

**Research to inform embodied carbon requirements in Squamish's Community Climate
Action Plan**

by

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Disclaimer

This report was produced as part of the UBC Sustainability Scholars Program, a partnership between the University of British Columbia and various local governments and organisations in support of providing graduate students with opportunities to do applied research on projects that advance sustainability and climate action across the region.

This project was conducted under the mentorship of District of Squamish staff. The opinions and recommendations in this report and any errors are those of the author and do not necessarily reflect the views of District of Squamish or the University of British Columbia.

Executive Summary

In 2019 District of Squamish Mayor and Council Declared a Climate Emergency and committed to creating a Plan to align Squamish’s community GHG reductions with guidelines for limiting global warming to 1.5 degrees Celsius. This means a 45% reduction in emissions by 2030, and net carbon neutrality by 2050. In 2020 the Community Climate Action Plan (CCAP) was created to guide the community toward these goals. In 2024 Squamish is updating its CCAP to create a bold and innovative blueprint to guide the community toward deeper emissions reductions. Part of the innovative character of this update lies with the expansion of the scope of emissions which are being addressed.

Scope 3, or ‘embodied’ emissions encompass those which are not directly produced within the boundaries of the organization or community in question, in this case, the District of Squamish. These are indirect emissions produced along the supply chain of the goods and services consumed within Squamish.

The present document compiles research and recommendations on how to best include Scope 3 considerations within Squamish’s CCAP update. To that end, a review of the current CCAP and other internal documents provided by the district was conducted, in order to identify opportunities to address Scope 3 within the plan’s existing structure. A selection of other climate plans was also reviewed for reference, with the goal of identifying positive examples of: Plan organization; communication; actions; quantification; and measures of success. Finally, recommendations were made for modifications, as well as new strategies and actions to be incorporated in the CCAP update to target embodied emissions.

Upon reviewing the current CCAP and other district documents, it was found that Scope 3 considerations could be folded within the existing structure of the CCAP without the need for another ‘Big Move’. Big Moves #4 & #5 can incorporate actions targeting embodied carbon in buildings, while Scope 3 considerations for other sectors could be incorporated in Big Move #1. Big Move #6 can include organizational actions designed to support the other Big Moves, and a bigger emphasis on capacity building actions throughout the plan would benefit implementation. Additionally, an opportunity was identified to draw from the valuable work already carried out to develop the Circular Economy Roadmap and Implementation Plan (CERIP) in Squamish.

Circularity inherently addresses Scope 3, by reducing waste (end-of-life emissions) and consumption (up-front emissions). This was illustrated by several of the reviewed reference action plans which prioritize the transition to a circular economy.

The reference climate plan review included a total of 18 action plans and yielded several key takeaways. For example, with regards to the development of a consumption-based emissions inventory (CBEI), though it is a useful way to track and report on the impact of scope 3 actions and strategies, it should not be seen as the sole first step towards tackling embodied carbon in the plan. The cost of such an estimate, paired with its high margin of error, has the potential to delay action. For the District of Squamish, much of the relevant information, useful to develop targeted policy, can be extrapolated from the Metro Vancouver CBEI, published in 2021¹. In addition, many proven embodied carbon reduction strategies can be implemented, and alternative performance indicators can be developed to help track progress.

The recommended updates to the CCAP to address embodied carbon include modifications as well as additions. To align Big Move #1 with the CERIP, the same 'thematic areas', which were developed based on DoS consumption and waste profiles, could be adopted. Some key actions from the CERIP are suggested in this document and can be finalized in the CCAP in collaboration with CERIP and CCAP implementors. The following action, pulled from the CERIP is an example of these suggestions:

“Develop and publish a circular asset map, to highlight the availability, and promote the use of circular tools and resources.”

In addition, some consumption from outside the system boundaries will be unavoidable. To address this, a new strategy could also be included which promotes responsible consumption and low carbon choices. The draft recommended strategy reads:

“Spread awareness about responsible consumption and promote low carbon choices for non-circular purchases”

Under this strategy, one recommended action is:

¹ Consulting, Cora Hallsworth. n.d. “Metro Vancouver Regional Consumption-Based Emissions Inventory.”

“Develop a Sustainable Consumption Guide, to provide information to the Squamish community on how they can leverage their purchasing power by prioritizing low- carbon purchases, particularly as it relates to food.”

Big Move #4 could expand on existing operational carbon reduction strategies to include embodied carbon considerations. Building capacity and spreading awareness is key to avoid increasing energy efficiency at the expense of up-front carbon emissions. The recommendation here is to take advantage of all the ongoing capacity-building programs around energy efficient retrofits, to fold in embodied carbon considerations, mainly focusing on insulation choices. City of Nelson’s Material Carbon Emissions Guide could be referenced.

For Big Move #5, recommendations to address embodied carbon in buildings fall within three main categories. The first includes actions aimed at building less or avoid building altogether wherever possible. One recommended action is:

“Develop a Relocation or Salvage program for single- family homes prior to applying for a demolition permit.”

The second category includes actions to build capacity around embodied carbon in the construction sector, such as:

“Develop and facilitate a workshop series to educate design and construction professionals on quantifying embodied carbon, the tools available, and their ideal application depending on building archetype and purpose of assessment.”

The third category of actions describes a potential path to develop incremental embodied carbon requirements for new construction. This could start with a ‘sustainability checklist’ and then mirror the path of City of Vancouver with a requirement for disclosure at BP, followed by incremental reduction targets.

Organizational actions suggested to address Scope 3 can be categorized in 3 areas. The first is to develop KPI’s and other metrics such as a ‘Circularity Index’ to track progress of actions in a way that is not necessarily tied to carbon accounting. The second is to build capacity, and the third is to lead by example and use the organization as a test bed for initiatives.

In general, the present report and its appendices is designed to serve as a tool to be referenced during the upcoming CCAP update process. It is the hope of the author that the research is sufficiently accessible for reference to save significant time and effort in supporting decisions to draft the final CCAP.

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Abbreviations

DoS – District of Squamish

CCAP – Community Climate Action Plan

CEA – Community Energy Association

CERIP – Circular Economy Roadmap and Implementation Plan

LFG – Landfill Gas

LCA – Life-Cycle Assessment

WBLCA – Whole Building Life Cycle Assessment

EPD – Environmental Product Declaration

CBEI – Consumption Based Emissions Inventory

GWP – Global Warming Potential

CE – Circular Economy

IDP - Integrated Design Process

Chapter 1: Introduction

In 2019 District of Squamish Mayor and Council Declared a Climate Emergency and committed to creating a Plan to align Squamish’s community GHG reductions with guidelines for limiting global warming to 1.5 degrees Celsius. This means a 45% reduction in emissions by 2030, and net carbon neutrality by 2050. In 2020 the Community Climate Action Plan (CCAP) was created to guide the community toward these goals. The CCAP focuses specifically on mitigation actions, but emphasizes co-benefits related to adaptation, equity, and social connectedness.

The 2020 CCAP has proven to be a comprehensive document that has guided a range of activities. The Plan consists of 122 Actions organized into 6 Big Moves focused on waste, transportation, buildings, and organizational readiness. Squamish has made notable progress related to demolition waste, EV readiness, transit expansions, retrofit support and many other actions.

In 2024 Squamish is updating its CCAP to create a bold and innovative blueprint to guide the community toward deeper emissions reductions. The Plan will build upon ongoing successes as well as lessons learned. One of the main objectives of the update is to include a more comprehensive scope of emissions in the Plan, namely, Scope 3 emissions. This will be the focus of this report. Recommendations have been compiled, as well as the research to inform them, on how to best include Scope 3 considerations within Squamish’s CCAP update. To that end, a review of the current CCAP and other internal documents provided by the district was conducted, in order to identify opportunities to address Scope 3 within the plan’s existing structure. A selection of other climate plans was also reviewed for reference, with the goal of identifying positive examples of: Plan organization; communication; actions; quantification; and measures of success. Finally, recommendations were made for modifications, as well as new strategies and actions to be incorporated in the CCAP update to target embodied emissions.

Chapter 2: Review of existing CCAP for main areas of opportunity

As a starting point for the research, DoS’s existing CCAP was reviewed in detail, along with other internal documents such as the implementation update table (Sep 2023 - Feb2024), with the intention of guiding the research and recommendations towards building on existing work. Given that the current CCAP was designed to target the community’s emissions profile, the first question that arises when considering an expansion of scope for the Squamish CCAP is whether to develop an estimated Consumption-Based Emissions Inventory (CBEI) specific to Squamish. The main goals of this would be to understand the Scope 3 emissions profile of the District, which is useful for developing targeted policy, and to establish a baseline for tracking reductions. Given the cost, complexity, and high margin of error of developing a CBEI, it is likely not the best path forward for DoS to conduct one. Several existing estimates and alternative paths for tracking should be sufficient to cover those needs. The Community Energy Association has already provided an estimate quantifying total Scope 3 emissions in the existing CCAP (fig. 1).

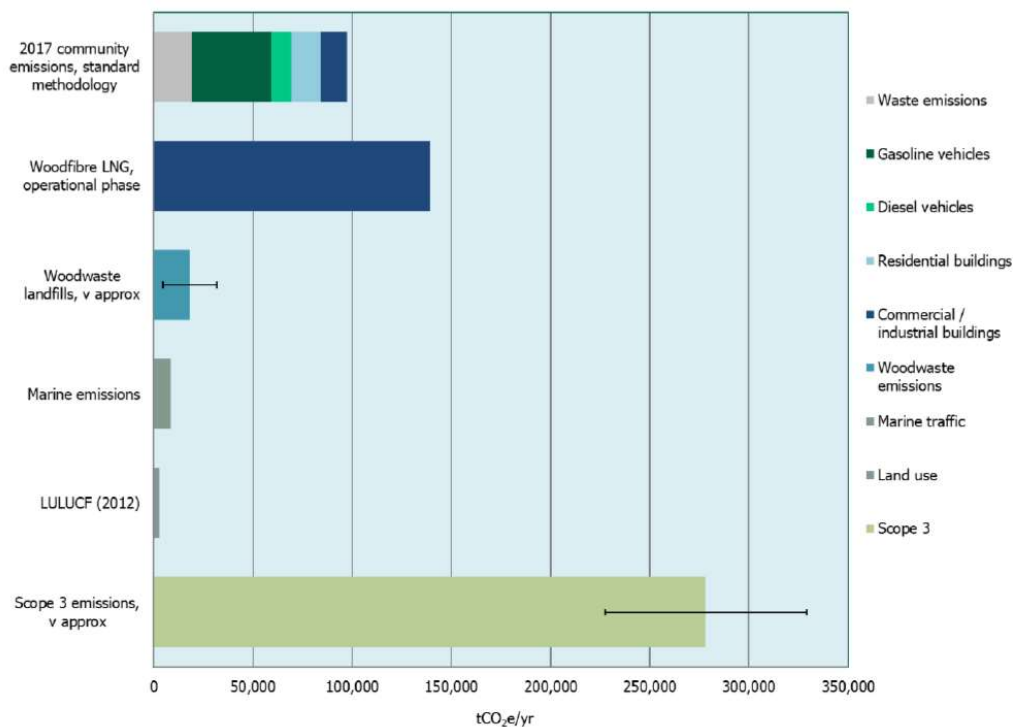


Figure 1: Estimated emissions of Woodfibre LNG, wood waste, Landfills, marine travel, land use/land use change/forestry (LULUCF), and scope 3 emissions, compared to the 2017 standard. Source: DoS CCAP

For the purpose of targeted policy development, Metro Vancouver has conducted and published a CBEI, which generally aligns with the DoS community emissions profile, suggesting that this inventory can be used and extrapolated from for the purposes of policy development and targeting reductions.

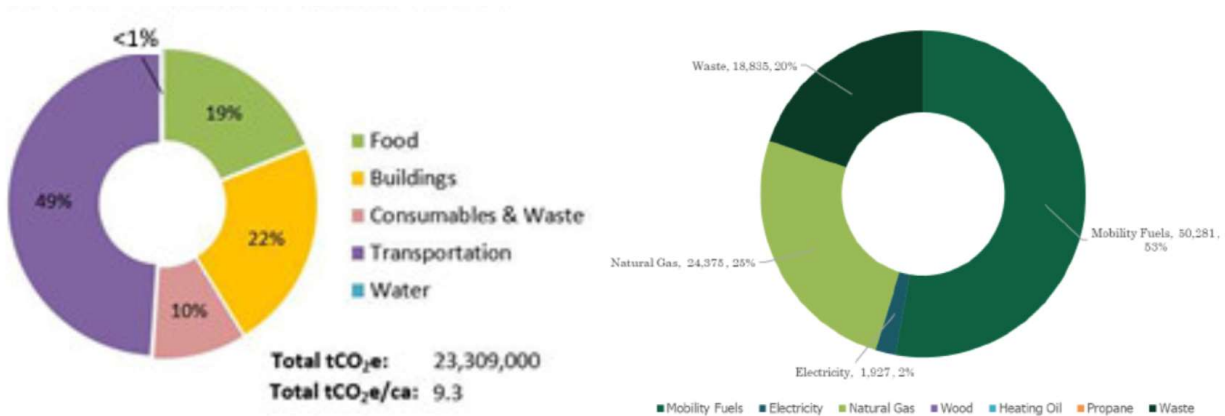


Figure 2: Metro Vancouver CBEI emissions profile (left) compared with DoS community emissions profile (right).

Source: Metro Vancouver Regional Consumption Based Emissions Inventory and DoS CCAP

As far as tracking emissions reductions are concerned, it will likely be necessary to develop alternative KPI's, specific to each proposed Scope 3 strategy in the new CCAP. This approach is preferable, not only because it can result in significantly more accurate metrics, but also can be executed independently of whether a CBEI is conducted or not.

The structure of the current Community Climate Action Plan is clear, and generally well suited for expanded actions and strategies to address Scope 3 emissions without the need for an additional 'Big Move' section and Scope 3 actions may be incorporated into Big Moves 1, 4, 5, and 6.

2.1.1 Big Move #1: Close the Loop on Waste and Circular Economy Roadmap and Implementation Plan

Big Move #1 is the best suited to include non-building related actions and strategies to address Scope 3 emissions. This can be accomplished by aligning the actions with those of the Circular Economy Roadmap and Implementation Plan.

2.1.2 Big Move # 4: Decarbonize Existing Buildings

Big Move #4 only addresses operational emissions in buildings. Those reduction strategies can often result in an increase in embodied emissions. Therefore, Scope 3 considerations should be included in this section.

2.1.3 Big Move #5: Construct Better Buildings

This section is well suited to include embodied emissions in buildings. ‘Better buildings’ includes those which are lower in embodied carbon.

2.1.4 Big Move #6: Other Organizational Actions

This section is well suited to include actions around capacity-building, progress tracking, internal policies and actions, and regional collaboration.

Chapter 3: Supporting Research

The research in support of the recommendations in this document was carried out in three main phases:

- I. Review of Squamish’s current CCAP to identify opportunity areas for embodied carbon strategies to be incorporated. Other internal documentation was also reviewed for reference, including the CCAP Implementation Update (Sept 2023- February 2024), the Circular Economy Roadmap and Implementation Plan, and the Embodied Carbon Guide.
- II. Review of city climate action plans to identify exemplars of plans that have incorporated embodied carbon into their strategies and actions. The goal of the review was to identify positive examples of: Plan organization; communication; actions; quantification; and measures of success. BC Plans were reviewed specifically, as well as global leaders.
- III. Relevant research papers and publications on the topic of embodied carbon are referenced within the draft updates and supporting materials in the appendices.

3.1 Reference Climate Action Plan Review

The focus of the review was on high-level climate action plans to inform the District of Squamish’s upcoming CCAP update. Since these action plans were published, some of the jurisdictions may have expanded their action on Scope 3 emissions through more granular and sector-specific policies or strategies which are not yet reflected at the action plan level. Though individual policies are referenced where relevant, the review is not meant to be a full audit on the most up to date actions of these jurisdictions, but rather an assessment of the high-level plans as published to inform that of District of Squamish.

The review included a total of 18 action plans. Out of the total plans reviewed, 9 were identified to be the most ambitious in tackling Scope 3 emissions and were deemed particularly valuable for closer review and reference. These are:

1. City of Richmond – Community Energy and Emissions Plan
2. City of Nelson – Nelson Next
3. City of Montreal – Climate Action Plan 2020-2030

4. San Francisco, CA – Climate Action Framework
5. Portland, OR – Climate Emergency Workplan
6. Eugene, OR – Climate Action Plan 2.0
7. Austin, TX – Climate Equity Plan
8. City of Vienna, Austria – Smart Climate City Strategy
9. City of Helsinki – Carbon Neutral Helsinki Action Plan

The following sections include summaries of the findings from those Plans. For a full review including findings from all plans, please refer to Appendix A of the report, which includes the complete assessment table. The following are the plans which are included in the assessment table but not highlighted in this report:

1. Municipality of Whistler - Big Moves - Climate Action Implementation Plan
2. City of Victoria - Climate Leadership Plan
3. City of Vancouver - Climate Emergency Action Plan
4. City of Toronto - Transform TO Net Zero Strategy
5. City of Hamilton - Community Energy and Emissions Plan
6. City of Edmonton - Community Energy Transition Strategy & Action Plan
7. City of Halifax - HalifACT-Acting on Climate Together
8. Lexington, MA - Resilient Lexington - Climate Action and Resilience Plan
9. Cambridge, MA - Cambridge Net Zero Action Plan

Out of all the plans reviewed, 5 belong to jurisdictions in British Columbia, 5 elsewhere in Canada, 6 in the United States, and 2 in Europe. An assessment was carried out using a table which looked at the following areas:

- Comments on general structure, clarity of communication and graphic design
- General ambition to address Scope 3 emissions
- Unique and innovative actions or strategies (with a focus on explicit tangible actions rather than vague direction) which are relevant to District of Squamish
- Actions and strategies which may be implemented at a lower financial cost or effort

Also included is Appendix B, which includes cut-outs and notes from these plans for direct reference.

3.1.1 City of Richmond - Community Energy and Emissions Plan, 2022²

General comments: structure, clarity and design

The plan has a clear structure, organized in 8 'strategic directions for climate action'. Current municipal emissions are outlined as well as projected contributions from each 'direction' towards the targets of 50% by 2030 and 100% by 2050. The plan also defines 6 tools for implementation. An explanation and action summary is provided for each direction organized by main action and sub-actions. The plan also includes an implementation roadmap section in the form of a table. For each action, the table defines the tools, sub-actions, and resources available for implementation. The plan is visually appealing and well organized.

General comments: ambition to address scope 3 emissions

Despite not having a full CBEI, Scope 3 considerations are embedded in the structure and actions. This is explicitly highlighted by an infographic showing which 'directions' address a typical municipal-based emissions reduction plan, which target an expanded scope, and which includes Scope 3 as well as carbon sequestration measures. Scope 3 is addressed in 2 'directions': 'Transition to a Circular Economy' & 'Carbon Neutral New Buildings'. The 'Transition to a Circular Economy' is particularly interesting as it shifts focus from costly, time-consuming, and potentially inaccurate carbon accounting (CBEI) to real actions with demonstrated impact towards circularity, while also reframing the 'waste-management' narrative.

Highlights of unique and innovative actions relevant to Squamish

Richmond's 'Carbon neutral new buildings' and 'Transition to a circular economy' directions are similar to Squamish's Big Moves 1 and 5, which makes the following actions particularly relevant:

- Carbon neutral buildings

² https://www.richmond.ca/__shared/assets/ceepreport61163.pdf

- Action: Accelerate adoption of low global warming potential technologies
 - a. Support local certification of promising new building technologies not yet certified in Canada. (This is unique and could be very impactful, see Nelson Natural Building Case Study)
 - b. Encourage Provincial and Federal governments to enact more stringent regulation related to high global warming potential (GWP) coolants and technologies
- Implementation:
 - i. Support local field test of promising new low-GHG technologies within new buildings
 - ii. Encourage the Federal Government to accelerate the phase-out of high GWP refrigerants in building mechanical equipment
 - iii. Encourage the Province to include GWP requirements for refrigerants in the Energy Efficiency Standards Regulation
 - iv. Support action by the Province to ensure a quick market transition to low-GWP technologies and best practices
- Transition to a circular economy (This whole section is worth reviewing)
 - Action: Advance implementation of circular economy initiatives by City of Richmond
 - a. Incorporate circular economic thinking into City project development and operations management, with the goal to ‘design out’ waste and pollution
 - Action: Accelerate adoption of Circular Economy approaches by the private sector in the design, manufacture and retooling of products and services
 - a. Develop a waste by-product tracking database for local firms with online tools for recovering and reusing products and materials through closed loop recycling, industrial symbiosis initiatives and upcycling

‘Easy Wins’ - action which may be implemented at a lower financial cost or effort

Transition to a circular economy

- Action: Advance implementation of circular economy initiatives by City of Richmond

- a. Integrate product footprint analysis and life-cycle assessment into the City's procurement process
- b. Increase proportion of recycled and reclaimed materials used by the City, to help drive the market toward a circular economy
- o Action: Accelerate adoption of Circular Economy approaches by the private sector in the design, manufacture and retooling of products and services
 - a. Enable sharing of products and assets to maximize use and longevity, enhance productivity and create value

General reflections and comments

Carbon neutral buildings - The actions laid out for this direction demonstrate that embodied emissions must be considered in addition to operational emissions to claim carbon neutrality. Direct emissions from refrigerants are also addressed.

- o Action: Accelerate transition to the top level of building performance - The plan understands that embodied emissions should be considered in conjunction with operational emissions to have a holistic view of 'building performance'.
- o Transition to a circular economy - This direction goes beyond waste management to focus on a true transition to a circular economy. It lays out actions for 3 main groups: City of Richmond, Residents and Businesses. Construction materials are also revisited here.

3.1.2 City of Nelson – Nelson Next, 2020³

General Structure, Clarity and Design

The plan is organized into 2 parts. The first provides a robust, well organized and succinct foundation of information which informed the development of the plan. Part 2 is the plan itself, made up of 7 'Aspirations', 23 strategies, and 'tactics' which are the actions for implementation. A community-based emissions estimate is provided as well as projected reductions from the plan towards the ambitious targets of 75% reductions by 2030 and net-zero

³ <https://nelson.ca/DocumentCenter/View/4920/Nelson-Next>

by 2040. The target for municipal operations is net zero by 2030. The plan boasts high-quality graphic design and is quite unique. Some creative liberties were taken as far as wording and structure, but the plan remains clear and reflects the character of the community.

General ambition to address Scope 3

Though the plan does not include Scope 3 in its reduction accounting, it does provide an estimated CBEI, which helped inform the policies, especially since the results of the estimate are very similar to the community emissions inventory as far as emission contributions by sector. Embodied carbon in buildings is addressed within 'Aspiration Two: Infrastructure and buildings in Nelson are zero carbon and resilient'. The plan also focuses on circularity, which inherently addresses Scope 3 emissions. in 'Aspiration Six: Nelson outlines a goal of 'a thriving circular economy and generates the lowest waste per capita in Canada'.

Unique and innovative actions or strategies which are relevant to District of Squamish

An especially unique tactic worth noting, which is conducive to driving a paradigm shift in construction techniques, can be found under 'Aspiration Two: Infrastructure and buildings in Nelson are zero carbon, and resilient'. This action manifested in reality in the 'Natural Building Case Study' conducted by City of Nelson and is referenced in the relevant publications of this document.

- Action: Promote and support natural, carbon-negative building initiatives that utilize local, renewable resources

The plan also uses zoning policy as a tool to promote low-carbon density like laneway housing. Smaller buildings have low impact foundations and therefore are less carbon-intensive:

- Action: Continue to promote increased density through the expansion of laneway housing, zoning amendments, and development incentives

'Aspiration Six: Nelson has a thriving circular economy and generates the lowest waste per capita in Canada.' also contains some unique actions around circularity which are particularly relevant considering the work District of Squamish has done on that front:

- Action: Work with regional partners to undertake a mapping of local material and energy flows to better understand key waste prevention and circular economy opportunities

- Action: Explore the feasibility of a collaborative repair and reuse center for Nelson
- Action: Support trade co-ops and manufacturing spaces that can receive diverted waste streams such as forestry by-products
- Action: Develop a ‘Sharing Economy Action Plan’ to enable the city, businesses and residents to reap the benefits from sharing platforms.

Actions and strategies which may be implemented at a lower financial cost or effort

Since publishing the Nelson Next plan, City of Nelson has done significant work to advance embodied carbon understanding and policy through their Low Carbon Materials program⁴. Although this is not part of the plan, it is a result of aligning to it and has produced significant findings which District of Squamish may use to reference and support policy without having to undergo costly studies. Some examples are:

- Benchmarking report (March 2022) - Could be used to help inform eventual embodied carbon reduction requirements
- Material Carbon Emissions Guide (March 2022) - Can help support workshops and policy aimed at homeowners or builders to make low-carbon material choices
- Building Better in the Kootenays series (2023) - A series of free embodied carbon analyses and consultations for projects across the Region, hosting three educational workshops on how to reduce embodied carbon emissions within building projects, and the completion of 4 informational case studies

Other actions, strategies or general aspects of the plan worth highlighting

City of Nelson's approach goes beyond performance-based requirements and uses other levers like capacity building through training opportunities and local collaborations. Under 'Aspiration Two: Infrastructure and buildings in Nelson are zero carbon, and resilient' the following 'tactics', though lacking in specificity reflect this focus and are worth noting:

- Work with local institutions to develop training opportunities for youth and students in smart, green, and resilient design and construction

⁴ <https://www.nelson.ca/905/Low-Carbon-Building-Materials>

- Collaborate with local nonprofits and businesses to construct innovative, green building demonstration projects, and share plans and learnings with industry and other local governments

There is also an action targeting construction site emissions, which is one of the few areas of embodied carbon in buildings which is within the community emissions profile:

- Require zero carbon/low carbon construction sites

Considering recent advancements in low-carbon concrete, and depending on availability, using low-carbon concrete may be considered 'low hanging fruit' to achieve reductions:

- Develop a low carbon cement and concrete policy and include embodied carbon requirements in new construction standards for buildings

3.1.3 City of Montreal – Climate Plan 2020-2030, 2020⁵

General Structure, Clarity and Design

The climate plan exists within the broader context of the Montreal 2030-10-year plan. The 'ecological transition' is 1 of 4 'key orientations'. There is also an interesting scale-based approach to interventions targeting the human, neighbourhood, and metropolis scales. The plan includes 46 actions across 5 sectors. The plan is visually very sleek and it is clear that graphic design and communication was prioritized.

General ambition to address Scope 3

The plan focuses on community-based emissions. The building sector actions do not consider embodied emissions. However, there is a significant focus on circularity within the plan's 1st sector for actions: 'Mobilization of the Montreal Community' and some embodied emissions are targeted in sector 5: 'Governance'

Unique and innovative actions or strategies which are relevant to District of Squamish

Sector 1: Mobilization of the Montreal Community, Action 5:

⁵ https://portail-m4s.s3.montreal.ca/pdf/climate_plan_2020_2030_vdm.pdf

- 'Stimulate and consolidate the circular economy by creating networks between businesses, stores and community organizations.'

Rather than planning to develop a consumption-based emissions inventory, the action proposes completing a

- '...profile of possibilities of implementing the circular economy on its territory. This profile will include analyses of material and energy flow for promising sectors island wide. The degree of implementation of the circular economy will be measured using an evolving circularity index. This process will help identify market prospects in applied industrial ecology, namely situations where outputs (such as heat, steam or a chemical compound) and waste materials from industrial processes can be reused as inputs and raw materials in the processes of other organizations. The implementation profile of the circular economy will specify the interventions required to harness these synergies.'

The focus is on circular economy, which not only addresses Scope 3 inherently, but has many co-benefits by stimulating the local economy.

Other actions, strategies or general aspects of the plan worth highlighting

Sector 1: Mobilization of the Montreal Community, Action 6:

- 'Form a multistakeholder work team to eliminate GHG emissions from construction projects....Montréal will draft a working plan that will reduce direct and indirect GHG emissions generated by construction sites. It will form a multistakeholder work team to put in place measures to lower these emissions. This team will examine avenues, such as the replacement of fossil fuels with electricity and procurement of low-carbon materials.' It is interesting that the building sector of the plan considers only operational emissions, and the focus on embodied emissions is associated to construction sites.

Sector 5: Governance, action 43:

- 'Impose a climate test on all the city's decisions to limit their impact in terms of GHG emissions and maximize those linked to adaptation to climate change.'
 - Identify which decisions are subject to a climate test

- Adopt a methodology for assessing climate impacts, such as GHG emissions and adaptation
- Establish an acceptable threshold that, in the case of buildings, for example, is already set at zero carbon for heating

Scope 3 is not called out specifically, but it would be difficult to ignore in a holistic 'climate test' as described.

3.1.4 San Francisco, CA – Climate Action Framework, 2021⁶

General Structure, Clarity and Design

The plan is very comprehensive and detailed. It is organized into 6 sectors: Responsible production & Consumption, Transportation & Land Use, Energy Supply, Building Operations, Healthy Ecosystems, and Housing. Each sector has several key areas associated to it. Sector-based emissions reductions targets are 61% by 2030 and achieving net-zero by 2040 compared to 1990 levels.

General ambition to address Scope 3

The plan includes a consumption-based GHG Inventory and sets targets in that regard. San Francisco hopes to achieve a 40% reduction by household by 2030 compared to 1990 levels and an 80% reduction by 2050. This is ambitious, though the 1990 baseline does take away a bit from that ambition. Consumption-based emissions are addressed in the 'Responsible production & consumption' sector, which includes strategies targeting construction, food, circularity of goods and materials, and aviation emissions.

Unique and innovative actions or strategies which are relevant to District of Squamish

The plan includes a whole section dedicated at addressing Scope 3 through 'responsible production and consumption'. There may be a missed opportunity to frame this more through the lens of circularity. , it is worth noting that the buildings and infrastructure strategy goes beyond the typical implementation of embodied carbon performance requirements:

⁶ https://www.sfenvironment.org/files/events/2021_climate_action_plan.pdf

- 'RPC.1-7 By 2030, advance best practices for “Design for Disassembly” and “Buildings As Material Banks” by creating implementation resources in partnership with global cities, and pilot at least one municipal project to maximize the value of carbon already invested in buildings.'

3.1.5 Portland, OR – Climate Emergency Workplan, 2022⁷

General Structure, Clarity and Design

The plan is very clear and succinct. The publication available online seems to be a summary highlighting priority actions from 2022-2025. Actions target both community emissions and consumption emissions and is organized in three main categories: Sources of Emissions, Sequestration, and Resilience. Though it is somewhat lacking in detail, given the structure and visual appeal, one might assume there is a far more detailed version not widely available. The target for the community-based inventory is net zero by 2050.

General ambition to address Scope 3

One of the action categories under 'Sources of Emissions' is embodied carbon, which targets building materials, purchases of goods and services, and food. Embodied Carbon is also addressed in the buildings category.

Other actions, strategies or general aspects of the plan worth highlighting

The plan appears to be ambitious and seems to target embodied emissions over most sectors, with some language alluding to circularity strategies. However, the overview is not very detailed, and it is difficult to pick out any specific strategies to reference as not many are listed and they are vague. However, the 2022-2025 timeframe may be a reason for this, given that this level of detail is likely more amenable to short term revisions and updates.

3.1.6 Eugene, OR – Climate Action Plan 2.0, 2020⁸

General Structure, Clarity and Design

⁷ <https://www.portland.gov/bps/climate-action/climate-emergency/documents/climate-emergency-workplan-2022-2025/download>

⁸ https://www.eugene-or.gov/DocumentCenter/View/55835/CAP-20_Summer_2020_FINAL-w-appendices-compressed

The City of Eugene (COE) plan addresses both community-based emissions and consumption-based emissions. Community based emissions are split into three buckets: Transportation, Building Energy and Fugitive Emissions which together account for Eugene's emissions. Each bucket has corresponding actions with additional actions to address consumption-base emissions, resilience, and equity. The actions don't necessarily align with the chapters of the document which can be slightly confusing but in general, it is clear and visually appealing. Some actions are lacking in detail.

General ambition to address Scope 3

The plan estimates Scope 3 emissions and sets out actions to address them. It includes a clear section with background information including graphic material. One particularly useful graph (Figure 16) shows the main sources of consumption-based emissions illustrating at what life-cycle stage most of the emissions are coming from for each.

Unique and innovative actions or strategies which are relevant to District of Squamish

- Action C5: COE will investigate the increased use of substitute supplementary cementitious materials (SCMs) for Portland cement in all capital construction projects and provide a target level of use by 2021.
- Action C13: COE to investigate the legal authority to incentivize the construction of smaller residential units by levying a building permit fee to account for lifecycle carbon emissions at the state level.

Other actions, strategies or general aspects of the plan worth highlighting

- Action C15: COE will support changes to state building codes to allow for greater use of reused materials in building construction and incentives for adaptive reuse of existing buildings.

3.1.7 Austin, TX – Climate Equity Plan, 2021⁹

General Structure, Clarity and Design

The plan is organized into five sections: Sustainable Buildings, Transportation and Land Use, Transportation Electrification, Food and Product Consumption, and Natural Systems. Within those sections, it sets out 17 goals to be met by 2030 and specific strategies towards each goal, for a total of 74 strategies. Equity considerations are embedded throughout the plan. The plan sets an ambitious target of reaching net-zero by 2040.

General ambition to address Scope 3

Though the plan only considers community-based emissions in its inventory, it does target consumption-based emissions quite aggressively. Within the Sustainable buildings section, it sets out the goal of reducing embodied carbon in building materials by 40% as well as reducing refrigerant leakage by 25% by 2030. It also includes a section dedicated to Scope 3 exclusively, targeting emissions from food consumption, purchasing, and waste management. For this section, it references the Austin Resource Recovery Comprehensive Plan.

Unique and innovative actions or strategies which are relevant to District of Squamish

The plan includes a roadmap to begin implementing embodied carbon requirements in buildings. Though this is not especially unique, it is worth reviewing for reference. The strategies proposed targeting refrigerant leakage are also worth noting, as this is a more unique aspect of this area. Despite the well-known high GWP of these gasses, few plans set out such clear steps to address their impacts. The following are the overarching strategies that are detailed further in the Plan:

1. Capture and destroy old refrigerants
2. Improve building codes to encourage cleaner refrigerants
3. Create incentives for leak detection and repair

⁹

https://www.austintexas.gov/sites/default/files/files/Sustainability/Climate%20Equity%20Plan/Climate%20Equity%20Plan%20Full%20Document__FINAL.pdf

4. Awareness and training for HVAC service providers
5. Reduce the volume of refrigerants

The plan also sets out 13 strategies within 3 main goals in the ‘Food and Product Consumption’ section. These all warrant review, but the following are particularly worth highlighting:

- Goal 1 Strategy 4: Conduct a food waste root cause analysis...to increase food waste reduction practices by 50%
- Goal 2 Strategy 4: Expand the City’s Circular Economy Program to (see plan for further details): Support City departments in reducing consumption. Use available City-owned space and/or leverage partnerships to create rent-subsidized incubation spaces, grants, loans, and technical assistance for qualifying circular organizations. Engage Austin youth in real-life problem-solving opportunities.
- Goal 3 Strategy 2: Create “Eco-hubs” that provide equitably distributed in-person neighborhood centers for borrowing, reuse, and repair services.

Actions and strategies which may be implemented at a lower financial cost or effort

Within the ‘Food and Product Consumption’ section, Goal 3 is the one which perhaps most aligns with current work being done in Squamish around circularity:

- Goal 3: Aggressively pursue waste reduction, organics composting, and recycling to achieve the waste reduction goals in the 2023 Austin Resource Recovery Comprehensive Plan.

District of Squamish already has work underway in that regard through the Circular Economy Roadmap and Implementation Plan (CERIP), much of which is not necessarily reflected in the current version of the CCAP. Austin's action plan sets out the following strategy which could serve as a reference for wording an action which consolidates work already underway in Squamish, as well as establish a common platform:

- Strategy 1: Promote waste reduction and reuse: Implement consumer awareness campaigns, such as community reuse challenges, promotion and expansion of Fix-It clinics and the Austin Reuse Directory, and educational campaigns that promote the

community benefits of reuse and repair. Encourage campaigns that promote the waste management hierarchy, which places recycling as a last resort before disposal.

Other actions, strategies or general aspects of the plan worth highlighting

The plan applies an equity lens throughout its goals and strategies, which comes through particularly in strategies which focus on capacity building. Within the ‘Food Production and Consumption’ section:

- Goal 3 Strategy 3: Create a workforce development program for the circular economy - Offer a workforce development program that includes training for repair and reuse skills, job placement, and entrepreneurship in local circular businesses, such as those found in the Austin Circular Economy Storymap. Prioritize the needs and strengths of low-income communities, youth, and communities of color. How we’ll get there:
 - Coordinate training opportunities with revamped bulk pick-up programming and promote skills that preserve cultural traditions and craftsmanship.
 - Collect and publish demographic data on program participants to ensure equitable accessibility and use

3.1.8 City of Vienna, Austria – Smart Climate City Strategy, 2022¹⁰

General Structure, Clarity and Design

Vienna has developed a very detailed plan guided by a 3 pronged vision:

- High quality of life for everyone in Vienna, through social and technical innovation in all areas, while maximising conservation of resources.

The plan is organized by 11 'thematic areas', with many goals and strategies specific to each, but always communicated holistically, recognizing many cross-cutting issues and synergies. Of the plans reviewed, this is perhaps the most well communicated, forward-thinking and ambitious.

General ambition to address Scope 3

¹⁰ https://smartcity.wien.gv.at/wp-content/uploads/sites/3/2022/05/scwr_klima_2022_web-EN.pdf

The plan addresses both community-based emissions and consumption-based emissions. For community-based emissions, it sets out the target to achieve net-zero by 2040, and a 50% reduction in consumption-based emissions by 2050. Scope 3 emissions are targeted mainly in the thematic areas of ‘Buildings, Economy & Employment’, and ‘Zero Waste & Circular Economy’. If there is a CBEI which has been developed, the plan does not mention it, but rather focuses on circularity, as illustrated in a diagram titled ‘Material flows in Austria’ on p. 35.

Unique and innovative actions or strategies which are relevant to District of Squamish

The whole plan is very innovative, highlighted by the particular focus on resource management through material flows analysis, circularity, digitalisation as a tool, and science and research. Some specific strategies which might be most relevant to Squamish are:

- In the Buildings section:
 - Establishment of regional building materials exchanges to facilitate reuse of materials.
 - Capacity-building for education and training programmes in circular planning and construction (trades/apprenticeships, technical colleges, higher education).
- In the Economy & Employment section:
 - Targeted promotion of the share & repair economy (cf. Vienna Repair Network, Vienna Repair Voucher initiative) along with development of innovative, sustainable solutions.
 - Establishment of new “living labs” with access to data and infrastructure for piloting of innovative products and services.
 - Promoting an economically, environmentally and socially sustainable and diverse tourist industry that creates added value both on and off the beaten track for visitors and locals alike and is aligned with the needs of local people.
- In the Zero waste and circular economy section:
 - Inventorying, mapping, recovery and recycling of reusable materials in existing buildings (“urban mining”).
 - Processing of residual waste to separate out reusable components for recycling (especially plastics).

- Reduction of food waste along the entire value chain through awareness-raising activities and joint measures with the business community.

Actions and strategies which may be implemented at a lower financial cost or effort

In the Buildings section, the plan proposes a strategy which transforms their advisory service for social housing into a central advisory service for all issues related to building retrofits. This could be an extremely impactful capacity-building tool which could be developed at a relatively low-cost:

- Creation of a “one-stop shop” for all issues relating to building refurbishment and energy efficiency by upgrading the “Hauskunft” advisory service into a central information, advice and service centre.

Vienna also ‘recognises the roofs and facades of buildings as important resources that can be used for PV systems and, in the case of roofs, as recreational spaces. Greening measures mitigate urban warming and help conserve biodiversity, while renewables are used to power active cooling systems. In the coming years, further buildings will therefore be greened where possible.’ Many of the strategies to implement this vision are not particularly simple or inexpensive but the first step has more potential to be developed within existing municipal planning processes in Squamish:

- Systematic survey to identify suitable surfaces on existing buildings and in new-build projects.

Other actions, strategies or general aspects of the plan worth highlighting

Perhaps the most interesting and forward-thinking aspect of the plan is its focus on 'digitalisation', which is one of the 'thematic areas':

- 'Vienna sees digitalisation as an effective tool to drive innovation and achieve the city's net zero target while simultaneously maintaining its superlative quality of life.'

The application of this digitalisation is leveraged in support of all other thematic areas, ranging from creating digital services and processes to streamline and minimize administrative workloads, to:

- 'Development of a digital twin, i.e. a complete digital replica of the city, incorporating data from a wide range of sources (particularly e.g. real-time IoT data or images of the urban space).'

In the context of Squamish, and focusing on targeting Scope 3, there are actions which build networks and facilitate community engagement:

- 'Digital public participation channels for all – from participatory development of strategies to involvement in the design of specific projects (e.g. traffic calming, greening, etc.) at neighbourhood level. Accessible, user-friendly design enables all social groups to participate.'
- 'Building networks in Vienna's digital community through initiatives such as DigitalCity.Wien.'

3.1.9 City of Helsinki – Carbon Neutral Helsinki Action Plan, 2018¹¹

General Structure, Clarity and Design

The plan is organized into the following sections: traffic, construction and use of buildings, consumption, procurements, sharing economy and circular economy, Smart & Clean growth, Helsinki's development programme, carbon sinks and compensation for emissions, communications and engagement, coordination, monitoring and assessment of climate work. Several actions are laid out under each section and each action details the parties responsible, the estimated timespan, complexity, and estimated cost. It is a very clear plan with specific key actions towards its ambitious goal of carbon neutrality by 2035.

General ambition to address Scope 3

Though Scope 3 emissions are not considered in the City's goal of carbon neutrality, the plan acknowledges and estimates indirect emissions and sets out many actions to address them. There are several actions in the 'Buildings' section to that end, and a whole section of the plan is dedicated to 'Consumption, procurements, sharing economy, and circular economy'.

¹¹ https://carbonneutralcities.org/wp-content/uploads/2019/06/Carbon_neutral_Helsinki_Action_Plan_1503019_EN.pdf

Considering that this plan was published in 2018, and comparing it to many current organizational plans, it can be considered very ambitious.

Unique and innovative actions or strategies which are relevant to District of Squamish

The plan lays out several interesting actions related to sharing economy and circular economy. The following are noteworthy:

- 115. The City will set an example by creating a digital platform and using it to share the City facilities and equipment with the staff, residents, entrepreneurs, adult education institutes, sports clubs and other actors.

Considering the existing work underway, as well as the generalized second-hand market which already exists through sites such as Craigslist and Facebook, a centralized sharing/circularity platform for Squamish would likely be well received by the community and greatly impactful. Also interesting to note, is the initiative to expand the scope of work of libraries. Object lending may not be very different administratively to book lending and could be a logical expansion of services given sufficient space is procured:

- 116. Libraries will advance sharing economy in a significant manner. Libraries will offer facilities and resources to be used jointly by the residents, as well as guidance for the use of digital solutions and devices, and also offer access to technological innovations that will be a part of everyday skills in the future. Libraries will prevent digital marginalization and enable residents to be engaged and share their skills. The expansion of the libraries' lending services will continue the cooperation with peer-to-peer services, such as Kuinoma.

Actions and strategies which may be implemented at a lower financial cost or effort

Actions towards a sharing economy can begin within the city's own organizational structure:

- 117. Rarely used objects and equipment will be inventoried, and a platform will be created for sharing them within the City organisation. The recycling of furniture and other movable property within the City will be made more efficient, for example by

creating instructions that promote circular economy in the relocation of and changes to official facilities.

Other actions, strategies or general aspects of the plan worth highlighting

The Helsinki plan understands that the transition towards circularity is rooted in capacity building and assigns several actions to target education. It is also important to recognize that the members of the community themselves are a resource to that end. Some particularly interesting actions which may be most relevant are:

- 93. The City will organise courses and education on the mitigation of and adaptation to climate change, as well as circular economy and sharing economy for its employees, representatives and residents.
- 94. Urban agriculture will be promoted by using crowdsourcing to survey spaces suitable to be used by the residents. The criteria for spaces suitable for urban agriculture and the rules for the use of these spaces will be defined.

Chapter 4: Recommendations

This section distills findings into recommendations for District of Squamish's upcoming CCAP update.

4.1 Key takeaways from literature review to inform Squamish CCAP update

The following are major guiding strategies that Squamish should employ when incorporating embodied carbon into the CCAP update:

Guiding strategy 1: Avoid 'Pigeon-holing' embodied carbon

There are several different approaches taken by cities to incorporate embodied carbon into their plans. Mostly, strategies are incorporated into either built environment or waste/circularity categories of actions, or both. Though these areas may be the most relevant to the issue, this approach fails to capture the interconnectedness of embodied carbon with all sectors. City of Portland has an interesting approach, using the higher-level categories: Sources of emissions, sequestration, and resilience, essentially addressing mitigation (reduction and sequestration) and adaptation. This does seem to be a more holistic approach, but again, embodied carbon is 'pigeonholed' into its own section, with a minor appearance of a strategy in the building section as well. The CCAP update should embrace the fact that embodied carbon is cross-cutting and should be tackled in all areas of the plan, without attempting to organize a separate section for this purpose.

Guiding strategy 2: employ Systems-thinking

Addressing Scope 3 emissions presents an opportunity to shift the understanding of the city from a sector-based view, to understanding it as a system, composed by many sub-systems. Scope 3 considerations should attempt to understand the emission implications of the flows of goods, services, waste, and energy in and out of the DoS system boundaries.

Guiding strategy 3: Capacity building & education

One of the most critical areas to invest in for the transition, especially when trying to understand Scope 3 emissions, is education and capacity building. Many plans consider strategies in one or more of their action areas, but there seems to be an opportunity to include actions for all areas to build capacity, as net-zero will require big shifts in processes and

understanding. Capacity building can accelerate the pace of incremental implementation of policy. This is also a great way of applying an equity lens to the plan. Prioritize training of historically marginalized, low-income, or underserved people to equip them as valuable assets in the transition.

4.2 Recommended updates to DoS CCAP for Scope 3 emissions reductions

The following sections will summarize the general strategy suggestions for each ‘Big Move’ in the current CCAP. A brief description of the general strategy is provided, along with the suggested new strategies and actions. Appendix C includes pdf exports of a Miro¹² board which provides a detailed description of these recommendations to understand the logic behind their development, including the supporting documentation which informed them. Actions are categorized as ‘Tier 1’ or ‘Tier 2’. Tier 1 actions are perceived to be either easier to implement, or represent the first step in a series of actions. Tier 2 actions, have a higher degree of complexity, or are considered to be more ambitious or innovative.

4.2.1 Big Move #1: Close the Loop on Waste and Circular Economy Roadmap and Implementation Plan

General recommended strategy for update

As mentioned, developing a consumption-based emissions inventory is likely not the best immediate path forward for the district. This is mainly due to the high cost, complexity, and margin of error of such a study. Additionally, the relevant information resulting from the estimate can already be extrapolated from the Metro Vancouver CBEI. Though the CBEI may be conducted in parallel, in order to keep progressing towards emission reductions, it is recommended that priority actions to address Scope 3 emissions in Squamish take on a circular economy approach. Circularity reduces consumption from outside the system boundary of Squamish, which limits embodied emissions, and minimizes waste leaving Squamish, reducing end-of-life emissions. The district has already developed an comprehensive and innovative roadmap and implementation plan to that end: the Circular Economy Roadmap and Implementation Plan (CERIP). The CCAP update should draw from this work and ideally

¹² Miro is a collaborative online tool for visualizing and organizing mind maps and flows. www.miro.com

rethink Big Move #1 to be in full alignment. The plan could adopt the same 'thematic areas', which were developed based on DoS consumption and waste profiles. Some key actions from the CERIP are suggested here, and can be finalized in the CCAP in collaboration with CERIP and CCAP implementors. In addition, some consumption from outside the system boundaries will be unavoidable. To address this, a new strategy could also be included which promotes responsible consumption and low carbon choices.

Draft updates

BIG MOVE 1

- New Strategy: Set strong foundations for the development and transition towards a circular economy
- - New Actions Tier 1:
 - Build an online platform to support communications campaigns, CE education, collaboration with content dedicated to the three thematic areas.
 - New Actions Tier 2:
 - Develop and publish a circular asset map, to highlight the availability, and promote the use, of circular tools and resources.
 - Leverage partner-led project, utilizing a system to facilitate labourforce and circular business labour needs for opportunity matching.
 - Develop a circular impact score, and 'Impact Hub' to providing a public benchmarking interface to demonstrate circular impact and progress.
- New Strategy: Foster circularity in Squamish's food systems (possible new Big Move)
- - New Actions Tier 1:
 - Work with partners focused on local, circular food systems, to develop, support and promote existing circular food system activations, as well as identify gaps, and collaboration and innovation opportunities.
 - New Actions Tier 2:

- Work with partners to undertake a Squamish Farm and Food Hub feasibility study. Based on the outcomes of the feasibility study, establish a food/ farm hub to facilitate local procurement, food production and processing, marketplace, commissary kitchen, distribution centre, warehouse, cold storage facility, or other, to shorten and localize the supply chain.
 - Develop local business-to-business food procurement and distribution systems, that facilitate local collaboration and product consolidation. Foster relationships, and develop food procurement programs and an online procurement platform.
- New Strategy: Foster circularity for textiles in Squamish (Big Move 1)
 - New Actions Tier 1:
 - Facilitate one year round table to understand barriers and enablers to a circular textiles economy.
 - Create a collective to take ownership of the Textiles CE in Squamish.
 - New Actions Tier 2:
 - Conduct a feasibility study regarding the local opportunity for a centralized textiles hub to facilitate resource storage and sharing, maker and retail space. This hub will look to extend the life of products through repair and upcycling, and finding new markets or purposes for existing products.
- Modify existing strategy: Rework 'Manage wood waste' strategy into an expanded 'Foster circularity in the building sector' strategy (Connections with Big Moves 4&5)
 - New Actions Tier 1:
 - Promote a shared platform for contractors to share experiences, events, skills, development programs, and success stories and challenges related to use of reused materials
 - Create public facing information relating to buildings slated for demolition at building permit application stage so that salvaging companies can

4.2.2 Big Move # 4: Decarbonize Existing Buildings

General recommended strategy for update

The recommended strategy for Big Move #4 has two main fronts. The first is to expand existing operational carbon reduction strategies to include embodied carbon considerations by developing a sustainability checklist to be implemented in all projects, mandatory for municipal projects. The district can take advantage of retrofit projects currently underway to develop and test the checklist and begin considering Embodied Carbon in design stages through the IDP team. At worst, project teams can learn about embodied carbon through the checklist exercise, and at best the district can begin gathering embodied carbon estimate data for retrofits. The latter consequence describes the second front for these strategic updates: Building capacity and understanding around embodied carbon implications of retrofits.

Draft updates

- Within existing strategy: Owner, renter, realtor and contractor education and coaching (help people to make and implement the best solutions)
 - Adjustments to existing actions: Ensure all capacity building actions around energy efficient retrofits includes embodied carbon considerations, i.e: explore material choice GHGI. Could focus on insulation choices and refrigerants, referencing City of Nelson Material Carbon Emissions Guide & Refrigerants in heat pump systems study commissioned by CoV.
 - New Action: Develop retrofit sustainability checklist for voluntary reporting (mandatory for public projects). City of Nelson Material emissions guide could be referenced.

4.2.3 Big Move #5: Construct Better Buildings

General recommended strategy for update

Recommendations to address embodied carbon in buildings fall within three main categories. The first includes actions aimed at building less or avoid building altogether wherever possible. The second includes actions to build capacity around embodied carbon in the

construction sector, and the third describes a potential path to develop incremental embodied carbon requirements for new construction.

Draft updates

Replace existing strategy: Encourage building materials that store carbon and/or have less embodied emissions with the following:

- New Strategy: Address Embodied Emissions in the building sector by reducing and avoiding new construction where possible
 - New Actions Tier 1:
 - Review existing DoS building stock for adaptive reuse opportunities and maximum utilisation
 - New Actions Tier 2:
 - Consider a home size cap through a land use bylaw
 - Develop a Relocation or Salvage program for single-family homes prior to applying for a demolition permit.
- New Strategy: Build capacity to reduce embodied emissions and support new requirement implementation. Promote education and collaboration in the local construction sector through workshops and course series.
 - New Actions Tier 1:
 - Engage with low-carbon concrete manufacturers and facilitate collaboration with the local building sector
 - Develop and facilitate a workshop series to spread awareness about low-carbon material choices and innovative construction methods
 - Develop and facilitate a workshop series to educate design and construction professionals on quantifying embodied carbon, the tools available, and their ideal application depending on building archetype and purpose of assessment.
 - New Actions Tier 2:
 - Review current design for disassembly and adaptability best practices and develop guidance for the Squamish building sector

- Promote and facilitate EPD development for local lumber mills and other building sector manufacturers to drive specification of their products in the region.
 - New Strategy: Develop an incremental path to embodied carbon requirements in all new construction
 - New Actions Tier 1:
 - Develop and implement two voluntary sustainability checklists for all new Part 9 construction: One for single Family Homes, and one for all other Part 9.
 - Consider aligning with City of Vancouver embodied carbon requirements for part 3 buildings, starting with mandatory embodied carbon disclosure at BP stage per WBLCA guidelines.
 - New Actions Tier 2:
 - Part 9: Implement mandatory sustainability checklist submittal requirement at BP along with an 'embodied carbon narrative' describing measures used to achieve reductions.
 - Part 9: Introduce an embodied carbon performance requirements at BP by establishing a benchmark based on latest BP submittals in Squamish.
 - Part 9: Offer an alternate path for embodied carbon requirement compliance at BP through prescriptive requirements around material selection.
 - Develop embodied carbon reduction targets to be implemented incrementally based on previously compiled disclosure data (or align with CoV targets)

4.2.4 Big Move #6: Other Organizational Actions

General recommended strategy for update

Organizational actions suggested to address Scope 3 can be categorized in 3 areas. The first is to develop KPI's and other metrics such as a 'Circularity Index' to track progress of

actions in a way that is not necessarily tied to carbon accounting. The second is to build capacity, and the third is to lead by example and use the organization as a test bed for initiatives.

Draft updates

- Within existing strategy: Measure and report on progress
 - New Actions Tier 1:
 - Partner to undertake research to identify opportunities for high-impact circular implementations, including but not limited to a materials flow analysis.
 - Develop a circular impact score, and 'Impact Hub' to providing a public benchmarking interface to demonstrate circular impact and progress.
 - Within existing strategy: Build organizational and community capacity
 - New Actions Tier 2:
 - Embrace digitalization as a tool for achieving climate goals, especially as it pertains to circularity. Explore opportunities to leverage technology for inventorisation of materials and goods, and promoting the local donating, sharing, and second-hand economy.
- New Strategy: Address Scope 3 emissions by example, and provide a test-bed to pilot circularity initiatives within the District's own organization
 - New Actions Tier 1:
 - Support and test share/free shed on district property for staff, and evaluate viability for the whole community
 - Support and test online platform for goods & material sharing, donation, exchange, re-use, and upcycling, organized by categories. Limit to district staff initially, and evaluate viability and functionality for public roll-out
 - Adopt incremental embodied carbon requirements for buildings in new district projects, at least one step ahead of public requirements.
 - New Actions Tier 2:
 - Develop a Buy Clean policy

- Step 1 – Establish the scope - Which materials and projects are impacted by the policy? And which types of projects will be covered by the policy?
 - Step 2 – Set data disclosure requirements - What types of environmental data are acceptable?
 - Step 3 - Set Product Standards for Maximum Global Warming Potential (GWP) - What should be the initial maximum GWP value for each eligible material? How will the product emissions standards change over time?
 - Step 4 – Establish incentives - How will the bidding process change?
 - Step 5 – Set timelines and supporting structures - How can different departments support adoption of this policy? When will the data be enforced?
- Develop a low-carbon concrete policy for public works
 - Require assessment of current DoS assets as part of all new district project business cases.

Chapter 5: Conclusions

In addition to the recommendations presented in this document, there are some further conclusions worth noting. Many of the recommendations, especially, within Big Move #1 are intended to drive a transition to a circular economy. This requires a shift in perspective to address the real driver of consumption-based emissions, which is the flow of materials, goods and services through Squamish. This focus on circularity is one of the trademarks of the most forward-thinking plans which were reviewed. DoS is well positioned to adopt this approach by building on the exhaustive work done to produce the Circular Economy Roadmap and Implementation Plan. This plan can serve as an extremely valuable resource to guide this update, especially as it concerns Big Move #1. Though the district may still decide to conduct a consumption-based emissions inventory, it may be beneficial to redirect the resources considered for this, towards the development of a ‘Circularity Index’, including an understanding of regional material, goods and services flows. This will help track the degree to which Squamish progresses towards circularity, and in turn reduces consumption-based emissions. Ultimately, this transition could not only minimize embodied carbon, but provide a boost to the local economy through diversification and new opportunities to recover value.

Embodied carbon is a complex topic, which can often seem abstract and be a source of confusion. For this reason, capacity building through education is key, especially as it relates to the gradual implementation of requirements in the building sector. Training, educational workshops and new professional networks for exchanging knowledge will ensure that building professionals can respond not only to new local requirements but also stay ahead of the curve regionally as other jurisdictions implement new policy. Alignment with the City of Vancouver’s incremental embodied carbon requirements could be considered.

Though the review of internal processes is outside the scope of this research, its importance is worth highlighting. As new policies and requirements are implemented, the district’s capacity to process these may become strained. Digitalization and leveraging technology could be a valuable recourse to minimize workloads and should be leveraged to reduce obstacles during implementation. It can also benefit data collection, especially as it relates to LCA submittals, which is key for future benchmarking and setting appropriate targets or caps.

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Appendix A – Reference Climate Action Plan Assessment Table

	Name of plan and publication date	Date Published	Comments on general structure, clarity of communication and graphic design	General ambition to address Scope 3		Unique and innovative actions or strategies (explicit rather than vague) which are relevant to District of Squamish	Actions and strategies which may be implemented at a lower financial cost or effort	Other actions, strategies or general aspects of the plan worth highlighting
				Grade 1-3	Comments			
British Columbia	City of Richmond 2050 Community Energy and Emissions Plan	Feb 2022	The plan has a clear structure, organized in 8 'strategic directions for climate action'. Current municipal emissions are outlined as well as projected contributions from each 'direction' towards the targets of 50% by 2030 and 100% by 2050. The plan also defines 6 tools for implementation. An explanation and action summary is provided for each direction organized by main action and sub-actions. The plan also includes an implementation roadmap section in the form of a table. For each action, the table defines the tools, sub-actions, and resources available for implementation. The plan is visually appealing and well organized.	3	Despite not having a full CBEI, Scope 3 considerations are embedded in the structure and actions. This is explicitly highlighted by an infographic showing which 'directions' address a typical municipal-based emissions reduction plan and which target an expanded scope, and which includes Scope 3 as well as carbon sequestration measures. Scope 3 is addressed in 2 'directions': 'Transition to a Circular Economy' & 'Carbon Neutral New Buildings'. The 'Transition to a Circular Economy' is particularly interesting as it shifts focus from costly, time-consuming, and potentially inaccurate carbon accounting (CBEI), to real actions with demonstrated impact towards circularity, while also reframing the 'waste-management' narrative.	Richmond's 'Carbon neutral new buildings' and 'Transition to a circular economy' directions are equivalent to Squamish's Big Moves 1 and 5, which makes the following actions particularly relevant: Carbon neutral buildings - Action: Accelerate adoption of low global warming potential technologies Sub-actions: a. Support local certification of promising new building technologies not yet certified in Canada. (This is unique and could be very impactful, see Nelson Natural Building Case Study) b. Encourage Provincial and Federal governments to enact more stringent regulation related to high global warming potential (GWP) coolants and technologies Implementation: i. Support local field test of promising new low-GHG technologies within new buildings ii. Encourage the Federal Government to accelerate the phase-out of high GWP refrigerants in building mechanical equipment iii. Encourage the Province to include GWP requirements for refrigerants in the Energy Efficiency Standards Regulation iv. Support action by the Province to ensure a quick market transition to low-GWP technologies and best practices Transition to a circular economy - This whole section is worth reviewing - Action: Advance implementation of circular economy initiatives by City of Richmond Sub-actions: a. Incorporate circular economic thinking into City project development and operations management, with the goal to 'design out' waste and pollution - Action: Accelerate adoption of Circular Economy approaches by the private sector in the design, manufacture and retooling of products and services Sub-actions: Develop a waste by-product tracking database for local firms with online tools for recovering and reusing products and materials through closed loop recycling, industrial symbiosis initiatives and upcycling	Transition to a circular economy - Action: Advance implementation of circular economy initiatives by City of Richmond Sub-actions: a. Integrate product footprint analysis and life-cycle assessment into the City's procurement process b. Increase proportion of recycled and reclaimed materials used by the City, to help drive the market toward a circular economy - Action: Accelerate adoption of Circular Economy approaches by the private sector in the design, manufacture and retooling of products and services Sub-actions: Enable sharing of products and assets to maximize use and longevity, enhance productivity and create value	Carbon neutral buildings - The actions laid out for this direction demonstrate that embodied emissions must be considered in addition to operational emissions to claim carbon neutrality. Direct emissions from refrigerants are also addressed. - Action: Accelerate transition to the top level of building performance: The plan understands that embodied emissions should be considered in conjunction with operational emissions to have a holistic view of 'building performance'. Transition to a circular economy - This direction goes beyond waste management to focus on a true transition to a circular economy. It lays out actions for 3 main groups: City of Richmond, Residents and Businesses. Construction materials are also revisited here.
	Municipality of Whistler Big Moves - Climate Action Implementation Plan	2022	The plan is split into 6 'Big Moves' aimed at climate change mitigation and 3 'goals' aimed at adaptation. A community-based emissions estimate is provided as well as projected reductions from the plan towards the target of 50% reductions by 2030. For each big move, a table is included with a list of actions showing the lead department and approximate timeline for kick-off. The plan is sufficiently clear visually, but could benefit from improved design.	2	The plan does not explicitly acknowledge the limited scope of its emissions inventory, though Scope 3 is addressed in Big Move 4: Build Zero Emission Buildings and Big Move 6: Close the Loop and Shift Towards Lower Carbon Consumption.	Most actions targeting Scope 3 emissions are vague, but some may be worth highlighting due to the similarities between Whistler and Squamish communities: Big Move 4 - Build resilient zero emissions buildings 4.4 Discourage carbon-based heating of outdoor spaces such as patio heaters, fossil fuel burning fire pits, heated driveways, outdoor hot tubs, pools and saunas, etc. through policy and/or permit changes. 4.8 Streamline the municipal building permit process to minimize administrative burden for property owners, developers and RMOW staff as relates to additional GHG related tasks and requirements. Big Move 6: Close the Loop and Shift Towards Lower Carbon Consumption 6.4 Demonstrate RMOW leadership by embedding GHG emissions and waste considerations into municipal operations and procurement practices. Conduct regular interval audits and reporting to understand RMOW progress towards meeting and beating the 80 per cent waste diversion goal as outlined in the Zero Waste Plan.	Actions are generally not explicit enough to assess this but there could be potential for: Big Move 4 - Build resilient zero emissions buildings 4.6 Build RMOW staff capacity related to embodied carbon emissions. Big Move 6: Close the Loop and Shift Towards Lower Carbon Consumption 6.5 Engage with residents, visitors and local businesses to advance sustainable consumption, to support locally reusable products and packaging, a local shared economy, and other local carbon reduction projects.	NA
	City of Victoria Climate Leadership Plan	2018	The plan is organized by 5 key sectors with targets and goals specific to each sector for a total of 12 goals. Actions are not assigned to a specific goal but listed generally as 'sector-wide'. A community-based emissions estimate is provided as well as projected reductions from the plan towards the target of 80% reductions by 2050. The plan is visually appealing, very clear and succinct, though lacking in explicit definition of actions	1	The plan frames all Scope 3 emissions as 'the next chapter', acknowledging it is out of scope at the moment it was published. There is only one (vague) action within the building sector which addresses embodied carbon.	NA	NA	Since the Climate Leadership Plan was published in 2018, City of Victoria has made significant progress worth noting. The publication of their 'Climate-Forward Building Guide' is worth noting. It is meant to serve as a tool for development applicants wishing to minimize emissions and increase resilience, as well as an assessment tool for assessing the merits of an application. 'Including climate-forward building features for new developments is encouraged and providing details of these features is a requirement for all rezoning applications that include new construction.' Among the topics covered are building retention and re-use, referencing Victoria's demolition waste by-law. Low carbon materials and construction is also listed with references to the LFI's embodied carbon quick guide and City of Nelson's Low Carbon Materials guide

City of Nelson	Nelson Next	2020	The plan is organized into 2 parts. The first provides a robust, well organized and succinct foundation of information which informed the development of the plan. Part 2 is the plan itself, made up of 7 'Aspirations', 23 strategies, and 'tactics' which are the actions for implementation. A community-based emissions estimate is provided as well as projected reductions from the plan towards the ambitious targets of 75% reductions by 2030 and net-zero by 2040. The target for municipal operations is net zero by 2030. The plan boasts high-quality graphic design and though some of the wording and structure is unique, it remains clear and reflects the character of the community.	3	Though the plan does not include Scope 3 in its reduction accounting, it does provide an estimated CBEI, which helped inform the policies, especially since the results of the estimate are very similar to the community emissions inventory as far as emission contributions by sector. Embodied carbon in buildings is addressed within 'Aspiration Two: Infrastructure and buildings in Nelson are zero carbon and resilient'. The plan also focuses on circularity, which inherently addresses Scope 3 emissions, in 'Aspiration Six: Nelson has a thriving circular economy and generates the lowest waste per capita in Canada'.	An especially unique tactic worth noting, which is conducive to driving a paradigm shift in construction techniques can be found under 'Aspiration Two: Infrastructure and buildings in Nelson are zero carbon, and resilient' . This action manifested in reality in the 'Natural Building Case Study' conducted by City of Nelson and is referenced in the relevant publications of this document. -Promote and support natural, carbon-negative building initiatives that utilize local, renewable resources The plan also uses zoning policy as a tool to promote low-carbon density like laneway housing. Smaller buildings have low impact foundations and therefore are less carbon-intensive: - Continue to promote increased density through the expansion of laneway housing, zoning amendments, and development incentives 'Aspiration Six: Nelson has a thriving circular economy and generates the lowest waste per capita in Canada.' also contains some unique actions around circularity which are particularly relevant considering the work District of Squamish has done on that front: - Work with regional partners to undertake a mapping of local material and energy flows to better understand key waste prevention and circular economy opportunities - Explore the feasibility of a collaborative repair and reuse centre for Nelson - Support trade co-ops and manufacturing spaces that can receive diverted waste streams such as forestry by-products - Develop a 'Sharing Economy Action Plan' to enable the city, businesses and residents to reap the benefits from sharing platforms.	Since publishing the Nelson Next plan, City of Nelson has done significant work to advance embodied carbon understanding and policy through their Low Carbon Materials program. Although this is not part of the plan, it is a result of aligning to it and has produced significant findings which District of Squamish may use to reference and support policy without having to undergo costly studies. Some examples are: - Benchmarking report (March 2022) - Could be used to help inform eventual embodied carbon reduction requirements - Material Carbon Emissions Guide (March 2022) - Can help support workshops and policy aimed at homeowners or builders to make low-carbon material choices - Building Better in the Kootenays series (2023) - A series of free embodied carbon analyses and consultations for projects across the Region, hosting three educational workshops on how to reduce embodied carbon emissions within building projects, and the completion of 4 informational case studies See: https://www.nelson.ca/905/Low-Carbon-Building-Materials	City of Nelson's approach goes beyond performance-based requirements and uses other levers like capacity building through training opportunities and local collaborations. Under 'Aspiration Two: Infrastructure and buildings in Nelson are zero carbon, and resilient' the following 'tactics', though lacking in specificity reflect this focus and are worth noting: - Work with local institutions to develop training opportunities for youth and students in smart, green, and resilient design and construction - Collaborate with local nonprofits and businesses to construct innovative, green building demonstration projects, and share plans and learnings with industry and other local governments There is also an action targeting construction site emissions, which is one of the few areas of embodied carbon in buildings which is within the community emissions profile: - Require zero carbon/low carbon construction sites Considering recent advancements in low-carbon concrete, and depending on availability, using low-carbon concrete may be considered 'low hanging fruit' to achieve reductions: - Develop a low carbon cement and concrete policy and include embodied carbon requirements in new construction standards for buildings
City of Vancouver	Climate Emergency Action Plan	2020	The plan is organized in 3 main areas with a total of 6 'Big Moves' and 32 'recommendations'. Actions only appear in the detailed plan which is very text heavy. The more immediately available summary is lacking in much detail and is mainly composed of 3 infographics. Navigating many different links and sub-plans is necessary to get a more clear picture of the plan. Targets are set to cut emissions in half by 2030 and to reach net zero before 2050. Emissions reductions achieved from each Big Move are not very clear.	2	Through 'Big Move 5: Low Carbon Materials and construction practices' , City of Vancouver is following through on their ambitious target of 40% reduction in embodied emissions from new buildings. The city is certainly one of the leaders in the region as far as action taken to address embodied carbon in buildings. However, there is a lack of ambition to address Scope 3 outside the construction sector. 'Big Move 6: Restored coasts + Forests' does address all scopes through sequestration, but there is no indication of an upcoming Consumption Based Emissions Inventory, and circularity does not feature as a focus of the plan. The topic is also not included in the Vancouver Economic Commission's Zero Emission Economic Transition Action Plan goals	Vancouver is one of the few jurisdictions worldwide that has actually set embodied carbon requirements for new construction. The Vancouver Building By-Law has allowed the city to fully execute these requirements independently of the BC Building code. This applies to all part 3 buildings. Currently, the limit is set at 2 X the established benchmark but a 10% reduction requirement is set to be implemented in 2025. This is supported by the embodied carbon guidelines which dictate required WbLCA methodology and a template to facilitate reporting. Both of these documents are quickly becoming examples and the guidelines were essentially adopted with minor changes at the federal level by NRC. Though the scale of the jurisdiction means this does not translate to Squamish, the model of first adopting a requirement for disclosure, and then gradually implementing reduction requirements supported by guidelines and templates could be applicable to squamish.	NA	NA
City of Toronto	Transform TO Net Zero Strategy	Nov 2021	The plan is clear and well organized, and sets out a Net Zero target by 2050 outlining potential for this to be reached by 2040. Targets and actions are organized into 7 categories.	2	The plan lays out an action to 'evaluate and limit impacts of embodied carbon in construction' within the Buildings category. Since then, the City has approved GHGI caps, though they are limited only to 'up-front' carbon (LCA modules A1-3). The plan also lays out an action to conduct a CBEI, which has since been published. However, the perspective to address Scope 3 emissions remains limited to 'waste management', rather than circularity.	NA	NA	One of the few jurisdictions which has actually conducted and published a CBEI as a direct result of their plan
City of Hamilton	Community Energy and Emissions Plan	Aug 2022	The plan is quite clear and succinct though not particularly ambitious. It is split into 5 categories covering industry, transportation, buildings, energy, and sequestration.	1	The plan is not particularly ambitious with respect to scope 3. It covers only community emissions and it does not have any particular focus on waste management, circularity, or responsible consumption	NA	NA	It is worth highlighting that Hamilton's emissions profile is dominated by the industrial sector. Hamilton is a hub for one of Canada's most carbon-intensive primary industries: steel. Considering this, though the plan is not particularly ambitious regarding scope 3, it is targeting the community's specific emissions profile.

Canada	City of Edmonton	Community Energy Transition Strategy & Action Plan	Apr 2021	The plan is clear and well organized, and sets out a Net Zero target by 2050. The strategies are grouped into: Renewable and Resilient Energy Transition, Low Carbon City Transportation, Emission Neutral Buildings, Nature Based Solutions and Carbon Capture	1	The plan targets only community-based emissions, and does not have any particular focus on waste management, circularity, or responsible consumption. Some supporting policy has been published targeting embodied carbon for city building stock.	NA	<p>Through the 'Climate Resilient Design and Construction of City Buildings' policy, some headway is made to target embodied carbon. One requirement worth noting is Requirement 3.1: <i>'The City will recognize the significant resource requirements and greenhouse gas impacts of New Construction, as well as the amount and impact of the Embodied Carbon in its existing building stock. As part of any business case development, the operational area leading the project will assess whether an identified real estate need of its programs or services can be met through its existing building portfolio and achieved in the absence of New Construction.'</i></p> <p>This is a relatively easy requirement to implement that first and foremost ensures that any new construction project is actually necessary. Aligning with a 'build less' approach to embodied carbon.</p>	Also found in the 'Climate Resilient Design and Construction of City Buildings' policy, is requirement 3.5: <i>'All New Construction shall require Embodied Carbon assessments as outlined in the City's Facility Design and Construction Consultant Manual(s). All New Construction must consider using the material with the lowest Embodied Carbon for an otherwise equivalent material. This review and consideration must be documented alongside the Embodied Carbon assessment.'</i>
	City of Halifax	HalifACT-Acting on Climate Together	JUN 2020	The plan is clear, well organized, and is visually attractive with a well designed format and artistic illustrations. It sets out a Net-Zero target by 2050 with a clear roadmap of where these reductions will come from. Actions are Split into 3 main categories: Decarbonized and Resilient Infrastructure, Prepared and Connected Communities, and Governance and Leadership. Within these categories, there are 17 sub-categories of actions.	2	The plan currently only considers community-based emissions. However, there is some initial language pointing towards addressing Scope 3 in the future	NA	NA	Though not particularly ambitious or specific, the plan lays out the following actions to target Scope 3 within the sub-category 5.4.4 Carbon Accounting: <i>45. Develop a consumption based emissions inventory</i> <i>46. Include embodied carbon in new construction standards for buildings</i>
	City of Montreal	Climate Plan 2020-2030	2020	Climate plan exists within the broader context of Montreal 2030 10 year plan. The 'ecological transition' is 1 of 4 'key orientations. There is also an interesting scale-based approach to interventions targeting the human, neighbourhood, and metropolis scales. The plan includes 46 actions across 5 sectors. It is a very visually sleek plan, which is very graphic-design forward.	3	The plan focuses on community-based emissions. The building sector actions do not consider embodied emissions. However, there is a significant focus on circularity within the plan's 1st sector for actions: 'Mobilization of the Montreal Community' and some embodied emissions are targeted in sector 5: 'Governance'	<p>Within Sector 1: Mobilization of the Montreal Community, it is worth noting Action 5: <i>'Stimulate and consolidate the circular economy by creating networks between businesses, stores and community organizations.'</i></p> <p>Specifically, rather than planning to develop a consumption-based emissions inventory, the action proposes completing a <i>'profile of possibilities of implementing the circular economy on its territory. This profile will include analyses of material and energy flow for promising sectors islandwide. The degree of implementation of the circular economy will be measured using an evolving circularity index. This process will help identify market prospects in applied industrial ecology, namely situations where outputs (such as heat, steam or a chemical compound) and waste materials from industrial processes can be reused as inputs and raw materials in the processes of other organizations. The implementation profile of the circular economy will specify the interventions required to harness these synergies.'</i></p> <p>Rather than investing time and resources in a consumption based emission inventory (costly, high margin of error, little government leverage to impact), the focus is on circular economy, which not only addresses Scope 3 inherently, but has many co-benefits by stimulating the local economy.</p>	NA	<p>In Sector 1: Mobilization of the Montreal Community, we find Action 6: <i>'Form a multistakeholder work team to eliminate GHG emissions from construction projects... Montréal will draft a working plan that will reduce direct and indirect GHG emissions generated by construction sites. It will form a multistakeholder work team to put in place measures to lower these emissions. This team will examine avenues, such as the replacement of fossil fuels with electricity and procurement of low-carbon materials.'</i> It is interesting that the building sector of the plan considers only operational emissions, and the focus on embodied emissions is associated to construction sites.</p> <p>In Sector 5: Governance, we can find action 43: <i>'Impose a climate test on all the city's decisions to limit their impact in terms of GHG emissions and maximize those linked to adaptation to climate change.'</i> The action goes on to highlight the following steps:</p> <ul style="list-style-type: none"> - Identify which decisions are subject to a climate test - Adopt a methodology for assessing climate impacts, such as GHG emissions and adaptation - Establish an acceptable threshold that, in the case of buildings, for example, is already set at zero carbon for heating <p>Scope 3 is not called out specifically but it would be difficult to ignore in a holistic 'climate test' as described</p>

USA	Lexington, MA	Resilient Lexington - Climate Action and Resilience Plan	2023	With a focus on both mitigation and adaptation, the plan is organized into 5 'key focus areas': Buildings & Energy, Community Resilience, Natural Resources, Transportation & Mobility, Waste. It is very clear and sufficiently detailed, going from high level goals, to actions, to sub-actions and then implementation plans. Main actions are listed in a table for each focus area with corresponding sub-actions. The plan includes an 'implementation blueprint' page for a selection of actions. The action is described in detail, including steps and timeframes, as well as tools & resources, equity considerations and opportunities to overcome potential barriers. The plan estimates community-based emissions only and shows pathway to a 2050 target for Net-Zero.	2	The plan focuses on community-based emissions. Embodied Carbon is addressed in the buildings & energy focus area and there is a clear and detailed implementation plan. The waste focus area also includes an action targeting material reuse and circularity in the construction industry.	District of Squamish already has a demolition bylaw in place. It is worth reviewing action WR 2.1: <i>'Work with contractors to recycle and reuse construction and demolition materials with significant potential value.'</i> along with sub-action 2.1A: <i>'Promote, and explore avenues to regulate the recycling and reuse of construction and demolition debris.'</i> which includes a detailed implementation plan.	Also under the Waste Reduction Action WR 2.1, the plan includes sub-action 2.1B: <i>'Compile a list of current facilities and resources in the region to find existing opportunities for reuse of salvaged building materials.'</i>	The Building & Energy focus area includes action BE 1.1.B: <i>'Engage developers to increase the share of low embodied carbon construction materials demonstrated by Environmental Product Declarations compiled in building design specifications.'</i> The implementation blueprint expands on the description: <i>'Create the conditions for Lexington to begin incorporating embodied carbon in building and construction materials into considerations for new construction of municipal buildings and community-wide, with the aim of considering embodied carbon in building performance standards.'</i> Though the action is not unique, it is also not that common to have it outlined in detail including specific steps for implementation.
	Cambridge, MA	Cambridge Net Zero Action Plan	2021 Update	The plan is organized 4 action areas: Energy Efficiency in Existing Buildings, Net Zero New Construction, Low Carbon Energy Supply, Financing and Capacity Building. It is quite text-heavy, with quite targeted actions. Legibility is not the best.	2	The plan does address embodied carbon in the new construction area. It does present a detailed roadmap to that end with actions ranging from the short term (1-2 years) to the Long term (5+ years). Scope 3 emissions are not considered anywhere else in the plan and this is explicitly stated.	NA	As a starting point towards introducing embodied carbon performance requirements, the plan proposes the following short term actions: 1. Adopt embodied carbon narrative for new construction <i>All new construction projects should be required to provide an embodied carbon narrative and adaptive reuse study for existing buildings for a limited set of the most impactful building materials for which emissions data is readily available. This is intended to inform the architectural and engineering community as well as developers of the embodied carbon issue and ensure that they consider adaptive reuse in their projects.</i> 3. Design and develop policy to prioritize re-use <i>Because re-use of existing structures in new construction projects is a key strategy for reducing embodied carbon, a policy that requires developers to prioritize the re-use of existing structures in their developments should be developed. These stepping stones are a good way to spread awareness, build capacity, and ensure good decisions are made at the pre-design phase without necessarily setting hard targets</i>	The plan looks to adopt a 50% embodied carbon reduction requirement through building LCA's in the long term (5+ years)
	San Francisco, CA	San Francisco's Climate Action Framework	2021	The plan is very exhaustive and detailed. It is organized into 6 sectors: Responsible production & Consumption, Transportation & Land Use, Energy Supply, Building Operations, Healthy Ecosystems, Housing. Each sector has several key areas associated to it. Sector-based emissions reductions targets are 61% by 2030 and achieving net-zero by 2040 compared to 1990 levels.	3	The plan includes a consumption-based GHG Inventory and sets targets in that regard. San Francisco hopes to achieve a 40% reduction by household by 2030 compared to 1990 levels and an 80% reduction by 2050. This is ambitious, though the 1990 baseline may undermine that. Consumption-based emissions are addressed in the 'Responsible production & consumption' sector, which includes strategies targeting construction, food, circularity of goods and materials, and aviation emissions.	The plan includes a whole section dedicated at addressing Scope 3 through 'responsible production and consumption'. There does seem to be a missed opportunity to frame this more through the lens of circularity but the whole section is worth reviewing. For the buildings and infrastructure strategy, it is worth noting this long term strategy that goes beyond the typical implementation of embodied carbon performance requirements: <i>'RPC-1-7 By 2030, advance best practices for "Design for Disassembly" and "Buildings As Material Banks" by creating implementation resources in partnership with global cities, and pilot at least one municipal project to maximize the value of carbon already invested in buildings.'</i>	NA	Unrelated to the specific issue of embodied carbon, Table 7 in the plan shows co-benefits of Low Carbon Transportation. This format is interesting and could be adopted to illustrate co-benefits of strategies in such cross-cutting areas like circularity and Scope 3 in general. There is also a dedicated strategy targeting refrigerants. (See BO.4)
	Portland, OR	Climate Emergency Workplan	Jul 2022	The plan is very clear and succinct. The publication available online seems to be a summary highlighting priority actions from 2022-2025. Actions target both community emissions and consumption emissions and is organized in three main categories: Sources of Emissions, Sequestration, and Resilience. Though it is somewhat lacking in detail, given the structure and visual appeal, one might assume there is a far more detailed version not widely available. The target for the community-based inventory is net zero by 2050	3	One of the action categories under 'Sources of Emissions' is embodied carbon, which targets building materials, purchases of goods and services, and food. Embodied Carbon is also addressed in the buildings category	NA	NA	The plan appears to be ambitious and seems to target embodied emissions over most sectors, with some language alluding to circularity strategies. However, the overview is not very detailed and it is difficult to pick out any specific strategies to reference as not many are listed and they are vague. However, the 2022-2025 timeframe may be a reason for this, given that this level of detail may be more amenable to short term revisions and updates

	Eugene, OR	Climate Action Plan 2.0	2020	<p>The plan addresses both community-based emissions and consumption-based emissions. Community based emissions are split into three buckets: Transportation, Building Energy and Fugitive Emissions which together account for Eugene's emissions. Each bucket has corresponding actions with additional actions to address consumption-based emissions, resilience, and equity. The actions don't necessarily line up with the chapters of the document which can be confusing but in general, it is clear and visually appealing. Some detail lacking in actions.</p>	3	<p>The plan estimates Scope 3 emissions and sets out actions to address them. It includes a clear section with background information including graphic material. One particularly useful graph (Figure 16) shows the main sources of consumption-based emissions illustrating at what life-cycle stage most of the emissions are coming from for each.</p>	<p>Action C5: COE will investigate the increased use of substitute supplementary cementitious materials (SCMs) for Portland cement in all capital construction projects and provide a target level of use by 2021.</p> <p>Action C13: COE to investigate the legal authority to incentivize the construction of smaller residential units by levying a building permit fee to account for lifecycle carbon emissions at the state level.</p>	NA	<p>Action C15: COE will support changes to state building codes to allow for greater use of reused materials in building construction and incentives for adaptive reuse of existing buildings.</p>
	Austin, TX	Austin Climate Equity Plan	2021	<p>The plan is organized into five sections: Sustainable Buildings, Transportation and Land Use, Transportation Electrification, Food and Product Consumption, and Natural Systems. Within those sections, it sets out 17 goals to be met by 2030 and specific strategies towards each goal, for a total of 74 strategies. Equity considerations are embedded throughout the plan. The plan sets an ambitious target of reaching net zero by 2040.</p>	3	<p>Though the plan still only considers community-based emissions in its inventory, it does target consumption-based emissions quite aggressively. Within the Sustainable buildings section, it sets out the goal of reducing embodied carbon in building materials by 40% as well as reducing refrigerant leakage by 25% by 2030. It also includes a section targeting Scope 3 exclusively, targeting emissions from food consumption, purchasing, and waste management, referencing the Austin Resource Recovery Comprehensive Plan.</p>	<p>The plan includes a roadmap to begin implementing embodied carbon requirements in buildings. Though this is not especially unique, it is worth reviewing for reference. The strategies proposed targeting refrigerant leakage are also worth noting, as this is a more unique aspect of the plan. Despite the well-known high GWP of these gasses, few plans set out such a clear steps to address their impacts. The plan includes more detail but the following are the overarching strategies:</p> <ol style="list-style-type: none"> 1. Capture and destroy old refrigerants 2. Improve building codes to encourage cleaner refrigerants 3. Create incentives for leak detection and repair 4. Awareness and training for HVAC service providers 5. Reduce the volume of refrigerants <p>The plan also sets out 13 strategies within 3 main goals in the <i>Food and Product Consumption</i> section. These all warrant review but the following are worth highlighting:</p> <p>Goal 1 Strategy 4: Conduct a food waste root cause analysis...to increase food waste reduction practices by 50%</p> <p>Goal 2 Strategy 4: Expand the City's Circular Economy Program to (see plan for further details): Support City departments in reducing consumption. Use available City-owned space and/or leverage partnerships to create rent-subsidized incubation spaces, grants, loans, and technical assistance for qualifying circular organizations. Engage Austin youth in real-life problem-solving opportunities .</p> <p>Goal 3 Strategy 2: Create "Eco-hubs" that provide equitably distributed in-person neighborhood centers for borrowing, reuse, and repair services.</p>	<p>Within the Food and Product Consumption Section, Goal 3 is the one which perhaps most aligns with current work being done in Squamish around circularity:</p> <p>Goal 3: Aggressively pursue waste reduction, organics composting, and recycling to achieve the waste reduction goals in the 2023 Austin Resource Recovery Comprehensive Plan.</p> <p>District of Squamish already has work underway in that regard through the Circular Economy Roadmap, much of which is not necessarily reflected in the current version of the CCAP. Austin's action plan sets out the following strategy which could serve as a reference for wording for an action which consolidates work already underway in Squamish, as well as establish a common platform:</p> <p>Strategy 1: Promote waste reduction and reuse Implement consumer awareness campaigns, such as community reuse challenges, promotion and expansion of Fix-It clinics and the Austin Reuse Directory, and educational campaigns that promote the community benefits of reuse and repair. Encourage campaigns that promote the waste management hierarchy, which places recycling as a last resort before disposal.</p>	<p>The plan applies an equity lens throughout it's goals and strategies, which comes through particularly in strategies which focus on capacity building. Within the Food Production and Consumption section:</p> <p>Goal 3 Strategy 3: Create a workforce development program for the circular economy Offer a workforce development program that includes training for repair and reuse skills, job placement, and entrepreneurship in local circular businesses, such as those found in the Austin Circular Economy Storymap. Prioritize the needs and strengths of low-income communities, youth, and communities of color.</p> <p>How we'll get there:</p> <ul style="list-style-type: none"> - Coordinate training opportunities with revamped bulk pick-up programming and promote skills that preserve cultural traditions and craftsmanship. - Collect and publish demographic data on program participants to ensure equitable accessibility and use.
Europe	City of Vienna	Smart Climate City Strategy Vienna	2022	<p>Vienna has developed a very detailed plan guided by a 3 prong approach:</p> <ul style="list-style-type: none"> • high quality of life for everyone in Vienna • through social and technical innovation in all areas • while maximising conservation of resources. <p>The plan is organized by 11 'thematic areas', with many goals and strategies specific to each, but always communicated holistically, recognizing many cross-cutting issues and synergies. Of the plans reviewed, this is perhaps the most well communicated, forward-thinking and ambitious.</p>	3	<p>The plan addresses both community-based emissions and consumption-based emissions. For community-based emissions, it sets out the target to achieve net-zero by 2040, and a 50% reduction in consumption-based emissions by 2050. Scope 3 emissions are targeted mainly in the 'thematic areas' of Buildings, Economy & Employment, and Zero Waste & Circular Economy. Nevertheless, the plan is laid out with a holistic lens and synergies and cross-cutting issues are identified throughout all thematic areas.</p>	<p>The whole plan is very innovative, highlighted by the particular focus on resource management through material flows analysis, circularity, digitalisation as a tool, and science and research. Some specific strategies which might be most relevant to Squamish are:</p> <p>In the Buildings section:</p> <ul style="list-style-type: none"> - Establishment of supraregional building materials exchanges to facilitate reuse of materials. - Capacity-building for education and training programmes in circular planning and construction (trades/apprenticeships, technical colleges, higher education). <p>In the Economy & Employment section:</p> <ul style="list-style-type: none"> - Targeted promotion of the share & repair economy (cf. Vienna Repair Network, Vienna Repair Voucher initiative) along with development of innovative, sustainable solutions. - Establishment of new "living labs" with access to data and infrastructure for piloting of innovative products and services. - Promoting an economically, environmentally and socially sustainable and diverse tourist industry that creates added value both on and off the beaten track for visitors and locals alike and is aligned with the needs of local people. <p>In the Zero waste and circular economy section:</p> <ul style="list-style-type: none"> - Inventorisation, mapping, recovery and recycling of reusable materials in existing buildings ("urban mining"). - Processing of residual waste to separate out reusable components for recycling (especially plastics). - Reduction of food waste along the entire value chain through awareness-raising activities and joint measures with the business community. 	<p>In the Buildings section, the plan proposes a strategy which transforms their advisory service for social housing into a central advisory service for all issues related to building retrofits. This could be an extremely impactful capacity-building tool which could be developed at a relatively low-cost:</p> <ul style="list-style-type: none"> - Creation of a "one-stop shop" for all issues relating to building refurbishment and energy efficiency by upgrading the "Hauskunit" advisory service into a central information, advice and service centre. <p>Vienna also recognises the roofs and facades of buildings as important resources that can be used for PV systems and, in the case of roofs, as recreational spaces. Greening measures mitigate urban warming and help conserve biodiversity, while renewables are used to power active cooling systems. In the coming years, further buildings will therefore be greened where possible.' Many of the strategies to implement this vision are not particularly simple or inexpensive but the first step has more potential to be developed with existing municipal planning processes:</p> <p>Systematic survey to identify suitable surfaces on existing buildings and in new-build projects.</p>	<p>Perhaps the most interesting and forward-thinking aspect of the plan is its focus on 'digitalisation', which is one of the 'thematic areas':</p> <p>'Vienna sees digitalisation as an effective tool to drive innovation and achieve the city's net zero target while simultaneously maintaining its superlative quality of life.'</p> <p>The application of this digitalisation is leveraged in support of all other thematic areas, ranging from creating digital services and processes to streamline and minimize administrative workloads, to:</p> <ul style="list-style-type: none"> - Development of a digital twin, i.e. a complete digital replica of the city, incorporating data from a wide range of sources (particularly e.g. real-time IoT data or images of the urban space).' <p>In the context of Squamish, and focusing on targeting Scope 3, it is worth highlighting actions which build networks and facilitate community engagement:</p> <ul style="list-style-type: none"> - Digital public participation channels for all – from participatory development of strategies to involvement in the design of specific projects (e.g. traffic calming, greening, etc.) at neighbourhood level. Accessible, user-friendly design enables all social groups to participate.' - Building networks in Vienna's digital community through initiatives such as DigitalCity.Wien.'

City of Helsinki	Carbon Neutral Helsinki Action Plan	2018	<p>The plan is organized into the following sections: traffic, construction and use of buildings, consumption, procurements, sharing economy and circular economy, Smart & Clean growth, Helen's development programme, carbon sinks and compensation for emissions, communications and engagement, coordination, monitoring and assessment of climate work. Several actions are laid out under each section and each action details the parties responsible, the estimated time-span, complexity, and estimated cost. It is a very clear plan with specific key actions towards its ambitious goal of carbon neutrality by 2035.</p>	3	<p>Though Scope 3 emissions are not considered in the City's goal of carbon neutrality, the plan acknowledges and estimates indirect emissions and sets out many actions to address them. There are several actions in the <i>Buildings</i> section to that end, and a whole section of the plan is dedicated to <i>Consumption, procurements, sharing economy, and circular economy</i>. Considering that this plan was published in 2018, and comparing it to many current organizational plans, it can be considered very ambitious.</p>	<p>The plan lays out several interesting actions related to sharing economy and circular economy. The following are a couple worth highlighting: 115. <i>The City will set an example by creating a digital platform and using it to share the City facilities and equipment with the staff, residents, entrepreneurs, adult education institutes, sports clubs and other actors.</i> Considering the existing work underway, as well as the generalized second-hand market which already exists through sites like craigslist and facebook, a centralized sharing/circularity platform for Squamish would likely be well received by the community and greatly impactful. Also interesting to note, is the initiative to expand the scope of work of libraries. Object lending may not be very different administratively and could be a logical expansion of services given sufficient space is procured: 116. <i>Libraries will advance sharing economy in a significant manner. Libraries will offer facilities and resources to be used jointly by the residents, as well as guidance for the use of digital solutions and devices, and also offer access to technological innovations that will be a part of everyday skills in the future. Libraries will prevent digital marginalisation and enable residents to be engaged and share their skills. The expansion of the libraries' lending services will continue the cooperation with peer to peer services, such as Kuinoma.</i></p>	<p>Actions towards a sharing economy can begin within the city's own organizational structure: 117. <i>Rarely used objects and equipment will be inventoried, and a platform will be created for sharing them within the City organisation. The recycling of furniture and other movable property within the City will be made more efficient, for example by creating instructions that promote circular economy in the relocation of and changes to official facilities .</i></p>	<p>The Helsinki plan understands that the transition towards circularity is rooted in capacity building and assigns several actions to target education. It is also important to recognize that the members of the community themselves are a resource to that end. Some particularly interesting actions which may be most relevant are: 93. <i>The City will organise courses and education on the mitigation of and adaptation to climate change, as well as circular economy and sharing economy for its employees, representatives and residents.</i> 94. <i>Urban agriculture will be promoted by using crowdsourcing to survey spaces suitable to be used by the residents. The criteria for spaces suitable for urban agriculture and the rules for the use of these spaces will be defined.</i></p>
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* Note on Scope 3 ambition grades:

1 = Plan only targets community emissions and has no particular focus or language recognizing scope 3

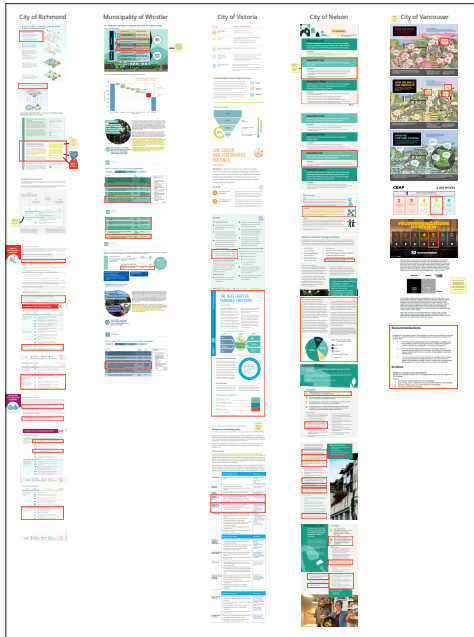
2 = Plan only includes community emissions but recognizes scope 3 and indicates some intentions to address it

3 = The plan addresses Scope 3 head-on, either by an expanded CBEI or otherwise, through concrete actions and strategies

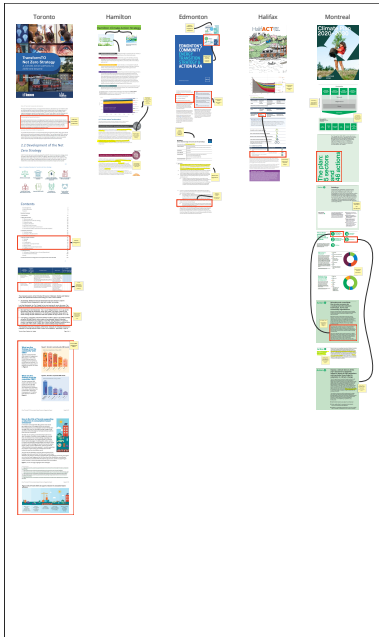
Appendix B - Reference Climate Action Plan Visual Review & Notes

Climate Action Plans

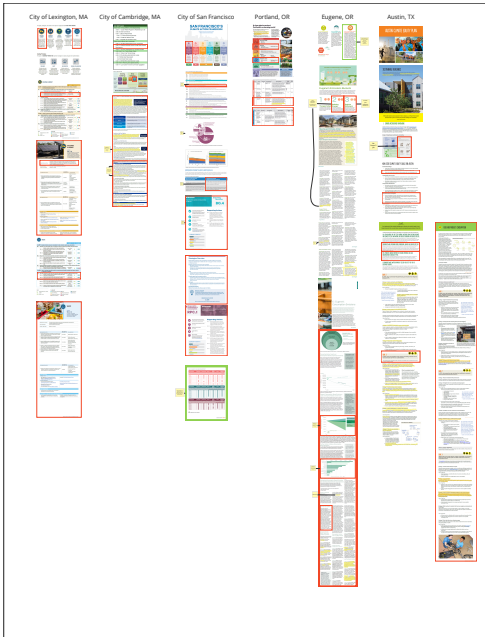
British Columbia



Canada



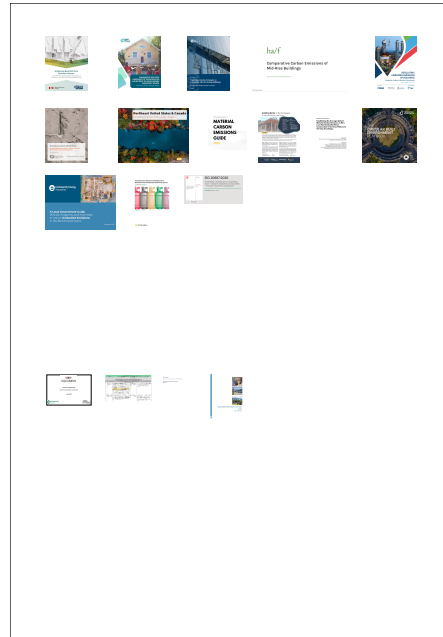
USA



Europe



Relevant Publications



Appendix C - DoS CCAP Update Recommendations

Big Move 1

Relevant actions currently underway per CCAP Implementation update table

Item	Current Status	Responsible Party	Timeline
CCAP Update	In Progress	City of Squamish	2024-2025
Foundation Setting (from CERIP)	Completed	City of Squamish	2023
Food Systems (from CERIP)	In Progress	City of Squamish	2024-2025
Textiles (from CERIP)	In Progress	City of Squamish	2024-2025
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LFG project	In Progress	City of Squamish	2024-2025

Squamish DOX & Squamish Rebuild project

General Strategy behind update

As mentioned, developing a consumption-based emissions inventory is likely not the best path forward for the district. Alternatively, it could be more efficient to address Scope 2 emissions in Squamish through the transition to a circular economy. Circularity reduces consumption from outside the system boundary of Squamish, which limits embodied emissions, and minimizes waste leaving Squamish, reducing end-of-life emissions. The district has already developed an exhaustive and innovative roadmap and implementation plan to that end: the Circular Economy Roadmap and Implementation Plan (CERIP). The CCAP update should draw from this work and ideally rethink Big Move #1 to be in full alignment. The plan could adopt the same thematic areas, which were developed based on DuS consumption and waste profiles. Some key actions from the CERIP are suggested here, but collaboration with the authors of that plan could inform the final CCAP drafting. In addition, some consumption from outside the system boundaries will be unavoidable. To address this, a new strategy could also be included which promotes responsible consumption and low carbon choices.



1. Transition to Circular Economy

As the transition advances, spread awareness about responsible consumption and promote low carbon choices.

- Foundation Setting (from CERIP)**
 - Establish a circular economy vision and strategy
 - Develop a circular economy action plan
 - Engage citizens and businesses
 - Support existing and emerging circular economy projects
- Food Systems (from CERIP)**
 - Reduce food waste
 - Support local food production
 - Encourage plant-based diets
 - Reduce food miles
- Textiles (from CERIP)**
 - Reduce textile waste
 - Support local textile production
 - Encourage repair and reuse
 - Reduce textile miles
- The Built Environment (from CERIP)**
 - Reduce embodied carbon
 - Support local construction
 - Encourage green buildings
 - Reduce building miles
- District Work (from CERIP)**
 - Reduce district emissions
 - Support local district projects
 - Encourage district-level circularity
 - Reduce district miles
- LFG project**
 - Reduce landfill waste
 - Support local waste management
 - Encourage recycling
 - Reduce landfill miles

Intervention points in current CCAP

Current CCAP Strategies & Actions

Big Move 1 - Close the loop on waste: divert organics, capture landfill gas, reduce waste
Reduce the community share of organics and recover value from waste.



Big Move 2 - Clean the loop on waste: divert organics, capture landfill gas, reduce waste
Reduce the community share of organics and recover value from waste.

ENGAGEMENT INSIGHTS
The engagement insights from the CCAP update and the CERIP update are summarized in a summary table below.

Item	Current Status	Responsible Party	Timeline
CCAP Update	In Progress	City of Squamish	2024-2025
Foundation Setting (from CERIP)	Completed	City of Squamish	2023
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Textiles (from CERIP)	In Progress	City of Squamish	2024-2025
The Built Environment (from CERIP)	In Progress	City of Squamish	2024-2025
District Work (from CERIP)	In Progress	City of Squamish	2024-2025
LFG project	In Progress	City of Squamish	2024-2025

Item	Current Status	Responsible Party	Timeline
CCAP Update	In Progress	City of Squamish	2024-2025
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Textiles (from CERIP)	In Progress	City of Squamish	2024-2025
The Built Environment (from CERIP)	In Progress	City of Squamish	2024-2025
District Work (from CERIP)	In Progress	City of Squamish	2024-2025
LFG project	In Progress	City of Squamish	2024-2025

Suggested new actions & strategies

Update CCAP action plans aligned with CERIP and CERIP update to address the scope 2 CCAP emissions reduction strategy.

Engaging citizens and businesses aligned with CERIP and CERIP update to address the scope 2 CCAP emissions reduction strategy.

Supporting existing and emerging circular economy projects aligned with CERIP and CERIP update to address the scope 2 CCAP emissions reduction strategy.

Strategy: Set strong foundations for the development and transition towards a circular economy

- Tier 2 Recommendation: Review and update the circular economy vision and strategy to highlight the availability, and promote the use of local materials.
- Tier 1 Recommendation: Build on existing platforms to support communication campaigns, CE education, collaboration, and support activities at the district level.
- Tier 2 Recommendation: Engage partner programs, working in partnership with other local and provincial organizations to support existing and emerging circular economy projects.
- Tier 2 Recommendation: Develop a circular economy action plan and support high performing public, non-profit, and private organizations to support existing and emerging circular economy projects.

Strategy: Foster circularity in Squamish's food systems

- Tier 2 Recommendation: Work with partners to establish a Squamish Food Hub that facilitates locally sourced and produced food, reducing food miles and supporting local food producers.
- Tier 2 Recommendation: Develop a circular economy action plan for food systems, including food waste reduction, food recovery, and food sharing.
- Tier 1 Recommendation: Engage partner programs to support existing and emerging circular economy projects in the food system.
- Tier 2 Recommendation: Develop a circular economy action plan for food systems, including food waste reduction, food recovery, and food sharing.

Strategy: Foster circularity for textiles in Squamish

- Tier 2 Recommendation: Develop a circular economy action plan for textiles, including textile waste reduction, textile recovery, and textile sharing.
- Tier 1 Recommendation: Engage partner programs to support existing and emerging circular economy projects in the textile system.
- Tier 2 Recommendation: Develop a circular economy action plan for textiles, including textile waste reduction, textile recovery, and textile sharing.

Strategy: Rework 'Manage wood waste' strategy into an expanded 'Foster circularity in the building sector' strategy

- Tier 1 Recommendation: Develop a circular economy action plan for the building sector, including wood waste reduction, wood recovery, and wood sharing.
- Tier 1 Recommendation: Engage partner programs to support existing and emerging circular economy projects in the building sector.
- Tier 2 Recommendation: Develop a circular economy action plan for the building sector, including wood waste reduction, wood recovery, and wood sharing.

Strategy: Continue to support existing projects and develop new district projects and policy aligned with circularity. Expand collaboration regionally.

- Tier 2 Recommendation: Work with partners to continue existing circular economy projects and develop new district projects.
- Tier 1 Recommendation: Engage partner programs to support existing and emerging circular economy projects in the district.
- Tier 1 Recommendation: Support partner programs to support existing and emerging circular economy projects in the district.

Strategy: Spread awareness about responsible consumption and promote low carbon choices for non-circular purchases

- Tier 1 Recommendation: Support partner programs to support existing and emerging circular economy projects in the district.
- Tier 2 Recommendation: Develop a circular economy action plan for responsible consumption, including low carbon choices for non-circular purchases.

Supporting resources

Circular Economy Roadmap and Implementation Plan

Item	Current Status	Responsible Party	Timeline
CCAP Update	In Progress	City of Squamish	2024-2025
Foundation Setting (from CERIP)	Completed	City of Squamish	2023
Food Systems (from CERIP)	In Progress	City of Squamish	2024-2025
Textiles (from CERIP)	In Progress	City of Squamish	2024-2025
The Built Environment (from CERIP)	In Progress	City of Squamish	2024-2025
District Work (from CERIP)	In Progress	City of Squamish	2024-2025
LFG project	In Progress	City of Squamish	2024-2025

Item	Current Status	Responsible Party	Timeline
CCAP Update	In Progress	City of Squamish	2024-2025
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Textiles (from CERIP)	In Progress	City of Squamish	2024-2025
The Built Environment (from CERIP)	In Progress	City of Squamish	2024-2025
District Work (from CERIP)	In Progress	City of Squamish	2024-2025
LFG project	In Progress	City of Squamish	2024-2025

Item	Current Status	Responsible Party	Timeline
CCAP Update	In Progress	City of Squamish	2024-2025
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Food Systems (from CERIP)	In Progress	City of Squamish	2024-2025
Textiles (from CERIP)	In Progress	City of Squamish	2024-2025
The Built Environment (from CERIP)	In Progress	City of Squamish	2024-2025
District Work (from CERIP)	In Progress	City of Squamish	2024-2025
LFG project	In Progress	City of Squamish	2024-2025

Embodied Emissions Guide

Minimizing Waste.

The guide provides information on how to minimize embodied emissions in different materials and products, including wood, concrete, and steel.

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Textiles (from CERIP)	In Progress	City of Squamish	2024-2025
The Built Environment (from CERIP)	In Progress	City of Squamish	2024-2025
District Work (from CERIP)	In Progress	City of Squamish	2024-2025
LFG project	In Progress	City of Squamish	2024-2025

Item	Current Status	Responsible Party	Timeline
CCAP Update	In Progress	City of Squamish	2024-2025
Foundation Setting (from CERIP)	Completed	City of Squamish	2023
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Textiles (from CERIP)	In Progress	City of Squamish	2024-2025
The Built Environment (from CERIP)	In Progress	City of Squamish	2024-2025
District Work (from CERIP)	In Progress	City of Squamish	2024-2025
LFG project	In Progress	City of Squamish	2024-2025

Item	Current Status	Responsible Party	Timeline
CCAP Update	In Progress	City of Squamish	2024-2025
Foundation Setting (from CERIP)	Completed	City of Squamish	2023
Food Systems (from CERIP)	In Progress	City of Squamish	2024-2025
Textiles (from CERIP)	In Progress	City of Squamish	2024-2025
The Built Environment (from CERIP)	In Progress	City of Squamish	2024-2025
District Work (from CERIP)	In Progress	City of Squamish	2024-2025
LFG project	In Progress	City of Squamish	2024-2025

Relevant actions currently underway per CCAP Implementation update table

General Strategy behind update

Intervention points in current CCAP

Suggested new actions & strategies

Supporting resources

Current Implementation Status

Item #	Item Description	Current Status	Next Steps
1
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Item #	Item Description	Current Status	Next Steps
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Item #	Item Description	Current Status	Next Steps
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Item #	Item Description	Current Status	Next Steps
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Supporting operation of carbon reduction strategies. To include embedded carbon, accessibility by ensuring a sustainability checklist is implemented in all projects.

The advantage of such projects is they allow us to identify and address sustainability issues early in the project lifecycle, before they become more complex and costly to address. This approach also allows us to gain better understanding of carbon reduction data for metrics.

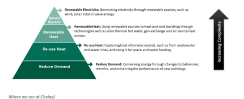
Building and understanding around embedded carbon implications of assets.

Current CCAP Strategies & Actions

Big Move 4: Decarbonisation Building, Retrofit & Upgrade

Reduce Energy Intensity and emissions in the carbon energy system.

Energy efficiency is the most cost-effective way to reduce greenhouse gas emissions. It is the most immediate and accessible way to reduce emissions. Energy efficiency measures can be implemented in a wide range of buildings, from residential to commercial, and can be implemented in a wide range of ways, from simple measures like weatherstripping doors and windows to more complex measures like installing energy-efficient lighting and HVAC systems.



- Through Green Check, the National Research Council and the National Research Council's Building Energy Performance Review (BEPR) have identified several key areas for improvement in the building energy performance review process.
- Through Green Check, the National Research Council and the National Research Council's Building Energy Performance Review (BEPR) have identified several key areas for improvement in the building energy performance review process.
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ENGAGEMENT RIGHTS

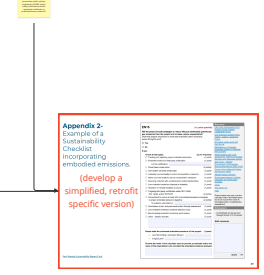
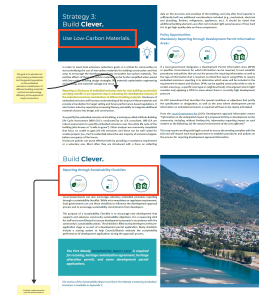
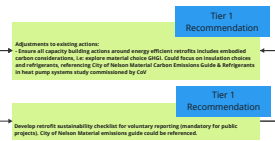
Engagement rights are the legal rights that allow citizens to participate in the decision-making process of their local government. These rights are essential for ensuring that the voices of all citizens are heard and that the government is accountable to the people it serves.

Item #	Item Description	Current Status	Next Steps
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Item #	Item Description	Current Status	Next Steps
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Item #	Item Description	Current Status	Next Steps
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New Action



Relevant actions currently underway per CCAP Implementation update table

Table with 4 columns: Region, Policy Recommendation, Action, and Status. It lists various policy recommendations and their corresponding implementation actions across different regions.

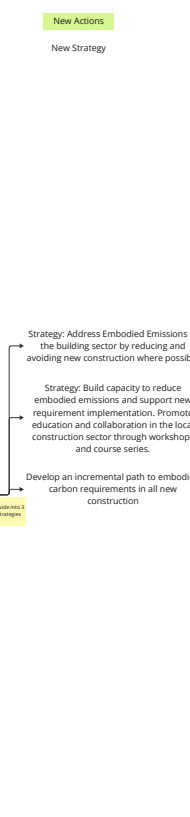
General Strategy behind update



Intervention points in current CCAP

Big Move 5 - Construct better buildings, zero and near-zero emission structures. This section includes detailed text and diagrams explaining the goals and strategies for reducing embodied carbon in buildings, such as using low-carbon concrete and steel.

Suggested new actions & strategies



Supporting resources

A collection of supporting resources including reports, guides, and toolkits. Key resources include 'House Moving and Salvage Program', 'Material Carbon Emissions Guide', 'ISO 20887:2020', and 'Appendix 2: Example of a Sustainability Checklist'. Each resource is accompanied by a small thumbnail image.

Big Move 6

Relevant actions currently underway per CCAP Implementation update table

Current Implementation Status

CCAP Strategy	Current Implementation Status	Key Actions	Timeline
Develop KPI's and a Circularity Index	Organizational actions suggested to address Scope 3 can be categorized in 3 areas:	Develop KPI's and a Circularity Index	2024-2025
Build Capacity	Organizational actions suggested to address Scope 3 can be categorized in 3 areas:	Build Capacity	2024-2025
Lead by example and use the organization as a test bed for initiatives	Organizational actions suggested to address Scope 3 can be categorized in 3 areas:	Lead by example and use the organization as a test bed for initiatives	2024-2025

General Strategy behind update

Organizational actions suggested to address Scope 3 can be categorized in 3 areas:

Develop KPI's and a Circularity Index

Build Capacity

Lead by example and use the organization as a test bed for initiatives

Intervention points in current CCAP

Current CCAP Strategies & Actions

Strategy	Key Actions	Timeline
Develop KPI's and a Circularity Index	Develop KPI's and a Circularity Index	2024-2025
Build Capacity	Build Capacity	2024-2025
Lead by example and use the organization as a test bed for initiatives	Lead by example and use the organization as a test bed for initiatives	2024-2025

New Strategy

Suggested new actions & strategies

Suggested CCAP updates

New Actions

New Strategy

- Tier 1 Recommendation**: Perform an undertake research to identify opportunities for high impact circular implementations, including but not limited to a materials flow analysis.
- Tier 1 Recommendation**: Develop a circular impact report, and "Target POC" to providing a public benchmarking interface to demonstrate circular impact and progress.
- Tier 2 Recommendation**: Enhance digitalization as a tool for achieving climate goals, especially as it pertains to circularity. Explore opportunities to leverage technology for the implementation of materials and goods, and promoting the local economy, sharing, and second-hand economy.
- Tier 2 Recommendation**: Develop a Buy Green policy. The policy will outline the criteria and process for selecting and purchasing green products. The policy will also outline the criteria and process for selecting and purchasing green products. The policy will also outline the criteria and process for selecting and purchasing green products.
- Tier 1 Recommendation**: Engage and seek otherwise shared on climate property for sale, and reduce volatility for the local economy.
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- Tier 1 Recommendation**: Engage and seek otherwise shared on climate property for sale, and reduce volatility for the local economy.
- Tier 2 Recommendation**: Develop a new carbon neutral policy for public works.
- Tier 2 Recommendation**: Develop a new carbon neutral policy for public works.

Strategy: Address Scope 3 emissions by example, and provide a test-bed to pilot circularity initiatives within the District's own organization

Supporting resources

Supporting Circular Economy Implementation Plan

Area	Resource
Research	Research Circular Economy Implementation Plan
Guidance	Guidance on Circular Economy Implementation
Tools	Tools for Circular Economy Implementation

Leading by Example

Resource	Description
Research	Research on Leading by Example
Guidance	Guidance on Leading by Example
Tools	Tools for Leading by Example

Leading by Example

Resource	Description
Research	Research on Leading by Example
Guidance	Guidance on Leading by Example
Tools	Tools for Leading by Example