<ul style="list-style-type: none"> Vehicles & equipment Zero emission vehicles Streetscape amenities 	Electrification of vehicles & equipment: City fleet	\$14.4			\$14.4	\$12.4	\$0.3	\$1.8		
		Off-street EV charging infrastructure: non-City buildings	\$6.0			\$6.0	\$6.0				
		Public realm EV charging infrastructure	\$4.3			\$4.3		\$4.3			
BM4	<ul style="list-style-type: none"> Programs Green buildings Renewable Energy Generation 	Energy optimization program: City buildings	\$5.6			\$5.6	\$5.6				
		Energy retrofits: non-City buildings	\$24.0			\$24.0	\$24.0				
		New low carbon base load capacity for existing network (land, planning and design)	\$6.0			\$6.0		\$6.0			
BM6/Extreme Heat	<ul style="list-style-type: none"> Urban forest 	Park trees - new		\$2.5		\$2.5				\$2.5	
		Street trees - replacement		\$5.0		\$5.0	\$5.0				
Extreme Rainfall	<ul style="list-style-type: none"> Core network 	Flood protection & drainage			\$10.0	\$10.0		\$5.0	\$5.0		
		Green infrastructure renewal & upgrades			\$41.6	\$41.6		\$2.5	\$2.5	\$36.0	\$0.6
Sea Level Rise	<ul style="list-style-type: none"> Seawall & shoreline Other 	Seawall/shoreline planning - Coastal Flood Protection and Resiliency			\$6.7	\$6.7	\$3.5			\$3.1	\$0.1
		Emerging climate adaptation priority initiatives			\$20.0	\$20.0		\$20.0			
Total, \$M			\$129.4	\$7.5	\$78.3	\$215.2	\$56.5	\$43.8	\$9.3	\$88.2	\$17.5
% of total City 4yr Plan (\$2,893M)			4.5%	0.3%	2.7%	7.4%					

The following 2024 Draft Budget climate investments represent new multi-year budgets for work getting underway. In addition to these, the City is prioritizing ongoing delivery of approximately \$80M of climate projects and programs already approved in this and past capital plans, including key initiatives like new greenways, green infrastructure renewal and upgrades, and building energy retrofits.

Table 9 – 2024 Multi-Year Capital Budget (Annual Budget): Climate Budget (“Climate Priority”) Initiatives and Funding Sources

Goal Area	Service Areas	Capital Plan Program / Project Name	2024 Draft Budget Allocation, \$M				Funding Source				
			CEAP	CEAP/CCAS	CCAS	Grand Total	Tax	Debt	Utility Fees	Dev. Contrib.	Partner Funding
BM2	<ul style="list-style-type: none"> Active transportation corridors & complete streets Traffic signals Transportation safety & accessibility Commercial high street corridors Transit integration & reliability Streetscape amenities 	2023-2026 Active Transportation - Beatty Street	\$2.0			\$2.0					\$2.8
		2023-2026 Complete streets- Portside Greenway	\$1.0			\$1.0		\$0.2	\$0.2		
		New Active Transportation improvements	\$1.5			\$1.5	\$0.3				\$0.2
		New Active Transportation - Drake St	\$3.5			\$3.5		\$0.8	\$0.8		
		Upgrade to Active Transportation Network	\$2.0			\$2.0		\$1.0	\$1.0		
		2023-2026 New Signals	\$0.2			\$0.2					\$3.6
		2023-2026 Bustransit improvements	\$1.0			\$1.0					\$2.0
		Bus Operations & Accessibility	\$2.0			\$2.0					\$0.5
		Rapid Transit - staffing	\$1.5			\$1.5					\$1.1
		2023-2026 School program	\$0.8			\$0.8					\$1.5
		2023-2026 Public realm electrification	\$1.1			\$1.1					\$0.2
		2023-2026 Transportation Design staffing	\$1.1			\$1.1	\$0.5				\$0.5
BM3	<ul style="list-style-type: none"> Vehicles & equipment Zero emission vehicles 	2023-2026 Electrification, Vehicles/Equip. - Parks	\$0.1			\$0.1		\$1.1			
		2023-2026 Off-Street Electrical Vehicle Charging Infrastructure: Non-City Buildings	\$1.8			\$1.8				\$1.0	\$1.0
		2023-2026 Public realm EV charging	\$1.0			\$1.0				\$2.5	\$1.0
BM4	<ul style="list-style-type: none"> Green buildings Renewable Energy Generation 	2023-2026 Energy Retrofits: Non-City Buildings	\$4.1			\$4.1		\$0.4	\$0.4	\$1.2	
		New low-carbon base load capacity, existing network	\$0.4			\$0.4		\$0.4	\$0.4	\$0.2	
BM6/Extreme Heat	<ul style="list-style-type: none"> Urban forest 	2023-2026 Park Trees - New		\$0.7		\$0.7				\$1.2	\$0.3
		2023-2026 Street Trees - Replacement		\$1.2		\$1.2				\$0.8	
Extreme Rainfall	<ul style="list-style-type: none"> Core Network 	2023-2026 Green Infrastructure renewal/upgrades			\$3.6	\$3.6		\$1.0			
		2023-2026 Green Infrastructure planning/design			\$2.8	\$2.8	\$1.8				
		2023-2026 Flood & Watershed Planning			\$1.6	\$1.6				\$0.7	
		2023-2026 Green Infrastructure Asset renewal			\$0.3	\$0.3		\$0.4			
		2023-26 Drainage Studies, Shoreline Protection			\$2.0	\$2.0	\$1.2				
Sea Level Rise	<ul style="list-style-type: none"> Seawall & shoreline 	Seawall/shoreline planning - Coastal Flood Protection			\$0.9	\$0.9	\$0.1				
		Seawall/shoreline planning - Coastal Resiliency			\$0.5	\$0.5	\$4.1				
Total, \$M			\$25.1	\$1.9	\$11.7	\$38.7	\$7.9	\$5.2	\$2.0	\$17.3	\$6.3
% of total City 2024 Draft Budget (\$368M)			7%	0.5%	3.2%	11%					

Figure 2 breaks down the 2024 Climate Priority capital and operating budgets by funding source. The majority of the capital portion is funded through development contributions (48%) and external partnership (16%), while the majority of operating is funded by property tax (61%), followed by utility fees (22%), user fees (10%), and funds from senior government (5%).



Climate-Beneficial Investments

The Climate Budget excludes items that do not have material climate benefits.

Investments with climate benefits that are intended to meet regulatory requirements are tagged “Climate Beneficial”. These programs further other Council Strategic Priorities, such as City Services and Infrastructure, etc. Due to how some project budgets are structured, items where the incremental investment that achieves climate benefit cannot be split out are also included as a “Climate Beneficial” item.

These are reported separately here to provide context, but do not count towards Climate Budget totals. This is to focus tracking and prioritization on the investments projected to exceed business-as-usual practice and move the City closer to its climate mitigation and adaptation goals.

Table 10 – 2024 Multi-Year Capital Budget (Annual Budget): “Climate Beneficial” Totals

Climate Benefit	Service Areas	2024 Draft Budget, \$M
Mitigation	<ul style="list-style-type: none"> Landfill non-closure NEU distribution Community facilities Streets: sidewalks, signals, neighbourhood transportation 	\$11.8
Adaptation	<ul style="list-style-type: none"> Seawall and waterfront (maintenance) Park infrastructure Bridges & structures Asset management/planning Core network 	\$33.6
Total, \$M		\$45.4

APPENDIX G

Future Investment Needs (2024-2025)

Numbers are approximate. The following is a breakdown of the projected investment needs in the 2024-26 period. Staff will bring forward 2026-2030 estimates with the CEAP and CCAS 5-year Refreshes in late-2025, which can be used to inform the 2027-2030 Capital Plan.

CEAP: Staff have prepared updated estimates for CEAP actions for 2024-2026. The updated estimate is meant to account for CEAP’s original five-year horizon and the remaining funding envelope in the 2023-2026 Capital Plan.

There is an estimated \$215M investment need over the next 3 years to fully implement CEAP. The remaining funding envelope in the 2023-26 Capital Plan is \$106M. Additionally, \$13M revenue is anticipated. The difference between investment need and available funding can be characterized as a “climate investment deficit” of \$97M. Other cities have similarly used target-setting to guide climate investment decision-making: in their 2020-2030 Climate Plan, the City of Montreal is aiming to allocate 10 to 15 per cent of their Ten-Year Capital Expenditures Program to adaptation initiatives.

This table breaks down these Future Needs and (modelled) best-case carbon reduction outcomes in 2030 by Big Move (BM), assuming fully funded implementation. These estimates incorporate the absence of Vancouver-only transport pricing (which was excluded in original CEAP estimates) and increased investment in the 2023-26 Capital Plan.

Table 11 – CEAP 2024-26 Future Needs (Capital) and Anticipated 2030 Outcomes

Big Move	Anticipated % Carbon Reduction, annually, 2030*	2024-26, \$M	
		Future Needs	Available Funding ¹³
1	<i>foundational to BM2-6</i>	\$0	\$0
2		\$126	\$55
3	up to -20%	\$28	\$28
4	up to -20%	\$33	\$26
5	<i>up to -54% [embodied]</i>	\$3	\$3
6	<i>up to -0.2% [2050]</i>	\$25	\$9
Total	up to -40%	\$215	\$118

* vs 2007 baseline, assumes fully funded implementation

** vs 2018 embodied carbon baseline, assumes fully funded implementation

Along with ongoing inflationary pressures and updated timing of investment and deployment, changes include:

- BM1: \$70M deferred after 2025 - public-benefit strategic spends in Broadway Plan area
- BM2: \$80M decrease in need - updated to reflect new estimates and cost-effective strategies in the Active Mobility Plan
- BM3/4/5: \$7M increase in need - updated to reflect new estimates for electric vehicle charging infrastructure and Zero Emissions Building Retrofit actions
- BM6: \$8M increase in need - originally excluded in original CEAP estimate; included now with adoption of BM6 Natural Climate Solutions report in December 2021

¹³ “Available” funding includes 2024 Draft Budget Allocation, remaining funding envelope for 2025-26, and anticipated external revenue.

CCAS: Staff will bring a summary of funded and key unfunded adaptation actions for 2024-2025 as part of a CCAS Refresh to Council in February 2024. Moving forward, the accelerating pace of climate change will increasingly apply pressure to future budgets. More frequent and extreme weather events are already forcing us to adjust plans and speed up implementation as demonstrated by the 2021 heat dome. Emerging needs also include developing better understanding of hazards in order to plan our responses. Adaptation measures in particular necessitate more sustained funding from senior government to design and implement complex solutions on longer timeframes.