2023 – 2026 Climate Implementation Plan

City of Calgary

2023-2026 Climate Implementation Plan

Executive Summary

Climate change poses a significant risk to The City of Calgary and all Calgarians. Through the declaration of a Climate Emergency and the prioritization of Climate Resilience as one-of-three foundations of Council's Strategic Direction for 2023-2026, The City is addressing climate change as a strategic priority and Council is committed to action.

The Council-approved Calgary Climate Strategy: Pathways to 2050 sets The City's climate vision, guiding principles, goals and targets to achieve the outcomes of the Climate Emergency Declaration. The 2023-2026 Implementation Plan focuses on the corporate and community-based climate programs and actions to be taken over the next four years.

The Implementation Plan describes the prioritized actions and programs in 2023-2026 across service lines that will accelerate improving energy use, reducing climate risk and working towards net-zero greenhouse gas (GHG) emissions by 2050 as outlined in the Calgary Climate Strategy. The implementation of climate actions also represents an immense opportunity for new industries, low carbon technology, jobs, local business growth, partnerships and the realization of equitable climate action and benefits for all Calgarians.

The City cannot achieve Calgary's climate goals alone. External community partners, organizations, businesses and industries are making significant commitments to climate action and are leading initiatives that contribute to Calgary's greater climate goals. The attached actions (Appendix B), produced by external groups, are over and above the City's Implementation Plan and are not part of the proposed budget. However, they demonstrate the impact of community-driven change and the criticality of collaboration to achieve Calgary's climate goals.

The Plan has been prioritized into six focus areas:

I. Communities
II. Buildings
III. Energy Supply
IV. Mobility
V. Natural Infrastructure
VI. Education & Outreach

Progress needs to be undertaken in each of these focus areas to set us on the path to achieving The City's net zero target by 2050 and becoming a climate resilient city.

To achieve this, the total cross-corporate investment identified to fund the 2023-2026 Implementation Plan is approximately $3.8M in new base operating, $44.1M in one-time operating and $207.8M in capital to achieve all the actions within the Plan.

This budget represents primary or direct climate investments for actions specific to accelerating GHG emissions reduction and/or climate risk reduction in City services and does not include secondary investments in actions specific to the provision of other City service outcomes that provide some climate benefit.

Many of these primary investments take advantage of existing procurement opportunities, capital infrastructure projects, lifecycle upgrades, operations of City assets and policies and bylaws by applying a 'climate lens' on the provision of City services that make Calgary an affordable, safe and great place to live.

Climate action will require sustained financial resources, and it will be crucial to leverage all avenues of funding to ensure that The City can provide Calgarians the resources and programs needed to meet our climate objectives. The City is exploring additional funding opportunities, financing, and partnership mechanisms to support implementation beyond tax-funded budgets.

To ensure enhanced accountability and transparency of progress on the Implementation Plan's actions and associated budget spend, climate reporting is being consolidated and integrated into three central City reporting documents: the Accountability Report, Annual Financial Report, and Climate Annual Report. Collectively, these reports help ensure The City is on track to achieving its climate goals (Appendix A).

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Introduction

Climate change poses a serious risk to The City and Calgarians, and the consequences of climate change are widespread, costly, and hazardous, posing risks to our economy, environment and collective health. The cost of climate impacts will continue to grow, affecting all Calgarians. Left unchecked, the impacts of climate change will stretch government and municipal resources, exacerbate inequity, disrupt business operations, and damage our environment.

Addressing climate change is a strategic priority for The City of Calgary with The City's Climate Emergency Declaration and *Climate Resilience* as one-of-three foundations of Council's Strategic Direction for 2023-2026.

Climate Resilience

A city that recognizes the climate emergency and does its part to limit global warming to 1.5 degrees Celsius. A more sustainable community that can manage the impacts of severe weather events; reduce emissions; build our green economy and play an active role in climate innovation.

The Climate Implementation Plan (the Plan) describes the prioritized programs in 2023-2026 that will accelerate action in improving energy use, reducing climate risk and working towards net-zero greenhouse gas (GHG) emissions by 2050 as outlined in the Calgary Climate Strategy: Pathways to 2050.

The Climate Strategy set The City's climate vision, guiding principles, goals and targets to achieve the outcomes of the Climate Emergency Declaration, while the Mitigation and Adaptation Plans provide the programs to achieve the goals. This Implementation Plan is The City's prioritized corporate and community-based climate actions over the next four-year business cycle to implement those programs developed in the Climate Strategy.

Prioritization of Work

The key implementation programs are prioritized into six focus areas based on low carbon and climate resilience outcomes:

I. Communities
Develop new and retrofit existing communities to achieve net zero emissions and reduce climate risk through land use policy planning, integrate climate considerations into water, waste services and utility infrastructure and support Calgarians to enhance climate resiliency in their communities.

II. Buildings
Develop and retrofit buildings (public and private) that reduce embodied and emitted carbon and incorporate climate-resilient designs and materials.

III. Energy Supply
Support low carbon and renewable electricity and heating through on-site and utility scale projects.

IV. Mobility
Support the scale up of both privately-owned low carbon vehicles and corporate fleets and encourage mode shift to low carbon transportation options such as walking, wheeling and transit.

V. Natural Infrastructure
Protect, restore and maintain natural assets, such as grasslands, forests, waterbodies, and street trees, as well as implement green stormwater infrastructure to manage water, reduce climate risk and provide ecosystem functions in our city.

VI. Education & Outreach
Provide activities that enhance the understanding of, and support for climate science and action for all Calgarians, ultimately leading to behavior change and action that contributes to reduced emissions and reduced climate risk.

The programs within these focus areas have been prioritized according to:

- Actions that have significant impact or are critical in building the foundation for future action.
- Opportunities to incorporate a climate lens on the procurement of assets, capital infrastructure projects, lifecycle upgrades, operations of City assets and updates to policies, bylaws or regulations, among others.
- Planning and budgeting process (balance of all City services within the Council approved budget envelope).

- Planning and budgeting process (balance of all City services within the Council approved budget envelope).
- Alignment with external funding opportunities and industry-lead climate initiatives; and
- Available technology.

We can expect that within the next four years, climate technologies, external funding opportunities and collaboration will continue to develop and evolve, providing enhanced opportunities for consideration through the annual plans and budgets adjustments and/or be advanced within the next business cycle (2027-2030).

Aligning priority programs with external industry and community partners is of critical importance, as The City cannot achieve Calgary's climate goals alone. External organizations have made significant commitments to climate action and are leading initiatives to contribute to Calgary's greater climate goals (detailed in Appendix B Calgary Climate Panel: Ongoing Community Projects Inventory (Fall 2022)).

Funding Climate Implementation

A "climate lens" approach was applied to the 2023-2026 Service Plans and Budgets (shown below). This approach, which is a best practice being implemented by leading cities in Canada on climate action, integrates climate considerations (GHG emissions and climate risk) into City assets and operations which provide Calgarians with high quality, safe and reliable services that make Calgary a great place to live. It categorizes actions into primary and secondary investment categories, where:

- Primary (direct) climate investment includes actions specific to accelerating climate action (significant focus on reducing GHG emissions and/or climate risk), and
- Secondary (indirect) climate investment includes actions specific to the provision of other key City services while providing some climate benefit. Work is underway to evolve the application of a "climate lens" on cross-corporate investment with the goal of identifying secondary climate benefit over the next business cycle.

The total cross-corporate operating and capital investment identified to fund the four-year Implementation Plan by each focus area is detailed in Table 1 below. The budgeted amounts reflect The City's primary (direct) cross-corporate climate investment and does not include secondary (indirect) climate investment.

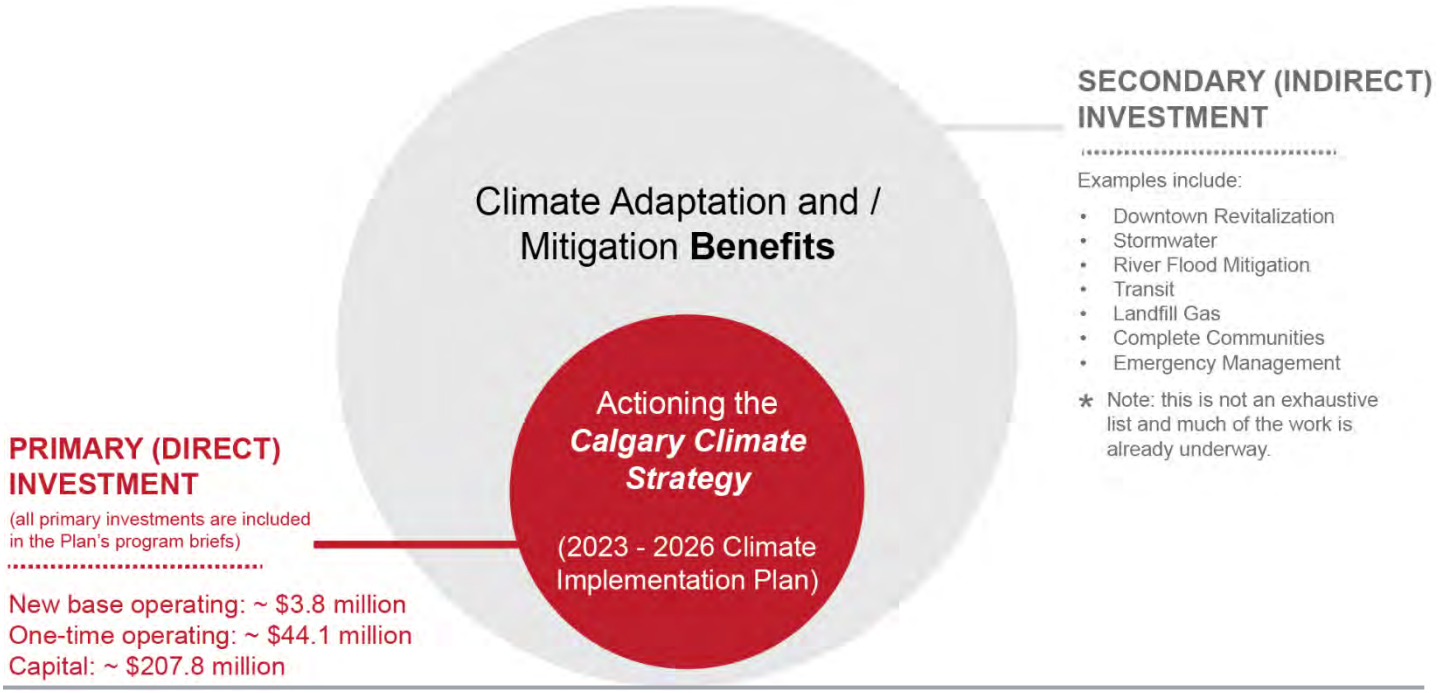


Table 1: 2023-2026 Cross-Corporate Primary Climate Investment

Implementation Plan Categories	Base Operating ~ (,000's)	One Time Operating ~ (,000's)	Capital ~ (,000's)
Communities	1,345	20,534	9,800
Buildings	200	18,498	49,069
Energy Supply	-	312	12,300
Mobility	290	3,126	103,961
Natural Infrastructure	1,829	-	31,123
Education & Outreach	-	1,187	-
Accountability & Reporting	165	454	1,501
Total	3,829	44,111	207,753

The City is exploring additional funding opportunities, financing, and partnership mechanisms to support implementation beyond tax-funded budgets. A financing 'toolkit' will be developed in 2023-2024, as there is no single source of funding or single financial mechanism that will allow The City to meet its climate goals. There are several options that could include federal and provincial grants and financing (e.g., Government of Canada's Disaster Mitigation and Adaptation Fund, Canada Infrastructure Bank), City fees or surcharges (e.g., development fees, franchise fees), and alternative financing mechanisms (e.g., climate or green bonds). Evaluation of these existing potential options and new opportunities as they arise will be a continuous process in developing and continuously evolving The City's financing toolkit.

Climate Governance

Climate governance will align and integrate climate consideration across The City's corporate planning, accountability and reporting programs and processes. There are five areas of focus for successful climate governance in Calgary; strategic prioritization; accountability and reporting; policy regulation and process alignment; integrated decision making and responsibility; and collaborative action.

To support these focus areas, The City will:

- Continue to evolve and integrate climate considerations into City decision making processes.
- Provide public communications, education, and outreach activities to improve awareness and support community-based climate action.
- Develop a public-facing climate reporting dashboard on climate action progress in alignment with The City's approach to ESG reporting to enhance transparency and accountability.
- Support the evolution of the new Climate Advisory Committee; and
- Report annually through a new Climate Reporting Framework (Appendix A) on Calgary's progress towards its climate goals as outlined by the Calgary Climate Strategy: Pathways to 2050.

Calgary's climate governance includes collaboration with external interested parties, including members from the Calgary Climate Panel, the newly developed council Climate Advisory Committee and many other businesses and organizations within the community.

Council's Climate Advisory Committee is an advisory committee to council that consists of 9-15 individual citizens that are a combination of technical climate experts and citizens at large with an interest in climate mitigation and/or adaptation. The Climate Advisory Committee has a mandate to provide Council and Administration with strategic advice and recommendations on policies and initiatives that relate to climate change mitigation and adaptation.

Calgary's climate governance supports improving the accountability and transparency of Calgary's progress towards our climate goals. This ensures The City is demonstrating leadership in climate action which supports Calgary in its low carbon economic transition, competitive advantage and talent retention and acquisition. This core work also includes the integration of equity and inclusiveness into The City's climate program and services.

Detailed Program Briefs

The following program briefs are a summary of the key actions that have been identified for implementation over the next four years. Each brief contains a program summary, list of key planned actions, lead services, external collaboration, leveraged investment and an overview of key program results.

Key services

- Climate & Environmental Management
- Emergency Management & Business Continuity
- Community Strategies
- Neighbourhood Support

External collaboration

- Climate Advisory Committee of Council will provide leadership, advice, direction, and community connections.
- Disaster Risk Reduction and associated Emergency Management-911 initiatives support and assist before and during crisis events.
- Climate Hub and Alliance for the Common Good initiatives are ongoing to support climate adaptation amongst vulnerable populations and all Calgarians.

Program Highlight

Equity workshops started during development of the Climate Strategy to begin identifying and supporting climate actions that puts adaptation into the hands of community members. We are focused on the work we need to make climate adaptation equitable and accessible for all Calgarians.

Supporting climate-resilient people

Through understanding how climate change will affect communities, we can better implement climate adaptation measures that equitably support all Calgarians. Climate risk is unique to each community in Calgary, differentiated by distinct sources of vulnerability and exposure to climate hazards. Working with Calgary communities to identify needs and match climate adaptation projects and planning is the most effective way to address climate adaptation across the city. This program addresses collecting, collaborating, and acting on community feedback and focuses on equity and equitable approaches to supporting community climate adaptation. A mix of short, medium, and longer-term actions are incorporated in this program, spanning through and beyond the next four-year business cycle.

Key planned actions

- Establish a climate vulnerability and resilience working group, including diverse representation from vulnerable groups and those who support them to better understand and share learnings in climate adaptation. This City-facilitated group will be a key engagement opportunity over the next few years. This working group and associated projects will help to strengthen relationships with community-based organizations to develop, promote and implement climate adaptation strategies.
- Establish community climate adaptation representatives who can assist in collecting and distributing information and guiding community initiatives to implement climate adaptation measures.
- Develop a climate equity toolkit in collaboration with The City's Equity Team to better recognize and support the intersectionality between equity and climate change.
- Improve access to and understanding of refuge locations for use during hazardous climate events. Mapping tools will be developed to locate accessible indoor and outdoor spaces.

Results	Monitoring & measurement
• Improved relationships with community-based organizations. • Climate adaptation projects designed and driven by community members.	• The number of community representatives, community-based organizations and community climate initiatives supported by The City. • Identification of community resources accessible during different climate events. • Number of community climate resilience programs supported.

Key services

- Climate & Environmental Management
- City Planning & Policy
- Emergency Management & Business Continuity
- Community Strategies

External collaboration

- Climate Advisory Committee of Council will provide leadership, advice, direction, and community connections.
- Established area builders and developers
- Federation of Calgary Communities
- Business Improvement Areas

Leveraging external investment

Alberta Municipalities, through the Climate Resilience Capacity Building Program, is providing $52,075 to fully fund the development of a Community-scale Climate Adaptation Guidebook to better inform and support integrating best practice climate resilience measures into plans, policies, and projects in the City of Calgary.

Program Highlight

Work has been underway since 2021 to design, optimize and automate the Community Climate Risk Profile process. Initial profiles have focused on communities undergoing immediate planning and development work, and consistent work on the profiles means that 61 have been completed to date out of the total 264 required to describe all Calgary communities. The remaining community profiles are planned for completion in 2023.

Enhancing community climate resilience

Understanding how vulnerable each existing community is to Calgary's climate hazards is vital to identifying what climate adaptation measures are best suited to each community. Supporting communities to better understand and learn about climate risk and build community capacity to climate impacts reduces vulnerability to climate events, allowing Calgarians to survive, adapt and thrive in our changing climate. A mix of short, medium and longer-term actions are incorporated in this program, spanning across and beyond the next four-year business cycle.

Key planned actions

- Complete community climate risk profiles for all existing Calgary communities that detail community-specific drivers of climate risk, urban heat island analysis and equity considerations. These profiles will inform strategies and plans to reduce the unique sources of climate risk and guide risk-reducing investments within each community.
- Understand the impacts of climate change on vulnerable communities through engagement and integration of community vulnerability into the Community Climate Risk Index (CCRI) tool and Community Climate Risk Profiles.
- Develop a public facing interactive map that provides the detailed Community Climate Risk Profiles.
- Develop a toolkit of climate adaptation and disaster risk reduction measures based on the latest advancements in best practices that can inform City planners and partners as they implement measures to reduce risk and increase resilience.

Results	Monitoring & measurement
• Inclusion of community engagement information in CCRI profiles, and in planning and development toolkit information. • Climate adaptation toolkit available to support improved planning practices.	• Completion of all 264 CCRI reports for Calgary communities in 2023. • Completed Community-scale Guidebook for Climate Adaptation.

Key services

- Climate & Environmental Management
- City Planning & Policy

External collaboration

- The Farm Stand program is facilitated by The City to bring single vendors to community associations and other public spaces, improving community access to locally grown food and improving food system resilience by providing more pathways to market for regional growers.
- Implementation of the Food Resilience Plan will involve external collaboration with food-related businesses and organizations

Program Highlight

In 2017 a first set of Land Use Bylaw Amendments were approved by Council. The approved amendments included new "food production" uses to accommodate indoor models of food production including hydroponic, aquaponic, aeroponic and aquaculture in the Industrial and Commercial districts; clarifying the definition of "Extensive Agriculture" to allow for small buildings and greenhouses; and a definition for "Intensive Agriculture"; and Brewery, Winery and Distillery is now a permitted use in the Industrial-General and Industrial-Redevelopment districts.

Developing food resilience

Assessing and providing recommendations for action for the Calgary and regional area food system will support a food system that is consistently available, accessible, affordable, appropriate, and healthy for all Calgarians. Climate hazards can affect the food system by disrupting farming, production, goods, transportation, commercial and non-profit operations, labour, prices and more and can lead to food insecurity for residents and particularly those already experiencing chronic food insecurity. Calgary's heavy dependence on food produced from outside the city, combined with the interconnected nature of global food supplies, also means disruptions anywhere in the world can affect the availability and price of food locally. This two-year initiative will assess Calgary's food system and provide a Food Resilience Plan with recommended actions for implementation that will help manage acute crises that affect food security by addressing chronic inequities.

Key planned actions

- Develop an implementation plan for food preparedness strategies to encourage food system organizations and businesses in Calgary to prepare and plan for current and future climate risks.
- Develop and implement strategies to reduce climate change vulnerabilities of Calgary's food systems, including possible crafting and enacting policies and legislation that acknowledge and address climate risks to food security.
- Strengthen connections between vested parties in the food system to allow collaborative climate adaptation work between local and regional agriculture, and to support and strengthen local and community-scale food production.
- Support the regionalization and diversification of food supply chains by working with provincial and federal governments, private sector, and other partners on a multi-level approach to food system security.

Results	Monitoring & measurement
• A food system that is more resilient against short-term shocks and long-term stressors.	• Number of food system assets (urban farms, farm stands, food pantries, education programs).

Key services

- Community Strategies
- Neighbourhood Support
- City Planning & Policy
- Development Approvals
- Data, Analytics & Information Access
- Emergency Management & Business Continuity
- Climate & Environmental Management

Program Highlight

Calgary summers are getting increasingly hotter and drier. Extreme heat can put human health at risk, causing illnesses like heat stroke and even death.
The City's Disaster Risk Explorer has information about the risk of disasters in Calgary and what the City is doing to prepare for it. A recent addition is the development of a Weather Relief and Resources map that allows Calgarians to find and access detail about heating and cooling facilities in the city.

Emergency preparedness and business and service continuity

Supporting the delivery of City services by integrating projected climate risks into existing business continuity strategies and reducing the impact of these events on Calgarians, City personnel, facilities, operations and supply chains is critical. Calgary is in an area of high risk for extreme weather events, and we have invested significantly in preparedness measures. Our experience managing some of the largest disasters in Canadian history has informed our strategies with an overall focus on reducing the risk of hazardous events and increasing resilience. While The City of Calgary has effective and industry-leading disaster risk reduction practices in place, climate change poses additional risk management challenges. An expected overall increase in the number of severe weather events and climate extremes, such as heat events, will require the integration of climate adaptation into existing emergency management strategies and broader disaster risk reduction objectives.

Key planned actions

- Integrate disaster risk reduction principles into City strategies, policies and plans by enhancing communication and increasing collaboration amongst key City decision-makers.
- Develop an ongoing process of ensuring that critical strategies, policies and plans have relevant disaster risk reduction actions and principles integrated and climate risk management principles are incorporated.
- Integrate projected climate risks into existing service continuity strategies and plans.
- Integrate projected climate risks into existing health and safety protocols for City personnel.
- Identify and reduce climate vulnerability in The City's supply chain to ensure continuous operations during severe weather events and climate-related emergencies.
- Develop guidance and strategies for The City and businesses to integrate sustainable procurement practices that reduce climate risk.

Results	Monitoring & measurement
• Climate risk management and adaptation principles fully integrated into emergency strategies, policies and plans.	• Monitor how climate change is integrated in disaster risk plans and policies. • Number of public awareness messages for extreme heat warnings and poor air quality days.

Key services

- Stormwater Management
- Climate & Environmental Management
- City Planning & Policy

External collaboration

- Collaboration with TransAlta and the provincial government to advocate and champion improved upstream storage.
- Engaging with the provincial government on flood hazard map updates.
- Supporting and providing funding to Global Water Futures (GWF) to research how climate change will affect the flows regime in the Bow/Elbow rivers in the future.

Leveraging external investment

The Disaster Mitigation and Adaptation Fund (DMAF) provides funding up to 40 per cent of projects' cost and has been accessed for many flood projects post-2013. City projects continue to be completed that have been funded under the Alberta Community Resilience Program, Investing in Canada Infrastructure Program, New Building Canada Fund, Environmental Damages Fund, National Disaster Mitigation Program, and Municipal Stimulus Program.

Reducing risk from river flooding

Reducing the exposure and vulnerability of City water services and Calgarians to river flood events is critical. Increasing winter snow volumes, higher spring temperatures, rain on snow events, and changes in seasonality can all trigger river flooding in Calgary. Increased river and water table levels can lead to overland, river or groundwater flooding. This program area is supported by research on the climate influences for river flooding. Calgary's Flood Resilience Plan uses a three-layered approach where all the elements working together will reduce flood risk. This includes upstream flood protection on the Bow and Elbow Rivers, community-level flood protection, and property-level flood protection.

Key planned actions

- Improve upstream water storage solutions through collaboration with upstream water managers, licence holders and the provincial government to manage risks exacerbated by climate change, including flooding and drought.
- Through research and modelling, improve understanding of climate impacts on groundwater and flood frequency and severity to better integrate these climate risks into flood maps and planning policy for improved flood resilience.
- Update and align land use planning policy and regulations with the new flood maps and flood zone classifications.
- Update the Land Use Bylaw to integrate watershed management concepts and practices to support long-term water security and resilience to floods, droughts, and other changes in climate that influence our water resources.

Results	Monitoring & measurement
• Climate-related changes to river flooding are integrated into City decision making.	• Measurement of number of flood protection projects planned, underway and completed. • Measurement of change in predicted Annual Average Damages. • Refined and enhanced land use planning policies and regulations with respect to flood zones.

Key services

- Stormwater Management
- Climate & Environmental Management

External collaboration

- Support various Canadian Standards Association committees.
- Intact Centre on Climate Adaptation collaborative research efforts on minimizing risk of stormwater flooding.
- Alberta Low Impact Development Partnership (ALIDP) member improving stormwater management practices.
- Providing data and subject matter expertise to the University of Calgary and University of Alberta to better understand stormwater management.

Leveraging external investment

Leverage provincial and federal funds in order to deliver stormwater flood resiliency. The Upper Plateau Separation Project received funding from the Alberta Community Resilience Program and Investing in Canada Infrastructure Program.

Integrating climate change into stormwater management

This program aims to reduce the exposure and vulnerability of Calgarians to increased stormwater volume and reduced stormwater quality from higher intensity rainfall events. More unpredictable and extreme precipitation amounts are occurring, straining the stormwater system. Implementing stormwater management improvements in city projects, and within the established areas is increasingly important. Addressing stormwater systems shortfalls will help to support a resilient Calgary. Appropriate integration of the climate impacts to rainfall and stormwater into the Stormwater Strategy, plans, and guidelines is a key outcome of this program area.

Key planned actions

- Integrate climate projections in developing and updating stormwater management strategies, plans, policies and guidelines to provide systems that will be resilient to climate change.
- Improve our understanding of stormwater flood risk in different areas of the city, including current guidelines, processes and practices with the projected climate impacts to precipitation. Integrating this into stormwater infrastructure design and implementation to improve neighbourhood resilience.
- Develop and implement a Green Stormwater Infrastructure (GSI) Plan including ecosystem services and their efficacy at managing impacts of densification and climate change city-wide. Strengthen relationships with community-based organizations to develop, promote and use climate adaptation strategies for stormwater management.
- Implement stormwater management improvements to reduce risk from localized flooding and improve stormwater quality in established areas.

Results	Monitoring & measurement
• Updated Stormwater Strategy and Stormwater Management and Design Guidelines. • Updated climate change IDF curves and continuous simulation data that can be used for capital project and developer requirements.	• Number of properties at risk of localized stormwater flooding. • Amount of City and development investment in planned, underway and completed stormwater quality projects.

Key services

- Water Treatment & Supply
- Climate & Environmental Management

External collaboration

- Partnership with the University of Calgary and Advancing Canadian Water Assets to support research and development, knowledge transfer, and piloting of water, stormwater and wastewater treatment technologies.
- Partnership with Olds College and the Turf Growers Commodity Group on the water requirements of ornamental vegetation and drought implications.
- Supporting Global Water Futures research on climate impacts to flow regimes in the Bow/Elbow rivers.

Leveraging external investment

Low Carbon Economy Fund from the federal government is used to support The City of Calgary's wastewater biosolids demonstration project.

Integrating climate change into long-term water plans

This program focuses on reducing the exposure and vulnerability of City water services and Calgarians to changes in timing, volume, and quality of raw water from shifting seasonality, drought events and higher temperatures. Calgary will increasingly see changes in when and how water is received. Improving our understanding of how our rivers and the demands on them are changing can assist in adjusting processes to be more resilient. Continuous improvement in water loss, water usage, efficiency, conservation and protection practices support better water management. Climate adaptation is being integrated into decision making, planning and design of infrastructure. A key outcome of this program is the completion of the Drought Resilience Plan.

Key planned actions

- Improve The City's understanding of climate impacts on long-term river flow, water quality and demand to adjust planning, policies, engineering, and operational processes.
- Assess water treatment and distribution infrastructure and operational practices for climate change risks to ensure delivery of high-quality water.
- Improve water usage and water loss data to inform water efficiency and water loss management initiatives.
- Implement plans and policies such as the Source Water Protection Plan and Policy and the Drought Management Plan to better manage water. Strategic management of water licences, restrictions, and operations with regulators, interested parties and customers will be explored to improve water management.
- Investigate and implement innovative alternative water supply sources including water reuse and stormwater use to provide fit-for-purpose water.
- Improve understanding of climate risk to wastewater collection, treatment and Approval to Operate conditions to protect human health and aquatic life.

Results	Monitoring & measurement
• Drought management plan considering climate change and climate impacted watersheds. • Improved understanding of climate-related changes to long-term river flow, water quality and demand. • Improved water-use and water efficiency.	• Measurement of average day demand, peak day demand and instantaneous demand. • Tracking of customer taste and odour complaints.

Key services

- City Planning & Policy
- Development Approvals
- Climate & Environmental Management

External collaboration

- The City is committed to working with key building industry members and Calgarians to ensure proposed legislative changes and process updates are implementable and reflect inherent development and city building realities.
- The City is committed to leveraging the latest science and research provided by post secondary institutions, utility providers, energy industry leaders, non-profit organizations, and other levels of government.

Program Highlight

The Growth and Development Climate Framework is a made-in Calgary approach that aims to integrate climate considerations throughout the planning approvals continuum – from strategic planning, through to the construction stage. The intent is to provide a coordinated and meaningful approach to growth and development that has reduced GHG emissions (mitigation) and increased resiliency to the impacts of severe weather and longer-term climate conditions (adaptation). Work to implement the Growth and Development Climate Framework will continue in 2023-2026.

Focus land use planning to prioritize zero emissions and climate-resilient city design

Calgary is expected to reach a population of two million people over the next 50-60 years. Achieving a status of a net zero and climate-resilient city will require a shift to the way The City plans, finances, operates and facilitates buildout of new and redevelopment of existing communities. Holistic approaches to city-building must include new frameworks for land use planning, changes to building and infrastructure designs, and measures to enhance Calgary's resilience.

This program identifies strategic actions to establish process and legislative frameworks necessary for Calgary to become a leader in climate resilience and energy efficiency. The actions listed below have been integrated into the Council approved Growth and Development Climate Framework designed to integrate key objectives of the Climate Strategy into the planning approvals continuum.

Key planned actions

- Integrate climate mitigation and adaptation principles and requirements through updates to key processes, bylaws, policies, guidelines and standards that inform and enable new growth and redevelopment.
- Develop and implement Net Zero Emissions and Climate Resilient Design Guidelines for both new and established communities.
- Prioritize climate mitigation and adaptation in the review of subdivision outline plan applications.
- Consider all available options to enable climate innovation including additional flexibility in applying City subdivision design standards.
- Allow a greater mix of housing types and support uses throughout all parts of Calgary to facilitate complete communities and reduce dependency on private vehicles.

Results	Monitoring & measurement
• Key guiding legislation is in place so that the way Calgarians build new and renovate existing buildings, move around the city, and manage adaptation efforts in response to changing climate advances the goals of the updated Climate Strategy.	• Number of climate-resilient infrastructure projects. • Number of multi-community plans that used Community Climate Risk Profiles to inform planning policy. • Number or percentage of new buildings built to a net zero ready and/or net zero standards.

Key service lines

- Waste & Recycling
- Wastewater Collection & Treatment
- Climate & Environmental Management

External collaboration

- AIM Environmental Group (Compost Facility operator)
- ATCO
- ENMAX
- Alberta Environment & Parks

Program Highlight

The Calgary Composting Facility is the largest of its kind in Canada. The facility opened in 2017 and processes materials from the Green Cart Program and some biosolids, a nutrient-rich by-product of wastewater treatment. Plans are already underway to expand the facility due to the success of the Green Cart Program. The residential Green Cart Program diverted more than 110,000 tonnes of food and yard waste from landfill in 2021, which reduced methane emissions and produced valuable compost. Expansion of the Calgary Composting Facility is planned in 2023-2026 to meet city growth needs and generate renewable natural gas.

Waste reduction, diversion, and methane management

The purpose of this program pathway is to reduce waste-related GHG emissions (i.e., methane) from landfills, the compost facility, and wastewater treatment plants. Methane emissions represent approximately 37 per cent of corporate GHG emissions and one per cent of community GHG emissions. Landfill gas is produced by decomposition of organic waste (primarily food and yard waste) and is caused by the consumption and disposal behaviours of Calgarians. Since landfill gas is emitted over the course of decades, The City stewards these emissions for the lifetime of its waste management facilities, and they create a future liability for The City.

The City can further reduce landfill gas emissions by enabling Calgarians to reduce or divert the amount of organic waste that is disposed in the garbage and by managing GHG emissions at landfills. GHG emissions are also released when organic material in wastewater decomposes to produce methane, which can also be destroyed or converted to useable biogas.

Key planned actions

- Promote further waste reduction by developing and implementing a food and organic waste strategy, establishing partnerships to pilot food waste reduction initiatives, and piloting circular economy grants to enable reuse and repair initiatives.
- Continue to optimize waste diversion programs, education, and outreach to improve program participation.
- Expand waste diversion program assessments to guide continual improvement.
- Expand and maintain landfill gas management infrastructure.
- Generate electricity from landfill gas.
- Expand Calgary Composting Facility to meet city growth needs and generate renewable natural gas.
- Explore and implement opportunities for self-sufficient production of power and utilization of waste by-products such as biogas at water and wastewater treatment plants.

Results	Monitoring & measurement
• Reduction in organic waste in garbage. • Reduction in GHG emissions due to landfill gas management. • Maximize biogas utilization from wastewater treatment plants.	• Waste-related GHG emissions. • Waste generation and diversion. • Energy generated from landfill gas. • Wastewater biogas captured.

Key services

- Climate & Environmental Management
- Capital Priorities & Investment
- Facilities Management
- Infrastructure & Engineering

External collaboration

- NRCan improving climate resilience of infrastructure with new tools, guides and codes. Many City SMEs (Subject Matter Experts) are supporting this work.
- Institute for Catastrophic Loss Reduction –City SMEs on Advisory Committees.
- Adaptation Resilience Training (ART) is a provincial initiative that Calgary has supported since its' inception to improve professional training and opportunities in adaptation.
- Integrating community climate risk and embedding climate resilience in public infrastructure projects like the Forest Lawn Multiplex.

Leveraging external investment

- Climate risk assessments are required to support many federal funding infrastructure applications.

Building new City-owned infrastructure to be climate resilient

This program incorporates climate resilience into new City-owned infrastructure to reduce the impacts of climate change. Most new public infrastructure will have a service life until the end of this century, when the full force of climate change will be apparent. Over the next 10 years, The City will be updating practices, guidelines and policies in conjunction with regulatory partners, operators and interested parties. Incorporating shifting climatic conditions will be important so public assets continue to deliver services regardless of climate impacts. The City can directly influence the design standards, guidelines and practices for wholly-owned and third-party partnership facilities and infrastructure. The City also has the ability to advocate, support and drive change in provincially and federally mandated regulations, standards and guidelines. This requires a combination of collaborative capacity building through education, training and knowledge sharing, research and analysis, and the application of higher standards.

Key planned actions

- Deliver a series of climate risk training sessions to continue to build capacity across The City and with industry partners.
- Support enhanced external climate change training for targeted infrastructure and approvals staff in key positions.
- Complete Climate Risk and Resilience Assessments for facilities and infrastructure to identify and prioritize risk reduction opportunities.
- Administer a Centralized Climate Fund to support incorporation of prioritized climate adaptation measures.
- Update standards including the Sustainable Building Guidance Document and The City of Calgary Design Guidelines to incorporate climate resilience.

Results	Monitoring & measurement
• Increased organizational and industry capacity to implement climate adaptation measures for infrastructure.	• Number of staff trained and the number external professionals / students receiving information from City experts. • Climate resilience measures integrated into infrastructure design. • City standards, guidelines and policies are updated to incorporate climate resilience.

Key services

- Facility Management
- Affordable Housing
- Climate & Environmental Management
- Capital Priorities & Investment

External collaboration

- Infrastructure and Buildings - Adaptation State of Play Report – being updated by Infrastructure Canada Working Group for improving building resilience. City SMEs are supporting this update through review and expertise.

Leveraging external investment

Climate risk assessments are required to support many federal infrastructure funding applications.

Program Highlight

The Marda Loop Main Streets Project underwent a Climate Risk and Resilience Assessment process and integrated information from associated Community Climate Risk Profiles to design a unique, holistic, and climate resilient main street for the Marda Loop communities. This process of climate resilience integration is also being trialed in similar projects such as Stephen Avenue and the Manchester Industrial Complex.

Reducing climate risk to existing City-owned infrastructure

Assessing, prioritizing and retrofitting City-owned infrastructure to be more resilient to climate change demonstrates leadership to the community. The City owns more than $90 billion of total assets, supporting more than 28 services (e.g., buildings, sports and recreation facilities, water and wastewater infrastructure, roads, bridges, pathways, and transit). This existing infrastructure was designed and maintained based on historic climate norms which may not be resilient to future climate impacts. Risks that are amplified due to climate change must be assessed and addressed through operations, maintenance and retrofit stages of infrastructure and facility life cycles to maintain long-term infrastructure performance. This program will focus on understanding the risk profile of existing City infrastructure, prioritizing buildings in the next four years. It will work to integrate climate risk perspectives into asset management processes as this is critical to providing long-lasting infrastructure and services for Calgarians.

Key planned actions

- Integrate climate risk and adaptation into asset management processes and practices (e.g., targeted investigations within Building Condition Assessments, asset deterioration modelling) to better identify and manage investment.
- Develop a screening process for climate risk to supplement the Climate Risk and Resilience Assessment process to identify and incorporate risk reduction measures in a more streamlined manner.
- Complete an Economic Climate Risk Analysis for City buildings to better understand the impacts of climate adaptation on our facility portfolio, identify risk reduction measures, and understand the investment impacts.
- Develop a guide for climate-resilient retrofits for facilities to support the tangible implementation of climate risk reduction measures.
- Administer a Centralized Climate Fund to support prioritized climate resilience measures in retrofit projects.

Results	Monitoring & measurement
• Improved longevity, durability, and business continuity outcomes from more climate adapted infrastructure.	• Number of existing City-owned or managed assets that are screened for climate risk, and the number of retrofit projects that incorporate climate resilience measures. • Economic climate risk analysis is completed for City buildings so that we can monitor the projected cost of climate risk to City-owned facilities.

Key services

- Building Safety
- Climate & Environmental Management
- Development Approvals
- Affordable Housing

External collaboration

- Institute for Catastrophic Loss Reduction - The City will be engaging, supporting, working with, and learning from industry and regulators in the development of climate resilient building standards, guidelines, and incentive programs.
- There are some co-beneficial adaptation practices with existing energy efficiency programs (e.g., Canada Greener Home Grant) however none are focused on adaption. Collaboration across sectors and jurisdictions will be necessary to offer incentive programs and the option for low-interest financing.

Program Highlight

The Resilient Roofing Program, rolled out in the aftermath of the June 2020 hailstorm, won a national award for Resilience in Recovery from the Institute for Catastrophic Loss Reduction (ICLR). The rebate program helped some 1600 Calgary homeowners install impact-resistant roofing. The Program and education associated with it, provided an opportunity to build awareness about climate hazards in Calgary and what Calgarian's can do to reduce their risk.

Developing climate-resilient private homes and buildings

The goal of this program is that private homes and industrial, commercial and institutional (ICI) buildings are resilient to the effects of climate change. The City will work within its legislative authority to improve climate resilience in private homes and ICI buildings through education, engagement, advocacy, and incentive programs. Although often considered as a privately managed cost, the true impacts of climate related damages and insurance claims have a broad societal impact and implications for City costs and services. A holistic approach to climate resilience, low carbon energy alternatives and buildings that promote wellness is necessary to manage the many facets of climate change and avoid maladaptive measures.

Key planned actions

- Launch the Climate Ready Home Program as a pilot method to engage, inform, and support Calgarians.
- Conduct a financial analysis to investigate the Return on Investment (RoI) and market cost implications of common climate resilience measures for homes.
- Incorporate aspects of climate risk and resilience assessments into the Development Permit process for new builds.
- Scope a potential incentive program to support climate ready home resilience measures, building on lessons learned from similar programs.
- Develop a low-interest financing program (e.g., similar to the Clean Energy Improvement Program) to support homeowners in making their homes more climate-resilient.
- Support key pilot projects in affordable housing to demonstrate the RoI for energy efficiency and climate-resilience in non-market housing.
- Develop a Climate Ready Guide for the ICI sector.

Results	Monitoring & measurement
• Calgary's stock of private homes and buildings are more suited to the changing climate, improving outcomes for Calgarians.	• Track the number of units of climate-resilient affordable housing built/retrofit/supported annually. • Once it is in place, The City will track the number of people accessing the climate-resilient retrofit financing program. • Monitor the number of new builds that integrate climate resilience measures. • Track the number of climate risk and resilience assessments that are completed for major private sector development permits for new projects.

Key services

- Climate & Environmental Management
- Facility Management
- Infrastructure & Engineering
- Affordable Housing
- Building Safety
- Development Approvals
- Capital Prioritization & Investment

External collaboration

- Opportunity for partnership with external organizations for development of net zero buildings innovation centre.
- Input provided on the 2020 edition of the National Energy Code of Canada for Buildings.
- Alberta Ecotrust manages the Climate Innovation Fund that invests in low carbon projects including the new building sector.
- Government of Alberta (for support on piloting Affordable Housing net zero buildings).

Program Highlight

The City of Calgary has been engaging with key interested parties to develop a program design for a mandatory building energy labelling program for new buildings. The concept has strong collaborative support. Work on further developing and launching the program will continue in the 2023-2026 business cycle.

Build new buildings to a net zero emissions standard

New high-performance buildings will use much less energy and produce less GHG emissions over the lifetime of the buildings. It is typically easier and more cost effective to build new buildings to a high energy performance standard than retrofitting the same building once it's already been constructed. To meet our 2030 and 2050 emissions targets, building performance must improve more quickly than the energy codes currently dictate and the key actions in this pathway are designed to eventually move to a Net Zero Emissions Building Standard for Calgary. A mix of short, medium and longer-term actions is incorporated in this program, spanning across and beyond the next four-year business cycle.

Key planned actions

- Require disclosure of building energy performance through energy labelling for all new residential buildings and through the Commercial and Institutional Energy Benchmarking program for all new commercial buildings.
- Facilitate the establishment of a centre for innovation, capacity building, and partnership to accelerate net zero emission buildings in Calgary, similar to the Vancouver's Zero Emissions Building Exchange (ZEBx).
- Continue the Net Zero Priority Stream to streamline The City's development approvals processes for net zero and net zero ready certified new buildings.
- Explore the potential adoption of a higher tier of the National Building Code of Canada, on the pathway to net zero buildings, in collaboration with key interested parties.
- Continue to invest in resilient and low-emissions infrastructure through the Sustainable Infrastructure Capital Program, which supports technology pilots, engineering and design, implementation planning, and solution deployment.
- Update the Sustainable Building Policy to improve building efficiency, reduce GHG emissions, and to ensure corporate and partner building and infrastructure projects consider the path to net-zero emissions by 2050 during design.

Results

- More new buildings are built to a high energy performance standard on the pathway to net zero.
- Increased availability of energy performance data for new buildings.
- Increased collaboration and capacity for net zero design and building within the construction sector.

Monitoring & measurement

- Number of pilot projects initiated for net zero carbon facilities.
- Number of commercial buildings disclosing energy performance.
- Number of new net zero buildings built in Calgary, tracked through the energy label

Key services

- Climate & Environmental Management
- Facility Management
- Infrastructure & Engineering
- Building Safety
- Development Approvals
- Capital Priorities & Investment

External collaboration

- The City is a participating municipality in the Canadian Home Builders' Association 'Net Zero Energy Ready Residential Renovations' initiative.
- City SMEs participate in QUEST Canada's National Deep Energy Retrofit Working Group.

Leveraging external investment

- The City leveraged its initial investment in the residential Clean Energy Improvement Program to secure a loan and grant from the Federation of Canadian Municipalities, more than tripling the available funding for the program.
- Execute the Public Buildings Retrofit Initiative investment program to leverage private sector capital and low interest financing to retrofit City owned and Civic Partner facilities to achieve energy, emissions, and operating cost savings.
- Alberta Ecotrust manages the Climate Innovation Fund that invests in low carbon projects including in existing buildings.

Retrofit existing buildings to a net zero standard

Approximately 50 per cent of the buildings standing in Calgary today will still be in use in 2050. This means that ambitious and widespread building retrofits, like building envelope improvements, heating and cooling equipment upgrades, and on-site renewable energy system installations, need to occur now. This can be challenging as retrofits can be more expensive and complicated than simply building new buildings to a net zero emissions standard at construction. This program reduces the barriers of energy retrofits, through education, capacity building, incentives, financing, and eventually through regulation.

Key planned actions

- Facilitate the disclosure of existing building energy performance through a residential digital energy labelling program and the Commercial and Institutional Energy Benchmarking program.
- Launch the Clean Energy Improvement Program, an accessible financing offering for residential building owners to invest in energy efficiency and renewable energy improvements and continue developing other innovative financing offerings for both residential and commercial buildings.
- Design and implement the Deep Energy Retrofit Challenge, an energy performance and climate resilience grant program linked to the Downtown Conversion Incentive Program.
- Participate in the Canadian Home Builders' Association's 'Net Zero Energy Ready Residential Renovations' initiative to provide training to local renovators and industry partners and to pilot residential deep energy retrofit projects.
- Develop Low Carbon & Climate Resilient Affordable Housing Pilot Projects.
- Develop incentive programs to support deep energy retrofits, including waiving building permit fees to incentivize low carbon renovation projects.
- Complete engagement and initial development of a Net Zero Emissions Retrofit Standard in Calgary that aligns with federal government direction.
- Develop the City Facility Climate and Energy Plan to optimize, utilize, and advance decision making around asset sustainment, operational and maintenance activities of Facility Management's portfolio to achieve an improved environmental footprint.
- Use the Facility Climate Sustainment Fund to invest in opportunities to improve energy performance that do not meet the requirements for typical sustainment funding (e.g., piloting zero carbon/low carbon facilities).

Results	Monitoring & measurement
• Existing buildings are retrofitted to a high energy performance standard on the pathway to net zero. • Increased availability of energy performance data for existing buildings. • Increased collaboration and capacity for net zero design and retrofits within the renovation sector.	• Number of buildings disclosing energy performance. • Number of Clean Energy Improvement Program applicants. • Number of buildings with improved energy performance in Calgary. • Number of deep energy retrofit pilot projects initiated.

Key services

- Climate & Environmental Management
- Community Strategies
- Social Programs

External collaboration

- Alberta Ecotrust - Energy Poverty Reduction and Home Upgrades Program.

Program Highlight

The Calgary Energy Poverty Reduction and Home Upgrades Program is an initiative run by Alberta Ecotrust Foundation designed to address the unique challenges faced by Calgary families living in energy poverty. Leveraging established and emerging partner and support organizations, Alberta Ecotrust, and their delivery partner Empower Me, will deliver a program that will aim to provide energy efficiency education and upgrades to 100 or more homes of Calgary families living in energy poverty, and present an approach for a long-term program.

Support Calgarians impacted by energy poverty

Energy poverty means that a household is spending twice the Canadian average percentage of after-tax household income spent on energy bills. These households are often unable to reduce their energy usage through renovations because they are tenants and/or they cannot afford the up-front costs. There are direct linkages between experiencing energy poverty and other impacts to health and wellness (e.g., difficulties paying for other necessities, uncomfortable homes, or mental health impacts).

The key actions in this program are intended to support those Calgarians living in energy poverty and ensure that programs do not inadvertently exacerbate the problems of energy poverty for Calgarians with low income or other equity deserving Calgarians. The first step in achieving these objectives is meaningful engagement with those experiencing energy poverty to better understand their perspective and needs and avoid creating programs based on assumptions about who is experiencing energy poverty.

Key planned actions

- Complete meaningful engagement with Calgarians impacted by energy poverty and integrate their perspective and feedback into the development of a strategy to alleviate energy poverty in Calgary.
- Integrate energy poverty and equity considerations identified in the strategy or identified by community partners into the design and implementation of all climate mitigation initiatives.
- Develop community investment programs, in partnership with community partners, to provide the specific support required for those experiencing energy poverty to reduce their energy usage as identified in the strategy.

Results	Monitoring & measurement
• Improved understanding of the specific barriers faced by those experiencing energy poverty. • Reduction in the number of households experiencing energy poverty.	• Number of impacted Calgarians engaged. • Number of households experiencing energy poverty.

Key services

- Climate & Environmental Management
- Facility Management
- City Planning & Policy

External collaboration

- Atlantica Sustainable Infrastructure owns and operates the Calgary District Heating Centre and is exploring low-carbon fuel transition.
- The University of Calgary is exploring the decarbonization of their district energy system, with support from The City of Calgary.
- Existing 100% renewable electricity supply contract with ENMAX.

Program Highlight

The City of Calgary is currently building about 1880 kW of solar parks at Mount Pleasant Fire Station No7, Bearspaw Water Treatment Plant, Manchester Building M, TELUS Spark PV ground-mount and Shepard Solar Park. The City continues to identify opportunities for solar PV installations on our own facilities and with our Civic Partners.

Support local renewable energy projects

On-site small-scale systems and utility or neighbourhood-scale projects, such as solar photovoltaic (PV) or district energy systems, will provide an important source of zero carbon energy in Calgary. District energy systems can use waste heat or low carbon fuel sources to supply heating and cooling to multiple buildings and improve overall system performance. Renewable energy can provide a localized source of low carbon energy.

Key planned actions

- Develop a district energy strategy to support the implementation and expansion of low-carbon district energy systems in suitable areas.
- Support the transition of existing district energy systems (e.g., Calgary District Energy Centre) to low carbon fuel sources.
- Collaborate with external partners to expand connections to the existing district energy system.
- Develop a solar photo voltaic (PV) strategy to accelerate and support the implementation of solar PV across residential, commercial, industrial, and community applications.
- Develop the Corporate Energy Supply and Development Strategy which provides guiding principles and recommended actions for procuring, managing and investing in a more renewable and low carbon corporate energy portfolio (e.g., grid electricity, natural gas, liquid fuels, etc.).
- Investigate and invest in small/large-scale distributed solar and renewable heat project opportunities at new and existing City facilities.
- Continue to work with Civic Partners to identify opportunities to implement renewable energy projects.

Results	Monitoring & measurement
• Transition of existing energy systems to low carbon fuel sources. • Increased installation rates of solar PV systems across building sectors.	• Percentage of corporate energy consumption that is from renewable sources. • Number of buildings connected to low-carbon district energy systems. • Number of neighbourhood-scale renewable energy projects. • Number of solar PV installations.

Key services

- Climate & Environmental Management
- Corporate Governance

External collaboration

- ENMAX
- ATCO
- Alberta Utilities Commission (AUC)
- Alberta Energy Efficiency Alliance (AEEA) – Demand Side Management Advocacy.
- Government Relations will support with advocacy to other orders of government and the AUC.
- The federal government has announced funding to support grid decarbonization, including $600 million to the Smart Renewables and Electrification Pathways Program to support additional renewable electricity and grid modernization projects.

Program Highlight

The City of Calgary currently has a contract with ENMAX until 2026 to purchase renewable electricity certificates to cover 100 per cent of the electricity used in City operations.

Support a clean provincial energy supply

Reducing the GHG emissions intensity of provincial electricity and heating fuels is mostly outside The City of Calgary's jurisdiction as those systems are managed by other provincial bodies. The pace and scale of greening the provincial electricity and natural gas supply directly impacts Calgary's overall emissions and meeting our net zero emissions targets significantly depends on these fuels becoming zero carbon by 2050.

This program recognizes action must happen at the provincial scale and identifies important collaboration, partnerships and advocacy that The City can do to support the clean transition of the provincial electricity and natural gas supply.

Key planned actions

- Work with electric utilities (e.g., ENMAX) to support grid and service upgrades in Calgary to support electrification of heating and transportation systems through research, business case development, and policy changes.
- Work with natural gas suppliers (e.g., ATCO) to explore low carbon fuels for heating, specifically hydrogen, in alignment with the federal and provincial governments through research, business case development, or policy changes.
- Integrate the hydrogen strategy data into GHG emissions data modelling to quantify opportunities for leveraging hydrogen to decarbonize building heating.
- Advocate to the provincial and federal governments and the Alberta Utilities Commission to support low carbon energy, low carbon heating fuels, demand side management, energy storage and expanded data access.

Results	Monitoring & measurement
• Decreasing GHG emissions intensity of both electricity and heating fuel in Alberta. • Improved coordination between The City and interested parties on advocacy efforts.	• GHG emissions intensity of electricity and heating fuels.

Key services

- Climate & Environmental Management
- Fleet Management
- Public Transit
- Police Services
- Building Safety
- Parking
- Streets

External collaboration

- The Federal government has launched the Incentives for Zero-Emission Vehicles Program, Zero Emission Vehicle Infrastructure Program, the Incentives for Medium and Heavy Duty Zero Emission Vehicles Program, and the Clean Fuel Regulations.
- Zero Emissions Transit Fund.
- Canada Infrastructure Bank.
- Calgary Parking Authority has installed and maintains electric vehicle charging infrastructure in several downtown locations.
- Provincial and federal government (for funding opportunities and transit infrastructure partnerships).
- ENMAX's fleet electrification.

Leveraging external investment

- The City is working to identify opportunities to leverage financing from the Canada Infrastructure Bank for including zero-emission transit as well as energy retrofits of public buildings.

Accelerate the transition to zero emission vehicles

Fuel switching in vehicles is the most significant opportunity to reduce emissions in the transportation sector in the short-to-medium term. Transition to electric vehicles (EV) and other technologies (e.g., hydrogen vehicles) will need to occur in both privately-owned vehicles and commercial fleets. This program is focused on supporting the transition to zero emission vehicles while keeping program design equitable and accessible to all Calgarians. By converting corporate fleets to zero emission vehicles, The City can pilot new vehicle types and demonstrate their feasibility for the broader community.

Key planned actions

- Leverage funding from other orders of government or provide support to private institutions to implement public electric vehicle charging infrastructure.
- Develop incentive programs to support EV charging infrastructure in both existing multi-unit residential buildings and non-residential public locations.
- Through policy and bylaw changes, require all new residential buildings to be EV-ready and commercial buildings to be 10 per cent EV-ready with 90 per cent conduit/partial readiness.
- Implement the Green Fleet Strategy by modernizing municipal fleet vehicles, equipment, and fueling infrastructure, achieving GHG emission targets, and positions Calgary as a municipal climate change leader.
- Implement the Calgary Transit Fleet Emission Reduction Plan to start replacing diesel buses due for replacement with battery electric buses and compressed natural gas buses with associated infrastructure, pending federal government funding.
- Pilot hybrid vehicles and battery electric vehicles for Calgary Police Services' Police Pursuit Vehicles when available.

Results	Monitoring & measurement
• Increased number of zero emission vehicles in Calgary. • Improved access to charging infrastructure across the city.	• Number of EV or other zero emissions vehicles registered in Calgary. • Number of public and residential EV chargers. • Percentage of corporate fleet converted to low carbon vehicles. • Number of medium and heavy-duty low carbon vehicle pilots initiated.

Program Highlight

The City of Calgary invested $120,000 to leverage $2 million in federal, provincial and regional partner funding to design the network for, procure and install 20 EV fast-charging stations in the southern Alberta Peaks-to-Prairies EV network This unique regional collaboration has significant benefits for Calgary drivers and has economic development benefits in Calgary and in partner communities. EV fleet vehicles will be piloted throughout the City fleet in 2023-2026.

Key services

- City Planning & Policy
- Public Transit
- Sidewalks & Pathways
- Streets
- Infrastructure & Engineering

External collaboration

- Government of Canada and Government of Alberta

Leveraging external investment

The Green Line LRT project has received $1.64B in funding from the Government of Canada, and $1.7B in funding from the Government of Alberta.

Increase the mode share of zero or low emissions transportation modes

High quality transit, walking and wheeling infrastructure and carpooling networks provide the backbone of a low carbon transportation system and were consistently identified as a priority in the initial engagement with equity-deserving people and groups. The City of Calgary should reinvest in infrastructure, frequent and convenient transit service, consistent and prioritized maintenance and snow clearing, and improved comfort and safety to achieve both climate action and equity objectives.

Key planned actions

- Integrate explicit evaluation of, and accounting for, the GHG emission impacts associated with transportation infrastructure investment alternatives as part of The City`s corporate infrastructure investment planning process.
- Explore ways to increase investment in walking and wheeling infrastructure, and revise community design and development standards to support implementation.
- Identify opportunities to repurpose existing vehicle travel lanes and update policies and complete streets design guidelines to prioritize active mobility, transit, green infrastructure, and traffic safety.
- Continue implementing the Green Line LRT to improve accessibility of low-carbon public transit.

Results	Monitoring & measurement
• Increased mode share of low carbon modes, including transit, walking and wheeling.	• Total investment towards walking and wheeling infrastructure. • Length of 5A network. • City-wide mode share percentages.

Key services

- Climate & Environmental Management
- Parks & Open Spaces
- Urban Forestry
- Stormwater Management
- City Planning & Policy

External collaboration

- CSA Natural Asset Inventory Standard – City staff support the development of federal standards for natural asset management and reporting (Public Sector Accounting Board).
- The City supports the international Task Force for Nature-related Financial Disclosure in developing standards for reporting.

Program Highlight

A Natural Asset Inventory and Valuation for The City of Calgary was completed in 2021 and has been requested by cities throughout Canada as guidance for their inventory work. Investigating upstream natural assets in the Bow watershed is underway to provide further regional context.

Integrating the benefits of natural infrastructure

The value of natural infrastructure is integrated into decision making through regulatory, management, educational and operational practices. Natural infrastructure is critical to supporting biodiversity, sequestering carbon, reducing climate risk and providing ecosystem services that enhance the wellbeing of all Calgarians. While the intrinsic value of nature for environmental and human wellbeing is appreciated, the conventional metrics of economics and development can often lead to its undervaluation in municipal finances. Integrating the value of natural assets into decision making, including through asset management, accounting and financial reporting, ensures they are preserved and well managed into the future.

Key planned actions

- Expand the scope of the natural asset valuation analysis with a focus on the key services provided, critical assets, and using site-specific case studies. This will help to protect natural assets through improved land use planning and influence decision making.
- Improve access to data through online tools and features to use natural asset valuation information effectively in decision making.
- Integrate natural assets into corporate asset management processes and practices and financial reporting to better manage and monitor the health of our natural assets.

Results	Monitoring & measurement
• Natural assets are better preserved, managed, maintained, and built across the city to protect their multi-service provision, including climate adaption.	• Monitor the number of City processes or policies that integrate natural asset value (e.g., The Municipal Development Plan [MDP]). • The service value of natural assets owned and operated by The City of Calgary.

Key services

- Climate & Environmental Management
- Parks & Open Spaces
- Urban Forestry
- Stormwater Management
- City Planning & Policy

External collaboration

- International Institute for Sustainable Development (IISD) is advancing the practice of natural infrastructure, City SMEs are engaged through interviews, case studies and invited forum guests.
- Investigating opportunities to support industry and private landowners in lot-level tree planting and site naturalization to increase climate resilience, biodiversity and ecosystem services of natural infrastructure on their lands.

Leveraging external investment

The Natural Infrastructure Fund is currently accepting applications and four projects, totaling $10M, have been submitted from The City to the federal government. Grants for natural infrastructure are highly competitive across Canada, and through improved access to information and sharing what we are doing at The City, there is a stronger likelihood for success.

Preserving, restoring, and building natural infrastructure

This program ensures that natural infrastructure is preserved, restored, built and maintained as a multi-benefit solution to continue to reduce the impacts of a changing climate. Implementing practices to reduce climate risk to natural infrastructure is necessary as it is vulnerable to the impacts of climate change. Partnering with the private sector to find solutions are also necessary. Through green stormwater infrastructure, roadside naturalization, green roofs, habitat restoration and native landscaping practices, the benefits of natural assets can be built directly into the urban fabric of our city. We must support practices such as tree planting, invasive species management and the use of native and climate-adapted species that improve the natural capacity to thrive.

Key planned actions

- Develop policies and plans that protect natural infrastructure and incorporate its' climate adaptive services and value into city-building processes (e.g., Municipal Development Plan, Land Use Bylaw, Open Space Plan).
- Develop an integrated funding strategy for the preservation, operation, restoration and creation of natural infrastructure, with shared climate adaptation, biodiversity, community and watershed health outcomes.
- Develop guidance to support implementation such as green stormwater infrastructure guidelines, green roof recommendations, landscape specifications, restoration guidelines and private tree protection to create more climate-adapted natural infrastructure.
- Increase the habitat restoration program in conjunction with key community initiatives to improve access to natural infrastructure across the city.
- Grow and maintain the urban canopy to realize the benefits of urban trees across the city on both public and private land.

Results	Monitoring & measurement
• Natural assets are better preserved, managed, maintained, and built across the city to protect their multi-service provision, including climate adaption.	• Improving the urban canopy to strive for the City target (14 to 20 per cent by 2058). • Track the number and hectares of climate-resilient natural infrastructure projects supported by the centralized Climate Infrastructure Fund. • Track the hectares of active restoration/hectares of completed restoration and the average Riparian Health Score across the city.

Key services

- Climate & Environmental Management

External Collaboration

Partnership Programs

- CPAWS - Climate Game Changers Program.
- ACEE - EcoSchools Canada.
- Empower Me - Home Energy Efficiency, Water Conservation, and Waste Diversion Education Program for New Canadians.
- Solar Alberta – Sponsorship for Solar Show and Solar seminar.
- Calgary Climate Hub – Silver Sponsor for climate programming.

Events

- Calgary Climate Symposium – 17 community partners.
- Arusha Centre - Calgary Unplugged: An Earth Hour Celebration and Energy Efficiency Day.
- Earth Day Canada - EcoHack-a-City (2021).
- Eco-Solar Home Tour - Silver Sponsor for Solar Alberta.
- Mayor's Environment Expo – 15 partners and sponsors.

Program Highlight

EcoSchools Canada is a certification program for K-12 schools that nurtures environmental learning and climate action, available for free to all publicly funded Alberta Schools. Reaching approximately 1 million students and over 100 school boards and districts annually, it is the largest bilingual environmental certification program for Canadian schools. Thanks to support from the City of Calgary, funding for action projects is available for Calgary EcoSchools in the 2022-2023 school year.

Education & outreach

This is a wide-ranging program to support the goals of the Calgary Climate Strategy: Pathways to 2050 by educating and engaging Calgarians in climate change processes and climate actions. This program's approach includes activities that lead to behavior change that contributes to reduced emissions and climate resilience. It also leverages the resources of The City and partner organizations to provide programs and educational services on The City's behalf, and specifically addressing equity-deserving communities in the city.

Key planned actions

- Pursue partnership opportunities with academic institutions, non-profit organizations and private businesses to support innovation, research, pilots and implementation of actions in the Mitigation and Adaptation Plans.
- Work with community partners to roll out a community Climate Ambassador Program.
- Develop and implement a community-based citizen support program for climate.
- Implement a 4-year climate outreach and behaviour change campaign.
- Implement the Arusha Climate Program initiatives (including Energy Efficiency Day, Earth Hour, Renewable Energy Climate Booth, etc.).
- Develop a social media campaign connecting with influencers, academic leaders etc. in certain target demographics that The City needs to connect with to champion climate change actions.
- Develop a multi-faceted and multi-year climate marketing campaign.

Results

- Behavior change amongst Calgarians, towards reduced emissions and climate resilience.
- Calgary community support for climate actions.

Monitoring & measurement

- Number of outreach and education programs delivered annually, including those in partnership with other organizations.
- Number of Calgarians attending outreach and educational programs.
- Number of partnering organizations supporting climate actions.
- Number of climate ambassadors and communities that are represented in the program.
- Number of community-based organizations supported by The City for climate adaptation and mitigation action.

Appendix A – Climate Reporting Framework

To enhance transparency, accessibility and alignment of various reporting outcomes, key climate information, including the progress on the actions within the Implementation Plan, is being consolidated and integrated into three central City reporting documents starting in 2023: the Accountability Report, Annual Financial Report, and Climate Annual Report (as shown in Figure A-1 below).

Figure A-1: The City of Calgary's climate reporting framework timeline and main reporting processes.

ACCOUNTABILITY REPORT
Executive Committee

Focus: City's Progress on Four-year Plans and Budgets

The City's Accountability Report provides an update on progress towards the City's four-year plans and budgets, summarizing service performance results, progress on Council's priorities, and compares budgeted to actual expenditures. The City has updated climate-related performance measures for the new Climate & Environmental Management service line as part of the 2023-2036 Service Plans and Budgets. Climate reporting is being incorporated in a comprehensive and integrated way in Accountability Reporting for the 2023-2026 Service Plans and Budgets.

Key information provided in report:

- Accountability reporting by service line, including challenges, emerging issues or opportunities, progress on approved initiatives and performance measures, and comparison of budgeted to actual expenditures (operating and capital)
- Community indicators of how the community is doing (e.g., community GHG emissions)
- The Climate & Environmental Management Service Line's climate-related performance measures:
    - Corporate GHG emissions measures progress towards Council-approved target of net-zero emissions by 2050

	○ Tracking Adaptation and Measuring Development (TAMD) annual assessment score aggregates metrics on the following for climate adaptation: ▪ Integration into planning, policy and strategies ▪ Budgeting and finance ▪ Institutional knowledge and capacity ▪ Adaptation planning under uncertainty ▪ Participation and awareness • The City is exploring an overarching strategy for an ESG reporting framework that will further enhance accountability and transparency.
 **ANNUAL FINANCIAL REPORT** **Audit Committee**	Focus: Financial Health of the Corporation The City's Annual Financial Report (the Annual Report) provides a comprehensive view of consolidated financial statements in accordance with Public Sector Accounting Board (PSAB) for local governments. In 2021, The City's Annual Financial Report included The City's first year of unaudited Climate-related Financial Disclosure (CRFD). The Task Force on Climate-related Financial Disclosures (TCFD) developed an international framework for CRFDs and the Chartered Professional Accountants of Canada (CPA Canada) provided guidance for municipalities on relevant and complete disclosures as part of an overall public sector Environmental, Social, Governance (ESG) framework. The City is working with the largest municipalities in Canada to determine the content of the CRFD section. Transitioning from unaudited to audited disclosures will evolve over the next five to ten years.
	Key information provided in report: • Audited section of Report[1] ○ Annual cross corporate climate-related spend which will improve in detail as climate-related financial instruments improve • Unaudited section of Report (Climate-related Financial Disclosure) ○ Total cross corporate climate-related budget (actuals) ○ Climate governance and strategy around climate-related risks and opportunities and how these impact planning and financial decisions, including: ▪ High-level summary of climate policy and decision-making frameworks ▪ Corporate GHG emissions ▪ Corporate Carbon Budget *(future)* ○ Climate risk management processes used by The City to identify, assess and manage climate-related risks ○ Metrics and targets used to assess and manage relevant climate-related risks and opportunities

ANNUAL CLIMATE REPORT
Community Development Committee

Focus: Progress on Calgary Climate Strategy

The City's Annual Climate Report is a summary of progress on climate action presented once per year to City Council. Annual reports were provided for the 2019 and 2020 reporting years. Timelines, scope, and alignment to the updated Climate Strategy - Pathways to 2050 will be adjusted for the 2022 reporting year (presented to Council in 2023).

Key information provided in report:

- Detailed reporting of GHG emissions (community and corporate)
- Sector-specific GHG emissions targets and milestones as per the 12 pathways
- Progress on climate action, including:
  - Progress towards understanding Indigenous world views and climate equity
  - Climate governance (internal and external partners)
  - Education and outreach
  - Implementation of the Growth and Development Climate Framework
  - The cost of action / inaction on climate change and project-specific return on investment
  - Corporate and Community Carbon Budget
- TAMD scorecard and program specific indicators for implementation of climate adaptation actions and outcomes

At the 2022 July 5 Council Meeting, City Council carried a motion arising to "***direct*** *the Calgary Climate Strategy* ***includes*** *provision for independent, objective audits to support accountability and transparency in reporting to Calgarians on the progress made towards successfully implementing the Strategy*". An independent objective audit provides Calgarians with robust assurance that The City is effectively implementing the Calgary Climate Strategy and 2023-2026 Climate Implementation Plan and is on track to achieve climate-related targets and objectives.

The City Auditor's mandate (as established in Bylaw 30M2004 [as amended]) establishes the ability to provide independent and objective assurance, advisory and investigative services to add value to The City of Calgary and enhance public trust. The City Auditor will incorporate consideration of climate-related risks into the development of future annual audit plans and will utilize internal resources and external subject matter experts to provide assurance to Council through Audit Committee. The City Auditor will continue to liaise with other providers of assurance such as the City's External Auditor to collectively provide the most efficient and effective assurance regarding climate-related reporting to Council via Audit Committee, including information reported in the Accountability Report, Annual Financial Report and Annual Climate Report.

Carbon budget framework

A component of The City's climate governance and accountability reporting is the development of The City's carbon budget framework. A carbon budget is a decision-making tool that identifies the amount of GHG emissions available to 'spend' (i.e., emit through actions, projects, programs, or processes) within the bounds of a given GHG emissions target (net zero by 2050), not unlike a financial budget.

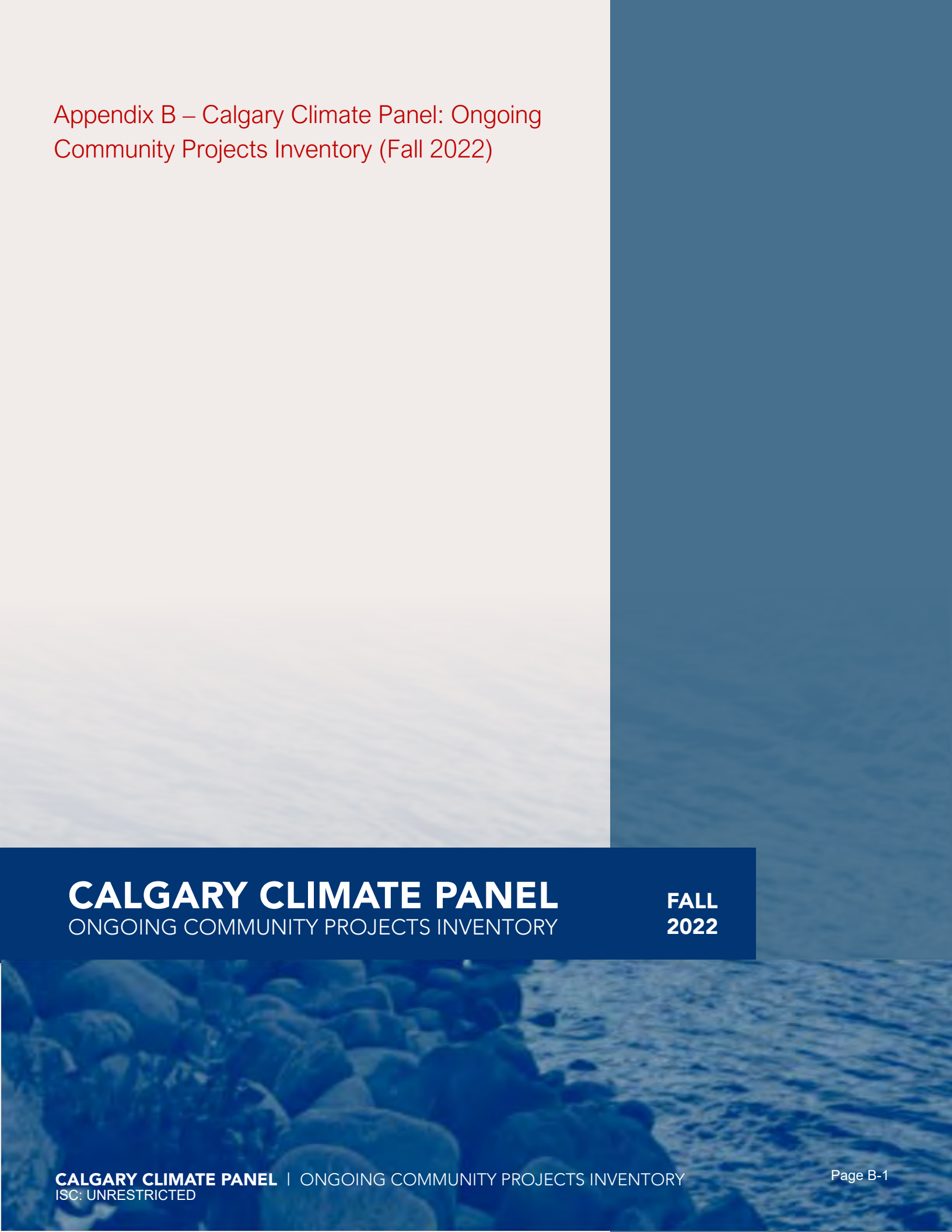
A carbon budget allows The City to quantify and report GHG emissions prior to decision-making processes. When fully developed and implemented, the carbon budget framework will provide transparency about how The City and Council decisions impact Calgary's ability to achieve its GHG emissions reduction targets. This ensures the GHG emissions implications of financial investment decisions are clearly understood, allowing decision-makers to make informed choices and understand trade-offs about how decisions impact Calgary's ability to achieve its GHG emissions reduction targets.

The comprehensive carbon budget framework is still in development. The City is working with the City of Edmonton, Ottawa and the Regional Municipality of Durham in the development of a carbon budget framework. As an initial step in its progress,

for the 2023-2026 Service Plans and Budgets, The City estimated the GHG impact of the forecasted energy use for corporate operations, and qualitatively assessed the GHG impact of proposed capital projects. The GHG emissions impact of the City's energy expenditures for corporate operations are presented in Attachment 8: 2023-2026 Supplemental Budget Information, and a qualitative assessment of the GHG emissions impact of proposed capital investments is provided in Attachment 9: Summary of Business Cases for Proposed Capital Investments. This is the first step in implementing a comprehensive carbon budget framework, which is the integration of GHG information into key City decision-making processes to highlight how the decisions will move The City towards or away from achieving our GHG reduction targets. GHG emissions are one variable that can inform decision making at The City.

The City's annual carbon budget will be reported in the next annual Climate Report. Work to further develop and implement the carbon budget framework will continue over the next budget cycle and will include integrating GHG information into capital and operating service plans and budgets (and annual adjustments) and into stage-gating of capital infrastructure projects and procurement decisions.

Appendix B – Calgary Climate Panel: Ongoing Community Projects Inventory (Fall 2022)



INTRODUCTION

The investment in climate-related action across Calgary's corporate and community organizations is considerable. To demonstrate the breadth and impact of the community's actions, we have inventoried our members to show the types of projects we are already leading the way on. Through these actions, we are contributing to innovation, community leadership, and corporate success in these emerging markets.

Each of the community and corporate actions has been organized based on the Climate Implementation Plan's focus areas:

I. COMMUNITIES

Develop new and retrofit existing communities to achieve net zero emissions and reduce climate risk through land use policy planning, integrate climate considerations into water, waste services and utility infrastructure and support Calgarians to enhance climate resiliency in their communities.

II. BUILDINGS

Develop and retrofit buildings (public and private) that reduce embodied and emitted carbon and incorporate climate-resilient designs and materials.

III. ENERGY SUPPLY

Support low carbon and renewable electricity and heating through on-site and utility scale projects.

IV. MOBILITY

Support the scale up of both privately-owned low carbon vehicles and corporate fleets and encourage mode shift to low carbon transportation options such as walking, wheeling and transit.

V. NATURAL INFRASTRUCTURE

Protect, restore and maintain natural assets, such as grasslands, forests, waterbodies, and street trees, as well as implement green stormwater infrastructure to manage water and provide ecosystem functions in our city.

VI. EDUCATION & OUTREACH

Provide activities that enhance the understanding of, and support for climate science and action for all Calgarians, ultimately leading to behavior change and action that contributes to reduced emissions and reduced climate risk.

CONTENTS

PROGRAMS

- *Supporting climate-resilient people*
- *Creating climate-resilient communities*
- *Developing food resilience*
- *Emergency preparedness and business and service continuity*
- *Reducing Risk from river flooding*
- *Integrating climate change into stormwater management*
- *Integrating climate change into long-term water plans*
- *Focus land use planning to prioritize zero emissions and climate resilient city design*
- *Waste reduction, diversion, and methane management*

Environmental Grant Program: Supporting the Circular Economy – Alberta Ecotrust

In 2022, Alberta Ecotrust refreshed its grant program and added the circular economy focus area in addition to nature-based solutions and conservation and climate change resilience and emissions reductions. Alberta Ecotrust currently offers upwards of $700,000 per year for grants aligning with the focus areas through its Environmental Impact and Springboard Grants.

Climate Change and Health Monitoring - Alberta Health Services

Alberta Health Services is developing a climate change and health surveillance system and will be looking for stakeholder input on potential indicators.

Climate Change Risk Assessment - Calgary Airport Authority

In 2020, YYC completed a climate change risk assessment for airport operations and assets. We are now focused on building resilience to those risks into projects and operational plans.

Development of Climate Change Projections for the Calgary Area - Calgary Airport Authority and City of Calgary

In 2021 the City of Calgary and Calgary Airport Authority partnered to develop climate change projects intended for use in a range of engineering, risk management, design and planning applications.

Waste Reduction – Calgary Board of Education

Implementing system and school waste reduction initiatives in support of CBE's target to reduce waste going to landfill by 90 per cent (from 2007-08 levels) by 2030 with a goal of zero waste by 2050.

I. COMMUNITIES

Updated Watershed Modelling - Nose Creek Watershed Partnership

The NWCP is a partnership of stakeholders within the Nose Creek watershed. In 2020, a long-term project to update the watershed modelling that is ultimately used to design resilient and sustainable land use plans and water management infrastructure began being updated. This will be a critical foundation for enabling nature-based solutions to be implemented in the Nose Creek watershed.

Zero Waste Strategy - UCalgary

UCalgary aims to be a zero waste campus. In 2022 we diverted approximately 60% of waste from landfill.

II. BUILDINGS

PROGRAMS

- *Building new City-owned infrastructure to be climate resilient*
- *Reducing climate risk to existing City-owned infrastructure*
- *Developing climate-resilient private homes and buildings*
- *Build new buildings to a net zero emissions standard*
- *Retrofitting existing buildings to a net zero standard*
- *Support Calgarians impacted by energy poverty*

Accelerating Retrofits in Commercial Buildings – Alberta Ecotrust

Alberta Ecotrust has partnered with software provider, Audette to launch our Accelerating Retrofits in Commercial Buildings pilot project. This initiative provides building owners with a digital, simplified, low carbon retrofit audit. The large-scale energy efficiency improvements identified are aggregated to take advantage of alternative financing mechanisms, to catalyze investment. This important next step is facilitated by our partners SOFIAC Canada and the Canada Infrastructure Bank. SOFIAC provides turn-key project management services and low-cost financing to realize the retrofits in these buildings.

Carbon Capture for Nonprofits – Alberta Ecotrust

Nonprofits in Alberta are facing unprecedented pressures associated with the COVID-19 pandemic and the continued economic challenges in our province. For nonprofits, energy conservation measures can help reduce their environmental footprint while also improving their financial resilience through lower overall operating costs.

Finding ways to reduce energy use in buildings can be time-consuming and expensive, making it difficult for nonprofits to lower their operating costs. To help reduce overall operating costs in an inexpensive way, carbon capture and storage units can be used to rapidly reduce building energy use and emissions while creating a new income stream.

That is why Alberta Ecotrust Foundation, with support from Cenovus, has partnered with the technology provider, CleanO2, to launch the Carbon Capture for Nonprofits pilot project. This program works with nonprofits, charities and social housing organizations in Calgary and Edmonton to install the CARBiN-X unit in their building so they can reduce emissions, lower costs and improve building performance.

Contractor-led Third-party Financed Green Home Program – Alberta Ecotrust

Alberta Ecotrust is exploring launching a program that will assist homeowners to make decisions to decarbonize their home utilizing private financing and contractor focused delivery. The program minimizes government involvement and unleashes the entrepreneurial expertise of the contractor community. The program is complementary to the public financed Clean Energy Improvement Program, focusing not on those homeowners that are already undertaking amenity or aesthetic renovations as the entry point into the conversation.

This financing program design relies heavily on the private sector for all financing and program delivery. Contractors are the gateway to this program, playing the key role of driving sales. Contractors are a trusted partner for the homeowner during the renovation process. They provide homeowners with information on budget, scope, and financial support. They can provide an informed decision about including additional energy efficiency measures into project scope. Contractors will be the main point of entry by providing a 'green pathway' during the consultation process.

Digital Residential Energy Labels and Virtual Energy Concierge – Alberta Ecotrust

Alberta Ecotrust Foundation, with support from the Alberta Real Estate Foundation, and in partnership with software provider, Lightspark will providing a modelled energy label for every single-family home in Calgary. A home energy label shows how much energy a home uses (energy and carbon) and how that compares to similar homes. The label gives homeowners and buyers a deeper understanding of a home's efficiency that can help inform the buying or selling process. Building on previous energy score programs, Alberta Ecotrust and Lightspark will be developing the first automatic, digital, home energy labelling program and are aiming to launch the Digital Home Energy Map publicly in late fall 2022.

Thanks to additional funding, the Lightspark platform will also be able to provide virtual energy concierge services, allowing homeowners to take a virtual audit and then run retrofit scenarios to better understand the energy reduction and emission reduction potential of various measures.

Energy Poverty Reduction and Home Upgrades Program – Alberta Ecotrust

Data shows one out of 6 Albertan families pays more than double the national average of their income on their energy bills. Of these, 38% spend more than triple the national average of their income, and 18% spend more than five times the national average. Alberta is one of the last jurisdictions in Canada to provide fully subsidized energy efficiency measures to income qualified families. Reducing energy use, reduces emissions while also ensuring equity deserving groups are accessing the benefits of low carbon programs. The Energy Poverty Reduction and Home Upgrades Program pilot will provide home upgrades for upwards of 100 qualifying households in Calgary with the aim of reducing the burden of energy bills for Edmonton families at no cost to the residents or owners. In addition, the program will develop an Edmonton based knowledge and resource team focused on delivering energy efficiency services to this underserved sector of the population.

II. BUILDINGS

Sustainability Action Plan (In development) - Alberta Health Services

BOMA BEST Environmental Assessment and Certification Program – BOMA Calgary

BOMA Calgary is the administrator of the BOMA BEST Environmental Assessment and Certification program for Calgary and Southern Alberta. Since 2005, the BOMA BEST Certification program has seen over 7,000 buildings obtain certifications and recertifications through the program. This unique, by industry, for industry voluntary program provides managers and owners of properties with a consistent framework for assessing environmental performance and management of existing buildings of all sizes. The program recognizes excellence in energy and environmental management and performance in commercial real estate. The program is regularly updated through technical committees and provides those who enter the program with foundational best practices and certifications that benchmark their property's performance against best practices within the industry. The program allows entrants to identify opportunities and supports planning to allow these properties to move closer to net zero or their respective environmental goals.

Net-Zero Emissions Feasibility Study and Execution Plan - Calgary Airport Authority

YYC's Net-zero Roadmap is our overall vision and approach to decarbonizing our airports. The first stage in the plan is a detailed Feasibility Study and Execution Plan that will specify potential implementation approaches. Individual components will be designed and constructed over time.

Commercial and Institutional Building Energy Benchmarking - Calgary Board of Education and City of Calgary

The Calgary Board of Education participates in City of Calgary Commercial and Institutional Building Energy Benchmarking Program

GHG 50% Reduction by 2030, Net Zero by 2050 Target – Triovest

Climate Action Plan - UCalgary

UCalgary's Climate Action Plan confirms our goal to be a carbon neutral campus by 2050 with interim goals of a 35% reduction in greenhouse gas emissions by 2025 and a 50% reduction by 2030. Through new building innovation, investment in existing building energy retrofits, and greening of the grid, UCalgary has surpassed its 2025 target. Learn more at UCalgary Climate Action Plan.

District Energy System (DES) Decarbonization and Resilience Planning Study - UCalgary

The District Energy System (DES) Decarbonization and Resilience Planning Study seeks to define a pathway to decarbonize the main campus district energy system, build resilience to the impacts of our changing climate, and renew our energy services infrastructure for the next 50 plus years while ensuring reliable energy services. Decarbonization of the DES is a transformative step in reaching our aspiration to be a carbon neutral campus by 2050. The planning study is made possible through funding support from the Federation of Canadian Municipalities Green Municipal Fund, and the City of Calgary.

Low Carbon and Climate Resilient Buildings - UCalgary

UCalgary's Climate Action Plan (CAP) confirms our goal to be a carbon neutral campus by 2050. One key pillar of the CAP is our focus on highly-energy-efficient, net-zero carbon ready, and climate resilient buildings. UCalgary utilizes an integrated design process, emphasizing the reduction of operational and material life-cycle emissions through innovative low-carbon design solutions, water reuse strategies, indoor environmental quality, and resilient landscape design informed by the University's Main Campus Landscape Plan. UCalgary campuses comprise fourteen certified LEED buildings, one Zero Carbon Building design certification. To minimize the impacts of current and future climate change-based weather events, the University employs climate impact adaptation strategies and future weather modeling to understand potential operational energy impacts in design, creating buildings which are adapted to a rapidly evolving climate and a resilient University campus.

PROGRAMS

- *Support local renewable energy projects*
- *Support a clean provincial energy supply*

Hydrogen Advocacy – ATCO

ATCO is engaged with various levels of government to advocate for changes in provincial policy to allow for the delivery of hydrogen energy products and for provincial support in the transition to clean energy (current Gas Utilities Act only allows for the delivery of natural gas and there is no regulatory guidance on decarbonization). The development of a hydrogen market will allow for the development and implementation of 100 hydrogen communities, use of hydrogen in transportation such as heavy-duty trucks, and rail.

Hydrogen Blending Pilot – ATCO

ATCO's active hydrogen blending pilot in Fort Saskatchewan is set to deliver 5% hydrogen-blended natural gas to approximately 2000 customers in fall of 2022 through new and existing infrastructure (first in the province). ATCO is looking at future hydrogen blending pilot potential in Calgary.

Solar Decarbonization Planning – Calgary Airport Authority

Current YYC Decarbonization Plan has identified 50 MW of potential solar at Calgary International Airport and 70 MW at Springbank Airport. YYC is looking at hydrogen technology, in combination with major energy efficiency improvements to support the decarbonization of the airport, along with our tenants.

Solar for Schools – Calgary Board of Education

Installation of solar PV systems on schools with funding support from Alberta Municipalities (formerly MCCAC) Solar for Schools program.

Lithium Value Chain – Calgary Economic Development

Quantitative analysis to help understand Calgary's value proposition for entry into the Lithium Value Chain.

III. ENERGY SUPPLY

Dual Fuel Hydrogen Program - Calgary Economic Development

Calgary participated in the hydrogen dual fuel program in 2021 and continues to participate as the city explores opportunities to decarbonize heavy-duty transport.

Chinook Solar Project with Two-Way Flow – ENMAX

Multi-year project with implementation of solar panels on Chinook Centre with two-way power flow on ENMAX Power's secondary network (high-density grid previously only allowing one-way power flow). ENMAX has modified its secondary grid to allow for two-way power flow and Chinook installation is the first on-site implementation to test the system.

Crossfield Energy Centre – ENMAX

At Canada's first hybrid electric gas turbine facility (2021), a lithium-ion battery allows the peaking facility to provide standby electricity without burning fuel, avoiding an estimated 45,000 tonnes of GHG emissions annually.

Investment in Upgrading Grid from 100 - 200 AMP – ENMAX

Residential Solar Projects – ENMAX

Battery Storage - ENMAX

IV. MOBILITY

PROGRAMS

- *Accelerate the transition to zero emissions vehicles*
- *Increase the mode share of zero or low emissions transportation modes*

Hydrogen Transport – Calgary Airport Authority

YYC hydrogen vehicle pilot planned for 2023

V. NATURAL INFRASTRUCTURE

PROGRAMS

- *Integrating the benefits of natural infrastructure*
- *Preserving, restoring, and building natural infrastructure*

Environmental Grant Program: Supporting the Nature Based Solutions and Climate Resilience – Alberta Ecotrust

Alberta Ecotrust Foundation's Environmental Grants fund initiatives across Alberta in support of our charitable purpose and vision of healthy ecosystems for all Albertans. Throughout the history of our programs, we've supported a diverse range of initiatives, from identifying key biodiversity and conservation areas in Alberta, to engaging Albertans on the issues of climate change and energy transition, to supporting ecological restoration work on farms, creeks, and landscapes across the province. And many, many other important environmental initiatives over the last 30 years. In 2022, Alberta Ecotrust refreshed its grant program and added the nature based solutions and climate resilience as focus areas in addition to conservation, circular economy and emissions reductions. Alberta Ecotrust currently offers upwards of $700,000 per year for grants aligning with the focus areas through its Environmental Impact and Springboard Grants.

VI. EDUCATION & OUTREACH

PROGRAMS

- *Education, outreach, and marketing*

Climate Innovation Grant Program – Alberta Ecotrust

Alberta Ecotrust annually provides upwards of $1,000,000 in grants to charities and not for profits operating in Calgary and Edmonton to undertake emissions reductions projects. Our funding is designed to accelerate and unlock urban emission reductions through technology demonstration, to collective impact, and policy advancement, we support a variety of projects that inspire innovation and create tangible benefits in our communities. Our intention is to provide funding to solutions that can be scaled up quickly to address the climate emergency and specifically they include the pursuit of co-benefits including economic development and supports for equity deserving groups.

VI. EDUCATION & OUTREACH

Green Economy Calgary – Small to Medium Size Business Supports – Alberta Ecotrust

Building on a successful program provided in the City of Edmonton, the Corporate Climate Leaders Program, Alberta Ecotrust has partnered with Green Economy Canada to develop the Green Economy Calgary Hub. Green Economy Hubs are non-profit programs that help businesses of all sectors and sizes take meaningful climate action while becoming stronger and more resilient for the future. They provide training, resources and 1:1 support to help businesses measure their carbon footprint and other environmental impacts, set reduction targets, and develop and implement action plans to achieve their goals. Members of the Hub have the opportunity to learn and share best practices with peers and external experts and be publicly recognized for their work as Green Economy Leaders both locally and nationally. There are currently ten Green Economy Hubs in the national network led by Green Economy Canada, with three new Hubs having launched over the past year. To date, Hubs have engaged over 500 Green Economy Leaders of all sectors and sizes who have collectively reduced over 200,000 tonnes of GHG emissions -- the equivalent of removing 60,000 cars off the road annually.

Climate of Change Series - Climate Hub

Community Climate Conversations - Climate Hub

Calgary Schools for Climate Action – Climate Panel Subcommittee

In the 2021/2022 school year, approximately 55 Calgary schools were engaged in the EcoSchools Program (compared to 43 in 2020-2021). The Calgary EcoSchools impact metrics for 2021/2022 included: 5000 hours of outdoor learning, 1600 earth day participants and participation from nearly 250 environmental/EcoTeam leaders. New funding has been secured from Telus Future Friendly Innovation Fund, to grow the EcoSchools Program across Alberta following the successful model of Calgary EcoSchools.

VI. EDUCATION & OUTREACH

Mobilizing Alberta: Building Capacity for Climate Change - UCalgary

Mobilizing Alberta aims to increase engagement on climate change in Southern Alberta and provide a foundation on which community groups and organizations can continue to build awareness and support meaningful, on-the-ground climate action.

With support from Environment and Climate Change Canada's Environmental Damages Fund, we are offering multiple grants amounting to $50,000. The purpose of the climate action grant program is to increase awareness, engagement and participation in community-based climate action initiatives through collaboration between community organizations, UCalgary faculty and students. These projects will create experiential learning and work integrated learning opportunities for students.

Launching fall 2022, Mobilizing Climate Conversations is a new speaker series aimed at engaging community in transformative conversation on climate action. Learn more about the Mobilizing Alberta here.

Research at the University of Calgary

- Current state of climate policy: Jennifer Winter is partnering with the Canadian Climate Institute and several provincial governments to enumerate federal, provincial and territorial climate policies. This will become an interactive database and web visualization hosted by CCI. The goal is to identify gaps and overlaps in policy actions.
- Energy modelling hub: the Government of Canada has funded a national network of energy and electricity modellers; Blake Shaffer is one of the three leads. Announcement: https://www.canada.ca/en/natural-resources-canada/news/2022/05/canada-invests-in-clean-energy-hub-in-quebec3.html
- Electricity prices and consumer behaviour: Blake Shaffer studies how households respond to better information about electricity prices and their electricity use

Research at the University of Calgary Continued...

- Energy poverty: Jennifer Winter and Blake Shaffer completed a study for the BC basic income panel on energy poverty in BC, including different ways to define it. They are currently expanding their work to explore energy poverty across Canada. BC report: https://bcbasicincomepanel.ca/wp-content/uploads/2021/01/Defining_and_Describing_Energy_Poverty_in_British_Columbia_The_Distribution_of_Households_Energy_Expenditure.pdf
- Electricity affordability: Jennifer Winter recently published a paper through the Canadian Climate Institute on electricity price changes and affordability on the path to net zero: https://climateinstitute.ca/wp-content/uploads/2022/09/Electricity-and-equity-canadas-energy-transition.pdf
- Energy retrofits and energy efficiency: Erica Myers studies projected and realized benefits from residential energy efficiency improvements
- REDEVELOP program: trains graduate students to work across disciplines, distance and cultures through interdisciplinary training and a group research project in the responsible energy development (REDEVELOP) that brings together policy, economics, sustainability studies, and science. The projects incorporate priorities from industry partners. More info: redevelop.ca.