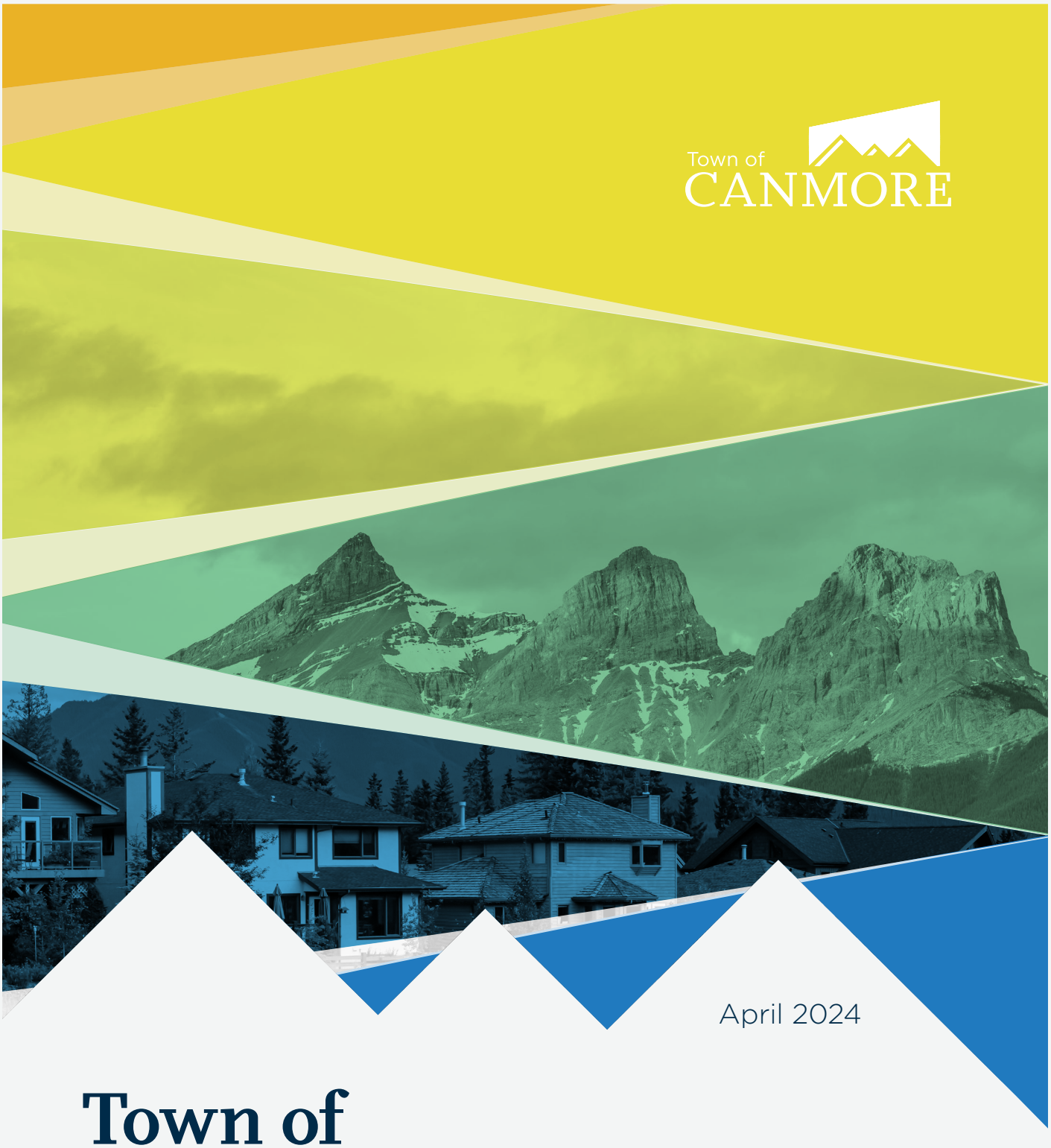

April 2024

Town of CANMORE

Climate Emergency Action Plan

Prepared for:

Town of Canmore

Prepared by:

Sustainability Solutions Group

Designed by SSG

April 2024

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Acknowledgments

Land Acknowledgement

The Town of Canmore is located within the Treaty 7 region of Southern Alberta. In the spirit of respect, reciprocity and truth, we honour and acknowledge the Canmore area, known as “Chuwapchipchiyan Kudi Bi” (translated in Stoney Nakoda as “shooting at the willows”) and the traditional Treaty 7 territory and oral practices of the Îyârhe Nakoda (Stoney Nakoda)—comprised of the Bearspaw First Nation, Chiniki First Nation, and Goodstoney First Nation—as well as the Tsuut’ina First Nation and the Blackfoot Confederacy comprised of the Siksika, Piikani, and Kainai. We acknowledge that this land is also home to the Rocky View Métis District 4 within the Battle River Territory. We acknowledge all Nations who live, work, and play and help us steward this land and honour and celebrate this territory. We commit to working to live in right relations and to advance Truth and Reconciliation.

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Disclaimer

Reasonable skill, care, and diligence have been exercised to assess the information acquired during the preparation of this analysis, but no guarantees or warranties are made regarding the accuracy or completeness of this information. This document, the information it contains, the information and basis on which it relies, and the associated factors are subject to changes that are beyond the control of the authors. The information provided by others is believed to be accurate but has not been independently verified.

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Table of Contents

How to Read this Climate Emergency Action Plan

This Climate Emergency Action Plan (CEAP) for the Town of Canmore is a strategic guide for proactively addressing the multifaceted impacts of climate change. The guide includes both mitigation and adaptation strategies.

Essential Components of the CEAP

Essential components of the CEAP include the following:

- **Introduction and Context:** An overview of current corporate and community emissions. This section also recounts the Town's achievements in taking climate action and stories from the community that underscore the urgency and impact of these initiatives.
- **Progress and Targets:** Highlights of the Town's strides in mitigating and adapting to climate change, with a focus on identifying greenhouse gas (GHG) reduction targets and protecting the community against climate hazards.
- **Climate Change Impacts:** An overview of how climate change is affecting the Town, and how this is expected to change in the future.
- **GHG Reduction Actions:** Specific, measurable actions designed to achieve the Town's GHG reduction targets (climate change mitigation).
- **Climate Change Impact Scenario and Actions:** Modelled scenarios for climate resilience and specific actions to adapt to current and future climate impacts (climate change adaptation).
- **Pathway Analysis:** An analysis of the financial, economic, and other implications, including co-benefits, of the strategies and actions outlined for climate change mitigation and adaptation.
- **Carbon Accounting Framework:** A summary of the Town's Carbon Budget and accounting framework as a tool to effectively manage the annual carbon emission cap for the Town.
- **Community Engagement:** The process of community engagement, its outcomes, and how it has shaped the CEAP.
- **Implementation Plan:** The strategy for ongoing monitoring and evaluation of the plan's effectiveness and adaptability.

The CEAP aims to be a coherent, compelling, and accessible document, effectively guiding the Town's efforts in both reducing GHGs and adapting to climate change. It is structured to provide clarity and ease of understanding, ensuring the plan is not only a strategic-level document but also a practical guide for future action.

Strategic-Level Plan vs. Feasibility Plan

A strategic-level plan is a high-level document that outlines an organization's overall goals and objectives, and the strategies and actions that will be taken to achieve them. It typically covers a longer time horizon than a feasibility plan, and provides a broad overview of the organization's direction and plans.

A feasibility study, on the other hand, is a detailed analysis of a specific project or proposed course of action to determine if it is viable and likely to be successful. It typically includes a thorough examination of the technical, economic, and operational aspects of the project, as well as an assessment of any risks or challenges that may need to be addressed.

The bottom line: This document is a strategic-level plan. It outlines what is necessary to achieve a low-carbon, climate resilient future for Canmore. It will guide the implementation of actions and provide direction for future feasibility studies related to actions where viability needs to be determined for implementation to be successful.

A New Story for Canmore

In the heart of the Rockies, Canmore is writing a new story. This story is not about climate change in the traditional sense; rather, it is about transformation and foresight, led by the Town's Climate Emergency Action Plan (CEAP). This tale weaves together economic resilience and community harmony, painting a picture of a future where every action and decision shapes a better tomorrow.

The economic chapter of this story highlights Canmore as a hub of innovation and growth. It envisions a town where the streets buzz with the energy of new enterprises grounded in sustainability—from bustling startups in renewable energy to booming businesses in eco-tourism. These aren't just ventures aiming to protect the environment; they represent a new economic frontier. In this tale, Canmore is a beacon of progress, attracting entrepreneurs and investors who are drawn by the town's vision of marrying economic prosperity with environmental stewardship. It's a testament to the Town's ability to adapt, innovate, and lead in an ever-changing local and global landscape.

Parallel to this economic transformation is a focus on the community's well-being. It's a story where improved air quality, more efficient and resilient buildings, and expanded green spaces aren't just checkboxes for environmental compliance but are vital chapters in enhancing residents' quality of life. Interwoven into this narrative is the thoughtful safeguarding of residents' homes against climate challenges like flooding, wildfire, and smoke. This approach reflects a deeper commitment, where climate goals are aligned with ensuring a secure, joyful community, illustrating that the essence of Canmore lies in both its vibrant economy and the safe havens of its homes. This Canmore is a place where health and happiness are as much a priority as economic indicators.

This is also about creating spaces where communities thrive, where every park and street corner becomes a haven for social interaction, relaxation, and connection with nature. It's a narrative that places people at the centre—where every decision made today is with an eye toward securing a livable, prosperous future for all residents.

This narrative of Canmore's future, guided by the CEAP, isn't just a tale of optimism and ambition; it's a story about undertaking what is both challenging and necessary. It acknowledges that the path ahead is not one of ease, but of complexity and diligence.

Achieving a harmonious balance between economic growth and environmental stewardship, between community well-being and sustainable development, requires a level of dedication and innovation that goes beyond the ordinary. This chapter of Canmore's journey is marked by tough decisions, bold moves, and a willingness to venture into uncharted territories. It's about

making choices today that will shape a more resilient and prosperous town for the future, recognizing that the greatest achievements often stem from embracing and overcoming challenges. The CEAP isn't just a plan; it's a commitment to a vision that requires courage, foresight, and collective effort to turn it into reality.

As this story unfolds toward 2050, the CEAP becomes Canmore's north star, ensuring that with each step taken, the town moves closer to a vision of sustainability, economic vitality, and community well-being. It's a sophisticated blueprint, embracing change, seizing opportunity, and forging a legacy that will be told for generations to come.

The Climate Action Imperative

Canmore is a growing community, with the population expected to grow from 16,100 permanent residents in 2021 to 27,000 people by 2050—a growth of 63%.[1] This growth comes with the need to house, employ, transport, and support the additional population, with added pressures to developable land within the town boundary.

Canmore currently sees between 3–5 million visitors annually, and 26% of total dwellings are second homes (about 4,000 semi-permanent residents). The importance of tourism in Canmore's economy highlights the need to consider those who do not live permanently in the town in climate action planning.

The Town of Canmore has a history of leadership on environmental issues starting all the way back in 1999, when the Town joined the Federation of Canadian Municipalities (FCM) Partners in Climate Protection (PCP) Program. Since then, the Town has adopted the Energy Management Action Plan in 2005, the Environmental Sustainability Action Plan (ESAP) in 2010 (updated in 2013), and the Climate Action Plan in 2018.

Each mitigation plan is supported by an updated greenhouse gas (GHG) inventory and each successive iteration has included newer, more aggressive GHG reduction goals. Currently, Canmore's emissions reduction targets are to reduce corporate and community emissions by 30% by 2030, and 80% below 2015 levels by 2050. An update to the climate plan will propose a new target of net-zero emissions by 2050. Canmore is a signatory to both the PCP Program and the international Global Covenant of Mayors, which requires periodic GHG emissions reporting.

[1] Population from Statistics Canada (15,990 people in 2021) adjusted for the census undercount in the CIS model.

With a progressive Council and supportive, engaged residents, Canmore has put in place a number of emissions reductions programs and initiatives including:

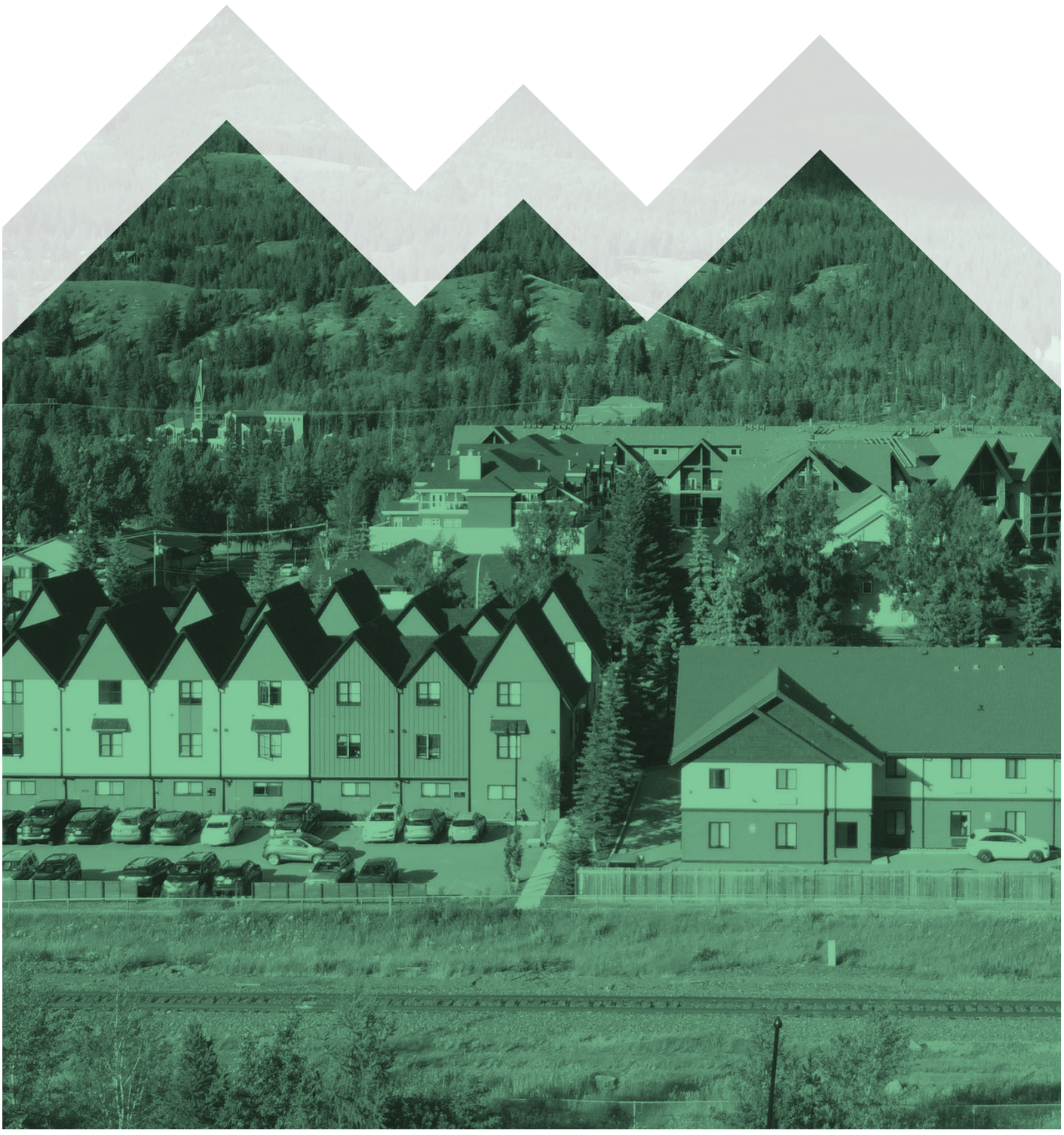
- The incentive-based Green Building Regulation (GBR);
- A limit on house sizes to 325 square metres;
- The Clean Energy Improvement Program (CEIP) for energy upgrades financing;
- The Home Upgrade Program for low-income households;
- The residential and commercial Solar Incentive Programs;
- Local and regional transit via the ROAM program;
- Fare-free local transit;
- Composting programs; and
- Cycling and subsidized e-bike programs.

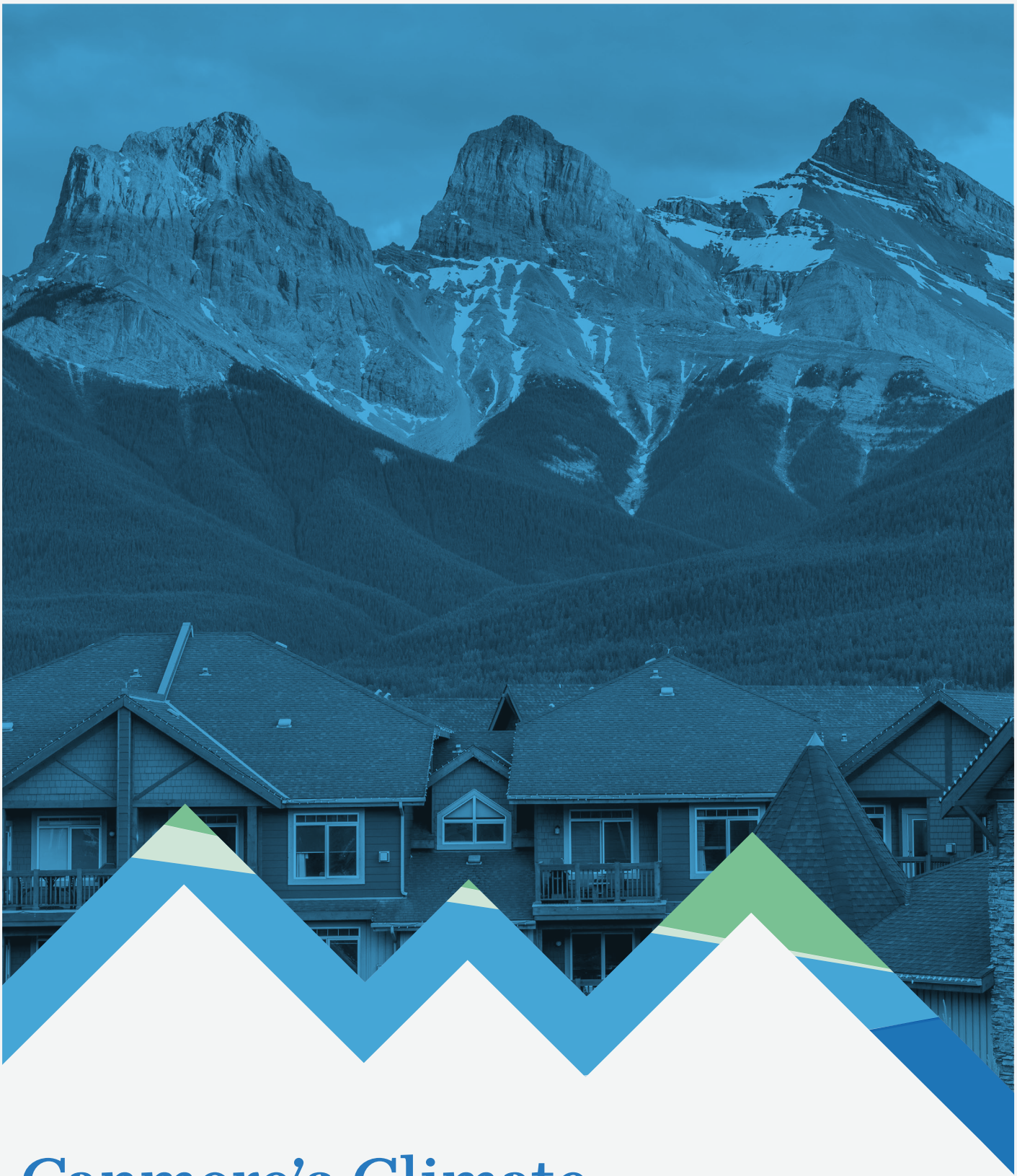
Each solution is designed to address Canmore's unique, local context. For instance, the ROAM program meets visitors' needs to travel between Canmore and Banff, while the composting programs take into account wildlife encounters in the area.

In 2013, Canmore experienced a catastrophic flooding when the seven mountain creeks surrounding the town overflowed due to torrential rain and rapid snow melt, causing extensive damages. This event prompted the Town to begin to consider climate impacts in its planning, in order to strengthen its adaptation strategies and capabilities. The Town's Climate Change Adaptation Background Report and Resilience Plan, published in September 2016, identified priority climate risks facing Canmore over the next several decades: forest fires, Bow River flooding, creek flooding, localized flooding due to an overwhelmed stormwater system, extreme winds, heavy snowfall events, and freeze-thaw cycles. The plan also outlined three opportunities for action planning that Canmore could take: an increase in summer season recreational opportunities, an extended construction season, and an increase in winter tourism competitive advantage.

Wildfires and extreme heat are increasing concerns, and in April 2023, the Town released its report Adapting to the Risks of Extreme Heat and Wildfire Smoke in Canmore. This report reviews the risks to the community from extreme heat and wildfire smoke, as well as guidance on developing emergency response plans for heat and smoke, and recommendations to ensure long-term preparedness.

In October 2019, the Town officially declared **a state of climate emergency**, the second municipality in Alberta to do so after Edmonton. The declaration reaffirms Canmore's commitment to reduce its carbon footprint and waste generation.





Canmore's Climate Emergency Action Plan

How the CEAP Was Developed

Canmore's CEAP was developed using a systematic approach that integrates technical modelling with a comprehensive engagement process, as illustrated in Figure 1. The interaction between these two processes ensures the plan is achievable and evidence-based while being rooted in the local context and responsive to community concerns.

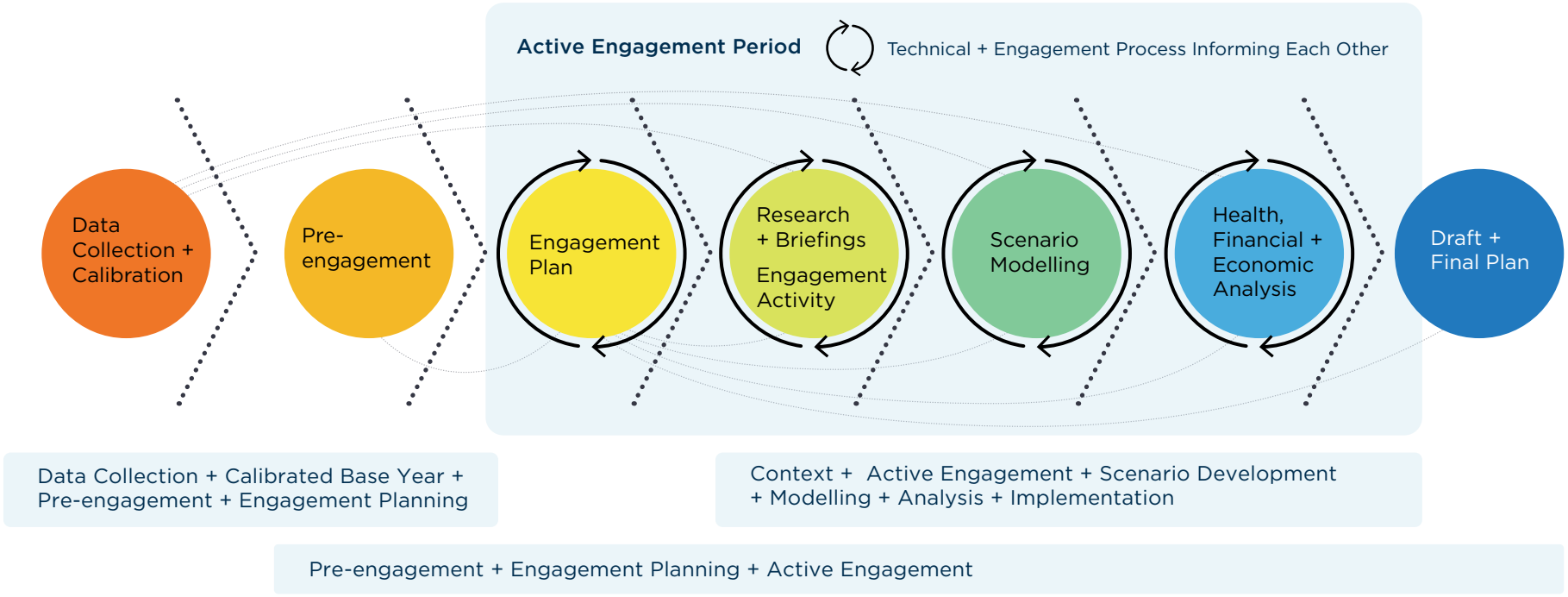


Figure 1. The process for developing the Town of Canmore's CEAP.

Energy and Emissions Modelling

"Reduce, Switch, Produce, and Offset, and Sequester" is a simple mantra to follow in energy and emissions planning (Figure 2, next page). This framework is adapted from similar approaches, such as Reduce-Reuse-Recycle (from the waste sector) and Avoid-Shift-Improve (from the transportation sector), and provides guidance on an overall approach to community energy and emissions planning.

To start, prioritizing reductions in energy consumption will reduce required investments in renewable energy and result in energy cost savings. Maximizing energy consumption reductions and energy efficiency opportunities lowers total energy costs and per-unit energy costs by reducing the overall build-out of the electricity system, which is logistically complex and capital-intensive.

The second and third steps are to switch to locally produced renewable electricity, which will maximize local economic benefits and the resilience of the electricity system. The final step is to offset and sequester any remaining emissions to reach net zero.

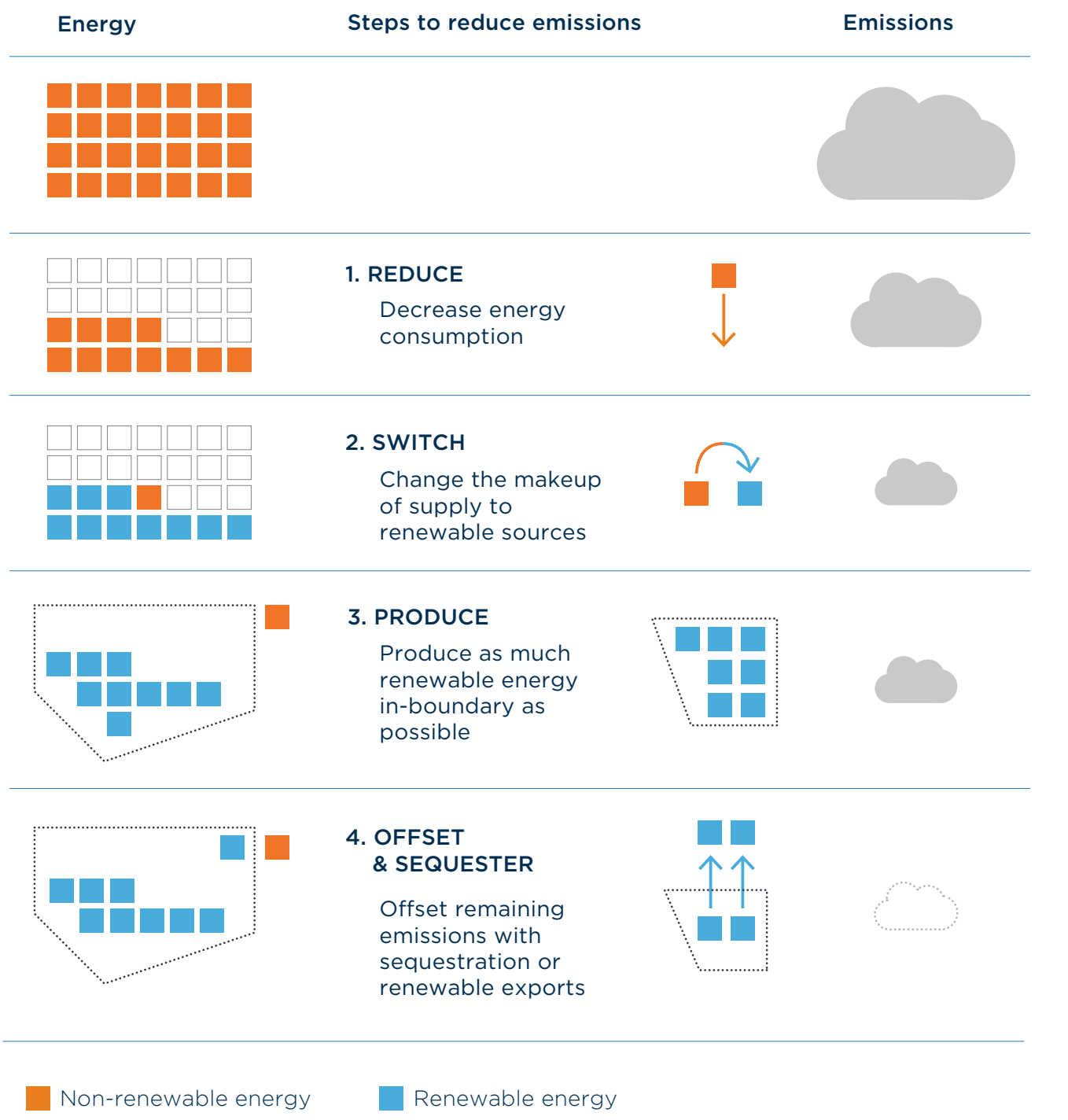


Figure 2. A systematic approach to reducing GHG emissions.

Climate Adaptation Modelling

Understanding how to adapt to climate change requires assessing how climate change is expected to affect environmental hazards over time, what the potential impacts of those changes are, and how prepared a community is to handle and recover from emergencies.

Climate parameters like overall trends in temperature and precipitation, and changes to the number of very hot and very cold days, can be linked with climate hazards like flooding, wildfires, and heatwaves. Translating those hazards into risk requires an assessment of the threat likelihood, the vulnerability of a community to the hazard, and the potential consequences of that hazard.

Figure 3. Conceptual formula of risk.

Once the priority climate hazards are identified, an assessment of data availability and the geographic and temporal variability of the hazard is used to develop a modelling methodology. The same spatial and temporal model used in the energy and emissions tracking is then applied to assess the impacts of climate hazards on people, places, and spaces in Canmore both in the present day and in 2070.

Identifying sources of damages, injury, illness, death, and other vulnerabilities leads to the development of a suite of adaptation actions that work together to protect Canmore and the community from climate change, and ensure that everyone is prepared for emergency events and the changing environment.

Engagement Activities

The engagement approach for this plan has been a comprehensive and inclusive process, crucial for developing effective and supported actions. This approach has involved multiple interested parties (e.g., stakeholders), ensuring diverse perspectives, particularly focussing on an equity perspective. Engagement sessions were not only designed for the broader community but also tailored to cater to the unique needs and insights of businesses and the tourism sector.

The drafting of the plan's actions was informed by detailed modelling and incorporates best practices from North American municipalities, contributions from non-governmental organizations (NGOs), and the latest scientific data. The plan also builds upon the Town's previous climate plans and experiences in implementation, harnessing lessons learned from past initiatives.

The engagement process over the past year was extensive and multi-faceted, shaping the direction and details of the plan. This process included:

- Two online town halls, providing a platform for widespread community involvement and feedback;
- Equity-focused workshops and community focus group sessions, ensuring diverse perspectives and addressing equity issues in climate action;
- Sessions specifically dedicated to the Bow Valley Builders and Developers Association (BOWDA) members, the business sector, and the tourism sector, recognizing the crucial role of these stakeholders;
- A public survey that was open for an entire month, allowing ample time for a broad section of the community to contribute their views;
- Eight in-person "pop-up" engagement sessions led by the Biosphere, facilitating direct interaction and feedback from community members;
- Interviews and engagement sessions with town staff, alongside discussions with subject matter experts, ensuring the plan is grounded in both local knowledge and expert insights; and
- Community partner and staff engagement in drafting the action items, further enriching the plan with varied perspectives.

The overall approach to engagement was comprehensive emphasizing pre-engagement (i.e., engaging on how to design the engagement for this plan), robust scientific grounding, and a commitment to learning from successful models. The plan aimed to build on past successes while being open to new ideas and strategies. Priority was placed on ensuring equity, inclusivity, and accessibility in all engagement activities, with transparency and community building as central themes. This approach welcomed feedback and was adaptable, ensuring the plan remained dynamic and responsive to community needs.

It is important to note that as the CEAP progresses into the implementation phase, extending to 2050, ongoing and substantive engagement will remain a critical component. The implementation phase will continue to involve all interested and engaged parties, maintaining the emphasis on inclusive participation. This phase will offer additional opportunities for sectors like businesses, alongside other community groups, to actively contribute and collaborate in the action plan's execution. The plan's long-term success depends on this continued engagement, ensuring the actions and strategies evolve to meet emerging challenges and opportunities in the journey toward a sustainable, resilient future for Canmore.

Mitigation and Adaptation Working Together

Mitigating and adapting to climate change are two interconnected approaches that are crucial for addressing the challenges posed by a changing climate. While they have distinct goals and strategies, their combined efforts are needed to ensure the long-term sustainability of ecosystems, economies, and societies.

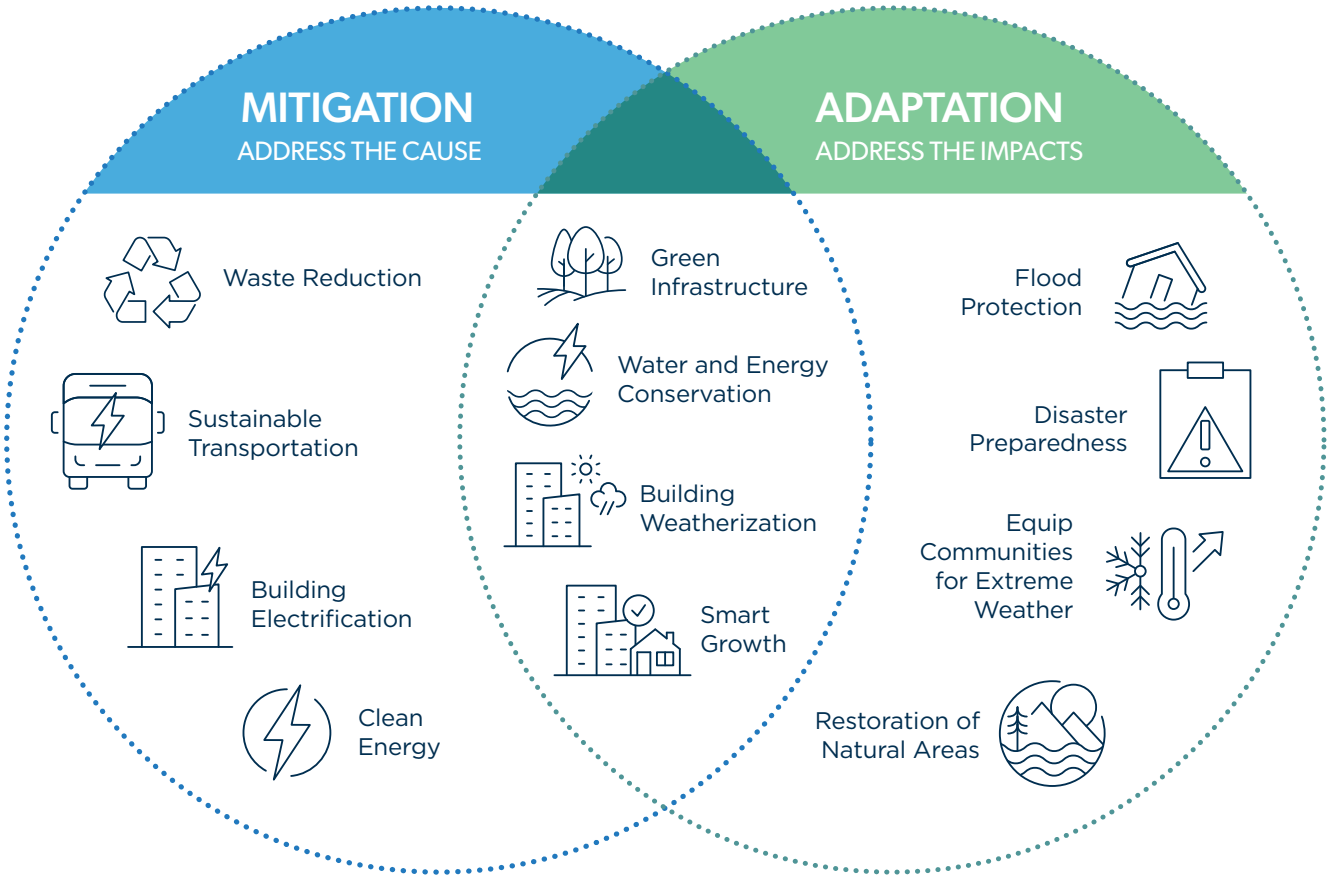


Figure 4. Climate change adaptation and mitigation.

Addressing climate adaptation and mitigation simultaneously allows for efficiencies and co-benefits to be maximized, and prevents us from taking adaptive or mitigation actions that result in a co-harm to the other. These benefits include:

1. Identifying actions where adaptation and mitigation can work together to enhance the benefits, resulting in comprehensive benefits to the community.
2. Identifying and avoiding potential co-harms. For example, adaptation planning might identify the need for supplemental electricity generation, but mitigation planning shows that back-up diesel generators work against overall climate action.
3. Avoiding being locked in to detrimental long-term choices, by implementing adaptation measures to protect and secure current infrastructure, while simultaneously working to reduce the global impacts of climate change. This reduces the need for the most expensive upgrades and adaptation measures. For example, without consideration of future flow rates and volumes, culverts due for replacement might not be correctly sized to accommodate climate change, increasing the likelihood of localized flooding.
4. Maximizing the economic benefits through job creation, efficient planning, and enhanced energy security.
5. Aligning policies and political energy, and avoiding duplication of efforts, as much as possible. Climate plans, funding programs, and implementation strategies for both mitigation and adaptation can be developed together, maximizing efficiency and allowing the town to shift more quickly to implementing climate plans.

What Is Climate Change Mitigation Versus Climate Change Adaptation?

Mitigation focuses on taking action to reduce human-caused GHG emissions to limit changes in the climate.

Adaptation focuses on adjusting infrastructure and practices to decrease risk and build resilience to expected changes in the climate.

Addressing both mitigation and adaptation recognizes that emissions need to be reduced to avoid the most catastrophic impacts of climate change, but also that some changes are already underway and will be unavoidable, so we must prepare and adapt to minimize the impact of those changes.

Scopes of Emissions

Scopes of emissions typically refers to the different categories or levels of emissions associated with various activities or processes, especially in the context of environmental impact assessment, carbon footprint analysis, or sustainability reporting. These scopes help us understand and categorize emissions for better management and mitigation strategies. The most commonly referred to scopes of emissions are defined by the Greenhouse Gas Protocol, which is widely used for assessing GHG emissions (Figure 5).[2]

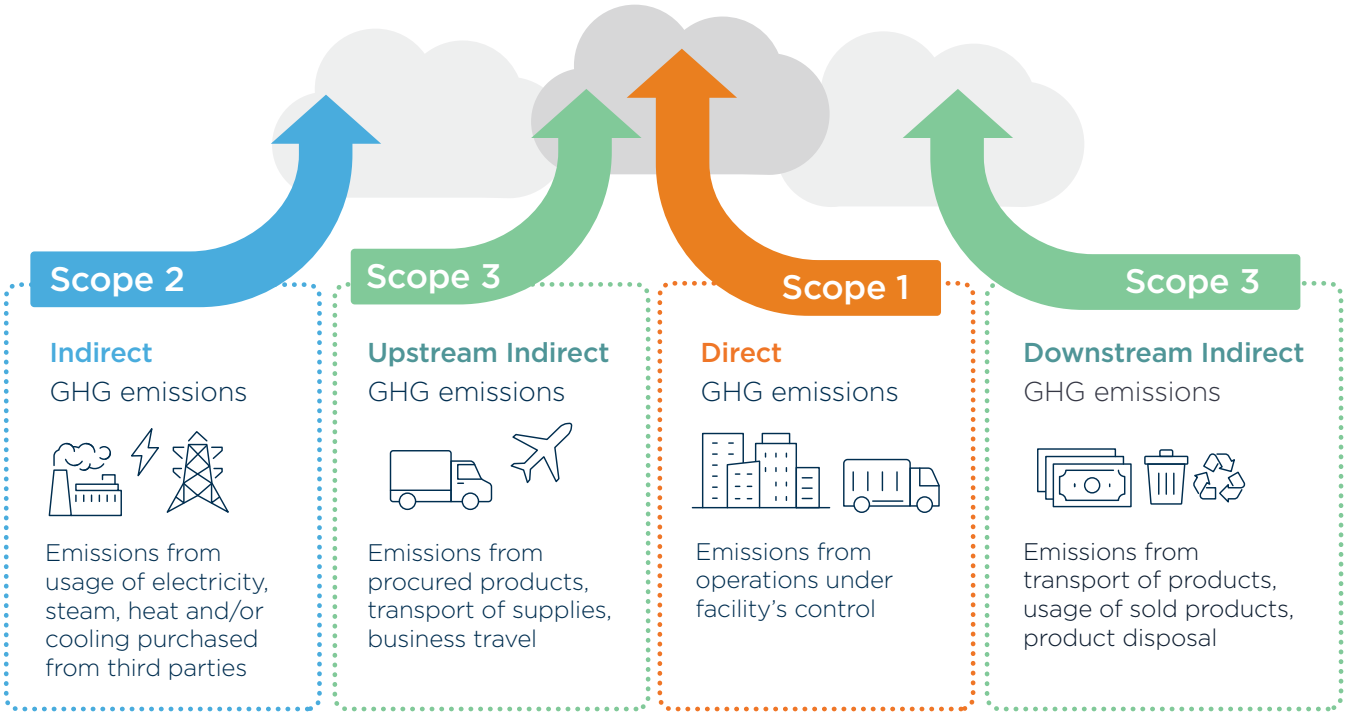


Figure 5. Emission scopes as defined by the Greenhouse Gas Protocol.

Scope 1 Emissions: These are the GHGs that come directly from sources we own or control (e.g., exhaust from our cars, heating in our buildings).

Scope 2 Emissions: These emissions come from the energy we use (e.g., electricity). Even though we don't produce this energy ourselves, we're responsible for the emissions because we use the energy.

Scope 3 Emissions: This category includes all other emissions that are a result of our activities, but come from sources we don't own or control directly (e.g., emissions from making a product that we buy).

[2] Fong, W. et al., 2019. Global protocol for community-scale greenhouse gas emission inventories: An Accounting and Reporting Standard for Cities Version 1.1. Greenhouse Gas Protocol.

Understanding the Challenge

Mitigating the Source: Town of Canmore Community Emissions

Inventory

To provide guidance on what actions and what scale of action would be needed to reach net-zero emissions in Canmore, an understanding of the local context was developed. This context includes current energy use and emissions, and plausible projections for energy use and emissions based on current practices, policies, and demographic projections.

Canmore consumed 6,343 megajoules (MJs) of energy in 2022 to fuel vehicles; heat space and water; operate appliances, equipment, and machinery inside all types of buildings; and provide municipal services like water and waste management (Figures 6 and 7, next page). These processes, combined with landfill emissions, generated 461 ktCO_2e of GHG emissions. Two-thirds of these GHG emissions was from the transportation sector, where gasoline and diesel are used to power vehicles that move people and goods. Fugitive emissions are emissions associated with leaks in natural gas pipes, storage tanks, and appliances.

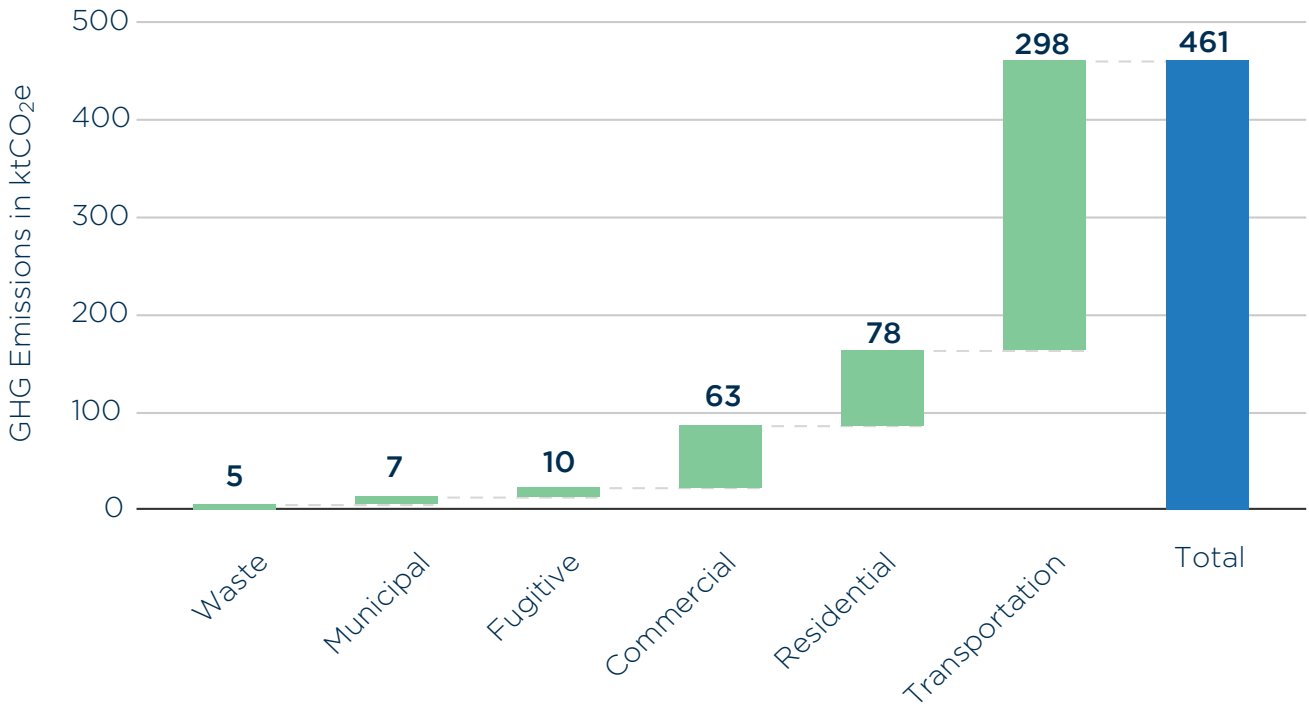


Figure 6. GHG emissions by sector in baseline year 2022.

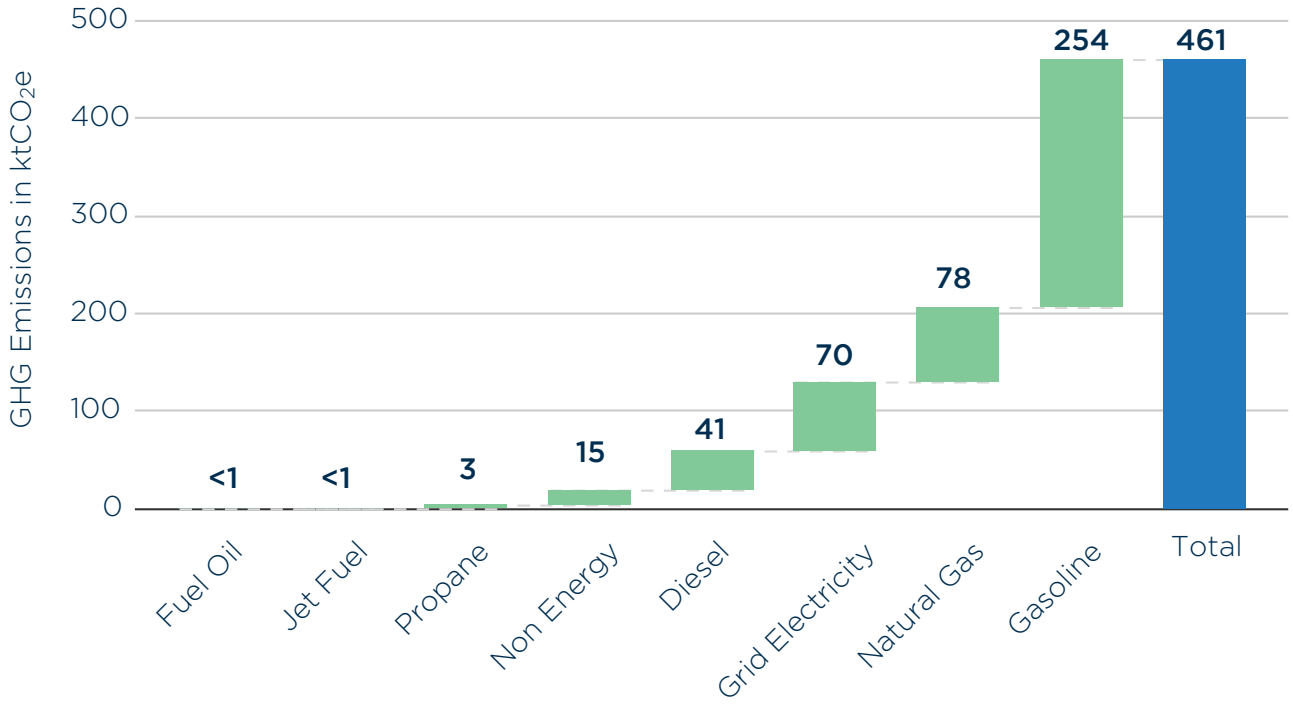


Figure 7. GHG emissions by fuel type in baseline year 2022.[3]

[3] Non-energy emissions refer to GHG emissions released from landfills, wastewater treatment, or other non-energy sources.

Based on Canmore's 2022 permanent population, this translates to 27.8 tCO_2e generated per person, which is higher than the latest reported national GHG emissions per capita—17.5 tCO_2e generated per person in 2021.[4]

A Future Town of Canmore Without Further Climate Action

Two potential scenarios show the emissions pathway for Canmore where no future climate action is implemented (Figure 8, next page). The first scenario, the business-as-usual (BAU) scenario, extrapolates current demographic patterns into the future if no additional plans, policies, programs, and projects are implemented. In this case, energy sources and consumption trends, transportation modes and patterns, and land-use plans are held constant.

The second scenario is the business-as-planned (BAP) scenario, which explores a pathway with the same demographic and economic trends, but also accounts for current plans, policies, legislation, and regulations at the municipal, provincial, and federal levels. This scenario excludes pledges, promises, or ideas that have not yet been endorsed, passed through legislation, or budgeted for with committed capital and/or operational funding.

Figure 8 shows a wedge diagram that compares the BAU and BAP scenario results for Canmore. The top line represents the BAU scenario pathway. Each coloured wedge or section represents the emissions reduction resulting from each BAP action. Collectively, these measures enable the BAP scenario pathway. The grey area represents the residual GHG emissions.

Following the growth of a coloured wedge from left to right shows that initially, each measure eliminates only a small amount of emissions. However, the measures build on each other, and their impacts increase over time. Each measure is more impactful 15 years into implementing the CEAP than it was at the beginning. This shows how important it is for Canmore to begin these actions as soon possible and to avoid delays throughout the CEAP.

[4] Government of Canada (2023). Greenhouse gas sources and sinks in Canada: executive summary 2023. Retrieved from https://www.canada.ca/en/environment-climate-change/services/climate-change/greenhouse-gas-emissions/sources-sinks-executive-summary-2023.html

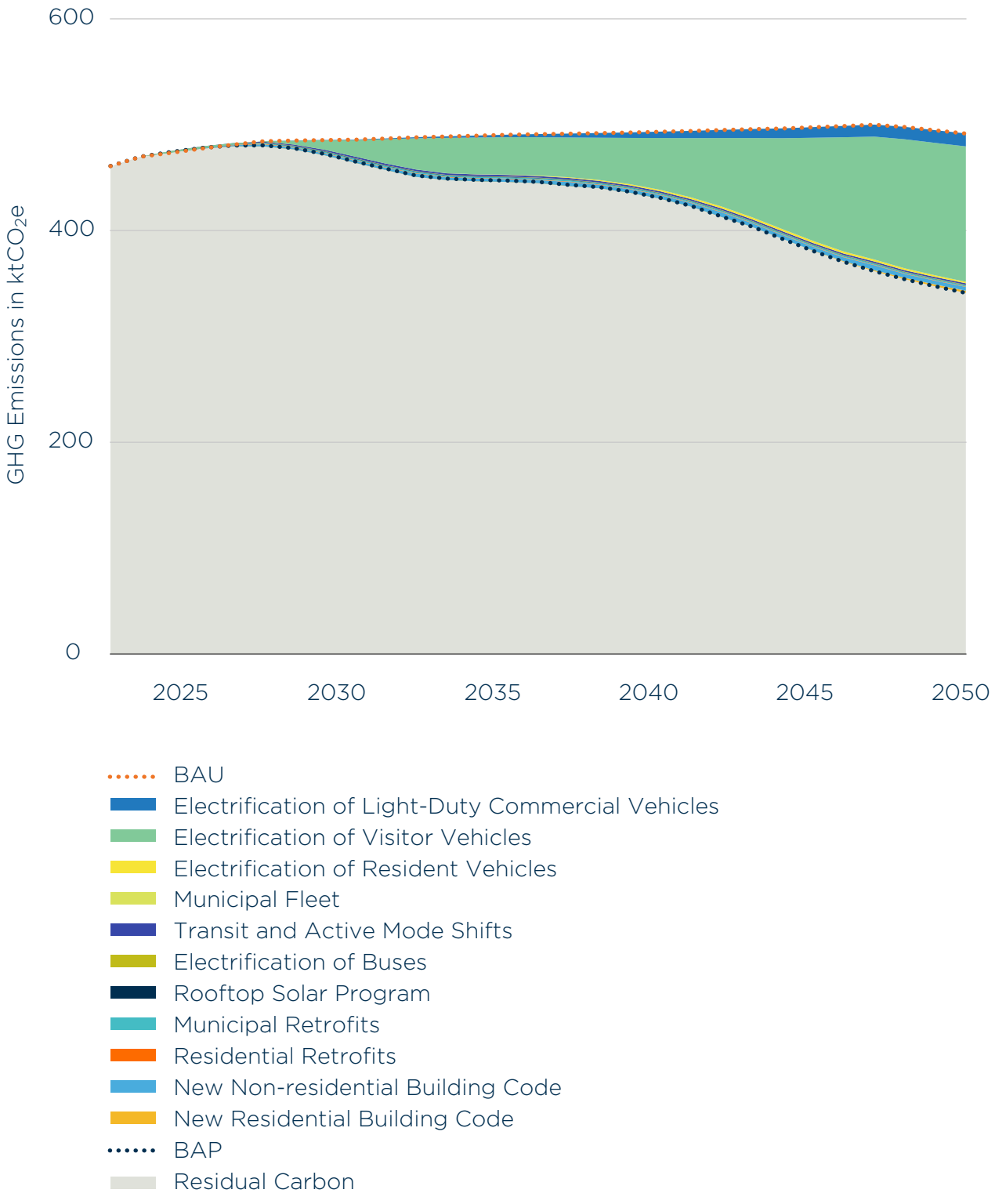


Figure 8. Emissions reduction impact of each action in the BAU and BAP scenarios, 2022–2050.

The BAU and BAP modelling assumptions are described in Table 1.

Table 1. BAU and BAP Modelling Assumptions.

Strategy	BAU Scenario	BAP Scenario	Impact
Higher-performance new buildings	No change in building performance	• New residential and non-residential buildings are constructed to Tier 1 of the 2020 National Building and Energy Codes	Avoided/reduced energy use
Retrofit existing buildings	No retrofits take place	• Municipal buildings are retrofitted to become 50% more efficient by 2030 • 20 homes are retrofitted by 2026 under CEIP and low-income programs	Avoided/reduced energy use
Rooftop solar	12.8 MW rooftop solar installed by 2030	• 13.6 MW rooftop solar power installed by 2030 with additional Town of Canmore incentive program	Fuel switching
Vehicle electrification	No change in vehicle fuel use	• 1 electric bus by 2024 • All new light-duty vehicles are electric by 2035 under federal mandate	Fuel switching
Mode shift to transit and active transportation	No change in transportation mode share	• Transit and active transportation networks are expanded based on Canmore's Integrated Transportation Plan, resulting in higher shares of people walking, biking, and riding the bus	Avoided energy use

A Business-As-Usual (BAU) Scenario Explained

A business-as-usual (BAU) scenario for carbon emissions reductions reflects a continuation of current consumption and supply trends for Canmore with no policy interventions and minimal technological progress. This scenario is mostly hypothetical and serves as a comparison for the effectiveness of the BAP scenario.

A Business-As-Planned (BAP) Scenario Explained

A business-as-planned (BAP) scenario for carbon emissions reductions projects Canmore's expected emissions levels if the Town continues with current policies and practices, with no additional policy or climate action intervention. This scenario serves as a benchmark, or starting point, against which Canmore can measure the effectiveness of its emissions reduction efforts. It includes projections for energy consumption, emissions from transportation, emissions from industrial processes, and other sources of carbon emissions.

The projections are based on locally available data including utility use records, transportation data, demographic data, and forecasts for population and employment changes. Policy implications at the local, provincial, and federal level are also considered.

This scenario essentially describes the size of the emissions reduction challenge the town faces and can be used to set emissions reduction targets and track progress toward achieving them. It can also be used as a way to communicate the town's reduction strategy to interested and affected parties (stakeholders) and the general public.

In the BAU scenario, GHG emissions grow by 8% from 2022 to 2047, with a slight downward trend in the last three years. This projection reflects the interplay between several factors: the growing population trends and warming climate trends combined with improved equipment and vehicle efficiencies.

What the business-as-planned (BAP) scenario showed is that GHG emissions were likely to decrease by 26% (Figure 9, next page) by 2050, with current policy that does not include a climate emergency action plan. This means without an ambitious climate action plan, emissions are not reduced to a low-carbon state. To eliminate as many GHG emissions as possible by 2050, comprehensive changes across all sectors are needed. The challenge is daunting but not impossible.

Emissions Targets

Setting emissions reductions targets allows the Town and the community to identify a clear goal and track progress toward achieving it. To align with the Government of Canada's Canadian Net-Zero Emissions Accountability Act, the Town has set a target of net-zero GHG emissions by 2050.

Canada has an interim target of reducing emissions by 40%–45% below 2005 levels by 2030. This target aligns with Canada's Paris Agreement commitments. As Canmore does not have a comparable emissions inventory for 2005, establishing a firm target to align with federal commitments is challenging. Canmore has grown between 2005 and 2022, our modelling base year, but emissions from grid electricity, gas-powered vehicles, and other sources have reduced through updates to fuel sources and emissions regulations. The modelled target for 2030 in this study is 350 $ktCO_2e$. This represents a 25% decrease in emissions from 2022, and is likely close to a 40%–45% decrease from 2005 emissions, based on those changes.

Figure 9 shows the BAU and BAP scenarios, as well as the 2030 and 2050 GHG targets for Canmore. Included in this graph is the Low Carbon Scenario, which is a pathway for Canmore to achieve its GHG targets. This scenario is explored in more detail further in this document.

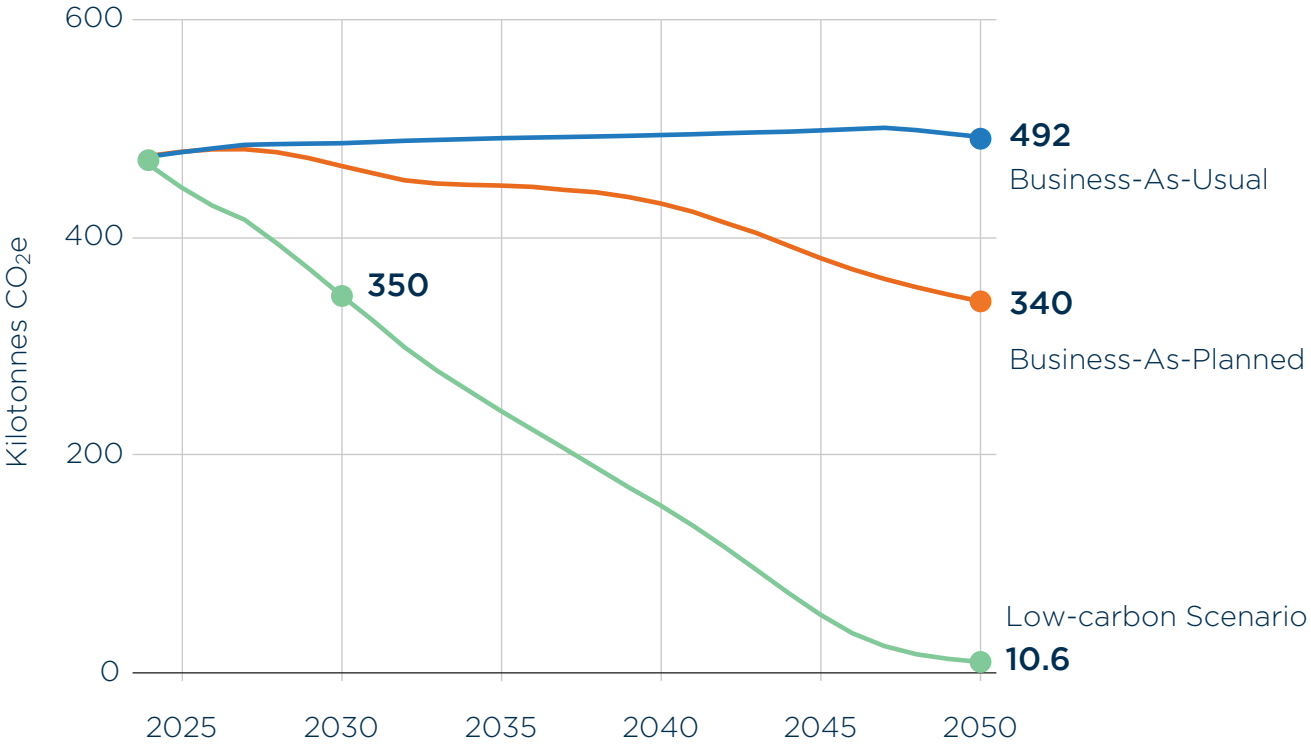


Figure 9. GHG emissions projections for BAU, BAP, and low-carbon scenarios.

Adapting to Climate Change: Climate Hazards and Projections

Climate Hazards

Canmore will be getting **warmer** and **wetter**, with **wilder** weather. Both the mean and maximum annual temperatures are increasing. Minimum temperatures will increase throughout the century, and Canmore can expect to see multiple days above 30°C annually.

The total annual precipitation will also increase, but with less precipitation in the form of snow, and more in the form of rain, especially in the spring and fall. The number of frost-free days will increase dramatically. The combination of warmer weather and less predictable precipitation will have impacts on the snowpack and glaciers in the mountains around Canmore, with effects on flooding, ecosystem health, and freshwater supply.

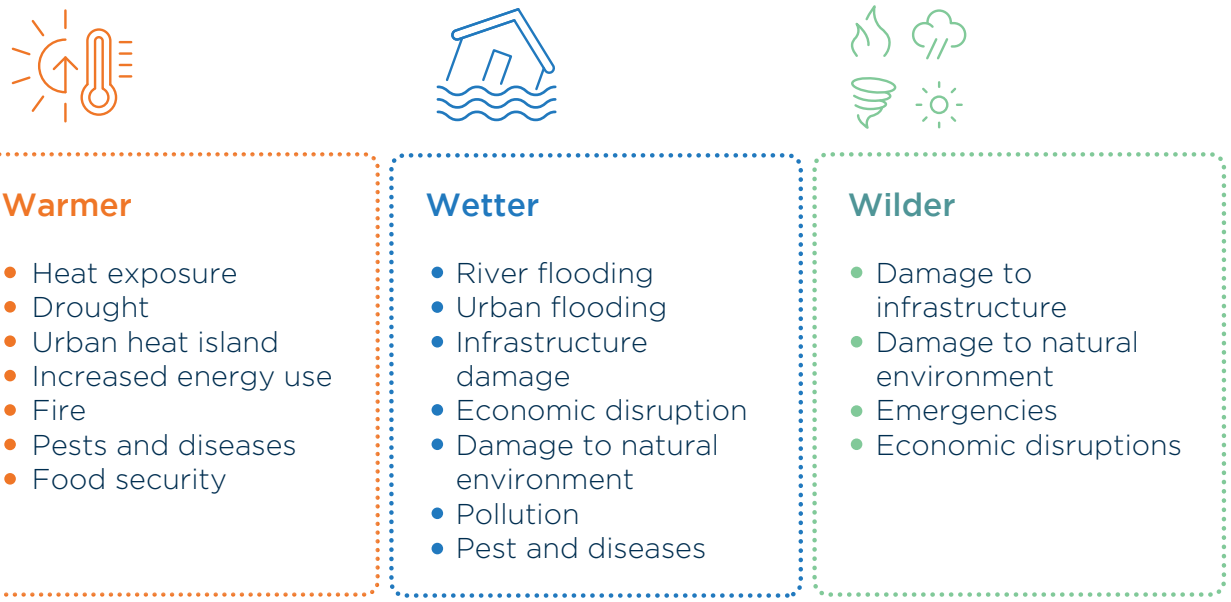


Figure 10. Climate impacts in Canmore.

Linking climate change with changes in hazards requires a multi-faceted analysis of the links between climate indicators and the physical assets of Canmore, including both the built environment and the natural environment. Figure 11 (next page) shows the interrelated nature of these relationships, linking climate indicators to hazards.

Translating climate change trends to hazards allows for a deeper understanding of how the warmer and wetter weather will shape the seasons, ecosystems, and risks to people, places, and spaces in Canmore.

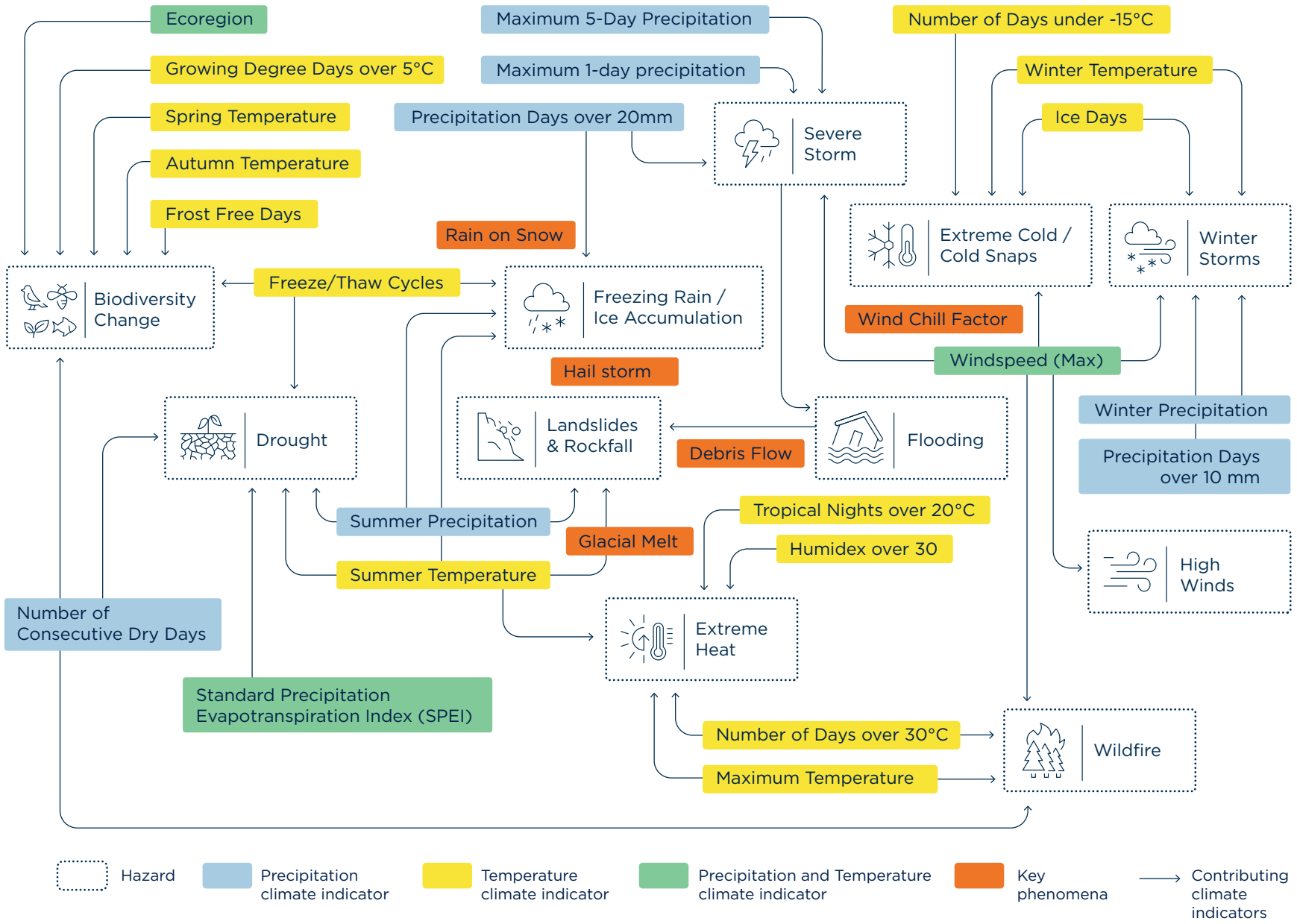


Figure 11. Relationships between climate indicators and hazards affecting Canmore.

Climate Risk and Vulnerability Assessment

Assessing the vulnerability and consequences of climate hazards, as well as the threat each hazard poses, allows us to develop a risk score for each hazard. These risk scores range from 0 to 5, where 0 is no risk, and 5 is a very high risk. These risk scores consider how well Canmore can adapt to a hazard, the spatial impact of the hazard, how quickly the community can recover, long-term impacts, and direct and indirect damages to buildings, infrastructure, and other assets.

To understand the risk from climate hazards, three components are assessed:

- **The hazard threat:** What is the extent of the threat, how frequently does it occur, and how will it change over time?
- **The vulnerability:** What is the adaptive capacity of the system, and what is the sensitivity and susceptibility of the system to the hazard?
- **The consequence:** What are the direct and indirect consequences of the hazard to the system?

The risk score is the result of all three components combined. Table 2 (next page) shows the score for each of these components, and Annex 5 provides more details.

Table 2. Risk assessment scores for climate hazards in Canmore.

Rank	Hazard	Hazard Threat	Vulnerability	Consequence	Risk
1	Ecoregion Changes	2.2	0.7	2.5	**1.67**
2	Wildfire	2.1	0.9	4.5	**3.90**
3	Steep Creeks	1.5	0.7	4.0	**2.93**
4	Extreme Heat	1.3	0.4	2.0	**0.80**
5	Riverine Flooding	1.1	0.7	4.0	**2.67**
6	High Winds	1.0	0.3	1.5	**0.50**
7	Freezing Rain/ Ice Accumulation	0.9	0.2	1.5	**0.30**
8	Dry Weather Conditions/ Drought	0.8	0.4	1.5	**0.60**
9	Extreme Cold / Cold Snaps	0.8	0.3	1.0	**0.27**
10	Snow Accumulation	0.8	0.2	1.0	**0.20**

Risk	Insignificant 0.20 - 0.59	Minor 0.60 - 0.99	Moderate 1.00 - 1.99	High 2.00 -3.99	Very High 4.00 - 5.00

Summary of Climate Impacts

The following sections describe the impacts of the highest risk climate hazards in Canmore.

Ecoregion Changes

Ecoregion changes are shifts in the composition of species, or type of ecosystem or ecoregion, found in the area. The focus of this hazard is on invasive species and diseases, as well as stresses to the forest ecosystem. Canmore is located in a beautiful and diverse natural environment, and impacts to the ecosystems will affect the whole community. These impacts include:

- Increased stresses to forests, which can lead to an increased risk of fires, floods, and landslides;
- Loss of urban forest cover, and changes in the health of other ecosystems including lakes and streams;
- Increased presence of invasive species, including vectors of disease such as ticks and mosquitos;
- Spread of species like the mountain pine beetle; and
- Disruptions to tourism due to fires, reduced forest health, and increased vector-borne diseases.

Wildfire and Smoke

Wildfire is the unplanned spread of fire caused by natural events or human activity. Smoke from wildfires can affect locations far away from the actual fire. All of Canmore is at an elevated risk from wildfire (Figure 12, next page). Because the town is a valley, smoke can become trapped in the area, resulting in health problems and negative impacts to recreation and tourism. Wildfire and smoke impacts include:

- Damage to or destruction of homes, businesses, and other assets;
- Disruptions to transportation networks and the electricity grid;
- Stresses and injury to people from fire and smoke;
- Increased strain on emergency services;
- Unhealthy outdoor conditions; and
- Impacts on tourism from fire or smoke.

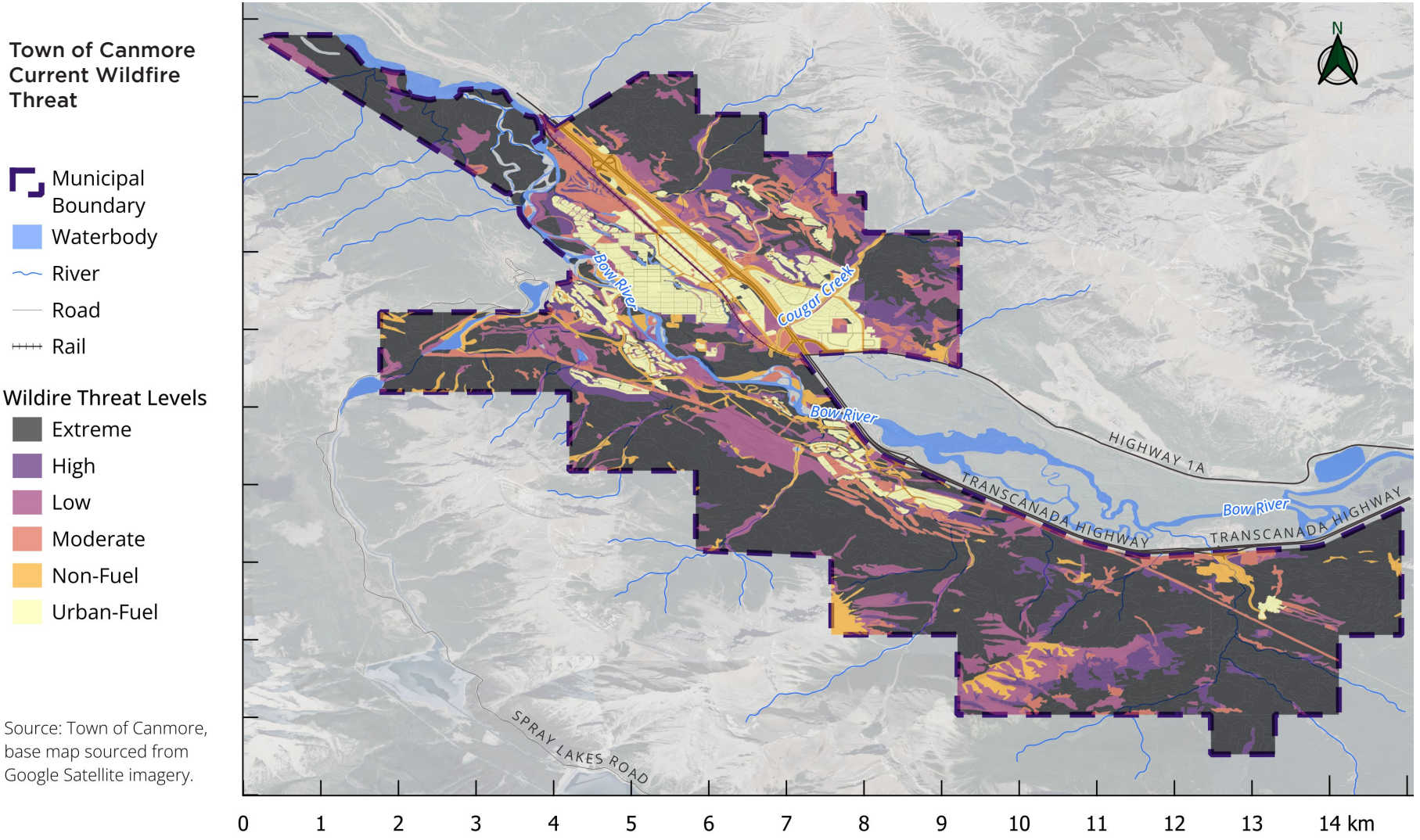


Figure 12. Wildfire threat levels for the present day for Canmore.[5]

[5] Modified from: Walkinshaw, Stew, 2020. Wildfire Risk Assessment. Three Sisters Mountain Village. Montane Forest Management Ltd.

Steep Creek Flooding

Landslides and debris flows, also known as steep creek flooding, occur when large precipitation events in mountainous areas cause flooding and debris flows. These floods can be unpredictable and dangerous. In the past, they have caused extensive damage downstream, and continue to pose a significant risk to areas of Canmore within the flow paths of these creeks (Figure 13, next page). These impacts include:

- Damage to homes, businesses, and other infrastructure;
- Potential injury or death;
- Disruptions and evacuations from emergency events;
- Increased sedimentation in downstream water bodies; and
- Expensive and complicated clean-up and repairs.

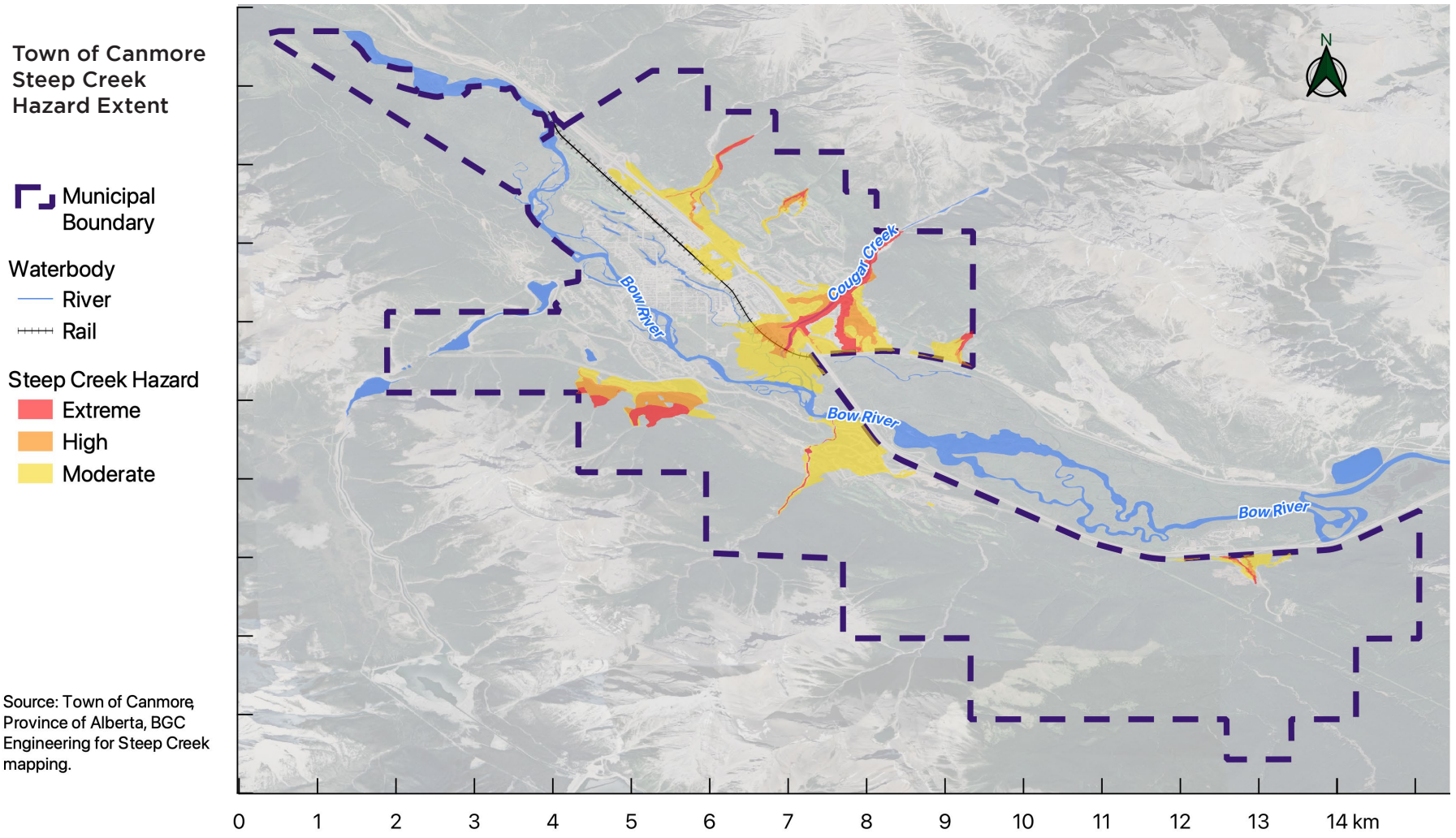
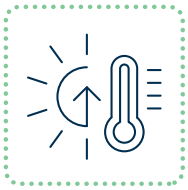


Figure 13. Extent of Steep Creek Hazard zones for the creeks included in the risk assessments completed between 2015 and 2018 by BGC Engineering, Ltd. Hazard level increases from yellow to red in severity, based on the steep creek risk assessment analysis.



Extreme Heat

Extreme heat is a period of high heat, specifically daily high temperatures above 30°C, and nighttime low temperatures above 14°C. For the purposes of this analysis, we looked specifically at the effect of such conditions as they relate to heat stress and the effect of periods of high heat on Canmore's residents.

Canmore is protected from the temperature extremes seen in other parts of the country, but it will still experience elevated temperatures relative to historic conditions. The nighttime temperatures of a 1-in-10 year heat event are shown in Figure 14 for the present day, and Figure 15 for 2070 (next pages). The increase in temperature across all of Canmore is evident and can cause the following impacts:

- Increased risk of heat-related illnesses and diseases;
- Increased need for space cooling/air conditioning;
- Increased energy demand for space cooling;
- Heat stress of vegetation and changes in ecosystems as the climate warms;
- Changes in water quality;
- Increased demands on health services, with stresses on health care workers and emergency services; and
- Increased need for cooling centres and other municipal supports.

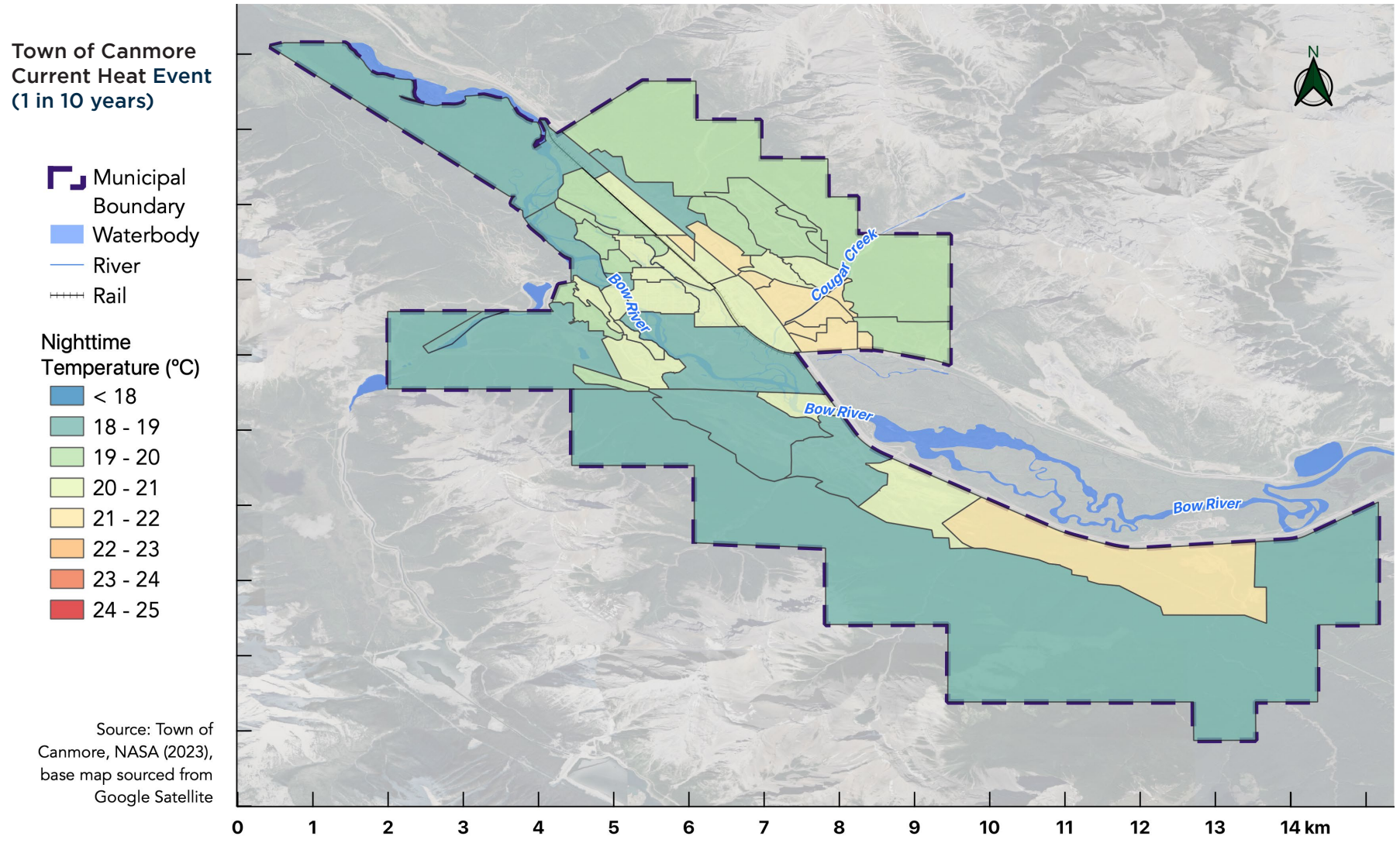


Figure 14. Estimated minimum nighttime temperatures across Canmore during a 10-year heat event in the present day.[6]

[6] A 10-year heat event has a 1 in 10 chance of happening in any given year.

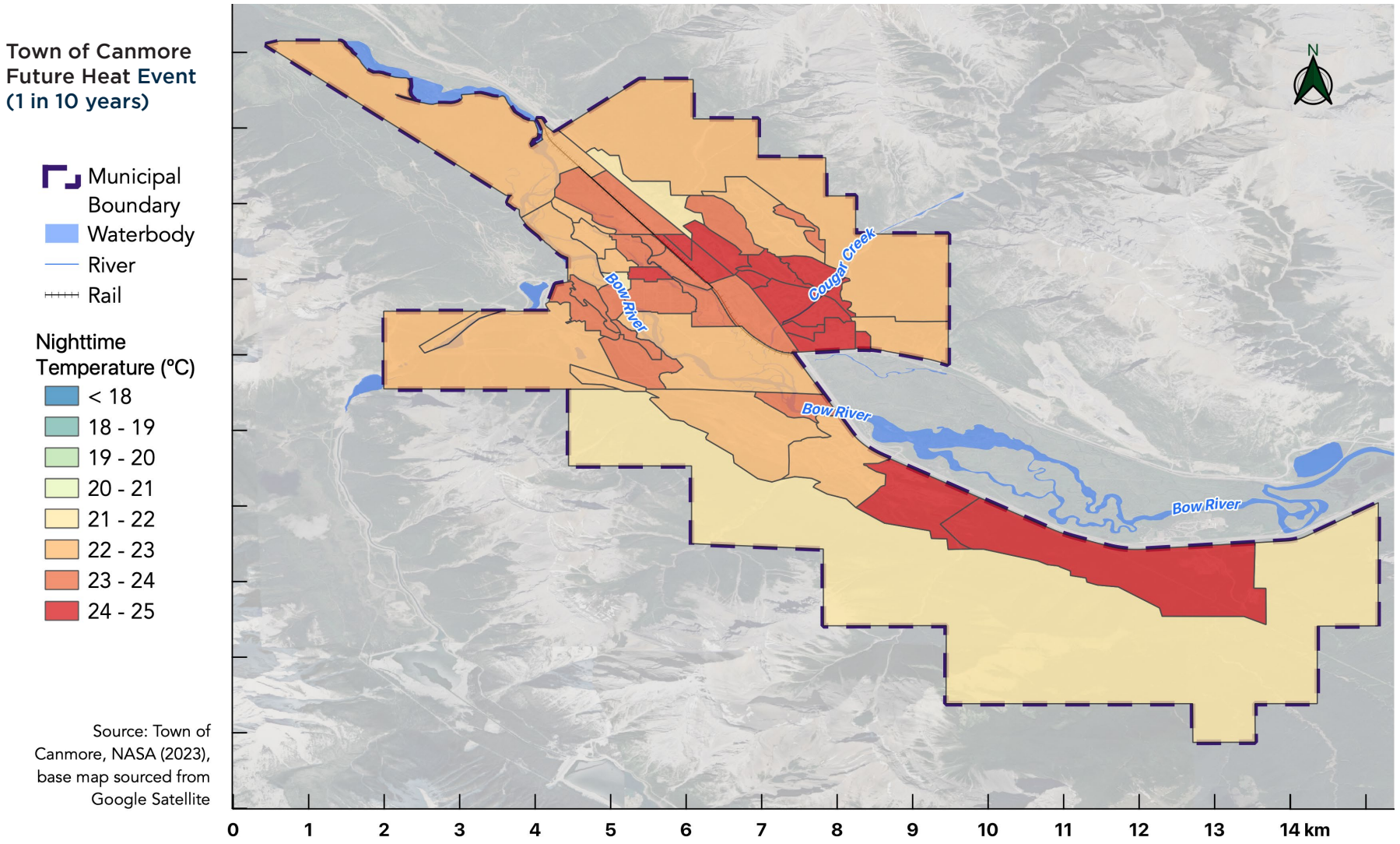
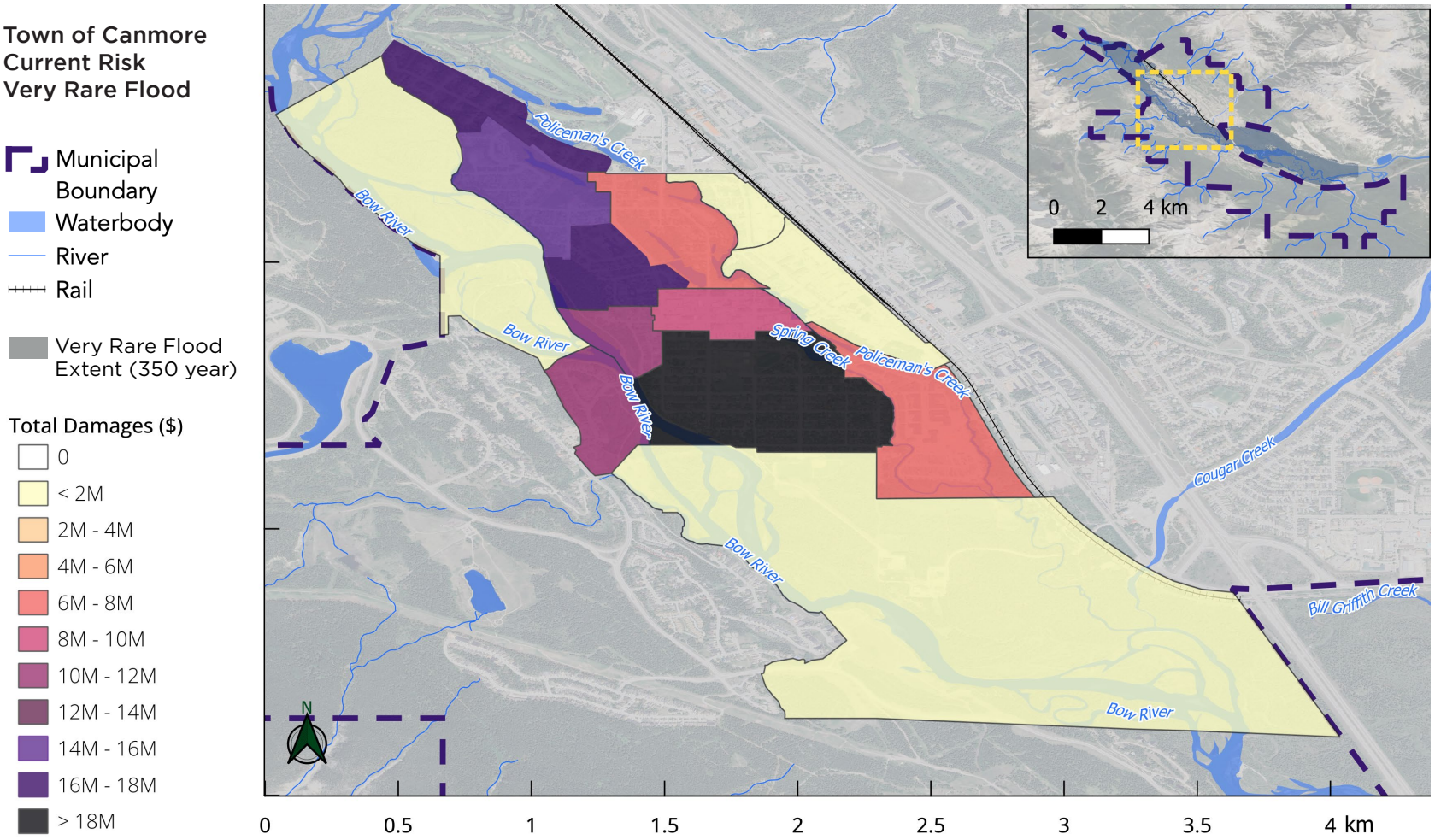


Figure 15. Estimated minimum nighttime temperatures across Canmore during a 10-year heat event in 2070, with the combined impacts of climate change and development.

Riverine Flooding

Riverine flooding occurs when rivers or creeks overflow due to excessive rainfall over an extended period. The increase in total precipitation in the future, as well as the increase in volume of precipitation over short periods of time, increases the potential for riverine flooding into the future. Flooding occurs along the Bow River, affecting the central portions of Canmore. Figure 16 (next page) shows the potential annual damages to structures, contents, and disruptions from flooding both today and in 2070 for four flood return periods. Impacts can include:

- Damage to homes and businesses within the floodplain;
- Potential for flooding of the Wastewater Treatment Plant, which could disrupt essential services to Canmore and contaminate downstream areas;
- Disruptions from evacuations and repairs from flood damage; and
- Increased need for emergency services during flood events.



Source: Town of Canmore, extents from Government of Alberta Flood Mapping GIS Dataset, from Environmental Knowledge and Prediction Branch, Environment and Protected Areas. Base map sourced from Google Satellite imagery.

Disclaimer: Flood events are described by the "return interval", the probability of a flood event of a particular threshold to occur. Flood frequencies are grouped by the likelihood of an event to occur during a lifetime (average lifespan of 85 years). A "nuisance flood" describes flood events that occur many times in a lifetime. "Frequent flood" events occur several times a lifetime. "Rare flood" events may occur once or twice a lifetime. "Very rare flood" events may occur in a lifetime.

Figure 16. Flood damages from a Very Rare (200-year+) flood in the present day

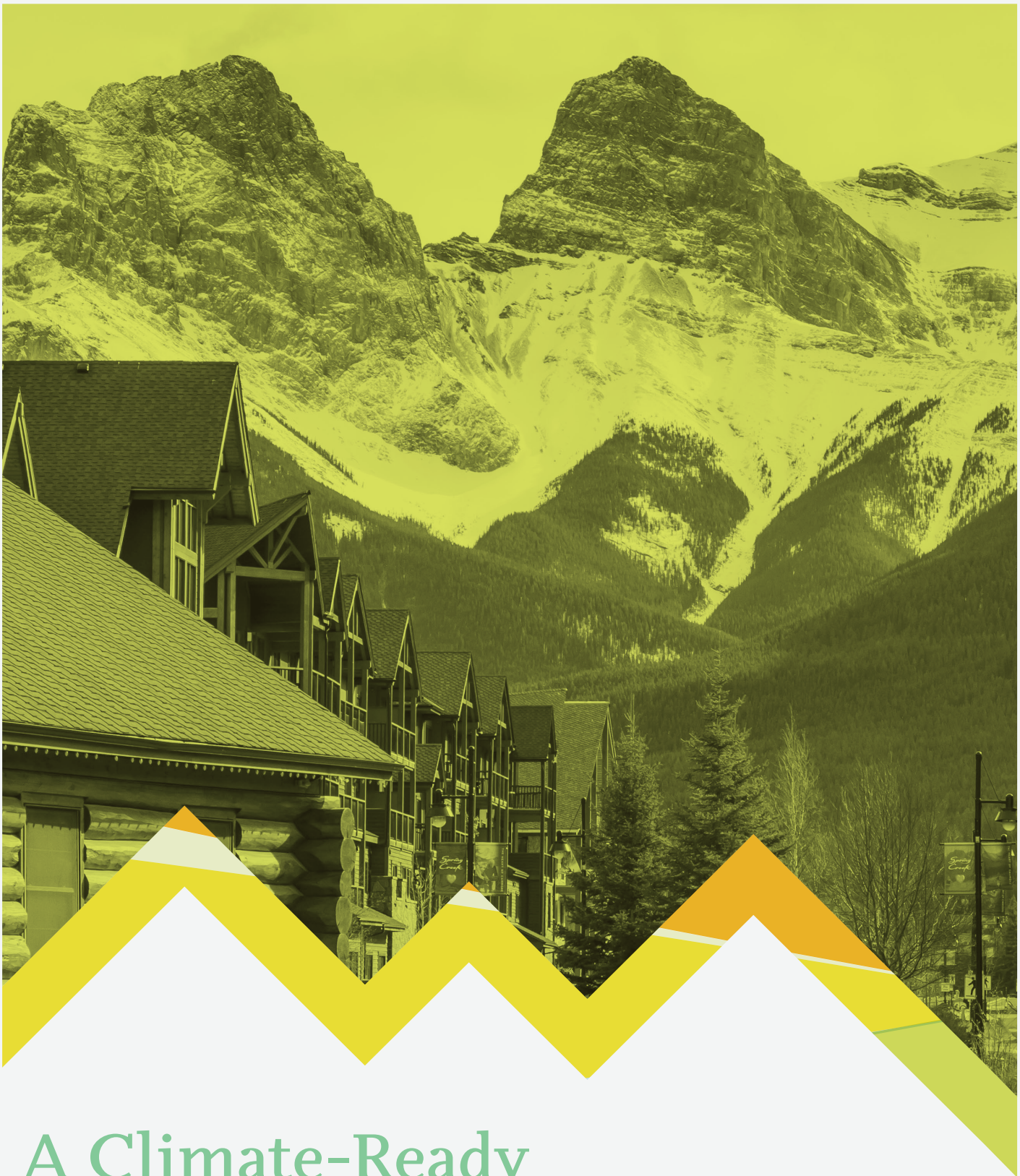
Dry Weather Conditions/Drought

Extended warm periods can lead to droughts. Stresses to surface and subterranean water supplies threaten potable water availability. Increasing temperatures, as well as less predictable precipitation, pose a threat to water security for Canmore. Fresh water is supplied by upstream snow melt, glacial runoff, and precipitation. Changes in any of these elements affects both the quality and the quantity of water available for municipal use, and in natural systems. These impacts can include:

- Changes in water supply and storage;
- Changes in water temperature or condition can require changes to water treatment processes;
- Drinking water supply can be affected, with a higher probability for disruption to residential water supply and enforcement of water restrictions during dry periods; and
- Changes in water supply could result in water use restrictions in Canmore to mitigate drought conditions in downstream communities.

Other Hazards

High winds, freezing rain and ice accumulation, extreme cold, and snow accumulation were not assessed as the increased risk associated with these hazards is insignificant, especially as the climate warms. These are hazards for which Canmore is prepared, and have historically been addressed, so do not require additional consideration beyond the current levels.



A Climate-Ready Future for Canmore

The Pathway to a Net-Zero Town of Canmore

Carbon neutrality is achieved when decarbonization of the economy reduces carbon emissions to as close to zero as possible. Decarbonization occurs through energy-use avoidance, energy efficiency, and the replacement of fossil fuels with renewable energy technologies and energy systems. Any remaining human-driven emissions are balanced out by an equivalent amount of carbon being removed from the atmosphere. Carbon removal or sequestration can be achieved by restoring or enhancing natural lands and soils, or through direct air capture and storage technology.

Deep reductions in GHG emissions are required to meet Canmore's 2030 and 2050 emissions targets. A set of low-carbon actions were identified for Canmore based on established best practices and existing, readily available technologies. These actions were refined to fit the specific context of Canmore through an extensive community engagement process, ensuring their suitability and effectiveness for addressing local needs and challenges.

Many actions exhibit synergistic effects, amplifying one another's efficacy. These actions can be grouped into four 'Big Moves' that together will limit the amount of energy Canmore needs and enable it to meet energy demand with clean energy. The following section lists key modelled and non-modelled actions for each Big Move; Annex 2 includes a full list of modelled actions.

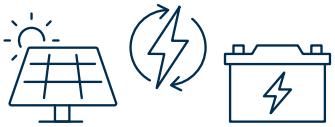
The Big Moves

Resilient Efficient Buildings

To reduce building sector emissions, Canmore's CEAP calls for increasing energy efficiency in buildings and the electrification of equipment.

Key actions:

- Improve the efficiency of new buildings so they require less total energy.
- Improve the efficiency of existing buildings through deep energy retrofits.
- Convert space heating and cooling, as well as water heating systems, to low-carbon systems, preferentially heat pumps.
- Convert any other systems that use fossil fuels, including natural gas stoves or dryers, to electric systems.
- Ensure equity is centred in programming and supports developed to encourage these actions.



Clean, Resilient Energy

Switching from fossil fuels to renewable energy is key to decarbonization.

Key actions:

- Identify and remove existing regulatory and other barriers to renewable energy.
- Expand rooftop solar on buildings in Canmore.
- Add solar canopies on municipal parking lots around the community
- Purchase renewable electricity for all municipal operations.
- Explore large-scale renewable energy generation both within and outside the town.

Community Solar Garden

A community solar garden is a subscription program where community members can invest in solar energy without having to install their own solar panels. For example, Boulder, Colorado, has offered solar garden programs dedicated to income-qualified participants since 2021.

Rethinking Transportation and Mobility

Transportation is the largest emitting sector in Canmore. As a visitor town in the world-renowned Banff National Park region, Canmore sees a lot of visitor traffic, all of which is fueled by high-carbon fuels like gasoline, diesel, and aviation fuel. Addressing transportation sector emissions will require avoiding or shifting as many vehicle trips as possible and decarbonizing vehicles through electrification.

Key actions:

- Expand and electrify transit options within Canmore and to nearby destinations.
- Expand the network of charging stations to support electrification of personal vehicles.
- Increase walking and biking for short trips, including expanding the town's active transportation network and protected bike lanes.
- Fund an expanded and longer-term electric bike incentive program.
- Encourage car sharing programs.
- Establish car-free zones within the community.

Efficient Waste, Water, and Wastewater Management

Limiting waste emissions requires residents and businesses in Canmore to reduce their waste generation and divert as much waste as possible from the landfill. Similar tactics are applicable to the water and wastewater sector.

Key actions:

- Develop and implement a system-wide leak detection system for the municipal water supply system to identify and reduce leaks.
- Develop and implement an underground utility life-cycle upgrades program to reduce water loss, inflow, and infiltration.
- Include rainwater harvesting and greywater recycling systems in new buildings.
- Ensure all properties install smart water monitoring systems.
- Reduce total waste generation, and improve organic waste diversion for all sectors.
- Divert most food waste to composting systems.
- Develop and implement a water conservation strategy, focusing on large users.
- Convert to an anaerobic digestion system for wastewater treatment, with methane capture.
- Shift waste disposal to a landfill with methane capture and utilization.

Low-Carbon Scenario

If the CEAP is fully implemented, GHG emissions in Canmore are projected to follow the trajectory depicted in Figure 17 (next pages). The low-carbon scenario results in a 97% reduction in total GHG emissions by 2050 from the 2022 baseline. Canmore can monitor new and emerging technologies and continue to identify and engage opportunities to address the remaining 'carbon gap' of 11 $ktCO_2e$ in 2050.

Annex 9 outlines the estimated financial costs and benefits of each action in the low-carbon scenario and the scenario as a whole.

A Low-Carbon Scenario (LCS) Explained

A low-carbon scenario (LCS) is a projected future situation in which the amount of carbon emissions is significantly reduced to mitigate the effects of climate change. This can be achieved through a combination of measures such as increasing the use of clean energy sources, improving energy efficiency, and reducing overall consumption of fossil fuels.

LCSs can be modelled using computer simulations that take into account different economic, technological, and policy factors to project how emissions will change over time under different assumptions. The assumptions used in Canmore's CEAP were reviewed by Town staff. They are used to evaluate the effectiveness of different policy options for reducing emissions and to inform decisions about how to achieve a low-carbon future.

LCSs are used in the context of energy and power systems, transportation and mobility, buildings and urban systems, industry and manufacturing, and land use.

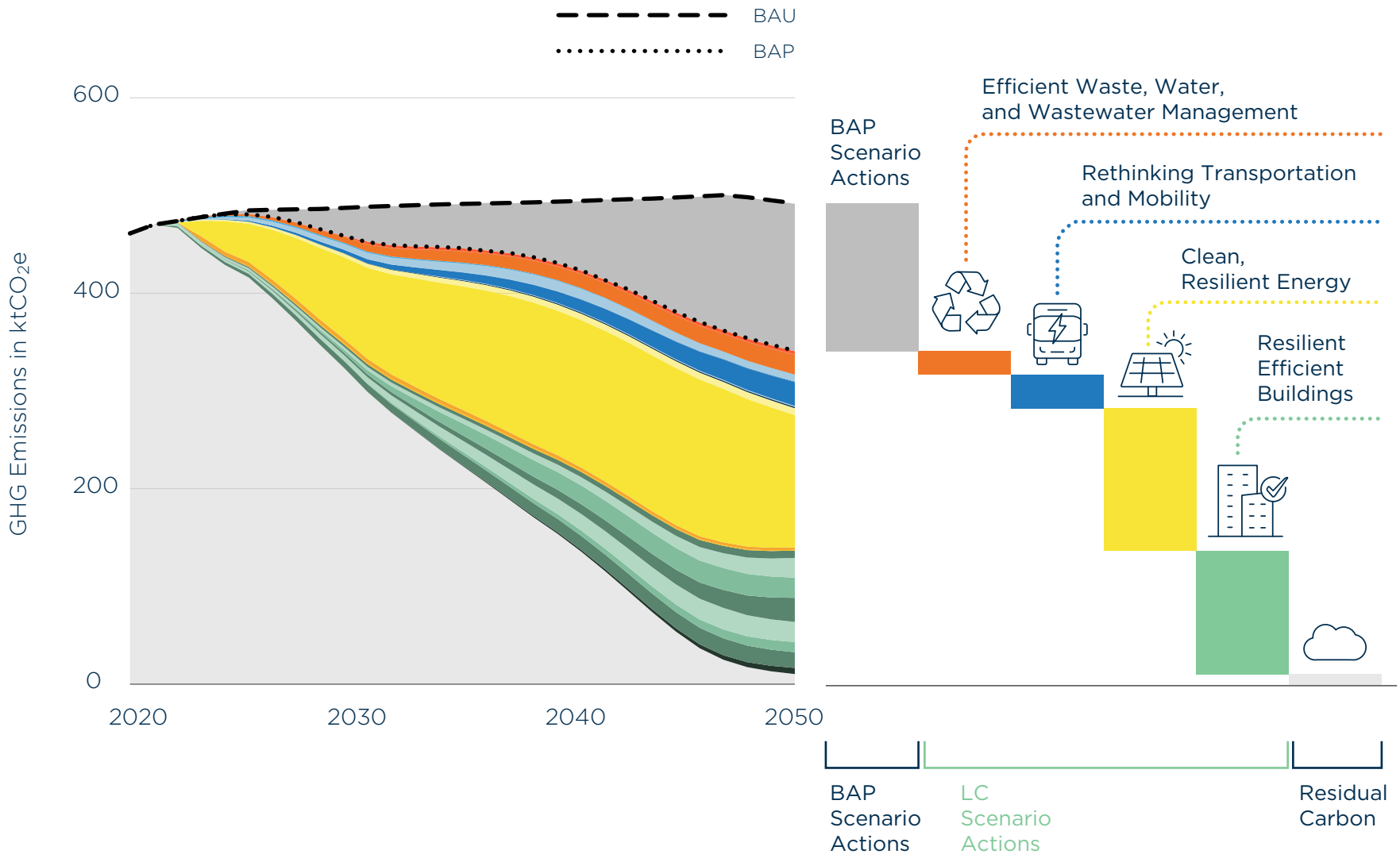


Figure 17.1. The emissions reduction impact of each Big Move in the Low Carbon pathway, 2022–2050.

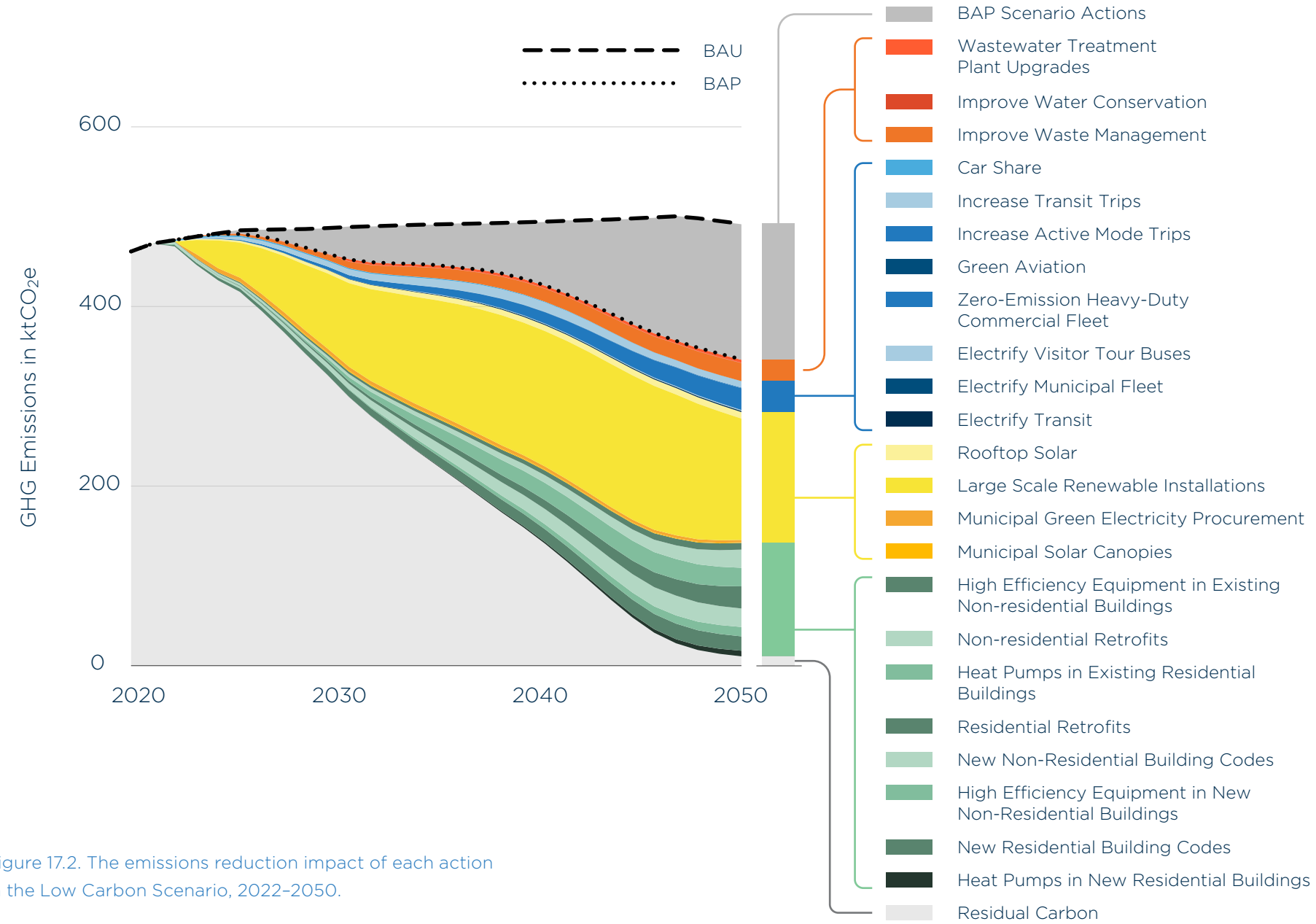


Figure 17.2. The emissions reduction impact of each action in the Low Carbon Scenario, 2022–2050.

The Economic Opportunities of an Energy Transition

Historically, there has been a discourse at the political level that climate action costs money and requires sacrifices. However, an economic analysis of the costs and benefits of implementing the low-carbon scenario in the community of Canmore finds the opposite. There are compelling economic reasons to implement a net-zero pathway as quickly as possible, with no financial downsides.

Investments and Savings

Implementing the CEAP and transitioning to a low-carbon economy will require investments that are spread out across residents, businesses, institutions, the Town of Canmore, and other levels of government between now and 2050. Conversely, the actions will generate returns beginning immediately after implementation and provide an ongoing economic opportunity for the community.

The financial impacts outlined in this CEAP identify the projected investments and returns associated with low-carbon measures that are above and beyond those assumed in the reference BAP scenario. For example, the incremental capital investment is the difference between a net-zero home and a conventional home, or an electric vehicle and a gasoline vehicle. These incremental costs are partially or completely offset by incremental savings; to continue the example, an electric vehicle costs less to operate than a gasoline vehicle.

The financial analysis is developed at the low-carbon pathway level, meaning it represents total costs across the community and does not allocate costs or savings specifically to the municipality or other sectors or investors. Costs to the municipality are dependent on the degree to which the municipal government chooses to invest in certain actions and incentivize other sectors. To implement the CEAP, it will be critical to investigate all financial tools available to the municipal government and other community stakeholders—including individuals, businesses, and other levels of government—as capital costs and upfront investments are considered a primary barrier to climate action.

Investments are likely less than 3% of Canmore's annual GDP

Implementing Canmore's CEAP requires a community-wide investment totalling $843 million from 2024 and 2050, averaging $32 million annually. To put this into perspective, the CEAP investments represent 2.54% of Canmore's annual gross domestic product (GDP) of $1.26 billion per year.[7] These investments generate returns from avoided costs for energy, operations and maintenance, and carbon price (Figure 18). These benefits accrue to the community as a whole, including households, businesses, and the Town itself.

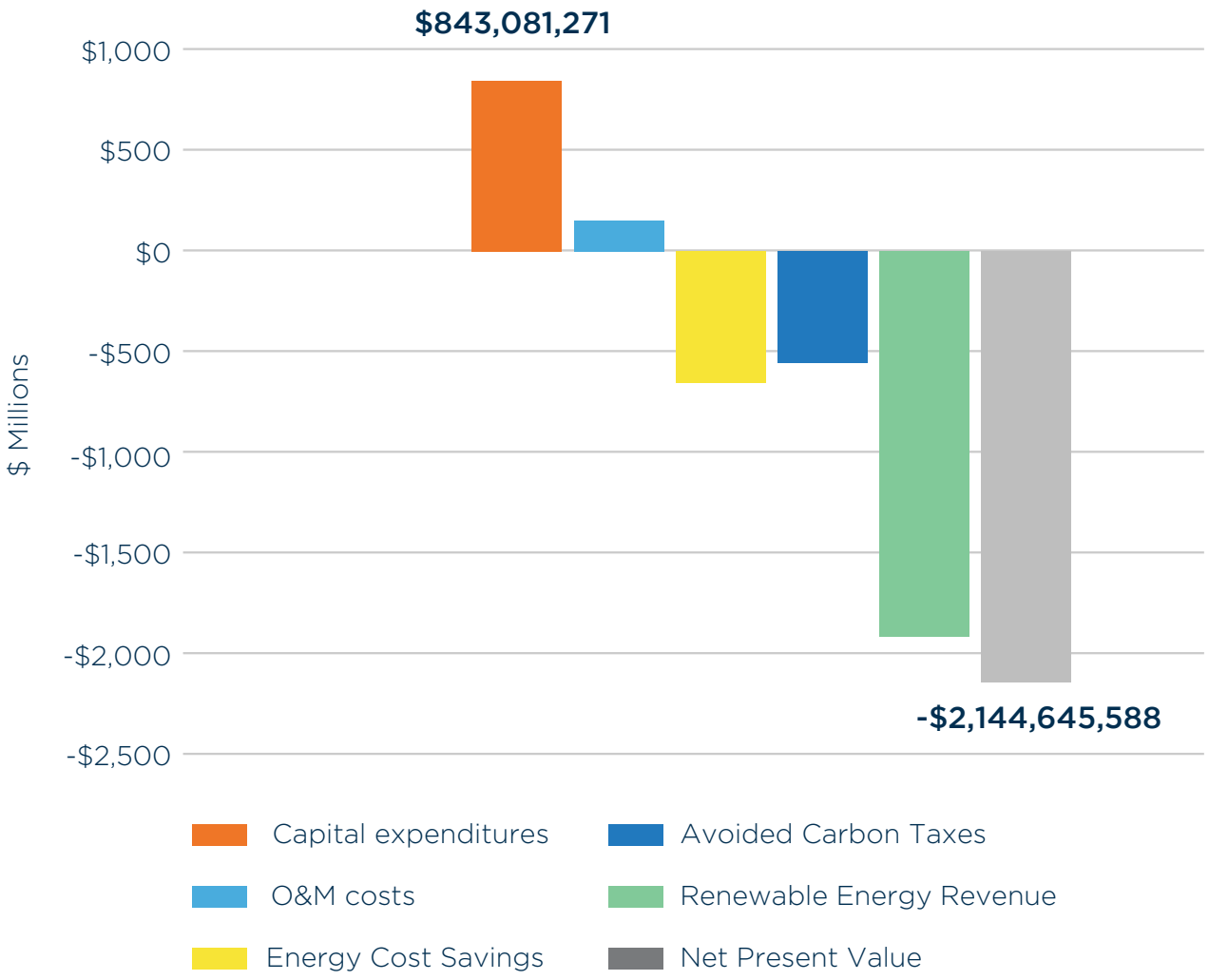


Figure 18. Present value of investments and returns, discounted at 3% (costs are positive and revenue and savings are negative), 2024–2050.

[7] Calculated based on provincial average productivity of labour.

Investments are front loaded

Figure 19 illustrates the level of investments that would be required by residents, businesses, and government to decarbonize Canmore. Similar to other low-carbon transitions, costs are higher in the earlier years as the infrastructure and systems needed to achieve GHG emissions reductions must be put in place rapidly. However, financing most of these investments can be amortized to spread out the cost over time. By the year 2028, savings outweigh the costs.

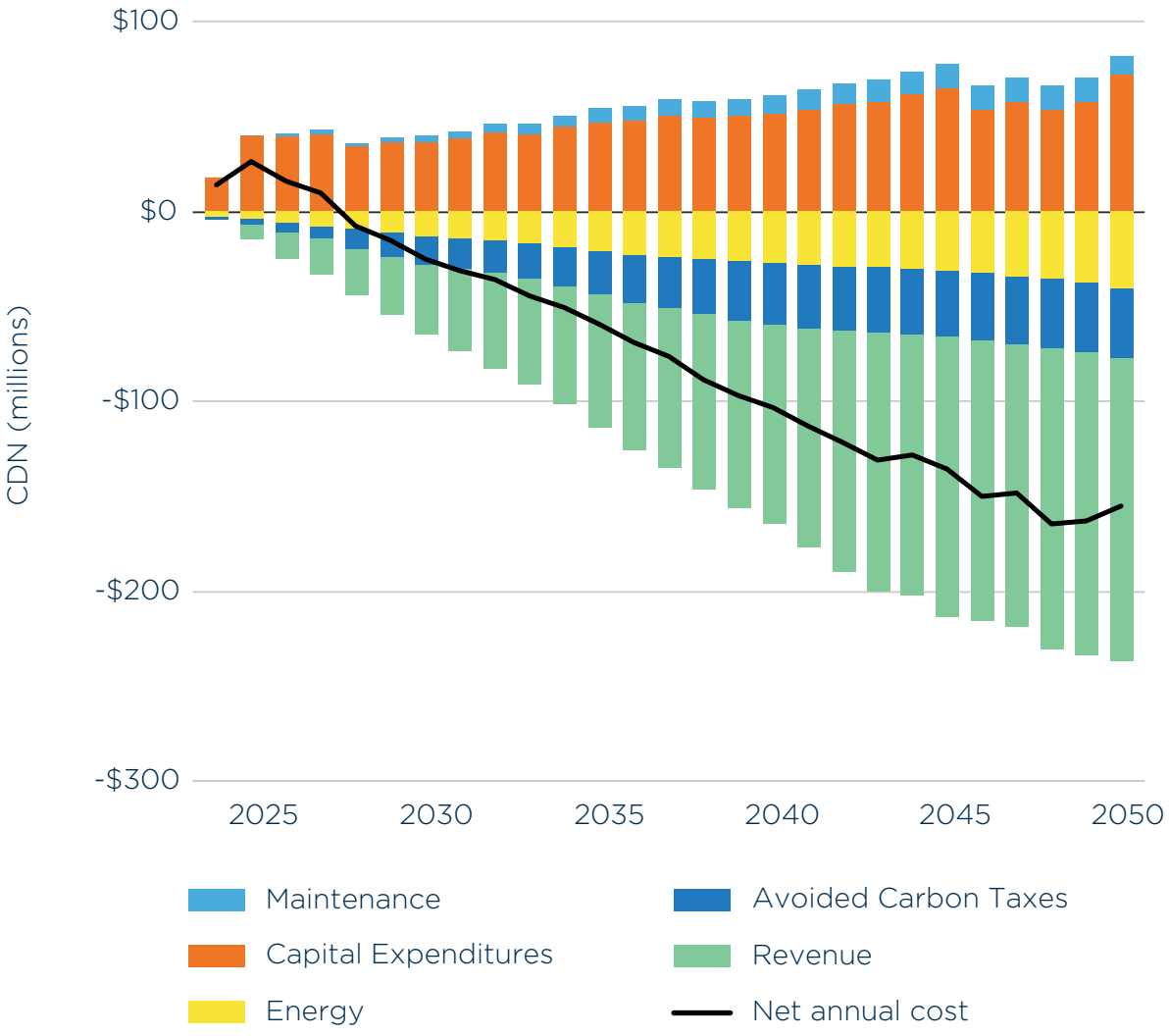


Figure 19. Year-on-year investments and returns, undiscounted, 2024–2050.

Most of the capital investments are for residential and commercial building retrofits and renewable energy installation. Retrofits and renewables provide long-term energy savings, wth some additional revenue for renewable energy production, but entail high upfront costs. The incremental investment in transportation is negligible because the costs of light-duty electric vehicles are projected to reach parity with gas- and diesel-powered vehicles as early as 2026.[8] The reduced operational costs and avoided carbon tax represent a major opportunity for cost savings going forward.

Linking investments to actions

The marginal abatement cost (MAC) is the incremental cost of preventing one tonne of GHG emissions. The lower the cost, the more affordable the action; in some cases, the action can be profitable. The abatement cost is calculated by summing the net present value of capital costs and operating costs over the lifetime of the investments divided by the tonnes of GHGs reduced.

By indicating individual costs for actions, MACs can imply that the actions are a menu from which individual actions can be selected. In fact, many of the actions are dependent on each other. For example, energy costs increase without retrofits. To be successful, the CEAP must be implemented in full. Additionally, in order to achieve Canmore's emissions reduction targets, all the actions need to be undertaken as soon as possible.

Figure 20 (next page) summarizes the MACs for modelled actions for Canmore. The actions with negative abatement costs generate financial returns over their lifetimes. A positive abatement cost signifies a net cost over the span of the project. This comparison provides one way to view the costs and benefits of implementing emissions-reducing actions, but should not be the only metric used to evaluate an action.

[8] Slowik, Peter et.al. (2022). Assessment of light-duty vehicle costs and consumer benefits in the United States in the 2022–2035 time frame. The International Council on Clean Transportation. White Paper. October 18, 2022. Retrieved from https://theicct.org/publication/ev-cost-benefits-2035-oct22/

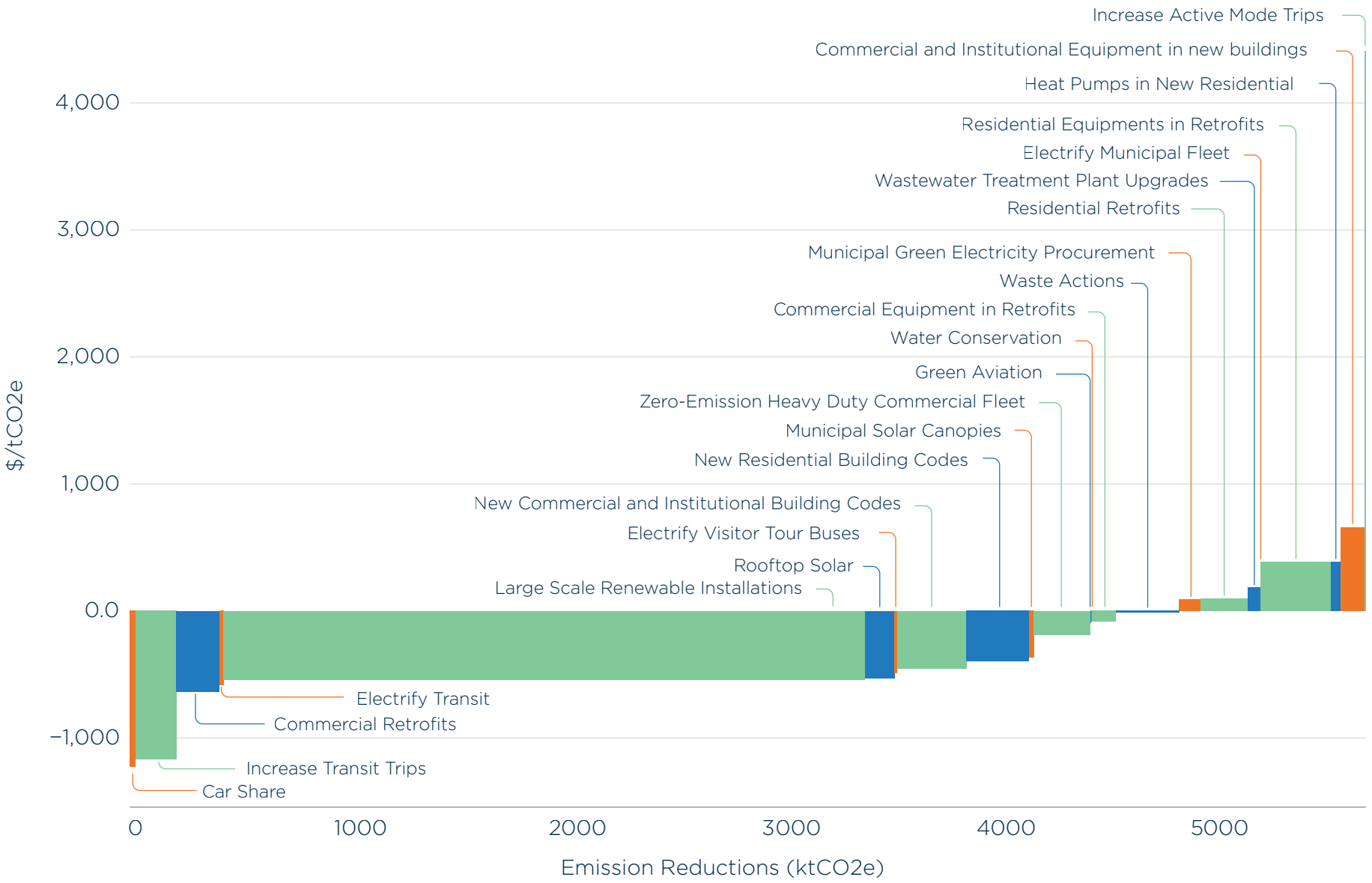


Figure 20. Marginal abatement costs for low-carbon scenario.

Investments generate new jobs

Transitioning to a zero-carbon economy is expected to have four types of impacts on the job market:

- Additional jobs will be created in emerging sectors;
- Some employment will be shifted (e.g., from the fossil fuels industry to clean technology);
- Certain jobs will be reduced or eliminated (e.g., mechanics for gasoline or diesel cars); and
- Many existing jobs will be transformed or redefined.

For Canmore, implementing the CEAP is expected to add 5,900 person-years of employment between 2024 and 2050.

Investments reduces household energy costs

Household energy expenditures—on natural gas, electricity, gasoline, and diesel—are projected to decline by 15% in the BAP scenario, from $4,000 in 2023 to $3,400 by 2050. In the BAP scenario, these savings mainly result from reduced vehicle fuel expenditures due to vehicle electrification following federal targets, increased substitution of traditional heating equipment with more efficient heat pumps, and decreased heating requirements as the climate becomes milder due to climate change.

In the low-carbon scenario, household energy expenditures fall by 36% to $2,600 by 2050. Depending on the business, policy, and financing strategies used in implementing the actions, these savings will be partly offset by the incremental capital expenditures required. Investments in building energy retrofits, faster vehicle electrification, increased transit and active trips, high-performance buildings, and renewable energy generation all contribute to significantly reducing average household energy expenditures.

Leave no one behind

An analysis of climate action and climate action plans indicates that investments which reduce GHG emissions will result in the following:

- Net savings for households, municipalities, and businesses;
- Reduced exposure to fluctuations in energy commodity prices;
- Reduced exposure to carbon pricing;
- Support for economic development; and
- New jobs.

These impacts have financial benefits for all actors in the community, but these benefits may be disproportionate. Special considerations must be made to ensure equity-denied members of the population are not left behind or adversely impacted by climate action. As Canmore works to integrate equity considerations across the community, consideration of the unique characteristics and needs of different neighbourhoods will shape how the CEAP is implemented. Below is a summary of the policy recommendations, supported by pertinent data from the equity analysis, to address the challenges identified and foster an inclusive approach to climate action.

1. Actions for homeowners in established neighbourhoods

- Implement subsidies for retrofitting energy efficiency in homes, particularly targeting homeowner households with mortgages or neighbourhoods with higher rates of energy poverty. Identify areas with lower income and higher energy burden to act as early adopters for these programs and subsidies.
- Develop policies that encourage energy efficiency and resilience retrofits for second-home owners to reduce overall energy demand. Publish energy rankings of homes used as vacation rentals to encourage retrofits.
- Support the development and implementation of community-based sustainability projects and green initiatives.

2. Actions for renters

- Increase support for rental housing retrofits, particularly in locations with higher rates of energy poverty.
- Develop affordable housing solutions and enhance energy efficiency in apartment dwellings.
- Ensure rental properties have EV charging facilities and renewable electricity generation included in retrofit programs.

3. Actions for developing neighbourhoods

- Develop actions to encourage efficient and resilient new housing development, with a focus on removing fossil fuels for heating and cooling and reducing energy consumption in new homes.
- Encourage adopting renewable energy in new constructions.
- Support the development and implementation of community-based sustainability projects and green initiatives.
- Look for opportunities to encourage dense, walkable development in these neighbourhoods.

4. Actions for community connectivity

- Expand transit service and frequency to allow both established and developing neighbourhoods to rely less on personal vehicles for travel within Canmore, as well as to neighbouring communities.
- Expand active transportation infrastructure to encourage walking, biking, and wheeling, when possible.
- Focus on neighbourhoods with a lower median income, higher rates of energy poverty, and more renters for initial deployment.

The Pathway to Resilience

Canmore can become more resilient to the changing climate through taking actions that reduce the vulnerability and consequences of climate hazards, and that increase the town's preparedness and adaptive capacity.

These actions include changes to how and where buildings and other infrastructure are built, and improvements to existing homes and businesses. They include monitoring and managing natural spaces for pests and invasive species, and for ecosystem health, particularly in vulnerable or high-risk locations. They also include preparing for emergency events—including heat waves, floods, and wildfires—to ensure the community, the Town, and emergency services are coordinated on emergency preparedness, responses, and recovery. To explore the impact these actions can have on the community, three scenarios were modelled:

1. The present day, where current,population levels, land use and climate risks were modelled;
2. The 2070 BAP scenario, where the expected growth and development of Canmore by 2070 was modelled, and combined with the expected climate conditions of 2070; and
3. The 2070 Adapted Scenario (AS), where actions to reduce the risk from climate change were modelled with the 2070 climate conditions.

The following sections outline specific modelled and non-modelled actions Canmore can take to address climate hazards.

Ecoregion Changes

Key actions:

- Establish forest monitoring and management programs to track pests and invasive species.
- Update the Urban Forest Management Plan to include climate considerations and pest management.
- FireSmart buildings and vegetation to reduce fire risk.
- Educate the community on how to identify vectors and protect themselves from disease.
- Encourage citizen science programming to monitor ecosystem health and the spread of invasive species.
- Work with the tourism industry to share educational materials on the identification of disease vectors, and how to protect visitors and workers from disease.

Wildfire and Smoke

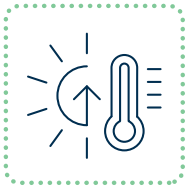
Key actions:

- Integrate FireSmarting into new building planning, including using fire-resistant building materials.
- Work with the community to implement FireSmarting on existing buildings, and include monitoring for continued compliance over time.
- Deploy the Smoke Emergency Response Plan.
- Continue fuel management in high-risk forested areas, partnering with other jurisdictions to align activities and maximize effectiveness.
- Develop and update community-wide evacuation route planning, particularly for neighbourhoods with limited road access.
- Update the Municipal Emergency Management Plan to include visitors and the tourism sector.

Steep Creek Flooding

Key actions:

- Continue to fund and implement steep creek debris flow mitigation measures, and continue to monitor slopes for additional threats to downstream areas.
- Work with Engineering, Public Works and Protective Services to prioritize movement of essential services during an emergency.
- Work with Protective Services, Communications, and Engineering to prepare and coordinate emergency response plans and education for vulnerable locations.
- Adhere to building codes to keep development out of high-risk areas.
- Continue to identify and maintain locations within the community to serve as short-term shelters for evacuees during emergency events.



Extreme Heat

Key actions:

- Deploy the Extreme Heat Emergency Response Plan.
- Retrofit homes and other buildings for energy efficiency and add space cooling with efficient heat pumps.
- Incentivize the development of efficient new buildings, and include space cooling using electric heat pumps.
- Add cooling centres to high-risk areas.
- Develop a heat stress policy for all outdoor workers.
- Plant heat-resistant and climate-proofed tree species, and install shade structures in public spaces.

Riverine Flooding

Key actions:

- Increase the flood protection infrastructure for the wastewater treatment plant.
- Protect existing buildings in the Bow River floodplain with dry flood-proofing measures.
- Continuously review community-wide evacuation plans and routes, with a focus on neighbourhoods with vulnerable populations and challenging access to designated emergency routes.
- Increase the Flood Construction Level for new buildings within the floodplain.
- Include future flooding conditions in planning and development decisions.
- Develop emergency plans for rapid deployment during floods to protect buildings and infrastructure, and coordinate evacuations.
- Identify emergency shelters for use during flood evacuations.

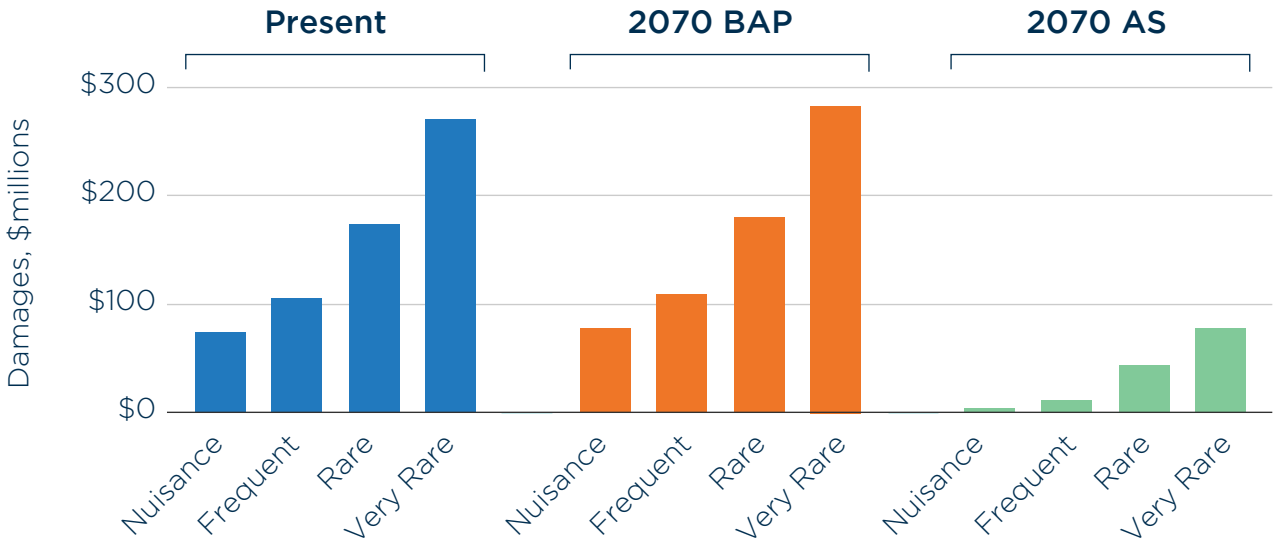


Figure 21. Total annual damages from flooding by return period for present day ($ millions), 2070 BAP and 2070 Adapted Scenario (AS) summed across the entirety of Canmore.

Water Security

Key actions:

- Increase flood protection measures for the wastewater treatment plant.
- Develop a leak detection system for the municipal water supply.
- Develop a drought contingency plan that identifies when water use restrictions should be considered.
- Develop a bylaw to restrict activities in sensitive drinking water source areas.
- Encourage water conservation by the public, visitors, and businesses.
- Protect water quality by restricting the use of pesticides, particularly in places with vulnerable groundwater.

Co-benefits

Co-benefits in Canmore

Actions which reduce GHG emissions can also advance objectives for improved health, equity, prosperity, and climate adaptation. In many cases, these actions correspond or directly overlap with actions that create vibrant cities and towns, improve public health outcomes, reduce municipal and state operating and capital costs, and support innovation—these are no-regret policies. These corollary benefits, or co-benefits, are positive actions that occur beyond the primary objective of a measure or a policy. The opposite, a co-harm, is an unintended negative consequence that results from an action or policy.

One distinction, made by the Organization for Economic Co-operation and Development (OECD), is that co-benefits are effects that are valued in the mitigation (emissions reduction) costs of a policy or action, whereas ancillary or additional benefits are effects that are incidental and are not accounted for in that analysis.[9] In this plan, co-benefits are assumed to be any potential or anticipated benefits of the action in addition to its impact on GHG emissions.

Not all co-benefits nor co-harms are equal. One set of criteria by which to consider the co-benefits of actions to reduce GHG emissions follows:[10]

- **Synergies:** Many low-carbon actions have multiple socio-economic benefits including transit improvements, energy efficiency, and compact urban design.
- **Urgency:** Some actions are associated with a higher degree of urgency in order to avoid loss of inertia on action already taken, lock-in effects,[11] irreversible outcomes, or deferred costs that become even more elevated as a result of deferment. Some low-carbon actions require time to be effective, which makes immediate implementation all the more important.
- **Costs:** The cost of early action is generally lower than the cost of later action, in particular because delayed action involves ongoing investments in infrastructure, activities, and utilities that have higher emissions than low-carbon solutions. Examples include renewable energy infrastructure, transit, and energy efficiency.

[9] IPCC. (2014). Annex II: Glossary [Agard, J., E.L.F. Schipper, J. Birkmann, M. Campos, C. Dubeux, Y. Nojiri, L. Olsson, B. Osman-Elasha, M. Pelling, M.J. Prather, M.G. Rivera-Ferre, O.C. Ruppel, A. Sallenger, K.R. Smith, A.L. St. Clair, K.J. Mach, M.D. Mastrandrea, and T.E. Bilir (eds.)]. In: Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Barros, V.R., C.B. Field, D.J. Dokken, M.D. Mastrandrea, K.J. Mach, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L. White (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 1757-1776. p. 1762.

[10] Adapted from (Fay et al., 2015).

[11] The lock-in effect refers to the implementation of a strategy or action that improves the performance of an object or activity in the short term but is prohibitive to future change. The lock-in effect can refer to building upgrades or land use, for instance. As an example, where quick building retrofits are undertaken, no additional improvements in the equipment installed can be expected over the course of its lifetime without considerable additional expense. In this way, lower levels of energy reductions can be locked in for a long period.

- **Longevity:** Related to urgency, the longevity of investment decisions locks society into their effects for decades,[12] if not centuries.
- **Distribution effects:** Low-carbon actions have different impacts on different subsets of the population, including income levels, generations (including future generations), race, and ethnicities.

Assessing the co-benefits and co-harms of climate action allows us to identify secondary benefits to the community and reduce the occurrence of co-harms. The following is a high-level review of the co-benefits that Canmore would experience by implementing the CEAP, including reduced reliance on fossil fuels, expanded active transportation and transit options, and building improvements for energy efficiency. Co-harms were considered in the development of proposed actions, and avoided where possible.

Air Quality and Health Benefits

The implementation of this plan is set to yield significant co-benefits in terms of improved air quality and consequent health benefits for Canmore's community. As we progress toward a lower emission future, primarily through reducing reliance on fossil fuels and increasing green spaces, we can anticipate a notable improvement in air quality.

New Air Quality Guidelines by the World Health Organization[13] demonstrates the substantial health risks associated with air pollution, even at lower concentrations than previously understood. By reducing key air pollutants, which include some that contribute to climate change, these guidelines aim to save millions of lives affected by conditions such as respiratory infections, asthma, heart disease, stroke, and diabetes. The guidelines emphasize that adhering to improved air quality standards could prevent millions of premature deaths annually, making it a global health priority on par with risks like unhealthy diets and tobacco smoking.

[12] For example, when a new building is constructed, if it does not have low-carbon design built in from the beginning, this infrastructure decision comes with a multi-decade set of consequences (as most buildings are built to last 50+ years).

[13] New WHO Global Air Quality Guidelines aim to save millions of lives from air pollution. 22 September 2021. Retrieved from:
https://www.who.int/news/item/22-09-2021-new-who-global-air-quality-guidelines-aim-to-save-millions-of-lives-from-air-pollution

Decreased emissions from vehicles and industries mean fewer pollutants like nitrogen oxides and particulate matter, which are directly linked to respiratory and cardiovascular diseases. Enhanced green spaces contribute to this improvement by acting as natural air filters, absorbing pollutants and providing cleaner air. Health benefits include a decrease in pollution-related illnesses, potentially leading to reduced healthcare costs and an increase in overall community well-being. Reduced air pollution also correlates with better cognitive functioning and mental health, further elevating the quality of life for Canmore's residents.

Active Transportation and Health Benefits

Active transportation, encompassing walking, cycling, and the use of other non-motorized forms of transport, is a key element of the CEAP. Encouraging active transportation not only reduces GHG emissions but also significantly enhances public health.

The co-benefits include increased physical activity leading to lower rates of obesity, heart disease, and type 2 diabetes. Regular physical activity through walking and cycling also contributes to improved mental health, potentially reducing symptoms of depression and anxiety. Moreover, active transportation supports community engagement and connectivity, fostering a sense of belonging and well-being. To maximize these benefits, our plan includes accelerating the extended development of safe, accessible, and extensive networks of bike lanes and pedestrian paths, making active transportation a viable and attractive option for all ages and abilities in Canmore.

Safe Healthy Buildings Benefits

Focusing on safe and healthy buildings in the CEAP leads to several co-benefits, central to both climate resilience and public health. The plan's emphasis on energy-efficient, well-insulated, and well-ventilated buildings ensures a healthier indoor environment, reducing the risks of respiratory problems, allergens, and mould growth. These improvements are particularly beneficial for vulnerable populations such as children, the elderly, and those with pre-existing health conditions.

Energy-efficient buildings also contribute to economic benefits by lowering energy costs, thus reducing the financial burden on households. Moreover, the use of sustainable, non-toxic building materials reduces exposure to harmful chemicals, contributing to overall better indoor air quality. Safe, resilient buildings also mean enhanced protection against climate-induced hazards, such as extreme temperatures and air quality issues, further safeguarding the health and well-being of Canmore's residents.

Equity

Equity emerges as a pivotal factor in the implementation of Canmore's Climate Emergency Action Plan, bridging climate action and social justice. Pursuing a low-carbon future, while beneficial, does not inherently guarantee equity. A conscious effort must be made to ensure fairness across various demographic groups and scenarios, addressing issues like intergenerational equity, income inequality, housing affordability, and global equity. Intergenerational equity is particularly significant, as younger and future generations inherit the consequences and responsibilities of climate actions taken today. Canmore's commitment to immediate emissions reductions can significantly lessen this burden.

Income inequality is a critical aspect of this equity conversation. The transition to a low-carbon economy often poses a greater financial challenge to those with lower incomes. For example, the upfront costs of energy-efficient upgrades can be prohibitive for low-income families, potentially leading to higher long-term costs and a widening of the equity gap. This scenario underscores the necessity for targeted support systems, such as instant rebates or time-of-purchase financial aids, which can be more inclusive and effective than post-purchase rebates. Furthermore, it is crucial to provide equitable access to transit and active transportation options. These services not only facilitate mobility but also enhance access to essential services and employment opportunities, particularly for those without personal vehicles.

Equity also extends beyond local and national borders. The adverse impacts of climate change disproportionately affect poorer nations, despite their relatively minor contributions to global emissions. This global inequality demands a more rapid and substantial response from wealthier nations, not only as a matter of fairness but also to mitigate the risks of climate-induced instability and conflict.

In summary, the implementation of Canmore's Climate Emergency Action Plan offers an opportunity to embody equitable practices that address both local and global disparities, ensuring that the pathway to sustainability is inclusive and just for all.

This section of the plan discusses intergenerational equity, income inequality, and global equity. Annex 8: Canmore's Climate Equity Analysis outlines the full equity analysis, including a look at energy poverty and transit access across the town's neighbourhoods (these factors are included in the Implementation Plan found in Annex 1).

Intergenerational Equity

As the impacts of climate change increase in frequency, duration, and severity, younger generations and generations yet to be born are and will be increasingly affected by the responsibility and impacts of reducing emissions contributed to systems created by older and past generations. Addressing emissions in the short-term decreases that burden.

Income Inequality

We often hear that it is "expensive to be poor" and that is true in the low-carbon transition unless an effort is made to decrease the financial burden for low-income individuals and families. For example, if a person cannot afford energy efficiency upgrades in their home due to the upfront cost, it could mean an increase in their ongoing costs or missing out on utilities savings that others in higher income brackets can take advantage of.

In addition, most utility fees are determined based on the fixed cost of operating and usage fees. This means that if a greater number of higher-income earning homes are using less energy, the fixed costs could increase per unit of energy used, disproportionately impacting lower-income households by costing them more money per unit of energy used. However, if individuals and families living on a low income are supported to make their homes and vehicles more efficient, they could see utility savings. The Town and other levels of government must play a role in ensuring that such supports are accessible for low-income earners. For example, providing instant rebates and other time-of-purchase financial supports may be more realistic than post-purchase rebates.

Access to transit and active transportation can also increase equity. For individuals who do not own a vehicle, especially for those that cannot own a vehicle due to cost, access to transit and active transportation increases the ability to get to services, appointments, activities, and employment. This is only possible if robust transit and active transportation networks are extended to areas within the community where lower-income earners reside, and are connected to areas with employment opportunities and services.

Individuals living on low and fixed incomes are also more susceptible to climate risks than wealthier individuals due to a lack of resources to prepare for climate-related events, limited access to transportation to flee during climate-related events, lack of money for alternative accommodations and to repair or restore their dwellings after an event, lack of space cooling during heat-related events, lack of access to affordable healthcare, and higher rates of comorbidities.[14]

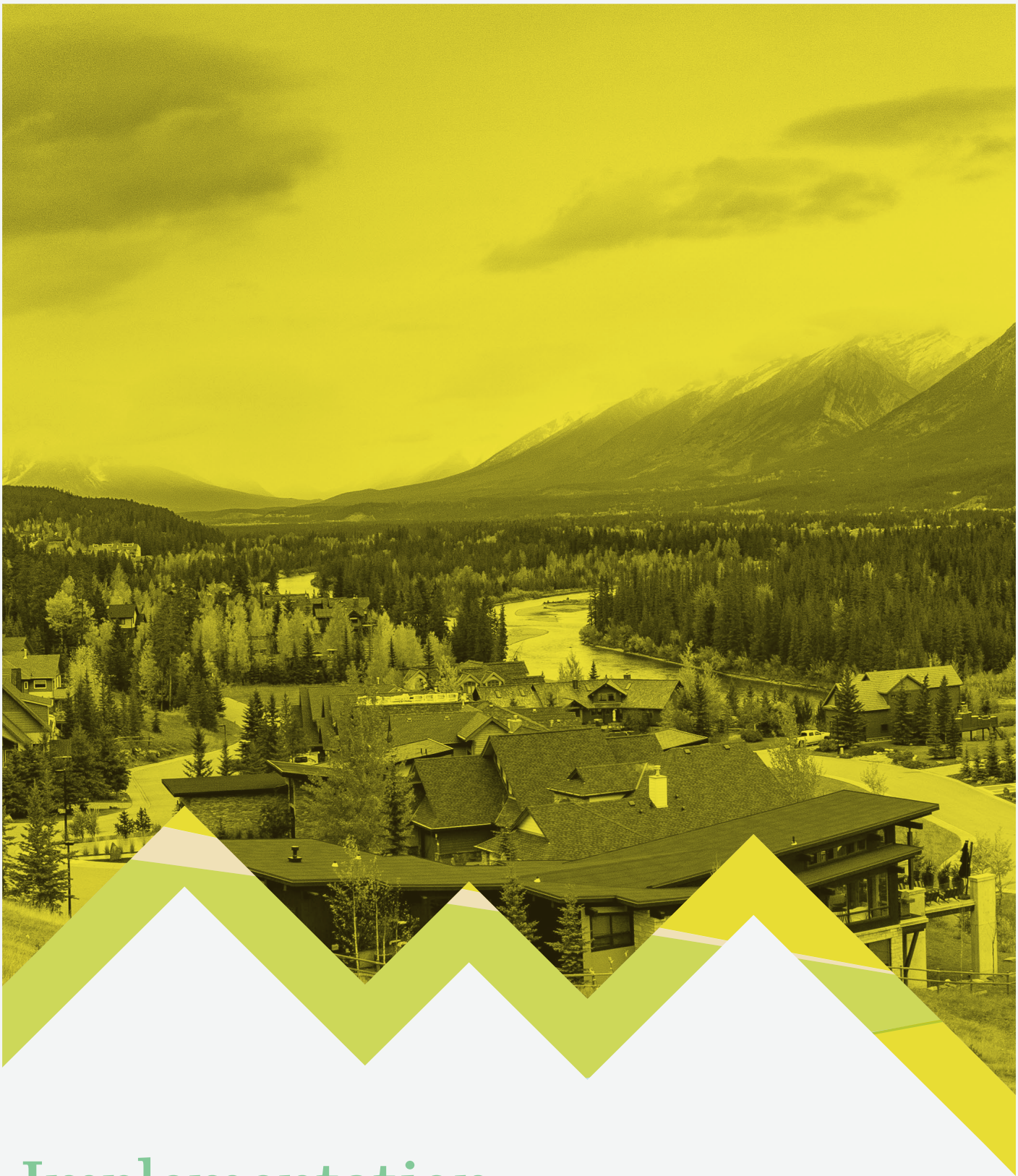
[14] Comorbidities refer to the presence of multiple chronic conditions in a single individual. These conditions can be related or unrelated, and they can have a significant impact on a person's overall health and well-being. Examples of comorbidities include diabetes and heart disease, or depression and anxiety.

Global Equity

Globally, climate change is currently having a disproportionate impact on poorer nations who experience more climate-related events and higher mortality rates as a result. Climate-related events, such as extreme weather events and rising sea levels, can happen more frequently and with greater severity in poorer nations due to a combination of factors. These nations often lack the resources and infrastructure to prepare for and recover from severe weather events and other climate-related impacts. They also tend to be located in areas that are particularly vulnerable to the impacts of climate change, such as coastal regions or areas prone to drought. Additionally, poorer nations are less likely to have the economic means to adapt to the changing climate, making them more susceptible to the negative effects of climate change.

Many of the countries impacted by climate change have also had a lesser impact on the increased use of fossil fuels that has led to the current climate crisis. Led by C40,[15] many communities have set GHG reduction targets that acknowledge that those in wealthier countries must act more rapidly to reduce emissions than communities struggling with widespread poverty. While action by wealthier countries is imperative from an equity standpoint, global climate mitigation can also help reduce the risk of climate-driven instabilities, refugee crises, conflicts, and threats to international security.

[15] C40 is a network of mayors of nearly 100 world-leading cities collaborating to deliver the urgent action that is currently needed to confront the climate crisis. Learn more here: https://www.c40.org



Implementation

Implementing the Climate Emergency Action Plan (CEAP) for the Town of Canmore is an intricate process that involves comprehensive strategies and actions organized across various themes. These themes synergistically contribute to Canmore achieving a sustainable, resilient, and low-carbon community.

Our first theme, "Municipal Leadership," sets the tone, highlighting the critical role of the Town in guiding, exemplifying, and facilitating climate action. It underscores the necessity for developing a municipal carbon budget, retrofitting public buildings, and electrifying the Town fleet.

The second theme, "Resilient, Efficient Buildings," targets the reduction of emissions from Canmore's building stock. It advocates for energy-efficient retrofitting of existing buildings and adopting stringent standards for new constructions, ensuring they are not only energy-efficient but also resilient to climate impacts.

Theme three, "Clean Resilient Energy," focuses on the shift to renewable energy sources, crucial for reducing the town's reliance on fossil fuels. This includes promoting solar installations and exploring community-level renewable energy projects.

Theme four, "Safe and Protected Natural Spaces," focuses on preserving Canmore's unique natural environment. This involves managing forests and water bodies to mitigate risks like wildfires and floods while enhancing their role in carbon sequestration and ecosystem health.

The fifth theme, "Emergency Preparedness for All," recognizes the importance of preparing the community for climate-induced emergencies. It involves creating robust response plans, ensuring efficient evacuation routes, and educating the community on emergency preparedness.

Transportation, a significant emission source, is addressed in "Rethinking Transportation and Mobility," the sixth theme. It envisions a shift to electric vehicles, enhanced public transit, and improved infrastructure for active transportation like walking and biking.

The seventh and final theme, "Efficient Waste, Water, and Wastewater Management," emphasizes safeguarding essential services against climate impacts and managing resources efficiently. This includes implementing strategies for water conservation and waste reduction, and ensuring the resilience of wastewater management systems.

Collectively, these themes form a cohesive strategy to transform Canmore into a model of sustainable development and climate resilience. Each theme, while distinct, is interdependent and requires an integrated approach to implementation, ensuring that every action contributes toward the overarching goal of a sustainable, resilient Canmore.

Presented here are the key high-level strategies and actions for the CEAP's implementation. The full implementation plan, including all actions, with additional technical details, timelines, and risk analysis can be found in a separate document, Annex 1: Implementation Plan.

It should be noted that the Town cannot implement all of the necessary actions on its own. It requires policies, programs, and funding from the federal and provincial governments. For this reason, a number of the actions are to advocate to the Province or Federal Government for aspects that are out of the Town's sphere of control. There are also actions that require collaboration and partnership with organizations.

Theme 1: Municipal Leadership

Decisions made by the Town of Canmore shape all of the community, now and into the future. By establishing itself as a leader in climate action, the Town can demonstrate to the community and the world what is possible when climate action is the north star guiding all decisions, plans, and actions. While the Town itself does not have direct jurisdiction over every element of energy use, GHG emissions production, or climate adaptation, it can serve as a hub of learning and sharing, and a catalyst for change.

GHG impacts: Most of these actions are enabling actions, supporting the decarbonization of municipal buildings and the fleet, which will reduce GHG emissions by 124 $KtCO_2e$ from 2022 to 2050.

Adaptation impacts: The Town acts as a convenor, communicator, and coordinator for emergency response, risk management, and asset management. Centralizing climate change in Town planning and decision-making will reduce risk across all hazards.

Strategy: Internal Leadership

- Ensure that climate change remains a strategic priority for Canmore.
- Adopt an annual carbon budget, and tools and resources to integrate a climate lens into municipal planning and decision-making.
- Expand staffing and resources for implementing the CEAP.
- Ensure staff have the capacity and knowledge to implement the CEAP, and conduct training sessions and workshops on advanced climate change concepts.

What Is a Carbon Budget?

A carbon budget, or a climate budget, is a governance system that offers a way for municipalities to turn climate commitments into funded and measurable actions across the municipal government. It embeds climate targets, measures, and considerations into decision-making as part of a municipality's ordinary budgeting process.[17]

The climate budget framework brings urgency to municipal carbon management by converting long-term targets into annual emissions limits or carbon budgets. All project proposals are quantified through a climate lens, the sum of which could then be evaluated against the carbon budget.

This framework would provide the Town of Canmore with a powerful tool for prioritizing projects and mainstreaming climate action to encompass the entire organization.

Strategy: Community Involvement

- Work with community groups to create an online platform for residents to monitor local projects, track progress toward community GHG reduction targets and adaptation actions, follow municipal initiatives, and stay updated on climate action efforts.
- Work with community groups to lead and educate on community-based broader environment and sustainability programming such as waste reduction, cycling promotion, water conservation, and air quality.

Theme 2: Resilient, Efficient Buildings

The buildings sector is an ideal place for implementing the paradigm of reducing energy demand, switching energy sources, and then producing energy locally to meet that need. Retrofitting existing buildings and upgrading building codes for new construction can dramatically reduce the total energy need and introduce opportunities to increase the resilience of buildings to climate hazards. This is then paired with decarbonization of the energy used for space heating and cooling, water heating, cooking, and other activities. Finally, renewable energy can be used to fuel these actions to reduce emissions as much as possible.

[17] C40. Climate Budget. https://www.c40knowledgehub.org/s/topic/0TO1Q000000x2DNWAY/climate-budgeting?language=en_US

GHG impacts: Actions to improve the efficiency of buildings, and decarbonize their energy can reduce 1,640 $KtCO_2e$ from 2022 to 2050.

Adaptation impacts: Protecting new and existing buildings from riverine flooding can reduce flooding damages by millions of dollars. Ensuring that buildings are energy efficient and have space cooling allows people to remain safe and comfortable during heat events. FireSmarting significantly reduces the risk of damage from wildfire, protecting people and their properties year-round.

Strategy: Municipal Climate Leadership

- Retrofit municipal buildings to reduce energy demand, aiming for net-zero buildings.
- Expand the use of renewable energy on municipal buildings and infrastructure.
- Dedicate staff to identify ways to reduce energy consumption, waste generation, and water consumption in municipal facilities.
- Use municipal retrofits and projects to act as demonstration projects to share learnings and successes with the community.

Strategy: Efficient and Resilient New Buildings

- Advocate for the Province to accelerate the adoption of high-efficiency building codes.
- Incentivize developers and builders to build net-zero buildings that are equipped with high-performance air filters to reduce wildfire smoke and other indoor pollutants.
- Consider additional measures to restrict development in the future-climate Bow River floodplains.
- Advocate for the adoption of net-zero-ready building codes.
- Promote the use of sustainable building materials.
- Explore mechanisms to develop life-cycle assessments for new buildings to reduce overall environmental impacts.
- Require new developments to include considerations to maximize solar electricity potential.

Strategy: Efficient and Resilient Residential Retrofits

- Advocate to the provincial and federal governments for supports for home retrofits to improve the efficiency of existing buildings.
- Develop mechanisms to transition away from natural gas and fossil fuels in buildings.

- Support the conversion to electric heat pumps for space heating and cooling, and water heating.
- Extend and expand the current four-year pilot of the residential Clean Energy Improvement Program (CEIP) and/or develop additional measures for financing and incentives for building energy retrofits.
- Expand or develop a longer term program for low-income households to receive free energy audits and subsequent energy efficiency upgrades, aimed at reducing energy poverty.

Strategy: Efficient and Resilient Commercial and Institutional Retrofits

- Develop a CEIP for the commercial sector.
- Offer educational sessions to builders on net-zero design principles and funding opportunities.

Theme 3: Clean Resilient Energy

Expanding opportunities to access renewable energy in Canmore is essential for meeting the Town's GHG emissions targets. Fossil fuels like natural gas, gasoline, and diesel emit GHGs as they are used; the provincial electricity grid similarly uses fossil fuels to generate electricity. Renewable electricity, paired with energy efficiency, are the core of Canmore's low-carbon future.

GHG impacts: Decarbonizing energy in Canmore can reduce GHG emissions by 3,140 $KtCO_2e$ from 2022 to 2050.

Adaptation impacts: Access to efficient, reliable back-up energy is critical for emergency management. Replacing back-up generators and fuel sources with batteries reduces emissions associated with back-up fuels, and can allow more homes to access back-up electricity during outages or emergencies.

Strategy: Renewable, Reliable Electricity

- Expand and accelerate current incentives and other programs to encourage and incentivize renewable and low-carbon energy systems (e.g., solar rooftop installations, parking lot solar canopies, ground and air source heat pumps) for all new and existing residential, commercial, and institutional buildings.
- Expand community programs that allow residents and businesses to subscribe to solar and other renewable energy at a reduced cost without requiring installation on their property.
- Set a goal for local solar energy to account for at least 20% of the community's electricity mix for buildings by 2030.

Strategy: Emergency Energy Management

Advocate for investment into Alberta's electricity grid to prepare for increasing extreme weather events, such as isolating and managing outages more effectively via 'smart grid' systems.

Advocate for a voluntary energy demand response program where residents and businesses can opt in to reduce energy usage during peak times in exchange for reduced utility rates or other incentives.

Strategy: Reducing Energy Poverty

Advocate for an energy bill assistance program that provides sliding scale payments so that no household spends more than a certain percentage of their income on energy.

Start community-based energy literacy programs to educate residents about energy-saving techniques and available support.

Develop a network of energy advisors within the community that can provide personalized support to households struggling with energy bills.

Integrate energy poverty mitigation into existing social services, ensuring that support for energy is part of holistic assistance programs.

Theme 4: Safe and Protected Natural Spaces

Healthy and intact natural systems are essential for maintaining the health of waterways, moderating temperature, managing extreme storms, and preserving air quality. Protecting Canmore's forests, streams, and wetlands helps preserve the natural beauty and character of the town while also reducing risks from hazards like wildfire, steep creek flooding, and riverine flooding.

GHG impacts: Natural spaces sequester carbon as they grow and develop, so maintaining the health of these ecosystems ensures that carbon sequestration can continue, and that carbon is not released into the atmosphere.

Adaptation impacts: Protecting forests from invasive species, pests, and other hazards helps reduce the risk of wildfire and stabilize slopes. Ensuring that waterways and surrounding areas are healthy can reduce the severity of flooding, as vegetation can slow and reduce overland flooding.

Strategy: Protected Forests and Urban Trees

- Update Land Use Bylaw landscaping requirements and Engineering Design and Construction Guidelines to ensure that reducing wildfire risk and providing shade are priorities in landscape planning and design.

- Update the Urban Forest Management Plan into a broader Natural Asset Strategy and urban tree canopy assessment that reflects climate considerations and integrated hazard management. Include set percentages for canopy targets, and develop a reserve fund for tree plantings in capital projects.
- Ensure that trees are planned and budgeted for as part of transportation capital projects, with a focus on providing shade along active transportation routes.

Strategy: Protected Freshwater

- Update the Bow River Flood Response Plan to include water quality and environmental impacts due to a potential uncontrolled release of contamination resulting from flood damage to the wastewater treatment plant.
- Establish guidelines and regulations for the use of pesticides, particularly in areas where groundwater is vulnerable.
- Develop and implement a salt management plan to reduce the amount of salt needed, and where it is used.

Theme 5: Emergency Preparedness for All

Emergency preparedness is essential for protecting the community before, during, and after a climate emergency. Well-structured emergency plans equip individuals, families, and communities with the knowledge and tools to respond swiftly and efficiently, minimizing the impact of disasters. A coordinated response to reducing risks and vulnerability before an event can help reduce damages, limit the need for evacuations, and improve recovery times. Planning for and practicing emergency responses ensures that all of Canmore knows they are safe and prepared for all that climate change will bring.

GHG impacts: These actions have minimal impacts on total GHG emissions reductions.

Adaptation impacts: These actions can reduce risk of damage, injuries, or even death. They can protect homes and businesses, and can reduce recovery times after an emergency event.

Strategy: Wildfire Management

- Review and update the Canmore Wildfire Mitigation Strategy to include climate change projections, and update the Municipal Emergency Management Plan accordingly.

- Develop a regional wildfire management working group to coordinate FireSmarting, grants, and other fire management priorities and activities across the region.
- Integrate and find efficiencies with the mountain pine beetle monitoring and control program with FireSmart tree removal program, and ensure long-term funding for pine beetle management is included in budgeting.
- Complete regular testing of the wildfire incident preparedness plan.
- Develop programs and incentives for property owners to implement Fire Smarting, including potentially offering a Town service to collect material from households. Regularly monitor for continued compliance.
- During extreme heat events and/or poor air quality due to wildfire smoke, ensure the community is aware of designated cooling centres and/or clean air shelters.
- Review and update FireSmart guidelines for new developments in the Land Use Bylaw and explore options for more stringent requirements for both building hardening and landscaping. Advocate to the Province to ensure that the building code is aligned to FireSmart goals.

Strategy: Flooding and Steep Creek Hazard Management

- Continue to fund and implement steep creek debris flow and flood mitigation measures. Ensure that watershed-level hazard and risk assessments are continually updated to align with advances in flood mitigation measures and climate change science and modelling.
- Update restrictions for development in steep creek flood zones to align with ongoing updates to debris flow/flood projections.
- Equip all pump stations and lift stations with back-up power plans and supply to ensure reliable access to water and sanitary services during extreme weather events. This includes access to water for fire suppression in the event of a wildfire.
- Increase flood protection infrastructure for the wastewater treatment plant.
- Complete regular testing of the Steep Creek Emergency Response Plan and Evacuation Plan.

Strategy: Water Security

- Develop a comprehensive drought contingency plan that includes thresholds for triggering water restrictions and emergency water supply measures, as well as a supporting communications plan. Ensure an equity lens is applied to limit potential negative impacts of water restrictions to vulnerable populations and food security.

- Implement key recommendations from the Wellhead Protection Study to reduce potential impacts to drinking water sourced from groundwater.
- Develop an emergency response plan for the potential of wastewater treatment, drinking water treatment, and/or pumping operations being limited or ceased as a result of a flood or wildfire events. Ensure that hazard mitigation strategies are integrated into plans for life cycle replacements and updates to facilities.
- Develop a source water protection plan to holistically evaluate the risks to Canmore's drinking water sources (e.g., wildfire, flooding, impacts from different land use impacts, recreation) and to prioritize mitigations, which may include a Source Water Protection Bylaw.
- Establish a working group to coordinate approaches on water supply management across the region, integrating local expertise.

Strategy: Community and Visitor Safety

- Advocate to the Province to develop an regional working group to monitor the spread of invasive species that could have impacts on ecosystems, infrastructure, and human health.
- Continuously review community-wide evacuation plans and routes, with a focus on neighbourhoods with vulnerable populations and challenging access to designated emergency routes. Support these plans with regular communication, including translation into multiple languages.
- Update the Municipal Emergency Management Plan to more specifically address the potential impacts of climate-related emergencies on visitors and the tourism sector. Continue to collaborate with Tourism Canmore Kananaskis and other representatives from the tourism sector on emergency and overall preparedness.
- Ensure that access to energy supply is integrated into emergency response plans, including the ability to communicate with residents and visitors during an emergency if the power is out.
- Work with Town Communications and Tourism Industry Leaders to develop multilingual communications about climate hazards and emergencies
- Identify and maintain locations within the community to serve as short-term shelters and reception centres during and after events such as floods, steep creek debris flows or floods, or wildfires. Ensure these facilities have access to back-up power supply, and that the community is aware of these options for local shelter during emergencies.

Theme 6: Rethinking Transportation and Mobility

Decarbonizing vehicles is only the first step in a climate-ready transportation system for Canmore. Improving access to transit, and ensuring that active transportation options are accessible to all, reduces the need for private vehicles. Changing how people travel to Canmore, and move about the community, will transform the town into a connected, accessible community.

GHG impacts: The conversion to electric vehicles (EVs) for daily use reduces GHG emissions by 1,520 KtCOe2 by 2050. Converting heavy-duty vehicles to low-carbon fuels, and increasing transit and active transportation, result in a further reduction of 520 $KtCO_2e$ by 2050.

Adaptation impacts: Reducing the number of internal combustion vehicles on the road improves air quality, and reduces heat generation, particularly in more densely developed neighbourhoods.

Strategy: Electric Vehicles for All

- Require all new residential and commercial developments to be EV ready.
- Continue to install and enable public EV charging stations.
- Develop a long-term fleet strategy for the Town, including bikes and e-bikes, right-sizing vehicles, and transitioning to electric or low-carbon vehicles as they become available.
- Develop an EV charger installation incentive program for existing multi- family and commercial buildings, ensuring that both residents and visitors have access to charging.
- Establish an EV car sharing program to reduce the need for personal vehicle ownership, reduce parking demand in higher density neighbourhoods, and support mode shift goals by providing access to shared vehicles for trips that can't be served by transit, walking, or cycling.
- Support the tourism industry in their efforts to reduce transportation emissions.

Strategy: Active Mobility Across Canmore

- Prioritize the build-out of Canmore's network of safe, accessible, and equitable walking and cycling infrastructure to ensure that every residential area has access to safe and connected mobility paths leading to major destinations like downtown, schools, and shopping.

- Fund an expanded and longer-term electric bike incentive program, and investigate adding non-electric bikes and other mobility aid options.
- Establish pedestrian and cycling zones in high-traffic areas of Canmore,particularly in the downtown core. Complement this with the development of intercept parking.
- Ensure that new and infill development is designed to reduce the need for personal vehicles.

Strategy: Low-Carbon Transit

- Integrate an equity lens in transit planning and ensure that residents who don't own personal vehicles can travel to critical facilities such as the hospital, grocery stores, and pharmacies.
- Continue to expand ROAM service to high-traffic visitor destinations, as well as stops at critical facilities.
- Continue to coordinate with ROAM to transition to electric buses, and install necessary charging infrastructure throughout the town.

Theme 7: Efficient Waste, Water, and Wastewater Management

Protecting essential infrastructure and the services delivered through this infrastructure—including wastewater management and the supply, treatment, and delivery of fresh water—ensures that Canmore remains a healthy and thriving community in all conditions. Loss of these services could require long-term evacuations of the town, so protecting these services is essential. Protecting freshwater sources for Canmore, and for downstream communities ensures everyone has access to safe and reliable drinking water. Reducing the volume of waste produced by the community, as well as the emissions from that waste, helps reduce total community emissions, and these actions keep climate change work front-of-mind for all of the community.

GHG impacts: Rethinking waste production and management, and capturing and using renewable natural gas at the wastewater treatment plant, reduces GHG emissions by 360 $KtCO_2e$ by 2050.

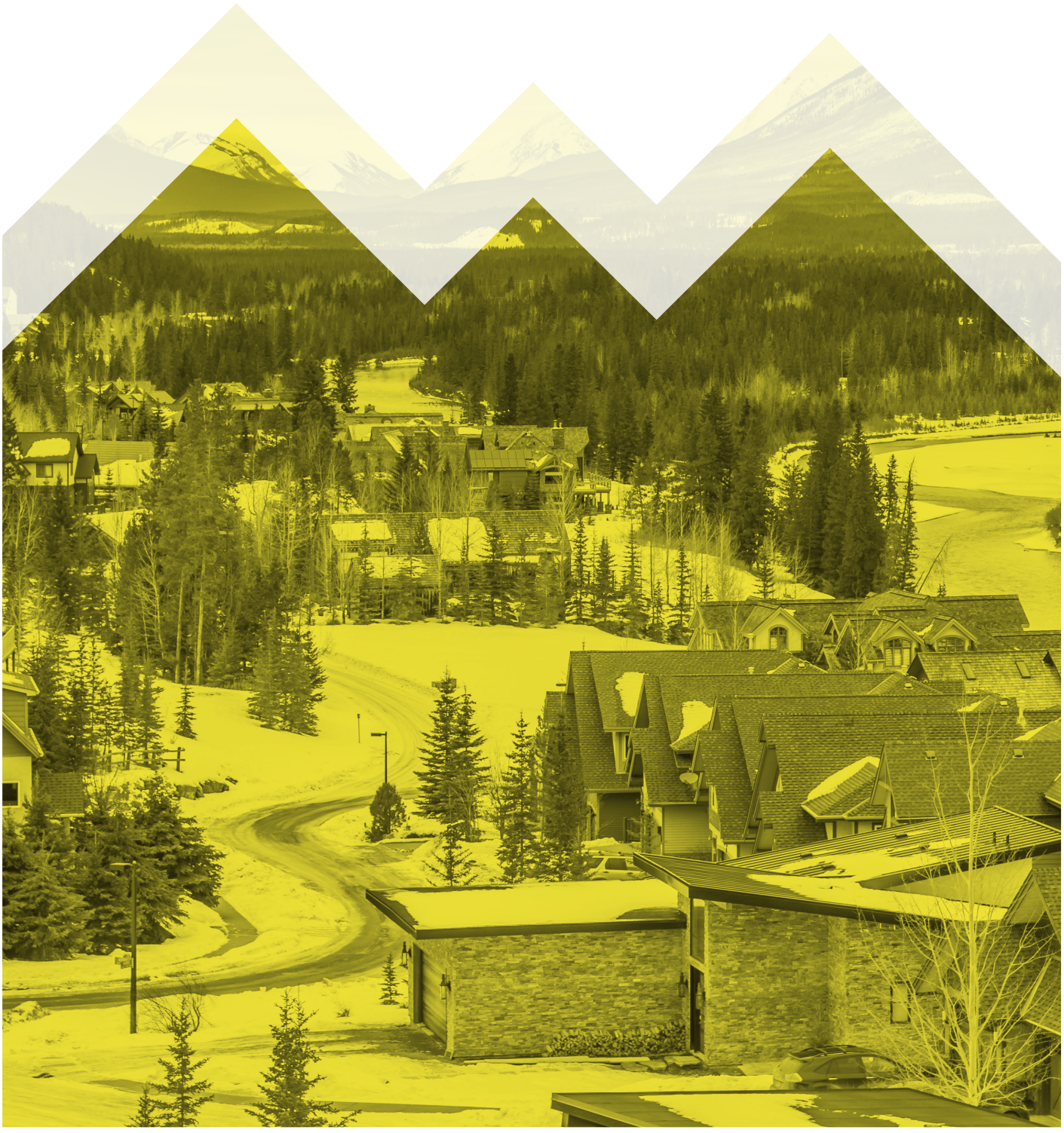
Adaptation impacts: Protecting the wastewater treatment plant, and other water and wastewater infrastructure, from flooding and other climate hazards is critical for ensuring the community is protected, and essential services continue in Canmore in all climate emergencies.

Strategy: Water Conservation and Management

- Reduce water loss, inflow, and infiltration through a formalized and funded system-wide municipal water leak detection program (including closed-circuit TV), continual maintenance, and the Utility Lifecycle Upgrade program.
- Develop an integrated stormwater master plan, which incorporates low-impact development approaches, updated stormwater design criteria, and climate considerations, and explore the option of implementing a stormwater utility rate.
- Develop and implement a water conservation strategy that identifies and targets the sectors with the highest water consumption.
- Install smart water metering systems for all properties to monitor water usage in real-time and identify leaks quickly.

Strategy: Waste Reduction

- Develop and implement a zero waste strategy, with a focus on circular economy. Include actions to both incentivize and require waste diversion, focusing on food waste and other organic material.
- Increase enforcement of the existing commercial food waste diversion bylaw, ensuring that all food-service businesses are actively diverting their food waste.
- Develop a regional construction, renovation and demolition waste strategy that incorporates circular economy principles. The strategy should establish requirements and incentives to maximize the re-use, recycling, and reduction of waste while creating jobs and local economic development opportunities.
- Dispose of municipal solid waste in a landfill with methane gas capture.



A New Chapter in Canmore's Climate Story

As we conclude this Climate Emergency Action Plan (CEAP), it's important to understand that this is not the end but the beginning of a dynamic, long-term narrative in Canmore's ongoing commitment to sustainability. This plan is not a collection of definite answers but a testament to Canmore's dedication to continuously seek, innovate, and refine its approaches to climate action over the coming decades.

This journey is analogous to venturing into the vast, beautiful, and sometimes daunting wilderness that surrounds our town—each step, though determined, leads us toward discovery. We do not have all the answers today, and perhaps we will face moments of trial and error, but it is our perseverance and collective commitment that will pave the way for meaningful change. This plan is designed to be Canmore's guide, a north star, ensuring that each generation contributes to a legacy of environmental stewardship.

The essence of this plan is about more than achieving metrics; it's about weaving the values of sustainability into the fabric of daily lives and the heart of the community. It's about each resident of Canmore joining in this epic tale, not as passive observers but as active participants who shape the narrative.

We envision a Canmore where every initiative and decision enriches this story, transforming challenges into opportunities for growth and innovation. This document is a call to arms for all—residents, businesses, and policymakers—to embark on this journey together, fostering a town that thrives economically and socially while holding fast to the principles of environmental care.

In moving forward, let this plan remind us that our actions today write tomorrow's chapters. Let us step bravely into this journey, crafting a tale of resilience and hope that will be told for generations to come. Together, let's create a future where Canmore stands as a beacon of sustainable living, proudly setting a course for others to follow.

Annexes

(External documents)

Annex 1:
Implementation Plan

Annex 2:
Data, Methods, and Assumptions Manual – Mitigation

Annex 3:
Data, Methods, and Assumptions Manual – Adaptation

Annex 4:
Engagement Summary Report

Annex 5:
Climate Risk and Vulnerability Assessment Report

Annex 6:
Adapted Scenario Summary Report

Annex 7:
Carbon Budget

Annex 8:
Canmore's Climate Equity Analysis Report

Annex 9:
Financial Analysis Results

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