Climate Action Committee
Agenda
Tuesday, January 19, 2021 at 5:30 PM
Electronic meeting in accordance with Ministerial Order M192

PUBLIC PARTICIPATION

Register to participate electronically
If you have a webcam and microphone, you can register to participate via a Microsoft Teams Meeting with a valid email address. Once registered, an invitation to participate will be sent to your email. To register to participate electronically, email corp@sooke.ca or phone 250-642-1634. The deadline to register is 4:30 p.m. on Monday, January 18, 2021.

1. CALL TO ORDER

2. FIRST NATION RECOGNITION

Acknowledgement of the T'Sou-ke Nation territory.

3. MINISTERIAL ORDER M192

THAT the Committee is holding this meeting without members of the public in attendance under Ministerial Order M192, as Council Chambers cannot safely accommodate the unknown number of public participants wishing to attend; and

THAT Committee is committed to ensuring openness, transparency, accessibility, and accountability through the submission of written comments, and the provision of the opportunity to participate as a pre-registered participant in the electronic meeting.

4. APPROVAL OF THE AGENDA

THAT the agenda for the January 19, 2021 Climate Action Committee meeting be adopted as circulated.

5. PUBLIC QUESTION AND COMMENT PERIOD

6. WELCOME AND INTRODUCTIONS (10 minutes)

- Meeting timeline
- Introduction of members and staff

7. REPORTS

7.1. **Committee Structure** (10 minutes)

- Council Procedure Bylaw – application to committee
- Committee Structure and Function Policy
- Terms of Reference
- Code of Ethics

See Administrative Orientation Package

7.2. **Foundational Documents** (35 minutes)

- Community Energy and Emissions Plan — 1
- 2020 Climate Action Committee Workplan — 45

- Climate Adaptation and Mitigation Strategy - January 11, 2020 Report to Council — 59

  Council resolution January 11, 2021:

  1) THAT Council directs the Climate Action Committee, Community Economic Development Committee, and the Planning and Land Use Committee to:
  - Consider the information provided in the:
    - Preliminary Strategic Climate Risk Assessment for British Columbia;
    - Territorial Analysis and Survey of Local Government Priorities for Climate Action: Vancouver Island and Coastal Communities
    - Modernizing BC's Emergency Management Legislation; and
    - UBCM Special Committee on Climate Action Proposed Recommendations DRAFT Report
  - Consider the 4 pillars of the Sendai Framework in their decision-making with a particular focus on mitigation and recovery initiatives.

  2) THAT Council directs the Climate Action Committee and Community Economic Development Committee to meet jointly in May and November, 2021 to share/transfer their respective knowledge.

7.3. **Committee Priorities** (15 minutes)

- Discussion – *"What are one or two goals you'd like to see the committee achieve this term?"*

7.4. **Election of Chair & Vice Chair** (10 minutes)

- Call for nominations from the floor

7.5. **Next Meeting** (10 minutes)

- Committee to determine meeting schedule

- Possible recommendation to amend Terms of Reference

8. NEW BUSINESS

9. PARKING LOT

9.1. **Carry Forward Topics**

- Standing Agenda Item

10. ADJOURNMENT

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District of Sooke

Community Energy and Emissions Plan

October 7, 2013

BC hydro powersmart

Table of Contents

List of Acronyms

BAU	Business As Usual
CEEI	Community Energy and Emissions Inventory (inventories created by the Province for each local government)
CEEP	Community Energy and Emissions Plan
CO_2	Carbon Dioxide
DCC	Development Cost Charge
DSM	Demand Side Management (name for measures used to reduce energy consumption)
GHG	Greenhouse Gas (there are several different anthropogenic GHGs and they have different relative impacts. When tonnes of GHGs are stated in the document the standard practice of stating this in equivalent of tonnes of carbon dioxide is followed. Carbon dioxide is the most important anthropogenic GHG.)
GJ	Gigajoules (one of the standard measures of energy)
HDV	Heavy Duty Vehicles (i.e. commercial vehicles, like trucks)
ICSP	Integrated Community Sustainability Plan
kWh	kilowatt hours (standard measure of energy, typically used with electricity)
LAP	Local Area Plan
LDV	Light Duty Vehicles (i.e. the types of vehicles driven by ordinary people)
OCP	Official Community Plan
RGS	Regional Growth Strategy

Executive Summary

On October 7, 2013, a workshop was held with staff and stakeholders from the District of Sooke facilitated by BC Hydro and the Community Energy Association. The workshop group looked at the energy and emissions data for their community as a whole and decided on an action plan for the community. The following document provides an overview of the workshop outcomes, and presents a vision for energy reductions that will be brought to the community for consultation in (Spring 2014).

Community Energy and Emissions – current status and business as usual

The 2010 Sooke Official Community Plan (OCP) sets community reductions targets at 33% total emissions reduction by 2020 compared to 2006. For the purpose of the Community Energy and Emissions plan (CEEP) the workshop participants decided these goals were demonstrated to be unachievable with a population growth rate at or near 3.58% since this would equate to an 86% reduction in per-capita emissions within seven years.

For the modelling process the group decided it was prudent to use the GHG targets set in the Official Community Plan however also utilized the projected annual community population growth rate of 3.6% so that the reduction goals were practical and attainable. This translated into a target reduction of 1% annually that would result in a 24% per-capita reduction by 2016, 36% per-capita by 2020, 60% by 2030 and an 84% overall per-capita reduction in GHG emissions by 2050 at 0.6 tonnes per person.

The Community Energy and Emissions Inventory (CEEI) produced by the Province of British Columbia in 2010, calculated Sooke's total community annual energy expenditure to be approximately $26 million, and GHG emissions were approximately 41,000 tonnes. The annual energy expenditure is calculated to save $6.24 million annually by 2020 if this plan is implemented successfully.

Action Plan

An action plan developed by the workshop group by prioritizing actions from each of the following categories:

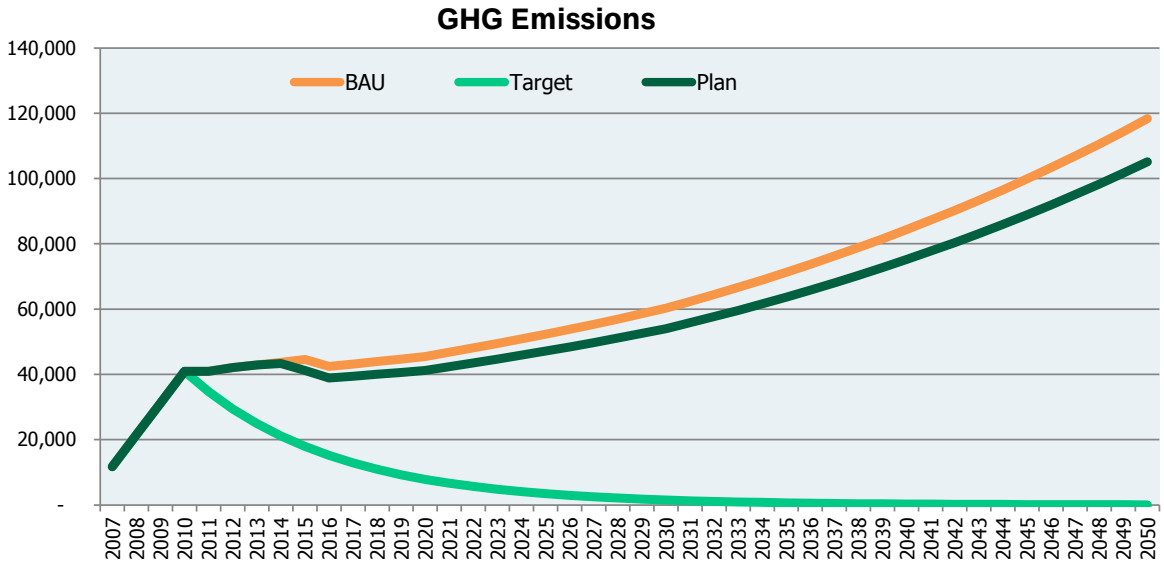
1. Building basics,
2. Building high-growth measures,
3. Residential buildings,
4. Commercial/institutional buildings and transportation,
5. Light-duty vehicle (LDV) transportation urban from,
6. LDV transportation infrastructure and collaboration,
7. Waste, and
8. Enabling actions.

The numbers of the actions listed above correspond to their numbers in the CEEP QuickStart Guide (see Appendix), which contains further detail about each. The workshop focused in-depth discussion of the following opportunities:

- 6.2 Walking infrastructure for three central schools
- 1.1, 1.2, 1.3 Promoting demand side management / home retrofits through integrated program

Results

The proposed CEEP sets a target of 1% annual reductions in GHG emissions against a 2010 base year, resulting in a 36% per capita reduction by 2020 or 0.6 tonnes per person. The estimated impact of the plan on the community greenhouse gas emissions (in tonnes of GHGs per year) is shown below.



Significant emissions reductions will be achieved. The target trajectory will be reached for 2020.

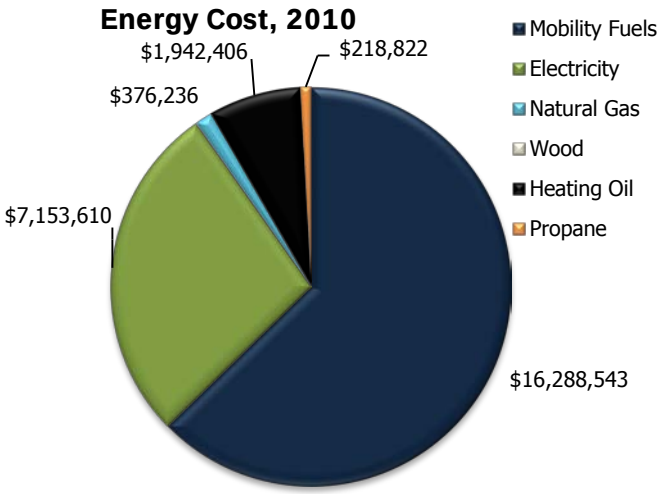
Under business as usual (BAU), electricity consumption for 2020 and 2050 are estimated at 136 gigawatt hours and 182 gigawatt hours respectively. Under the plan developed in this report, 7.3 gigawatt hours are saved by 2020, resulting in $514,000 community-wide savings (assuming a $0.07/kwh price).

The major actions identified in the workshop and outlined in this plan are in line with Council's Strategic Plan and are currently underway. They are listed below by impacts in terms of annual GHG savings in 2020:

Action		Annual GHG Savings
5.2	Land use suite "enhanced" (beyond "land use suite lite", urban containment boundaries could be established to further force where development occurs)	2,995 tonnes
7.1	Organics diversion from Harland Landfill	2,969 tonnes
5.15.1	Land use suite "lite"(designate growth areas and set minimum lot sizes outside the growth area; apply mixed-use zoning for downtown)	2,411 tonnes
6.2	Improve walking infrastructure (sidewalks connecting central schools)	2,272 tonnes
1.1, 1.2 & 1.3	Promote home retrofits and demand side management (DSM) programs to reduce energy consumption	1,533 tonnes/year

Community Energy Economics

For the District of Sooke, only a small percentage of the energy dollars spent within the community remain within the community. Therefore, a significant co-benefit of implementing this plan to reduce energy consumption and emissions is that reducing the energy dollars spent will contribute to community economic development.



It is estimated that $26 million was spent in 2010 in the District of Sooke on energy. The chart to the left indicates that mobility fuels are the primary fuel being consumed.

The overall impacts of the plan are summarized in this report, comparing 2010 and 2020. The model assumes that energy costs will increase to 2020. Community energy costs are projected to be reduced by approximately 3% through plan implementation, corresonding to **$1.5 million per year in 2020**.

Next Steps to Finalizing the Community Energy and Emissions Plan

1. Report to Council on the BC Hydro Power Smart CEEP Quickstart (QS) workshop held October 7, 2013. Include CEEP-QS workshop description and participation, DRAFT results and DRAFT report
2. Submit final Sooke Community Energy and Emissions Plan (CEEP) to Council
3. Where applicable, integrate CEEP actions, into future planning activities
4. Where applicable, include the CEEP as part of inter-departmental annual planning
5. Begin plan implementation

Introduction

Through Bill 27, the local government is required to make efforts towards reducing the greenhouse gas emissions of the community. In addition, considering the energy and emissions from the community can give opportunities for increased efficiency and local economic development for this community of close to 12,000 people. The figures in this report are based on 2007 energy and emissions information (the most recent non-draft energy and emissions inventory data currently available from the Province), and 2013 energy costing data.

Bill 27 background

Through the Local Government (Green Communities) Statutes Amendment Act, also known as Bill 27, municipalities and regional districts are required to include targets, policies, and actions towards reducing greenhouse gas emissions from their communities in their Official Community Plans and Regional Growth Strategies.

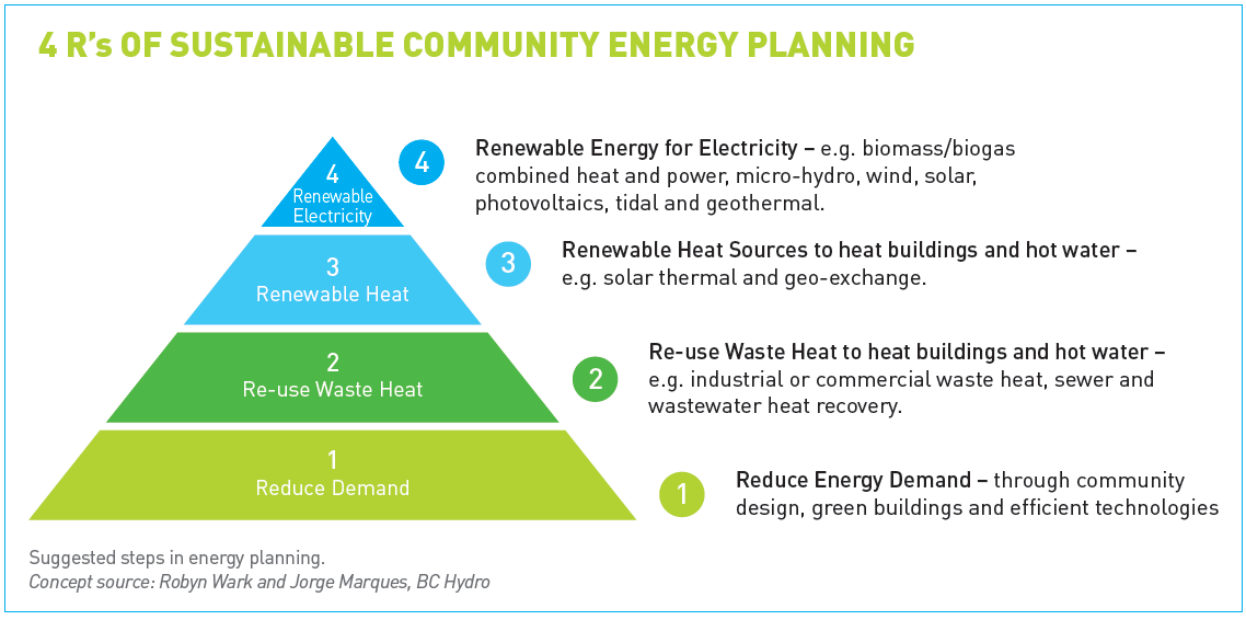
Community Energy and Emissions Planning

A community energy and emissions plan (CEEP) evaluates a community's existing energy use and greenhouse gas (GHG) emissions in order to reduce energy consumption and emissions, improve efficiency, and increase the local renewable energy supply. A CEEP encompasses land use and transportation planning, building and site planning, infrastructure (including solid and liquid waste management), and renewable energy supply. It provides guidance to a local government in planning future developments and in long-term decision making processes.

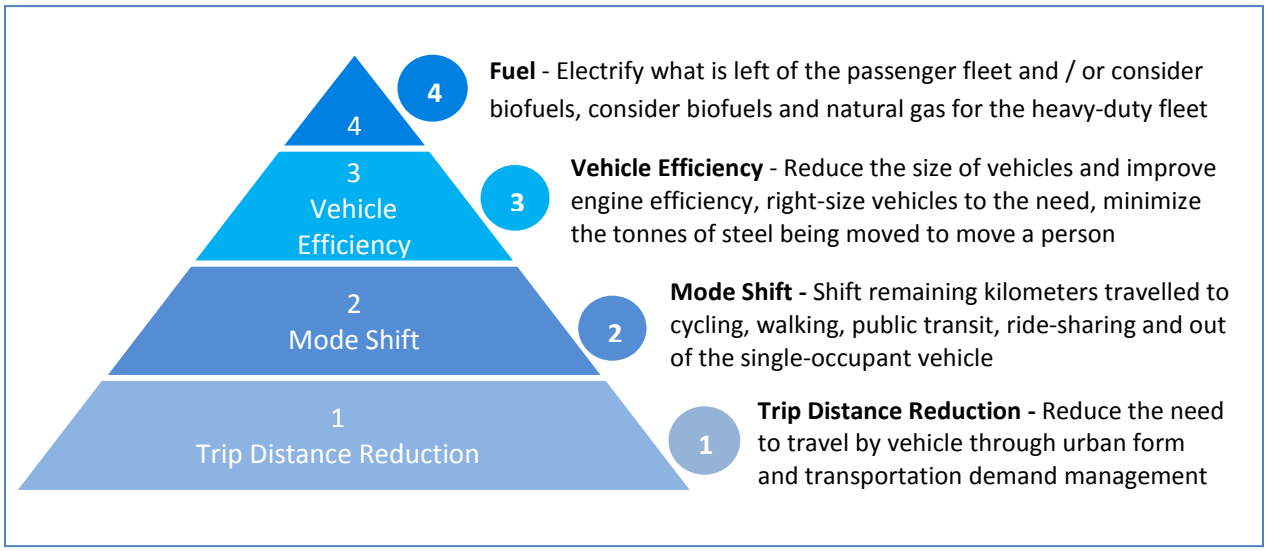
Most GHG emissions within a local government's jurisdiction result from energy consumption and the burning of fossil fuels. With this relationship it makes sense to combine greenhouse gas emissions and energy planning into one integrated plan. While some communities have completed stand-alone energy or GHG action plans, the close linkages between energy and GHG emissions suggest that a combined plan is preferable. In this guide the term community energy and emissions plan (and the acronym CEEP) is intended to incorporate both energy and GHG emissions, but not other emissions such as particulates or criteria air contaminants.

Energy Planning Hierarchy

Not all opportunities to influence energy and emissions across a community are created equally. It makes sense to reduce demand as much as possible first, since there is often significant opportunity to reduce energy and emissions.



A similar hierarchy can be applied to the transportation sector. The image below is similar to the steps towards energy planning. In the transportation sector, the easiest step to take is to reduce vehicular trip distances through appropriate urban form (planning) and transportation demand management.



CEEP QuickStart Overview

The Community Energy and Emissions Planning (CEEP) QuickStart program is designed to provide a cost-effective way for small to mid-sized local governments to rapidly develop a practical CEEP including an implementation timeline. The CEEP process is depicted in the graphic below:

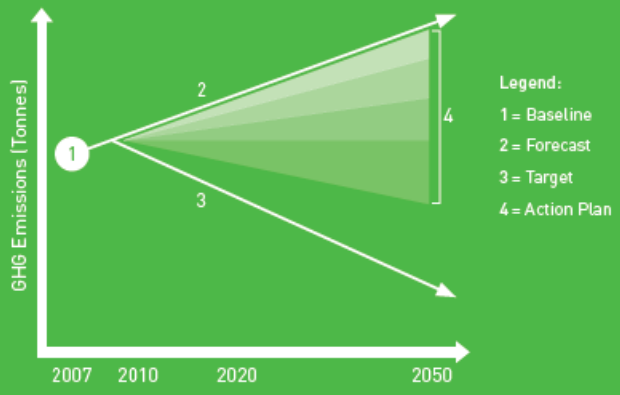
The graphic below explores the 'planning' step in the CEEP process as well as the benefits of developing a CEEP, ultimately leading to an action plan.

WHAT IS A CEEP?

A Community Energy and Emissions Plan is a comprehensive, long-term plan to improve energy efficiency, reduce GHG emissions, and foster local green energy solutions in your community.

There are 4 elements to a CEEP:

1. **Baseline:** 2007 Energy and Emissions from CEEI (Province of BC)
2. **Forecast:** Population forecast (BC Stats and local government)
3. **Target:** From Official Community Plan (legal requirement for GHG reduction target)
4. **Action Plan:** List of actions and approaches, developed by quarter, spanning several years, to estimate impacts and locally specific opportunities



BENEFITS OF DEVELOPING A CEEP:

- Reduce GHG emissions: Energy planning helps local government effectively manage GHG emissions. This contributes to mitigating climate change, and helps manage costs associated with carbon taxes and offsetting
- Reduction of energy costs: Energy planning improves budgeting and save money
- Creation of jobs and stimulation of the local economy: a CEEP can highlight opportunities for community development
- An opportunity to demonstrate leadership: Your CEEP contributes to a smart community plan, more efficient infrastructure, more livable neighbourhoods, and protection of the environment, showing leadership on multiple fronts

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Action Plan

On the 7th of October 2013, a workshop was held with staff and stakeholders from the District of Sooke facilitated by BC Hydro and the Community Energy Association. The workshop group looked at the energy and emissions data for their community as a whole and decided on an action plan for the community.

To assist with pre-workshop preparation, a short preparatory webinar was held to give participants background information on how energy planning initiatives can influence long-term carbon emissions while also providing economic opportunities.

At the workshop a brief presentation was held and a GHG reduction assessment tool was introduced. The tool has been provided to staff for use in further analysis, and is populated with data derived from calculations developed to assess the impact that various actions and strategies may have on GHG emissions into the future. The tool shows the final results in user friendly charts and graphs.

Then the workshop group was provided with a collection of actions, and each action was discussed within the group and placed in one of four categories: “yes”, “no”, “maybe”, and “already done”.

The actions were placed on a chart in order to create a plan that covered the years from 2013-2016. Each member of the workshop group was invited to look at the plan and provide input as to the timing and sequencing of the actions.

Following this, some of the key actions were “unpacked”, meaning that they were discussed in detail, with appropriate steps highlighted, likely impacts, and other considerations.

ONE GJ IS ABOUT THE SAME ENERGY AS:

- 3-4 DAYS HOUSEHOLD NATURAL GAS HEATING
- A TANK OF GAS FOR A SMALL CAR
- 10 DAYS OF HOUSEHOLD ELECTRICITY USE
- 2 BBQ PROPANE TANKS
- 3,000 HOURS OF HARD PHYSICAL LABOUR

Current Emissions and 'Business As Usual' Projections

The Province of BC has calculated the total energy use and greenhouse gas emissions from the community for 2007 through the Community Energy and Emissions Inventory (CEEI). In 2007 the people, organizations, and businesses in the community emitted approximately 41,000 tonnes of greenhouse gases through the use of electricity, natural gas, gasoline, diesel, propane, and heating oil. Community wide energy spending was approximately $26 million in 2010. Further detail on the current energy and emissions for the community can be found in the Community Energy and Emissions Inventory (CEEI), produced by the Province.

There was discussion before and during the workshop on reasonable population growth projections. The annual growth figure for population for the purpose of this plan was set at 3.6%.

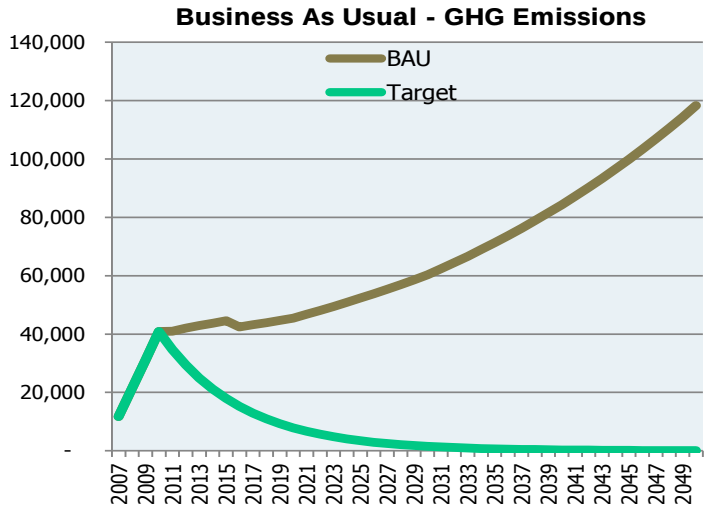
With no action plan, but taking into account the population projection and Provincial policies, community emissions are predicted to change according to the tables and charts in the rest of this section. (In the charts, the target line is set to meet the 2020 and 2050 GHG targets set out in the OCP.)

"Business As Usual" Projections & Target Overview	
Community	Sooke District Municipality
Annual % target change in ghg	-15.20%
Population growth	3.6%
Default population growth	3.58%
2007 Population	10,333
Start-year for actions	2013

Emissions Summary		
2007 Emissions		11,739
2010 Emissions		40,915
Total Energy Expenditure	$	26,105,029
Per-capita energy cost	$	2,400
2010 Per-capita emissions		**3.76**

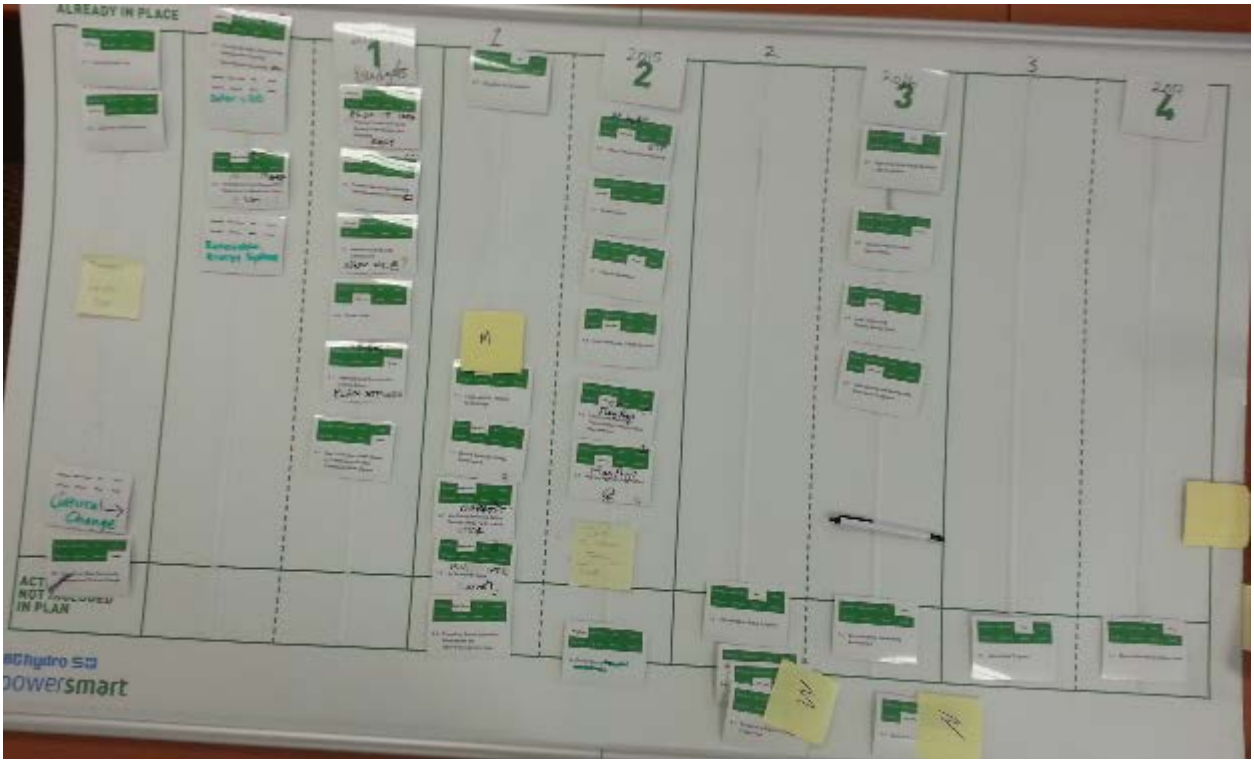
Targets Summary	2016	2020	2030	2050
Total reduction	29.6%	-33%	-87%	-100%
Per-capita reduction	-70%	-86%	-98%	-100%
Total GHG	15,214	7,868	1,513	56
Per-Capita GHG	1.1	0.5	0.1	0.0

Business as Usual (BAU) Summary	2016	2020	2030	2050
GHG's	42,463	45,472	60,276	118,318
GHG growth	262%	287%	413%	908%
Population	13,432	15,461	21,978	44,413
Pop growth	3,099	5,128	11,645	34,080
Pop Grow %	30%	50%	113%	330%
Per capita emissions	3.16	2.94	2.74	2.66



Action Plan

The action plan developed by the workshop group is shown below. Actions that were considered to be inapplicable are not included in the plan. Many actions were already being implemented by the community. The actions in the plan were categorised according to what year it was believed that they will be implemented (note that some actions have already been implemented but are ongoing).



STEP 2 - SELECT ACTIONS AND TIMING - Sooke District Municipality		Years reduction occurs i						
Actions	PLANNED?	2013	2014	2015	2016	2017	2018	Annual
1 Buildings Basics								
1.1 Promote BC Hydro DSM programs	2		1					1
1.2 Promote natural gas DSM programs	2		1					1
1.4 District energy / renewable energy systems	0							
1.5 Improve building code enforcement	1		1					
1.6SK Solar Colwood promotion	0							
2 Buildings High-Growth Measures								
2.1 Sustainability checklist for buildings	0							
2.2 Use zoning bylaws to define desired energy performance	0							
2.3 Density bonus for energy performance	0							
2.4 Expediting permit approvals, fee rebates, other financial incentives	0							
2.5 Tax exemption bylaw	0							
2.6 Development cost charge (DCC) reductions or waivers for GHG's	1		1					
3 Residential Buildings								
3.1 Sign on to solar-ready building code provision	1				1			
3.2 Education to developers - renewable energy technologies and efficiency	1		1					
4 Commercial / Institutional Buildings and Transportation								
4.1 Host climate-smart program delivery	0							
4.2 Eco-industrial networking assessment	0							
4.3 Natural gas vehicle collaboration	0							
5 LDV Transportation Urban Form								
5.1 Land use suite "lite"	1	1						
5.2 Land use suite "enhanced"	1	1						
5.3 Street design	1			1				
5.4 Flow RGS, OCP, and local area plans through to zoning	1	1						
6 LDV Transportation – Infrastructure & Collaboration								
6.1 Active transportation planning	1			1				
6.2 Improve walking infrastructure (sidewalks connecting central schools)	1			1				
6.3 Cycling & alternative transportation infrastructure improvements	1			1				
6.5 Collaborate with major employers on work-related transportation	0							
6.6 Transit suite	1		1					
6.7 Ride-sharing and guaranteed ride home programs	1				1			
6.8 Intercommunity transit services	1			1				
6.9 Low carbon and electric vehicle suite	1				1			
6.10SK Galloping goose trail improvements with CRD	1			1				
7 Waste								
7.1 Organics diversion	1			1				
8 Enabling Actions								
8.1 Organizational structure for climate action	1		1					
8.2 Establish a regional energy co-operative	0							
8.3 Identify green economy opportunities	1				1			
8.4 Leverage Local Government assets into community change	1		1					
8.5 Long-term, deep community engagement (culture change)	0							

The numbers of the actions listed above correspond to their numbers in the CEEP QuickStart Guide (see Appendix), which contains further detail about each of them. Further detail about action next steps can be found in the 'Unpacking actions' section. For further detail on BC Hydro DSM program incentives consult the BC Hydro Power Smart website, http://www.bchydro.com/powersmart.html.

Unpacking actions

The main workshop day on the 7th of October included discussion of the following opportunities:

- **6.2 – Walking Infrastructure**: Based on the existing walking / sidewalk infrastructure and the location of Sooke Elementary, Poirier, and Journey schools the team estimated kilometer and fuel savings. The three schools are centrally located in Sooke and have a combined student population approaching 1,200. A trip pattern often seen in the community is driving to school, then home and back to school to pick up at the end of the school day and come back home. This is a total of up to 4 trips per day per enrolled student or 4,800 trips in total every day. The average trip distance assumed was 2 kilometers (9,600 km per day). Assuming 200 school days per year, this results in 1.9 million kilometers per year. This may sound like a lot, but it is only 2.3% of the total 84,000,000 kilometers that passenger vehicles registered in Sooke travel every year. The team assumed that with 1-2 kilometers of sidewalk infrastructure to fill in gaps in the existing network and active promotion of walking to school, perhaps 25% may shift to walking from driving. This would result in reducing vehicle kilometers by **480,000km** (0.6% of total kilometers) per year and saving residents **$91,000** per year based on current fuel economy of vehicles in Sooke and assuming a price of $1.40 per liter for gasoline.
- **1.1, 1.2, 1.3 Promoting Demand Side Management Programs**: The discussion on this option centered on an "energy diet" approach like the one piloted in Rossland and adapted to all West Kootenays, East Kootenays, and Okanagan as well as Campbell River. This action involves partnering with utilities and LiveSmart BC to take a community-based social marketing approach to encouraging home energy efficiency retrofits. This can be done for relatively low cost if a program is designed well. Rossland achieved 20% up-take across single detached homes and over 50% implemented at least one energy improvement. Subsequently during the broader Kootenay Energy Diet which includes Rossland, a further 5% took advantage of discounted energy assessments and retrofit opportunities. Preliminary results from the Rossland Energy Diet indicate that approximately **$1.6 million** was invested locally by homeowners and businesses that implemented retrofit projects. This is in addition to the ongoing money saved by the energy efficiency improvements. Enhancing the local economy provides economic stability, job opportunities and creates a resilient community. In Sooke, there is also the opportunity to integrate Solar Colwood incentives for solar hot water. We conservatively estimated that annually, 10% (520) of the approximately 5,200 households could be reached and that 50% (**260**) would proceed through the program achieving 15% electricity savings and 30% natural gas savings. The Livesmart program is under review and the design of the program in the future will affect the potential for this program. There may also be an opportunity to collaborate with other western communities on a joint program and increase program attractiveness for potential partners. This program would require some marketing collateral developed specifically for the market here, a website, active promotion to contractors and at community events as well as other gatherings. With a regional program there may be the opportunity to count the ghg savings against the municipality's carbon neutral operations commitment.

During the full day and half day workshops, ways to proceed with the actions were discussed, and are outlined in the table on the next page.

Potential Community Engagement Opportunities

Community engagement provides an opportunity for the local government to not only present the CEEP, but to highlight some of the actions that have already been taken by the municipality to save energy and reduce emissions. This demonstrates commitment and leadership, and sets a positive example for the community. Additional suggested approaches are provided below:

- Invite local experts or relevant businesses/organizations to set-up a booth at your event to share the services or products they offer that will support GHG emission reductions and energy efficiency
- Encourage input into the CEEP through an interactive wallchart timeline of energy and emissions actions – invite participants to add their own ideas or commitments to the timeline
- Invite BC Hydro to share information about incentives or other programs that are available to encourage efficiency
- In addition, the local government may wish to engage the Chamber of Commerce, the local developers, local interest groups or specialists in applicable fields (i.e. alternative energy specialists, home energy assessment consultants, etc.), and other individuals.

	Actions	2013	2014	2015	2016	2017	2018	Annual	Effort	Comments
1 Buildings Basics										
	1.1 Promote BC Hydro DSM programs		1					1		
	1.2 Promote natural gas DSM programs		1					1		
	1.4 District energy / renewable energy systems									
	1.5 Improve building code enforcement		1							
	1.6SK Solar Colwood promotion									
2 Buildings High-Growth Measures										
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	2.3 Density bonus for energy performance									
	2.4 Expediting permit approvals, fee rebates, other financial incentives									
	2.5 Tax exemption bylaw									
	2.6 Development cost charge (DCC) reductions or waivers for GHG's		1							
3 Residential Buildings										
	3.1 Sign on to solar-ready building code provision				1					

	3.2 Education to developers - renewable energy technologies and efficiency		1							
4 Commercial / Institutional Buildings and Transportation										
	4.1 Host climate-smart program delivery									
	4.2 Eco-industrial networking assessment									
	4.3 Natural gas vehicle collaboration									
5 LDV Transportation Urban Form										
	5.1 Land use suite "lite"	1								
	5.2 Land use suite "enhanced"	1								
	5.3 Street design			1						
	5.4 Flow RGS, OCP, and local area plans through to zoning	1								
6 LDV Transportation – Infrastructure & Collaboration										
	6.1 Active transportation planning			1						
	6.2 Improve walking infrastructure (sidewalks connecting central schools)			1						
	6.3 Cycling & alternative transportation infrastructure improvements			1						
	6.5 Collaborate with major employers on work-related transportation									
	6.6 Transit suite		1							
	6.7 Ride-sharing and guaranteed ride home programs				1					
	6.8 Intercommunity transit services			1						
	6.9 Low carbon and electric vehicle suite				1					
	6.10SK Galloping goose trail improvements with CRD			1						
7 Waste										
	7.1 Organics diversion			1						
8 Enabling Actions										
	8.1 Organizational structure for climate action		1							
	8.2 Establish a regional energy co-operative									
	8.3 Identify green economy opportunities				1					
	8.4 Leverage Local Government assets into community change		1							
	8.5 Long-term, deep community									

	engagement (culture change)									

Next Steps to Finalize Community Energy and Emissions Plan

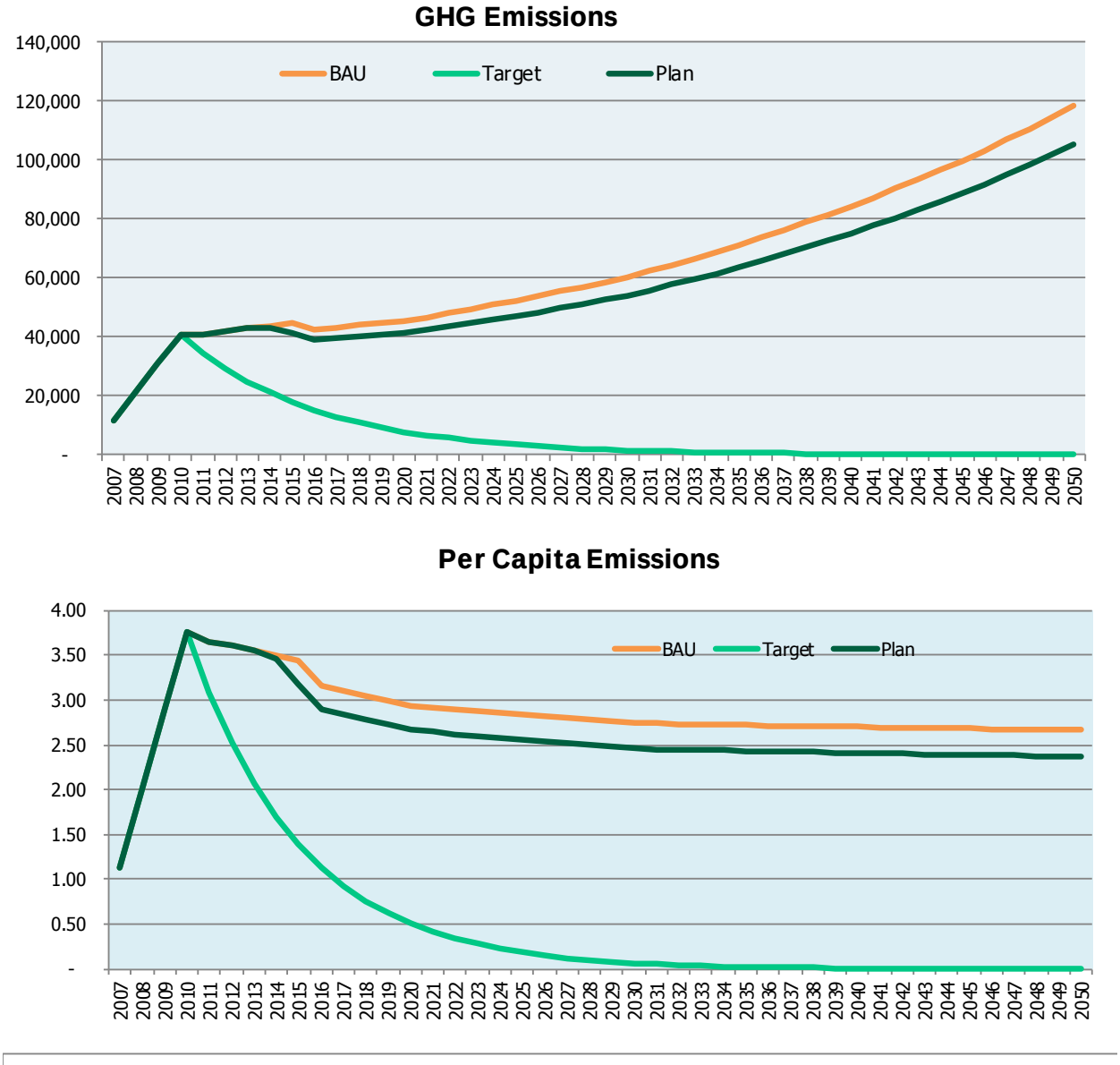
1. Report to Council on the BC Hydro Power Smart CEEP Quickstart (QS) workshop held October 7, 2013. Include CEEP-QS workshop description and participation, DRAFT results and DRAFT report
2. Submit final Sooke Community Energy and Emissions Plan (CEEP) to Council
3. Where applicable, integrate CEEP actions, into future planning activities
4. Where applicable, include the CEEP as part of inter-departmental annual planning
5. Begin plan implementation

Results of Actions

The anticipated results of the action plan, and the unpacked actions, are shown in the charts below. Significant greenhouse gas emission savings are feasible by implementing the actions.

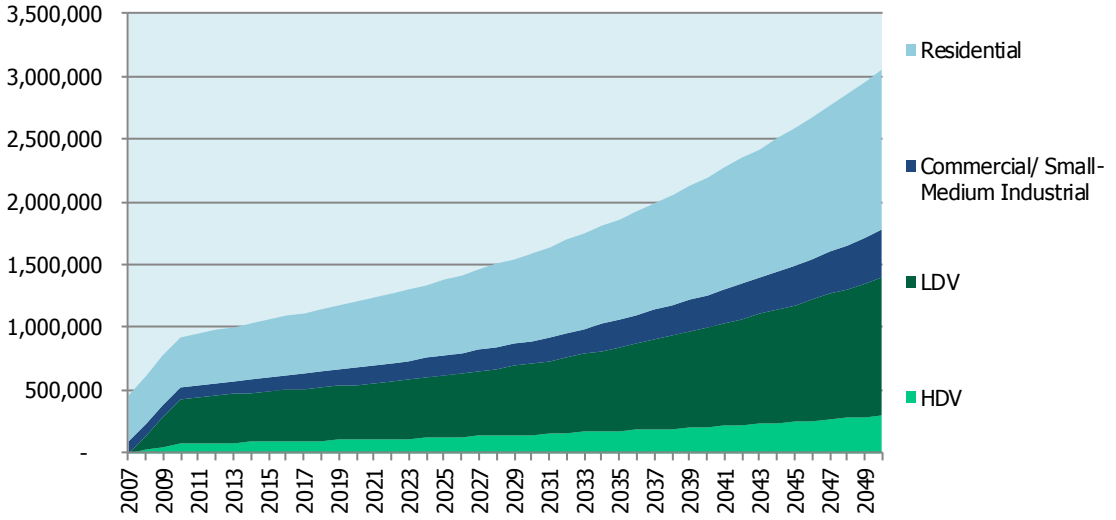
Under Business As Usual, electricity consumption for 2020 and 2050 are estimated at 136 gigawatt hours and 182 gigawatt hours respectively. Under the plan, 7.3 gigawatt hours are saved by 2020, resulting in $514,000 community-wide savings (assuming a $0.07/kwh price).

Overview

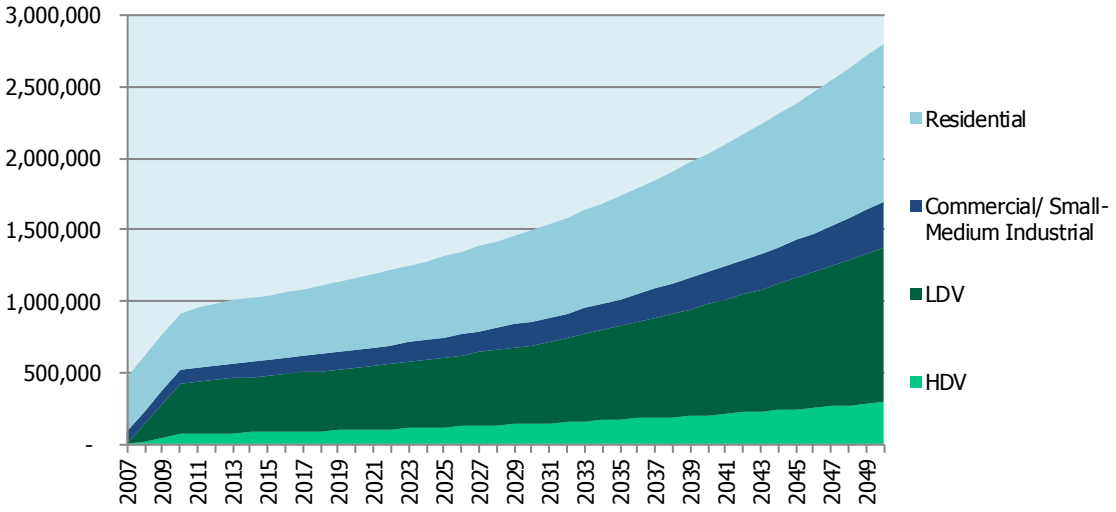


Energy Use by Sector

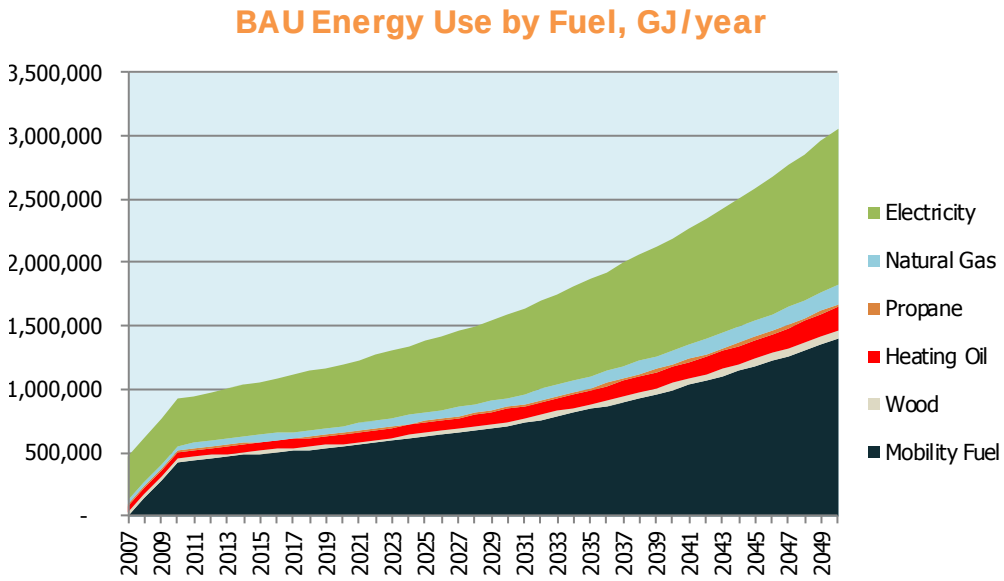
BAU Energy Use by Sector, GJ/year

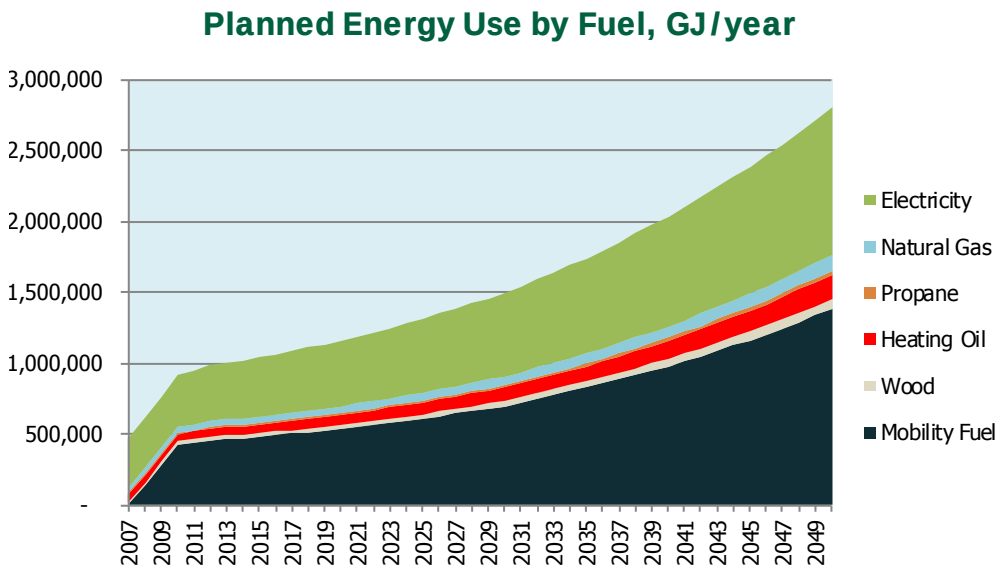


Planned Energy Use by Sector, GJ/year



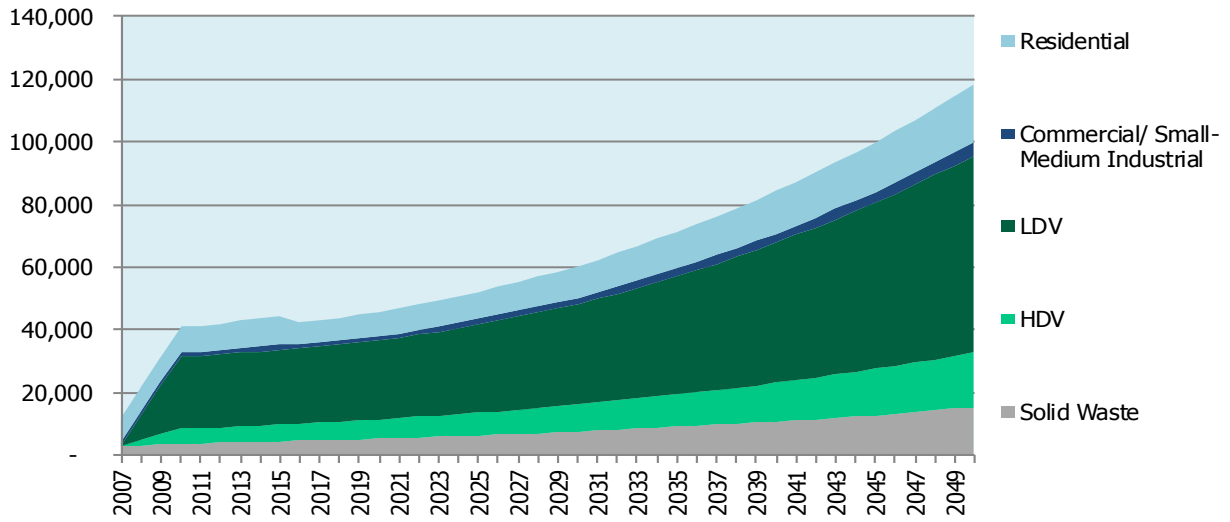
Energy Use by Fuel



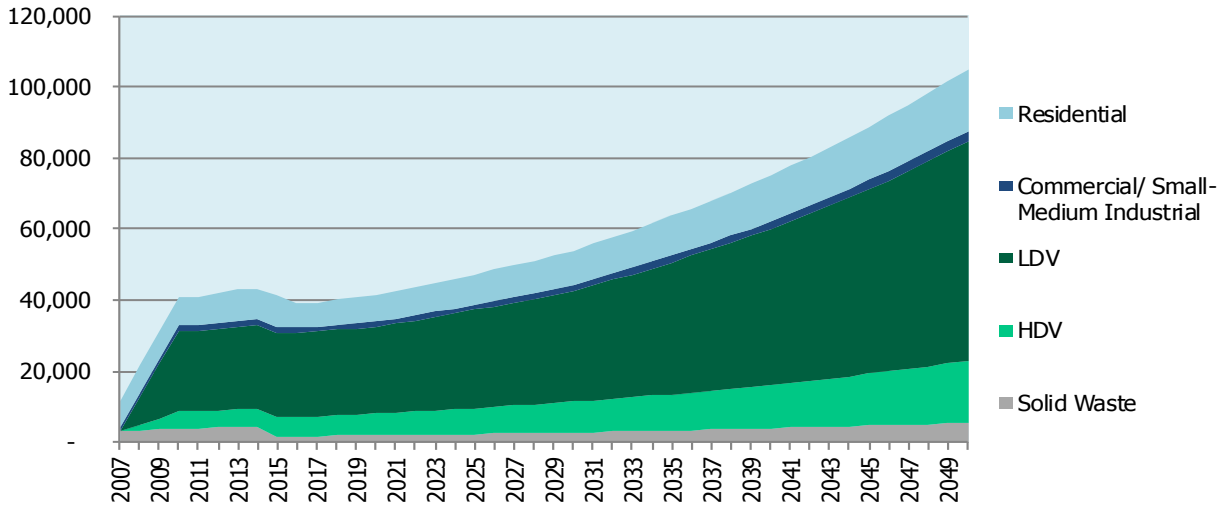


GHGs by Sector

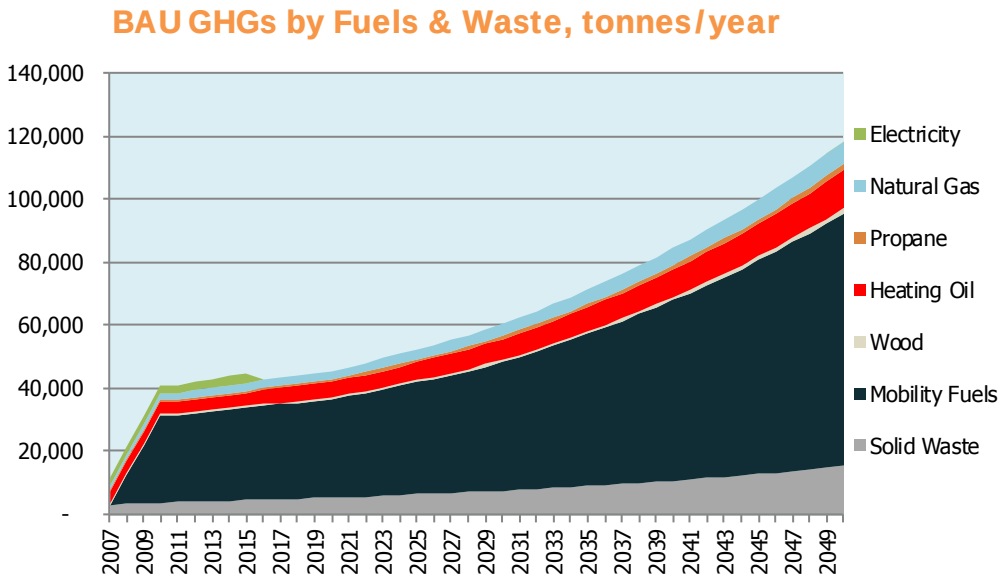
BAU GHGs by Sector, tonnes/year

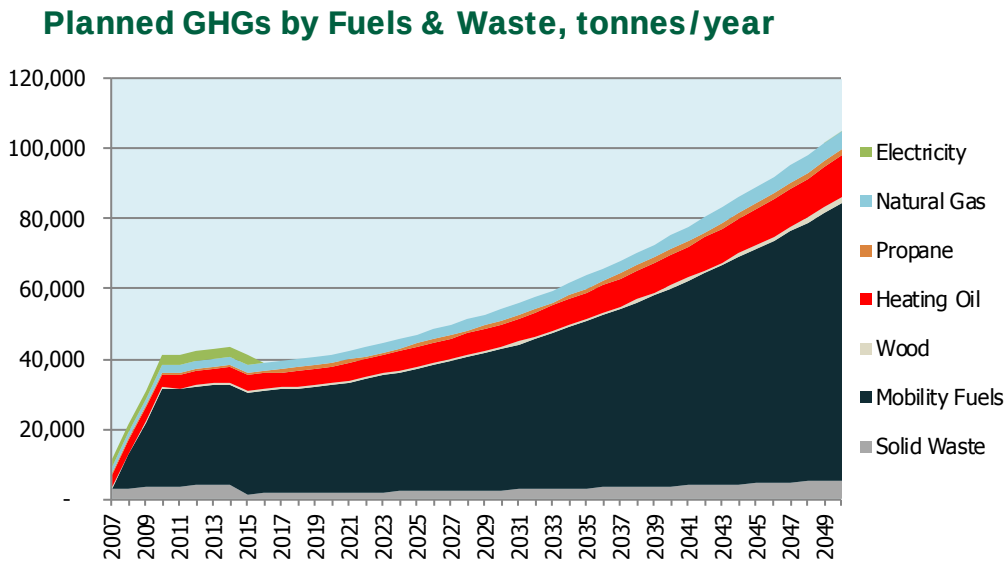


Planned GHGs by Sector, tonnes/year



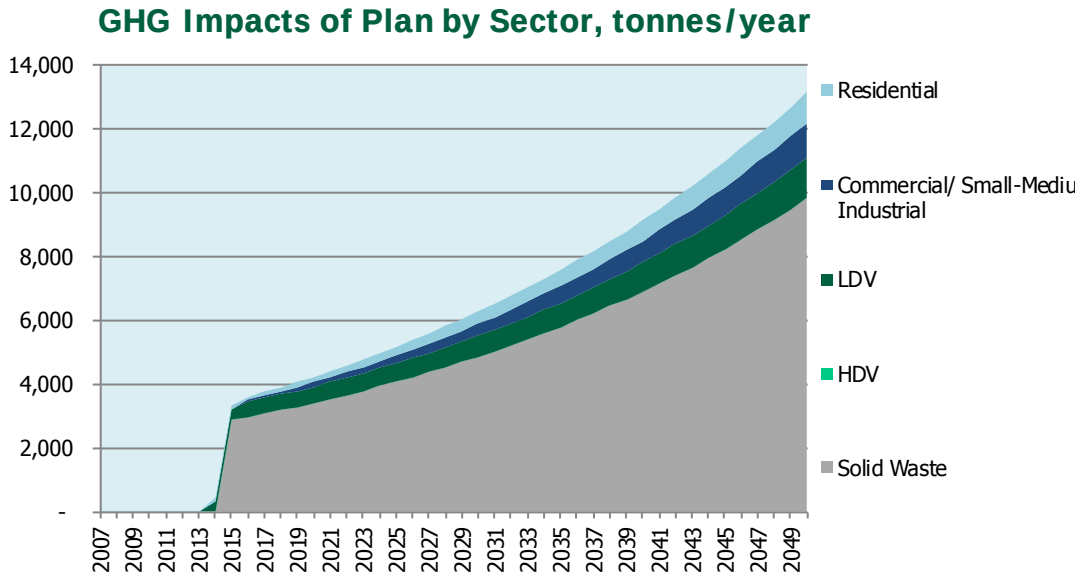
GHGs by Fuel

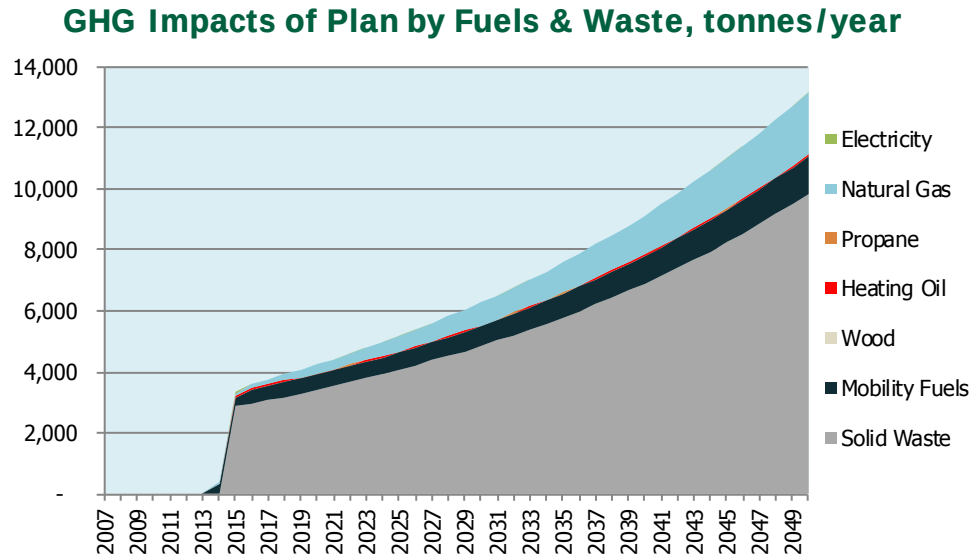


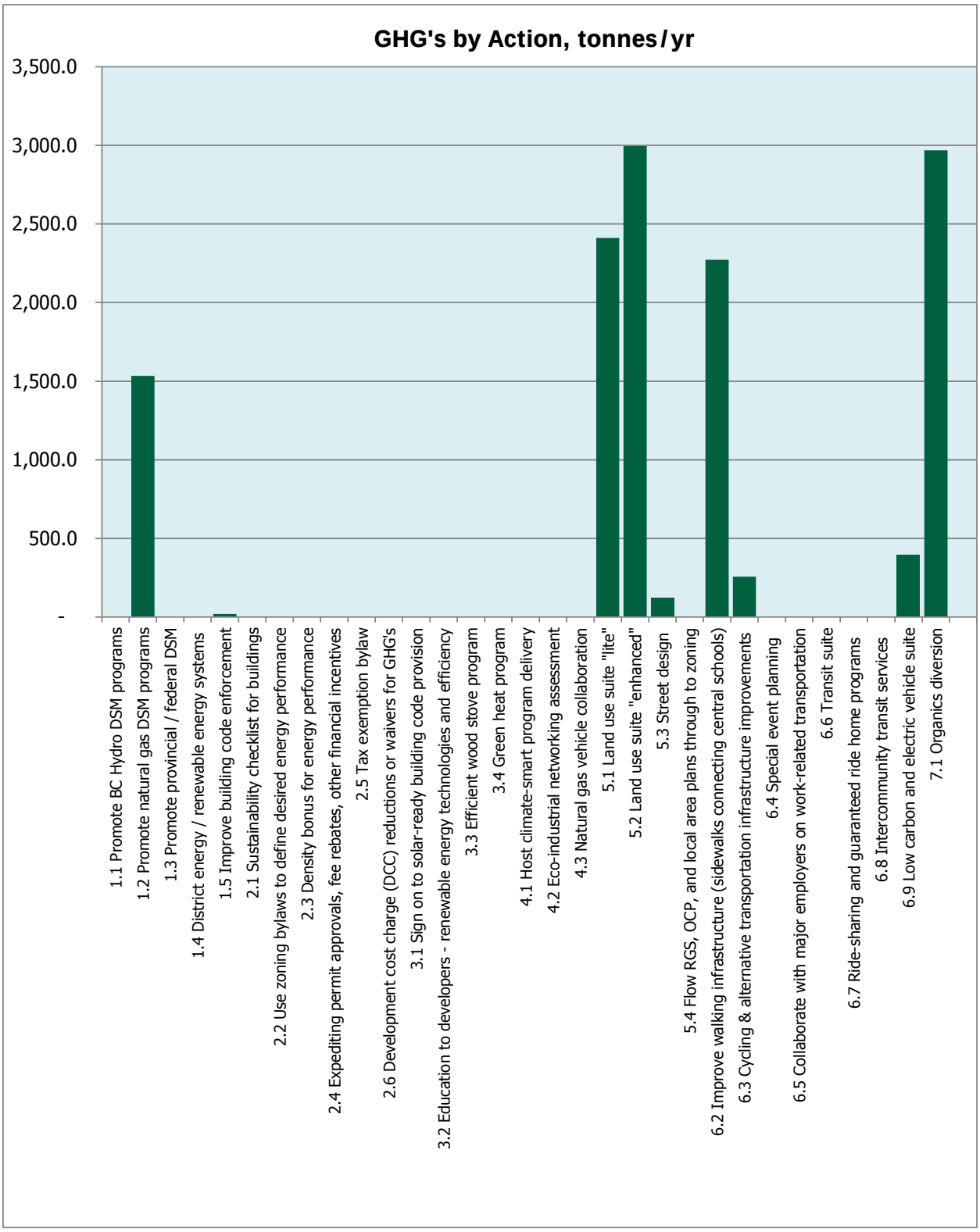


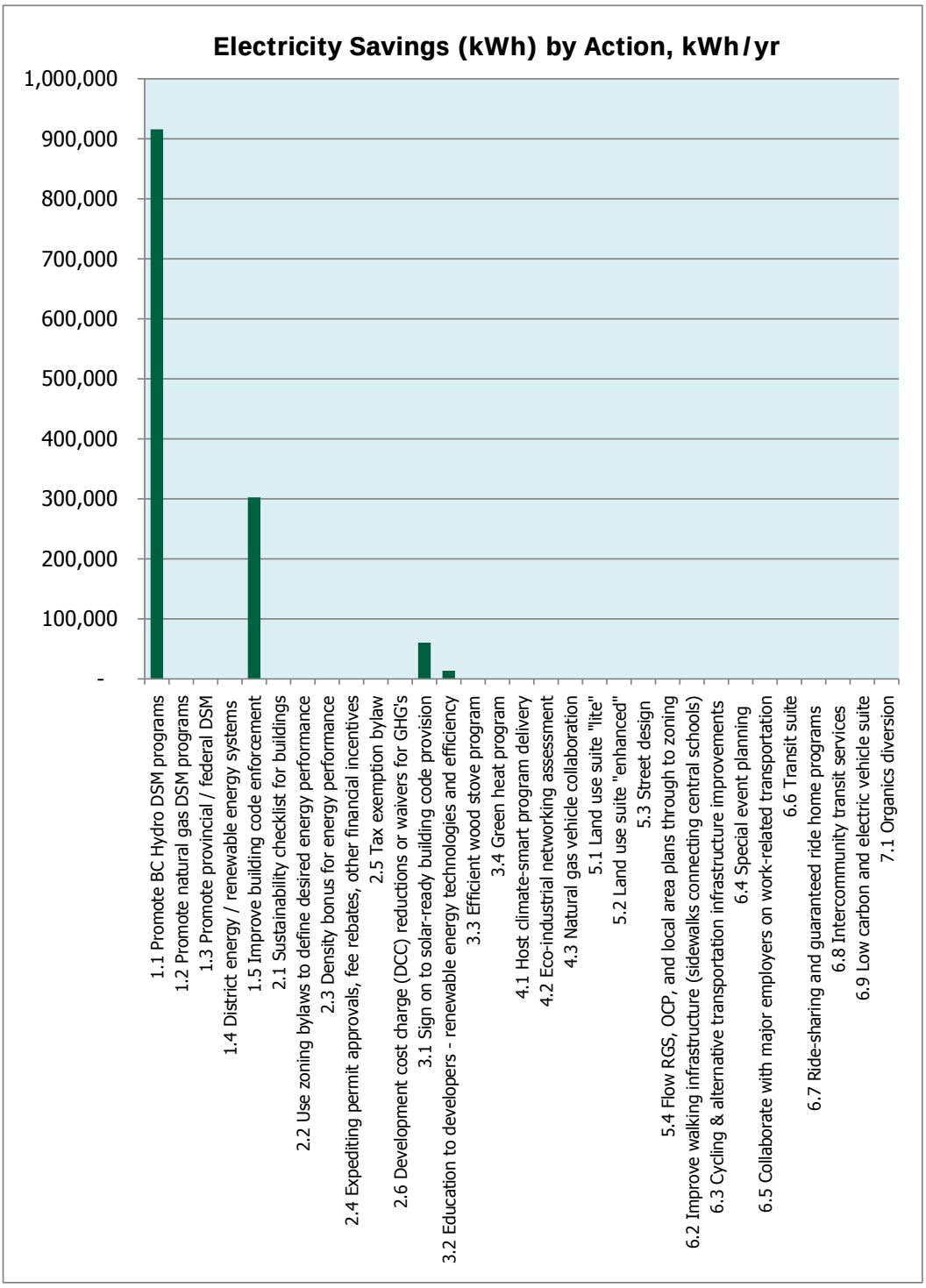
Note that the Province of BC has committed to a carbon-neutral electric grid by 2016. In the model electric emissions become zero from 2016 and remain there for the duration of the projected period.

Plan GHG impacts






GHG's by Action, tonnes/yr
3,500.0
3,000.0
2,500.0
2,000.0
1,500.0
1,000.0
500.0
-
1.1 Promote BC Hydro DSM programs
1.2 Promote natural gas DSM programs
1.3 Promote provincial / federal DSM
1.4 District energy / renewable energy systems
1.5 Improve building code enforcement
2.1 Sustainability checklist for buildings
2.2 Use zoning bylaws to define desired energy performance
2.3 Density bonus for energy performance
2.4 Expediting permit approvals, fee rebates, other financial incentives
2.5 Tax exemption bylaw
2.6 Development cost charge (DCC) reductions or waivers for GHG's
3.1 Sign on to solar-ready building code provision
3.2 Education to developers - renewable energy technologies and efficiency
3.3 Efficient wood stove program
3.4 Green heat program
4.1 Host climate-smart program delivery
4.2 Eco-industrial networking assessment
4.3 Natural gas vehicle collaboration
5.1 Land use suite "lite"
5.2 Land use suite "enhanced"
5.3 Street design
5.4 Flow RGS, OCP, and local area plans through to zoning
6.2 Improve walking infrastructure (sidewalks connecting central schools)
6.3 Cycling & alternative transportation infrastructure improvements
6.4 Special event planning
6.5 Collaborate with major employers on work-related transportation
6.6 Transit suite
6.7 Ride-sharing and guaranteed ride home programs
6.8 Intercommunity transit services
6.9 Low carbon and electric vehicle suite
7.1 Organics diversion


Electricity Savings (kWh) by Action, kWh/yr
1,000,000
900,000
800,000
700,000
600,000
500,000
400,000
300,000
200,000
100,000
-
1.1 Promote BC Hydro DSM programs
1.2 Promote natural gas DSM programs
1.3 Promote provincial / federal DSM
1.4 District energy / renewable energy systems
1.5 Improve building code enforcement
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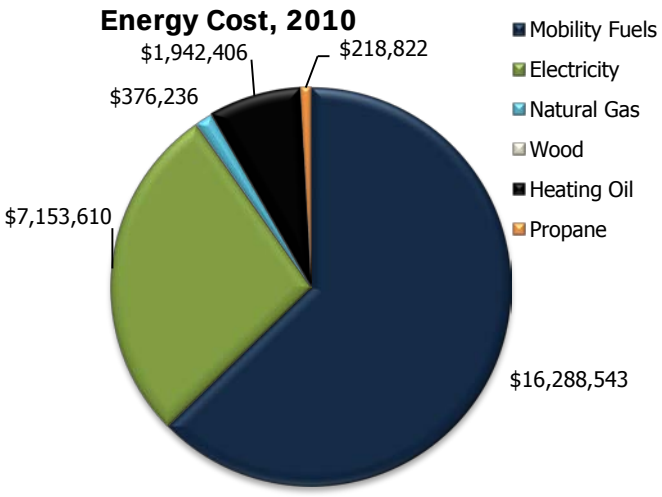
6.6 Transit suite
6.7 Ride-sharing and guaranteed ride home programs
6.8 Intercommunity transit services
6.9 Low carbon and electric vehicle suite
7.1 Organics diversion

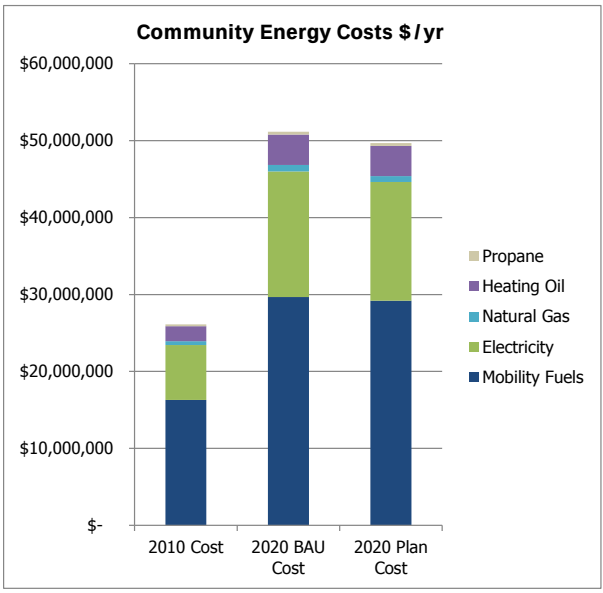
Community Energy Economics

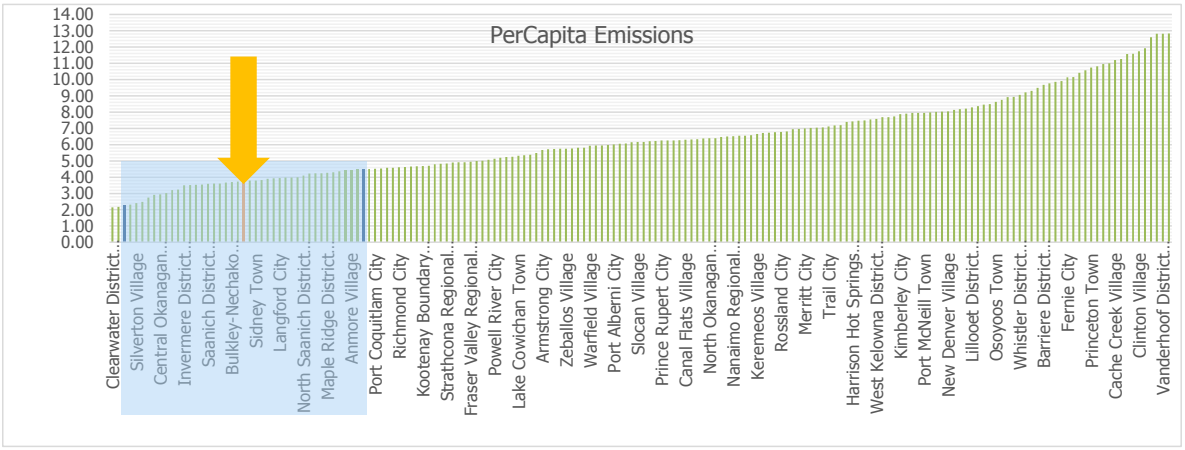
For the District of Sooke, only a small percentage of the energy dollars spent within the community remain within the community. Therefore, a significant co-benefit of implementing this plan to reduce energy consumption and emissions is that reducing the energy dollars spent will contribute to community economic development.

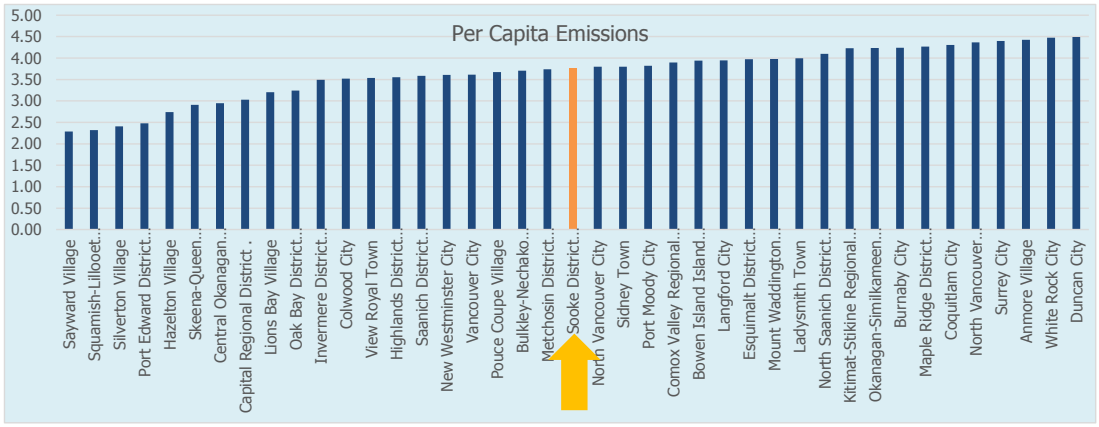


The following chart shows the $26 million of community energy expenditures made in 2010, split by fuel type.

The overall impacts of the plan are shown in the following chart, comparing 2010 and 2020. The model assumes that energy costs will increase to 2020. Community energy costs are projected to be reduced by approximately 3% through plan implementation, corresponding to **$1.5 million per year in 2020**.




PerCapita Emissions
14.00
13.00
12.00
11.00
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
Clearwater District...
Silverton Village
Central Okanagan...
Invermere District...
Saanich District...
Bulkley-Nechako...
Sidney Town
Langford City
North Saanich District...
Maple Ridge District...
Anmore Village
Port Coquitlam City
Richmond City
Kootenay Boundary...
Strathcona Regional...
Fraser Valley Regional...
Powell River City
Lake Cowichan Town
Armstrong City
Zeballos Village
Warfield Village
Port Alberni City
Slocan Village
Prince Rupert City
Canal Flats Village
North Okanagan...
Nanaimo Regional...
Keremeos Village
Rossland City
Merritt City
Trail City
Harrison Hot Springs...
West Kelowna District...
Kimberley City
Port McNeill Town
New Denver Village
Lillooet District...
Osoyoos Town
Whistler District...
Barriere District...
Fernie City
Princeton Town
Cache Creek Village
Clinton Village
Vanderhoof District...


Per Capita Emissions
5.00
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
Sayward Village
Squamish-Lillooet...
Silverton Village
Port Edward District...
Hazelton Village
Skeena-Queen...
Central Okanagan...
Capital Regional District ...
Lions Bay Village
Oak Bay District...
Invermere District...
Colwood City
View Royal Town
Highlands District...
Saanich District...
New Westminster City
Vancouver City
Pouce Coupe Village
Bulkley-Nechako...
Metchosin District...
Sooke District...
North Vancouver City
Sidney Town
Port Moody City
Comox Valley Regional...
Bowen Island Island...
Langford City
Esquimalt District...
Mount Waddington...
Ladysmith Town
North Saanich District...
Kitimat-Stikine Regional...
Okanagan-Similkameen...
Burnaby City
Maple Ridge District...
Coquitlam City
North Vancouver...
Surrey City
Anmore Village
White Rock City
Duncan City

Appendix – Actions Descriptions

The descriptions below are taken from the CEEP QuickStart Guide.

1. BUILDINGS - BASICS

These actions are recommended for all local governments unless there is a compelling reason that a particular measure should not be implemented. Energy-efficiency retrofits in buildings can yield 25%-50% savings in total energy use. Retrofits through the LiveSmart program averaged 31%.

ACTION	DESCRIPTION
1.1 PROMOTE BC HYDRO DEMAND SIDE MANAGEMENT PROGRAMS Type: Social	**Key Question:** This action is recommended unless there is a reason why it cannot be done. **Description:** BC Hydro offers many electricity conservation programs branded as PowerSmart (PS). Local governments can assist in promotion of these programs, increasing awareness and encouraging local participation in residential and commercial sectors (e.g. communicating about PowerSmart programs during building permit application processes), so residents and businesses can save electricity and money.
	% Energy Savings Calculation: Commercial = a*b*c, Residential = d*e*f a. % of commercial customers reached b. % of reached commercial that engage with PS c. average % improvement from engaging with PS d. % of residential customers reached e. % of those reached that engage with PS f. average % improvement from engaging with PS Example: (a*b*c) = (90% * 5% * 30%) = 1.4% (commercial buildings sector) (d*e*f) = (90% * 5% * 30%) = 1.4% (residential buildings sector)
1.2 PROMOTE NATURAL GAS DEMAND SIDE MANAGEMENT PROGRAMS Type: Social	**Key Question:** This action is recommended unless there is a reason why it cannot be done. **Description:** Natural gas providers offer natural gas conservation programs. Local governments can assist in promotion of these programs, increasing awareness and encouraging local participation in residential and commercial sectors (e.g. during building permit application processes), so local residents and businesses can save natural gas and money.
	% Energy Savings Calculation: Commercial = a*b*c, Residential = d*e*f a. % of commercial customers reached b. % of reached commercial that engage with programs c. average % improvement from engaging with programs d. % of residential customers reached e. % of those reached that engage with programs f. average % improvement from engaging with programs Example: (a*b*c) = (90% * 5% * 30%) = 1.4% (commercial buildings sector) (d*e*f) = (90% * 5% * 30%) = 1.4% (residential buildings sector)
1.3 PROMOTE PROVINCIAL / FEDERAL DEMAND SIDE MANAGEMENT PROGRAMS Type: Social	**Key Question:** This action is recommended unless there is a reason why it cannot be done. **Description:** Federal and Provincial governments offers many energy conservation programs. Local governments can assist in the promotion of these programs locally, increasing awareness and encouraging participation in residential and commercial sectors (e.g. including program information in regular communications and in building permit application processes), so local residents and businesses can conserve energy and save money.
	% Energy Savings Calculation: Commercial = a*b*c, Residential = d*e*f a. % of commercial customers reached b. % of reached commercial that engage with programs c. average % improvement by energy type (elec, gas, ...) from engaging with programs d. % of residential customers reached e. % of those reached that engage with programs f. average % improvement from engaging with programs energy use by type in residential Example: (a*b*c) = (90% * 5% * 30%) = 1.4% (commercial buildings sector) (d*e*f) = (90% * 5% * 30%) = 1.4% (residential buildings sector)

ACTION	DESCRIPTION
1.4 DISTRICT ENERGY / RENEWABLE ENERGY SYSTEMS **Type: Infrastructure**	**Key Question:** Is there a source of waste heat (rink, industry, sewer pipes, wastewater treatment plant, ...) near to heat demand (pool, hospital, ...) OR are several public-sector (municipality, regional district, provincial ministry, health authority, school district, ...) facilities located close to each other? **Description:** Development permit area (DPA) guidelines can be used to require renewable energy systems external to buildings, such as a renewable district energy system. DPA's can enable the maximization of passive solar opportunities. District energy (DE) example: Revelstoke Community Energy Corporation.
	Calculation: Existing Residential = a*b*c, New Residential = a*d*c, Existing Commercial = e*f*g, New Commercial = e*f*h a. % of energy used for heating & cooling for residential (77%) b. % of existing residential connected to DE c. % reduction of energy from DE for residential (66%, based on Coefficient of Performance of 3 (COP 3); i.e. energy output is 3 times energy input (3 times more efficient than electric baseboard) use 66% for electric baseboard displacement, higher for natural gas / heating oil displacement d. % of new residential connected to DE e. % of energy for heating and cooling in industrial/commercial/institutional (ICI) (63%) f. % reduction in heating / cooling from DE for ICI (66%, based on COP 3) g. % of existing ICI connected to DE h. % of new ICI connected to DE Example: Energy improvements in indicated sectors: (a*b*c) = (77% * .5% * 66%) = 0.3% (existing residential buildings sector) (a*d*c) = (77% * 5% * 66%) = 2.5% (new residential buildings sector) (e*f*g) = (63% * 66% * 1%) = 0.4% (existing commercial sector) (e*f*h) = (63% * 66% * 10%) = 4.2% (new commercial sector)
1.5 IMPROVE BUILDING CODE ENFORCEMENT **Type: Operations**	**Key Question:** Would buildings be more energy efficient with better building code enforcement and inspection? **Description:** Greening the Building Code is an ongoing provincial initiative. The current focus is on reducing buildings energy and water use, improving energy performance of new housing to the equivalent of EnerGuide 80, and including solar hot water ready homes (where practical). BC Building Code EnerGuide standard may not be reflected in some buildings due to lack of sufficient inspection and enforcement. Local governments can facilitate installation of high quality renewable energy systems by: • Ensuring that building inspectors are familiar with Council support for renewable energy, and know where to go for information about renewable energy. • Creating guidelines, and passing a resolution endorsing them, to provide clear interpretation of building code issues with respect to specific technologies. • Increasing the number and training of inspectors.
	% Energy Savings Calculation: New Residential = a*b, New Commercial = c*d a. % new residential buildings captured by improved enforcement b. % improvement in new commercial buildings by energy type through better enforcement c. % new commercial buildings captured by improved enforcement d. % improvement in new residential buildings by energy type through better enforcement Example: (a*b) = (80% * 15%) = 12% (new residential buildings) (c*d) = (80% * 5%) = 4% (new commercial buildings)

2. BUILDINGS - HIGH GROWTH MEASURES

These measures typically have the greatest applicability in communities that are growing rapidly or are land-constrained. Communities with a low/no growth rate may also find some measures useful.

ACTION	DESCRIPTION
2.1 SUSTAINABILITY CHECKLIST FOR BUILDINGS **Type:** Social	**Key Question:** Is the community expected to grow rapidly? **Description:** Developers can be required to complete a sustainability or smart growth checklist as part of development permit or rezoning application processes. The checklist might include, for example, questions about sustainable energy features incorporated into new developments. Checklist measures are not compulsory; the aim of the checklist is to highlight local government sustainability and clean energy objectives, and to educate developers about the potential for including energy efficiency measures or renewable energy technologies in new buildings.
	% Energy Savings Calculation: New Buildings = a*b*c, Existing Buildings = d*e*f a. % new buildings exposed to checklist b. % of those in (a) who improve performance c. Average % impact in new buildings by energy type d. % major renovations exposed to checklist e. % of existing buildings doing major renovations f. Average % impact by energy type for major renovations Example: (a*b*c) = (90%*20%*15%) = 2.7% new buildings (d*e*f) = (90%* 1%*15%) = 0.7% existing buildings
2.2 USE ZONING BYLAWS TO DEFINE DESIRED ENERGY PERFORMANCE **Type:** Regulatory	**Key Question:** Is the community expected to grow rapidly? **Description:** Council can adopt a rezoning policy that encourages developments that incorporate renewable energy. Any development that requires a rezoning must be approved by Council, which can consider benefits to the community as part of its decision. While the OCP lays out general expectations of the community, Council can also adopt a rezoning policy, which provides a clear statement of attributes that Council will seek in making rezoning decisions. It is important to note that a rezoning policy cannot set requirements for rezoning, because Councillors are required to approach rezoning hearings with an 'open mind.' However, if a development does not meet stated expectations of Council, it is unlikely to be recommended by staff or approved by Council. The rezoning policy must be designed carefully to be legal and effective. Example: Bowen Island Municipality.
	% Energy Savings Calculation: (a*b*c) a. % new buildings covered by policy b. % of those in (a) who improve performance c. Average % impact in new buildings by energy type Example: (a*b*c) = (30% * 90% * 30%) = 8% for new buildings
2.3 DENSITY BONUS FOR ENERGY PERFORMANCE **Type:** Financial	**Key Question:** Is the community expected to grow rapidly? **Description:** Density bonusing means that a developer may be allowed to build to a higher density than is normally permitted in the zone (in terms of floor space ratio, site coverage or buildings per parcel) in exchange for the provision of amenities. It is possible that this could be used to promote renewable energy, if GHG reduction, energy security, improved air quality and economic benefits from the use of renewable energy are considered community amenities. The BC Office of Housing and Construction Standards has produced some guidance on the use of density bonuses, and drafted a model bylaw, available at: http://www.toolkit.bc.ca/tool/density-bonusing
	% Energy Savings Calculation: (a*b*c) a. % new buildings covered by policy b. % of those in (a) that improve performance c. Average % impact in new buildings by energy type Example: (a*b*c) = (25% * 75% * 25%) = 4.7% for new buildings

ACTION	DESCRIPTION
2.4 EXPEDITING PERMIT APPROVALS, FEE REBATES, OTHER FINANCIAL INCENTIVES Type: Financial	**Key Question:** Is the community expected to grow rapidly? **Description:** Expedited approvals provide strong incentive for developers. Example: District of Saanich
	% Energy Savings Calculation: (a*b*c) a. % new buildings covered by policy b. % of those in (a) who improve performance c. Average % impact in new buildings by energy type Example: (a*b*c) = (25% * 75% * 25%) = 4.7% for new buildings
2.5 TAX EXEMPTION BYLAW Type: Financial	**Key Question:** Is the community expected to grow rapidly? **Description:** Tax exemptions provide significant financial incentive. A Revitalization Tax Exemption (RTE) program may be designed to encourage energy efficient development in a small area or throughout a jurisdiction. This tool could allow property owners to make energy improvements to their property and apply for a tax exemption. The benefit of a RTE is tied to the property. Example: District of Maple Ridge.
	% Energy Savings Calculation: (a*b*c) a. % new buildings covered by policy b. % of those in (a.) who improve performance c. Average % impact in new buildings by energy type Example: (a*b*c) = (25% * 75% * 25%) = 4.7% for new buildings
2.6 DCC REDUCTIONS OR WAIVERS, FOR GHG'S Type: Financial	**Key Question:** Is the community expected to grow rapidly? **Description:** A development cost charge (DCC) reduction or exemption provides financial incentive for developers, with costs directly borne by the local government.
	% Energy Savings Calculation: (a*b*c) a. % new buildings covered by policy b. % of those in (a) who improve performance c. Average % impact in new buildings by energy type Example: (a*b*c) = (5% * 90% * 25%) = 1.1% for new buildings

3. RESIDENTIAL BUILDINGS

The following actions may be applicable to residential buildings.

ACTION	DESCRIPTION
3.1 SIGN ON TO SOLAR-READY BUILDING CODE PROVISION Type: Regulatory	**Key Question:** This action is recommended unless there is a compelling reason not to implement. **Description:** The Province of BC has developed a model solar-ready bylaw (link below) **http://www.housing.gov.bc.ca/building/consultation/shwr/qanda.htm** that local governments can sign on to and implement in their jurisdictions. This bylaw reduces the cost of installing solar hot water (SHW) after construction at minimal cost at construction time. Domestic hot water is approximately 30% of residential energy use. Solar hot water can provide up to 50% - 60% of domestic hot water use. Applies to residential only. Further calculations available in "Option 1C: Project Profile Solar Thermal (Hot Water) Retrofits" at the 'how' tab of http://www.toolkit.bc.ca/carbon-neutral-government. The deadline has passed but a future opportunity is likely.
	% Energy Savings Calculation: (a*b*c) a. % of new residential that is single family b. % of new residential that installs SHW c. Average % reduction on total household fuel use by fuel type from SHW (typically 30% of household energy use is hot water, typical SHW installations cover 50% of domestic hot water) Example: (a*b*c) = (60% * 20% * (30% * 50%)) = 1.8% for new buildings
3.2 EDUCATION FOR DEVELOPERS Type: Social	**Key Question:** This action is recommended unless there is a compelling reason not to implement. **Description:** Developers make key decisions as projects are being developed, that affect the energy performance of buildings over their lifecycle. While some developers pursue high performance buildings and renewable heating/cooling systems, many lack awareness of these systems and view them as increasing cost and risk. Education and showcasing can build awareness that leads to action. Applies primarily to residential development.
	% Energy Savings Calculation: (a*b*c) a. % of development community reached b. % of those in (a) who integrate energy improvements into their developments c. Average % impact by energy type of improvements Example: (a*b*c) = (20% * 10% * 20%) = 0.4% for new buildings
3.3 EFFICIENT WOOD STOVE PROGRAM Type: Financial	**Key Question:** Do many residents use inefficient wood fireplaces / stoves? **Description:** The Provincial Wood Stove Exchange Program encourages residents to change out their older, smoky wood stoves for low-emission appliances — including new CSA-/EPA-certified clean-burning wood stoves. Offered at the community level, the program involves funding and incentives to promote the exchange and replacement of old wood stoves. It also delivers education to help people operate their wood-burning appliances efficiently. In the Skeena region, communities contributed between $7,000 and $15,000 to offer their residents extra incentives. In addition, permit fees for installation of new appliances were waived, and additional incentives were established in the form of bylaws requiring mandatory removal of old wood stoves. Note: assumes increased efficiency of burning, results in less wood being consumed, and has little impact on fossil fuels and GHGs (since wood-burning is considered GHG-neutral).
	% Energy Savings Calculation: (for wood fuel only) = (a*b) a. % of wood-stoves changed as a result of the program b. Average % improvement in efficiency per stove Example: (10%*40%)= 4% for wood fuel for existing buildings

ACTION	DESCRIPTION
3.4 BIOMASS HEATING **Type: Social, Financial**	**Key Question:** Is there a local or regional biomass supply that could be used for heating? Description: Communities heating primarily with propane, heating oil, or in some cases electricity may have a strong financial case for conversion to automated forms of bioenergy such as wood pellet and woodchip. Green Heat Initiative (http://www.greenheatinitiative.com/) is an unbiased non-profit resource that local governments can draw upon to further assess feasibility. The reasons that some homes may not have yet converted to wood pellet, despite the substantial cost savings in energy include: • Knowledge • Individual difficulties with handling of pellets – delivery & storage • Capital costs, particularly for those on fixed incomes The knowledge barrier could be covered quite easily, with an information campaign that describes the economic and environmental factors. The local government could help to coordinate bulk purchases of wood pellets for the community, which could help to further reduce the cost of wood pellets. Purchasing pellets in loose bulk is the cheapest option. To assist with the difficulties of handling pellets including for the elderly could involve automated systems such as hoppers that could be filled by an operator(?). Outdoor storage options that a pellet stove could suck or auger pellets from could also be filled by an operator(?). Alternatively, when the hopper needs refilling, the resident could use a small container to transfer the pellets from the bag into the hopper. Financing of pellet stove: It is estimated that the installation cost of a wood pellet stove might be approximately $5,000, although this cost might be reduced if several pellet stove installations were coordinated together as a bulk order. Cost savings compared to propane, heating oil and electric in small villages could result in a simple payback of the order of 5 years, with the estimated lifespan of a wood pellet stove (provided it is properly cleaned and maintained) to be at least greater than 10 years. Benefits to the project include reducing community energy expenditures, a substantial reduction in community greenhouse gas emissions, and some potential for local economic development. Similar benefits can be achieved in southwestern BC's temperate climates with the use of air-source heat pumps. Further calculations available in " Option 1B: Project Profile Energy Efficient Building Retrofits and Fuel Switching" at the 'how' tab of http://www.toolkit.bc.ca/carbon-neutral-government.
	% Emissions Savings Calculation = (a*b*c*d) a. % existing buildings exposed to program b. % of those exposed who convert c. % of building GHG's associated with space heating d. % of heat load that biomass covers Example: (a*b*c*d) = (100%*40%*70%*80%) = 22.4% existing residential buildings

4. COMMERCIAL / INSTITUTIONAL BUILDINGS AND TRANSPORTATION

The following measures apply to the commercial / institutional sector. Note that there are likely other specific opportunities to engage this sector in specific communities.

ACTION	DESCRIPTION
4.1 HOST CLIMATE-SMART PROGRAM DELIVERY **Type: Social**	**Key Question:** Are there small and mid-sized businesses that would engage in climate training if offered? **Description:** ClimateSmart provides training, tools, and technical assistance to small and mid-sized businesses. This includes three, four-hour training sessions. Each session is run by experts experienced in advising small and medium-sized enterprises on best practices of managing and reducing GHGs. Groups consist of 10-15 enterprises, with training sessions scheduled over a ten-week period. Local governments can sponsor ClimateSmart to come to their community.
	% Energy Savings Calculation: for commercial sector buildings = (a*b) and for commercial sector transportation= (c*d) a. % of commercial sector participating in climate smart b. % improvement in buildings as a result of participating in the program c. % of commercial sector participating in climate smart d. % improvement in buildings as a result of participating in the program Example: (a*b) = (2% * 15%) = 0.3% for existing commercial buildings Example: (c*d) = (2% * 10%) = .2% for commercial transportation
4.2 ECO-INDUSTRIAL NETWORKING ASSESSMENT **Type: Social**	**Key Question:** Are there industrial / commercial operations that may benefit from collaboration (shipping co-ordination, waste as input, sharing heat, ...) **Description:** Eco-industrial networking is a relationship-building process that aims to minimize waste and create efficiencies among industrial and other buildings. For example, an eco-industrial network might involve locating a building with a high waste-heat output, such as an ice rink, next to a major heat consumer, such as a swimming pool, thus capturing the value of what was previously wasted. Local governments are well placed to identify and promote opportunities for eco-industrial networking. Local governments can also specifically zone for eco-industrial uses and location of uses: for example, District of Ucluelet has established the Ucluelet Eco-Industrial Park zone, a comprehensive development zone.
	% Energy Savings Calculation: commercial sector buildings= (a*b) and for commercial sector transportation= (c*d) a. % of commercial sector included in eco-industrial networking b. % improvement as a result of participating in the program c. % of commercial sector included in eco-industrial networking d. % improvement as a result of participating in the program Example: (a*b) = (1% * 10%) = 0.1% for existing commercial buildings Example: (c*d) = (1% * 20%) = 0.2% for commercial transportation

ACTION	DESCRIPTION
4.3 NATURAL GAS VEHICLE COLLABORATION **Type: Social, Financial**	**Key Question:** Are there heavy-duty fleets that could refuel where local government fleets refuel? **Description:** Gasoline and diesel have approximately 140% of the emissions per unit of energy as natural gas. Natural gas refuelling stations need a critical mass of return-to-base heavy duty vehicles (often ten or more) to be viable. The local government may have some fleet vehicles that could be converted to natural gas from diesel to meet its carbon-neutral operations commitments. Collaborating with other local return-to-base fleets (such as BC Transit, school board, waste haulers, and commercial operators) could provide the critical mass to make a refuelling station viable. This can lower the emissions from all of the participating entities. Further calculations available in "Option 1A: Project Profile Low Emission Vehicles" at the 'how' tab of http://www.toolkit.bc.ca/carbon-neutral-government.
	% Emissions Savings Calculation = (a/b)*c , where: a. Number of heavy duty vehiclekilometers traveled from vehicles converting to natural gas b. Total number of heavy duty vehicle-kilometers traveled c. % difference in emissions from original configuration to natural gas configuration (efficiency and carbon intensity) Example: (a/b)*c = (10,000/100,000) * 30% = 3% of emissions from existing heavy duty commercial vehicles

5. LIGHT DUTY VEHICLE TRANSPORTATION – URBAN FORM

Urban form including smart growth and street design offer the greatest single opportunity for many communities to reduce emissions.

ACTION	DESCRIPTION
5.1 LAND USE SUITE LITE	**Key Question:** Recommended for communities wherever politically practical. **Description:** Designate growth areas and set minimum lot sizes outside growth area; apply mixed-use zoning for downtown. This can preserve the rural character outside of downtown while enabling more residents to live in proximity to services. This can reduce transportation needs while developing areas that are most economically maintained by the local government (rather than sprawling infrastructure). Specific zoning is required for primary and secondary growth areas as well as areas outside the designated growth areas. Conservation covenants (such as through land trusts) may also be considered for agricultural lands or natural habitats.
	% Energy Savings Calculation: for Light Duty Vehicle sector= (a*b*c) a. % of community in downtown b. Degree to which the area in (a) will exhibit the full implementation of supportive land use c. % reduction in transportation emissions (see Background section for guidance on emissions reduction potential) Example: (a*b*c) = (20% * 20% * 30%) = 1.2% for LDV sector
5.2 LAND USE SUITE ENHANCED	**Key Question:** Recommended for communities seeking significant GHG reductions **Description:** This measure extends 'Land use suite lite'. Beyond designating growth areas, urban containment boundaries could be established to further enforce where growth occurs. Also, the type of growth could be further defined through establishing zones for transit-oriented development or pedestrian-oriented development. An industrial/commercial land strategy may also be required to facilitate eco-industrial networking, transit provisioning and mobility.
	% Energy Savings Calculation: for LDV sector = (a*b*c) a. % of community covered by program b. Degree to which the area in (a) will exhibit the full implementation of supportive land use c. % reduction in transportation emissions (see Background section for guidance on emissions reduction potential) Example: (a*b*c) = (50% * 25% * 30%) = 3.8% for LDV sector
5.3 STREET DESIGN	**Key Question:** This action is recommended for all communities unless there is a reason why it should not be implemented. **Description:** Reconfigure streets to be 'living streets' / 'complete streets' - including formalizing hierarchy (pedestrian - bike - transit - truck - car). Typically this is a policy decision, followed by street reconfiguration as streets are regularly scheduled for resurfacing / reconstruction for pavement maintenance or installation of utilities. If new streets are required, design to support a grid pattern.
	% Energy Savings Calculation: for LDV sector = (a*b*c) a. % of community covered by program b. Degree to which the area in (a) will exhibit the full implementation of supportive land use c. % reduction in transportation emissions (see Background section for guidance on emissions reduction potential) Example: (a*b*c) = (5% * 25% * 30%) = 0.4% for LDV sector
5.4 FLOW RGS, OCP, AND LAP THROUGH TO ZONING	**Key Question:** Recommended for all communities. **Description:** It is important to flow climate and energy-related statements from the RGS or OCP through to local area / neighbourhood plans and zoning. Often good statements in the RGS/OCP just need to be implemented all the way through in a rigorous way.
	% Energy Savings Calculation: N/A – depends on OCP policies.

6. LIGHT DUTY VEHICLE TRANSPORTATION – INFRASTRUCTURE & COLLABORATION

ACTION	DESCRIPTION
6.1 ACTIVE TRANSPORTATION PLANNING	**Key Question:** This action is recommended for all communities considering transportation demand management. **Description:** Active transportation planning processes can lead to future policy and infrastructure changes. A number of communities have researched, developed and planned active transportation initiatives through funding grants offered by the Built Environment and Active Transportation (BEAT) initiative of the BC Recreation and Parks Association (BCRPA) and UBCM. Many of these communities are small yet have started ambitious active transportation plans. Such programs can kick-start a transportation demand management (TDM) program for small or mid-size communities, especially those with little or no public transit.
	Calculation: N/A - this is a planning process which will not produce direct results itself, but may lead to projects that will produce savings.
6.2 IMPROVE WALKING INFRASTRUCTURE	**Key Question:** Are there major trip destinations (commercial services, schools, hospital, employers, etc.) less than 3km from a significant number of residences? **Description:** Local governments can easily promote walking. Tips on promoting walking have been developed by the Central Okanagan Regional District: **www.kelowna.ca/CM/Page1056.aspx** Other communities could create a similar resource page on their website or as a printed handout. Walking is suitable for trips in small and mid-size communities where distances in town are short. Most people can walk a kilometre in 10 minutes and can walk for 30 minutes, or approximately 3 km, during good-weather months. It is reasonable to target distances of 3 km or less for the promotion of active transportation (if combined with strategies to change people's perception of the time and effort it takes to walk). One walking-infrastructure opportunity available in many communities is a walking school bus. A Walking School Bus or Bicycle Train consists of a group of children walking or cycling to school with one or more adults. It can be informally planned when two or three families take turns walking or cycling with their children to school, or more formally developed and organized with specific stops, designated participants and volunteer Walking School Bus or Bicycle Train leaders.
	% Energy Savings Calculation: for LDV sector= (a*b*c)/d a. Number of walking trips/year b. % of trips that would have been by car c. average walking trip length d. Total LDV vehicle kilometers travelled (VKT) (estimation can be derived from CEEI data) Example: (a*b*c)/d = (36,500 * 20% * 1.5) / 200,000,000 = 0.01% LDV emissions

ACTION	DESCRIPTION
6.3 CYCLING & ALTERNATIVE TRANSPORTATION INFRASTRUCTURE IMPROVEMENTS	**Key Question:** Are there trip destinations within 5-8km of a significant number of residences? **Description:** Cycling is perhaps the fastest way to make a trip of less than 5 km. It is reasonable to target distances of 5 to 8 km for cycling in an active transportation strategy. Cyclists travelling 8 km or more value shower facilities at their final destination, and all cyclists value safe, secure storage for their bikes. These facilities can be installed at various sites of employment in a community, such as public institutions, businesses and regional district or municipal offices. A major barrier to increasing the number of cycling trips to workplaces is lack of secure bike lock-ups and change-room facilities. Requiring these basic facilities can be made part of the development process through a community's planning bylaw. A US tool to estimate demand for bike routes is available at: **http://www.bicyclinginfo.org/bikecost/step1.cfm** . It is tailored for use in the US, but can be used by BC communities. Information required includes population density in the area surrounding the bike route, and the percentage of total trips in the area already made by bicycle. Where this is not known, use the BC average figure of 2%. More detailed guidance on methods for estimating the likely number of users is available from the governments of New Zealand, US, UK and Australia. However, these tend to be lengthy documents; guidance from New Zealand may be of most direct use. Other important parameters include percentage of cyclists using the bike route that would otherwise have driven, and average bike trip length. Where locally-specific data are not available, the following benchmarks may be used: • % of non-recreational cyclists who would have driven, if they were not cycling: 50%. • Average BC cycling commuter distance: 5km each way, 10km return trip.
	% Energy Savings Calculation: for LDV sector = (a*b*c)/d a. Number of cycling trips/year b. % of trips that would have been by car c. average walking trip length d. Total LDV vehicle kilometers travelled Example: (a*b*c)/d = (36,500 * 30% * 5) / 200,000,000 = 0.03% LDV emissions This calculation methodology is only relevant where bicycle facilities are constructed on commuter routes, or to other major destinations to which people travel by car. Recreational bike paths will not lead to a reduction in emissions, and may even lead to an increase in emissions, since people may drive to them.
6.4 SPECIAL EVENT PLANNING	**Key Question:** Are large special events planned? **Description:** Local governments often promote transit for transportation to major community or sporting events in their area. There are direct benefits to having people try alternative modes of transportation during large events. Experience has shown that people will be more likely (at worst, less reluctant) to use transit after having a good experience at a special event. This was the case in Victoria in 1994 when a 12-day major sporting event saw record modal splits for transit (50% and up), which set the stage for an impressive five-year growth in ridership.
	% Energy Savings Calculation: for LDV sector = (a*b*c) a. % of LDV travel associated with travel to/from event b. % of travel population in (b) affected by action a. Average % reduction in vehicle kilometers travelled by population in (c) Example: (a*b*c) = (.1% * 20% * 10%) = 0.002% LDV sector

ACTION	DESCRIPTION
6.5 COLLABORATE WITH MAJOR EMPLOYERS ON TRANSPORTATION	**Key Question:** Is there major employer(s) in the community? **Description:** Collaboration with major employers such as industries, schools and hospitals can uncover opportunities to reduce commuting-related transportation emissions. UVic achieved a 27% reduction in campus parking during a 30% growth in student population and major new building activity in the past 16 years. Single-occupant vehicle traffic to campus plunged from 58% in 1992 to 37.5% in 2008, while parking rates soared from minimally priced to market-rate priced.
	% Energy Savings Calculation: for LDV sector = (a*b*c) b. % of LDV travel associated with travel to/from employer/institution c. % of travel population in (b) affected by action d. Average % reduction in vehicle kilometers travelled by population in (c) Example: (a*b*c) = (10% * 50% * 20%) = 1.0% LDV emissions
6.6 TRANSIT SUITE	**Key Question:** Are there major trip destinations beyond 8km that are not sufficiently served by transit? **Description:** There are 82 transit systems serving 50 communities in BC. Three types of transit service are operated through BC Transit: conventional transit, paratransit and custom transit. • Conventional transit serves the general population using mid-size, large or double-decker buses with fixed routes and fixed schedules. Most buses are fully wheelchair accessible, with door ramps that lower. • Paratransit offers small-town, rural and suburban areas flexible routing and schedules for passengers using minibuses, taxis and vans. Many paratransit systems offer trips beyond their immediate community one or more days a week. • Custom transit serves those who cannot use conventional transit because of a disability. It operates vans and minibuses for dial-a-ride, door-to-door handyDART service. Service is also offered through contracted Taxi Supplement and Taxi Saver (discounted coupon) programs. Many factors affect transit deployment, key ones being residential density and form.
	% Energy Savings Calculation: for LDV sector = (a*b) a. % of population affected by transit measures (within approx. 400 meters of stops) b. Average % reduction in vehicle kilometers traveled for population in (b) Example: = (20% * 5%) = 1% LDV emissions
6.7 RIDE-SHARING AND GUARANTEED RIDE HOME PROGRAMS	**Key Question:** Are there major trip destinations beyond 8km that are not sufficiently served by transit? **Description:** Carpooling is a simple way for local governments to begin TDM while saving money, reducing congestion and conserving energy along the way. Founders of the Nelson Carshare Co-op set up a ride-sharing system for longer-distance intercommunity travel where rides could be offered or sought for travel between communities. This ride-matching service is now run by the Kootenay Rideshare and is undergoing expansion; details can be found at **www.kootenayrideshare.com**. "With car sharing as a choice, Car Co-op members drive much less (1400 km/year) than the average driver (6,000-24,000 km/year) in the Lower Mainland." Source: Cooperative Auto Network. (75%-94% reduction but much of this cannot be directly attributed to a coop.)
	% Energy Savings Calculation: for LDV sector= (a*b) a. % of population affected by ride-share b. Average % reduction in vehicle kilometers traveled for population in (b) Example: = (10% * 10%) = 1% LDV emissions

ACTION	DESCRIPTION
6.8 INTERCOMMUNITY TRANSIT SERVICES	**Key Question:** Is there significant inter-community travel? **Description:** While trips between BC communities have typically relied on the private automobile, there are publicly funded transportation links between many communities, some covering distances of several hundred kilometres. These transportation links are usually established for a specific purpose and are not well known or publicized. The transit link between Vernon and UBC Okanagan in Kelowna is a key example, providing a long-distance transit link from one community to a post-secondary institution in another community. This practice is not common in small or mid-size communities and could be more widely implemented. Health Connections is a provincially funded program to address regional travel needs for rural residents who must travel long distances to access specialized nonemergency medical services. Regional health authorities have full discretion in how they seek to deliver this service. Service restrictions vary region to region, but many include intercommunity bus services. **http://www.bctransit.com/health_connections/?p=2.list** The Interior Health Authority provided an estimated 25,000 rides in 2008, with 35% of trips being medical in nature. Within the 200,000-square-kilometre Interior Health region, encompassing the East Kootenay, Kootenay-Boundary, Okanagan and Thompson Cariboo Shuswap areas, these trips are a largely untapped resource for the area's 700,000-plus residents. Few people know about this service because it is not well advertised outside of doctors' offices and the medical community. Promoting these services is an opportunity for local governments.
	% Energy Savings Calculation: for LDV sector = (a*b*c) a. % of population affected by inter-community transit b. % of VKT related to inter-community travel c. % of LDV trips avoided Example: = (60% * 10% * 10%) = 0.6% LDV emissions
6.9 LOW CARBON AND ELECTRIC VEHICLE SUITE **Type: Social, Financial**	**Key Question:** Can adequate resources be allocated to implement these recommended actions? **Description:** Low carbon and electric vehicles can play a significant role in reducing emissions from light duty (passenger) vehicles. Local governments can play an enabling role in this transition. Measurement may be difficult, but without this suite of support or a similar one, the local transition to low carbon and electric vehicles may be delayed by many years. Battery electric vehicles may be appropriate in some communities, with current models that travel on highways and can travel for over 100km. In other areas, plug-in-electric-hybrids (PHEV) may be a more practical option. With PHEVs, most travel within the community can be done on electricity and the gasoline engine can provide power to the batteries for extended highway driving. Some models have an option to heat the cabin up before unplugging. There are several specific actions all local governments can take to prepare for low carbon and electric vehicles. • Sign on to provincial 'EV-Ready' bylaw when it is available. Analysis indicates 80% of charging will be done at home. • Include EV charging infrastructure in sustainability guidelines • Ensure permitting processes (for renovations particularly) are set up to smoothly address electric vehicle charging infrastructure • Consider low carbon vehicles (see action 4.3) and electric vehicles for the local government fleet to demonstrate the viability of the technology • Set up a charging station at a highly visible location For higher growth communities, a requirement for alternative fuelling could be established for new gas stations. Surrey City Council passed an innovative new fuel initiative. All new service stations in Surrey will be required to provide at least one alternative fuel source, such as hydrogen, compressed natural gas, or electric vehicle recharging, in addition to conventional gasoline, diesel and propane energy.
	% Emissions Savings Calculation: N/A – unquantifiable at this time, however given national and international projections, with supportive measures as outlined above, electric vehicles (split between PHEV and battery electric vehicles) could comprise 1% of passenger vehicles on the road by 2016 and up to 2% by 2020.

7. WASTE

ACTION	DESCRIPTION
7.1 ORGANICS DIVERSION	**Key Question:** Is a significant amount of organics going to landfill that could be economically diverted? **Description:** GHG emissions from landfills are primarily from the decomposition of buried organics. Create a comprehensive composting program: • Encourage grass swapping and back-yard composting. • Create a public compost pick-up site and program. • Support existing and new capacity for reusable resources, including Free Swaps, Share Sheds, free-store for unwanted goods, and building materials depot. Organics make up approximately 43 percent of solid waste in Metro Vancouver according to the Recycling Council of BC, which also states that on average, each British Columbian generates over 600 kilograms of waste annually. By diverting organics, each of us has the opportunity to remove approximately 200 kilograms from the solid waste stream every year. Further calculations available in "Option 1D: Project Profile Household Organic Waste Composting" at the 'how' tab of http://www.toolkit.bc.ca/carbon-neutral-government.
	% Energy Savings Calculation for municipal solid waste sector = (a –c)*b a. % of landfill GHG's from organics b. % of organics diverted annually c. Average % of emissions over planning period (to 2050?) from organics currently in landfill under BAU scenario Example: (a –c)*b = (80% - 25%) * 10% = 35% waste emissions

8. ENABLING ACTIONS

ACTION	DESCRIPTION
8.1 ORGANIZATIONAL STRUCTURE FOR CLIMATE ACTION	**Key Question:** Are there questions about who is accountable within council / board as well as within staff for climate action? **Description:** Climate action crosses all departments and levels within a local government. Establishing decision-making, communication, accountability, and resourcing structures that are appropriate for the size and culture of the local government has repeatedly been proven to be critical to implementing actions in a cost-effective manner and achieving results. Taking time up-front to establish such structures is a worthwhile investment in setting implementation up for success. Key questions to answer include: • Who makes which decisions regarding climate action? • Who is expected to do what and how are they held accountable? • What new / different communication / planning is required to enable implementation of actions, some of which may be cross-departmental? • What organizational structure changes are required to operationalize this? Some examples include: Council climate committee, cross-departmental working group, updated job descriptions, resource allocation to include climate action and new positions. • How will capital, operating and human resource elements of the CEEP be funded?
	Calculation: This enabling action does not have direct impacts itself, however it may be critical to achieving results from other actions.
8.2 ESTABLISH A REGIONAL ENERGY COOPERATIVE	**Key Question:** Is there strong interest in clean energy in the community? **Description:** Energy co-operatives are companies owned by their members, rather than by shareholders, with each member having an equal vote. Community energy cooperatives have provided an important vehicle for development of local renewable energy in Denmark, the Netherlands and Germany. In Germany, 200,000 people own shares in local wind turbines. City of Dawson Creek played an important role in establishment of the Peace Energy Cooperative, providing advice and other forms of non-financial support.
	Calculation: Impacts from this enabling action will be dependent on actions and investments of the co-op. This can provide funding and a sense of community and buy-in to climate actions.
8.3 IDENTIFY GREEN ECONOMY OPPORTUNITIES	**Key Question:** This enabling action is recommended to all local governments who want to achieve economic development / diversification benefits from climate action. **Description:** British Columbians pay on average $4200 per person annually for energy in their communities (i.e. electricity, natural gas and transportation fuels), not including energy consumed by industry, airlines, ferries, etc. For most communities, 70-80% of money spent on energy leaves town, going to utilities, oil companies, and provincial and federal taxes. Local clean energy development and energy efficiency can be drivers of economic diversification in rural BC, presenting opportunities for communities to transition to a green economy, thereby generating long-term economic and community development benefits. A "green economy" is characterized by low carbon (with renewable energies replacing fossil fuels), low resource depletion and low environmental degradation. A guide to achieving economic development potential of climate action is *Clean Energy for a Green Economy* available at **http://www.communityenergy.bc.ca/node/692**
	Calculation: This enabling action will assist in moving other actions forward.

<table>
<tr><th>ACTION</th><th>DESCRIPTION</th></tr>
<tr><td>8.4
USE LOCAL GOVERNMENT ASSETS TO CREATE EXPERTISE AND COMMUNITY-WIDE CHANGE</td><td>
Key Question: Are actions being taken in local government (LG) operations that could be leveraged to support community-wide action?
Description:
<table>
<tr><th colspan="2">LG ACTION</th><th>COMMUNITY OPPORTUNITIES</th></tr>
<tr><td rowspan="2">BUILDINGS</td><td>District energy systems

- Building energy efficiency retrofits

- New green buildings</td><td>Awareness: Increasing public awareness of clean energy and conservation, leading to a greater willingness to explore clean energy and conservation, particularly if corporate actions are deployed in a way to maximize public visibility.
Association: Visible actions that others are implementing clean energy and conservation.
Action: Local governments across BC are exploring district energy systems with their own buildings as the first buildings that provide critical mass for the system. Many local governments are also connecting public sector organizations in BC which all have carbon neutral commitments. These systems then extend to the surrounding community.</td></tr>
<tr><td>FLEET</td><td>- Biofuels

- Hybrids / EV's</td><td>Agency: Improved access to fuels and mechanics who can service biofuel, hybrid, or electric vehicles.</td></tr>
<tr><td>OTHER</td><td>- Carbon neutral actions</td><td>Awareness and Association: Provides local government leaders (staff and elected officials) an opportunity to gain knowledge of clean energy and conservation so they can more confidently demonstrate community leadership by implementing them where appropriate in their own business or residence.</td></tr>
</table>
Calculation: Impacts of these enabling actions are highly dependent on specific actions planned for local government operations.
</td></tr>
<tr><td>8.5
LONG-TERM, DEEP COMMUNITY ENGAGEMENT (CULTURE CHANGE)</td><td>
Key Question: Do the other actions identified fall short of the desired change?
Description: Overall, the purpose of social mobilization for British Columbia climate action is to:
1. Engage residents in developing and implementing climate solutions through collective, 'bottom-up', informal, organizational and institutional initiatives.
2. Change collective behaviour to reduce carbon footprints.
3. Build public support for (and contributions to) low-carbon climate policies and actions focused on the green economy, ecological resilience and sustainable communities, in order to achieve GHG targets, short- and long-term, as well as other provincial climate change goals.
4. Build capacity and resilience to plan and respond to climate change adaptation and mitigation.
Active mechanisms can be established to pilot, replicate and monitor successful social engagement techniques, such as the Columbia Basin Community Adaptation program, and the UK Rural Community Councils community-led planning, which writes:
People need ... information, a realistic assessment of the threat or diagnosis, a sense of personal control over their circumstances, a clear goal, an understanding of the strategies to reach that goal, a sense of support, and frequent feedback that allows them to see that they are moving in the right direction.

A recent study found that reasonably achievable emissions reductions are approximately 20% in the US household sector in 10 years, if "most effective non-regulatory interventions are used," such as incentives and social marking (Dietz, T., Gardner, G. T., Gilligan, J., Stern, P. C., Vandenbergh, M. P.: Household actions can provide a behavioural wedge to rapidly reduce U.S. carbon emissions, in Proceedings of the National Academy of Sciences, 106: 44, 18452-18456, 2009).

Calculation: Impacts can be substantial but are highly dependent on the specific program implemented.
</td></tr>
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FOOD SECURITY

Council Strategic Plan Goal	NOTE these items are now part of Council's Strategic Plan Demonstrate leadership in climate action.				
	Promote food security at individual and community levels.				
Climate Action Committee Goal	Expand food security in the community.				
		Mechanisms	**Department**	**Resource**	**Initation**
1. Invite the T'Sou-ke Nation to the food security table.		Advocacy, Letter	Corporate Services	Staff	2020
	1.1.Collaborate and develop a local food system.	Advocacy, Letter	Corporate Services	Staff	Ongoing, 2021
2. Review, adopt and initiate the 2012 Agricultural Plan.					
	2.1.Work with the ALC to support the development of farm villages.	Advocacy, Letter	Corporate Services	Staff	Ongoing, 2021
	2.2.Identify regulatory barriers to small farm viability.	Policy, Food Security Plan	Planning	Staff, SRCHN, $25,000 per 3.1	Ongoing, 2021
	2.3. Support the establishment of a local abattoir in the South Island.	OCP/ZB/Ec Dev	Planning	Staff, SIPP, CRD	As per CCAC and Council

FOOD SECURITY

Council Strategic Plan Goal	NOTE these items are now part of Council's Strategic Plan Demonstrate leadership in climate action. Promote food security at individual and community levels.				
Climate Action Committee Goal	Expand food security in the community.				
		Mechanisms	**Department**	**Resource**	**Initiation**
3. Support the formation of a Food Policy Council and the adoption of a Food Charter.		Advocacy	Council, Corporate Services	Staff	Ongoing, 2021
	3.1.Examine the operations of a local food system and provide ideas and policy recommendation for improvements.	Policy, Food Security Plan	Planning	Staff, SRCHN, $25,000 per 2.2	Ongoing, 2021
4. Use the Official Community Plan review to update a Food Systems Plan.		Post OCP Adoption	Planning	$50,000	2023

FOOD SECURITY

Council Strategic Plan Goal	NOTE these items are now part of Council's Strategic Plan Demonstrate leadership in climate action. Promote food security at individual and community levels.				
Climate Action Committee Goal	Expand food security in the community.				
		Mechanisms	**Department**	**Resource**	**Initiation**
5. Initiate a feasibility study for a Food Hub.		Plan	EDC and SRCHN	$50,000 per 4.0	2023
	5.1.Management of the aggregation, distribution and/ or marketing of source-identified food products primarily from local and regional producers.	Plan	EDC and SRCHN	$50,000	2024
6. Participate in a regional food strategy.		Advocacy	Council, Corporate Services	Staff	Ongoing
	6.1.Work with other levels of governments to make food systems more resilient.	Advocacy	Council, Corporate Services	Staff	Ongoing

TRANSPORTATION

Council Strategic Plan Goal	
	Demonstrate leadership in climate action
	Prioritize community and corporate strategies to address the climate emergency.
	Identify and plan for green infrastructure opportunities.
	Build additional trail infrastructure, connectivity and amenities.
Climate Action Committee Goal	
	Decrease vehicle reliance on fossil fuels and increase access to improved walkable and bikeable transportation modes. Increase public awareness.

	Mechanisms	Department	Resource	Initiation
1. Increase electrification of residential modes of transportation & District corporate transportation fleet.				
1.1. Identify and promote electric vehicle and electric bicycle incentive opportunities.	Website	Parks and Environmental Services	Staff	2021 - Ongoing
1.2. Utilize District website as source for information and education of electrification with Electric Vehicles and E-bikes.	Website	Parks and Environmental Services	Staff	2021 - Ongoing
1.3. Establish a baseline, of the current number of electric residential and District vehicles.	Website	Parks and Environmental Services	ICBC and Staff	2021 - Ongoing
1.4. Increase charging stations for Electric Vehicle's and E-bikes, in new building plans, commercial core and Park 'n Ride locations.	Zoning Bylaw, Advocacy	Planning, Building, Council	Staff	2022
1.5. Research, plan and invest for replacement of current District fleet with electric vehicles.	Policy	Finance, Corporate Services	Staff	2022
1.6. Install fast chargers for Electric Vehicles and E-bike charges at District owned facilities.	Capital	Engineering	$100,000	2023

TRANSPORTATION

Council Strategic Plan Goal	Demonstrate leadership in climate action Prioritize community and corporate strategies to address the climate emergency. Identify and plan for green infrastructure opportunities. Build additional trail infrastructure, connectivity and amenities.
Climate Action Committee Goal	Decrease vehicle reliance on fossil fuels and increase access to improved walkable and bikeable transportation modes. Increase public awareness.

		Mechanisms	Department	Resource	Initiation
2. District to advocate and work with the province, Ministry of Transportation and Infrastructure. and BC Transit services.	2.1. Pursue reductions of fossil fuel dependence by positioning for grants and government investment funding, to enhance access to eventual (post-covid19) greener public transit system.	Advocacy with BC Transit, Letter	Parks and Environmental Services, Corporate Services	Council, Staff	Ongoing, 2021
	2.2. Enhance services with BC Transit.	Transportation Master Plan, Capital	Engineering	$200,000	Ongoing, 2021
	2.3. Increase frequency of bus services.	Advocacy with BC Transit, Letter	Parks and Environmental Services, Corporate Services	Council, Staff	Ongoing, 2021
	2.4. Develop smaller-run bus routes, within the community.	Advocacy with BC Transit, Letter	Parks and Environmental Services, Corporate Services	Council, Staff	Ongoing, 2021

TRANSPORTATION

2.5. Enhance Park ‘n Ride options.	Advocacy with BC Transit, Letter	Parks and Environmental Services, Corporate Services	Council, Staff	Ongoing, 2021

TRANSPORTATION

Council Strategic Plan Goal	Demonstrate leadership in climate action Prioritize community and corporate strategies to address the climate emergency. Identify and plan for green infrastructure opportunities. Build additional trail infrastructure, connectivity and amenities.				
Climate Action Committee Goal	Decrease vehicle reliance on fossil fuels and increase access to improved walkable and bikeable transportation modes. Increase public awareness.				
		Mechanisms	**Department**	**Resource**	**Initiation**
3. Encourage awareness, access, usage of vehicles for ridesharing programs.		Policy and Website	Planning, Parks and Environmental Services	Staff	2022
4. Improve and increase infrastructure and amenities to make Sooke a bikeable and walkable community.	4.1. Research best practices establish clear targets and budget for interconnected bike ways and safe walkways.	Parks and Trails Master Plan, Transportation Master plan and Development Cost Charges (DCC's)	Parks and Environmental Services, Engineering	$75,000	2020
	4.2. Improve bike ways access to Park ‘n Ride locations.	Advocacy with Ministry of Transportation, Capital	Council, Engineering	$20 M	2025-2030
	4.3. Work to obtain provincial grant programs for on-going bike & pedestrian trail assessment/improvements.	Capital planning	Parks and Environmental Services	Staff	Ongoing
	4.4. Improve safe bike and walking access to town center from neighborhoods, schools, and outlying areas.	Capital planning	Parks and Environmental Services	$5.5 M	2021-2031

TRANSPORTATION

Council Strategic Plan Goal	Demonstrate leadership in climate action Prioritize community and corporate strategies to address the climate emergency. Identify and plan for green infrastructure opportunities. Build additional trail infrastructure, connectivity and amenities.				
Climate Action Committee Goal	Decrease vehicle reliance on fossil fuels and increase access to improved walkable and bikeable transportation modes. Increase public awareness.				
		Mechanisms	**Department**	**Resource**	**Initiation**
	4.5. Work with Juan de Fuca Electoral Area representatives for secure bike lanes into Sooke.	Advocacy, Ministry of Transportation and JDFEA, Letter	Parks and Environmental Services, Corporate Services	Council, Staff	Ongoing, 2021
	4.6. Advocate and work with the province for secure bike lanes along Highway 14 within the District.	Advocacy, Ministry of Transportation, Letter	Council, Engineering	Council, Staff	Ongoing, 2021
	4.7. Advocate and work with the Ministry of Transportation and Infrastructure for secure bike lanes along Highway 14 to Langford.	Advocacy, Ministry of Transportation, Letter	Council, Engineering	Council, Staff	Ongoing, 2022
5. Improve and increase amenities between neighborhoods, schools, and the town core within safe walking					
	5.1. Plan and complete sidewalks from neighborhoods to town core, schools, and community parks.	Transportation Master Plan, Capital	Engineering	$11.3 M	2021-2031
	5.2. Ongoing updates of Parks & Trails Master Plan to improve safe walking opportunities.	Parks and Trails Master Plan	Parks and Environmental Services	$100,000	2030

TRANSPORTATION

Council Strategic Plan Goal	Demonstrate leadership in climate action Prioritize community and corporate strategies to address the climate emergency. Identify and plan for green infrastructure opportunities. Build additional trail infrastructure, connectivity and amenities.
Climate Action Committee Goal	Decrease vehicle reliance on fossil fuels and increase access to improved walkable and bikeable transportation modes. Increase public awareness.

	Mechanisms	Department	Resource	Initiation
6. Seek input from the Climate Action Committee for District Transportation plans and Parks & Trails Master plans.	Advocacy	Parks and Environmental Services, Engineering	Staff, CCAC	2020
7. Pursue the oversight of Transportation priorities within the Official Community Plan planning process.	Advocacy, Engagement	Planning	Staff, CCAC	2020 - 2021

ENGAGEMENT EDUCATION

Council Strategic Plan Goal	Building a reputable organization Improve communication and engagement with the public and community partners.				
Climate Action Committee Goal	Increase public awareness of climate action.				
		Mechanisms	**Department**	**Resource**	**Initation**
1. Develop community communication and engagement actions that align with the 2013 Community Energy and Emission Plan.		Ethelo software	CAO Office, Parks and Environmental Services	Staff	2021, Ongoing
2. Enhance communication on District climate action progress, and actively promote climate action resources and lifestyle choices.					
	2.1. Online presence (via District website).	As indicated	CAO Office, Parks and Environmental Services	Staff	2021, Ongoing
	2.2. Monthly newsletters.	As indicated	CAO Office, Parks and Environmental Services	Staff	2021, Ongoing
	2.3. Article in the local newspaper	As indicated	CAO Office, Parks and Environmental Services	Staff	2021, Ongoing
	2.4. Other channels, as appropriate.	As indicated	CAO Office, Parks and Environmental Services	Staff	2021, Ongoing
	2.5 Promote heat pump incentives (District Website).	As indicated	CAO Office, Parks and Environmental Services	Staff, $20,000	2021, Ongoing
3. Support, celebrate, highlight, and encourage climate action by community groups, citizens and the District.		Policy, Website, Events	CAO Office, Parks and Environmental Services, SPA	Staff, $10,000	2021, Ongoing

ENGAGEMENT EDUCATION

Council Strategic Plan Goal	Building a reputable organization Improve communication and engagement with the public and community partners.
Climate Action Committee Goal	Increase public awareness of climate action.

	Mechanisms	Department	Resource	Initation
4. Support climate leadership and resilience among Sooke youth and include youth as stakeholders in community consultations.	Policy	Corporate Services, Parks and En	Staff	2021, Ongoing

DEVELOPMENT LAND USE

Council Strategic Plan Goal	Demonstrate leadership in climate action View municipal decision-making through a 'green' coloured lens. Identify and plan for green infrastructure opportunities.				
Climate Action Committee Goal	Assess opportunities for climate friendly changes for both municipal lands and for development in the community, to ensure that buildings and the supporting environment are resilient for the future.				
		Mechanisms	**Department**	**Resource**	**Initiation**
1. Building Energy Efficiency	1.1. Promote and encourage the replacement of oil and gas heating with air-source heat pumps in existing structures and in new buildings.	Website	Building	Staff	Post Building Regulation Bylaw adoption
	1.1.1.Identify and promote incentives for increased energy-efficient homes/ buildings and identify options for municipal, provincial, federal, and private incentives.	Website - heat pump incentives	Corporate Services	Staff	2020, Ongoing
	1.2. Enact the implementation of the Step Code into the municipal Building Regulation bylaw for new buildings	Bylaw	Building	Staff	2020
2. Strengthen policies and bylaws to ensure densification occurs only in the town centre, in areas supported by walkable and mobility accessible infrastructure.		OCP	Planning	Staff	2021

DEVELOPMENT LAND USE

Council Strategic Plan Goal	Demonstrate leadership in climate action View municipal decision-making through a 'green' coloured lens. Identify and plan for green infrastructure opportunities.
Climate Action Committee Goal	Assess opportunities for climate friendly changes for both municipal lands and for development in the community, to ensure that buildings and the supporting environment are resilient for the future.

	Mechanisms	Department	Resource	Initiation
3. Encourage the development of a tree management bylaw, that values and protects trees as a carbon sink, and especially trees that stabilize slopes, shorelines, or provide wildlife corridors, neighbourhood greenspace, windbreaks, and shade.	Bylaw, Development Permit Area (C	Planning, Parks and Environmental Services	Staff	2021
4. Encourage the development of an urban forest management plan for public and private properties.	Plan, Policy	Planning, Parks and Environmental Services	$50,000	2022
5. Develop and adopt a valuation tool for ecosystem integrity and ecosystem services for all proposed developments.	Development Permit Area (OCP), Pc	Planning, Parks and Environmental Services	Staff	2022
6. Require all land clearing to undergo permitting processes to ensure ecosystem integrity is retained.	Policy	Planning, Parks and Environmental Services	Staff	2022

DEVELOPMENT LAND USE

Council Strategic Plan Goal	Demonstrate leadership in climate action View municipal decision-making through a 'green' coloured lens. Identify and plan for green infrastructure opportunities.				
Climate Action Committee Goal	Assess opportunities for climate friendly changes for both municipal lands and for development in the community, to ensure that buildings and the supporting environment are resilient for the future.				
		Mechanisms	Department	Resource	Initiation
7. Explore options for potential partnerships in the development and management of a community forest with the Capital Regional District (CRD) and the T'Sou-ke First Nation		Advocacy, Letter	Council, Corporate Services	Staff	2020, Ongoing
	7.1. Encourage the acquisition of forest lands for carbon sequestration.	Policy	Council, Corporate Services	Staff	2021, Ongoing

Climate Adaptation & Mitigation Strategy Report

RECOMMENDATION:

1) THAT Council directs the Climate Action Committee, Community Economic Development Committee, and the Planning and Land Use Committee to:

- consider the information provided in the:
  - Preliminary Strategic Climate Risk Assessment for British Columbia;
  - Territorial Analysis and Survey of Local Government Priorities for Climate Action: Vancouver Island and Coastal Communities;
  - Modernizing BC's Emergency Management Legislation; and
  - UBCM Special Committee on Climate Action Proposed Recommendations DRAFT Report
- consider the 4 pillars of the Sendai Framework in their decision-making with a particular focus on mitigation and recovery initiatives.

2) THAT Council directs the Climate Action Committee and Community Economic Development Committee to meet jointly in May and November, 2021 to share/transfer their respective knowledge.

Report Summary:

The District of Sooke 2019-2022 Council Strategic Plan and the District of Sooke Climate Action Committee Workplan both identify a Climate Change Adaptation and Mitigation Strategy as a priority. A proper adaptation and mitigation strategy requires a risk assessment in order to understand the risk and plan to minimize risk as well as prepare, respond and recover from an incident. This report recommends a process to accomplish this using the Sendai Framework to reduce disaster risk.

Previous Council Action:

February 13, 2019 - CRD declares climate emergency
March 25, 2019 - Councillor St-Pierre gives notice of motion to Sooke Council to debate a climate emergency declaration for Sooke
April 8, 2019 - District of Sooke Council declare a climate emergency
September 30, 2019 - Council approves the 2019-2022 Council Strategic Plan
June 22, 2020 - Council approves the Climate Action Committee (CAC) Work Plan
September 8, 2020 - Council approves Strategic Priorities 2021 Report
September 30, 2020 - Council approves the Council Strategic Priorities Chart
October 26, 2020 - Staff report to Council on the inclusion of CAC recommendations into the 5-year financial plan
October 26, 2020 - Community Economic Development (CED) Committee and Planning and Land Use Committee Terms of reference approved

November 9, 2020 - CED Committee Terms of Reference amended to include Climate change elements
December 14, 2020 - CAC Terms of Reference amended

Report:

At their Board meeting on February 13, 2019, the Capital Regional District declared a climate emergency and sent letters to local governments in the Region. Councillor St-Pierre brought forward a notice of motion on March 25, 2019, which was debated by Council at the April 8, 2019 Council meeting. The following amended motion was carried by Council:

THAT Council declare a climate emergency in the District of Sooke and:

- District of Sooke aspire to be carbon neutral by 2030
- The climate be a priority to Strategic Panning
- Reactivate the Climate Change Action Committee

The District of Sooke 2019-2022 Council Strategic Plan was approved by Council at the September 30, 2019 Regular Council meeting. One of the three goals contained in the Plan was Goal 2: **Demonstrate Leadership in Climate Action** and had the following Objectives:

- Prioritize community and corporate strategies to address the climate emergency
- Identify and plan for green infrastructure opportunities
- View municipal decision-making through a "green" coloured lens
- Promote food security at individual and community levels
- Continue to advocate for expanded public transit
- Build additional trails infrastructure, connectivity and amenities
- Improve community emergency and disaster preparedness

Major initiatives that help to meet this Goal include the adoption of the 2020 Transportation Master Plan, the 2020 Parks and Trails Master Plan, the District of Sooke Building Bylaw review (and Step Code consideration) and the ongoing Official Community Plan that is scheduled for completion in late 2021. Priority items in the two master plans are included in the 2021-2025 Five Year Financial Plan. The Official Community Plan has a requirement to include targets for the reduction of greenhouse gas emissions, and policies and actions of the local government proposed to achieve those targets.

The Climate Action Committee (CAC) Work Plan was submitted to the Committee of the Whole in June of 2020 and was approved by Council on June 22, 2020, with the direction that the Administration report back to Council with a strategy to prioritize the Work Plan items. The following motions were carried at the June 22, 2020 Council meeting:

- Provide a definition of "green lens\climate first" for use in all municipal decision making and planning processes

- Develop a comprehensive Sooke Climate Action Plan which will include mitigation and adaptation strategies
- THAT Council direct staff to bring back a revised Terms of Reference for the Community Economic Development Committee to include climate action elements to support the CAC Workplan Action items
- THAT Council endorse staff's recommendations provided in the CAC Workplan for inclusion in the 2021-2025 Five-year Financial Plan process

Much of the identified work in both the Council Strategic Plan and the CAC Work Plan is on-going and is becoming institutionalized into the way that work is done at the District of Sooke. Council and Administration have worked at continuously improving our Strategic Planning processes. The current reporting tool is a one-page dashboard referred to as the Council Strategic Priorities Chart. In the Strategic Priorities Chart of the 2019-2022 Council Strategic Plan, under Goal #2 of 'Next Actions', the development of a *Climate Adaptation Mitigation Strategy* is identified as a priority of this Council. This is also one of two Global Goals in the Climate Action Committee 2019-2021 Work Plan.

At the April 8, 2019 Council meeting when the Climate Emergency declaration was first debated by Council, Councillor St. Pierre defined Climate Change Adaptation as, "things that are already happening, and will continue to happen, for which we must find ways to cope". He also defined Mitigation as, " ways to reduce carbon emissions to stop or slow down Climate Change". Councillor St-Pierre stated that it is the role of Local Governments to keep our community safe and secure. The goal of this report is for Council to approve a framework to continue to implement the Council Strategic Goals, CAC Work Plan items and to adopt a Climate Change Adaptation and Mitigation Plan to improve community emergency and disaster preparedness.

A vast amount of research has been conducted by the Province to identify the significant risks that Climate Change presents Province-wide. The report, *Preliminary Strategic Climate Risk Assessment* evaluates the likelihood of 15 climate risk events that could occur in B.C. along with their health, social, economic and environmental consequences. The next steps for this research is to now take the 15 province-wide risks and identify which apply to regional areas of the Province. This will then allow for regional adaptation strategies to be further developed. The Vancouver Island and Coastal Communities (VICC) have started to look at the regional aspects in their September 2020 report, *Territorial Analysis and Survey of Local Government Priorities for Climate Action: Vancouver Island and Coastal Communities.* These two recent reports are the foundation of a Climate Change Adaptation Plan for the District of Sooke.

Another important piece of developing an adaptation strategy is the work currently underway to Modernize the Emergency Management Legislation in B.C. Driven by climate change and the frequency and devastation of natural disasters, the *Emergency Program Act* is under review. The review is adopting the Sendai Framework that takes an ***all of society*** approach to share responsibility for reducing disaster risk. The Sendai Framework sets four priorities:

1. Understand disaster risk
2. Strengthen disaster risk governance to manage disaster risk
3. Investing in disaster risk reduction for resilience
4. Enhancing disaster preparedness for effective response and to "build back better" in recovery, rehabilitation, and reconstruction

The Framework includes a four pillar approach to emergency management; ***mitigation, preparedness, response, and recovery.*** The research findings suggest that at the local government level we do well with preparedness and response but have more work to do in mitigation and recovery. With a focus on the ***four recovery sectors of people & communities, infrastructure, environment, and economy*** this framework will be a great tool to inform our Climate Action Committee, Community Economic Development Committee and the Planning and Land Use Committee. Each of these committees working from the same reference point will allow for greater coordination and help to ensure that climate adaptation efforts are not duplicated. The Community Economic Development Officer can coordinate climate work between the committees.

If the work to modernize the *Emergency Program Act* suggests that local government has work to do regarding mitigating the effects of climate change, where do we look to see what mitigation efforts are most effective? The Union of British Columbia Municipalities (UBCM) has recently published proposed recommendations from their Special Committee on Climate Action. The proposed recommendations provide key areas to address and success markers to evaluate against. The draft report states six signature initiatives and 14 supporting actions that will lead local governments in climate mitigation. The six signature initiatives are:

- Buildings
- Transportation
- Waste Management
- Resilience
- Governance
- Social Mobilization

Taken together the Preliminary Strategic Climate Risk Analysis, Vancouver Island and Coastal Communities Report, Emergency Program Act Modernization and the UBCM Special Committee on Climate Action Draft Recommendations provide a roadmap for Climate Change Adaptation and Mitigation. It is recommended that Council direct these committees to provide recommendations on ways the District can implement mitigation and adaptation strategies.

Budget/Financial Impacts:
Nothing outside of the approved 5 year financial plan

Strategic Relevance:

- Build a reputable organization - Improve communication and engagement with the public and community partners
- Build a reputable organization - Support Council and staff with the necessary tools to provide excellent governance and customer service
- Demonstrate leadership in climate action - Prioritize community and corporate strategies to address the climate emergency
- Demonstrate leadership in climate action - View municipal decision-making through a ‘green’ lens

Attached Documents:
Preliminary Strategic Climate Risk Assessment Report
vicc_report_master
UBCM Special Committee on Climate Action
modernizing_bcs_emergencymanagement_legislation

Approved by

Raechel Gray, Director of Financial Services	Approved - 05 Jan 2021
Carolyn Mushata, Corporate Officer	Approved - 06 Jan 2021
Norm McInnis, Chief Administrative Officer	Approved - 06 Jan 2021

Preliminary Strategic Climate Risk Assessment

The Province has completed a Preliminary Strategic Climate Risk Assessment for B.C. This is the first phase of an initiative to better understand climate-related risks in B.C. and help government develop appropriate measures to address those risks.

Our changing climate is impacting people and communities across the province. With improved understanding of these risks in B.C., we can be better prepared for the changes ahead.

The climate risk assessment evaluates the likelihood of 15 climate risk events that could occur in B.C. along with their health, social, economic and environmental consequences. It is the first report of its kind in Canada to examine provincial-scale climate risks.

The assessment will be used to inform public engagement on the development of a provincial climate preparedness and adaptation strategy, which will help protect people, communities and businesses from the impacts of climate change and will be released in 2020. This work will build on provincial initiatives already underway, including those that support local government planning, improve transportation infrastructure, help agricultural producers prepare, and promote productive forests with seedlings matched to the future climate.

The risk assessment is not intended to be used as a prediction of future events. Instead, it is a tool to evaluate the likelihood and potential consequences of each event happening in the future to understand the degree of risk each poses for the province to help government prepare.

Key Findings

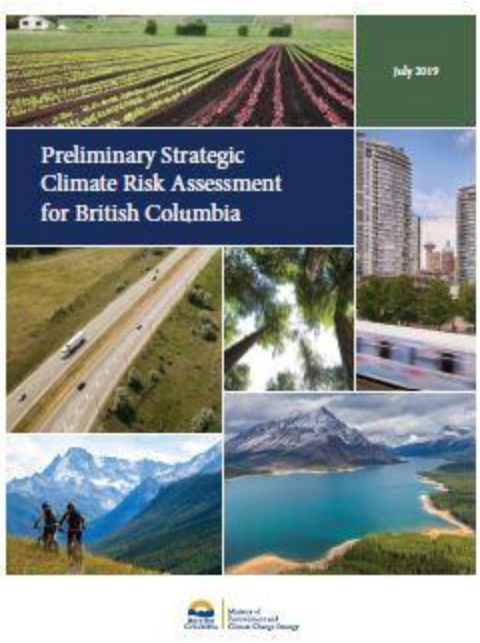
- The greatest risks to B.C. are severe wildfire season, seasonal water shortage, heat wave, ocean acidification, glacier loss, and long-term water shortage.
- Other risks that have the potential to result in significant consequences include severe river flooding and severe coastal storm surge, although these events are less likely to occur.
- Nearly all risk event scenarios (except moderate flooding and extreme precipitation and landslide) would have major province-wide consequences in at least one category.

Going forward, the risk assessment method will be customized and piloted to support provincial ministries and regional governments to better understand and respond to emerging climate risks.

- Read the Summary of Results (PDF, 5MB).
- Read the Risk Assessment Overview (PDF, 250KB)
- Read the full report, Preliminary Strategic Climate Risk Assessment (PDF, 16MB)
- Read the Climate Risk Assessment Framework (PDF, 1MB)

The Province continues to rise to the challenge of climate change by reducing carbon pollution and putting B.C. on the path to a cleaner, stronger future.

Climate Risk Assessment



- Risk Assessment Overview (PDF, 250KB)
- Summary of Results (PDF, 5MB)
- Preliminary Strategic Climate Risk Assessment (PDF, 16MB)
- Climate Risk Assessment Framework (PDF, 1MB)

Links and tools

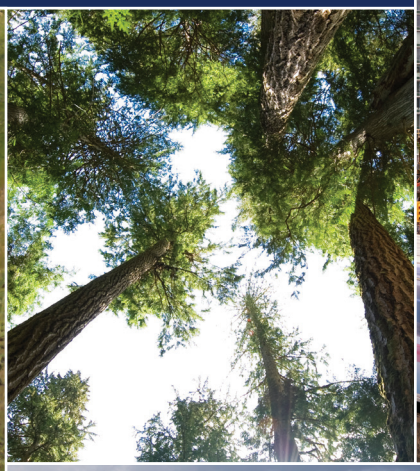
- Plan2Adapt
- ReTooling for Climate Change
- BC Climate Action Toolkit
- PCIC data portal
- Natural Resources Climate Change Adaptation

Contact Information

ClimateRisk@gov.bc.ca

July 2019

Preliminary Strategic Climate Risk Assessment for British Columbia -Summary of Results



BRITISH COLUMBIA
Ministry of Environment and Climate Change Strategy

Acknowledgments

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This project was led by staff in the Climate Action Secretariat at the Ministry of Environment and Climate Change Strategy.

The authors would like to thank the Project Advisory Committee, which consisted of staff from government ministries, who guided the project from conception through completion and the many experts consulted through workshops and interviews. The following individuals volunteered their time and expertise in support of this assessment:

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Supported by Natural Resources Canada's Building Regional Adaptation Capacity and Expertise (BRACE) Program

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Table of Contents

Preliminary Strategic Climate Risk Assessment for British Columbia

OVERVIEW

This report summarizes the first phase of an initiative to better understand and prioritize climate-related risks in British Columbia in the 2050s and to help government develop appropriate measures to address those risks.

British Columbia developed a strategic climate risk assessment framework to provide a consistent, replicable and scalable approach for climate risk assessment. Using this framework, the Province conducted a preliminary assessment of provincially significant, climate-related risks to residents, industries, infrastructure, natural resources, and ecosystems in British Columbia. As a high-level assessment, the results are intended for use at a provincial level and do not fully capture risks at other levels, such as local or Indigenous communities or a specific sector or region of the province.

The assessment analyzed the likelihood and consequence of specific scenarios for 15 distinct climate risks that could occur in the 2050s. Findings suggest that the greatest risks to B.C. are severe wildfire, seasonal water shortage, and heat wave events. Risk events with the highest consequences, such as severe coastal storm surge and severe river flood, do not necessarily rank highest in overall risk as they tend to have relatively low likelihood.

"Provincially significant" risks defined:

- Loss of life
- Widespread injuries or disease outbreaks
- Widespread damage to infrastructure, personal property, or other resources
- Long-term disruption to a significant economic sector
- Significant disruption to daily life
- Widespread psychological impacts
- Significant loss of natural resources
- Significant loss of cultural resources*

*Not presented in results

INTRODUCTION

British Columbia is experiencing the effects of climate change: temperatures are increasing, sea levels are rising, and variable and extreme weather is becoming more frequent. Scientists expect these changes to accelerate and intensify in the years and decades ahead. Understanding and managing these risks is necessary to help prepare for the changes ahead and protect B.C.'s residents, industries, and infrastructure while improving prosperity and reducing costs to future generations. The provincial risk assessment is a critical first step towards achieving this.

The need for the assessment is recognized in the Province's CleanBC plan, which commits government to developing a new climate adaptation strategy, for release in 2020, based on a provincial assessment of climate risks. In 2018, the B.C. Office of the Auditor General recommended that the provincial government undertake a province-wide climate risk assessment, building on existing assessments and case studies.

B.C.'s Climate Action Secretariat (CAS) worked with the consulting firm ICF and a 20-person project advisory committee composed of representatives from eight B.C. ministries, as well as more than 70 experts to develop a strategic risk assessment framework and apply it in an initial assessment of climate risks at the provincial level.

CLIMATE RISK ASSESSMENT METHODOLOGY

A risk assessment framework is a consistent methodology for conducting risk assessments, designed to be transparent in its approach to guide fair and open decision making. To ensure compatibility with existing standards, CAS developed the strategic climate risk assessment framework to be consistent with the *Risk Management Guideline for the B.C. Public Sector*, which is based on the International Organization for Standardization (ISO) 31000 Risk Management standard, and with the B.C.'s Risk Register, which the province's Risk Management Branch uses to record and manage information for identified risks.

"Major" consequences include, for example:

- **Health:** Loss of life of 10-100 people, 100-1000 people hospitalized
- **Psychological:** Localized disturbance resulting in long-term impacts
- **Social:** Weeks-long disruption to daily life. Permanent loss of livelihoods or way of life
- **Environmental:** Resources recovery will take decades
- **Infrastructural:** Weeks-long disruption. Major impediment to day-to-day life.
- **Economic:** Months-long disruption, losses of over $100 million, added cost $750 Million to $1 Billion

The framework provides a consistent, repeatable, and scalable approach that can be customized to analyze climate risks at multiple levels (from small communities to the entire province) and for multiple climate-related risks.

Why use RCP8.5?

- Representative Concentration Pathways describe different possible futures based on atmospheric concentrations of greenhouse gases. RCP8.5 is a high global emissions scenario.
- Projected temperature changes for BC are similar for each RCP for the 2050s and key findings would likely be unaffected by using a different RCP. The difference between the RCPs becomes substantive towards the end of the century.
- The aim of this assessment was to characterize, at a strategic level, the most problematic climate-related risks that could potentially occur in BC in coming decades, using best available evidence. Using RCP8.5 helps to identify such significant risks.
- Prudent assessment of risk involves explicit consideration of uncertainties.

Using the framework, 15 illustrative provincially significant risk events were identified and a specific scenario of fixed magnitude for each event was defined. The scenarios were designed to be provincially significant, involving major consequences in at least one of nine categories representing health, psychological, social, environmental, infrastructural, and economic consequences. This risk assessment assumes high global emissions growth to 2050 based on Representative Concentration Pathway (RCP) 8.5 by the Intergovernmental Panel on Climate Change (IPCC).

Using a combination of desk-based research, expert consultations, and risk assessment workshops, the team estimated the likelihood (the annual percent chance) of each scenario occurring both in the present day and in 2050, to determine how climate change influences the likelihood of the scenarios. Present day refers to the 20-year time period centred around 2010 (i.e., 2000 to 2019), although some scenarios use an earlier "present day" time period. 2050 refers to the 20-year time period centred around 2050 (i.e., 2040 to 2059). Following the same process, the project team estimated the consequences for each risk scenario. The team then multiplied

the estimates of likelihood by the average consequence scores to arrive at an overall risk score for each scenario. As this assessment was based on defined risk scenarios, the likelihood and consequence ratings for each risk event are specific to the chosen scenario.

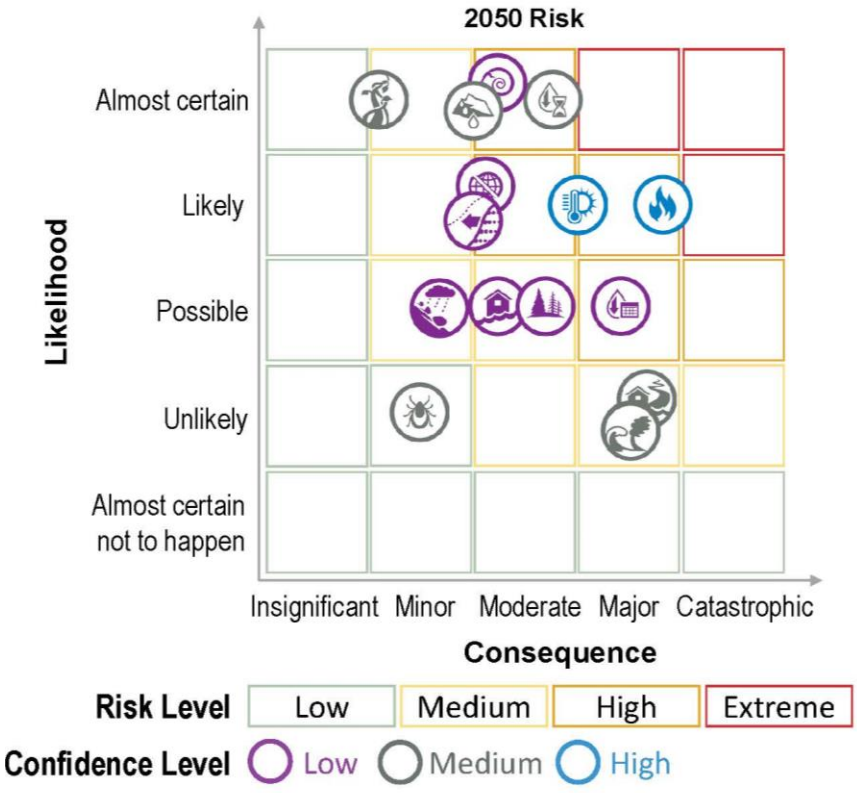
Some risk events have a more robust evidence base than others. The project team assigned a confidence level to each risk score based on the quality of the evidence base for each risk event and noted areas where information is currently lacking. The team plotted the likelihood and consequence ratings on a risk matrix to arrive at an overall rating for each event.

For additional information and details, see the full report at:

www2.gov.bc.ca/gov/content/environment/climate-change/adaptation/risk-assessment

CLIMATE RISKS TO BC

The following provides an overview of the risk assessment findings for 15 illustrative scenarios of climate risks to B.C. A summary of findings for each of the risk events is presented in more detail in the appendices.

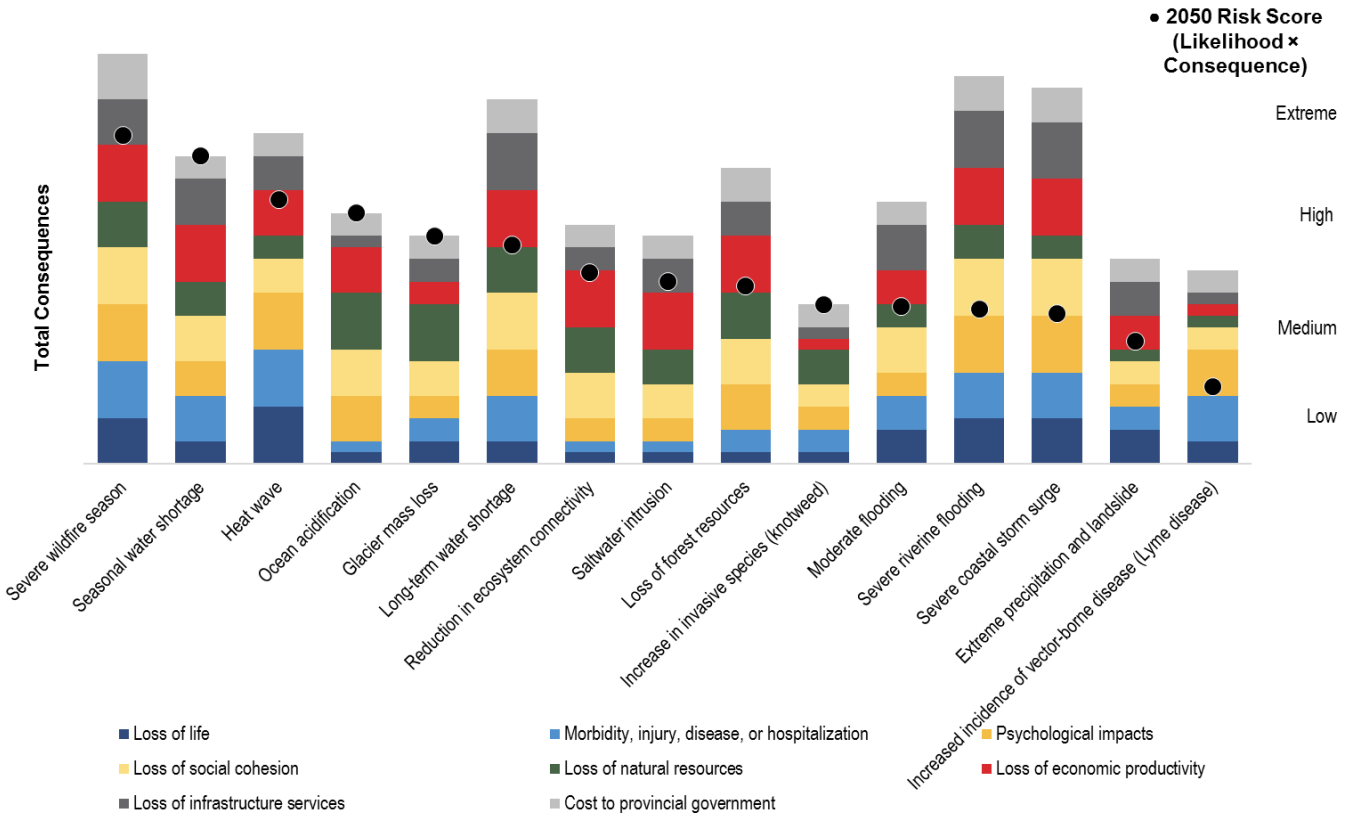


RISK EVENT	RISK
Severe wildfire season	High
Seasonal water shortage	High
Heat wave	High
Ocean acidification	High
Glacier mass loss	High
Long-term water shortage	High
Reduction in ecosystem connectivity	Medium
Saltwater intrusion	Medium
Loss of forest resources	Medium
Increase in invasive species (knotweed)	Medium
Moderate flooding	Medium
Severe riverine flooding	Medium
Severe coastal storm surge	Medium
Extreme precipitation and landslide	Medium
Increased incidence of vector-borne disease (Lyme disease)	Low

Key findings:

- Severe wildfire season, seasonal water shortage, and heat wave events are the three greatest climate risks to B.C., followed by ocean acidification, glacier mass loss, and long-term water shortage.
- Severe riverine flooding and severe coastal storm surge risk events would have among the highest overall consequences, but their relatively low likelihood reduces their overall risk relative to other events.
- The majority of risk events would have "catastrophic" economic consequences.
- High-risk events include both discrete events (such as wildfires, water shortage, and heat waves), as well as slower-onset, gradual climate changes (such as ocean acidification and glacier mass loss).
- Risk events with the highest overall consequences do not necessarily rank highest in overall risk as they tend to have relatively low likelihood.

Consequences Associated with Climate Risk Events



Note: Individual consequences are rated on a scale of 1 to 5 (Insignificant to Catastrophic). The size of the bar indicates individual consequence ratings.

Caveats that Apply to the Climate Risk Assessment Findings

- The 15 risk event scenarios do not comprehensively cover how climate change could affect B.C. nor represent the only provincially significant climate risks. Additionally, potential events were excluded that may be likely and could be significant for individual communities or sectors of the province but may not meet the definition of provincially significant.
- Lower-ranked risks should not be considered unimportant. The 15 risks assessed all have provincially significant consequences.
- Each scenario represents one version of a risk event. The project team analyzed how climate change would influence the likelihood of an event of a specific magnitude. As such, the consequence rating is determined by the specific details of the scenario used in the assessment, assumed to occur in or by 2050.
- To facilitate analysis, the risk assessment considers risk events in isolation. However, many risks are interrelated; the consequences of compounding or cascading events could be significantly greater than any single event alone.
- Similarly, climate-related risks may occur in conjunction with other risks (such as economic risks, public health risks, or seismic hazards) that B.C. may face during the same periods.

Future Work and Next Steps

This report is intended to be used to inform decisions made by the Deputy Ministers' Council and Cabinet relating to government priorities that may be at risk due to climate change. It will also inform the development of a provincial climate change adaptation and preparedness strategy, as committed to in the CleanBC plan. In addition, it is a first step toward meeting reporting requirements under *the B.C. Climate Change Accountability Act*, to report on climate risks to B.C., actions and progress toward reducing them, and plans to continue reducing risks.

Additional work is needed to build on this assessment, including:

- This initial assessment could not adequately consider Indigenous perspectives or cultural values without appropriate engagement. A second phase of work is planned to consider Indigenous perspectives on the effects of climate change. In the spirit of reconciliation, Indigenous perspectives shared during the engagement will be used to inform the upcoming provincial climate change adaptation and preparedness strategy.
- Impacts to cultural resources, including Indigenous and non-Indigenous cultures, were included in the framework as one of the nine consequence categories, and were initially considered for analysis. However, a robust assessment of the range of impacts to cultural resources in B.C. in each risk event scenario could not be completed within the scope of the existing project. As a result, an assessment of impacts to cultural resources is not included in this report. This work is planned and will be informed by the engagement process described above.

- The risk assessment does not fully capture risks to local governments, ethnic minorities, low-income/marginalized populations or gender-specific risks. The Climate Action Secretariat plans to address these gaps in future risk assessments.
- An important next step is to further evaluate the adequacy of existing risk mitigation efforts, considering the risk scores. The B.C. government already has several programs in place to address some of the climate risk events included in this assessment, including strategies to explicitly adapt to climate change as well as programs to address existing hazards.
- To build on this assessment, address gaps, and capture a broader range of potential risks, the following additional work would be useful: expand the analysis of each risk event to include a range of future scenarios; further explore the interactions and implications of cascading and compounding events; and conduct or encourage research to fill noted data gaps.
- The Climate Action Secretariat will engage with other ministries and stakeholders including public sector organizations to determine how the risk assessment framework could be used at different scales.

APPENDICES: RISK ASSESSMENT FINDINGS BY RISK EVENT

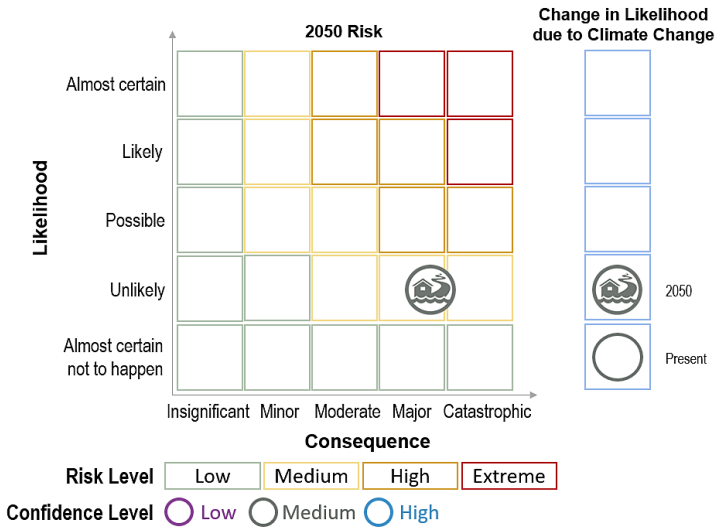
Severe Riverine Flooding

Medium Risk

Scenario analyzed: 500-year flood on the Fraser River

Key Findings

Today's 500-year Fraser River flood event would result in extensive flooding in the B.C. Lower Mainland and affect more than 30% of the province's total population. In addition, this event threatens the integrity of existing flood management infrastructure. If this event occurred today, it would be the costliest natural disaster to date in Canadian history. Though by definition this is a low-likelihood, high-consequence event, climate change could make today's one-in-500-year Fraser River flood up to five times more likely by 2050.



Consequences

CATEGORY	CONSEQUENCE	RATING: INSIGNIFICANT / MINOR / MODERATE / MAJOR / CATASTROPHIC	DESCRIPTION
Health	Loss of life	MODERATE–MAJOR	10 to 100 potential fatalities
	Morbidity, injury, disease, or hospitalization	MODERATE–MAJOR	100+ people at risk of injuries, water-borne disease, environmental contamination, limited access to critical infrastructure and services
Social functioning	Psychological impacts	MODERATE–CATASTROPHIC	Widespread evacuations, damages, and impacts to transportation or utility services causing stress, anxiety, depression, PTSD
	Loss of social cohesion	MODERATE–CATASTROPHIC	Months-long disruptions to daily life for individuals with direct damages; weeks-long disruptions to critical institutions and services
Natural resources	Loss of natural resources	MODERATE	Ecosystem stress or damage due to inundation, debris, and water and soil contamination
Economic vitality	Loss of economic productivity	MODERATE–CATASTROPHIC	$22.9 billion in economic losses including agriculture, transportation, and energy sectors; potential loss of ecosystem services
	Loss of infrastructure services	MODERATE–CATASTROPHIC	$4.7 billion in infrastructure and institutional losses; months-long disruption to transportation, water, and other infrastructure services
Cost to provincial government		MODERATE	Flood response, post-event cleanup, health services, and financial assistance program costs; significant financial assistance from the federal government

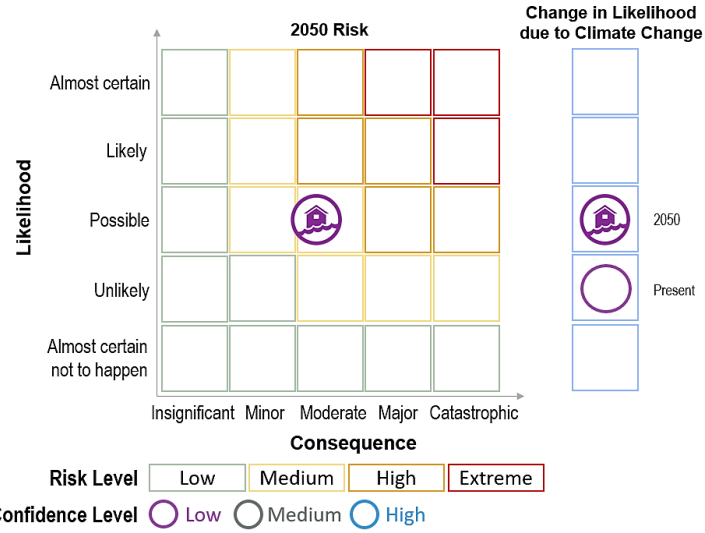
Confidence level indicated by bar color: Low | Medium | High

Additional engagement with Indigenous communities would be needed to understand potential consequences from their perspectives.

Moderate Flooding

Medium Risk

Scenario analyzed: Moderate flood in a single community



Key Findings

B.C. experiences multiple flood events across the province each year. Although the location and severity of flooding varies from year to year, climate change is expected to increase the frequency of both major and moderate flood events. This could include repeat flooding in certain locations, or more flood seasons with simultaneous flooding occurring in multiple communities. The consequences evaluated here are for a single moderate flood event. Individually and cumulatively, more frequent moderate flood events can put a strain on both local and provincial government resources.

Consequences

CATEGORY	CONSEQUENCE	RATING: INSIGNIFICANT / MINOR / MODERATE / MAJOR / CATASTROPHIC	DESCRIPTION
Health	Loss of life	MODERATE	2 to 10 potential fatalities
	Morbidity, injury, disease, or hospitalization	MODERATE	Risk of injuries, environmental contamination, limited access to critical infrastructure and services
Social functioning	Psychological impacts	MODERATE	Stress, fear, or anxiety due to flood damage, temporary displacement, disruptions to utility services
	Loss of social cohesion	MAJOR	Weeks-long disruptions to daily life due to flooded roadways, damage to homes and businesses
Natural resources	Loss of natural resources	MODERATE	Ecosystem stress or damage due to inundation, debris, and water and soil contamination
Economic vitality	Loss of economic productivity	MODERATE	Weeks-long disruption to at least one economic sector, such as tourism or agriculture
	Loss of infrastructure services	MAJOR	Weeks-long disruption to transportation, water, and other infrastructure services
Cost to provincial government		MODERATE	Flood response, post-event cleanup, health services, and financial assistance program costs

Confidence level indicated by bar color: Low | Medium | High

Additional engagement with Indigenous communities would be needed to understand potential consequences from their perspectives.

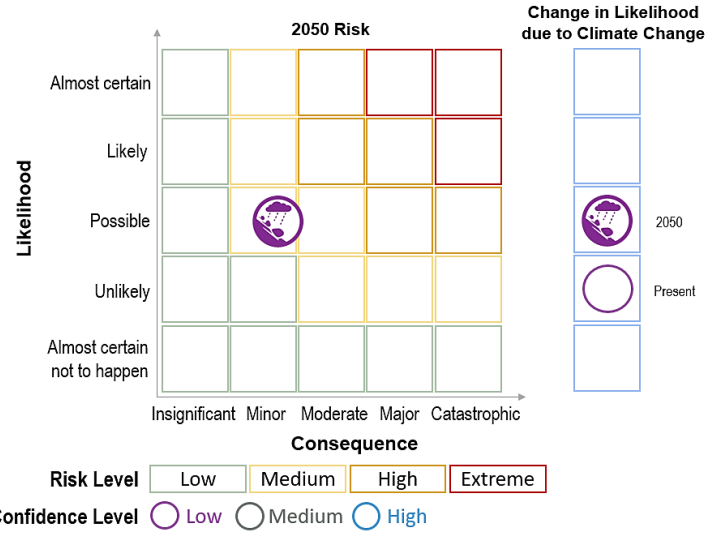
Extreme Precipitation and Landslide

Scenario analyzed: Significant landslide in Hope triggered by extreme precipitation

Key Findings

The majority of precipitation-driven landslides in B.C. are smaller debris flows or rock slides, which are likely to become more frequent due to climate change. This scenario represents an extreme case in which Hope experiences a large and provincially significant precipitation-driven landslide that affects transportation across the province. Disruptions to transportation hubs, such as Hope, can cause significant delays and disruptions to the movement of goods and services. Furthermore, due to the volume of vehicles and trains passing through Hope, there is also a risk for injuries, deaths, property losses, and other damages.

Medium Risk



Consequences

CATEGORY	CONSEQUENCE	RATING (INSIGNIFICANT / MINOR / MODERATE / MAJOR / CATASTROPHIC)	DESCRIPTION
Health	Loss of life	MODERATE	2 to 10 potential fatalities
	Morbidity, injury, disease, or hospitalization	MINOR	Fewer than 10 injuries, disease, or hospitalizations from falling debris or compromised drinking water supplies
Social functioning	Psychological impacts	MINOR	Localized, temporary psychological impacts for those directly affected
	Loss of social cohesion	MINOR	Hours to days-long disruption to transportation affecting daily life; Localized, permanent loss of homes, businesses, other property
Natural resources	Loss of natural resources	INSIGNIFICANT	Minimal overall impacts to natural resources in Hope; significant impacts within path of landslide
Economic vitality	Loss of economic productivity	MODERATE	Weeks-long disruptions to major economic sectors due to damage or destruction of key transportation and utility infrastructure
	Loss of infrastructure services	MODERATE	Days-long disruption to transportation and utility infrastructure
Cost to provincial government		MINOR	Response, recovery, health services, and financial assistance program costs

Confidence level indicated by bar color: Low | Medium | High

Additional engagement with Indigenous communities would be needed to understand potential consequences from their perspectives.

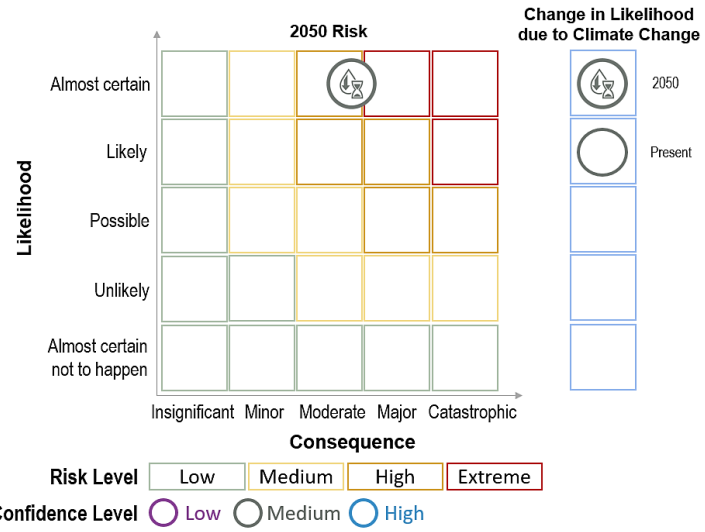
Seasonal Water Shortage

High Risk

Scenario analyzed: Months-long summer water shortage affecting two or more regions of the province

Key Findings

The risk of water shortage in B.C. is projected to increase with climate change due to rising temperatures and changes in precipitation that could affect both rain- and snowmelt-dominated systems. By 2050, water shortages could happen about once every two years or more frequently. The impacts can be wide-ranging and affect drinking water quality, ecosystem health, and water-dependent industries, including agriculture and tourism. Recovery from seasonal water shortages may take months and cost the provincial economy and government millions of dollars.



Consequences

CATEGORY	CONSEQUENCE	RATING: INSIGNIFICANT / MINOR / MODERATE / MAJOR / CATASTROPHIC	DESCRIPTION
Health	Loss of life	MINOR	Low potential for multiple losses of life
	Morbidity, injury, disease, or hospitalization	MODERATE–MAJOR	Over 100 people could experience negative health outcomes due to contaminated water sources, vector-borne disease, or fungal diseases
Social functioning	Psychological impacts	MODERATE	Temporary widespread psychological impacts due to water usage restrictions, economic hardship, and seasonal loss of livelihood
	Loss of social cohesion	MODERATE–MAJOR	Weeks-long disruptions to daily life
Natural resources	Loss of natural resources	MODERATE	Wetland and forest habitats species could take years to recover; fish spawning sites and migration patterns could be affected
Economic vitality	Loss of economic productivity	MODERATE–CATASTROPHIC	Over $1 billion in total economic losses
	Loss of infrastructure services	MODERATE–MAJOR	Weeks-long disruption in electricity production and water treatment
Cost to provincial government		MINOR	Cost for emergency response, recovery, and lost revenue could be tens of millions of dollars

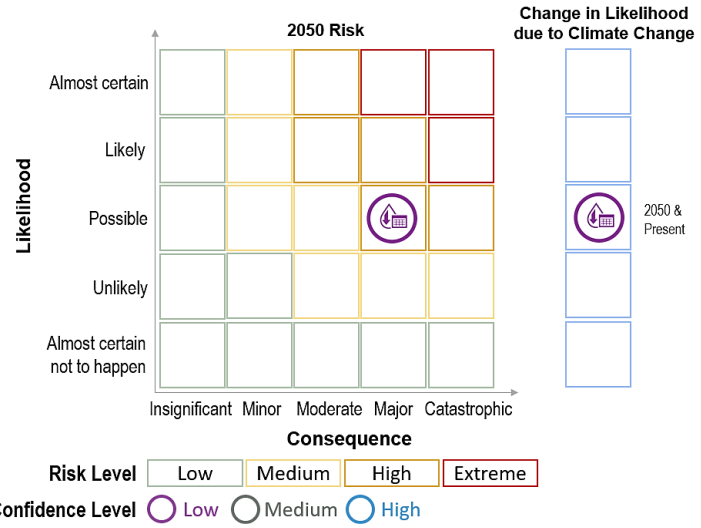
Confidence level indicated by bar color: Low | Medium | High

Additional engagement with Indigenous communities would be needed to understand potential consequences from their perspectives.

Long-term Water Shortage

High Risk

Scenario analyzed: Multi-year water shortage that results in insufficient supplies of both blue water (i.e., liquid surface water) and green water (i.e., moisture in soil and vegetation) in at least one region of the province



Key Findings

The interior of B.C. is particularly susceptible to water shortages, which could be exacerbated due to higher temperatures and below-average seasonal precipitation or streamflow. Multi-year water shortages can reduce agricultural productivity and make land and forests more susceptible to other risks, such as wildfires and insect outbreaks. Recovery of some resources from severe water shortage may take years or decades and cost the provincial economy and government billions of dollars.

Consequences

CATEGORY	CONSEQUENCE	RATING: INSIGNIFICANT / MINOR / MODERATE / MAJOR / CATASTROPHIC	DESCRIPTION
Health	Loss of life		Low potential for multiple losses of life
	Morbidity, injury, disease, or hospitalization		Hundreds of people could suffer from water-borne, vector-borne, or fungal diseases or respiratory ailments
Social functioning	Psychological impacts		Localized disturbance with long-term psychological impacts
	Loss of social cohesion		Months-long disruptions to daily life and permanent loss of livelihood in agriculturally dependent areas
Natural resources	Loss of natural resources		Soil erosion, wetland loss, habitat destruction, and forest degradation that could take decades to recover
Economic vitality	Loss of economic productivity		Over $1 billion in total economic losses
	Loss of infrastructure services		Months-long disruption to electricity production and water treatment
Cost to provincial government			Costs for emergency response and recovery, and lost revenue

Confidence level indicated by bar color: Low | Medium | High

Additional engagement with Indigenous communities would be needed to understand potential consequences from their perspectives.

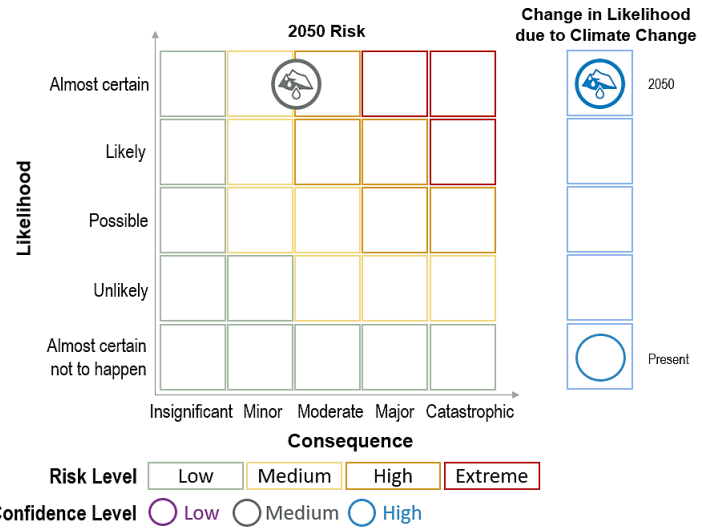
Glacier Mass Loss

High Risk

Scenario analyzed: 25% decline in glacier area by 2050, relative to 2005

Key Findings

Glacier area declined by approximately 11% between 1985 and 2005. Due to projected increases in temperature, glacier area is projected to decline an additional 30 to 50% by 2050. Glaciers represent a vital freshwater resource for the province. By the 2050s, the contribution of glaciers to streams and rivers will decline, and associated streamflow is projected to decrease. Timing, amount, and temperature of flow could affect natural ecosystems and communities. Particularly during summer months, water supply could be reduced for agriculture, power generation, and industry.



Consequences

CATEGORY	CONSEQUENCE	RATING	DESCRIPTION
		INSIGNIFICANT / MINOR / MODERATE / MAJOR / CATASTROPHIC	**Confidence level** indicated by bar color: Low | Medium | High
Health	Loss of life	MINOR	Low potential for multiple losses of life
	Morbidity, injury, disease, or hospitalization	MINOR	Minor risk due to reduced water quantity and quality from glacier-fed sources
Social functioning	Psychological impacts	MINOR	Localized psychological impacts due to loss of identity and livelihood
	Loss of social cohesion	MINOR–MODERATE	Seasonal loss of livelihoods or way of life
Natural resources	Loss of natural resources	MINOR–CATASTROPHIC	Permanent losses to glacier-dependent resources, including streamflow and aquatic ecosystems
Economic vitality	Loss of economic productivity	MINOR	Over $1 million in total economic losses to agriculture and recreation
	Loss of infrastructure services	MINOR	Minor disruptions to transportation, hydropower, agriculture, and other services due to reductions in seasonal water supply
Cost to provincial government		MINOR	Potential costs include lost revenue, reduced hydroelectric capacity, and reduced water rental fees

Additional engagement with Indigenous communities would be needed to understand potential consequences from their perspectives.

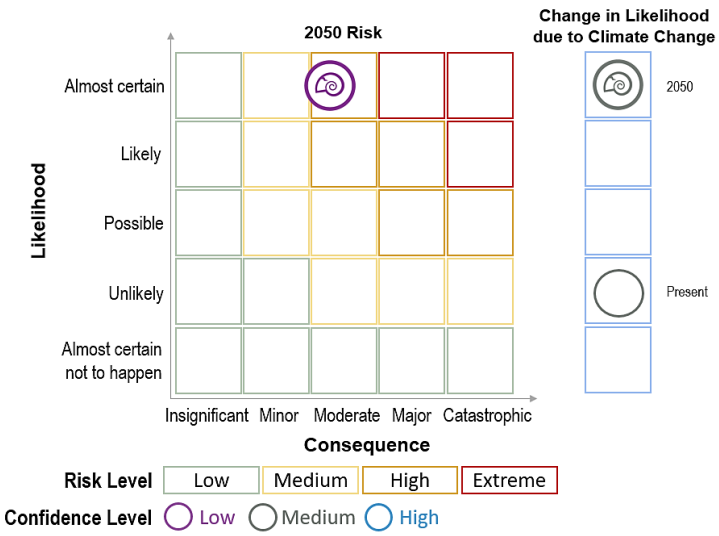
Ocean Acidification

High Risk

Scenario analyzed: 0.15 reduction in pH by 2050

Key Findings

B.C.'s aquaculture industry represents more than half of total aquaculture production in Canada. However, ocean pH levels are at their lowest in 20 million years, threatening B.C.'s shellfish industry and other marine life. For example, ocean acidification prevents or decreases the calcification of shells and skeletons, disrupting shellfish growth and development. A 0.15 reduction in pH, which is projected by 2050, would cause decreased calcification and population decline for a majority of marine shellfish, including oysters, clams, scallops, mussels, pteropods and snails.



Consequences

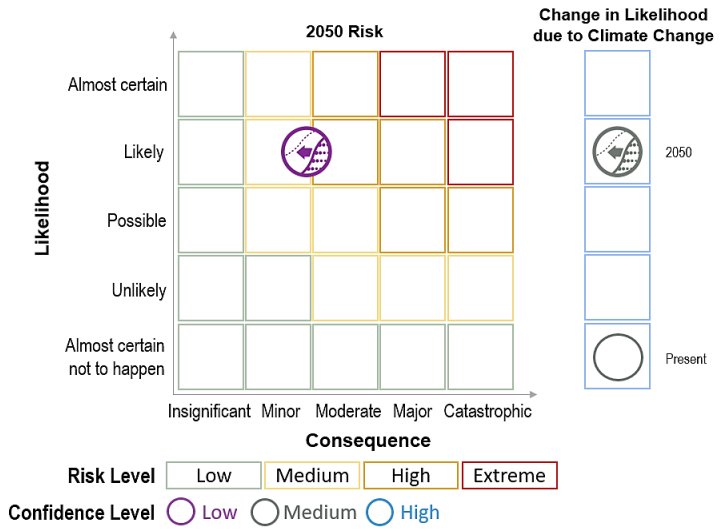
CATEGORY	CONSEQUENCE	RATING	DESCRIPTION
		INSIGNIFICANT / MINOR / MODERATE / MAJOR / CATASTROPHIC	**Confidence level** indicated by bar color: Low | Medium | High
Health	Loss of life	INSIGNIFICANT	No expected loss of life
	Morbidity, injury, disease, or hospitalization	INSIGNIFICANT	No evidence of morbidity, injury, disease, or hospitalization
Social functioning	Psychological impacts	MODERATE	Severe, long-term impacts such as depression or loss of identity for those directly connected to the ocean
	Loss of social cohesion	MODERATE	Permanent loss of livelihoods of way of life for coastal communities and those reliant on the shellfish industry
Natural resources	Loss of natural resources	CATASTROPHIC	Decreased calcification and altered behavioural and chemical responses; species permanently weakened and unable to recover
Economic vitality	Loss of economic productivity	MODERATE	Higher mortality of shellfish, decreased growth and productivity, and job losses within shellfish industry
	Loss of infrastructure services	INSIGNIFICANT	No evidence of loss of infrastructure services
Cost to provincial government		MINOR	Costs include lost revenue, lost taxes, and resources and programs to help shellfish industry cope with acidification

Additional engagement with Indigenous communities would be needed to understand potential consequences from their perspectives.

Saltwater Intrusion

Medium Risk

Scenario analyzed: At least seasonal saltwater intrusion into the Fraser River delta and surrounding communities by 2050



Key Findings

Over the course of the 21st century, sea level rise is expected to eventually lead to coastal inundation of low-lying areas. By 2050, the freshwater/saltwater interface is expected to extend farther up the Fraser River, which may also cause saltwater intrusion of groundwater and freshwater aquifers in low-lying areas of the Fraser River delta region. Saltwater intrusion is expected to have the most significant impacts on freshwater supplies and agriculture, which is a significant component of the delta's economy.

Consequences

CATEGORY	CONSEQUENCE	RATING: INSIGNIFICANT / MINOR / MODERATE / MAJOR / CATASTROPHIC	DESCRIPTION
Health	Loss of life		No evidence of loss of life if freshwater is accessible from other sources
	Morbidity, injury, disease, or hospitalization		No evidence of morbidity, injuries, diseases, or hospitalizations if freshwater is accessible from other sources
Social functioning	Psychological impacts		Moderate and temporary psychological impacts on farmers
	Loss of social cohesion		Seasonal losses of livelihoods; potential loss of trust in the government or water utility
Natural resources	Loss of natural resources		Decline in plant health and soil fertility; change in ecosystem composition and health near saltwater/freshwater interface
Economic vitality	Loss of economic productivity		Decreases in agricultural productivity and impacts on ecosystem services
	Loss of infrastructure services		Permanent loss of existing freshwater wells and aquifers; corrosion of pipelines and pumps
Cost to provincial government			Management of sensitive ecosystems and protected areas; supplying emergency water supplies to affected communities

Confidence level indicated by bar color: Low | Medium | High

Additional engagement with Indigenous communities would be needed to understand potential consequences from their perspectives.

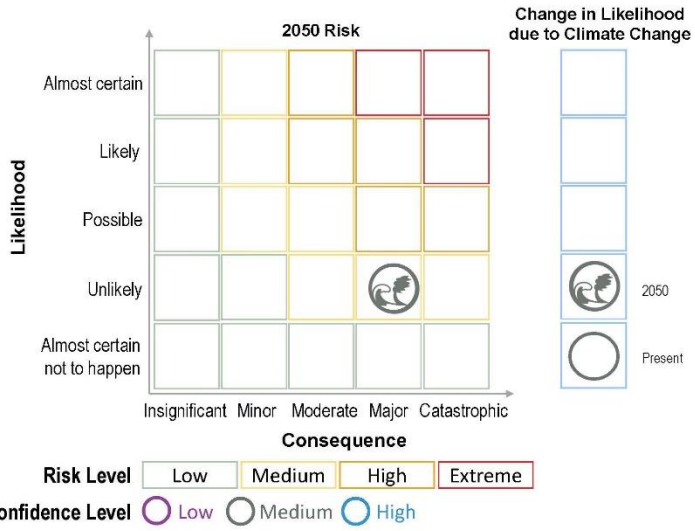
Severe Coastal Storm Surge

Medium Risk

Scenario analyzed: 3.9 m storm surge during a king tide along the B.C. coast

Key Findings

B.C. has more than 27,200 km of coastline and already experiences coastal flooding from storms and king tides. A present-day 500-year winter storm arriving at king tide, combined with 0.5 m of sea level rise, would result in significant flooding along the coast. A 2016 flood vulnerability assessment for the lower mainland revealed that a major coastal flood event would become the costliest natural disaster to date in Canadian history. Approximately four out of five B.C. residents live in coastal areas, increasing the risk of significant impacts to critical infrastructure and daily life.



Consequences

CATEGORY	CONSEQUENCE	RATING: INSIGNIFICANT / MINOR / MODERATE / MAJOR / CATASTROPHIC	DESCRIPTION
Health	Loss of life	MAJOR	10 to 100 potential fatalities
	Morbidity, injury, disease, or hospitalization	MAJOR	100+ people at risk of injuries, disease, limited access to critical infrastructure and services, or environmental contamination
Social functioning	Psychological impacts	CATASTROPHIC	Widespread evacuations, damages, and impacts to transportation or utility services causing stress, anxiety, or depression
	Loss of social cohesion	CATASTROPHIC	Months-long disruptions to daily life for individuals with direct damages; weeks-long disruptions to critical institutions and services
Natural resources	Loss of natural resources	MODERATE	Ecosystem stress or damage due to inundation, debris, and water and soil contamination
Economic vitality	Loss of economic productivity	CATASTROPHIC	$24.7 billion in economic losses including agriculture, transportation, and energy sectors; potential loss of ecosystem services
	Loss of infrastructure services	CATASTROPHIC	$1.8 billion in infrastructure and institutional losses; months-long disruption to transportation, electrical, and other infrastructure services
Cost to provincial government		MAJOR	Flood response, post-event cleanup, health services, and financial assistance program costs

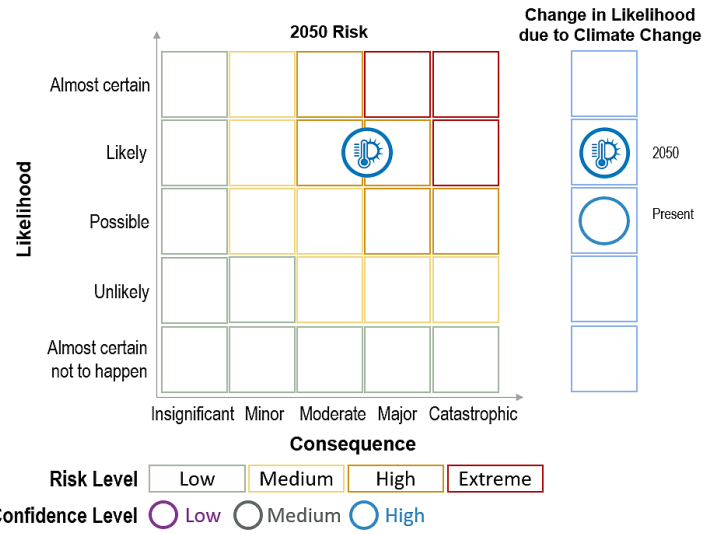
Confidence level indicated by bar color: Low | Medium | High

Additional engagement with Indigenous communities would be needed to understand potential consequences from their perspectives.

Heat Wave

High Risk

Scenario analyzed: Heat wave of at least three days that affects human health



Key Findings

In Canada, extreme heat events are the leading weather-related cause of death. People tend to adapt to gradually rising temperatures, but extreme heat events relative to average temperatures can manifest in dire health consequences. Heat waves are projected to become more common, and occur every three to ten years by 2050. In addition to health consequences—particularly to vulnerable populations—a heat wave could result in stress to infrastructure and transportation systems, economic productivity, and ecosystems.

Consequences

CATEGORY	CONSEQUENCE	RATING: INSIGNIFICANT / MINOR / MODERATE / MAJOR / CATASTROPHIC	DESCRIPTION
Health	Loss of life		Over 100 potential fatalities
	Morbidity, injury, disease, or hospitalization		Over 1,000 people with negative health impacts, ranging from dehydration to heat stroke and respiratory illnesses
Social functioning	Psychological impacts		Widespread and severe mental, behavioral, and cognitive disorders
	Loss of social cohesion		Days-long disruption to daily life, along with marginalization of vulnerable populations and the possibility of violent crime
Natural resources	Loss of natural resources		Heat stress or damage to wildlife, forests and fish; recovery could take months
Economic vitality	Loss of economic productivity		Over $100 million in total economic losses
	Loss of infrastructure services		Days-long disruption to electricity and transportation systems
Cost to provincial government			Potential costs include emergency management and response and short-term losses in productivity and associated tax revenue

Confidence level indicated by bar color: Low | Medium | High

Additional engagement with Indigenous communities would be needed to understand potential consequences from their perspectives.

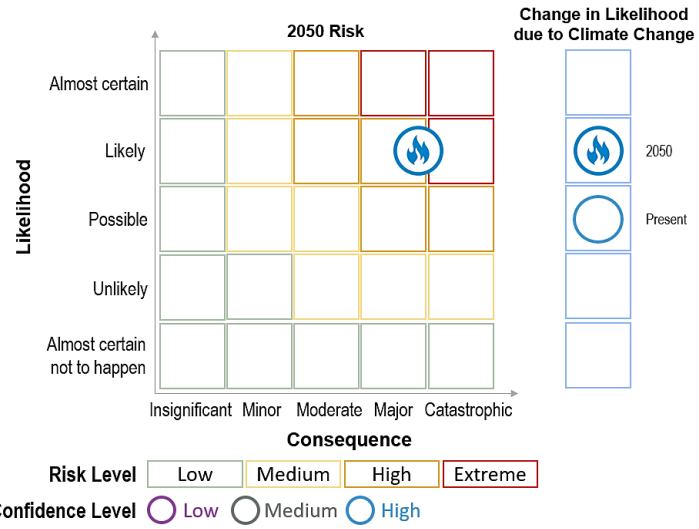
Severe Wildfire Season

Scenario analyzed: At least one million hectares burned that affect human settlements and significant infrastructure

Key Findings

Recent years have seen record-breaking wildfires, and the annual area burned in B.C. is projected to increase by 2050. Severe wildfires could contribute to negative health outcomes due to exposure to smoke, particulate matter, and other hazardous substances. Displacement due to wildfires, along with loss of possessions and livelihoods, could contribute to extreme psychological distress as well as economic losses to thousands of citizens. Severe wildfires may also disrupt operations and damage infrastructure across multiple sectors.

High Risk



Consequences

CATEGORY	CONSEQUENCE	RATING (INSIGNIFICANT / MINOR / MODERATE / MAJOR / CATASTROPHIC)	DESCRIPTION
Health	Loss of life	MODERATE	Over 100 potential fatalities due to direct and indirect exposure
	Morbidity, injury, disease, or hospitalization	MINOR – MAJOR	Risk of short-lived smoke irritation, severe respiratory and cardiovascular symptoms, and other illnesses for more than 1,000 people
Social functioning	Psychological impacts	MINOR – MAJOR	Major losses and displacement could lead to long-term psychological impacts
	Loss of social cohesion	MINOR – MAJOR	Months- to years-long disruptions to daily life for tens of thousands of people; agricultural and forestry livelihoods lost
Natural resources	Loss of natural resources	MODERATE	Damage to forests and forest ecosystems, displacement of wildlife, and degradation of water quality could take decades to recover
Economic vitality	Loss of economic productivity	MINOR – MAJOR	Over $1 billion in total economic losses due to operational disruption and physical damages to businesses
	Loss of infrastructure services	MODERATE	Months-long disruption in transport, electricity supply, telecommunications, water and wastewater treatment
Cost to provincial government		MODERATE	Costs include fire suppression and emergency management

Confidence level indicated by bar color: Low | Medium | High

Additional engagement with Indigenous communities would be needed to understand potential consequences from their perspectives.

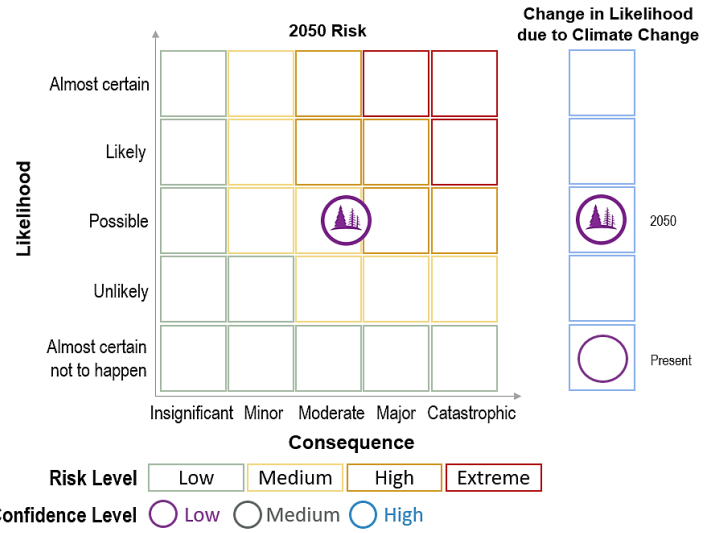
Loss of Forest Resources

Scenario analyzed: 25% decline in timber growing stock by 2050

Key Findings

With warmer temperatures and precipitation changes, B.C.'s forests could experience greater losses due to pests and wildfire, which have already destroyed millions of hectares of forest in past decades. Loss of forest resources could have detrimental effects to natural resources and economic productivity. Many species depend on forests for habitat and ecosystem regulation. In addition, the scenario could result in rising unemployment, loss of livelihoods for forestry-dependent communities, and significant economic losses to the provincial economy.

Medium Risk



Consequences

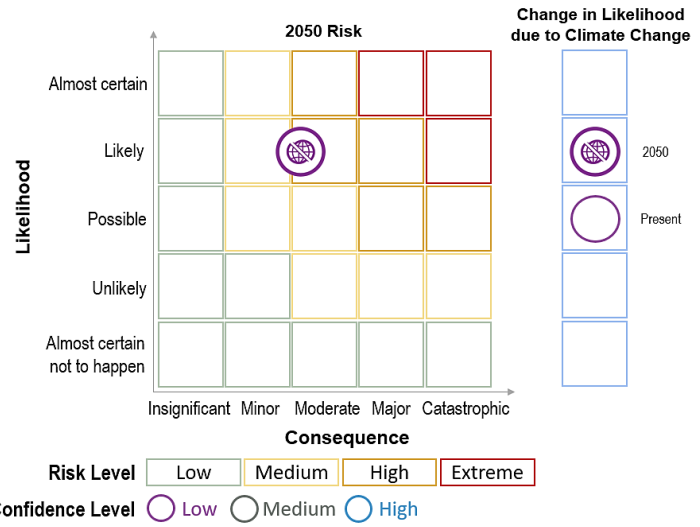
CATEGORY	CONSEQUENCE	RATING	DESCRIPTION
		INSIGNIFICANT / MINOR / MODERATE / MAJOR / CATASTROPHIC	**Confidence level** indicated by bar color: Low | Medium | High
Health	Loss of life		Loss of life is unlikely
	Morbidity, injury, disease, or hospitalization		Mild impacts from changes in pollen and allergens, reduced water quality, and disruption to ecosystem services
Social functioning	Psychological impacts		Mild widespread effects due to loss of aesthetic value and recreation; more severe impacts for those with forest-dependent livelihoods
	Loss of social cohesion		Localized, permanent losses of livelihood in the forestry industry
Natural resources	Loss of natural resources		Reduced habitat and biodiversity, increased erosion and sedimentation, and a decline in ecosystem services
Economic vitality	Loss of economic productivity		Over $1 billion in total economic losses to forestry, logging, and supported industries
	Loss of infrastructure services		Disruptions to daily life from abandoned forest roads
Cost to provincial government			Costs include losses in tax revenue, stumpage fees, and tourism revenue

Additional engagement with Indigenous communities would be needed to understand potential consequences from their perspectives.

Reduction in Ecosystem Connectivity

Medium Risk

Scenario analyzed: Reduction in ecosystem connectivity in the Okanagan-Kettle region by 2050



Key Findings

Ecosystem connectivity is vital for facilitating movements of wildlife populations, maintaining species diversity, and maintaining high-quality habitats. Climate change and human development threaten ecosystem connectivity in the Okanagan-Kettle region by disconnecting and changing species' habitat and causing ecosystem shifts. For areas with decreasing habitat suitability for a species, these changes can cause further isolation of habitats and decline of habitat quality. These changes can affect ecosystem services and biodiversity.

Consequences

CATEGORY	CONSEQUENCE	RATING: INSIGNIFICANT / MINOR / MODERATE / MAJOR / CATASTROPHIC	DESCRIPTION
Health	Loss of life		No evidence of loss of life
	Morbidity, injury, disease, or hospitalization		No evidence of morbidity, injuries, diseases, or hospitalizations
Social functioning	Psychological impacts		Moderate psychological impacts (e.g., fear, anxiety, grief); loss of identity or sense of place for individuals whose identify or livelihoods are embedded in the land
	Loss of social cohesion		Localized and permanent loss of livelihood or way of life
Natural resources	Loss of natural resources		Climatic shift and changes in ecosystem connectivity for all ecosystems with implications for ecosystem services and biodiversity
Economic vitality	Loss of economic productivity		Long-term disruption and job losses for agriculture, forestry, and tourism industries; significant losses in ecosystem services
	Loss of infrastructure services		Loss of ecosystem services benefits (e.g., water filtration or flood control)
Cost to provincial government			Costs include replacing lost ecosystem services, damage compensation for increased wildlife pressure on agricultural land, and recovery efforts for declining species or ecosystems

Confidence level indicated by bar color: Low | Medium | High

Additional engagement with Indigenous communities would be needed to understand potential consequences from their perspectives.

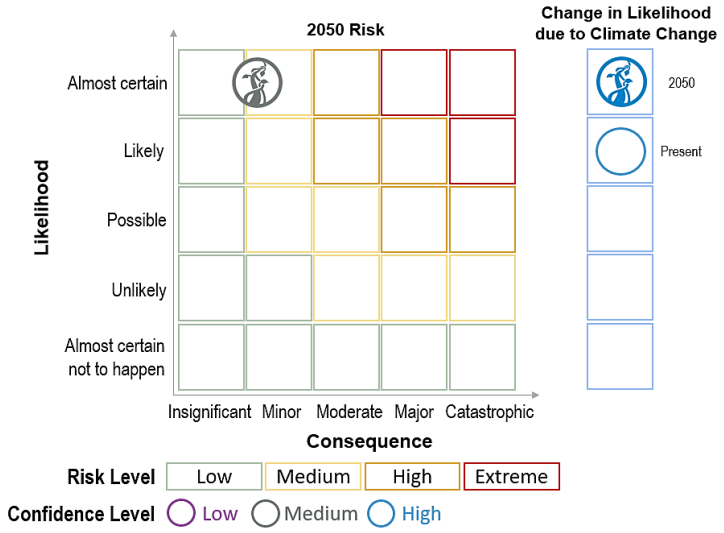
Increase in Invasive Species (knotweed)

Medium Risk

Scenario analyzed: Expansion of knotweed by 2050

Key Findings

Knotweed is identified by the International Union for Conservation of Nature as one of the world's 100 worst invasive species. Knotweed is one of the primary invasive species B.C. is working to control, in part due to its ability to grow through concrete and asphalt. Knotweed currently occupies only a small fraction of its total potential range, which could expand as temperatures increase, leading to negative consequences for infrastructure integrity and the health and abundance of native species. The potential consequences of knotweed expansion can be managed as long as its spread is controlled, which could be costly.



Consequences

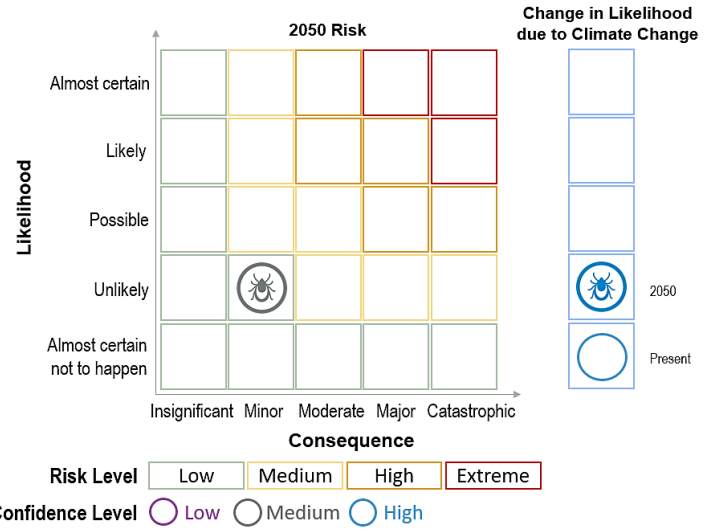
CATEGORY	CONSEQUENCE	RATING	DESCRIPTION
		INSIGNIFICANT / MINOR / MODERATE / MAJOR / CATASTROPHIC	**Confidence level** indicated by bar color: Low | Medium | High
Health	Loss of life		No expected loss of life
	Morbidity, injury, disease, or hospitalization		Fewer than 10 people could experience injury or hospitalization due to poor knotweed management
Social functioning	Psychological impacts		Localized and moderate fear and anxiety due to knotweed found on or near property
	Loss of social cohesion		Minimal impact on daily life; minor erosion of public trust in government
Natural resources	Loss of natural resources		Negative impacts on species or ecosystems; damage to surrounding ecosystem from prolonged herbicide treatment
Economic vitality	Loss of economic productivity		Limited loss of productivity; damage/disruption to infrastructure, agriculture, and goods movement
	Loss of infrastructure services		Nuisance knotweed treatment for transportation asset owners; no disruption to infrastructure services or daily life if treated
Cost to provincial government			Treatment and disposal costs on Crown lands

Additional engagement with Indigenous communities would be needed to understand potential consequences from their perspectives.

Increased Incidence of Vector-borne Disease (Lyme disease)

Low Risk

Scenario analyzed: At least a doubling of Lyme disease cases within B.C. over three years, occurring before 2050



Key Findings

The risk of Lyme disease in B.C. has remained relatively low while the infection has spread rapidly in the eastern part of the country. Although a rapid increase in infection in B.C. is unlikely to occur by 2050, it would result in major impacts to a relatively small number of people. Lyme disease can lead to severe and chronic health symptoms in addition to potential disenfranchisement and depression due to misdiagnosis or persistent morbidity. Individuals affected by Lyme disease may not be able to participate in day-to-day activities, contributing to economic losses. Costs of public education and patient treatment could increase.

Consequences

CATEGORY	CONSEQUENCE	RATING: INSIGNIFICANT / MINOR / MODERATE / MAJOR / CATASTROPHIC	DESCRIPTION
Health	Loss of life	MINOR	Low potential for multiple losses of life
	Morbidity, injury, disease, or hospitalization	MODERATE	22-120 people could experience a range of symptoms, from mild fever, rash, and headaches to more severe and chronic issues
Social functioning	Psychological impacts	MODERATE	Patients could experience symptoms similar to psychiatric disorders
	Loss of social cohesion	MINOR	Public outrage and erosion of public trust
Natural resources	Loss of natural resources	INSIGNIFICANT	No evidence of impacts to natural resources
Economic vitality	Loss of economic productivity	INSIGNIFICANT	Over $1 million in total economic losses due to losses in productivity and revenue from outdoor recreation
	Loss of infrastructure services	INSIGNIFICANT	No evidence of impacts to infrastructure services
Cost to provincial government		MINOR	Increased cost to the health system; losses in revenue and costs for public outreach

Confidence level indicated by bar color: Low | Medium | High

Additional engagement with Indigenous communities would be needed to understand potential consequences from their perspectives.

REPORT | SEPTEMBER 2020

Territorial Analysis and Survey of Local Government Priorities for Climate Action: Vancouver Island and Coastal Communities

PICS
PACIFIC INSTITUTE FOR CLIMATE SOLUTIONS

University of Victoria

We gratefully acknowledge the support of the Pacific Institute for Climate Solutions to undertake this work.

Document produced for the Vancouver Island and Coastal Communities Climate Leadership Plan Steering Committee (VICC CLP SC) by: Tamara Krawchenko, Katya Rhodes, Kimberly Harrison, Katherine Pearce, Kara Shaw, Astrid Brousselle, Tara Ney, Catriona Mallows (University of Victoria).

This report develops a collective understanding of the Vancouver Island and Coastal Community (VICC) region for the purposes of supporting a regional climate action strategy. Part 1: Territorial Analysis outlines key geographic, socio-demographic, economic, and environmental features of the VICC region in support of establishing a regional climate action plan. Part 2: Survey of climate adaptation and mitigation priorities identifies the key climate impacts, policies, priorities, barriers, and opportunities that currently guide decision-making about climate change mitigation and adaptation in the region.

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COVER PHOTO: Cortes Island, Catriona Mallows

Table of Contents

List of Tables

Table of Figures

Executive Summary

Urgent mitigation and adaptation efforts are needed. The Vancouver Island and Coastal Communities (VICC) region is already experiencing unique climate changes. Vancouver Island and Coastal Communities Climate Leadership Plan (VICC-CLP) has been convened to help catalyze climate mitigation and adaptation throughout the region. This report shares a territorial analysis (Part 1) and a survey of municipalities and districts and their approaches to climate action (Part 2).

Nearly all communities in the VICC region are *already* experiencing hazards and impacts related to climate change. The key hazards include wildfires, extreme rainfall, sea level rise, storm surges, extreme winds, and drought, while the top impact indicated by both municipalities and regional districts was to coastal ecosystems. There is some geographical variation in the hazards and impacts experienced. For example, impacts on tourism are the main concern for northern island communities whereas southern communities are concerned with impacts on land-use and coastal ecosystems. The majority of survey respondents expect climate change related hazards and impacts to continue and/or worsen into the future, and some anticipate new hazards and impacts not previously experienced.

Municipalities and regional districts are overwhelmingly supportive of climate action. 100% of local governments surveyed answered that climate change mitigation and adaptation are important or somewhat important to their community. The vast majority of municipalities and all regional districts also indicated that their communities are supportive of implementing mitigation and adaptation policies, with the highest support observed for pedestrian and cycling infrastructure (mitigation) and emergency management planning (adaptation). Most municipalities and all regional districts have implemented a variety of policies related to climate change mitigation and adaptation, with the types of policies varying by geography. Medium/large municipalities have a higher number of implemented policies compared to small municipalities. Despite the ongoing climate policy work and high levels of support for climate action, local governments face multiple climate action barriers, in particular related to lack of financial resources, authority and staffing capacity. Most local governments also noted the need for community-level climate and policy modelling information to plan for the future.

Local government cooperation and scaling-up efforts will be critical. The VICC has unique characteristics. It encapsulates many coastal communities including coastal and mountainous communities north of Vancouver. The vast majority (80%) of the VICC population resides in small to large population centers, while the remaining 20% live in what can be defined as rural areas—i.e., those without a population centre. Many rural areas have particularly high residential GHG emissions and high energy costs, especially those that rely on diesel power generators. Rural-urban connections and interrelationships are a key character of the VICC's society and economy—these connections are equally important for tackling climate change and scaling up efforts.

There is a need for increased senior government support to assist municipalities and regional districts in effective climate action. This support could help build essential low-carbon infrastructure and fund community-level modelling projections to implement most effective municipal and regional climate policies.

Introduction to the study

Territorial Acknowledgement

The authors respectfully acknowledge that the Vancouver Island and Coastal Communities Region is located upon the traditional unceded territories of many different Indigenous peoples. Although every effort is made to use unbiased data, much of the data is not framed to adequately reflect Indigenous realities.

The climate change challenge

Climate change is a complex and ongoing challenge that communities across the Vancouver Island and Coastal Communities Region (VICC) are tackling through a range of approaches. By 2050, it is anticipated that British Columbia will experience:

- Temperature increases of 1.3 to 2.7 °C;
- Increases in average annual rainfall from 2% to 12%, with summers being increasingly drier;
- Loss of glaciers resulting in changes to fish habitat, declining quality and storage of drinking water; and
- Continued rising sea levels along most of B.C.'s coast, more frequent wildfires and rainfalls (Province of British Columbia, 2020).

These environmental changes will have wide-ranging effects, from more frequent and severe heat waves and a greater propensity for forest fires to major disruptions in agricultural growing conditions. Climate change impacts all sectors of society and the economy now and in the future. Our communities are connected in tackling this challenge.

Why coordinate at the regional scale?

British Columbia has been at the forefront of actions to promote climate change mitigation and adaptation and there is widespread support for these efforts.[1] Communities big and small across the province have adopted a range of initiatives and there are a growing number of regional plans that aim to scale up these efforts and to promote co-ordinated actions. Climate change impacts are experienced at a local level, yet existing municipal and regional district governance structures can constrain climate action plans, making planning at a broader regional scale essential. An expanded regional scale for action has proved effective in other contexts, leading to the development of institutional arrangements better able to coordinate regional with local interests to navigate structural change (Birkmann, Garschagen, Kraas, & Quang, 2010; Gore, 2010). Regionally-scaled planning can help municipalities and Regional Districts to:

- Pool knowledge and map and understand functionally connected territories;
- Share expertise and build capacity;
- Share the costs of environmental assessments and other upfront planning needs;
- Co-ordinate and scale-up investments in adaptation and mitigation efforts;

[1] For example, British Columbia was the first jurisdiction in North America to have a revenue-neutral carbon tax and the government's CleanBC Plan has been notable across Canada for its vision and comprehensive ambitions.

- Speak with a common and louder voice to upper level governments about the region's unique needs and priorities; and
- Mutually support communities of all sizes to meet their climate goals, with larger administrations supporting smaller ones.

It is for this reason that three Vancouver Island Mayors—Lisa Helps (Victoria), Josie Osborne (Tofino), Michelle Staples (Duncan)—have convened an ad-hoc group: the Vancouver Island and Coastal Communities Climate Leadership Plan, VICC CLP SC. The VICC CLP SC includes representatives from each of the regional districts on the island and the Sunshine Coast to produce a plan that will catalyze climate mitigation and adaptation throughout coastal region.

The VICC represents a promising geographical region for this type of planning: comprised of island and coastal communities, the region shares a common history, as well as vulnerabilities, adaptation, and mitigation challenges. Its economic diversity and urban-rural linkages offer differential capacities and priorities, supporting the potential for building circular and sustainable economies with shared resources and coordinated action. The VICC CLP SC group shares a clear vision and priorities for its work, suggesting the potential for rapid collective progress. Collaborative planning at this scale thus offers a potential to build consensus and poly-benefits for climate action, including a shared regional vision to guide that action effectively and rapidly (Tomaney, Krawchenko, & McDonald, 2019).

This report proceeds in two parts.

- **Part 1: Territorial Analysis** outlines key geographic, socio-demographic, economic, and environmental features of the VICC region in support of establishing a regional climate action plan.
- **Part 2: Survey of climate adaptation and mitigation priorities** identifies the key climate impacts, policies, priorities, barriers, and opportunities that currently guide decision-making about climate change mitigation and adaptation in the region.

Please note that the Territorial Analysis (Part 1) covers the full VICC region, while the Survey (Part 2) covers Vancouver Island and the Sunshine Coast.

Part 1 Territorial Analysis

This Territorial Analysis supports a collective understanding of the key geographic, socio-demographic, economic, and environmental features of the VICC region in support of establishing a regional climate action plan. The analysis proceeds in six parts: i) about the region, ii) land use and the built environment, iii) population and demography; iv) economy and industry, v) community wellbeing, vi) the state of greenhouse gas emissions and vii) present and future climate change scenarios. This document identifies key trends and common challenges and opportunities in order to assist VICAPG with its planning and strategy development.

About the Region

- **The Vancouver Island and Coastal Communities Region is comprised of 11 Regional Districts, 89 First Nations Reserves and Indian Government Districts and 41 municipalities.**
- **The entirety of Vancouver Island and coastal mainland BC are the traditional territories of Indigenous peoples.**
- **Much of the territory and population is rural and remote with numerous small coastal and island communities: 40% of the population lives in Greater Victoria, 20% in medium sized population centres and 40% in small urban population centers and rural areas.**

The Vancouver Island and Coastal Communities region has unique characteristics that pose both a challenge and an opportunity for collective climate change adaptation and mitigation strategies. The region is shaped by its proximity to water and includes approximately 40,000 islands of vastly different sizes and around 67 inhabited major islands, the largest of which is Vancouver Island. Many communities rely on connections to water for both transportation and livelihoods. Given the prevalence of coastlines, sea level changes pose risks as does the prospect of more frequent and severe storms. The mainland part of the region north of Vancouver is coastal and mountainous, with many areas having limited accessibility. In this region land transport connections flow east-west towards the Pacific. Coastal routes are the life-blood of communities.

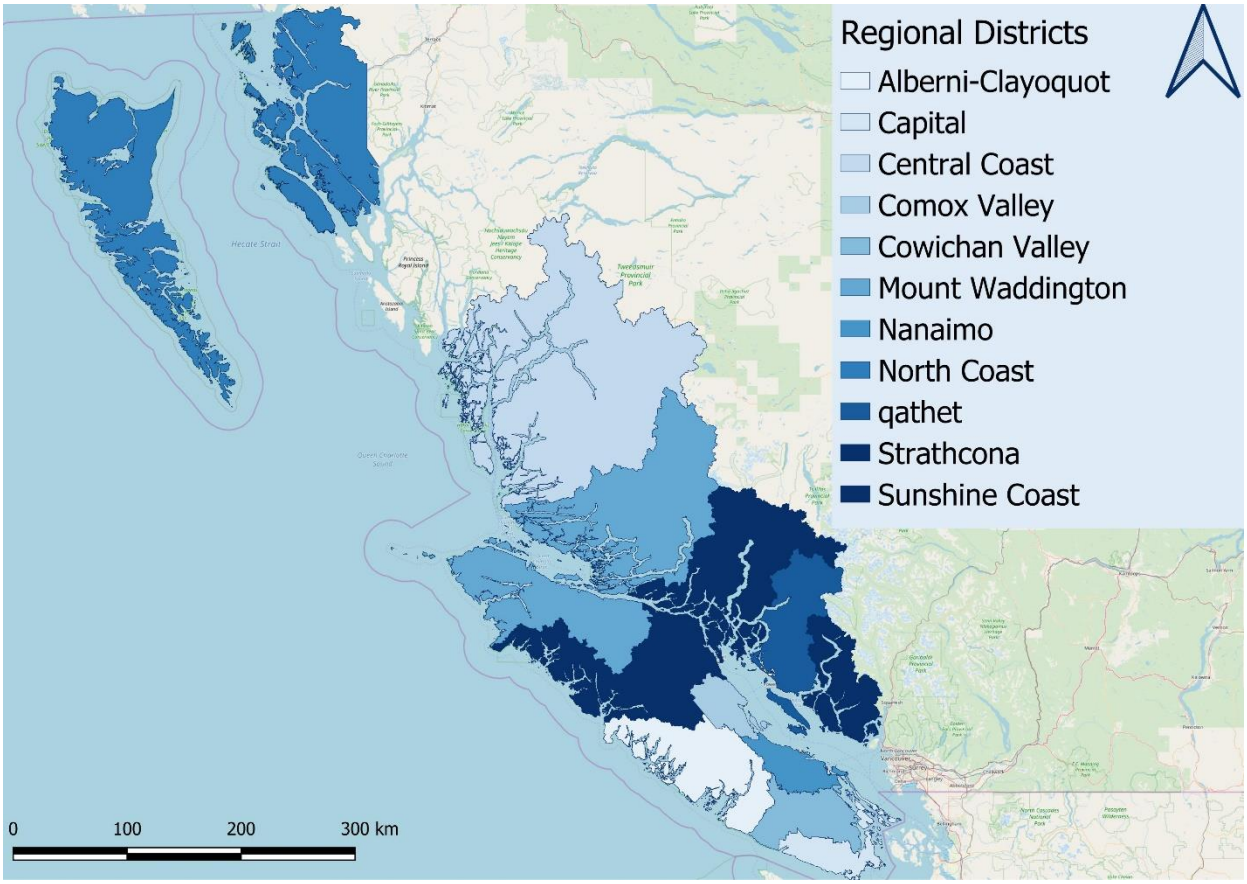
The Vancouver Island and Coastal Communities region is one of five Area Associations in BC

The territory of analysis in this document corresponds to that of the Association of Vancouver Island and Coastal Communities (AVICC), which is one of five area associations in BC. The area association was established in 1950 and includes including 41 municipalities, 11 regional districts, and Islands Trust (see Figure 1 Vancouver Island and Coastal Communities Regional Districts) that stretch from Haida Gwaii down to the tip of Vancouver Island and includes Powell River/qathet, the Sunshine Coast, the Central Coast, and the North Coast (AVICC, 2020). The Capital district at the southern tip of Vancouver Island is the largest district in the territory in terms of population and number of municipalities; it is also the seat of the provincial government. All

districts contain both municipalities and electoral areas except for the Central Coast regional district, which contains only electoral areas.

The entirety of Vancouver Island and coastal mainland BC are the traditional unceded territories of Indigenous peoples. All of the Regional Districts have First Nations reserves; the Alberni-Clayoquot Regional District has the largest number of First Nations reserves with 17, as per 2016 Census records (Table 1). The Capital Regional District has the largest on-reserve population at just over 5,000 (2016). Both qathet and Sunshine Coast Regional Districts have an Indian Government District municipality (the Sechelt Band IGD has lands in both regions) and, like Comox Valley, one reserve. There is a large population of Indigenous people living off reserve – comprising as much as 30% of the population in the North Coast district, 17% in Mount Waddington Regional District, and 13% in Alberni-Clayoquot Regional District.

Figure 1 Vancouver Island and Coastal Communities Regional Districts



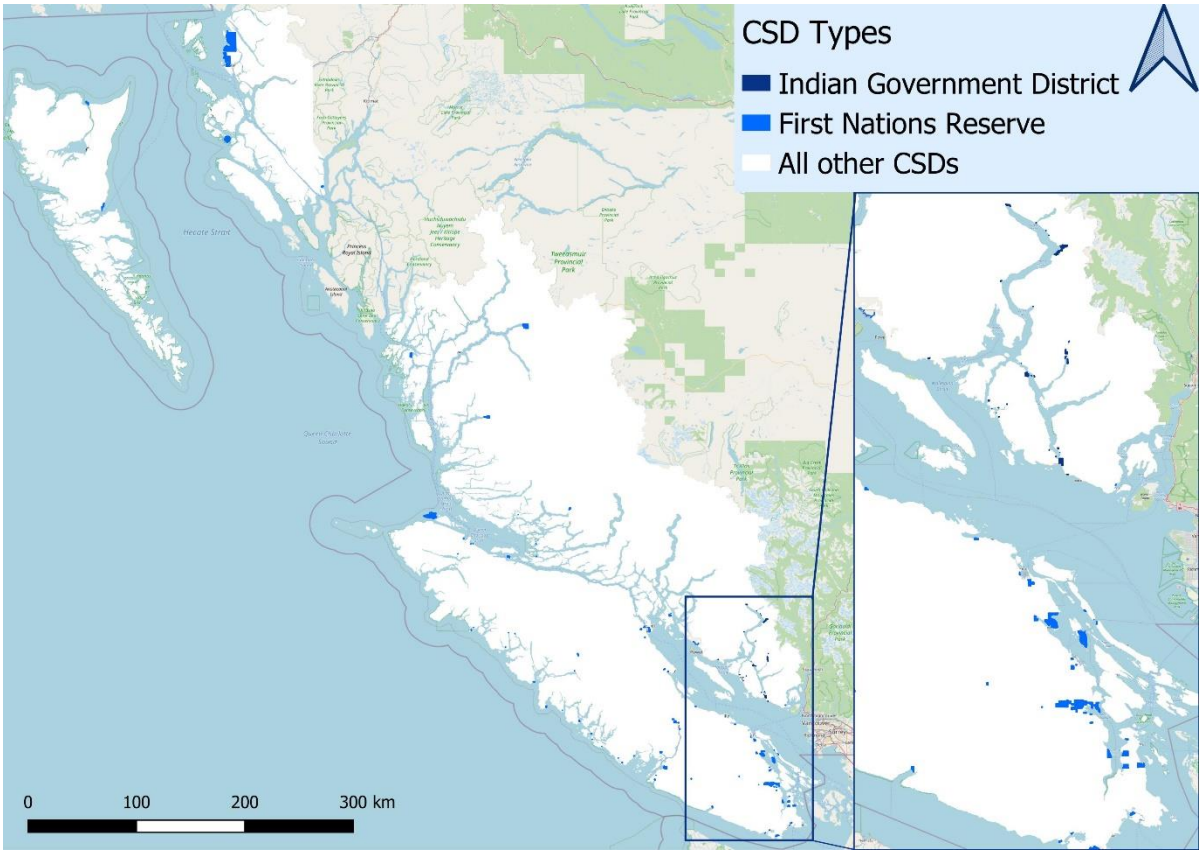
Source: British Columbia Data Catalogue. https://catalogue.data.gov.bc.ca/dataset/d1aff64e-dbfe-45a6-af97-582b7f6418b9 & https://catalogue.data.gov.bc.ca/dataset/nts-bc-coastline-polygons-1-250-000-digital-baseline-mapping-nts#edc-pow

Table 1 Municipalities, Population, and First Nations Reserves, by Regional District, 2016

Regional District	Municipalities	Total Population by District	First Nations Reserves and Indian Government Districts by Census Divisions	Population of First Nations Reserves and Indian Government Districts by Census Divisions, 2016	Population of Indigenous people living off reserve
Alberni-Clayoquot	3, + 6 electoral areas, 3 Modern Treaty First Nations	30,981	17	1,986	4,049
Capital	13, + 3 electoral areas	383,360	10	5,244	12,631
Central Coast	5 electoral areas	3,319	3	1,916	129
Comox Valley	3, + 3 electoral areas	66,527	2	222	3,603
Cowichan Valley	4, + 9 electoral areas	83,739	16	4,076	5,584
Mount Waddington	4, + 4 electoral areas	11,035	12	1,490	1,850
Nanaimo	4, + 7 electoral areas	155,698	4	1,035	9,600
North Coast	5, + 4 electoral areas	18,133	7	2,531	5,504
qathet	1, + 5 electoral areas	20,070	2	728	847
Strathcona	5, + 4 electoral areas	44,671	14	1,579	4,276
Sunshine Coast	3, + 5 electoral areas	29,970	2	671	1,349

Sources: Regional District Websites & Statistics Canada; Census Profile 2016; Census Divisions and Census Subdivisions, Statistics Canada. 2017. Focus on Geography Series, 2016 Census. Statistics Canada Catalogue no. 98-404-X2016001. Ottawa, Ontario. Data products, 2016 Census.

Figure 2 First Nations Reserves and Indian Governments Districts, VICC, 2016



Source: Statistics Canada; Census Profile 2016; Census Subdivisions

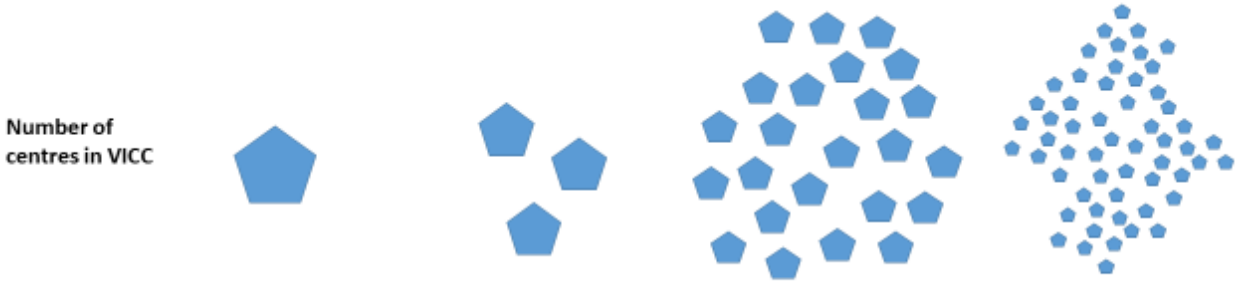
Much of the region is low density, characterised by small communities—rural-urban connections are critical to this region

The vast majority (80%) of the VICC population resides in small to large population centers, while the remaining 20% live in what can be defined as rural areas—i.e., those without a population centre (Figure 3). However, despite this definition, rurality is best understood along a gradient of more connected and dense places to less connected and dense ones. Smaller communities and rural areas may access services and labour markets in larger population centres; at the same time, these communities provide many resources and amenities that larger communities consume and enjoy, and are also a source of employment. Rural-rural connections are equally important. Across VICC, the nature of these connections and interrelationships are a key character of society and economy.

Greater Victoria is the only large population centre with a population greater than 100,000 (Figure 4Figure 4 Population Centres, VICC). Population centers are those places that have a population density of 400 persons or more per square kilometre and include more than one municipality. There are three medium-sized population centres across the region, all on the eastern coast of Vancouver Island: Nanaimo, Courtenay, and Campbell River (Figure 4). The majority of the population

centres in the region are in the middle and southern regions of Vancouver Island, forming a land-based network of urban agglomerations. There are few centres on the mainland coast, the largest being Prince Rupert. There are 24 small urban population centres. There is only one regional district without any population centres: the Central Coast.

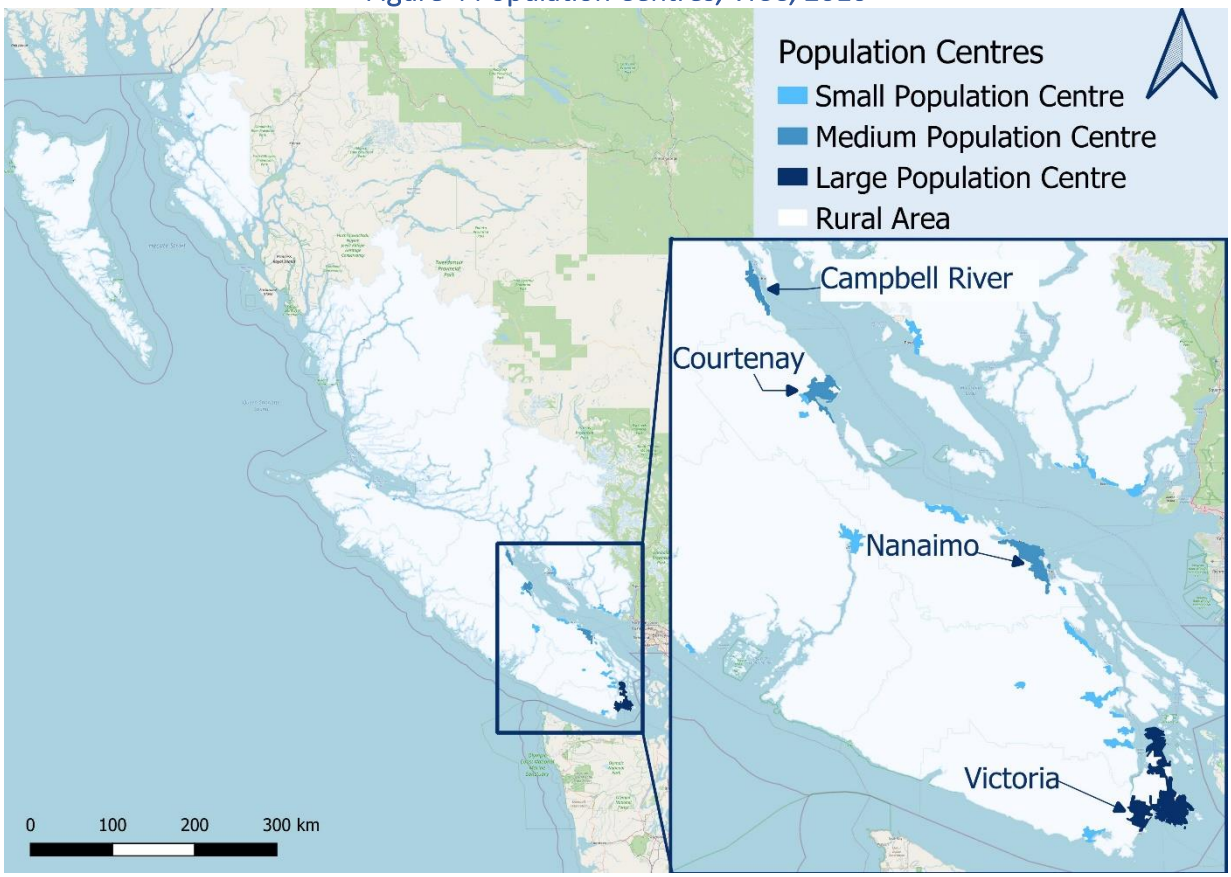
Figure 3 Urban Hierarchy by Population Centre, VICC, 2016



Type	Large urban population centres	Medium urban population centres	Small urban population centres	Rural area
Population range	100,000+	30,000 – 99,999	1,000-29,999	<1,000
Population by type	335,696	172,160	168,017	171,630
Share of population out of total	40%	20%	20%	20%

Source: Statistics Canada; Population Centre and Rural Area Classification 2016 & Population Centre Profiles, 2016 Census

Figure 4 Population Centres, VICC, 2016



Source: Statistics Canada; Census Profile 2016; Population Centres.

Land Use and the Built Environment

- **The VICC has vast forested land (60%); around 7.5% of the land has been recently or selectively logged (logged within the past 20 years)**
- **The VICC has rich ecosystems and many protected areas, including marine protected areas and Tribal Parks.**
- **A vast network of roads, ferry routes, and air travel connect people and trade across the territory; rural, remote and islands communities are at higher risk of transport disruption and isolation due to hazards (e.g., rising sea levels and more frequent and severe storms).**
- **Rural and urban areas are connected; around 8.4% of the population commutes long distances between Census Metropolitan Areas (CMA) and Census Agglomerations (CA).**
- **There are many car commuters across the southern and eastern areas of Vancouver Island; this may be in part due to high housing costs in some locales leading individuals to live in more affordable communities further from their places of work (growing suburbanisation).**

Land is life sustaining. It provides food, places to live, and its uses are fundamental to the robustness of ecosystems, air quality and even global temperatures. Human transformation of land uses has caused the fragmentation of habitats, the loss of biodiversity and the degradation of soil and water and has impacted the global carbon cycle.[2] Health outcomes are linked to land use in a myriad of ways—from the health benefits of walkable communities to the impacts of greenspaces on mental health. A wide range of social outcomes are influenced by land use; land availability is one of the major determinants of housing costs. Land and the property built on it constitute a major share of society wealth and can be a source of inequality. Land and its use also matters because people are attached to land and how it is used. Land is tied to places, communities, cultures and identities. For Indigenous peoples, land holds special importance—it provides sustenance for current and future generations; it is connected to spiritual beliefs, traditional knowledge and teachings; it is fundamental to cultural reproduction; moreover, commonly held land rights reinforce nationhood.

The unique geography of VICC creates both opportunities and challenges

VICC is a complex terrain. Included in its geography are the Coast Mountains, the Vancouver Island Ranges, and vast forests largely of Hemlock, Fir, Western Red Cedar, and Spruce (CFCG, 2020). Because of this, VICC has a range of landcover, from Alpine areas to Wetlands. The variety of landforms create great topographic relief, resulting in various climatic shifts and ecosystem changes. Due to the fact that much of VICC is on the windward side of the Coast Mountains, there is an abundance of precipitation resulting in rich rainforests flanking the coast (although some communities fall within rainshadows of these mountains, as well). Much of the VICC is covered

[2] Since 1850, roughly 35% of anthropogenic CO2 emissions resulted directly from land-use practices (Foley et al., 2005).

by forest: 45% of VICC is classified as old forest (140 years or older); 14.7% is young forest (less than 140 years old) (

Figure 5), and large tracts of the forest have been designated for logging.[3] Approximately 7.5% of the total land of VICC is either recently or selectively logged, providing revenue and jobs for the region.[4] As depicted in Figure 5, much of the logging occurs at lower elevations, which is where most urban agglomerations reside, while the majority of old growth is at higher elevations and away from populated areas. Indeed, as 94% of BC is private land, the intensity of forestry activities varies greatly between that and the 4% and 1% which are Crown and Federal Crown land, respectively (Government of BC, n.d.) Forestry is an important economic sector for many communities in the VICC which has faced challenges in recent years. Its strength as an industry going forward will require sustainable logging practices combined with higher value-added activities.

A small share of land (0.03%, or 43km²), of the region is used for mining purposes, another goods-based industry. Finally, VICC is home to a unique agriculture industry. Less than 1% of land across the VICC is agricultural.[5] Areas used for this industry commonly flank urban areas in the southern reaches of Vancouver Island and the mainland coast. These tend to be highly specialized and much smaller sized farms than that of the mainland crops in Delta, Abbotsford, and surrounding areas. That which is not forest, mining, or agriculture is mostly alpine, barren, shrubbery, or range lands, which are areas not as often utilized for resource extraction, and commonly flank the sides of mountain ranges. A large portion of the mid-eastern part of VICC is covered in glaciers and snow, providing a valuable source of pack melt freshwater in the summer seasons. The availability of pack melt, regular precipitation, and the proximity to the ocean keep the relative humidity of VICC fairly high, which is fortunate in light of the increasing threat of wildfires to the province. Even so, 99 km² of VICC has been recently burned. However, as climatic zones shift in the coming years

[3] The government of BC's land use data may overestimate the share of old growth forest by including low productivity bog and subalpine forests; they should thus be interpreted with a note of caution (Ancient Forest Alliance, 2016). Furthermore, there is no commonly accepted definition of an old growth forest but that "most of B.C.'s coastal forests are considered to be old growth if they contain trees that are more than 250 years old. Some types of Interior forests are considered to be old growth if they contain trees that are more than 140 years old" (Government of British Columbia, 2020c). A report by Price et al. (Price, Holt, Bio, & Daust, 2020) on BC's old growth forest disaggregates old growth forest by different sizes and across different ecosystems (biogeoclimatic variants) and productivity classes. By their assessment, the vast majority (80%) of old growth forest in BC is comprised of small trees and only 3% of BC's remaining forests support large trees (Price et al., 2020).

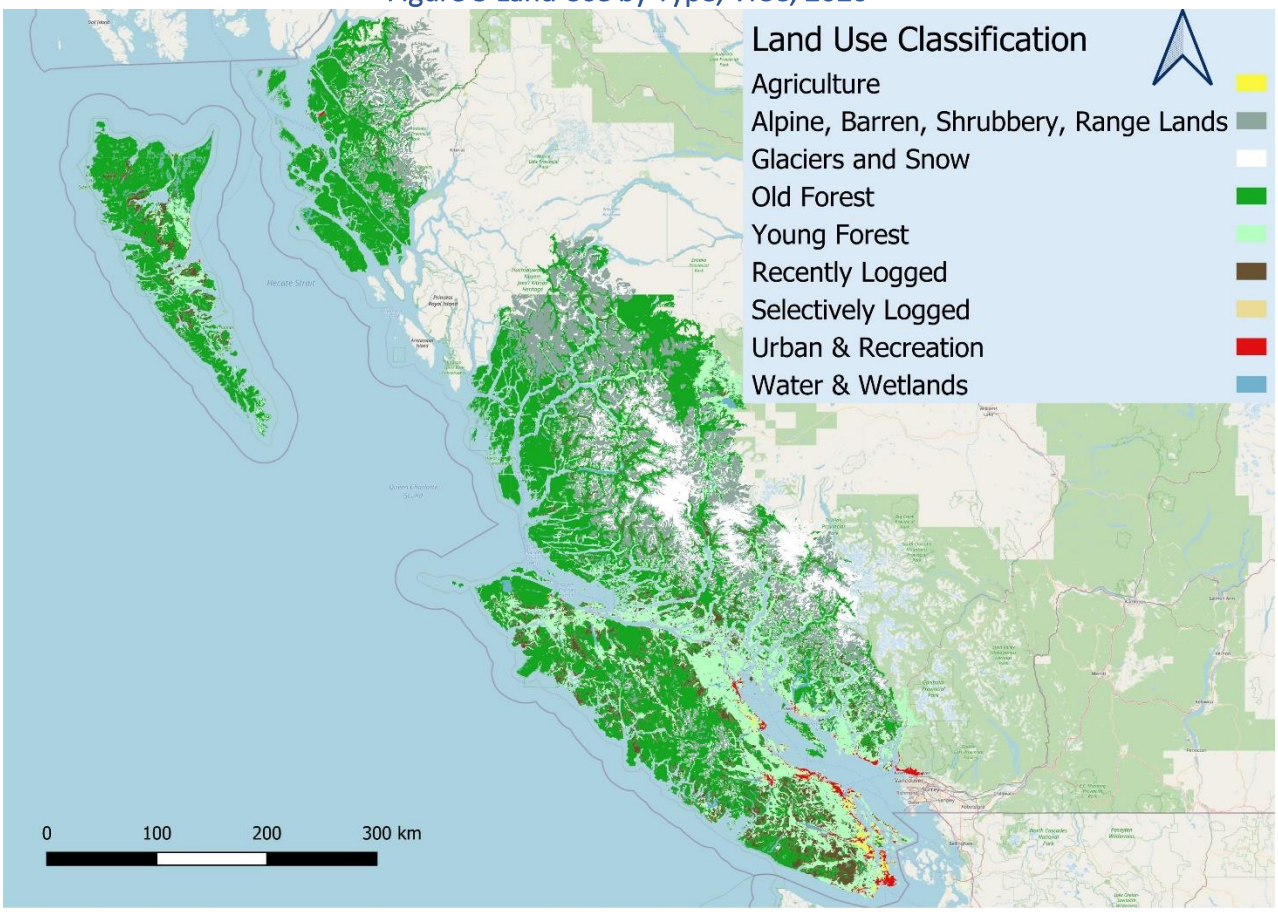
[4] Recently logged timber is that which was harvested within the past 20 years, or older if tree cover is less than 40% and under 6 metres in height. Selectively logged timber does not have a defined timeline, it is determined by viewing aerial imagery (areas where the practice of selective logging can be clearly interpreted on the Landsat TM image and TRIM aerial photography).

[5] Agriculture accounts for 310.22km2 (or 0.25% of total) mapped VICC land. Residential Agriculture Mixtures: 109km2 --- 0.10% of total mapped VICC land. This totals to only 0.35%, or 419.22km2, of total mapped VICC land being used for agricultural purposes. As per data catalogue: Agriculture is defined as land based agricultural activities undifferentiated as to crop (i.e. land is used as the producing medium); Residential Agriculture Mixtures are defined as areas where agriculture activities are intermixed with residential and other buildings with a building density of between 2 to 0.2 per hectare. Areas must be 15ha or larger to be mapped.

(discussed in the next section), the region may not be able to expect the same conditions, and both the natural and built environments of VICC may face a greater risk.

The majority of built environments in VICC cluster on the coastlines, mainly on the southeast coast of Vancouver Island and in the north around Prince Rupert, which is convenient for trade and transportation but leaves these urban areas vulnerable to changes such as sea level rise.

Figure 5 Land Use by Type, VICC, 2020



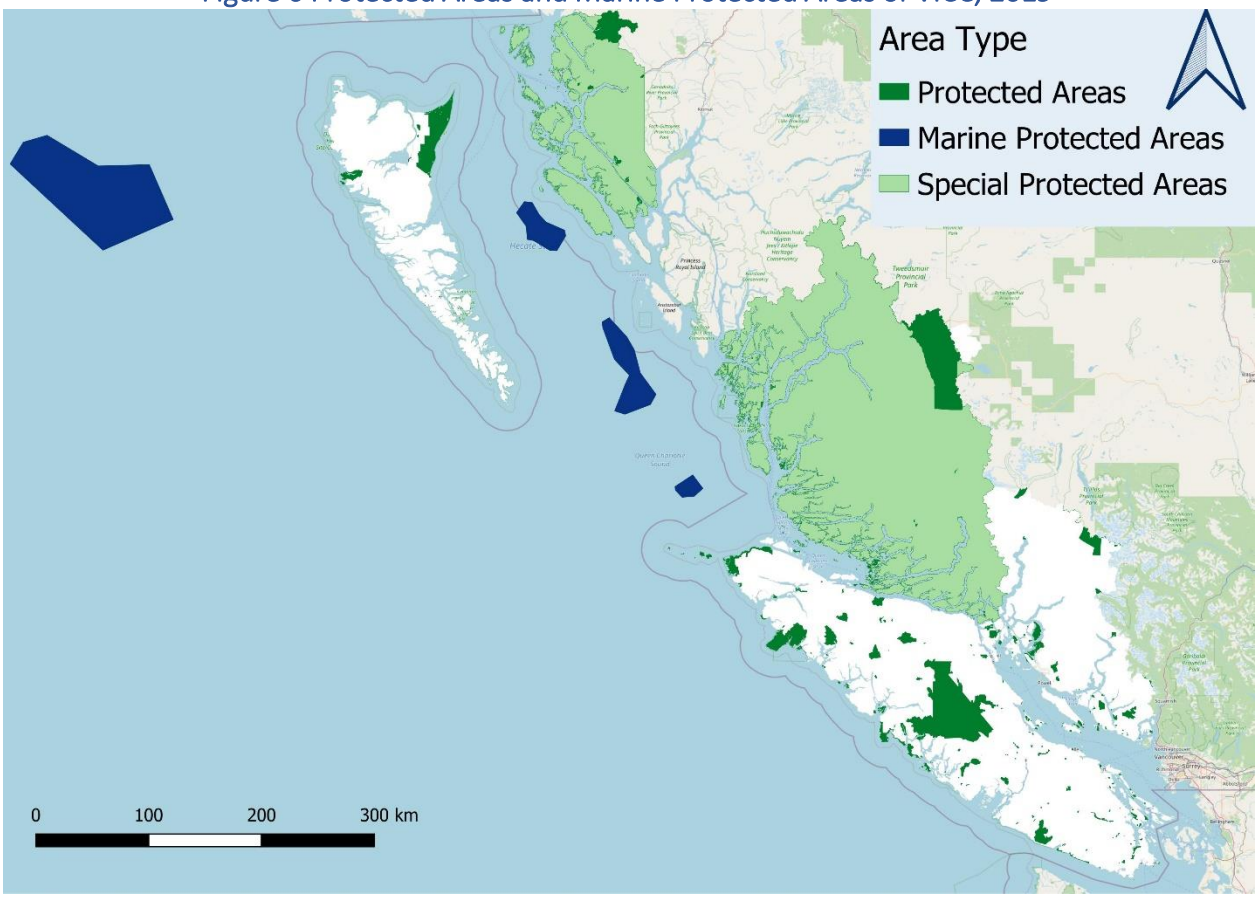
Source: BC Data Catalogue (2020), *Baseline Thematic Mapping Present Land Use Version 1 Spatial Layer*.

VICC is home to many Protected Areas and Marine Protected Areas, and needs more in the future to conserve lands and protect cultures

Coastal British Columbia is known for its rich ecosystems, and although many areas within the VICC region have been placed under protection in the form of Protected Areas and Marine Protected Areas, more are needed. Figure 6 below outlines the Marine Protected Areas established under the Oceans Act Marine Protected Area designation. Also illustrated are the BC Parks, Ecological Reserves, and Protected Areas, which symbolize the land-based areas dedicated to conserving and preserving the natural environments found there, along with Special Protection Areas such as the Great Bear Rainforest and other Special Forest Management Areas. Protected Areas of all types are important to the VICC region in many ways, not only are they crucial for

protecting wildlife and ecosystems, but also to preserve areas of important cultural significance. As such, there are many initiatives to create more and expand existing Protected Areas, as well as creating more sites under Indigenous supervision, such as Tribal Parks. Tribal Parks are unique from other types of Parks as they are created via Indigenous leadership, and they aim to support sustainability and Indigenous rights and cultures. The combination of all kinds of Protected Areas are vital to sustainability and adaptation in VICC.

Figure 6 Protected Areas and Marine Protected Areas of VICC, 2019



Sources: Government of Canada; (2019) Oceans Act Marine Protected Areas Shapefile; BC Data Catalogue; (2019). BC Parks, Ecological Reserves, and Protected Areas.; BC Data Catalogue; (2019). FADM – Special Protection Area.

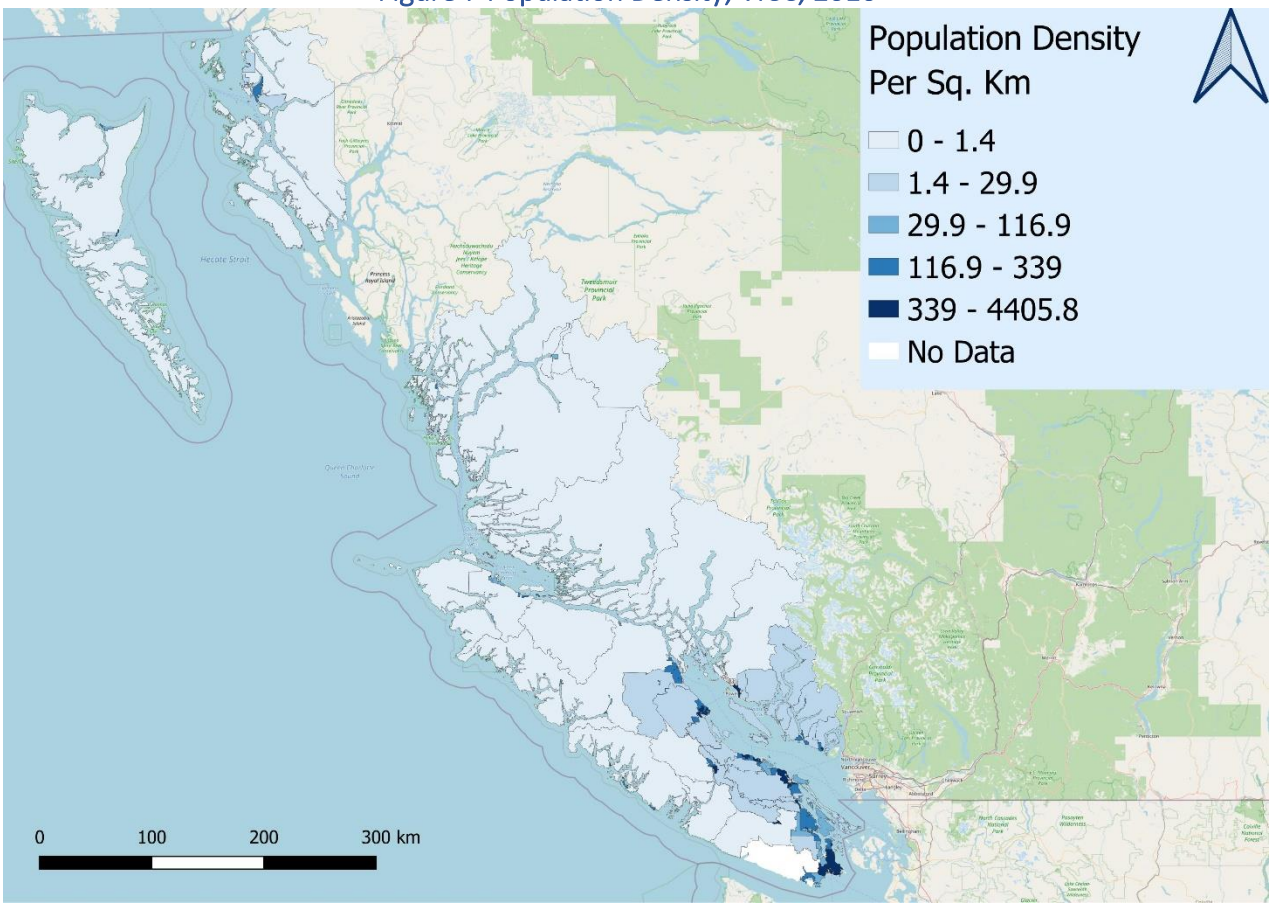
Although there are many busy population centres, much of VICC is rural land

Population density within VICC clusters around population centres. The southeast coast of Vancouver Island boasts the highest density, with moderate population densities in the areas north of Vancouver, as well as the areas immediately surrounding Prince Rupert. The denser census subdivisions in the north of VICC are very isolated from the highly populated areas in the southern reaches of the region. The areas of high-density correlate to areas which have connectivity to other population centres, especially Vancouver. These areas have major highways, ferries, and several airports to accommodate travel by citizens.

The majority of VICC, however, is far more rural, with an average population density ranging from 0-1.4 persons per square kilometer. These communities are more vulnerable to environmental

hazards, as their relative isolation can limit access to emergency assistance and resources. More generally, rural communities face the penalties of distance. They can have higher infrastructure and energy costs and higher transport costs for goods both in and out of the community. For example, rural, remote, and Indigenous communities in British Columbia spend up to three times the provincial average to heat their homes (Ecotrust Canada, 2020).

Figure 7 Population Density, VICC, 2016



Source: Statistics Canada; Population Data of 2016 Census via Canadian Census Analyser (CHASS, 2020).

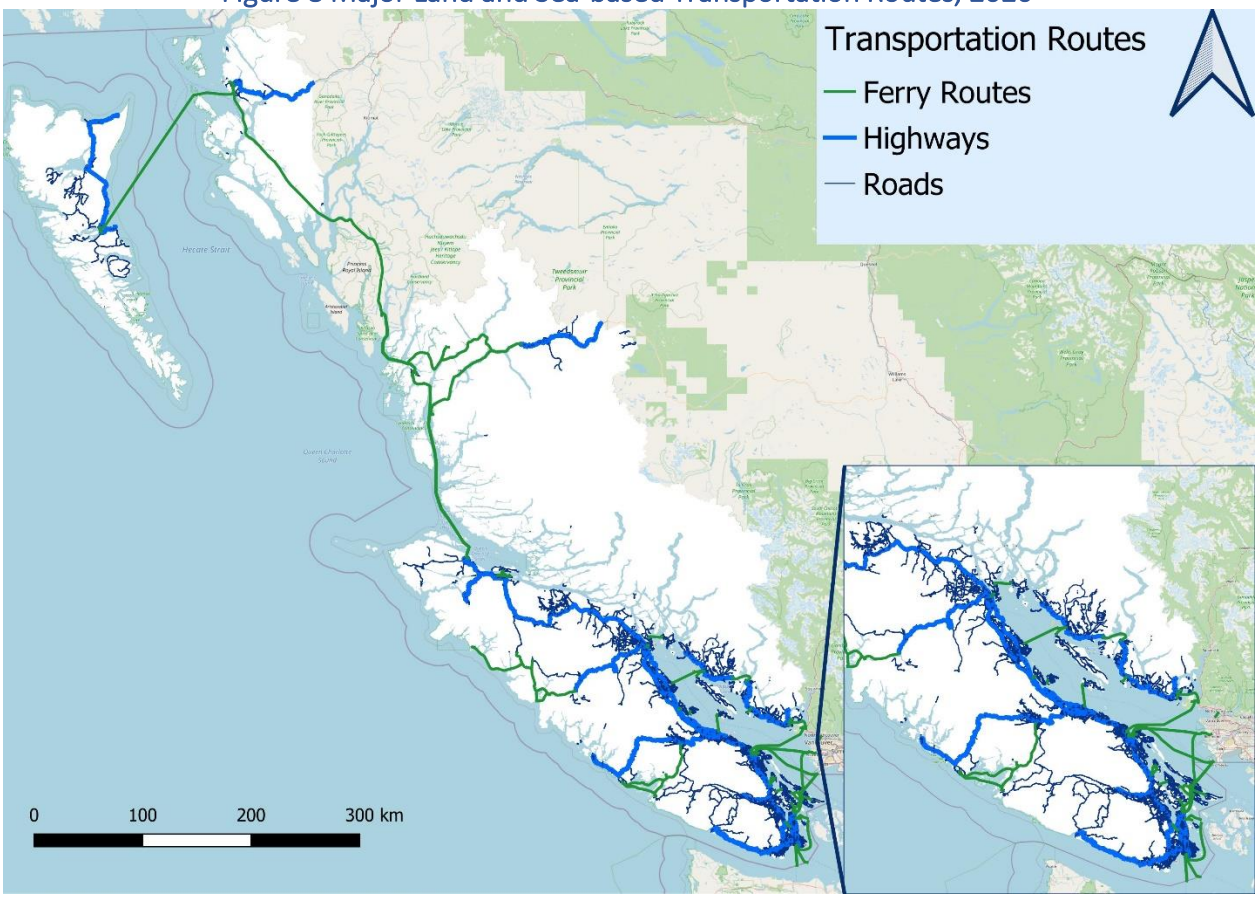
VICC is well connected to other population centres, but some rural areas are at risk

Though VICC is physically expansive, the vast networks of roads, ferry routes, and air travel connect people and trade. There are 16 highways, 73 ferry routes, 12 airports, and numerous aerodromes and seaplane landings (Figure 8). Connectivity is most concentrated in the southern reaches of VICC, linking population centres to the mainland and Vancouver. The four largest population centres in VICC are the most connected, with several highways and ferry terminals boasting high traffic thoroughfare daily.

The northern communities, such as Bella Coola and Prince Rupert, are more isolated from the rest of the territory, as the only vehicle access is through the two highways which terminate at these cities or the ferry services. The highways run on a latitudinal axis, connecting communities to the interior of BC, while the ferries run longitudinally creating a linkage of coastal communities. Some

of the more rural reaches of VICC have fewer links to depend on, which creates a vulnerability especially when storms or other hazards threaten to block or wash out the local roads. Many communities have only one road which connects them to the rest of VICC, which if obstructed leaves the community cut-off from assistance and supplies by land. VICC hosts numerous island communities whose only transportation method is by ferry. These communities face many of the same challenges as the rural communities with only single road access. Since many of these communities rely on food and resources from other areas, especially agricultural production, they are reliant completely upon the ferry systems which can be affected by both natural and mechanical hazards.

Figure 8 Major Land and Sea-based Transportation Routes, 2020



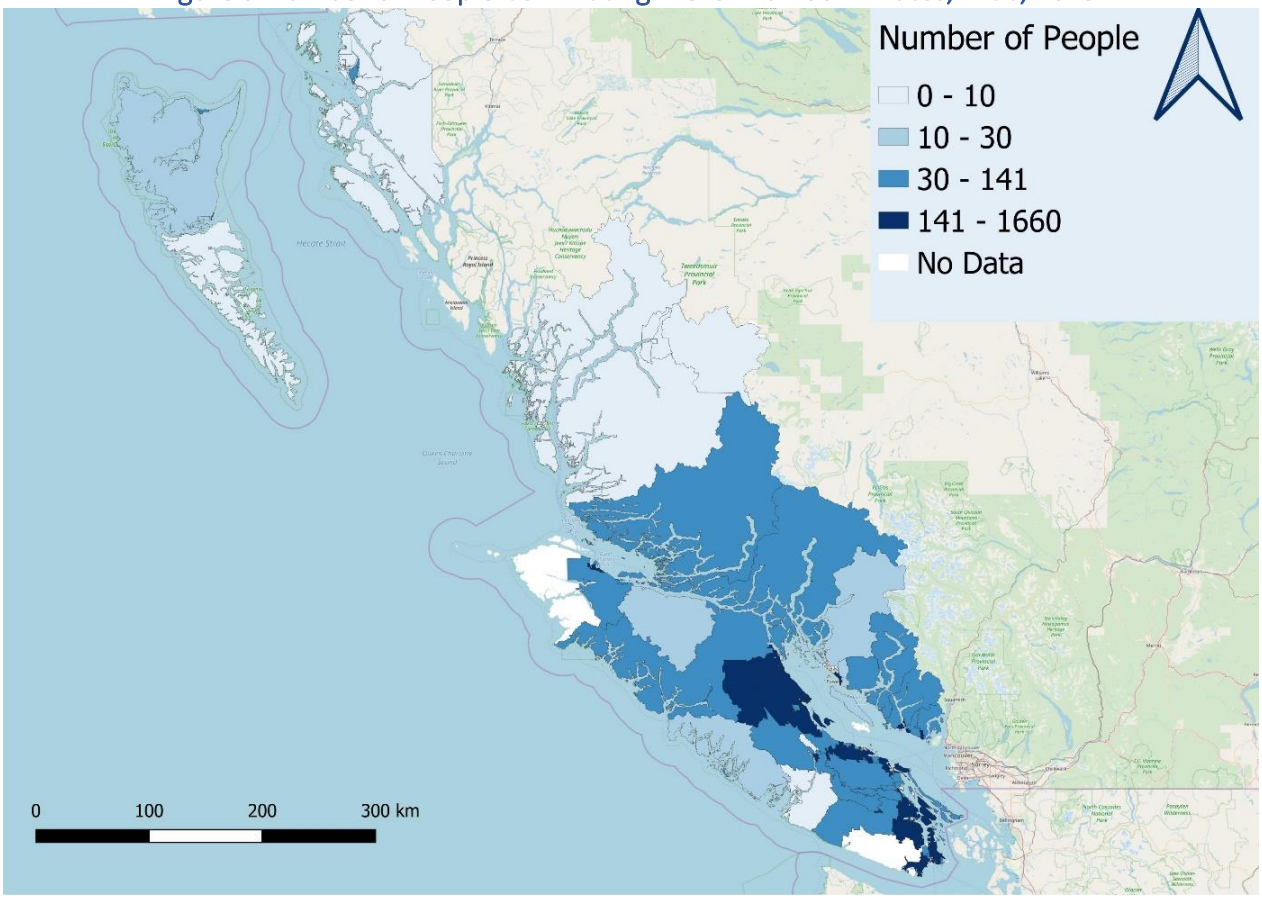
Source: BC Data Catalogue (Government of British Columbia, 2020b).

Rural and urban areas are connected by labour market commuting zones

Communities across the VICC are connected by labour market zones—the places across which people travel to live and work. On average, 8.4% of those working in the Census Metropolitan Areas (CMAs) and Census Agglomerations (CAs) of VICC commute to work *from other cities or municipalities* (Statistics Canada, 2020b). CMAs and CAs are defined as areas formed by municipalities centered around a core, which is a population centre. Therefore, this figure is only capturing long commutes between CMAs and CAs and not within them. It bears noting that while much of VICC is rural, smaller communities are connected to urban centres by these labour market commuting zones.

The southern sections of VICC have the largest commuting zones; in some cases over a thousand people commute more than one hour to work (Figure 9). As anticipated, commuters in Victoria use the largest variety transportation modes (Figure 10). Parksville has the highest proportion of workers commuting into the city, at just over 30%; most of these commuters reside in the neighbouring population centre of Nanaimo. The share of people commuting from other cities may be the result of workers being "locked out" of the city due to high housing prices. In addition, the relatively high percentage of workers commuting from other areas contributes a great deal of emissions, mainly from vehicle exhaust but also ferry and air fuels.

Figure 9 Number of People Commuting More Than 60 Minutes, VICC, 2019



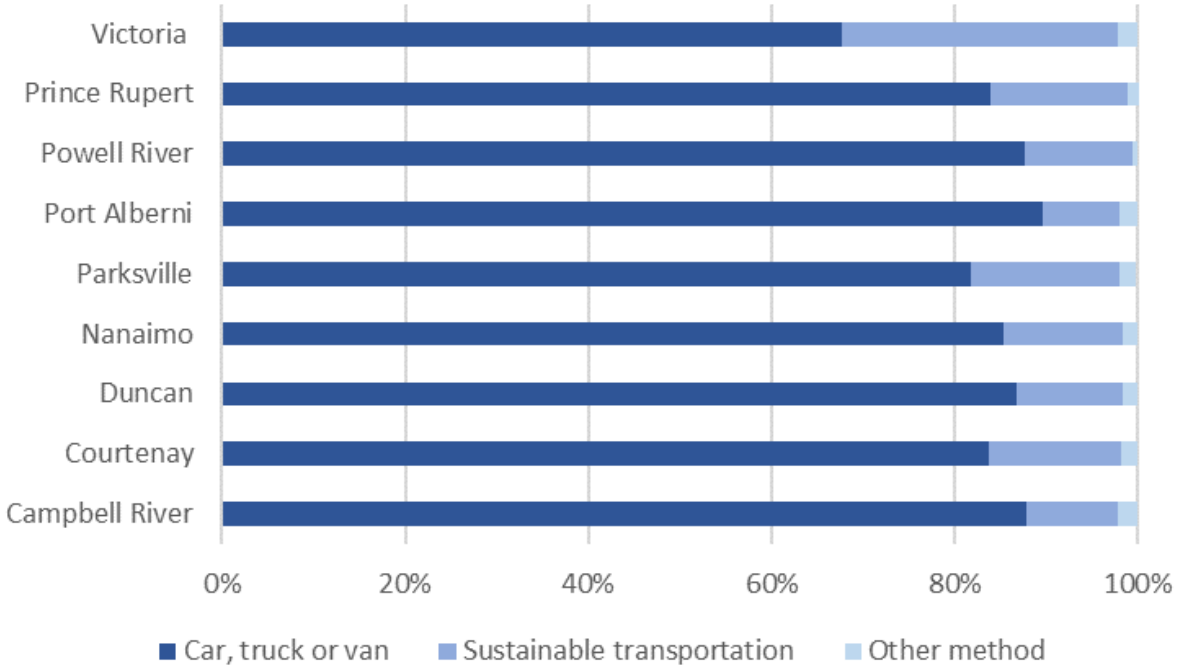
Source: BC Data Catalogue (Government of British Columbia, 2020a).

The vast majority of VICC citizens commute by car to work

In the major cities of VICC, the vast majority of commuters drive to work; over 80% in all but Victoria. There are many, however, who choose to travel by more sustainable means, such as public transit or walking/riding a bicycle. The highest percentage of sustainable travel is found within Victoria, a reflection on accessible public transit, the "walkability" of the city, and other ongoing initiatives stemming from the 2014 updates to the Bicycle Master Plan. Note that these data are form the 2016 Canadian Census and that, in the intervening years, modal share may have increased towards sustainable transportation due to ongoing investments. Additionally, more

sustainable vehicles (EVs and hybrids) are not separated from other less sustainable vehicles in the car, truck, or van category.

Figure 10 Commuter Transportation Type, Major Cities, VICC, 2016



Note: Data captures commuting for the purposes of work.
Source: Statistics Canada (2020b). *Commuting Flow from Geography of Residence to Geography of Work, 2016 Census of Population, Statistics Canada Catalogue no. 98-400-X2016327.*

Population and Demography

- **All Regional Districts in VICC are forecast to experience population growth over the next 20 years—by between 2-18% (2020-2040).**
- **Population growth is uneven: population areas in the southern VICC are growing while rural areas are shrinking. There is a trend of suburban population growth.**
- **The VICC has an older age profile than that of the province as a whole: the average age of the population of the VICC region is above that of the provincial average (44.8 years of age versus 42.3 provincially).**

Population and demography are key considerations in climate change adaptation and mitigation planning. Communities that are experiencing population growth face pressures to manage land use demand and to develop in a sustainable way while maintaining, upgrading, and expanding public amenities and infrastructure investments. Meanwhile, those communities that are losing population need strategies to address fixed capital assets and maintenance. In these contexts, key considerations include energy efficiency and community resilience against floods, coastal erosion, and other hazards amidst sometimes shrinking budgets.

Age is also an important factor in planning. The location and prevalence of different age cohorts creates demand for certain types of public amenities and services and at the same time, can intersect with increased propensities for vulnerability. Across the VICC, there are communities of very different profiles—some places are losing population while others are rapidly growing, creating a need for different, yet often interconnected, response strategies.

Another demographic aspect which is important to address in planning is culture. The abundance of differing—yet all equally important—cultures in this region creates another dimension to be considered in climate change adaptation and mitigation planning. Reaching a consensus on common goals and values between cultures is vital for the support and success of climate change programs and projects.

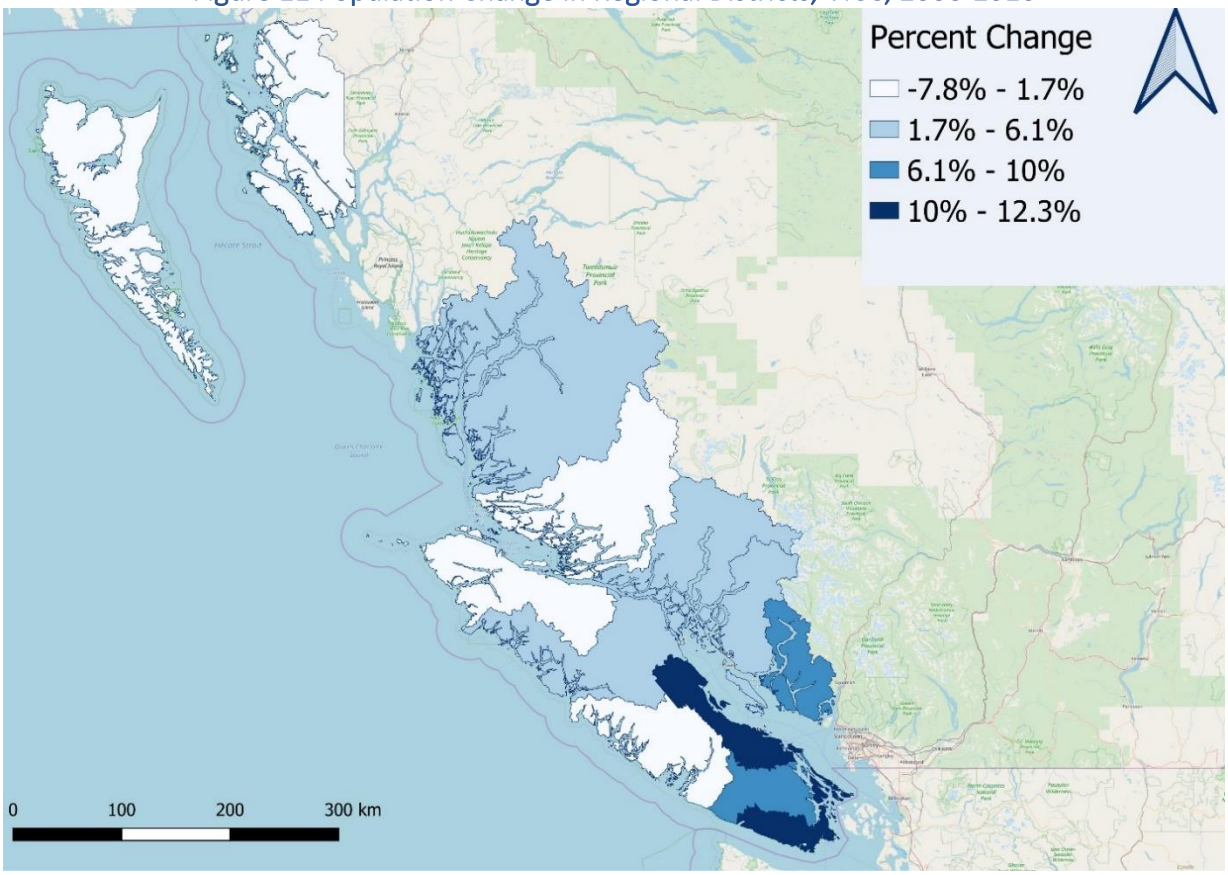
Population centers in the south are growing, while many rural areas are shrinking

The Regional Districts of VICC have a wide range of population growth in the ten-year period from 2006-2016, ranging from an increase of 12.3% to a decrease of –7.8% (Figure 11). The Regional District of Nanaimo has grown the most in the ten-year period while the Comox Valley and Capital Regional Districts had the second and third highest population growth respectively. The three districts with the highest growth rates from 2006-2016 all correspond to districts with large or medium population centres. The only other regional district with a medium population centre is the Strathcona Regional District, which falls in the middle of the range with population growth of 6.3% over 2006-2016.

The districts with highest population growth from 2006-2016 tend to be located in the southern reaches of the VICC, centred around the southern tip of Vancouver Island. On the opposite end of the region, the North Coast Regional District has had the greatest decrease in population over this

time period, followed closely by Mount Waddington. Most of these districts are rural, with some small population centres scattered throughout.

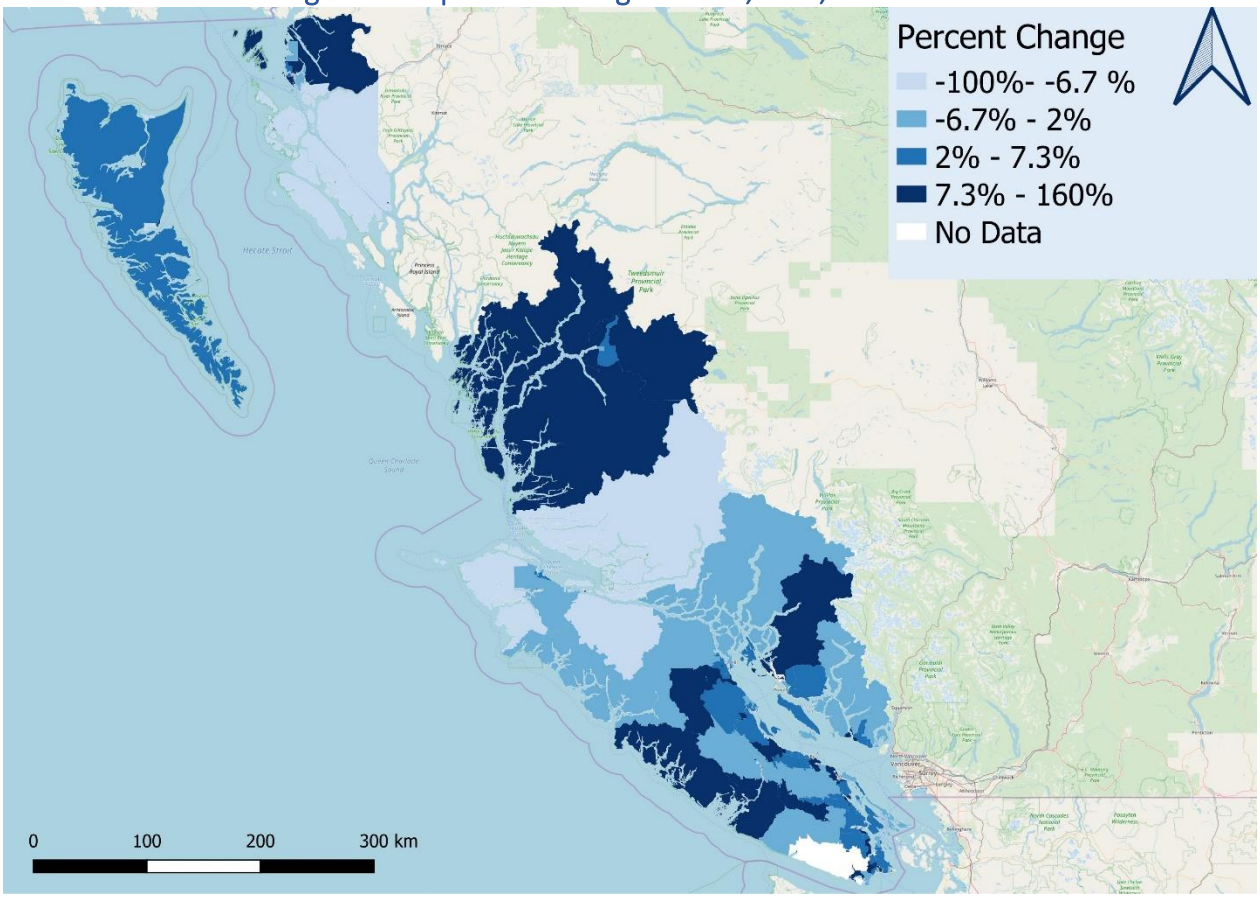
Figure 11 Population Change in Regional Districts, VICC, 2006-2016



Source: Statistics Canada; Census Profile 2016; Census Divisions.

The Census subdivisions (CSDs) of VICC provide further insight into population dynamics; CSDs are a general term for municipalities (as determined by provincial/territorial legislation) or areas treated as municipal equivalents for statistical purposes (e.g., First Nations Reserves, Indian Government Districts, and unorganized territories). The five-year timespan illustrated shows that many of the CSDs in VICC are decreasing in population. However, these decreases are often offset by large growth occurring in other neighbouring CSDs, accounting for a net increase when classed by Regional District. These increases are not only internal growth, but also contributed to by people moving from out of province and out of country to these CSDs. Many of the CSDs with the largest decreases contain First Nations Reserves and several have recorded populations of 0 in 2016.

Figure 12 Population Change in CSDs, VICC, 2011-2016



Note: there is no data for either timespan for the CSD of Juan de Fuca in the Capital Regional District
Source: Statistics Canada; Focus on Geography Series, 2016 & 2016 Census Boundary Files.

The three CSDs with the largest populations in 2006 (Saanich, Nanaimo, and Victoria) remained the largest in 2016 and all experienced population growth over that time (Table 2). Among these three, Nanaimo saw the greatest rate of growth at 15% over this time.

Among all CSDs (with populations larger than 100), those that saw the greatest population growth between 2006-2016 are a mix of urban and rural communities: Langford at 57.3%, Central Coast A at 47%, and South Saanich 1 at 44% (Table 3). While Langford and South Saanich 1 are part of the same economic region as Victoria (suburban municipalities), Central Coast A is in the district which contains no population centres and is classified as entirely rural. Central Coast A is the largest of the five electoral districts in the Central Coast Regional District, spanning well over 19,000 km², and includes parts of the Great Bear Rainforest. This may account for some of the increases, as investments flowing from the Great Bear Rainforest Agreements may have helped expand economic development opportunities in the area. Thus, growing populations are not just an urban phenomenon across this region.

Those CSDs that have seen the greatest population declines over the 2006-2016 period are largely rural and remote. The size of these population decreases should be interpreted with a note of caution. Communities with smaller populations may demonstrate population fluctuations which

are in fact a product of seasonality—reflecting when the data was collected more than the year-round population. Among CSDs in the VICC region, the communities of Kulkayu (Hartley Bay) 4, North Coast Mount Waddington B, and Refuge Cove 6 show the greatest population declines.

Table 2 Top 3 largest populations by CSD, VICC, 2006, 2016

	Population 2016	Population 2006	Percentage change 2016-2006
Saanich (Capital Regional District)	114,148	108,265	5%
Nanaimo (Nanaimo Regional District)	90,504	78,692	15%
Victoria (Capital Regional District)	85,792	78,057	10%

Source: Statistics Canada; Census Profile 2016; Census Subdivisions.

Table 3 Top 3 population increases and decreases, by CSD, VICC, 2006, 2016

CSDs with highest population increase, 2006-2016	CSDs with highest population decrease, 2006-2016
Langford, 57.3%, 22459 - 35342, RD: Capital	Kulkayu (Hartley Bay) 4, -66%, 157 - 52, RD: North Coast
Central Coast A, 47%, 138 - 203, RD: Central Coast	Mount Waddington B, -60%, 150 - 60, RD: Mount Waddington
South Saanich 1, 44%, 571 - 822, RD: Capital	Refuge Cove 6, -57%, 103 - 44, RD: Alberni-Clayoquot

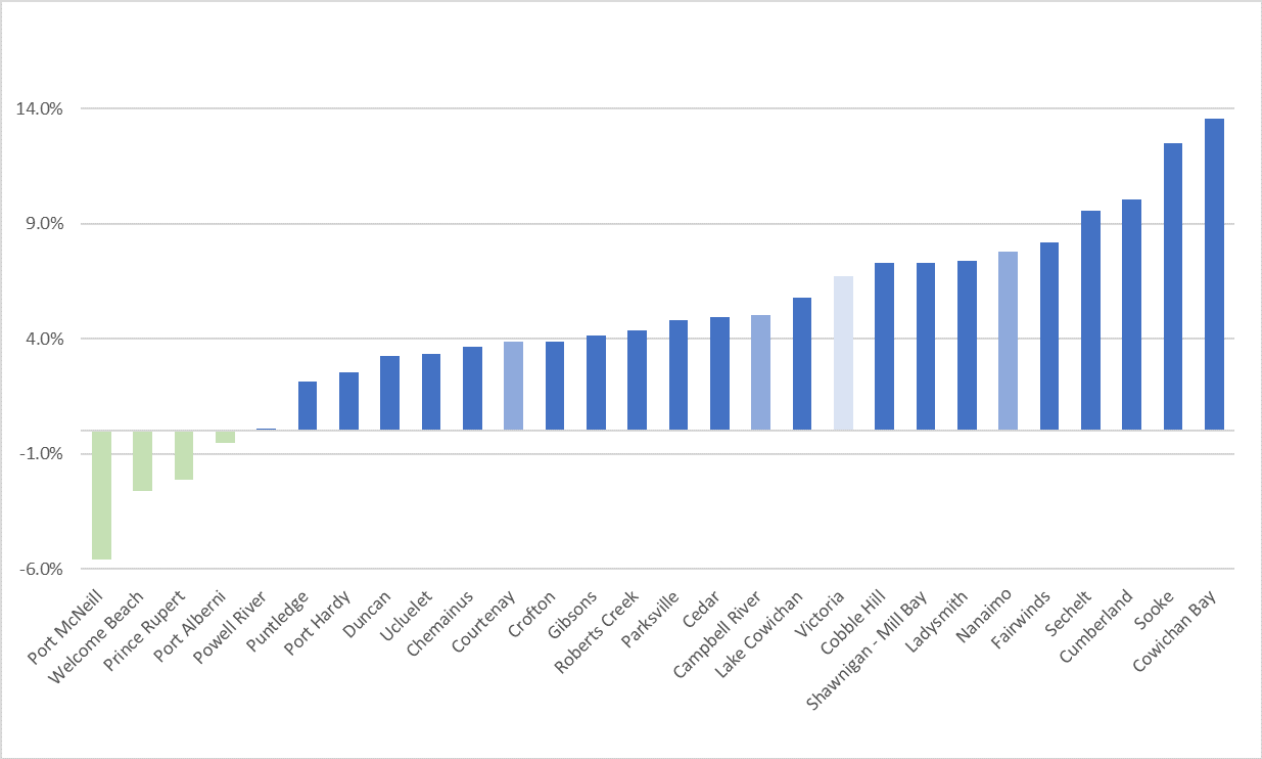
Note: Only CSDs with populations greater than 100 included in analysis
Source: Statistics Canada; Census Profile 2016; Census Subdivisions.

Cowichan Bay and Sooke have the highest population growth, while remote resource-based economies are losing population

The majority of population centres in VICC are growing, and many are growing at a rate greater than 4% (relative to their individual populations) on a 5-year timescale (Figure 13). Some small centres are growing at a much more rapid pace, such as Cowichan Bay and Sooke, advancing at 13.6% and 12.5%, respectively. The medium and large population centres are all growing at a relatively similar rate, at an average of 5.9%.

Four population centres in VICC are losing population: Port Alberni, Port McNeill, Prince Rupert, and Welcome Beach (see green bars in chart below). Of these, Port McNeill is decreasing the fastest, at a rate of –5.6%, which is related to declines in the logging industry—a dominant industry in the region. All four of these population centres are at a distance from other centres and require either several hours of driving and/or ferries to access. Remoteness combined with a lack of economic diversification has made these places vulnerable to exogenous shocks (i.e., external market demand).

Figure 13 Percent Population Change, Population Centres, VICC, 2011-2016

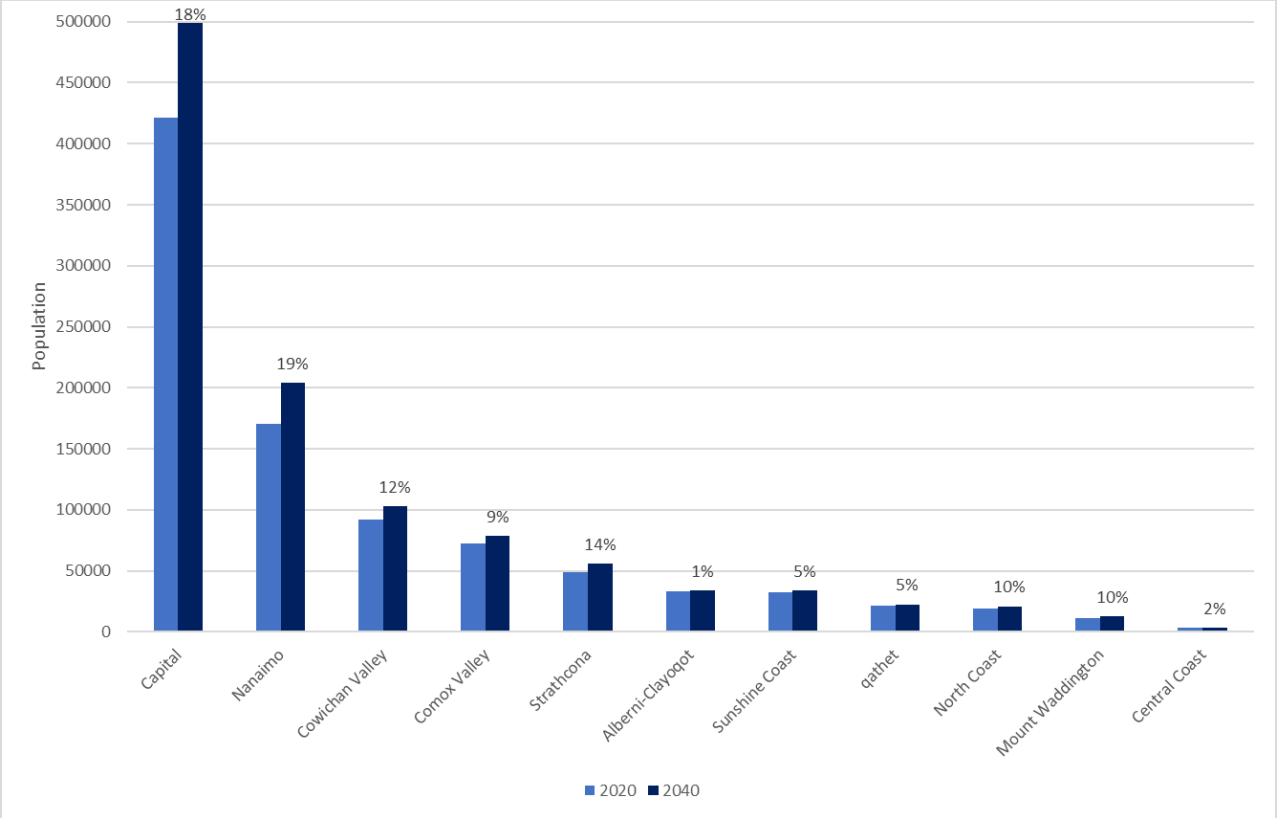


Note: Dark Blue denotes small population centres, Blue for medium population centres, and Light Blue is the large population centre.
Source: Statistics Canada; Census Profile 2016; Population Centres.

Over the next 20 years, all regional districts are anticipated to experience some regional growth, with the population centres leading the pack

All Regional Districts in VICC are predicted to continue to grow in the next 20 years. Some, such as Alberni-Clayoquot and Central Coast, are only projected to grow by a small percentage. Others, including Capital, Nanaimo, Strathcona, and Cowichan Valley, are expected to increase by over 10%. VICC is a desirable place to live and the options available in population centres such as Victoria and Nanaimo add to the incentive for people to move there. Though this provides many opportunities, it is also the source of some challenges such as increasing house prices and growing traffic congestion, to name a few.

Figure 14 Projected Population Change, VICC Regional Districts, 2020-2040



Source: BC Stats Population Projections, Data Version PEOPLE 2019; https://bcstats.shinyapps.io/popProjApp/

There is a large and growing senior population across the VICC

The average age of the VICC region is 44.8 years of age; this is above the provincial average of 42.3 (Figure 15). The dependency ratio (the ratio of the young and working age versus seniors 65+) is 72% in the region and 63.2% across the province.[6] Thus, the VICC has an older age profile than that of the province as a whole.

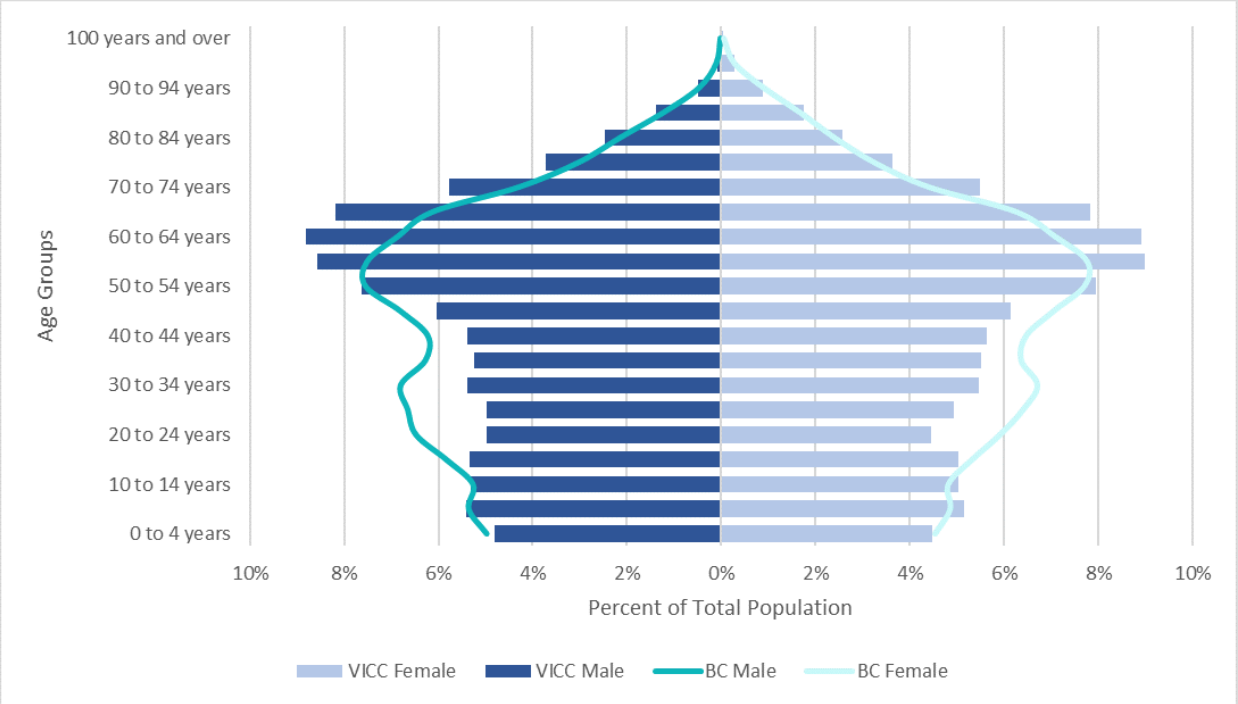
Population aging is a great accomplishment; people in Canada and across the world are living for longer and in better health than ever before. At the same time, population aging can be associated with a number of social vulnerabilities—i.e., the inability of individuals or groups to withstand negative impacts from stressors given their locality—which is connected to climate change. For example, more frequent and extreme weather events leading to coastal area flooding and other hazards can present a risk for residents and the infrastructure and services they rely on. This is particularly the case for seniors, who can be disproportionately impacted by extreme heat and cold fluctuations and who can experience greater social isolation, increasing their risk to hazard. Across the VICC region, these risks are compounded for seniors living in coastal rural and/or remote communities as environmental hazards can impact their access to assets that support Instrumental Activities of Daily Living (IADL), such as grocery stores. This is true of the population at large,

[6] Dependency ratio calculated according to Stats Can age groups of 0-19, 19-64, and 65+.

but can be particularly challenging for seniors who have lower incomes, experience social isolation, have limited mobility, etc.

Certain CSDs within VICC are experiencing changes in age balances more acutely than others; during the ten-year time span of 2006-2016, the Southern Gulf Islands experienced a -14% and -21% decrease of young and working age cohorts, while simultaneously having an increase of seniors by 51%. Even more profound are the changes found in the CSD of Sunshine Coast D: the youth population decreased by -23%, the working age population decreased by -10%, and the senior population increased by 97%. These examples illustrate the more extreme cases of changing population demographics within VICC.

Figure 15 Ages cohorts, VICC, BC, 2016



Source: Statistics Canada (2020) *Age and Sex Highlight Tables, 2016 Census.*

Economy and Industry

- **The services sector is dominant across the VICC, comprising around 87% of all jobs in the region. This sector is vulnerable in the wake of COVID-19.**
- **The VICC also have important goods-based economies including the forestry, agriculture, and energy sectors.**
- **Greater Victoria had the 8th highest GDP per capita among Canadian metropolitan areas in 2016; but it underperforms in economic growth.**
- **While incomes are higher in the urban population centers than in smaller more rural communities, urban centers have higher rates of income inequality.**
- **Rural communities face high transport and energy costs, which decreases their competitiveness.**

Economic composition has a wide-ranging impact on climate change adaptation and mitigation activities. It impacts how land is used, where and how people are employed, the intensity of energy usage, environmental impacts, and a wide range of other factors. The VICC has a mixed economy with both tradable and non-tradable sectors. Key industries include tourism, agriculture, aquaculture, forestry, manufacturing, high tech, and education, though the composition of these sectors across each sub-region differs (VIEA, 2020).

A central challenge across the VICC (and elsewhere in Canada) is to transition away from carbon intensive and environmentally harmful activities towards more sustainable ones, and to support local value chains where possible (thus reducing the carbon footprint of locally consumed goods). Such a shift requires careful attention to how people and communities are impacted. Single industry resource dependant economies are especially vulnerable to industrial transitions as they have a less diversified economy. At the same time, low-income individuals are at risk when the price of goods and energy increases.

An uncertain economic climate

The BC economy overall has experienced solid growth and a favourable labour market climate. Following strong momentum in 2019, BC was forecast to lead economic growth in Canada in 2020 (Government of British Columbia, 2019). However, the COVID-19 crisis has brought great uncertainty; economic growth forecasts for all provinces have declined with many forecasting negative growth in 2020. The TD Bank has forecast BC's economic growth at 0.5% for 2020 (on par with Ontario).

While global financial conditions pre COVID-19 indicated fiscal tightening leading to growing concerns about debt burdens in BC and beyond, we are now entering into an unprecedented time of government-backed loans and stop gap measures to reduce the employment losses and maintain industries. While it is uncertain what the future will hold and in the coming months and years, the public sector will play an oversized role in the economy, akin to the fiscal and monetary stimulus

post the 2008 economic crisis. This presents both challenges and opportunities. It could be a chance to focus public investments on climate adaptation and mitigation efforts, particularly infrastructure, as part of a programme of broader public investment to spur the economy and get people back to work.

The VICC has a services-dominated economy—which in the short term is vulnerable to the impacts of COVID-19

Like the province as a whole, the VICC has a services dominated economy. Across the VICC, 87% of all occupations are service-based (CHASS, 2020). The largest services sectors by occupation are sales and services, trades and transport, and business, finance and administration. Some areas, especially those closest to population centres, are almost entirely services-based. The impacts of COVID-19 and negative price shocks have harmed all economic sectors, however they has been particularly harmful to services sector industries like tourism which are an important economic contributor across the VICC and the province as a whole. In 2018, the tourism sector in BC contributed $8.3 billion to GDP, which is higher than that of the mining ($5.2 billion), oil and gas ($4.9 billion) and agriculture and fishing industries ($3.2 billion) (Government of British Coumbia, 2018). The real estate sector has also been a major economic contributor in recent years, especially in the growing urban areas like greater Victoria and Nanaimo. It is not yet clear how this sector will be impacted by the COVID-19 crisis. The B.C. Real Estate Association presently estimates the declines in home sales to be short term, with sales recovering in 2021 (BCREA, 2020).

Victoria—as a metropolitan area and the capital of the province—has the largest, services-dominated, economy. Victoria has many important assets for the region including three post-secondary institutions. The economy's tech sector has shown strong growth in recent years and is linked to the broader Cascadia megaregion (Seattle to Vancouver). Among Canadian metropolitan areas, Victoria had the 8th highest GDP per capita in 2016, falling just below metro-regions of Hamilton and Vancouver.[7] It is however not a dynamically growing economy. Between 2009 and 2016, Greater Victoria had the second lowest increase in GDP per capita among Canada's metropolitan areas (with a net decline of -0.54%, second only to Ottawa at -2.35%)(OECD, 2020). This indicates that it may not be making the most of its agglomeration benefits.

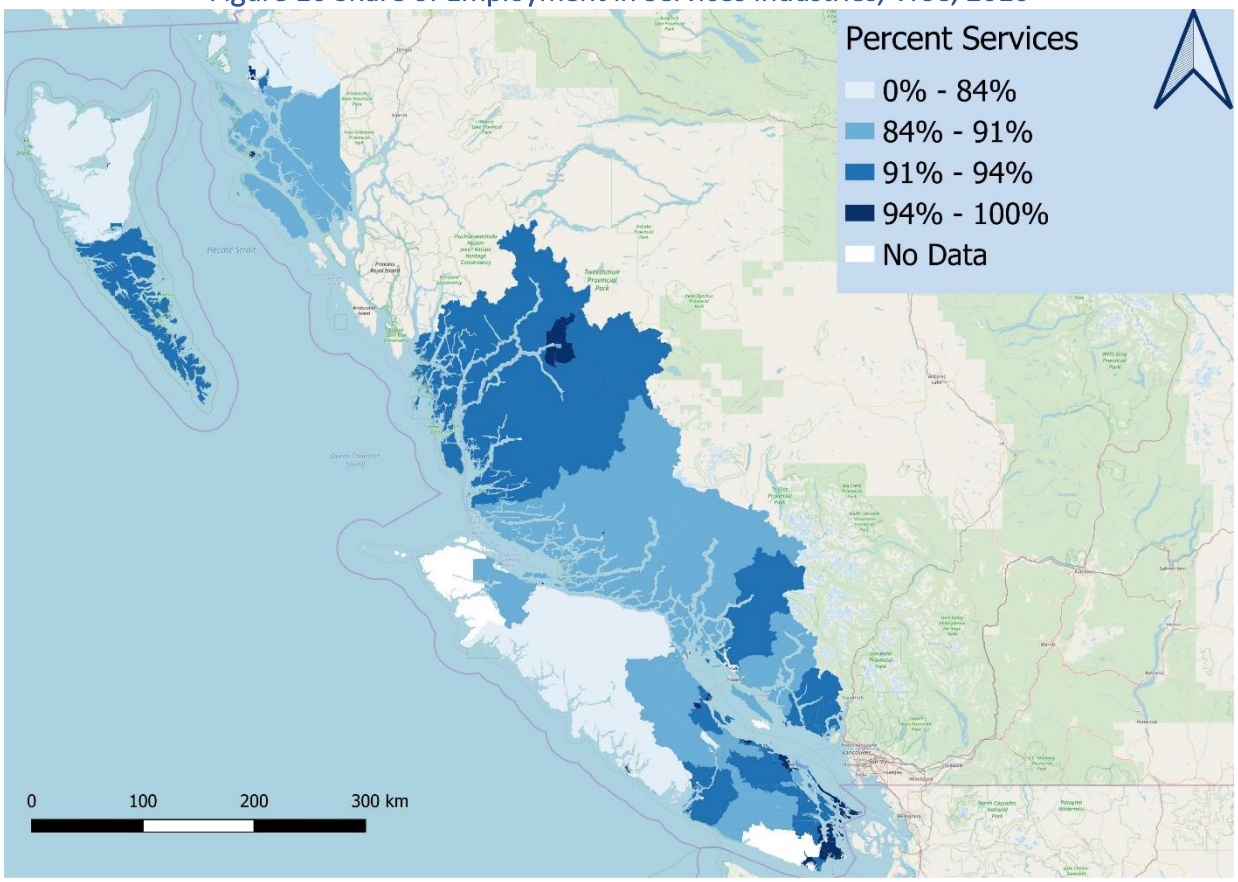
While the services sector is dominant, communities across the VICC also have important goods-based economies including the forestry, agriculture, and energy sectors. Goods-based industries are especially important in the northern halves of Vancouver Island and Haida Gwaii, as well as the mainland sections of the North Coast (Figure 16). These industries are vulnerable on a number of fronts. BC's forestry sector is currently in crises due to a number of factors such as low timber prices, reduced demand from Asian markets, U.S. tariffs, high cost structures, government fees or stumpage rates, and timber supply shortages. Transportation and energy costs are a major factor impacting the competitiveness of these industries; investments in more sustainable and affordable transport and energy options are thus important to their robustness.

BC's largely mountainous topography is not amenable to agriculture and the sector is relatively small; the smallest among Canadian provinces second only to Newfoundland. However, the VICC

[7] GDP per capita (USD, constant prices, constant PPP, base year 2015) in metropolitan Victoria (Functional Urban Area) was $38,828 in 2016 (*Strategies to Improve Rural Service Delivery*, 2010) (OECD, 2020).

includes some of the province's prime agricultural areas such as Comox, Sayward and Cowichan valleys, Saanich Peninsula, Nanaimo lowlands, Alberni Valley, Powell River lowlands and many Gulf Islands. Farms in these areas tend to be smaller and specialized: the region accounts for only around 2% of total provincial farmland but 15% of total farms (Government of British Columbia, 2011). Farms across this region mostly supply local and tourism-oriented markets as well as those on the mainland. A 2004 study of Vancouver Island food systems found a high reliance on imported food: an estimated 85% of food was imported to the region (Macnair, 2004). The agricultural sector is highly vulnerable to climate change. At the same time, it is a sector that can help communities across the VICC reduce the carbon footprint of their food consumption and to diversify food security through local supply chains.

Figure 16 Share of Employment in Services Industries, VICC, 2016



Notes: Based on National Occupational Classification, NOC.
Source: Statistics Canada; Labour Data of 2016 Census via Canadian Census Analyser (CHASS, 2020).

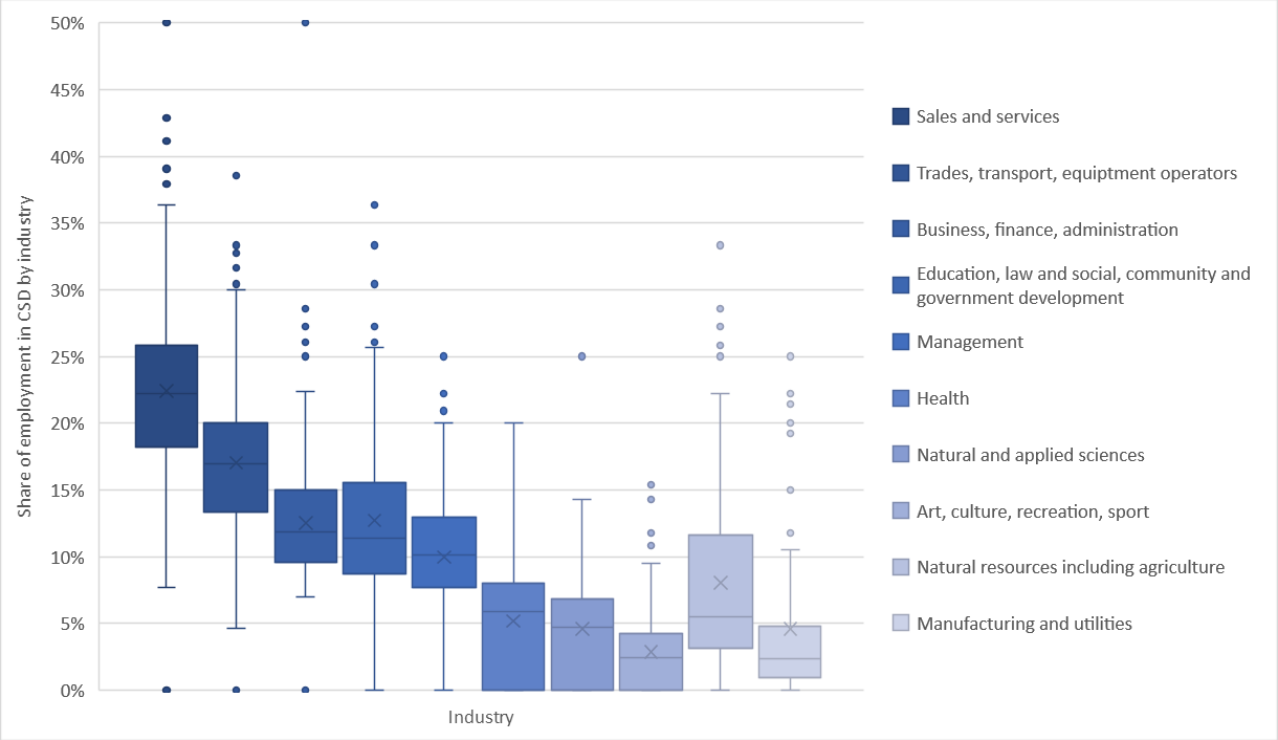
While the sales and services sector is dominant, the trades and transport sector is also a major source of employment across many communities

Occupations in the sales and services sector represent a large proportion of employment in most of the CSDs in VICC (as seen in Figure 11, which illustrates the share of employment in CSDs that is attributed to specific industry sectors). In some areas, as much as half of the total employment in the area is in the sales and services sector; the area surrounding Tofino, a renowned surfing and tourist destination, is an example of such an area (Opisat 1 CSD). The importance of trades, transport, and equipment operating occupations also stands out. There is a large proportion

of employment across many CSDs in these professions particularly on the Tsimshian Peninsula, Powell River, and Zeballos. The geography of the VICC, with island and coastal communities and mountains regions on the mainland, makes the transport sector absolutely critical.

Linked to the transport sector, manufacturing is a major employer in communities like Prince Rupert (Skeena Queen Charlotte CSD). As BCs main northern transportation hub and port, the region's industries are well connected to regional and international markets. The arts culture and recreation, health, natural and applied sciences, and manufacturing are smaller occupational groups across the majority of CSDs but a major contributor to quality of life and wellbeing.[8]

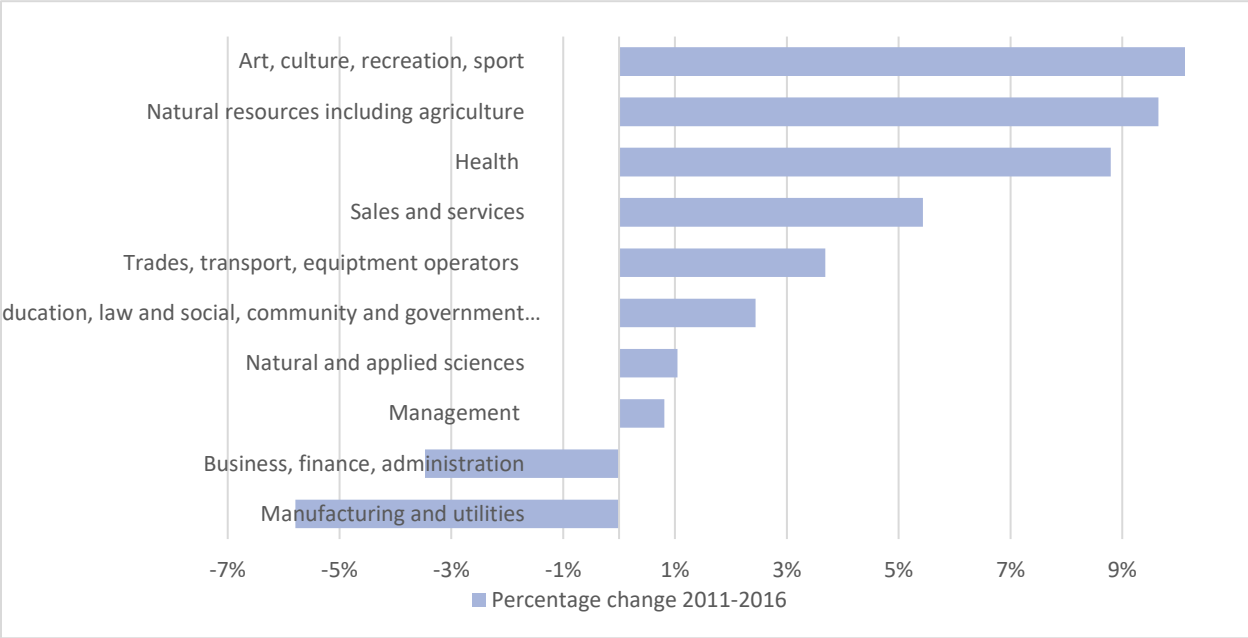
Figure 17 Share of Employment by Industry, CSD, VICC, 2016



Note: Occupational categories by industry according to single digit National Occupational Classification codes, NOC.
Source: Statistics Canada; 2016 Census Labour Data, Accessed via *Canadian Census Analyser* (CHASS, 2020).

Between 2011-2016, employment across the majority of occupational categories by industry increased. Among all sectors, jobs in arts, culture, recreation, and sport showed the strongest increase over this period growing by around 10% with the greatest gains seen in the Capital and Nanaimo Regional Districts. Jobs in natural resource occupations also showed a strong increase over this time, growing around 9.5% between 2011-2016 with the greatest gains seen in the Capital Regional District, Cowichan Valley, and Nanaimo Regional District. Sectors that saw the greatest employment losses over this time are manufacturing and utilities at around 6% and business, finance and administration at around 4.5%. Jobs in manufacturing and utilities saw the greatest declines in the Capital Region while those in business, finance and administration showed the greatest declines in the Nanaimo and Mount Waddington Districts.

Figure 18 Percentage Change in Employment, by Industry, VICC, 2011-2016

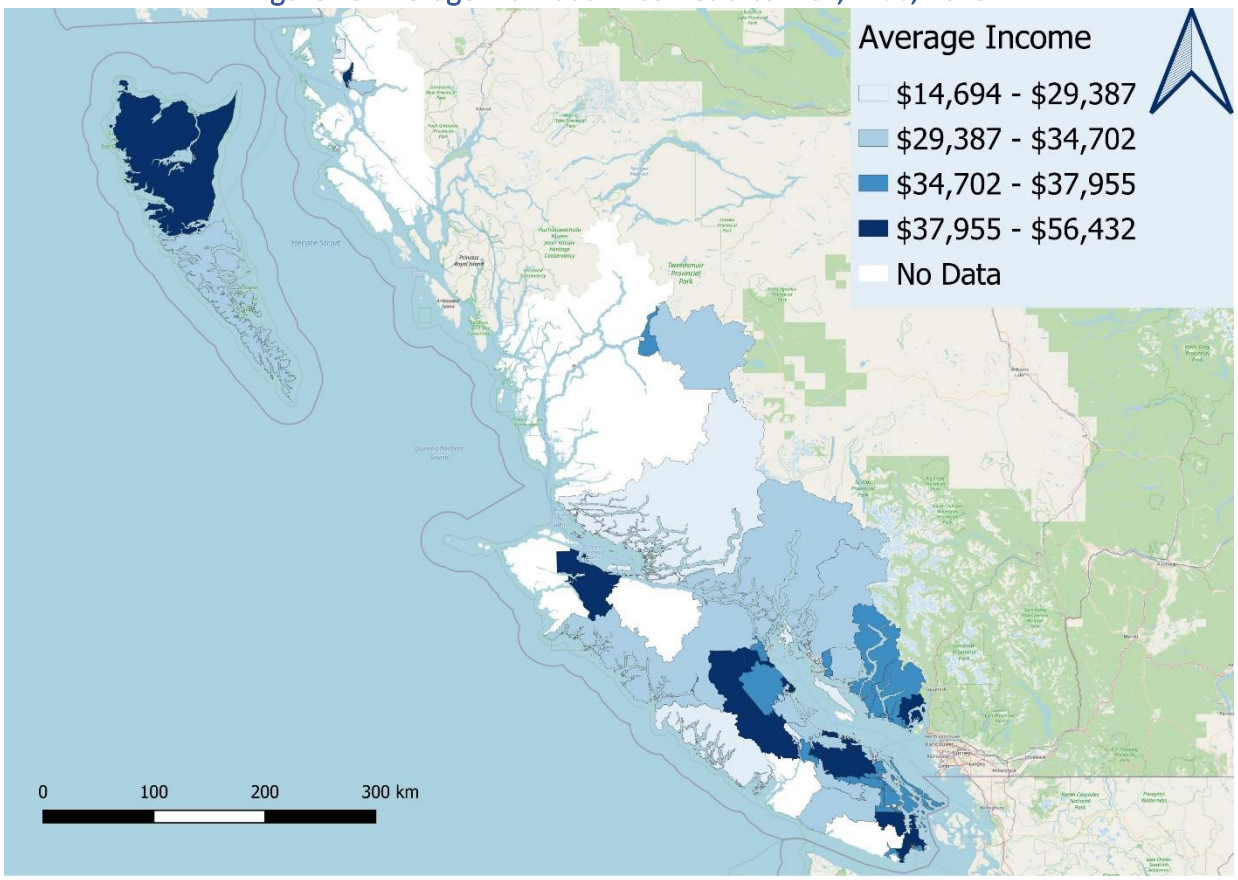


Notes: Based on National Occupational Classification, NOC.
Source: Statistics Canada; 2017 & 2013, Labour Highlight Tables, 2016 Census & 2011 National Household Survey.

Average incomes are higher for CSDs that are more connected to population centres

The average individual income (after tax) for all VICC CSDs in 2015 was $33,435. The range of average incomes was large, spanning from $14,694 to $56,432. The CSD with the lowest average income was Penelakut Island 7, a reserve in the Cowichan Valley Regional District. The CSD with the highest average income was Oak Bay, in the Capital Regional District. Interestingly, both of these CSDs are in the Southern Vancouver Island region, however Oak Bay is part of the main island, and Penelakut Island 7 is clustered near the Gulf Islands. Indeed, many of the Gulf Islands have median incomes below the territory's average. This may indicate a link between proximity and transportation to population centres, as well as a reflection upon the high average age of Gulf Island communities which correlates to a large retired population. The widest range of incomes centralize around the southern end of Vancouver Island, corresponding to locations of several population centres. Indeed, this illustrates the disparity within and around cities in respect to income.

Figure 19 Average Individual Incomes after Tax, VICC, 2015

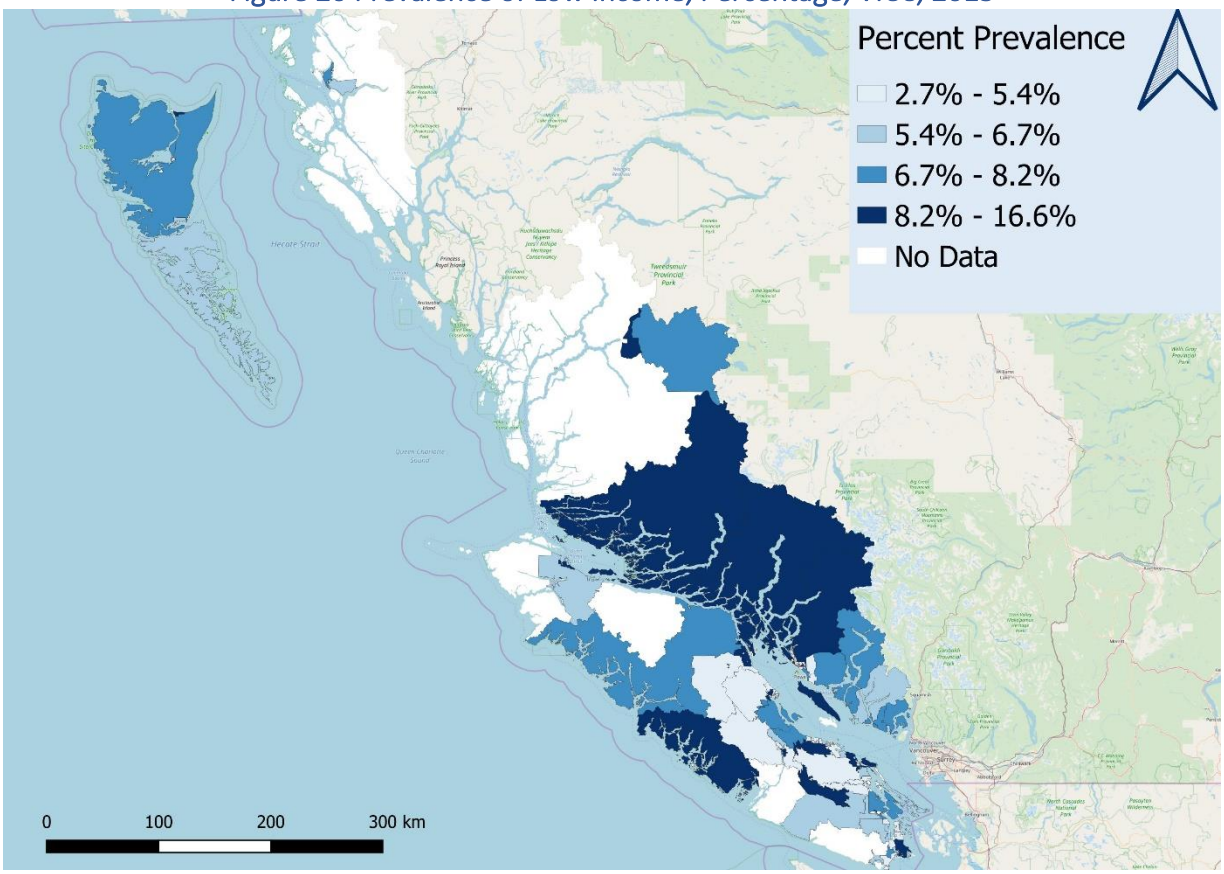


Source: Statistics Canada; Income Data of 2016 Census via Canadian Census Analyser.

There is a higher prevalence of low-income individuals in population centres of the VICC

The prevalence of low income within the CSDs of VICC ranges from 2.7% to 16.6% as per 2015 data (Figure 20 Prevalence of Low Income, Percentage, VICC). The three CSDs with the highest rate of low income are Strathcona B (16.6%), Alberni-Clayoquot C (15.5%), and Victoria (14%). The CSDs with the highest population in 2016 (Table 3) correspond with high prevalence of low-income persons, ranging from 9.5%, 10.6%, and 14%, in Saanich, Nanaimo, and Victoria, respectively. There appears to be a correlation of low-income persons and high population regions, informing us that population centres (i.e., cities) may have more options for those in need of low-income services, and as such there is a higher concentration of people who need such assistance moving to more urban areas. This highlights the need for more accessible housing and other social services related to low-income in population centres in order to better support the citizens who reside there.

Figure 20 Prevalence of Low Income, Percentage, VICC, 2015

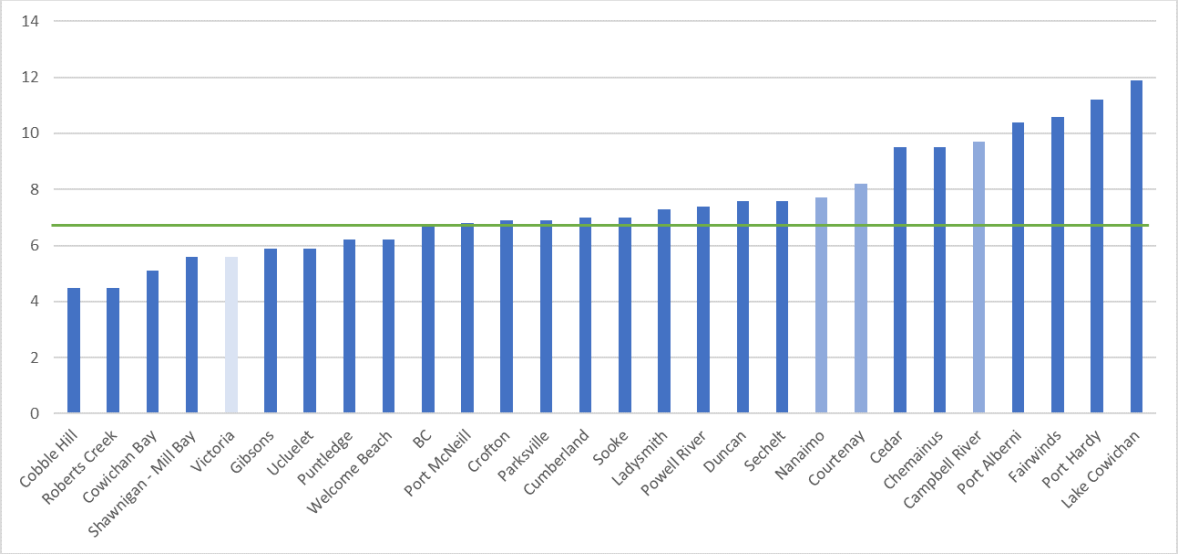


Note: Classed by LICO-AT: Income levels at which families or persons not in economic families spend 20 percentage points more than average of their after-tax income on food, shelter and clothing.
Source: Statistics Canada (2020b). *Income Highlight Tables, 2016 Census.*

The unemployment rate in most population centres across the VICC is above the provincial average

Unemployment rates in the VICC population centres are varied, ranging from 4.5% in Cobble Hill to 12.7% in Prince Rupert. The average unemployment rate for British Columbia is 6.7%, and 19 of the 28 population centres (69%) have rates higher than this average. The large population centre, Victoria, is below the average, at 5.6%, and yet the three medium population centres, Campbell River, Courtenay, and Nanaimo are situated above the average rate at 9.7%, 8.2%, and 7.7%, respectively. This indicates a relatively high unemployment rate within the VICC's towns and cities, which could be in response to individuals seeking assistance services which are not available in rural areas, but are abundant within these urban agglomerations. Note that these unemployment rates are from the 2016 Census and do not reflect current unemployment rates which are much higher due to COVID-19.

Figure 21 Unemployment Rates of VICC Population Centres, BC Average Comparison, 2016



Note: Dark Blue denotes small population centres, Blue for medium population centres, and Light Blue is the large population centre.
Source: Statistics Canada (2020c). *Labour Highlight Tables, 2016 Census.*

Community Wellbeing

- **Rural communities have lower levels of wellbeing according to Canada's Community Well-Being than their urban counterparts.**
- **Indigenous communities have lower levels of wellbeing according to Canada's Community Well-Being than non-Indigenous communities.**
- **Rural and remote communities, both Indigenous and non-Indigenous, have limited or no internet access, which detracts from their wellbeing.**

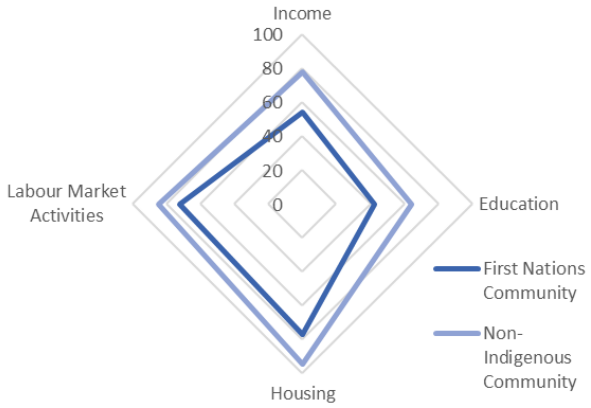
Community wellbeing scores across the VICC indicate rural-urban and First Nations-non-Indigenous community divides

Community wellbeing is a dynamic concept that links quality of life and material conditions to the goal of sustainable well-being over time. It is a multidimensional concept that is grounded in the view that economic conditions should be viewed as part of broader social and environmental systems and conditions. There are a number of different ways to measure community well-being. The Government of Canada's Community Well-Being (CWB) index measures socio-economic well-being for individual communities based on four components: education, labour force activity, income, and housing. Importantly, this index facilitates a comparison of variations in well-being across First Nations and Inuit communities and non-Indigenous communities over time. According to the Canadian Well-Being index, which uses data from the 2016 census to derive well-being scores for CSDs in Canada, the CSDs in VICC with more urban populations (those over 1000) scored higher on average than rural CSDs (those with populations less than 1000) (Figure 22 Rural and Urban Community Well-being, VICC, 2016).

Akin to the rural-urban split, First Nations communities in the VICC also have lower well-being scores across the four indicators when compared to non-Indigenous communities (Figure 23). This data should be interpreted with caution. The proxy indicators that the well-being index draws on is just one way to depict the concept of well-being. This Index does not capture many aspects of well-being that may be important to Indigenous communities such as social and spiritual connections or informal and reciprocal economies that are also important to community well-being. Furthermore, it does not capture the domains of health, food, governance, ecology, or infrastructure and does not reflect a self-assessment of well-being.

Figure 22 Rural and Urban Community Well-being, VICC, 2016

Figure 23 First Nations and Non-Indigenous Community Well-being, VICC, 2016

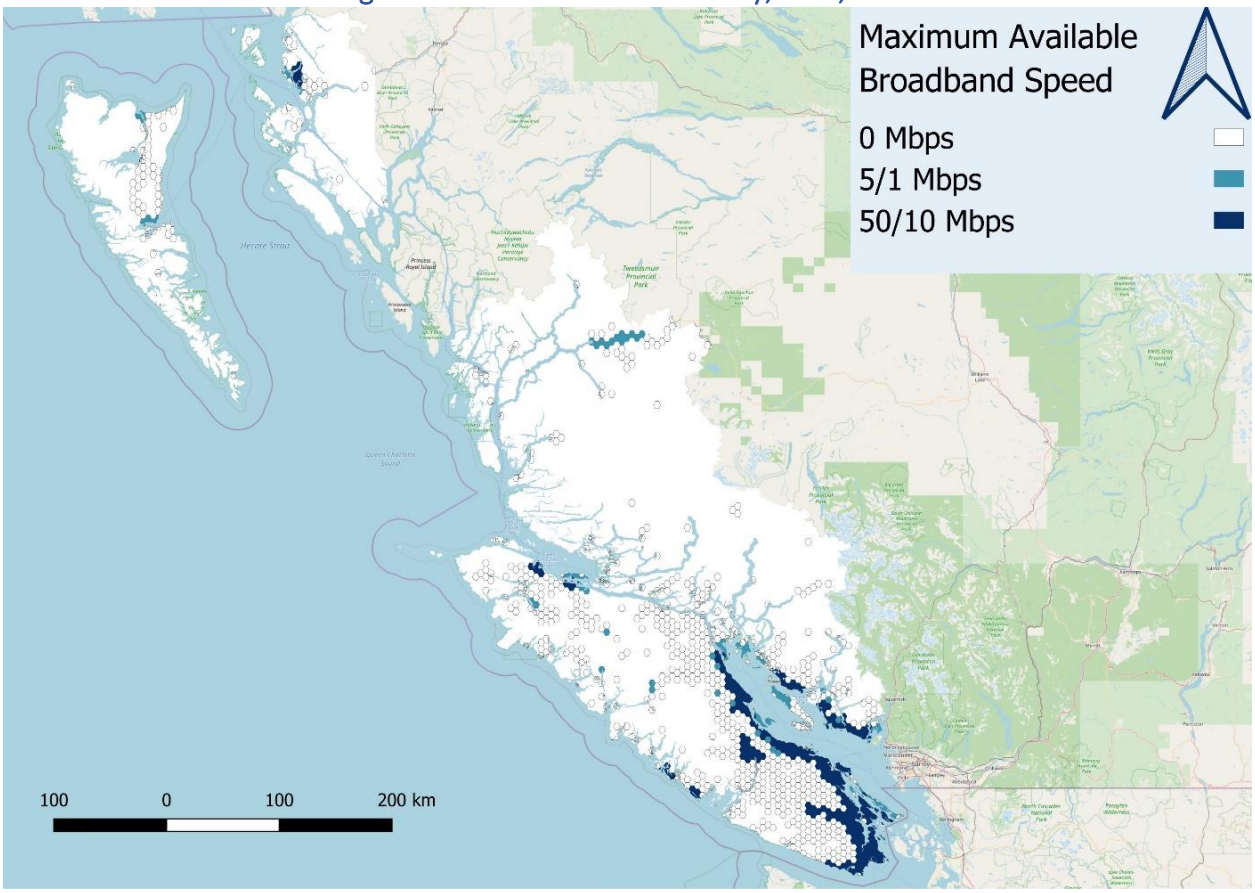


Source: Government of Canada (2020). Community Well-Being Index - Open Government Portal.

Digital network connectivity is important to community wellbeing—many rural areas and First Nations communities are poorly connected

Access to the Internet has rapidly become one of the most important sources of connectivity within a region. This digital connectivity is what helps keep communities linked and supported through challenging times, as experienced with the distancing implications of COVID-19. Although population centres and the communities adjacent to them have access to high speed broadband services, many more remote communities have limited or no access (Figure 24). This has implications for the well-being of the communities, as internet access has been associated with helping with social isolation, purchasing of goods, accessing educational material, and acquiring jobs (Kearns & Whitley, 2019). What is more, access to the Internet was not correlated to lower levels of physical activity, according to a recent study from the UK (Kearns & Whitley, 2019). These findings exemplify the necessity for more vulnerable rural and remote communities to have access to broadband Internet services, especially when one considers the amount of health-related care becoming more accessible online.

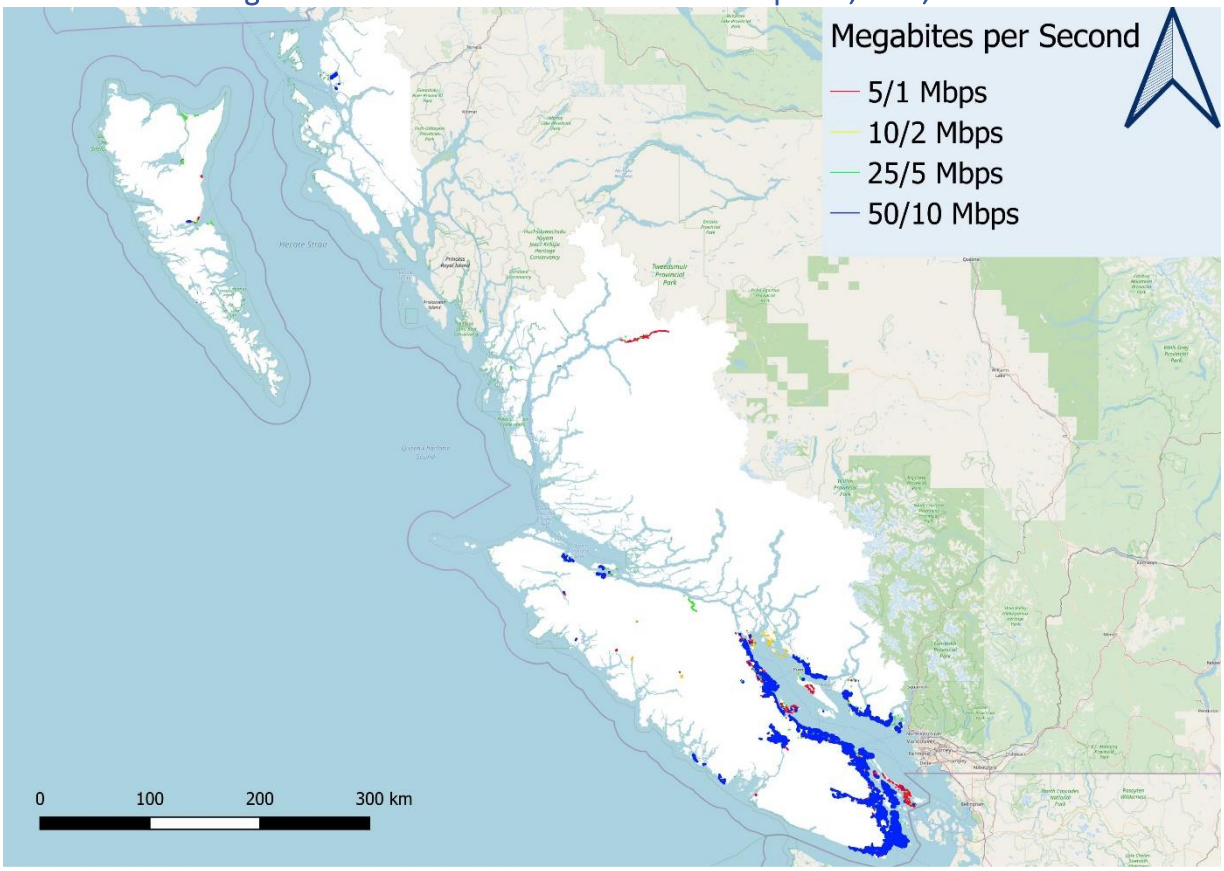
Figure 24 Broadband Connectivity, VICC, 2017



Source: Government of Canada (2020b), *National Broadband Data Information.*

Urban areas have the fastest Internet, with speeds up to 50/10 Mbps, and although some more remote communities have access to the Internet, many have "slow" access, meaning the rate of which data can travel to a household per second is much lower than urban areas (Figure 25). More remote communities with slower internet access include Tahsis, Zeballos, Gold River, Bella Coola, and Tlell. Many of the islands of VICC have slower internet access, as seen in concentrations in the Gulf Islands, Texada Island, and the islands clustered around Desolation Sound. Therefore, while communities may have internet available, the access may be inadequate to use for certain internet services, such as video conferencing and streaming—functions which are important for the delivery of e-services such as health and education.

Figure 25 Households Internet Broadband Speeds, VICC, 2017



Source: Government of Canada (2020b), *National Broadband Data Information.*

The State of Greenhouse Gas Emissions

- **Residential GHG emissions from utilities and solid waste across the VICC decreased by 3% between 2007-2017.**
- **Declines in residential GHG emissions were uneven; many rural areas have high residential GHG emissions and high energy costs, especially those that rely on diesel power generators.**
- **Commercial and Industrial emissions decreased by 17% from 2007-2017**
- **Urban centres and large industrial facilities have the highest commercial and industrial emissions**

British Columbia's Greenhouse Gas Emissions Inventory provides data for 57 communities across the VICC. Data involving single large industrial emissions which amount to greater than 50% of a community's total emissions within that subsector are withheld due to confidentiality, but all other commercial and industrial emissions are available (CAS, 2007). All Wood, Oil, and Propane data were calculated for 2007 and have been adjusted to 2017 but should be considered approximate. This is the only data available for the Islands Trust Areas of VICC, and therefore those emissions should be considered with caution. Additionally, this data has several other limitations, including the Fortis BC data collection system, which assigns emissions in a less-accurate way than previous. Because of this, the Climate Action Secretariat has adjusted the residential data to align with the older data.[9] Other considerations for this data are likewise found in the Technical Methods and Guidance Document which should be consulted when interpreting this data. Although not all-inclusive, this data is a good representation for the territory, and outlines some important features. Different kinds of emissions are counted. Residential GHG emissions are an inventory of all energy consumed for different types of homes.

On average, residential GHG emissions have declined across the VICC

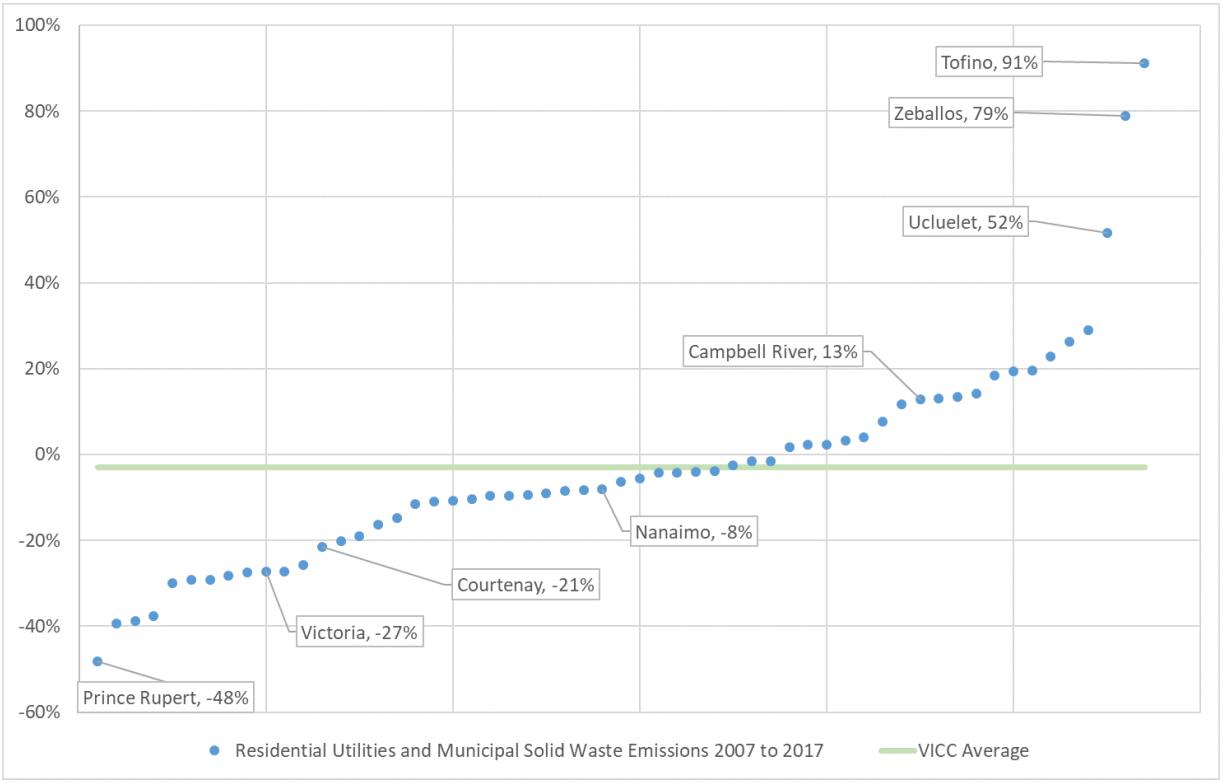
Residential GHG emissions from utilities and solid waste across the VICC decreased by -3% between 2007-2017 (Figure 26). At the lowest end, Prince Rupert has the greatest decrease in GHG emissions, at –48%, as well as having the lowest per capita residential utilities emissions for 2017 at 0.14 tonnes of carbon dioxide equivalent (tCO2e) (CAS, 2019). Port Edward, another northern community, has a decrease of -20% (CAS, 2019). However, not all northern communities are experiencing decreases in emissions; Masset and Queen Charlotte (Charlotte) on Haida Gwaii both have increases over the decade. This is likely a reflection on the remoteness of the islands, and is reflected in other island communities such as the Gulf Islands, which also are experiencing an increase in emissions. Another disparity is the difference within the Sunshine Coast communities; Gibsons and Sechelt are among the top five communities with the largest decreases, yet Sechelt Band Indian Government District is in the top five communities with the largest increases in utilities and solid waste emissions (CAS, 2019).

[9] See Technical Methods and Guidance Document, 2007-2012 Reports (BC Ministry of Environment, 2017).

The community which had the highest residential emissions per capita in 2017 was Tahsis, at 7.40 tCO2e; but they also have among the lowest commercial and industrial GHG emissions per capita (at 0.13 in 2017, see Figure 28) (CAS, 2019). More rural and isolated communities tend to have higher emissions because they do not have the capital to invest in the same scale of projects as more urban areas do, and often are having to rely on diesel generators for much of their energy. These generators are not only high in emissions, but also in cost - a heavy burden for smaller communities. Higher energy demands may also be related to their location in colder climates.

The medium and large population centres of VICC all have changes below the territorial average, ranging from –8 to -27% (Figure 26) (CAS, 2019). The decrease in tCO2e reflects the ability for urban areas to invest in greener infrastructure, low-emissions public transportation, and sustainable energy. These urban areas have had the ongoing opportunity to make such changes and investments and the data reflects the effectiveness of some of these initiatives.

Figure 26 Percent Change in Residential Utilities and Solid Waste Emissions, per capita tCO2e, 2007 to 2017



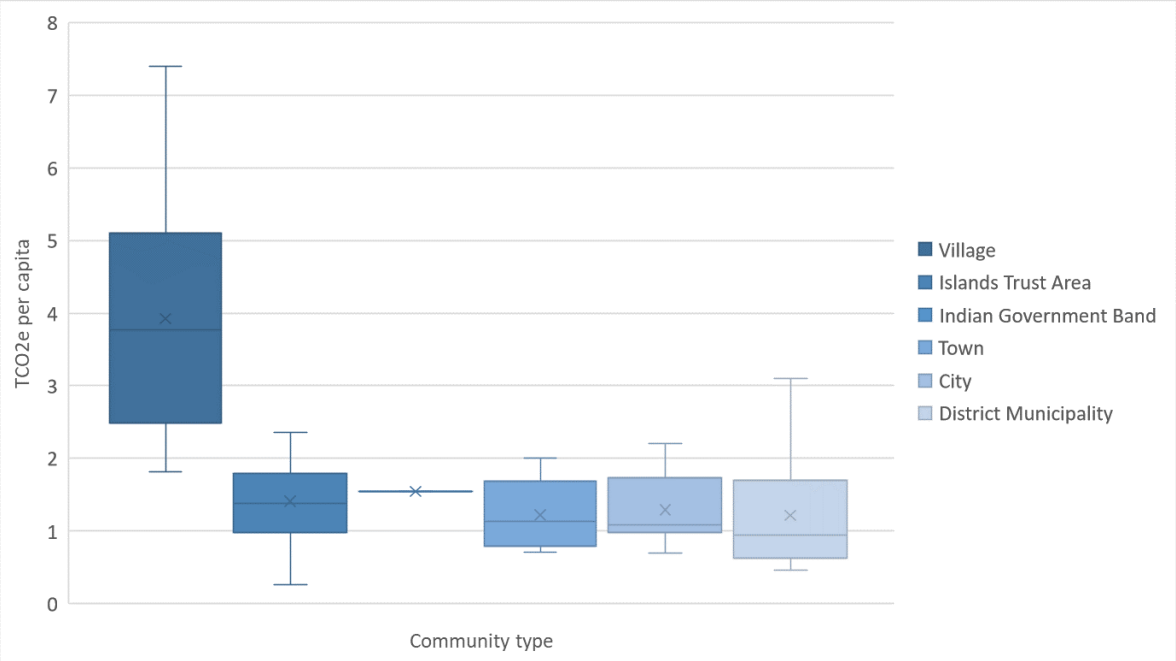
Source: Government of British Columbia Climate Action Secretariat (2019). BC utilities energy data at the community level, BC landfill waste data at the community level

Rural communities have the highest per capita GHG emissions on average

Figure 27 further illustrates the disparity between smaller communities and urban areas; the rural communities (villages) of VICC have the highest average residential GHG emissions in 2017, and includes places such as Tahsis, Zeballos, Masset, and Port Clements. These areas are all very remote in comparison to the population centres of VICC, and do not have access to the same connectivity or capital resources. Villages also display the largest range in emissions, indicating

that some communities have invested in cleaner energy options, and others do not have that ability yet.

Figure 27 Tonnes of Residential GHG Utilities and Solid Waste Emissions per capita, by Community Type, VICC, 2017

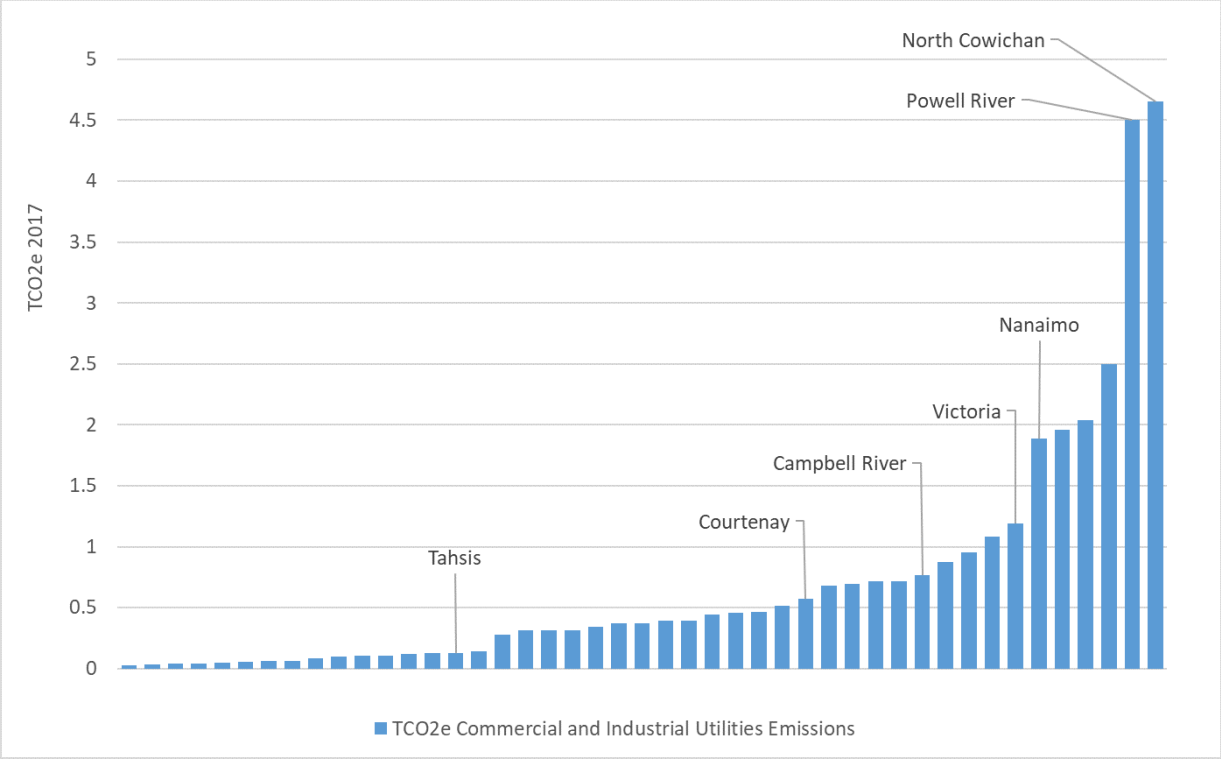


**Note: there is only one Indian Government District – the Sechelt IGD*
Source: Government of British Columbia Climate Action Secretariat (2019). BC utilities energy data at the community level, BC landfill waste data at the community level

There is little correlation between high industrial and commercial GHG emissions and communities with goods-based economies

In VICC many communities either do not have commercial and industrial (CI) data, or have a CI emission of zero; and are not illustrated in Figure 28, below. All these communities are Islands Trust Areas and, as aforementioned, there is only data for these communities pertaining to estimated oil, wood, and propane. Other communities have significant CI emissions; the communities which have the greatest CI emissions are the District Municipality of North Cowichan and the City of Powell River, both of which are home to Pulp and Paper Mills, one in Crofton and the other in Historic Powell River. The closing of the pulp and paper mill in Campbell River contributed to the decrease in commercial and industrial utilities emissions over 2007-2017, which was -17%. There is little correlation between high CI emissions and goods-based economies. It is population centres with large commercial and industrial sectors (not just goods based), as well as communities with large industrial emitters that have among the highest CI emissions.

Figure 28 Commercial and Industrial Utilities Emissions by Community, per capita tCO2e, 2017



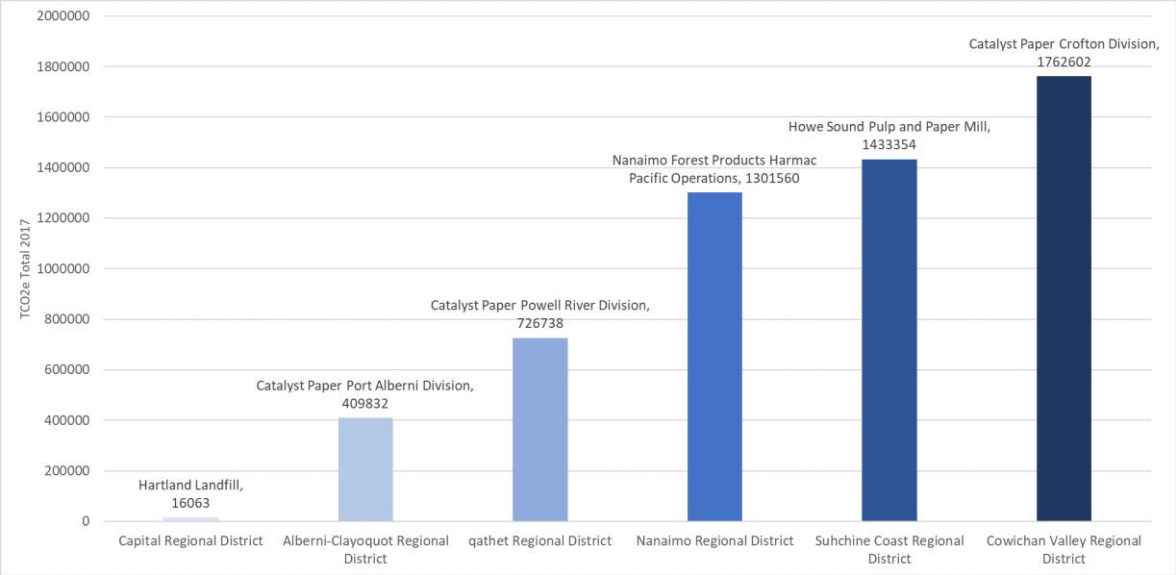
Source: Government of British Columbia Climate Action Secretariat (2019). BC utilities energy data at the community level, BC landfill waste data at the community level

Large Industrial facilities in VICC contribute heavily to emissions, but also supply important jobs and energy

VICC is home to six large industrial emitters, which are defined by the province as any facility which emits 10,000 tCO2e per year.[10] The emissions data on these six differs from the community data, as it includes all emissions, not just utilities. Additionally, large emitters do not always fall within the jurisdiction of towns and cities and so not all are reflected in the community data of Figure 29, notably Howe Sound Pulp and Paper Mill. Large industrial emitters are mostly Pulp and Paper Mills, the largest of which is the Crofton Division of Catalyst Paper (Figure 29). Hartland Landfill is the only other kind of large industrial emitter found in the Capital Regional District and emits a figure less than 1% of the Crofton Mill's emissions. For mills, the largest source of emissions stems from the combustion of biomass, for example in the burning of hogfuel to power boilers. These facilities greatly impact the emissions of VICC, yet also supply many jobs to the surrounding communities, as well as supplying power to communities and supporting the economy. Therefore, when considering these emitters, it is not a matter of just economy or environment, but both.

[10] Large industrial emitters definition(Government of BC, 2020)

Figure 29 Large Industrial Emitters, VICC, 2017

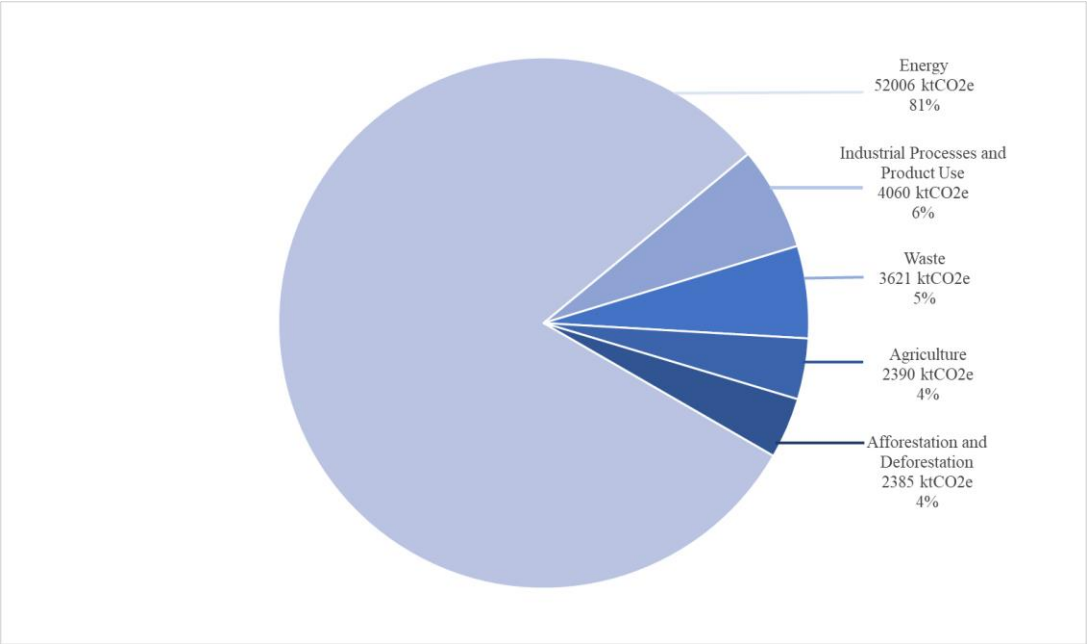


Source: Government of British Columbia (2019). Industrial Facility Greenhouse Gas Emissions.

Energy use is by far the highest emitting sector for BC…

Although there are no further sectoral and sub-sectoral emissions data available for VICC, the Provincial Inventory can provide blanket characteristics for the region, drawing on the provincial trends. Energy is the largest sectoral contributor to total emissions, making up 81% of total BC emissions in 2017 (Figure 30). The four other sectors, Industrial Processes and Product Use, Waste, Agriculture, and Afforestation and Deforestation, are all very similar in numbers, accounting for 6%, 5%, 4%, and 4% of total emissions respectively (see **Error! Reference source not found.**, Appendix for provincial emissions categorizations).

Figure 30 Sectoral Emissions of British Columbia, in ktCO2e, 2017

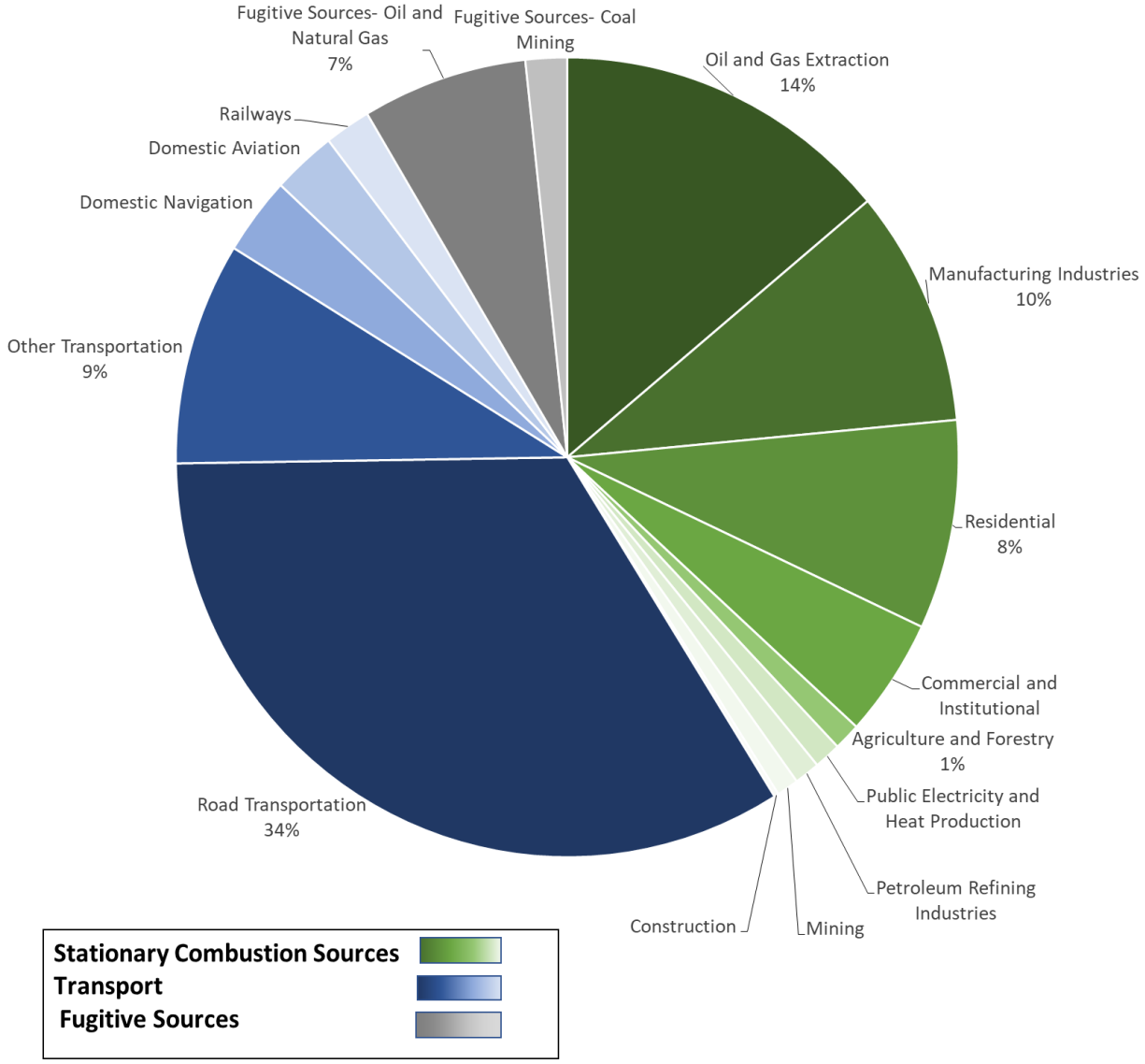


Source: Government of British Columbia, (2019). Provincial Greenhouse Gas Emissions Inventory.

…of which transportation emissions are around half

Transportation encompasses 50% of energy sector emissions (blue shades, Figure 31 Energy Sector Emissions Breakdown for British Columbia, 2017). The VICC is heavily reliant on transportation in several ways; the region imports many of its goods (especially food) from other parts of BC by way of ferry systems and large transport trucks. Road Transportation makes up 34% of BC's energy emissions. Also, the rurality of VICC lends itself to an increased transportation sub-sector, as it requires significant travel to reach many of the remote and rural communities of the region. Oil and Gas Extraction is the next highest energy emitter at 14%, and Manufacturing Industries at 10%; both are part of the Stationary Combustion Sources sub-sector which is the second largest and accounts for 41%. These are not as dominant in VICC. Agriculture and Forestry are relatively low emitters, accounting for only 1% of the total energy emissions in BC.

Figure 31 Energy Sector Emissions Breakdown for British Columbia, 2017



Source: Government of British Columbia, (2019). Provincial Greenhouse Gas Emissions Inventory.

The 2017 wildfires contributed over three times as many greenhouse gasses into the atmosphere than the total provincial emissions

Finally, there are some emissions that are not included in the BC totals, but that are important to help understand the emissions profile for VICC: these are emissions from Other Land Use (Table 4 Emissions Related to Other Land Use in British Columbia, 2017). This category of emissions includes Forest Management, which accounts for 202,993 ktCO2e—this is over three times as high as the Provincial total. The reason for this is largely due to wildfires: in 2017 BC experienced its worst fire season on record, and totalled to 176,550 ktCO2e. It is important to note this, as all other years on record have significantly lower emissions. Wildfires are a large source of greenhouse gas emissions, and are expected to increase in the coming years due to climate change, and so need to

be considered not only in terms of preserving land and hazards to humans, but also from an emissions standpoint. It is important to note while considering this data that carbon sinks are not included in this data; forest carbon management (through sustainable forestry and conservation practices) reduces forest carbon sources like wildfires and slash piles, which is needed to maintain and/or increase carbon sinks in the VICC forests.

Table 4 Emissions Related to Other Land Use in British Columbia, 2017

Category	Sub-Category	Emissions, ktCO2e
Forest Management		202,993
	Wildfires	176,550
	Emissions from Decomposition of Harvested Wood Products	42,034
	Slash pile burning	3,990
	Forest growth minus decay	-19,581
Cropland Management		158
Wetland Management		40
Grassland Management		0
Settlement Management		-498

Source: Government of British Columbia, (2019). Provincial Greenhouse Gas Emissions Inventory.

Present and Future Climate Change Scenarios

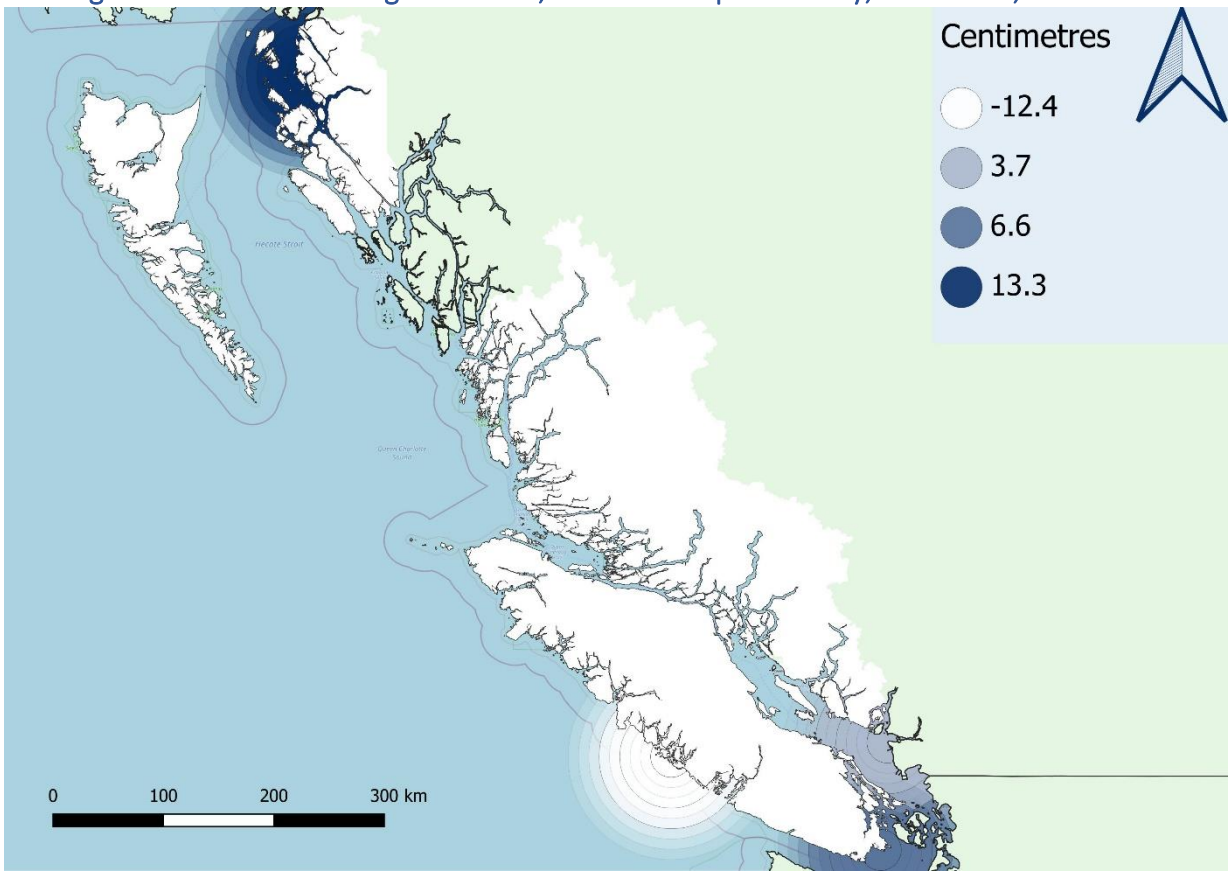
- **Sea-level rise together with more frequent and severe storms due to climate change poses hazard to VICC communities and industries.**
- **Sea level rise over the past century has been uneven across the VICC due to isostatic rebound from the last glaciation; some areas are under greater threat than others.**
- **Ocean surface temperatures vary across the VICC, but overall depict a warming trend, threatening marine life.**
- **Communities face current and ongoing risk of flooding, landslides, and structural damage to critical infrastructure.**

As a coastal territory, the changes in the ocean pose a serious threat to communities within VICC

The VICC region is intrinsically connected to the ocean, and therefore the changes to the ocean due to climate change are of significant importance to the region. Globally, mean sea level has risen 0.19m from 1901-2010, and it is very likely that the rate of sea level rise was 1.7mm/yr within that time range, but 3.2mm/yr from 1992-2010 (IPCC, 2014). It is very likely that the rate of rise will continue to increase in the coming years (IPCC, 2014). However, sea level rise varies across the VICC (

Figure 32). In Prince Rupert the average sea level rise was 0.13m/century, and 0.06m/century in Victoria, while in Tofino the average sea level dropped at -0.12m/century (BCMoE, 2016). At first this may seem counter-intuitive, but there is a simple explanation; due to the isostatic rebound from the last glaciation, parts of Vancouver Island are rising at ~0.25m/century, while other areas are not moving (to a significant degree) (BCMoE, 2016).

Figure 32 Observed Change Sea Level, Centimeters per Century, Coastal BC, 1910-2014



Sources: BC sea level data (Government of British Columbia, 2020e)*; US cartographic file* (US Census Bureau, 2020)*; BC cartographic file* (Government of British Columbia, 2020d).

Isostatic rebound is the lifting of land after a large quantity of ice in the form of glaciers has retreated from the area; it is a slow response which takes place over thousands of years. This rising of the land is responsible for the apparent lowering of sea level in Tofino, and accounts for the large differences between there and Prince Rupert where there is little rebound occurring. The implications of sea level rise within VICC are vast, including:

- Flooding, especially beaches, wetlands, coastal dunes, and waterfront properties;
- More frequent extreme high-water occurrences, impacting property, infrastructure (docks, wharves, port facilities), especially in Prince Rupert;
- Salinification of agricultural lands from intrusion of saltwater into groundwater aquifers and;
- Wave changes, including magnitude and direction, as well as storm waves and surges (BCMoE, 2016).

In addition to sea level rise, the oceans are also experiencing an increase in temperature. From 1971 to 2010, the ocean surface increased on average by 0.11°C/decade (IPCC, 2014). In VICC the temperatures at the ocean surface vary from a low of 0.6°C at Kains Island to a high of 1.4°C at Entrance Island, but on average agree with the IPCC numbers (BCMoE, 2016). Marine organisms are very sensitive to temperature increases, and as such the warming of the surface layer

of the ocean impacts the fish and shellfish which are crucial sources of food and income for many residents of VICC, and are of significant cultural importance. Additionally, the heating of the surface layer is increasing stratification in the ocean – the warm, less dense water "floats" upon the deeper, colder, and more saline water below. The problem with this is that the mixing of surface and deep water is what brings mineral-rich water in autumn to replenish the nutrients in the surface layer, which are necessary for feeding the phytoplankton that are the basis of the marine food chain. The lower the mixing, the less nutrients are available, and the lower the productivity of the ocean (BCMoE, 2016).

Alongside temperature increases, the increasing amount of CO_2 entering the ocean is altering the pH of the water, making it more acidic (Canadian Climate Forum, 2017). Ocean acidification occurs as the CO_2 from the atmosphere dissolves into multiple ions, notably hydrogen ions, which lower the pH of ocean water and make it more acidic (Canadian Climate Forum, 2017). The implications of ocean acidification include deteriorating habitats for fish and shellfish, and decreasing carbonate ions needed by shellfish to build their shells (Canadian Climate Forum, 2017). This is just one of the several impacts of climate change to shellfish, which are an especially vulnerable but equally important class of life to the VICC region. As an example, in 2014 ten million scallops died in the waters near Qualicum Beach (Shore, 2014). These types of die offs have been increasing over the past decade.

VICC is experiencing rising temperatures, putting vulnerable populations at a higher risk

Average global surface temperatures have been warming since 1850 (IPCC, 2014). In BC, the temperature changes are felt more acutely: globally, temperatures have increased on average by 0.85°C/century, while BC on average has experienced increases on average of 1.4°/century from 1900-2013 (BCMoE, 2016). Due to the complex geography of VICC, there are variations in the average temperature increases. The southern coastal reaches of VICC have experienced increases of 0.8°/century, while more northern areas, such as Prince Rupert, have experienced increases of 1.1°C (BCMoE, 2016).

One of the further changes predicted to occur is the increase of heat waves; heat waves are expected to happen more often in urban areas, because the built environment (paved roads, buildings, other infrastructure) retains heat more so than the natural environment (BCMoE, 2016). As such, the heat waves are felt more acutely in urban agglomerations where there is a higher concentration of people, as well as more vulnerable populations, especially seniors. In Victoria, between 1951-1980, there were usually only 3 days a year which reached temperatures above 30°C, but within this century that is expected to increase more than four-fold, to 13 days per year (BCMoE, 2016).

Increased precipitation and glacial meltwater help soil moisture, but increase flooding hazard to communities

VICC spans two unique ecoprovinces; the Georgia Depression, which covers Victoria and the southeast sections of Vancouver Island, and the Coast and Mountains, covering the remaining portions of VICC (BCMoE, 2016). Within the Georgia Depression, precipitation increased by 14% per century, and by 10% per century in the Coast and Mountains ecoprovince, The increase

in precipitation has many implications for VICC (BCMoE, 2016). Some of these implications are beneficial to the territory, the increased precipitation assists in adding to groundwater stores, replenishing soil, and adding to river discharge (BCMoE, 2016). However, increased precipitation does have some negative effects, namely increased risk of flooding, landslides, and damage to infrastructure (BCMoE, 2016). Flooding is a common hazard in British Columbia, and the increasing precipitation is an indicator that this hazard may become more frequent. As such, it is an important event to be prepared for, with attention to storm drains, culverts, and river characteristics.

Much of BC's freshwater is stored in glaciers, however from 1985-2005 BC lost 2525km² of glacial coverage (BCMoE, 2016). Most of the glaciers within VICC are found in the Coast and Mountains ecoprovince, yet the glaciers with the greatest percentage of area loss are found in the Georgia Depression (BCMoE, 2016). The increased melting of glacial ice has similar implications to increased precipitation; the added meltwater increases the discharge of rivers, which has both positive and negative ramifications.

Increasing temperature means more available energy for plants, but may decrease yield of crops

The temperature increases within VICC do have some benefits, as there is an increase in available heat energy for plants, which stimulates growth, and correlates to an increase of Growing Degree Days (BCMoE, 2016). The result is that plants are able to successfully grow for more days out of the year than in previous years. This has implications for agriculture in VICC, which has been able to expand due to a more favourable climate. However, the IPCC warns that if these annual temperature increases are more than a few degrees then there will be a generalized loss in mid-latitudinal potential crop yields, a threat to VICC's food security (IPCC, via BCMoE, 2016). These changes may be important to keep in mind while decisions are made upon the type of crops to be planted. As well, the increase of temperature may bring more droughts to the region; this will impact both agricultural activity and the supply of drinking water for the communities of VICC. Not only that, but the decrease in relative humidity experienced in droughts increases the risk of wildfire activity.

Species are relocating as their zone of tolerance within their habitat shifts

Additionally, the climatic changes appear to be altering the tree coverage within VICC: there is a decrease in Mountain Hemlock, which is being replaced by the more abundant Western Hemlock (Wang, Hamann, Spittlehouse, & Carroll, 2016). This illustrates the movement of species to be expected in VICC: certain species are able to thrive or adapt to higher temperatures and increased precipitation, but for some that change will put the territory of VICC outside of their range of tolerance, and they will cease to grow in this region. A damaging result of this change is the spread of invasive species, which have already influenced many of the VICC ecosystems and can drive out keystone species. This altering of ecosystems in turn changes habitats, as many faunae in VICC are dependent on specific flora to provide food and/or shelter. With the changes in coming years it is expected that the habitats of animals may also shift. This impacts not only the flora and fauna, but also the people who reside in these habitats; certain species are vitally important to communities, especially Indigenous communities. One species of note is the Western Red Cedar,

which has been declining on the eastern flank of Vancouver Island, and holds high cultural importance to Indigenous communities. The relocation of key species may be damaging not only in a resource-based frame, but also culturally, and as such reforestation and habitation efforts need to be a collaborative process respecting values from all sides. There are already examples of species moving from traditional habitats because of the various climate changes, including increased precipitation, changes in river discharge, drought impacts, wildfire, and flooding, to name a few.

Climate change impacts on the health of VICC communities

The result of these many changes to the environment have far reaching ramifications for the citizens of VICC. Water quality is already a concern for many communities, and the changing climate has impacts on this as well. As aforementioned, the rise in sea level may flood low-lying areas, bringing in salt water and contaminants from the ocean (BCMoE, 2016). Further, the increased risk of flooding due to heavy precipitation has the ability to overwhelm sewage systems and to carry runoff into drinking reservoirs, a hazard experienced previously in BC several times, leading to outbreaks of disease transmitted from both sewage and animals (BCMoE, 2016). An example from the CRD comes from 1995, where an outbreak of toxoplasmosis was thought to be linked to a municipal water reservoir following two heavy precipitation events which caused significant turbidity in the reservoir concerned (Bowie et al., 1997). Another implication of sewage runoff is the negative effects it has on shellfish, this in turn not only harms the ocean life but also has threats to the shellfish industry and the consumers of it. There are additional ocean borne diseases which transfer from shellfish to humans, and are also implicated with climate change (James, Carey, O'Halloran, Van Pelt, & Škrabáková, 2010).

Other health considerations associated with climate change include the illnesses related to air quality which is degraded by emissions from vehicles and industrial activities; the smog which can form from emissions is created faster at warmer temperatures, and as such the occurrence of respiratory illnesses may increase (BCMoE, 2016). Heat related illnesses, as aforementioned, are an ongoing concern, and combined with that citizens will see that although they may spend less on heating in the winter, they may be spending more in the summer to keep their houses cooler (BCMoE, 2016). This highlights the importance of energy efficient upgrades, as the cost of energy required to maintain "room temperature" is heightened with older less efficient systems. However, the cost of replacing heating and cooling systems is outside the budget of many families, and as such retrofits and other more economical solutions may be presented as more attainable.

Social inequities are a major determinant of population health and play an important role when trying to understand the health impacts of climate change. Vulnerable populations are at greater risk of phenomena such as flooding, heatwaves, and extreme cold because they have less capacity to adapt to environmental and health risks.[11] The populations most at risk of harmful consequences from climate change events are the most disadvantaged and vulnerable, and those living in arctic ecosystems, drylands, small islands, and least developed countries (IPCC, 2018). In Canada, the most affected are "those living closest to the land" (Goyena & Fallis, 2019), many of whom are farmers and Indigenous communities in coastal and remote communities. The IPCC (2018) also warns that "poverty and disadvantage are expected to increase in some populations as global

[11] See for example: (Cutter, 2006; Douglas et al., 2012; Nicholas et al., 2015).

warming increases." As climate change impacts deepen, it is important to increase population/community resilience.

Our Shared Future

Climate change—sea level rise, an increase in ocean temperatures, more frequent and severe storms, flooding, and landslides—challenges communities across the VICC to pursue adaptation and mitigation measures. These trends impact all communities across the VICC, but in different ways. Some communities are more vulnerable than others both in terms of how they are impacted by climate changes and in terms of their capacity to address it through adaption and mitigation measures.

This Territorial Review has highlighted the interconnectedness of the VICC region and critically, the importance of rural-rural and rural-urban linkages and partnerships. Rural and urban communities are linked by their environments and ecosystems, social connections, labour markets and economies. Rural areas provide critical resources and environmental amenities for the region while urban areas are important service centers and transport hubs. Remote rural communities are especially vulnerable to climate related hazards due to their greater isolation and less diversified transport connectivity and critical infrastructure. Small town and rural VICC communities have inherently smaller administrations and fewer resources with which to manage increasingly complex issues. Rural-rural and rural-urban partnerships can help build economies of scale through such measures as joint procurement, infrastructure and land management and service agreements. These types of partnerships are critical to the region's resilience.

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Appendix Part 1

Table 5 Sectors and Subsectors of Provincial Inventory, 2019

Sector	Subsectors
Energy	Stationary Combustion Sources
	Transport
	Fugitive Sources
	CO2 Transport and Storage
Industrial Processes and Product Use	Mineral Products
	Chemical Industry
	Production and Consumption of Halocarbons, SF6 and NF33
	Non-Energy Products from Fuels and Solvent Use
	Other Product Manufacture and Use
Agriculture	Enteric Fermentation
	Manure Management
	Agricultural Soils
	Field Burning of Agricultural Residue
	Liming, Urea Application and Other Carbon-containing Fertilizers
Waste	Solid Waste Disposal
	Biological Treatment of Solid Waste
	Wastewater Treatment and Discharge
	Incineration and Open Burning of Waste
Afforestation and Deforestation	Deforestation
	Afforestation
	Grassland converted to Cropland
	Other Land converted to Wetlands

Source: Government of British Columbia, (2019). Provincial Greenhouse Gas Emissions Inventory.

Part 2 Survey of Climate Adaptation and Mitigation Policies and Priorities

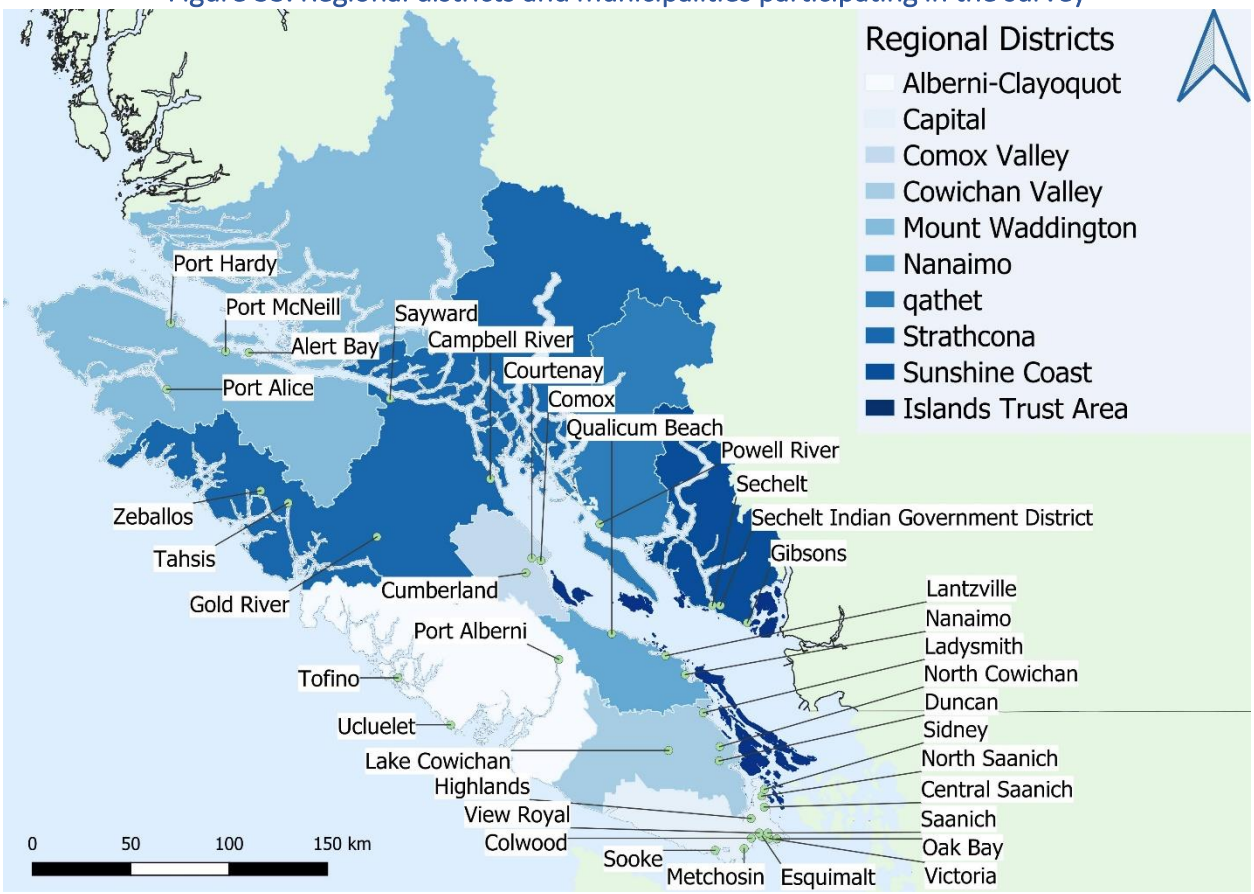
An understanding of the various climate impacts and policy priorities across the region is a critical part of regional climate planning. This is especially relevant for the VICC region given that it is not an established administrative unit and information about its communities' climate change impacts and actions to address them is not systematically summarized. The following survey identifies the key climate impacts, policies, priorities, barriers, and opportunities that currently guide decision-making about climate change mitigation and adaptation in the region, using a web-based survey of municipal government officials. Understanding local priorities will help enhance social and political acceptance of climate policy solutions and their rapid implementation (Goulder and Parry, 2008).

This survey identifies the key climate impacts, policies, priorities, barriers, and opportunities that currently guide decision-making about climate change mitigation and adaptation in the region. A total of 106 government officials, including 69 elected representatives and 35 staff from 38 municipalities and 10 regional districts participated in the survey. Multiple individuals from each local government were invited to participate in the survey, with responses for a single municipality or regional district aggregated into one complete response.

Survey area: Geography of study

The VICC represents a promising geographical region for regional planning: comprised of island and coastal communities, the region shares a common history, as well as vulnerabilities, adaptation, and mitigation challenges. Its economic diversity and urban-rural linkages offer differential capacities and priorities, supporting the potential for building circular and sustainable economies with shared resources and coordinated action. The region partially corresponds to that of the Association of Vancouver Island and Coastal Communities (AVICC), one of five area associations in BC. The planning process and survey cover the areas of Vancouver Island, the Sunshine Coast, and the smaller islands in between, and includes 40 municipalities and 10 regional districts (Figure 33).

Figure 33. Regional districts and municipalities participating in the survey



Due to its coastal nature, the hazards experienced in the VICC region can be expected to differ from other parts of the province. Changes to the ocean caused by climate change, such as sea level rise, warmer temperatures, and acidification are of particular concern in coastal areas. Sea level rise is linked to numerous impacts to coastal communities, including more frequent and severe flooding, salinification of groundwater aquifers and agricultural lands due to saltwater intrusion, increased stress on drainage and sewage systems, and more frequent and severe storms (BCMoE, 2016). Warming ocean temperatures harm marine organisms, including fish and shellfish, which are economically and culturally important as well as being crucial food sources. Ocean acidification, caused by the dissolution of CO_2 into the water, likewise is harmful to marine life, particularly to shellfish, as it interferes with their ability to form shells. While many of these changes are significant throughout the region, the impacts are not uniform, illustrating the importance of collecting information from communities in order to identify varying impacts and priorities.

As noted in Part 1, the global trend of rising surface temperatures also affects the VICC region, and due to the complex geography of the region, there are variations in the average temperature increases, with northern areas experiencing greater increases than southern coastal area. There are a number of impacts associated with rising temperatures affecting the region, which include increased droughts, more frequent heat waves, increased risk of wildfire, threats to food security

and drinking water supplies, and changing habitats for flora and fauna including the relocation of culturally and economically important species. Precipitation patterns are also changing, with the region experiencing an overall increase in precipitation. The effects are mixed, as increased precipitation adds to river discharge and replenishes soil and groundwater stores, but also increases risk of flooding, landslides, and damage to infrastructure (BCMoE, 2016).

The VICC region is culturally, geographically and economically diverse, and as a result, the climate change related hazards experienced by communities, their corresponding vulnerability to impacts, and their capacity for adaptation varies widely. Much of the territory is rural and remote, with a majority of the population clustered in population centres in the southern part of Vancouver Island. Due to their greater isolation, remote rural communities are especially vulnerable to hazards related to climate change and are less equipped to respond in terms of administrative capacity and resources.

Urban areas typically have more extensive mitigation and adaptation measures in place, but experience their own challenges, such as greater development pressures, stormwater management issues, and unique impacts like urban heat islands (Simperler et al, 2020). Urban municipalities can act as service centres for surrounding areas, resulting in differing patterns of vulnerability compared to more rural areas. Cities are often located on or near the coast and have larger and denser populations, resulting in major impacts to people, properties, and infrastructure from climate change hazards. With respect to climate change mitigation, urban centres are responsible for a large share of global energy consumption and GHG emissions and therefore have a key role to play in transitioning to a sustainable future.

Many of the larger urban municipalities in the VICC have climate plans, including the City of Victoria's (2018) Climate Leadership Plan, the District of Saanich's 2020 Climate Plan: 100% Renewable and Resilient Saanich, and the City of Nanaimo's (2012) Community Sustainability Action Plan, with mitigation policies focusing on buildings, transportation, land use, waste management, municipal operations, and energy systems. Canadian municipal climate plans have tended to prioritize mitigation over adaptation (Guyadeen et al., 2018). For example, Nanaimo's 2012 Sustainability Action Plan focuses solely on energy and GHG emissions (i.e., mitigation only). However, municipalities in the VICC are starting to turn their attention toward adaptation planning, which is reflected in the more recent plans. Victoria's plan has adaptation as one component out of five sections, but adaptation is integrated into various sections of the plan and also into other plans, including the stormwater management plan. Saanich's 2020 climate plan integrates adaptation throughout, and Nanaimo has just produced an adaptation plan: the Climate Change Resilience Strategy (2020). The City of Campbell River has a community energy and emissions plan and climate adaptation planning is underway (City of Campbell River, 2020). Some smaller municipalities are also working on climate plans, for example, the District of Ucluelet, which developed its first climate action plan in 2019 is presently developing a climate adaptation plan (District of Ucluelet, 2020).

In these municipalities, mitigation policies are designed in alignment with established provincial and national commitments, as well as international climate targets. For example, Victoria committed in 2016 to reduce community-wide GHGs by 80 percent by 2050 from 2007 levels and to shift away from fossil fuels to 100 percent renewable energy by 2050 (City of Victoria, 2018). Nanaimo has set GHG emissions reduction targets of 33 percent below 2007 levels by 2020 and

80 percent below 2007 levels by 2050 (City of Nanaimo, 2012). Saanich has the most ambitious plan, with a goal to cut emissions in half by 2030 and net zero by 2050, as well as to transition to 100 percent renewable energy by 2050 (City of Saanich, 2020).

Almost every local government in B.C.—187 of 190 municipalities, regional districts and the Islands Trust—has signed the BC Climate Action Charter. The Charter requires local governments to take action to reduce greenhouse gas emissions, report on community climate initiatives, and become carbon neutral in municipal operations. Two island communities – Sechelt Indian Government District and Zeballos – have not signed the charter.

Despite this provincial commitment and the existence of climate plans and policies in larger urban centres, information on climate-related hazards, actions, and priorities is not well-documented in the rest of VICC. The information gathered through the survey will help summarize all mitigation and adaptation policy information in a consistent manner.

Survey Methodology

Data collection

Primary data about existing climate change hazards, climate action plans, policies, and priorities were collected using a web-based survey of local government officials (n=106) in each VICC community. Purposive non-representative sampling of respondents was employed using open-access contact information of government officials from the BC CivicInfo website and individual local government websites. Government officials included elected officials as well as senior staff and administrators in municipalities and regional districts who are responsible for climate change mitigation and adaptation policies and actions. Multiple individuals from each local government were invited to participate in the survey, with the intention of aggregating the responses for a single municipality or regional district into one complete response.

Specifically, the survey invitation was sent by email to 384 government officials including 334 elected officials in 40 VICC municipalities, 10 regional districts and 23 Island Trust communities. A total of 50 municipal and regional district chief administrative officers (CAOs) were also invited to participate and were asked to distribute the survey to relevant staff within the organization.

Responses were received from 38 municipalities and 10 regional districts for a 96% response rate. Of the total 106 individual responses, 69 came from elected officials while 35 were from staff (2 respondents declined to provide their role). All 10 regional districts provided full responses; 38 of 40 municipalities provided responses (i.e., Langford and Parksville did not complete the survey), and of these, 35 were complete while 3 were incomplete (i.e., substantial sections of the survey were not filled out). The average amount of time to complete the survey was 23 minutes. Participation in the survey was completely voluntary with no incentives or compensation offered in exchange for completing the survey. The survey was designed and administered using University of Victoria's SurveyMonkey platform.

Participants in the survey were given a brief overview of the purpose of the survey project and were advised of the benefits and limited risks of participation, steps taken to protect anonymity, confidentiality of data, and dissemination of results. Respondents were requested to complete the

survey in their formal role as staff or representative of their local government and to refrain from offering personal opinions. Survey respondents were given the option to skip questions as well as to pause and save the survey and resume at a later time if needed. Respondents were also allowed to return to previously answered questions to review or edit their answers at any time during or after completing the survey.

The survey consisted of four key sections related to (1) information about the community, (2) climate change mitigation, (3) climate change adaptation, and (4) hazards and impacts (see Appendix A for a full survey questionnaire). This survey design and structure was informed primarily by municipal climate change action survey guidelines by Fisher (2011). Sections on mitigation and adaptation policy options also drew on and BC Government's (2012) climate policy implementation guide for local governments, the Federation of Canadian Municipalities (2009) summary of municipal mitigation policies, as well as existing municipal and regional climate action plans including the City of Victoria's (2018) Climate Leadership Plan, the City of Nanaimo's Community Sustainability Action Plan (2012), the Capital Regional District's (2017) Regional Climate Action Strategy, the Regional District of Nanaimo Community Energy and Emissions Plan (2013), and the City of Barrie (2017) Climate Change Adaptation Strategy.

Each survey section included a mix of open-ended and closed-ended questions. Because this research is exploratory in nature, the questions were not designed to test a specific conceptual framework. Rather, the questions were designed to gather information in order to inform an understanding of current and future local government priorities to support the development of a regional climate plan. The survey questions were pre-tested with the University of Victoria research team and VICAPG representatives.

In Section 1, respondents were asked overview questions about their local government, including administrative capacity to work on climate change issues, the existence of strategic climate plans in their community, the most important natural resources in their community, and the inclusion of Indigenous knowledge in the analysis and decision-making. In section 2 on climate change mitigation, respondents were provided with the definition of climate change mitigation and asked questions about the importance of climate change mitigation to their community and general support for climate change mitigation (on a four-point Likert scale ranging from "not important at all" to "very important").[12] Other questions asked to identify the top priorities for climate change mitigation and investment in the community, the main mitigation policies already implemented by their local government with a list of 22 policy choices and an open-ended response option, as well as support for those policies with an option "I don't know." The policy list was based on the FCM (2009) summary of municipal mitigation policies as well as a review of policy options from local government climate plans. The last two questions in this section addressed barriers to climate change mitigation (with multiple choice response options from the lack of authority to the lack of capacity, financial resources, and senior government support) and an open-ended question on mitigation policies the local government would like to implement next but could not.

Section 3 on climate change adaptation employed a similar set of questions as in the preceding mitigation section but with the term "adaptation" replacing "mitigation."[13] Respondents were

[12] "Climate change mitigation" refers to efforts to reduce greenhouse gas emissions in your entire community.
[13] "Climate change adaptation" refers to efforts to adapt to existing and expected impacts of climate change.

provided with the definition of climate change adaptation in the beginning of the section. The two questions listing policy options differed in that this set of questions contained 19 possible choices for adaptation measures, with response options tailored toward adaptation policies rather than mitigation policies. The list of adaptation policy options was primarily derived from a review of government documents including the provincial government's implementation guide for preparing for climate change (BC Government, 2012) and the City of Barrie's (2017) adaptation strategy.

In the final section on hazards and impacts, questions were asked about past and future hazards based on Fisher (2011). Definitions of the terms "hazard" and "impact" were provided to respondents based on IPCC (2014).[14] To assess past hazards, respondents were asked to identify the top five hazards facing their community from a list of 12 options, with an option of indicating "not applicable/no hazards" or an open-ended option to specify additional hazards. This question was followed by an open-ended question on the measures taken to respond to the indicated hazardous events. Next, respondents were asked to identify the top five critical challenges to the community in terms of impacts from a list of 16 options (with similar options to respond "not applicable/no impacts" or to provide an open-ended response). The questions about hazards and impacts carried forward responses into a number of future questions, using the survey logic application available in SurveyMonkey. A series of matrix style questions were then used to elicit further detail about the hazards being experienced in the community. Respondents were asked to indicate how prepared their local government is if hazards or events occur again or become more frequent or severe, on a three-point Likert-type scale ranging from "not prepared," to "somewhat prepared," and "prepared," with an "I don't know" response option for each hazard. Respondents were next asked to assess their local government's capacity to manage the next hazardous events and the frequency of those events on similar Likert-type scales. Another series of matrix questions asked respondents to evaluate the severity of impacts of the hazardous events previously indicated. Respondents were asked to rank the severity of economic impacts, environmental impacts, and social impacts of each hazard with Likert-type scale answer options from "low" to "medium," "high," or "I don't know." Respondents were then asked to rank the severity of the impacts on Indigenous communities in the region, with the same answer options.

Future hazards questions asked respondents whether impacts of past hazards will continue into the future and become more problematic without climate action. This question was a matrix style format which carried forward the impacts that had been indicated by respondents in the previous section. Answer options included "yes," "maybe," "no," and "I don't know." Next, respondents were asked what climate change impacts will become more of a problem for the community over time, with a list of 12 options and additional options to indicate "not applicable (no events/hazards)" or "I don't know". The next questions asked about the information needed to plan effectively for the future hazards with multiple choice options and an open-ended response option. Finally, respondents were asked about new opportunities for their community related to the

[14] "Hazard" refers to the potential occurrence of a natural or human-induced physical event or trend or physical impact that may cause loss of life, injury, or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, ecosystems, and environmental resources. "Impacts" refer to effects on natural and human systems of extreme weather and climate events and of climate change. Impacts generally refer to effects on lives, livelihoods, health, ecosystems, economies, societies, cultures, services, and infrastructure due to the interaction of climate changes or hazardous climate events occurring within a specific time period and the vulnerability of an exposed society or system.

changing climate action as well as the impact of the COVID-19 crisis on mitigation and adaptation efforts.

Data analysis

Of the total 48 local governments that responded to the survey, 21 had one respondent, while 19 municipalities and 8 regional districts had more than one respondent. The Islands Trust had the highest number of individual respondents (13). Responses from communities with more than one respondent were merged together to form one complete response per municipality or regional district using the following methods: 1) responses were combined to fill in blank sections of survey (i.e., in some cases, respondents from one community divided sections of the survey among themselves); 2) where two or more respondents filled in the same sections of the survey, procedures were developed to merge the responses. These procedures included using an averaging/majority rules strategy where the most frequent response was chosen, and grouping of response options (e.g., "important" and "somewhat important" were combined into one category; "supportive' and "somewhat supportive" were combined into one category; "low" and "medium" impacts were combined into one category coded as "not severe" while "high" was coded as "severe impacts"). For answers with an "I don't know" option, any alternative response would replace "I don't know" (e.g., rating severity of impacts, where to find information). As well, new categories of "limited preparedness/capacity/frequency" were developed where disagreements could not be resolved using the above rules.

Respondents were followed up with by email to confirm information in cases where variation between answers from a single jurisdiction could not be otherwise resolved. In total, 10 local governments (2 regional districts and 8 municipalities) were followed up with via email. The questions requiring follow up included: strategic climate plan (9), dedicated climate staff (3), Indigenous knowledge (3), climate adaptation importance (1), overall support for climate adaptation (1).

Municipalities were categorized into four sub-regions--North Island, Central Island, South Island, and Coast in order to examine the effects of geography on climate action as well as hazards and impacts experienced. Municipalities were also categorized by population size in order to examine how differently sized municipalities experience and respond to climate impacts. The population size categorization followed that used by the Union of BC Municipalities (UBCM), which categorizes municipalities with populations less than 5000 as small, 5000-20,000 as mid-sized, and greater than 20,000 as large (see Appendix B).

Descriptive statistics were used to analyze data, including calculation of frequencies for multiple choice questions. There were three municipalities that only filled in a small section of the survey and others that skipped certain questions. In calculating frequencies, municipalities that did not answer a question/section of the survey were excluded from the total. Contingency tables, using the pivot table function in Excel, were used to compare multiple variables, as in the analysis of the effect of geography and municipal size on hazards/impacts experienced and policy options implemented. Open-ended questions were analyzed to identify common response themes using manual scanning of responses given the small sample size. These themes were used to support and/or explain findings from multiple choice questions.

Survey Results

What Motivates Governments to Act?

Municipalities and regional districts are overwhelmingly supportive of climate action

The survey found that both municipalities and regional districts are overwhelmingly supportive of climate action: 100% of municipalities and regional districts answered that climate change mitigation and adaptation are "important" or "somewhat important" to their community.

An analysis of open-ended responses found that the top five common themes of motivation to act include:

1. Public and/or political demand;
2. Science and data on climate change including observable impacts from changing weather patterns such as increased storms, droughts, and wildfires;
3. concern about sea level rise;
4. Preparation for the future and concern for future generations; and
5. Support and funding from senior levels of government. Several municipalities referenced their declarations of climate emergency and mentioned emissions reductions targets and/or climate action committees that have been established.

Regional districts were particularly likely to mention senior government funding and support as an enabling factor in being motivated and able to take action. The survey results showed that on the whole, municipalities and regional districts in the VICC region are well aware of the issues related to climate change, are already observing the effects, and are motivated to take action:

> ***"****We are motivated and have declared a climate crisis, have written to oil companies and, most significantly, are re-writing our Official Community Plan with a climate change lens."* – Courtenay
>
> "*Council members are strongly and personally motivated. For some councillors, it is their prime motivation for being in local politics*." – Highlands
>
> "*A changing climate has many implications in our region – affecting our health, infrastructure, water supply, agriculture, ecosystems and species, and marine environments. The global scientific community agrees that the more we reduce our total greenhouse gas (GHG) emissions in the short term, the less intense these climate changes will be over time. The costs of inaction exceed the cost of action…In addition, there are significant co-benefits to climate action, including, improved air quality, healthier active lifestyles, reduced operating costs, and potential local economic opportunities*." – Central Saanich
>
> "[We are motivated by] *public pressure, escalating costs for infrastructure repair/replacement, but mostly having senior government enable us (and fund us) to take action*." – Sunshine Coast regional district
>
> "[We are motivated by] *sea level rise, obvious changes to our weather patterns, specific environmental issues as they arise*." – Strathcona regional district

> *"Climate change is a public and therefore political priority. CRD and Islands Trust emergency declaration is spurring action. Climate change impacts such as forest fires and drought are already being felt here*." – Islands Trust

Hazards and Impacts

Climate change hazards and impacts are already being experienced

Virtually all municipalities and regional districts are already experiencing hazards and impacts related to changing weather patterns caused by climate change. The unique island and coastal geography of the region influences the types of hazards and impacts that are experienced in this area compared to other regions of the province. The distinct challenges related to island and coastal communities were reflected in open-ended comments:

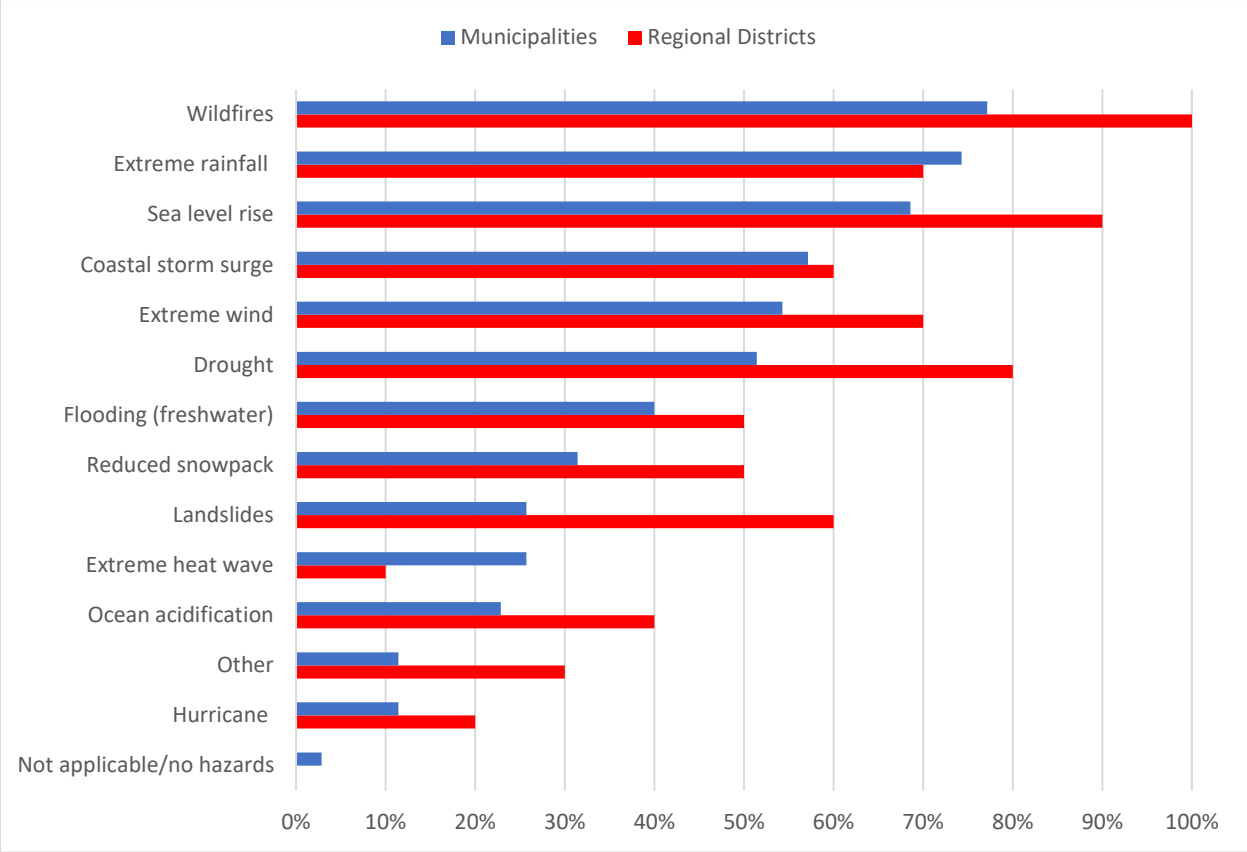
> *"We experience multiple power outages in any given year and often have road/access issues due to wind/rain storms on a yearly basis. We had a wildfire above the town 2 years ago. We live in a deep valley, surrounded by forest, on a flood plane in an earthquake and tsunami zone." –* Zeballos

> "*Saanich is positioned in a climate that is naturally challenging such as being located within a rainshadow and a rare ecosystem. This has caused many streams to dry up during the summer and loss of biodiversity. Climate change is adding to these stressors by further reducing environmental flows, stressing remnant ecosystems, and impacts from poor air quality from wildfires*." – Saanich

> "*Small islands have a more obvious finite land base and natural resources and any climate impacts will have a greater impact to our communities*." – Islands Trust

All except for one municipality indicated that they have experienced hazards related to climate change with wildfires, extreme rainfall, sea level rise, storm surges, extreme winds, and droughts being the key hazards (Figure 34). Municipalities and regional districts identified additional hazards other than those listed in multiple choice responses including tsunamis, earthquakes, heating tank oil spills, air quality, and pandemics. Tsunamis and earthquakes were the most frequently mentioned "other" hazards.

Figure 34. Hazards experienced in municipalities and regional districts



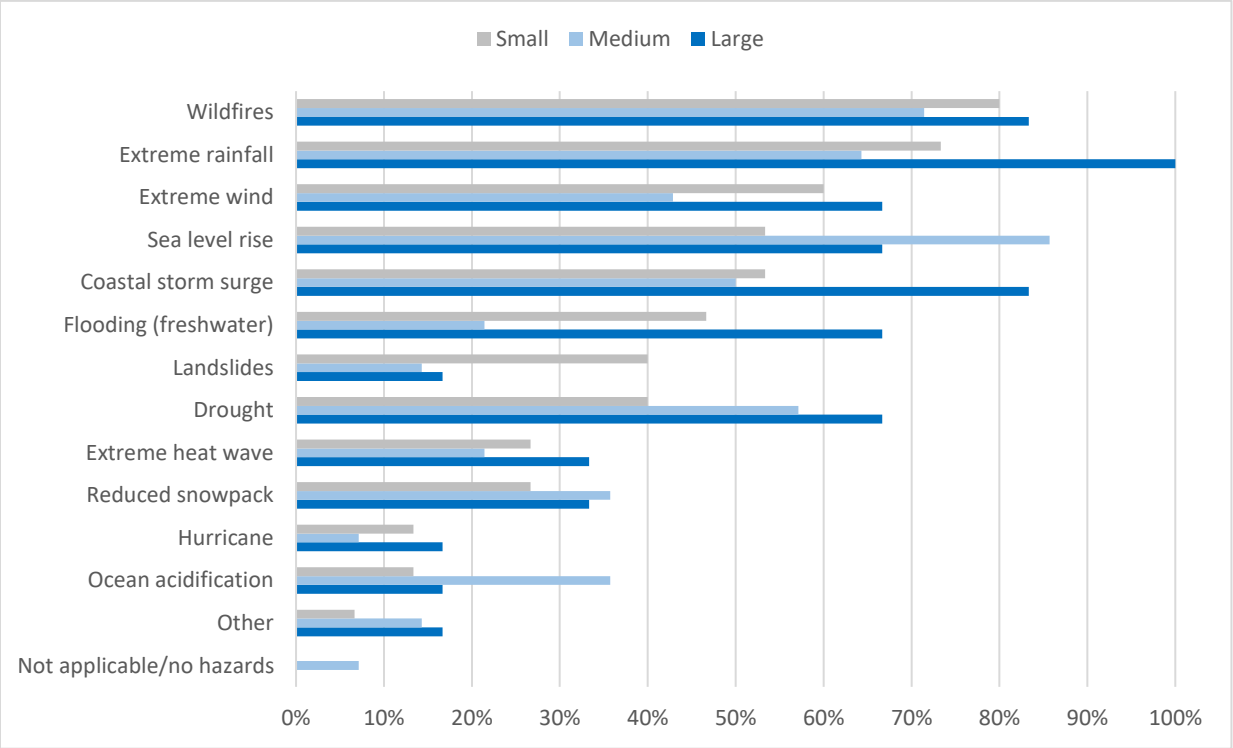
There are some geographic differences in the hazards experienced in different sub-regions, and also commonalities. Wildfire is the top hazard overall for both municipalities and regional districts, and is a top three hazard in all areas (i.e., North Island, Central Island, South Island, and Coast). Extreme rainfall is one of the top three hazards for island municipalities but is not in the top three for coastal municipalities. Sea level rise and drought are top concerns in the Southern region of Vancouver Island and the Coast region but less of a concern in the Central and Northern parts of Vancouver Island. Reduced snowpack was less of an issue in Northern municipalities compared to other areas; conversely, landslides are a top concern in Northern municipalities but not a high concern in other areas.

In the North Island, the top hazards indicated by municipalities included wildfires (89%), extreme rainfall (78%), landslides (78%), storm surges, flooding, and extreme wind (56% each). Central Island top hazards included wildfire (82%), extreme rainfall (73%), reduced snowpack (73%), drought (64%), and sea level rise (64%). In the South Island, top hazards included sea level rise (83%), extreme rainfall (75%), wildfires, extreme wind, and drought (58% each). Finally, in the

Coast sub-region, the top hazards were wildfires, storm surges, sea level rise, and drought (100% each).

Hazards also varied by the size of municipality (Figure 35). The top hazards for small municipalities included wildfires (80%), extreme rainfall (73%), extreme wind (60%), sea level rise (53%), and freshwater flooding (53%). Medium municipalities indicated top hazards such as sea level rise (86%), wildfires (71%), extreme rainfall (64%), drought (57%), and storm surge (50%). The top hazards for large municipalities were extreme rainfall (100%), wildfires (83%), coastal storm surge (83%), sea level rise (67%), drought (67%), extreme wind (67%), and freshwater flooding (67%).

Figure 35. Comparison of hazards by size of municipality



Wildfire and extreme rainfall were top hazards in municipalities of all sizes

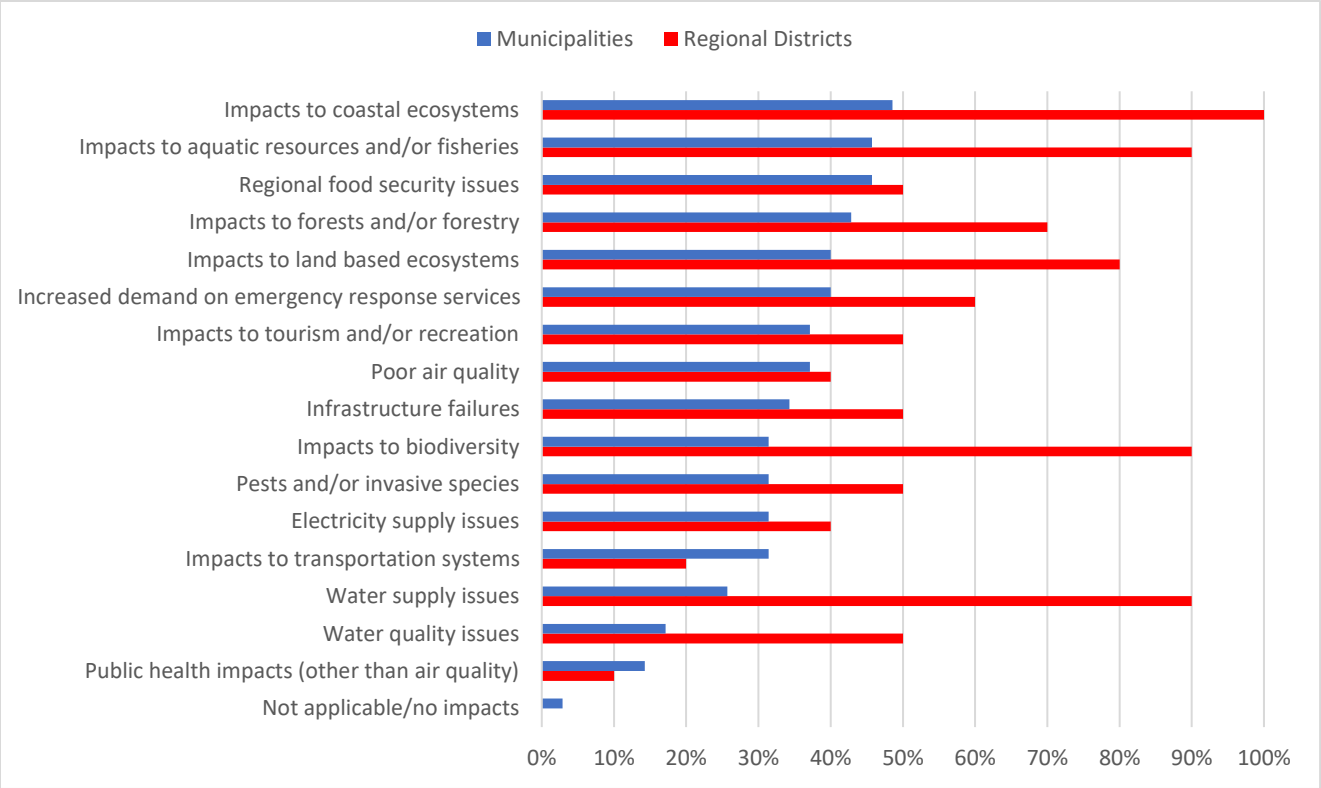
Hazards were identified as more prevalent in large municipalities than small and medium sized municipalities. Although heat waves were not a top hazard overall, they were identified as more of a problem in urban areas, and are a top concern in two out of three of the largest urban municipalities. Landslides stood out as being more a concern for small municipalities as compared to medium and large municipalities, which may relate to the remote nature of many of the smallest municipalities.

In terms of being prepared for most top hazards identified, most municipalities indicated they are fairly well prepared. Although wildfires are the most frequent hazard, almost all municipalities (93%) that identified wildfire as a top hazard are "prepared" or "somewhat prepared" to handle the next event. Sea level rise and ocean acidification are the hazards municipalities feel least prepared to handle (of those who identified sea level rise as a top hazard, only 42% are "prepared/somewhat

prepared"; of those who identified acidification as a top hazard, all have "limited or no preparedness"). Similar to findings on preparedness, most municipalities felt they have either strong capacity or some capacity to handle the next hazard. The hazards that municipalities felt they have the least capacity/resources to handle are sea level rise (63% have some/strong capacity), and ocean acidification (0% capacity).

After identifying hazards, respondents selected top impacts of those hazards. The top impact identified by both municipalities and regional districts was impacts to coastal ecosystems. The most frequently identified impacts for municipalities included impacts to coastal ecosystems (49%), aquatic resources and fisheries (46%), food security (46%), forests and forestry (43%), and land-based ecosystems (40%). The most frequently identified impacts for regional districts included impacts to coastal ecosystems (100%), aquatic resources and fisheries (90%), biodiversity (90%), water supply issues (90%), and land-based ecosystems (80%) (Figure 36).

Figure 36. Climate change impacts experienced in municipalities and regional districts



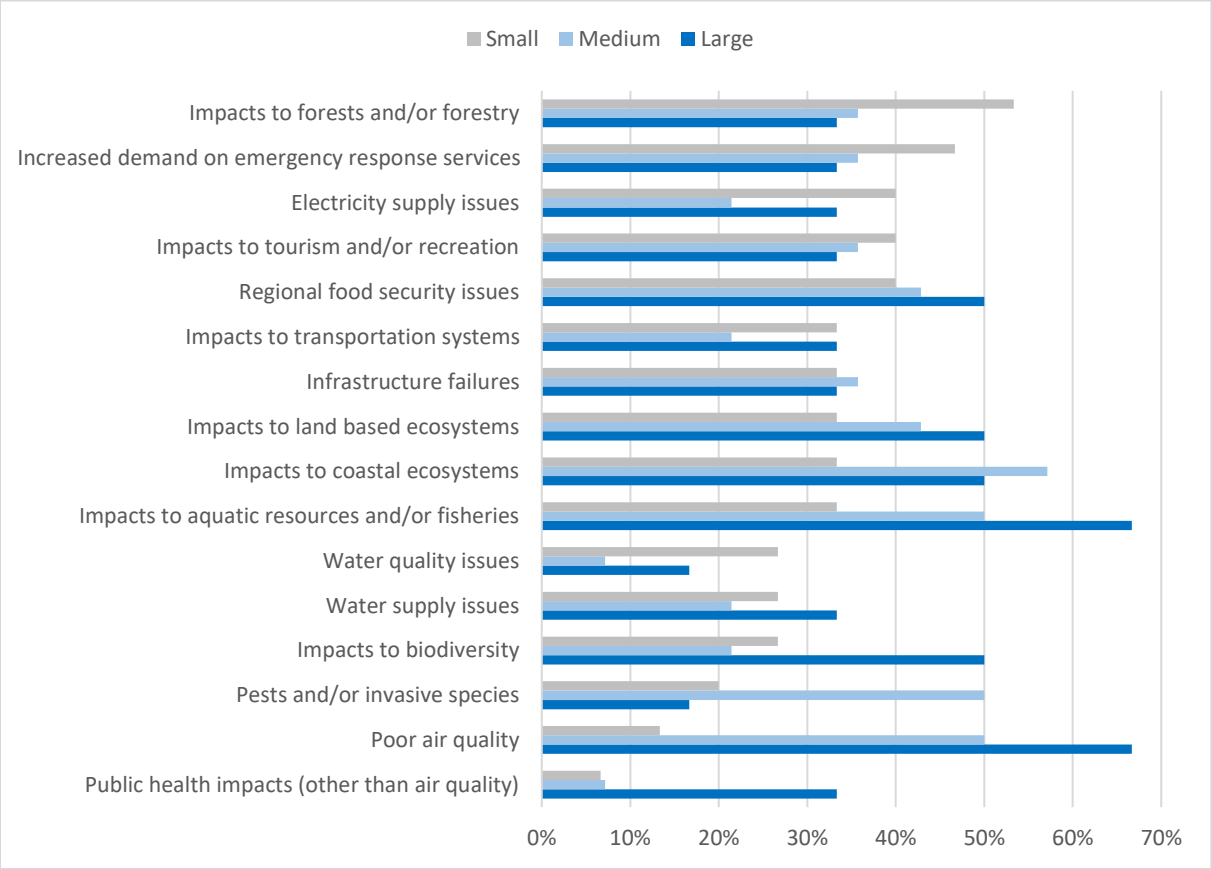
There are distinct regional differences in the impacts experienced

In the North Island, the top impacts indicated by municipalities were to tourism/recreation (67%), forests/forestry (67%), and electricity supply (56%). In this sub-region there were no air quality, public health impacts, or water supply issues identified. Municipalities in the Central Island indicated poor air quality (55%), demand on emergency services (45%), aquatic resources/fisheries (45%), and water supply issues (45%) as top impacts. In the South Island, the top impacts included land-based ecosystems (67%), coastal ecosystems (67%), poor air quality (50%) and aquatic

resources/fisheries (50%). The top impacts in the coastal sub-region included pests/invasive species (100%), food security (100%), land based ecosystems (67%), and coastal ecosystems (67%). No public health impacts or water quality impacts were indicated in the Coast area.

Climate change impacts also varied by municipality size (Figure 37). In small municipalities the top impacts included impacts to forests/forestry (53%), demand on emergency response services (47%), tourism/recreation (40%), food security (40%), and electricity supply (40%). The top impacts in mid-sized municipalities included impacts to coastal ecosystems (57%), poor air quality (50%), pests and/or invasive species (50%), aquatic resources/fisheries (50%), land-based ecosystems (43%), and food security (43%). In large municipalities, the top impacts were poor air quality (67%), impacts to aquatic resources and/or fisheries (67%), impacts to coastal ecosystems (50%), impacts to land based ecosystems (50%), regional food security issues (50%), and impacts to biodiversity (50%).

Figure 37. Comparison of climate change Impacts by size of municipality



Small municipalities were more likely than mid-sized and large municipalities to identify impacts to forestry, emergency response resources, electricity supply, tourism/recreation, and water quality. The impacts that are important to small communities reflect to some extent the closer linkage and dependency on natural resources, especially the importance of forestry. The demand on emergency response services may be a bigger problem for these small municipalities due to their smaller administrative capacity and the remoteness of many small communities.

Medium and large municipalities were more likely to identify impacts to aquatic resources, coastal ecosystems, and land-based ecosystems as a top impact compared to small municipalities. Large municipalities were the most likely to identify impacts to biodiversity compared to smaller municipalities. Air quality and health impacts were the least frequently chosen for small municipalities, but medium and large municipalities are much more affected by poor air quality and other types of public health impacts as compared to small and medium sized municipalities. These differences are even more pronounced when examining only the largest urban municipalities all three of which indicated poor air quality as a top impact, with two out of three indicating other public health impacts.

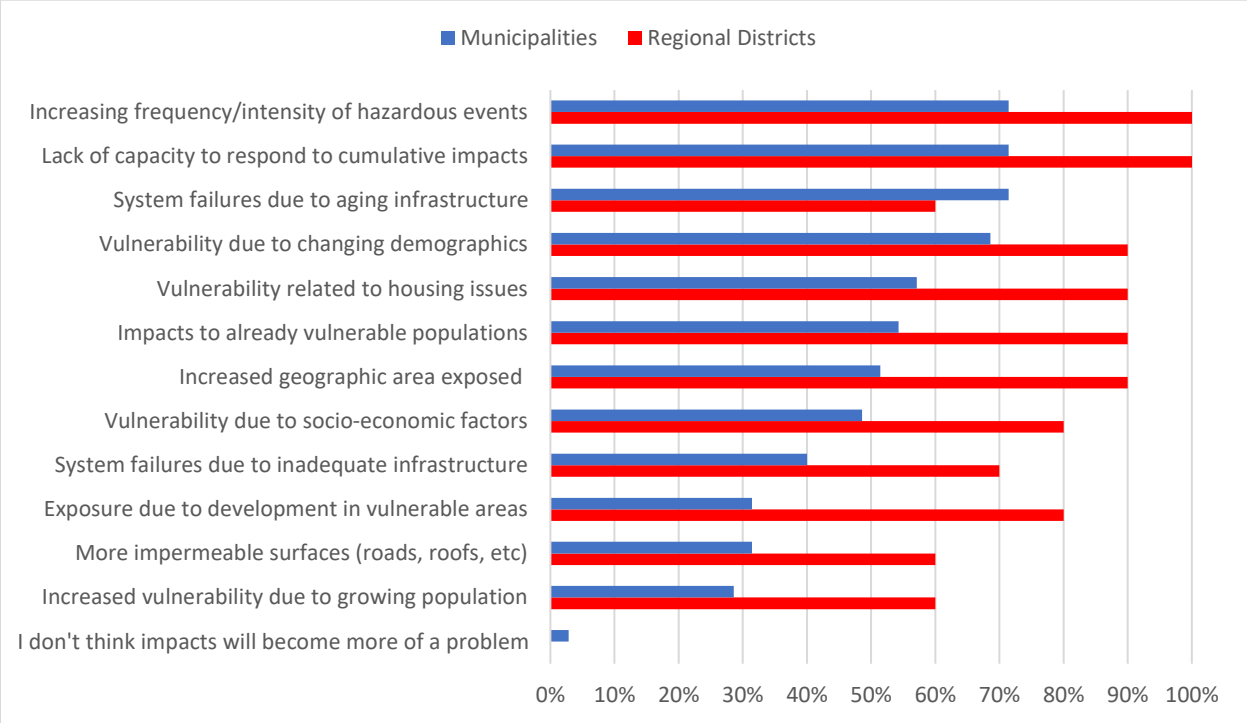
A number of respondents pointed to the interrelated and cumulative nature of hazards and impacts in open-ended comments. Most communities expect these hazards and impacts to increase into the future. The majority of municipalities believe that the climate change related impacts they identified will continue and/or worsen, ranging from 67% for water quality issues to 93% for food security and impacts to land-based ecosystems. The majority of regional districts believe impacts to the community identified in the survey would become more problematic in the future for all impacts except for electricity supply (only 25% that identified this impact believed it would become more of a problem). For all other impacts, the percentage that believe impacts will get worse ranged from 60% to 100%.

Survey respondents were also asked how and why they expected climate impacts to become more of a problem over time (

Figure 38). The most frequent response for both municipalities and regional districts was increased frequency and/or intensity of hazardous events (71% municipalities; 100% regional districts), and lack of capacity to respond to multiple or cumulative events (71% municipalities; 100% regional districts). Municipalities also identified system failures due to aging infrastructure (71%) and changing demographics (69%) as key areas of vulnerability. Regional districts identified changing

demographics, housing issues, vulnerable populations, and increased geographic area exposed to hazards (90% each) as key vulnerabilities.

Figure 38. Reasons for increased vulnerability to climate impacts



Nearly half of municipalities (46%) believe their community will experience new impacts in the future, and another 51% think they might experience new impacts. Most regional districts (80%) believe they will experience new impacts which have not affected them in the past. Some of the future impacts described by respondents include: flooding, sea level rise, increased pests and invasive species, impacts to food security including local agriculture and food supply chains, more

frequent extreme weather events, more frequent droughts and wildfires, impacts to water resources including drinking water scarcity, increased human disease, impacts to forests including specific tree species such as cedars, damage to ecosystems, loss of biodiversity, impacts on salmon streams, migration of climate refugees, and loss of Indigenous food and medicines. The quotes below from respondents speak to the anticipated future impacts of climate change and their cumulative effects:

> *"The way climate impacts combine or accumulate means there are many impacts we can't anticipate but will likely deal with…As our landscapes change and we lose biodiversity, we can't predict the cascading impacts that will have on other living systems. Climate migrants and local food shortages are potential impacts we could deal with in the future. Climate change may impact trends in tourism, interface fire risks, etc"* – Victoria

> *"Sea level rise has not affected us to date, but this is changing. Likelihood of pests/invasive species appearing not previously seen. Wildfire and air quality, invasive plants and animals including noxious pests, human disease, climate refuges, ecosystem collapse, food insecurity, social breakdown."* – Campbell River

> *"Electricity supply issues have not occurred yet, but may become an issue with sea level rise and storm surge for our buried lines throughout the town at sea level, or high winds*." – Sidney

> *"While water quality and quantity don't seem to be an issue yet…our study indicates that ground water resources are expected to be affected by climate change."* – Highlands

> *"Once very rare emergency events (extreme weather, storm surges, drought, floods, wildfires) are now becoming regular although still manageable events."* – Mount Waddington regional district

> *"Many of the likely impacts have not been functionally realized on the islands but it is inevitable that they will including wildfires, loss of bio-diversity, sea level rise and increase in storms."* – Islands Trust

> *"Cumulative/compounding impacts will become increasingly challenging to address."* – Capital regional district

Climate Change Mitigation

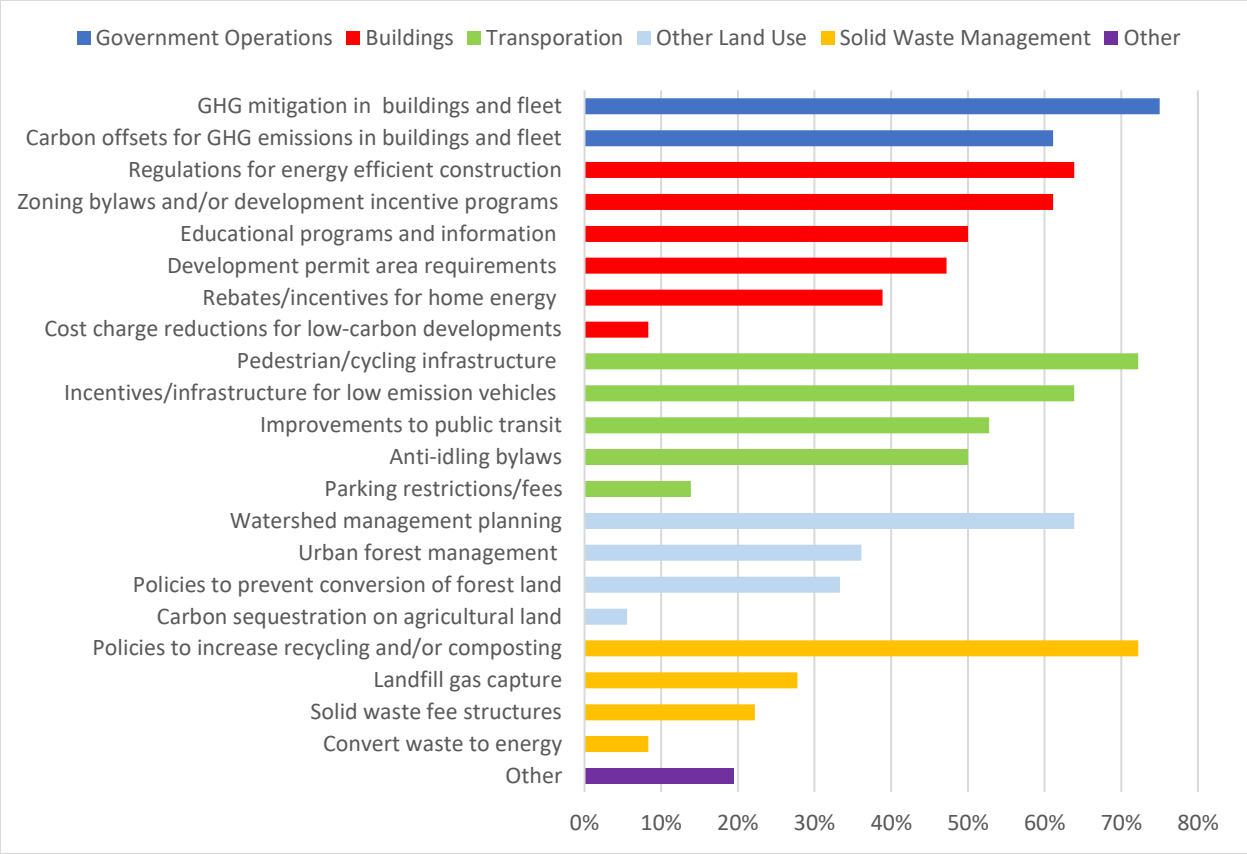
This is a high level for support for climate mitigation policies and practices

Municipalities and regional districts overall are highly supportive of taking action to mitigate climate change, and almost all have mitigation policies in place. Some of the most frequently mentioned priorities for climate change mitigation include land use planning, green infrastructure, public transit, pedestrian and cycling infrastructure, building standards including civic buildings, fleet management, tree and forest conservation, and general community emissions reductions.

Municipalities and regional districts have implemented mitigation policies across a range of sectors, including government operations, buildings, transportation, land use, and solid waste management. Policies exist in almost all municipalities (Figure 39); only two indicated they have no mitigation policies currently in place. Most policies are investment-like policies, followed by

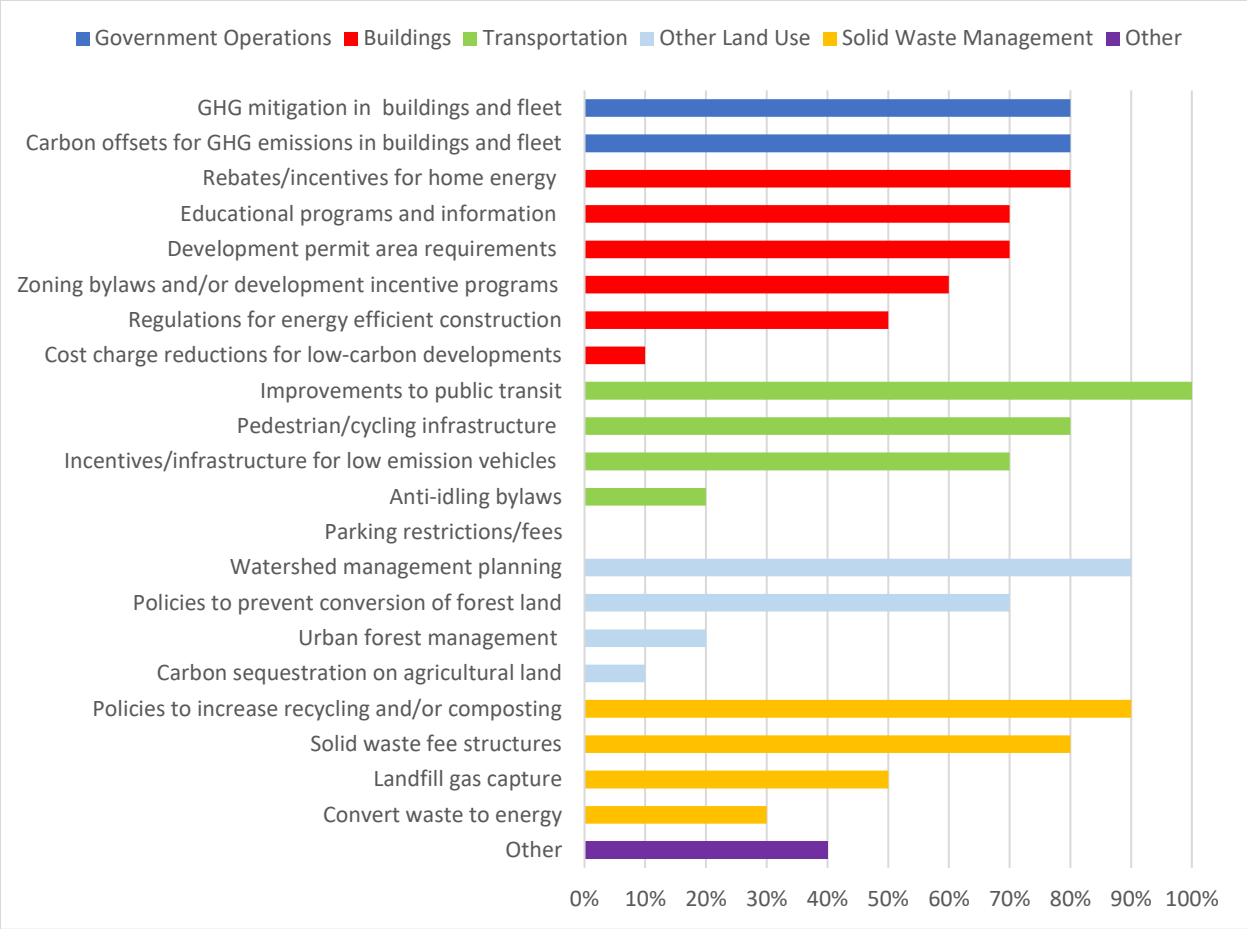
regulations and incentives. The most frequently selected policy options included GHG mitigation in buildings and fleet (75%), pedestrian/cycling infrastructure (75%), and policies to increase recycling and/or composting (72%). Respondents were given the choice to indicate other policies not included in the list of options. They identified policies such as asset management, flood/sea level rise impact and mitigation studies, use of bio-diesel or renewable natural gas, investments in urban forest/tree planting, public education and corporate catering related to lower impact food choices, and environment committees.

Figure 39. Municipal mitigation policies by sector



Climate change mitigation policies exist in all regional districts, across all sectors (Figure 40). Regional districts tend to have a higher number of mitigation policies in place compared to municipalities (average of 13 versus 9 for municipalities). The most frequently implemented policies in regional districts included improvements to public transit (100%), watershed management planning (90%), and policies to increase recycling and/or composting (90%). Differences in jurisdiction explain some of the differences in policies between regional districts as compared to municipalities; for example, regional districts tend to have more policies in the area of solid waste management. “Other” policies indicated by regional districts included water conservation measures, heat recovery, biosolids/woodwaste composting, integration of mitigation into plans including OCP and regional growth strategies, urban containment boundaries, emission reduction targets, and protection of Douglas fir.

Figure 40. Regional districts' mitigation policies by sector

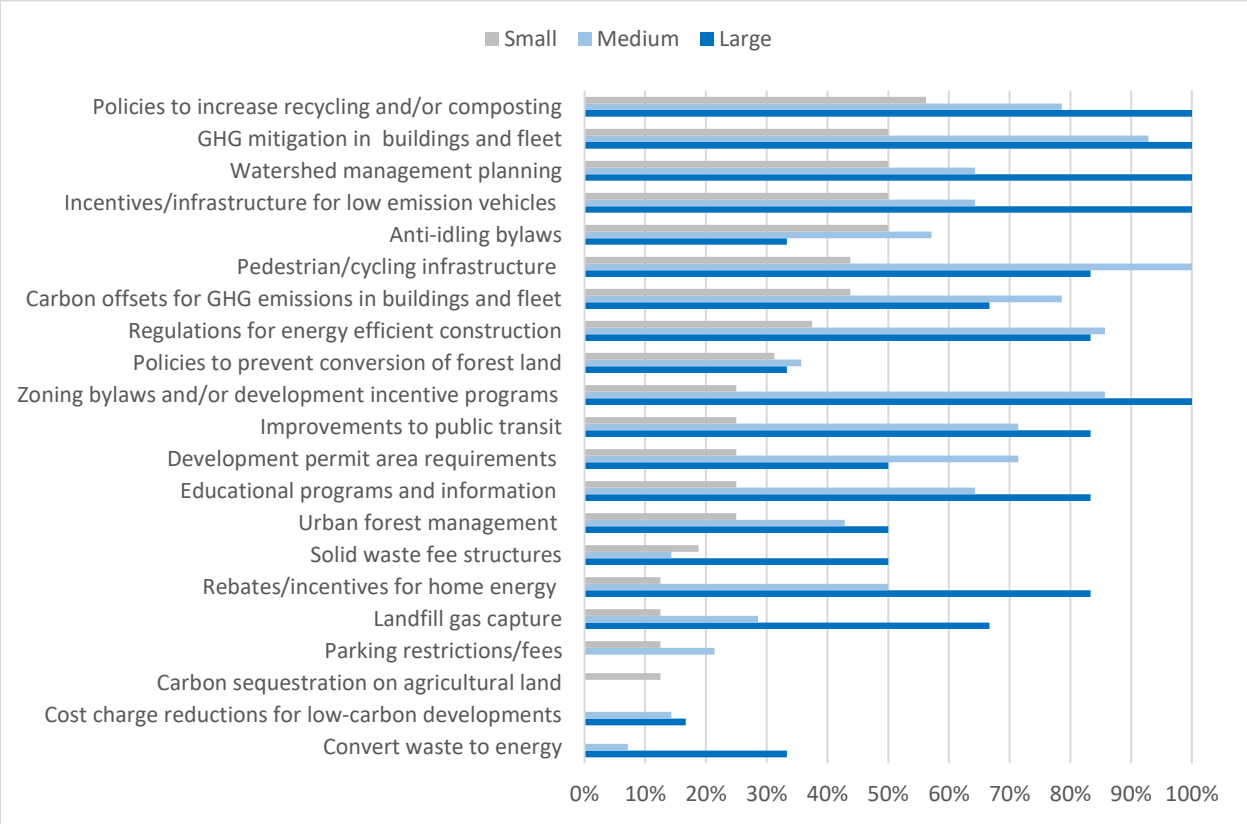


Municipalities in the North Island sub-region tend to have the fewest climate change mitigation policies in place, with an average of 5 policies per municipality. The average is even lower when controlling for municipality size, with an average of only 3 policies per small municipality. Interestingly, the sole large municipality in the northern area, Campbell River, had the highest number of policies of any municipality with 18 policies. The most frequent policies in northern municipalities included recycling/composting, watershed management, and GHG mitigation in civic buildings and fleet (44% each). In the Central Island, municipalities had an average of 10 mitigation policies each. The most frequent policies included recycling/composting and GHG mitigation in buildings and fleet (83% each), followed by watershed management, pedestrian/cycling infrastructure, incentives/infrastructure for low emissions vehicles (LEVs), zoning bylaws/development incentives, and carbon offsets (75% each). In the South Island, there was an average of 12 policies per municipality. The top policies included regulations for energy efficient new construction (100%), pedestrian/cycling infrastructure (92%), educational programs/information (83%), GHG mitigation in civic buildings and fleet (83%), recycling/composting (75%), incentives/infrastructure for LEVs (75%), and zoning bylaws/development incentives (75%). The Coast also had an average of 12 policies per municipality. The most frequent policies implemented in coastal municipalities include recycling/composting, pedestrian/cycling infrastructure, zoning bylaws/development incentives, development permit area requirements, GHG mitigation in buildings and fleet, and carbon offsets (100% each).

The total number of mitigation policies implemented corresponds roughly to municipality size, with small municipalities having an average of six policies, mid-sized municipalities having an average of 11 policies, and large municipalities an average of 13 policies. The smallest, remote municipalities in the north have the fewest policies (only three policies per small northern municipality on average), while the three largest urban municipalities average 15 policies each.

Climate change mitigation policies vary by municipality size (Figure 41). In small municipalities, the most frequently implemented policies included recycling/composting (56%), GHG mitigation in buildings and fleet (50%), watershed management planning (50%), incentives/infrastructure for LEVs (50%), and anti-idling bylaws (50%). In mid-sized municipalities, the top policies included pedestrian/cycling infrastructure (100%), GHG mitigation in buildings and fleet (93%), zoning bylaws and/or development incentive programs (86%), and regulations for energy efficient construction (86%). In large municipalities, the most frequent policies included recycling/composting, GHG mitigation in buildings and fleet, watershed management planning, incentives/infrastructure for LEVs, and zoning bylaws/development incentive programs (100% each).

Figure 41. Mitigation policies by municipality size



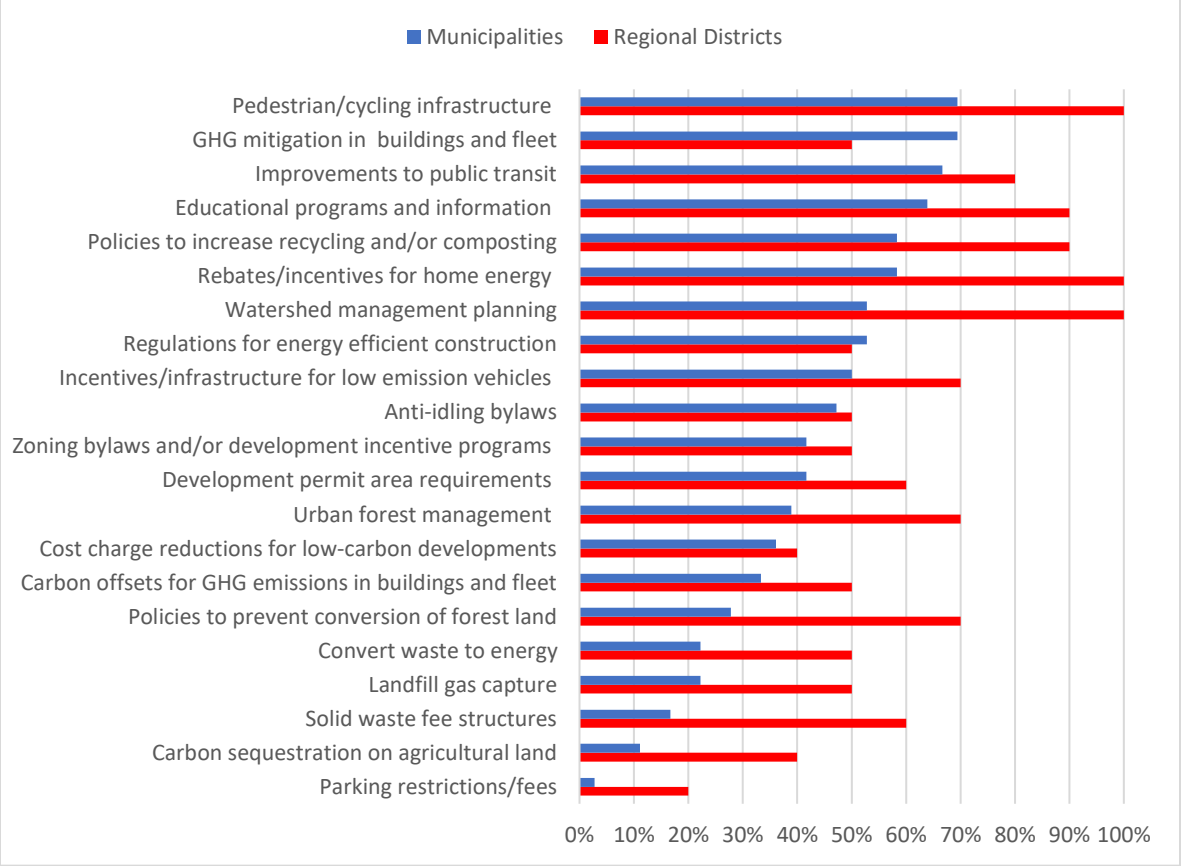
Pedestrian and cycling infrastructure have the highest support

When asked about community support for different policy types, respondents indicated the highest level of support for investments in pedestrian and cycling infrastructure (69%), GHG mitigation in civic buildings & fleet (69%), and improvements to public transit (67%) (Figure 42). In regional

districts, the policies with the highest support included pedestrian & cycling infrastructure, rebates/incentives for home energy upgrades, and watershed management planning (100% each). Government investment and incentives, as well as voluntary actions tend to receive higher support than regulations and pricing. Although most municipalities and regional districts indicated support for climate action, one respondent noted concerns about costs of climate change mitigation:

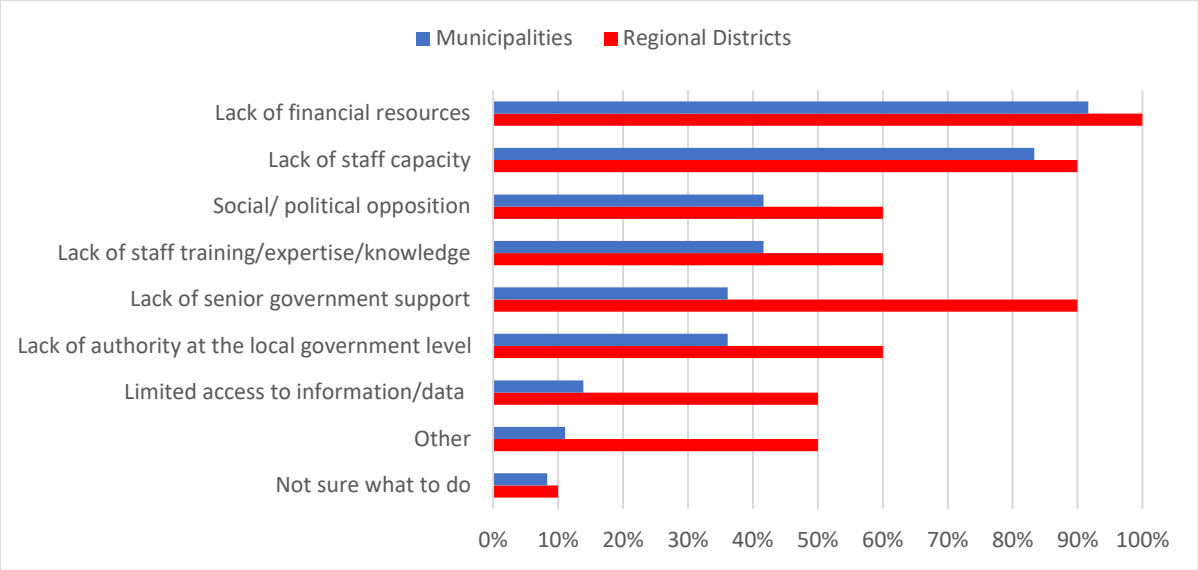
> *"Support is sometimes a hard sell, even if it is cost effective because there is a general belief that climate policies have higher costs than need be."* – Mount Waddington

Figure 42. Support for mitigation policies



Despite high support for climate action, local governments face a number of barriers to climate action. In both municipalities and regional districts, lack of financial resources (92% of municipalities, 100% of regional districts) and lack of staff capacity (83% of municipalities, 100% of regional districts) are the top barriers (Figure 43).

Figure 43. Climate change mitigation barriers



Dedicated staff to work on climate issues is uncommon

In terms of capacity, the majority of municipalities and regional districts do not have dedicated staff working on climate issues. Only 32% of municipalities and 40% of regional districts indicated that they have dedicated climate staff. Although the majority of municipalities do not have dedicated climate staff, four small municipalities do: Tofino, Ucluelet, Highlands, and Sechelt Indian Government District. Larger municipalities are more likely to have climate staff, with the four largest municipalities indicating that they have dedicated staff. Regional districts with climate staff indicated they have between 1 to 4 staff.

Multiple respondents commented that although they may or may not have staff that work solely on climate change, many staff work part time on climate change issues as it relates to their mandates and climate change is integrated throughout several departments. Most municipalities (79%) and all regional districts do employ planners, with large municipalities tending to have the highest number of planners (Saanich and Victoria lead with 18 and 20 planners respectively). The municipalities with no planners are all small municipalities located in the northern part of Vancouver Island. Regional districts have an average of 6 planners, ranging from 1-2 to 15 in Islands Trust.

As well as funding and capacity issues, small municipalities face additional barriers including lack of expertise and limited data. Small and mid-sized municipalities were more likely to choose these options, with lack of staff training, expertise, and knowledge being the third largest barrier among small municipalities (63%). By contrast, no large municipalities chose lack of expertise/training or limited access to information as barriers.

Regional districts also tend to face additional barriers as compared to municipalities, struggling with limited authority and feeling a stronger lack of senior government support. Nearly all (90%) regional districts selected lack of senior government support, while only 36% of municipalities face this barrier. Several regional districts cited the limited authority of regional districts in the survey comments, for example:

> *"Regional districts have very limited authority, and rural areas have limited access to many resources, such as energy audits. It is also difficult to implement solutions like transit in low density dispersed communities."* – Sunshine Coast

As illustrated by the quote above, rural and remote communities face additional challenges, as many typical mitigation policies focus on urban based solutions and may not apply in less densely developed areas. Although limited regulatory authority was indicated more frequently by regional districts, municipalities also face this barrier, for example:

> *"Reducing emissions from existing building stock is one of the most difficult areas for local governments to target due to the limited regulatory authority and the large amount of existing building stock. There is a critical need for tools such as property-assessed clean energy (PACE) financing in BC to enable local governments to address the challenge of lowering greenhouse gas emissions from existing buildings."* – Central Saanich

The COVID-19 crisis has added to the challenges faced by local governments. Open-ended responses from survey respondents indicated that staff capacity and funding issues are magnified, there is less ability for public engagement, communities are experiencing decreased transit ridership, civic projects have been delayed, and financial challenges may delay residential building retrofits. When asked about how COVID-19 has affected climate change mitigation and adaptation efforts, some of the comments included the following:

> *"It will change the way we engage with the public, funding for climate action might become more scarce if funding is needed to respond to COVID, Public support for climate change measures might be more challenged than usual if they perceive the funds better spent elsewhere."* – Victoria

> *"It has already delayed progress and the financial uncertainty has hindered the potential to allocate funds on these activities. Ability to take action has been delayed. rules around community meetings make it harder to interact with citizens."* – North Saanich

Climate Change Adaptation

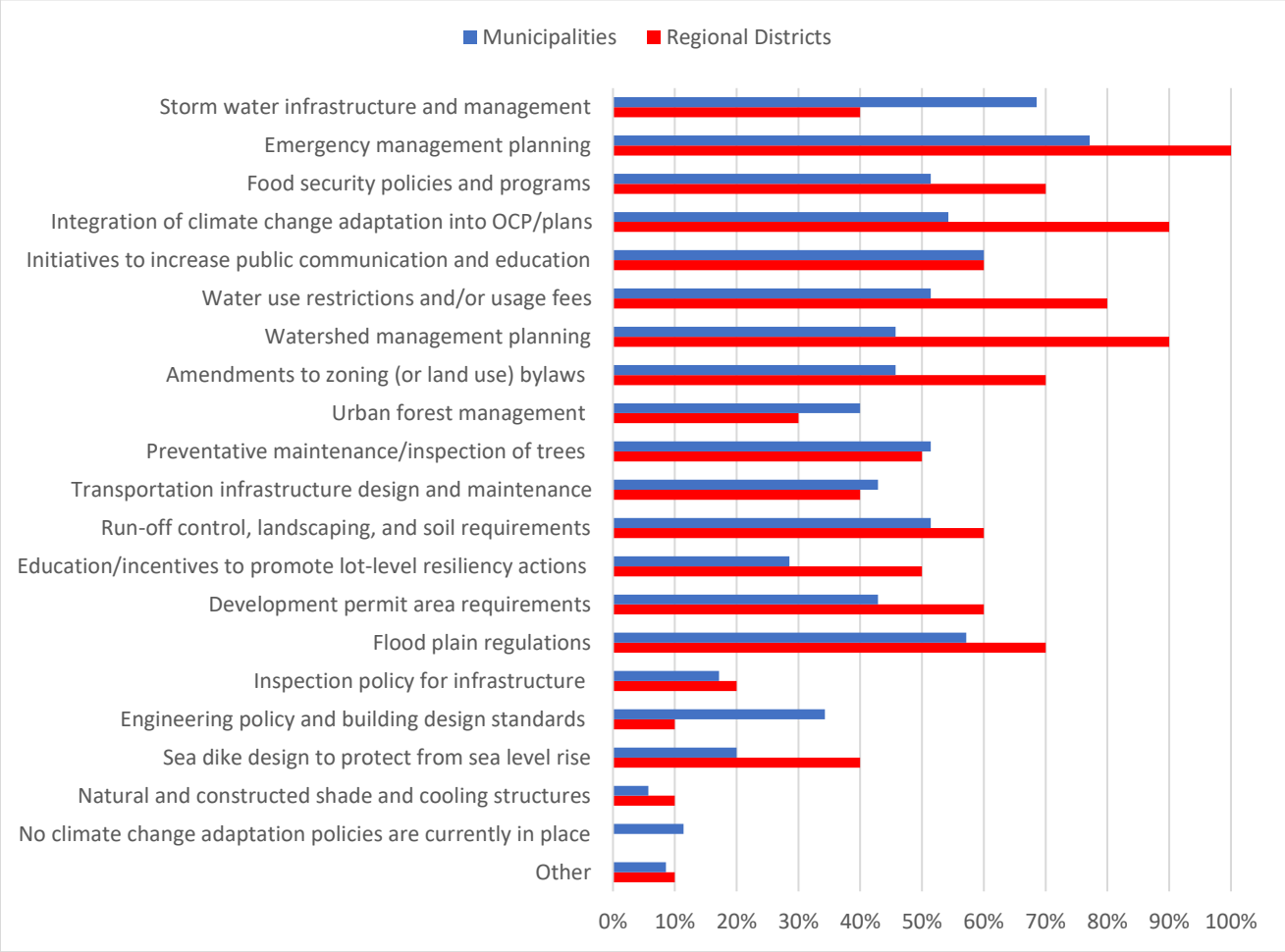
There is a high level of support for climate adaptation policies

Similar to mitigation, municipalities and regional districts are overall highly supportive of taking action to help their communities adapt to climate change, and almost all have adaptation policies in place. Some of the top priorities for climate change adaptation mentioned in open-ended comments included emergency management planning, land use planning, infrastructure upgrades, green infrastructure, forest management and conservation, watershed management, asset management, water conservation, urban forests, food security and local food production, civic building standards, air quality, and planning for sea level rise.

All regional districts and all but three municipalities have adaptation policies. Emergency management planning is the most frequently implemented adaptation policy in municipalities (77%) and regional districts (100%) (Figure 44). Other policy areas prioritized by municipalities include storm water management (69%), public communication (60%), and flood plain regulations (57%). In regional districts, other top policies include watershed management planning (90%),

integration of adaptation in OCPs (90%), and water use restrictions (80%). Respondents also indicated "other" adaptation policies outside of those listed, including sea level rise interventions other than sea dikes, natural asset management strategy, groundwater protection, revegetation for dying trees, and declaration of climate crisis. Two respondents commented that some of the adaptation policy actions they have implemented had been originally undertaken for other reasons and not specifically to address climate change. Respondents also noted that some adaptation policies are under development but not yet implemented.

Figure 44. Adaptation policies currently implemented in municipalities and regional districts



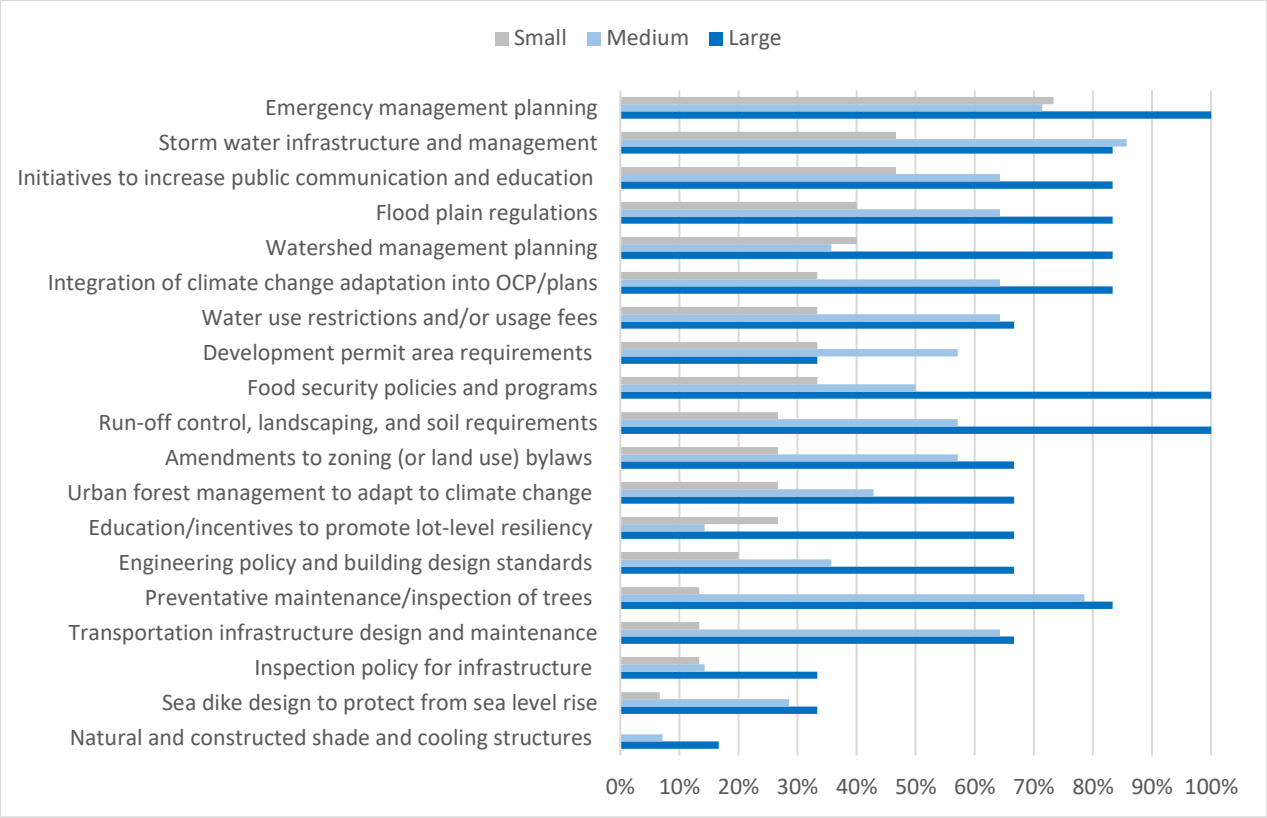
There are geographic differences in the types and average number of adaptation policies. Municipalities in the North Island tended to have the fewest policies, with an average of 5 each, although Campbell River, the sole large municipality in this sub-region, had among the highest number of policies of any municipality. The most frequently implemented policies in the North Island included emergency management planning (78%), storm water management (56%), and watershed management planning (44%). In the Central Island, there was an average of 9 policies per municipality. The most frequent policies included water use restrictions (73%), flood plain regulations (73%), food security programs (64%), emergency management planning (64%), and integration of policies into OCP (64%). Municipalities in the South Island had an average of 11 policies each. The most frequently implemented policies in this sub-region included public

communication (92%), emergency management planning (83%), stormwater management (83%), and preventative maintenance and inspection of trees (83%). Finally, municipalities in the Coast sub-region had the highest average number of adaptation policies, with 12 per municipality. Top policies in this area included emergency management planning, stormwater management, transportation infrastructure, urban forest management, and integration of policies into OCP (100% each).

The average number of policies also varies with municipality size. As with mitigation, medium and large municipalities tend to have more adaptation policies in place compared with smaller municipalities. Small municipalities averaged 6 adaptation policies each, mid-sized municipalities averaged 10 each, and large municipalities averaged 13 each. There was less of a difference apparent between the largest urban municipalities and other large municipalities as the average number of adaptation policies for these three municipalities was the same as the overall large municipality average, unlike the case with mitigation policies where the three largest urban municipalities had a higher average number of policies. Campbell River and Gibsons had the highest number of policies at 18 each. The three municipalities that indicated they had no adaptation policies were all small municipalities, located in either the North or Central Island areas.

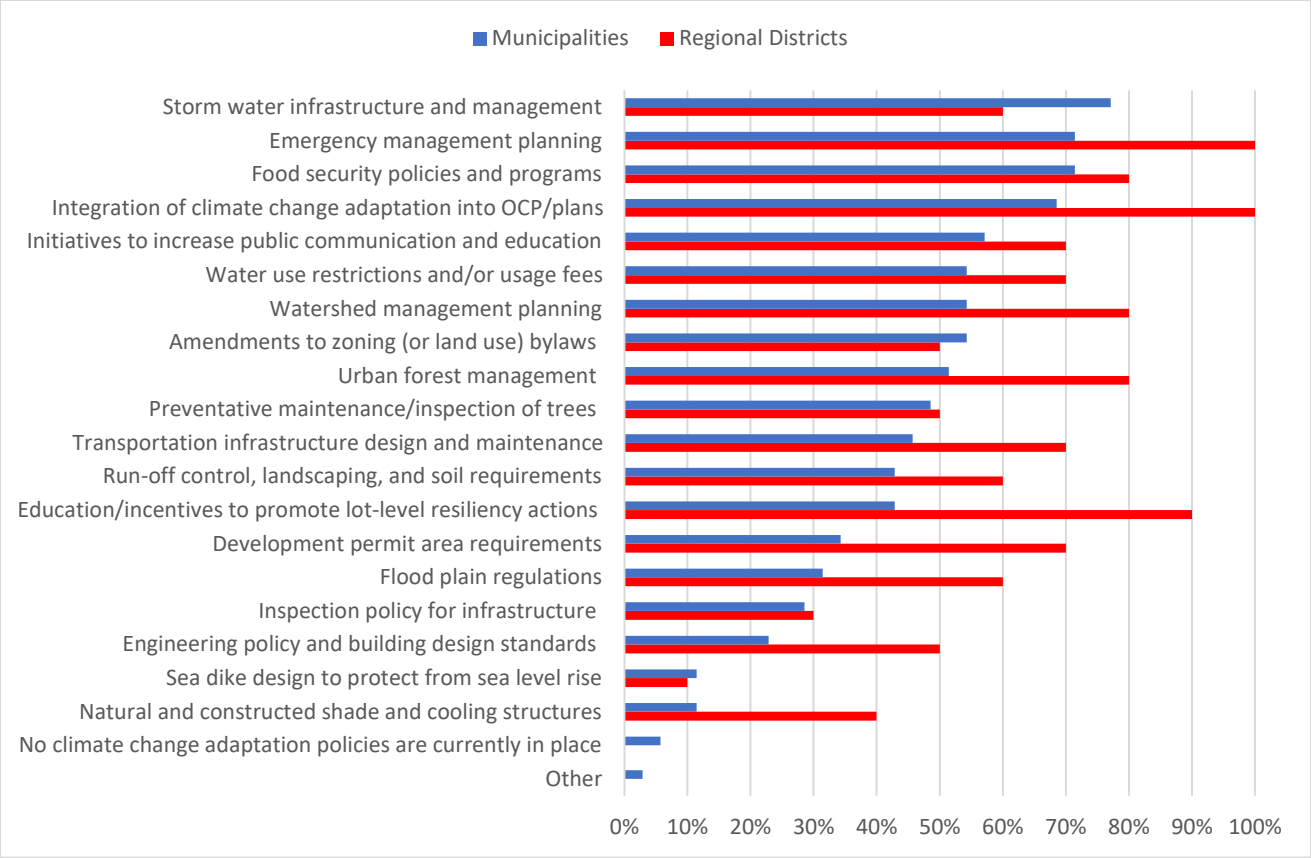
There are some differences in the types of policies most frequently implemented among different sized municipalities (Figure 45). In small municipalities, the most frequent adaptation policies included emergency management planning (73%), storm water management (43%), and public communication (43%). In mid-sized municipalities, the most frequent policies included storm water management (86%), preventative maintenance and inspection of trees (79%), and emergency management planning (71%). In large municipalities, the top policies included emergency management planning; run-off control, landscaping, and soil removal and deposit requirements; and food security programs (100% each).

Figure 45. Adaptation policies by municipality size



Support for adaptation policies varies (Figure 46). In municipalities, the most supported policies included storm water management (77%), emergency management planning (71%), and food security programs (71%). In regional districts, the policies with the most support included emergency management planning (100%), integration of adaptation into OCP/plans (100%), and lot level resiliency (90%). One respondent noted that it is very difficult to gauge community support for the various policy options. Also, it was noted that in the case of regional districts, support can vary widely between communities.

Figure 46. Support for adaptation policies

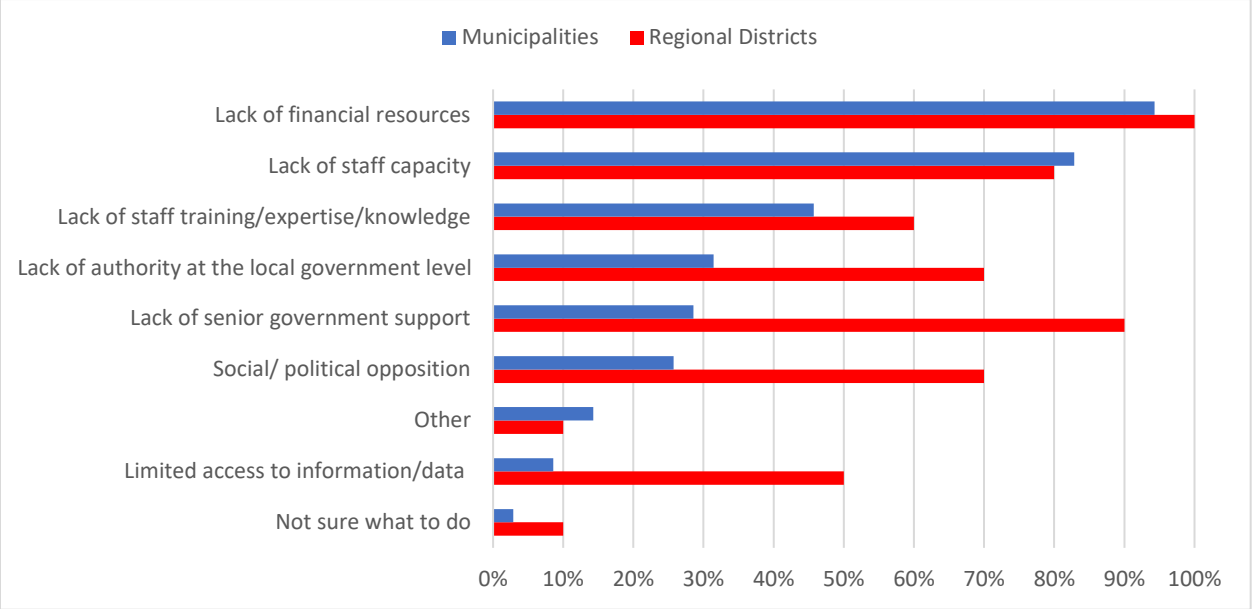


Lack of financial resources are the top barrier

Despite high levels of support for climate change adaptation, local governments face a number of barriers to action, with lack of financial resources indicated as the top barrier for both municipalities (94%) and regional districts (100%) (Figure 47). As described by one respondent:

"Policy implementation is not an issue. Lack of financial resources is." – Campbell River

Figure 47. Climate change adaptation barriers



A lack of staff capacity is a major challenge

The second major barrier for municipalities is lack of staff capacity (83%). Regional districts tend to face more barriers to adaptation compared to municipalities, with lack of senior government support (90%), lack of staff capacity (80%), lack of authority (70%), and political/social opposition (70%) as other key barriers. As discussed in the previous section on mitigation, in terms of capacity most municipalities and regional districts do not have dedicated climate staff, though the majority do have planners. Staff responsible for implementing policies related to adaptation may be spread through various departments, as adaptation measures can be broad and can vary considerably depending on the needs of each individual community. Respondents commented that climate change work is integrated throughout departments as it relates to their mandates. One respondent summed up the challenges related to lack of capacity:

> *"Our staff is at capacity with existing work. We need more staff to manage new projects such as climate adaptation planning or even to finish the work on the list now."* - Cumberland

Smaller communities face additional challenges. Lack of staff training, expertise, and knowledge was the third largest barrier to adaptation for municipalities overall (46%), but similar to mitigation, lack of staff expertise was much more of an issue for smaller municipalities, with no large municipalities indicating this barrier. Regional districts also struggle with lack of staff expertise (60%), along with limited access to information/data (50%). The following quotes from respondents speak to some of the challenges faced when it comes to climate change adaptation:

> *"Generally there is a greater understanding of climate mitigation combined with better data collection, indicator sets, globally consistent methodologies and well researched strategies. This is lacking when it comes to climate adaptation."* – Saanich

> *"Adaptation [is] not framed as a political priority from senior governments. No authority for systematic implementation of a regional approach to land use, transportation or infrastructure planning."* – Capital Regional District

> *"There is limited regulatory authority for the local government to do anything but encourage adaptation practices within the community. Climate adaptation actions may be specific to each neighbourhood or area of the District and require a more tailored approach than mitigation actions, which are easier to communicate."* – Central Saanich

> *"Green space protection faces political opposition by landowners, developers. Groundwater and multi-family rainwater catchment for potable purposes face regulatory barriers and complications. Very limited local financial capacity a barrier to new firehall and water/sewage treatment infrastructure. Greater senior government regulatory and financial support for climate adaptation initiatives needed."* – Islands Trust

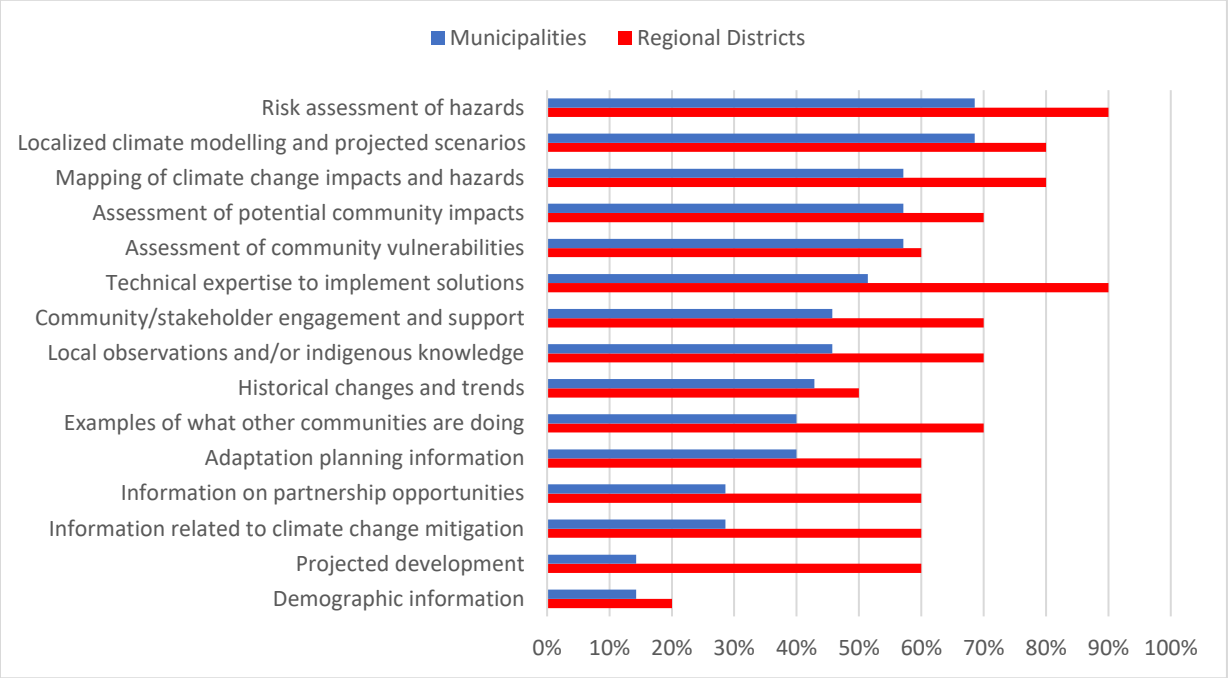
> *"Electoral areas cannot implement tree by laws but they are becoming increasingly important [with regard to] protecting water supply."* – Cowichan Valley

The quotes above illustrate that while the major barriers to action on climate change adaptation are similar to the barriers to mitigation, there are specific challenges when it comes to adaptation, in part related to less overall understanding and data, challenges communicating the issues, opposition, and limited regulatory authority. As discussed with respect to climate change mitigation, the COVID-19 crisis has magnified the challenges faced by local governments in many arenas, including climate action. In terms of adaptation, COVID-19 may result in further reduced staffing capacity, funding challenges, and project delays.

What Information is Needed to Act?

Survey respondents listed the top five types of information needed to plan for the future with respects to the impacts and issues identified in the survey (Figure 16). Municipalities identified localized climate modelling and projected scenarios (69%), risk assessment of hazards (69%), assessment of potential community impacts (57%), assessment of community vulnerabilities (57%), and mapping of climate change impacts and hazards (57%) as the most important information needed.

Figure 48. Information needed to plan for the future



Regional districts tended to identify more information needs than municipalities. The types of information identified by regional districts included risk assessment of hazards (90%), technical expertise (90%), localized climate modelling and projected scenarios (80%), mapping of climate change impacts and hazards (80%), local observations and/or indigenous knowledge (70%), assessment of potential community impacts (70%), community engagement (70%), and examples of what other communities are doing (70%).

Opportunities for Climate Action

Green growth, clean energy, new jobs, rural vitality

Although responding to climate change is a huge challenge and local governments face a number of barriers to climate action, the climate crisis also presents opportunities for the future. Almost half (49%) of municipalities see new opportunities for their community as the climate changes; another 17% answered "maybe." Among regional districts, 70% anticipate new opportunities and 30% answered "maybe". Some examples of opportunities mentioned by respondents include building a circular economy, green jobs, benefits to agriculture including an extended growing season, tourism, new economic sectors such as the low emissions building sector, work from home/telecommuting opportunities, and increased migration to small communities, such as those in the VICC region. Some of the open-ended comments from respondents on future opportunities included the following:

> *"Green growth - We are seeing a lot of re-development on our coastline and there is an opportunity to build back better."* – Comox Valley Regional District

"*Economic development shaped around climate action and the opportunity to attract new investment, businesses and jobs to our community."* – Esquimalt

"New jobs in dealing with water conservation/green building/tourism." - Sechelt

"New jobs and new economic sectors. An example is the low emissions building sector, where jobs in energy advising and with low emissions technologies such as heat pumps have emerged in recent years." – Central Saanich

"We should be able to grow a wider variety of agricultural products." – Metchosin

"Clean energy projects, utilization of woodwaste, remote working from home for knowledge industries." – Mount Waddington

"Tourism, food production, human migration coming here." – Sunshine Coast

Several municipalities mentioned the attractiveness of smaller, safe, and/or rural communities in the future:

"Smaller communities because of livability will attract more jobs and investments." – Nanaimo

"[We are] already seeing a migration of people to what is perceived as a fairly resilient, safe community for food production, telecommuting." – Powell River

"Rural areas have the potential to be attractive for city workers for health reasons (i.e. air quality)." – Ucluelet

In addition to migration, increased tourism and an extended tourist season was one of the potential opportunities mentioned by respondents, including the following comment about the potential to become a destination as a learning centre for sharing knowledge:

"We think we could be a great learning center for climate change adaptation, particularly around indigenous knowledge and practice (worldview) sharing as our collaborations with indigenous community members grows. We have a large number of very active climate change scientists, activists and educators working to develop this type of edutourism." – Islands Trust

The COVID-19 crisis has created additional challenges for local governments but also potentially presents opportunities:

"Remarkable response to COVID by all levels of govt and by the public suggests we are capable of rising to the climate challenge. COVID has reinforced concerns about and is encouraging changes to address self-sufficiency (e.g., reliance on imported food and tourism)." – Islands Trust
"The speed with which all levels of government and community responded to [the COVID-19] health crisis demonstrates the possibility, should the climate emergency be considered with a similar sense of urgency. There is a substantial opportunity for investment in climate change mitigation and adaptation as part of a green economic stimulus package." – Saanich
"In many ways COVID has allowed our community more time to engage with the [Land Use Bylaws] review and make it more robust." – Islands Trust

> *"It may reduce our staffing and funding capacity even further; however, it may also increase public support for active transportation measures and urban forestry improvements for social distancing reasons that would have the add on effect of climate change mitigation and adaptation."* – Sidney

Our common priorities

The survey found that nearly all communities in the VICC region are already experiencing hazards and impacts related to changing weather patterns caused by climate change, and most expect these hazards and impacts to continue and/or worsen into the future. Both municipalities and regional districts are overwhelmingly supportive of climate action, with 100% of local governments surveyed answering that climate change mitigation and adaptation are either important or somewhat important to their community. The vast majority of municipalities and all regional districts also indicated that their communities are supportive of implementing mitigation and adaptation policies. Most municipalities and all regional districts have implemented policies related to climate change mitigation and adaptation, with the numbers and types of policies varying by geography and by size of municipality. Despite these high levels of support for climate action, local governments face multiple barriers, particularly related to a lack of financial resources and staffing capacity.

There are a number of limitations to the analysis. First, there are potential biases that could affect the answers provided by respondents. Both elected officials and relevant staff within municipalities and regional districts were invited to participate, and it is possible that biases related to an individual's role within the organization could influence their answers. Though respondents were asked to provide answers on behalf of their community based on their professional or elected role, rather than personal opinions, there could also be some degree of personal bias in the responses. Survey based responses may also be affected by a social desirability bias whereby support for climate action and policies might have been overemphasized. Results could be influenced by a questionnaire design bias, as how the questions were framed and the ordering of questions could potentially influence how respondents answer the survey. Varying levels of knowledge could also be a source of bias in the survey results. For example, in some cases individuals from the same community provided different answers to the same question (e.g. which policies have been implemented in their community). Finally, some survey questions required making an assessment (for example, assessing community support for various policies). Citizens in the community may think differently, and some respondents did point out that gauging community support can be challenging. In addition to various potential biases, a further limitation of the analysis relates to the study design. As this research was an exploratory study, the survey was designed to gather information and not to test a specific conceptual framework. Further research is needed to identify causal linkages between the identified barriers and climate actions, as well as impacts of actions on mitigating and adapting to hazards and impacts.

Despite these limitations, this survey research makes an important contribution to developing an understanding of the various climate impacts and policy priorities across the VICC region. There are potential policy recommendations arising from the results of the survey. One such recommendation is that increased senior government support is needed to support municipalities and regional districts in climate action. A key finding of the survey was that lack of funding is a major barrier to local governments when it comes to climate change mitigation and adaptation. Limited authority and lack of senior government support were also important barriers, especially

for regional districts, and survey respondents called for more regulatory and financial support from senior levels of government. This support could help build essential low-carbon infrastructure and fund community-level modelling projections to assess localized climate change impacts as well as the impacts of various policies on GHG emissions and costs to choose among most effective and efficient municipal and regional climate policies.

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Appendix Part 2

Appendix A: Survey Questionnaire

Exploring policies and priorities for creating resilience in the Vancouver Island and Coastal Communities region

*1. Selecting the "yes" button below indicates that you understand the above conditions of participation in this study and that you have had the opportunity to have your questions answered by the researchers.

- Yes (I consent to the aforementioned terms of the survey)
- No (I do not consent to the terms of the survey)

Part One: Overview of your Community

Please fill out the survey in your formal role as staff or representative of a local government or regional district. Please do not offer personal opinions. Given that the survey is distributed to multiple staff and officials in your local government or regional district, it is acceptable to skip questions that others will be better placed to answer.

2. Respondent identification
First and last name:_____

3. Local government name (or electoral district name if no local government in the district):
_____

4. Position (if you serve multiple roles, please identify what role you are answering the survey from): _____

5. How many staff work in your local government? _____

6. Does your local government have dedicated staff working on climate change related issues?

- Yes
- No
- If yes, how many? _____

7. Does your local government employ planners?

- Yes
- No
- If yes, how many? _____

8. Does your local government have a strategic climate plan?

- Yes
- No

- Don't know

9. What are the most valuable natural resources in your community from the **ecological preservation** perspective? **List up to three natural resources** (e.g. clean groundwater, shorelines, vegetation for slope stability, coastal douglas fir ecosystem)
Resource #1_____
Resource #2_____
Resource #3_____

10. What are the most valuable natural resources in your community from the **economic development** perspective? **List up to three natural resources.**
Resource #1_____
Resource #2_____
Resource #3_____

11. Is Indigenous knowledge included in analysis and decision making in your local government? _____

12. How does your local government work with First Nation communities on climate change issues (if at all)? _____

13. What motivates (or would motivate) your local government to act on climate change? _____

Part Two: Climate Change Mitigation

"**Climate change mitigation**" refers to efforts to reduce greenhouse gas emissions in your entire community.

14. Overall, how important is climate change mitigation to your community?
- Important
- Somewhat important
- Not important

15. On average, how supportive is your community of implementing climate change mitigation policies?
- Supportive
- Somewhat supportive
- Not supportive

16. What are the **top priorities** for action and investment in your community with respect to climate change mitigation? (Examples might include: infrastructure upgrades, green infrastructure, land use planning, public transit, pedestrian and/or cycling infrastructure, urban forests and conservation, civic building standards, fleet management, air quality planning)
Priority #1_____

Priority #2_____
Priority #3_____

17. Please indicate the main policy actions that your local government has taken/implemented to address climate change mitigation. **Please check all that apply and/or indicate other policies not listed below.**

- Carbon offsets for GHG emissions in government buildings and fleet
- GHG mitigation in government buildings and fleet
- Regulations for energy efficient new construction
- Development permit area requirements (e.g. energy and water conservation, green infrastructure requirements)
- Amendments to zoning bylaws and/or development incentive programs to increase density, mixed use, and infill development
- Cost charge reductions for low-carbon developments
- Rebates/incentives for home energy audits, energy efficient retrofits, and/or installation of alternative energy technology
- Educational programs and information to promote energy efficiency awareness and/or alternative energy to homeowners and/or businesses
- Improvements to public transit
- Pedestrian/cycling infrastructure improvements (e.g. sidewalks, bike lanes, etc)
- Parking restrictions/fees
- Incentives and infrastructure for low or zero emission vehicles (e.g. EV charging stations, priority parking, etc)
- Anti-idling bylaws
- Policies to prevent conversion of forest land to non-forest land
- Carbon sequestration and emission reduction on agricultural land
- Urban forest management to reduce carbon emissions
- Watershed management planning
- Policies to increase recycling and/or divert organic material (composting)
- Landfill gas capture
- Convert non-diverted waste to energy
- Incentives to reduce waste through solid waste fee structures
- No climate change mitigation policies are currently in place
- Other (please specify) _____

18. Among the following climate change mitigation policies/actions, which ones would have the greatest support from your community? **Please check all policies that are likely to have the greatest support (or the lowest opposition).**

- Carbon offsets for GHG emissions in government buildings and fleet
- GHG mitigation in government buildings and fleet
- Regulations for energy efficient new construction
- Development permit area requirements (e.g. energy and water conservation, green infrastructure requirements)
- Amendments to zoning bylaws and/or development incentive programs to increase density, mixed use, and infill development

- Cost charge reductions for low-carbon developments
- Rebates/incentives for home energy audits, energy efficient retrofits, and/or installation of alternative energy technology
- Educational programs and information to promote energy efficiency awareness and/or alternative energy to homeowners and/or businesses
- Improvements to public transit
- Pedestrian/cycling infrastructure improvements (e.g. sidewalks, bike lanes, etc)
- Parking restrictions/fees
- Incentives and infrastructure for low or zero emission vehicles (e.g. EV charging stations, priority parking, etc)
- Anti-idling bylaws
- Policies to prevent conversion of forest land to non-forest land
- Carbon sequestration and emission reduction on agricultural land
- Urban forest management to reduce carbon emissions
- Watershed management planning
- Policies to increase recycling and/or divert organic material (composting)
- Landfill gas capture
- Convert non-diverted waste to energy
- Incentives to reduce waste through solid waste fee structures
- I don't know
- Other (please specify) _____

19. Are climate change mitigation strategies reflected in your community's Official Community Plan?

- Not integrated – no stand alone plan
- Not integrated – have a stand alone plan
- Integrated comprehensively across the policies and objectives within the OCP and mainstream associated action throughout all guidelines and regulations.
- Used to frame specific climate change adaptation objectives to advance climate change assessment and planning, and/or to modify specific policies and objectives to incorporate adjustments to climate change impacts

20. What are the **key challenges** preventing climate change mitigation in your community? **Please select all responses that apply.**

- Lack of authority at the local government level
- Lack of staff training/expertise/knowledge
- Lack of staff capacity
- Lack of financial resources
- Limited access to information/data on climate change mitigation
- Social/ political opposition
- Lack of senior government support
- Not sure what to do
- Other (please specify) _____

21. What are the next climate change mitigation policies your local government would like to implement but cannot? What barriers are they facing to implementation? _____

Part Three: Climate Change Adaptation

"**Climate change adaptation**" refers to efforts to adapt to existing and expected impacts of climate change.

22. Overall, how important is climate change adaptation to your community?
- Important
- Somewhat important
- Not important

23. On average, how supportive is your community of implementing climate change adaptation policies?
- Supportive
- Somewhat supportive
- Not supportive

24. What are the **top priorities** for action and investment in your community with respect to climate change adaptation? (Examples might include: infrastructure upgrades, green infrastructure, land use planning, emergency management planning, urban forests and conservation, civic building standards, air quality planning)
Priority #1_____
Priority #2_____
Priority #3_____

25. Please indicate the main policy actions that your local government has taken/implemented to address climate change adaptation. **Please check all that apply and/or indicate other policies not listed below.**
- Amendments to zoning (or land use) bylaws to adapt to climate change impacts
- Development permit area requirements to adapt to climate change impacts
- Flood plain regulations
- Run-off control, landscaping, and soil removal and deposit requirements
- Emergency management planning
- Urban forest management to adapt to climate change impacts
- Watershed management planning
- Transportation infrastructure design and maintenance
- Sea dike design to protect from sea level rise
- Integration of climate change adaptation into Official Community Plan and other plans
- Initiatives to increase public communication and education (e.g. about road conditions/safety during weather events, etc)
- Food security policies and programs
- Storm water infrastructure and management

- Preventative maintenance/inspection of trees to reduce damage caused by extreme weather events
- Requirements for natural and constructed shade and cooling structures on public and private property
- Engineering policy and building design standards to reflect climate change impacts and projections
- Inspection policy for infrastructure to identify damage from extreme weather events
- Water use restrictions and/or usage fees
- Education and/or incentive programs to promote lot-level resiliency actions and storm water management (e.g. green roofs, shade structures, rain gardens, rain barrels)
- No climate change adaptation policies are currently in place
- Other (please specify) _____

26. Among the following climate change adaptation policies/actions, which ones would have the greatest support from your community? **Please check all policies that are likely to have the greatest support (or the lowest opposition).**

- Amendments to zoning (or land use) bylaws to adapt to climate change impacts
- Development permit area requirements to adapt to climate change impacts
- Flood plain regulations
- Run-off control, landscaping, and soil removal and deposit requirements
- Emergency management planning
- Urban forest management to adapt to climate change impacts
- Watershed management planning
- Transportation infrastructure design and maintenance
- Sea dike design to protect from sea level rise
- Integration of climate change adaptation into Official Community Plan and other plans
- Initiatives to increase public communication and education (e.g. about road conditions/safety during weather events, etc)
- Food security policies and programs
- Storm water infrastructure and management
- Preventative maintenance/inspection of trees to reduce damage caused by extreme weather events
- Requirements for natural and constructed shade and cooling structures on public and private property
- Engineering policy and building design standards to reflect climate change impacts and projections
- Inspection policy for infrastructure to identify damage from extreme weather events
- Water use restrictions and/or usage fees
- Education and/or incentive programs to promote lot-level resiliency actions and storm water management (e.g. green roofs, shade structures, rain gardens, rain barrels)
- I don't know
- Other (please specify) _____

27. Are climate change adaptation strategies reflected in your community's Official Community Plan?

- Not integrated – no stand alone plan
- Not integrated – have a stand alone plan
- Integrated comprehensively across the policies and objectives within the OCP and mainstream associated action throughout all guidelines and regulations.
- Used to frame specific climate change adaptation objectives to advance climate change assessment and planning, and/or to modify specific policies and objectives to incorporate adjustments to climate change impacts

28. What are the **key challenges** preventing climate change adaptation in your community? **Please select all responses that apply.**

- Lack of authority at the local government level
- Lack of staff training/expertise/knowledge
- Lack of staff capacity
- Lack of financial resources
- Limited access to information/data on climate change adaptation
- Social/ political opposition
- Lack of senior government support
- Not sure what to do
- Other (please specify) _____

29. What are the next climate change adaptation policies your local government would like to implement but cannot? What barriers are they facing to implementation? _____

Part Four: Past hazards

30. What are the top five **hazards** facing your community? **Please select up to FIVE hazards most critical to your community.** ("Hazard" refers to the potential occurrence of a natural or human-induced physical event or trend or physical impact that may cause loss of life, injury, or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, ecosystems, and environmental resources.)

- Drought
- Extreme rainfall (amount, duration and/or intensity)
- Extreme wind
- Flooding (freshwater)
- Coastal storm surge
- Hurricane and/or hurricane force winds (wind speeds >118 km/h)
- Extreme heat wave
- Reduced snowpack
- Landslides
- Wildfires
- Sea level rise
- Ocean acidification
- Not applicable/no hazards
- Other (please specify) _____

31. What kind of actions or measures (if any) were undertaken in order to address or respond to the hazardous events indicated in the previous question? _____

32. What **impacts** or adverse effects, resulting from weather events and weather patterns driven by climate change, have become issues for your community? **Please select up to FIVE of the top priorities/challenges critical to your community**. (*"Impacts" refer to effects on natural and human systems of extreme weather and climate events and of climate change. Impacts generally refer to effects on lives, livelihoods, health, ecosystems, economies, societies, cultures, services, and infrastructure due to the interaction of climate changes or hazardous climate events occurring within a specific time period and the vulnerability of an exposed society or system.*)

- Water supply issues
- Water quality issues
- Electricity supply issues
- Infrastructure failures
- Regional food security issues
- Pests and/or invasive species
- Poor air quality
- Public health impacts (other than air quality)
- Impacts to tourism and/or recreation
- Impacts to coastal ecosystems
- Impacts to land based ecosystems
- Impacts to aquatic resources and/or fisheries
- Impacts to forests and/or forestry
- Impacts to biodiversity
- Increased demand on emergency response services
- Impacts to transportation systems
- Not applicable/no impacts
- Other (please specify) _____

33. Would you like to offer any further explanation of your answers above?

34. How well prepared is your local government if such hazards or events occur again; especially if such an event becomes more frequent or severe as a result of climate change?

Event/hazard name	Not prepared	Somewhat prepared	Prepared	Don't know
Hazard #1				
Hazard #2				
Hazard #3				
Hazard #4				
Hazard #5				

35. Does your local government have the capacity/resources to manage the next hazard/event?

Event/hazard name	No capacity/ resources	Some capacity/ resources	Strong capacity/ resources	Don't know
Hazard #1				
Hazard #2				
Hazard #3				
Hazard #4				
Hazard #5				

36. How often do these hazardous events occur?

Event/hazard name	Not frequently (once every 5 years or less)	Somewhat frequently (every year on average)	Frequently (several times a year)	Don't know
Hazard #1				
Hazard #2				
Hazard #3				
Hazard #4				
Hazard #5				

37. What is the severity of the **economic impacts** of these events in your community?

Event/hazard name	Low	Medium	High	Don't know
Hazard #1				
Hazard #2				
Hazard #3				
Hazard #4				
Hazard #5				

38. What is the severity of the **environmental impacts** of these events in your community?

Event/hazard name	Low	Medium	High	Don't know
Hazard #1				
Hazard #2				
Hazard #3				
Hazard #4				
Hazard #5				

39. What is the severity of the **social impacts** of these events in your community?

Event/hazard name	Low	Medium	High	Don't know
Hazard #1				
Hazard #2				
Hazard #3				
Hazard #4				
Hazard #5				

40. What is the severity of the impacts of these events on **Indigenous communities** in your region?

Event/hazard name	Low	Medium	High	Don't know
Hazard #1				
Hazard #2				
Hazard #3				
Hazard #4				
Hazard #5				

Part Five: Future hazards

Top of Form

41. Do you think the impacts to your community identified earlier will continue into the future and become more problematic unless actions are taken to minimize their effects?

Impact name	Yes	Maybe	No	Don't know
Impact #1				
Impact #2				
Impact #3				
Impact #4				
Impact #5				

42. How and why do you think climate change impacts will become more of a problem for your community over time? **Please select all that apply.**

- Increased exposure to hazards due to expansion of development into vulnerable areas
- Increased geographic area that is vulnerable or exposed to hazards (e.g., larger areas affected by coastal flooding)
- Increased vulnerability due to changing demographics (e.g. aging population)
- Increased exposure and/or vulnerability due growing population
- Increase in impacts to already vulnerable populations
- Vulnerability due to socio-economic factors
- Vulnerability related to housing issues
- Lack of capacity to respond to multiple or cumulative impacts
- Increasing frequency and/or intensity of hazardous events
- More impermeable surfaces (roads, roofs, etc)
- System failures due to aging infrastructure
- System failures due to inadequate infrastructure
- Not applicable (no events/ hazards)
- I don't know
- I don't think impacts will become more of a problem
- Other (please specify) _____

43. Do you think your community will experience other kinds of climate related issues in the future, which have not affected you in the past?

- Yes
- Maybe
- No
- I don't know

If you answered yes or maybe, what types of climate related issues do you think will affect your community in the future? _____

44. What information do you need to know to be able to plan effectively for the future of your local government, with respect to the impacts and issues you have identified? **Please select up to FIVE of the most important types of information needed.**

- Local observations and/or indigenous knowledge
- Historical changes and trends
- Localized climate modelling and projected scenarios
- Assessment of potential community impacts
- Assessment of community vulnerabilities
- Risk assessment of hazards
- Mapping of climate change impacts and hazards
- Demographic information
- Projected development
- Adaptation planning information
- Information related to climate change mitigation
- Technical expertise to implement solutions
- Community/stakeholder engagement and support
- Information on partnership opportunities
- Examples of what other communities are doing
- I don't know
- Other information (please specify): _____

Part Six: Final comments

45. With reference to the information identified in the previous question, do you have this information, and/or do you know where it can be obtained?

Type of Information	Yes	Maybe	No	Don't know
Information #1				
Information #1				
Information #1				
Information #1				
Information #1				

46. Do you see any new opportunities for your community in the future as the climate changes? (e.g. economic development opportunities, green growth, new economic sectors, new jobs)

- Yes
- Maybe
- No
- I don't know

If you answered yes or maybe, please describe what type of new opportunities you anticipate.

47. Will the COVID-19 crisis impact your climate change mitigation and adaptation efforts? If so, please explain how. _____

48. Will you be able to attend the AVICC convention on November 6, 2020, to discuss the development of the VICC Climate Leadership Plan?

- Yes
- No

49. Is there anything else it would be helpful for us to know about how your local government is responding to climate change? _____

Appendix B: Study Area Population by Municipality and Regional District

Sub-Region	Regional Districts		Municipalities	
	Name	Population	Name	Population
North	Mount Waddington	11035	Alert Bay	489
			Port Alice	664
			Port McNeill	2337
			Port Hardy	4132
	Strathcona	44671	Zeballos	107
			Tahsis	248
			Sayward	311
			Gold River	1212
			Campbell River	32588
Central	Alberni-Clayoquot	30981	Ucluelet	1717
			Tofino	1932
			Port Alberni	17678
	Comox Valley	66527	Cumberland	3753
			Comox	14028
			Courtenay	25599
	Nanaimo	155698	Lantzville	3605
			Qualicum Beach	8943
			Nanaimo	90504
	Cowichan Valley	83739	Lake Cowichan	3226
			Duncan	4944
			Ladysmith	8537
			North Cowichan	29676
South	Capital	383360	Highlands	2225
			Metchosin	4708
			View Royal	10408
			North Saanich	11249
			Sidney	11672
			Sooke	13001
			Central Saanich	16814
			Colwood	16859
			Esquimalt	17655
			Oak Bay	18094
			Victoria	85792
			Saanich	114148
Coast	Qathet	20070	Powell River	13157
	Sunshine Coast	29970	Sechelt Indian Government District	692
			Gibsons	4605
			Sechelt	10216
Total	**9 regional districts**	**826051**	**38 municipalities**	**607525**

Note: Only municipalities that participated in survey study are listed. Islands Trust is not included in table as population is reported within other regional districts. Islands Trust population: 26,245 (State of the Islands report)

UBCM Special Committee on Climate Action
Proposed Recommendations
DRAFT Report

Introduction

British Columbia local governments can continue to build prosperous, fair, resilient communities by capitalizing on the opportunity of low carbon solutions that meet their unique context.

We can build communities where:

- All buildings are comfortable, leverage local resources and are low cost to operate
- All British Columbians have transportation choices, like an electric personal vehicle or public transit, and feel safe moving around the Province
- Across all sectors, we waste less and, when do create waste, we turn it into a clean resource
- Communities all across the province are safe, secure, and resilient to risks like wildfires, floods and extreme weather
- Residents and businesses are active partners with the local government in ensuring the safety of the community and building a vibrant low carbon economy
- We create opportunities for our local industries to build on their strengths while providing new training and employment opportunities as we create demand for British Columbia's innovative, sustainable products

UBCM Climate Committee - Representation, Homework, Debate, and Consensus

The technical recommendations to achieve the above community benefits were developed through consensus by the Union of British Columbia Municipalities' (UBCM) Special Committee on Climate Action. This expert panel includes locally elected officials from all regions of the province supported by staff and expert advisors from NGOs, academia, and utilities.

The recommendations provide practical guidance to UBCM members so they can quickly design solutions that support their goals, help advance the provincial climate action strategy, while informing future UBCM collaboration and advocacy with other orders of government, ultimately ensuring that across the province local governments have fair access to tools and can choose climate actions for their community.

Implementation – Collaboration and Diversity

The solutions detailed in the following pages were selected because of their potential to help communities across BC, from Fort St. John to Tofino, achieve the economic,

environmental, social and preparedness benefits outlined in the Province's CleanBC climate and economy plan.

BC communities already have working examples of most of what needs to be done. We have an opportunity to quickly and methodically scale those examples up so that all communities have access to both solutions and benefits. We will continue to build on these solutions and to be open to innovations, ideas, and practices.

Done well, we will address the risk of climate change while creating new opportunities for our province's impressive research community, innovative entrepreneurs and well-trained workforce.

Done collaboratively, we will achieve our goals of reduced emissions and increased resiliency for all BC communities, while simultaneously and strategically creating products and services to export to the world.

Buildings

Signature Initiative

1. UBCM should support a partnership (between the provincial and federal governments) to build 100,000 zero emission, wood-constructed new housing units that are affordable/local market appropriate, *and* 500,000 low carbon building retrofits (with at least half of those retrofits to be zero emissions) over the next 10 years, to:
   - jump start climate action (both emissions reductions and resilience) in the building sector;
   - support workforce training for zero-carbon construction;
   - stimulate demand for advanced wood construction materials, and;
   - move forward with strong action on housing affordability in our communities.

   In this partnership, the federal and provincial governments would create the financing and policy framework (for both public and privately financed housing), while local governments would ensure there was sufficient appropriately-zoned land to achieve the targets.

Supporting Actions

2. UBCM should work with the provincial government and member local governments to:
   - advocate for the addition of carbon metrics (e.g. GHG's) to the Energy Step Code; and,
   - encourage individual local governments to give adequate notice to building industry by choosing levels on the energy efficiency STEP Code as soon as possible.

3. UBCM should advocate for an effective building retrofit incentive program that:
   - is easy for building owners to navigate;

- ensures retrofit investments achieve maximum reductions in carbon emissions;
- includes a financing program that matches payments to energy savings; and,
- works for all income levels.

4. UBCM should advocate for and participate in the development of a low carbon building step retrofit code, which sets standards for low carbon building retrofits.

   Work done as part of the retrofit code should consider climate resiliency issues (e.g. overheating of buildings in a warming climate), opportunities to produce energy and opportunities for local government leadership (like Energy Efficient Step Code).

   The code should be designed to be results-based to support innovative solutions.

Transportation

Signature Initiative

5. Advocate for (or partner with) the Province and Federal Governments for an initiative to build out a world-class Low Carbon Vehicle Charging Network for BC by 2030, including:
   - 300,000 Level 2 EV home chargers;
   - 50,000 workplace charging units,
   - 30,000 community charging stations for low carbon vehicles (5,000 of would be "fast-charging stations"), strategically located throughout the Province, and
   - Retrofitting apartment and condo parking, so that at least 50% of stalls are EV ready.

Supporting Actions

6. In order to support the creation of a world class Low Carbon Vehicle Charging Network, UBCM should advocate that the provincial government:
   - Provide streamlined standards for local governments to reference for electric vehicles charging requirements in buildings and parkades;
   - Work in partnership with local governments and homeowner associations on enabling Right-to-charge, to allow retrofitting of apartment and condo parkades;
   - Invest in Green Fleet conversions for Local Government and Community Fleets;
   - Invest in widespread industry training and retraining within our communities for light, medium and heavy-duty transportation (e.g. Centre's of Excellence, Demonstration Projects in every part of the Province, invest in educational institutes, industry transition support); and,
   - Ensure zero emission transportation options are accessible to more households, including low income households.

7. Local governments should work towards creating an enabling framework for local bylaws affecting electric vehicles, including parking polices, that is respectful of regional differences, but which still works towards harmonization.

8. Both local governments and the Provincial government should recognize the need for lower carbon fuels, including natural gas and biogas as a transition fuel.

Waste Management

Signature Initiative

9. By 2030, BC communities manage their solid waste and liquid waste as resources, maximizing opportunities to generate clean energy (such as renewable natural gas, electricity and heat) and continually finding new ways to use what is now considered to be waste in the creation of new products.

Supporting Actions

10. UBCM should work with the provincial government to enhance producer and consumer stewardship measures, in support of the circular economy. Measures to derive value from food products and construction demolition could be particular priorities.

11. UBCM should support the Clean BC target of continued 75 per cent landfill gas capture and 95 per cent of organic diversion.

12. Local governments should collaborate and share best practices on innovative ways to reduce GHG's, by deriving both energy and value from waste products through actions such as converting landfill gas, drawing heat from sewerage, creating energy from biosolids and utilizing organic waste for purposes such as soil enhancement or biogas production.

13. Local governments should continue to collaborate in order to devise and implement innovative, cost-effective solutions to reduce emission from small landfills, such as using dried biosolids as a greenhouse gas reducing surface cover.

Resilience

Signature Initiative

14. UBCM should work with the Province to ensure that all BC local governments have the tools and resources to adopt risk assessments and associated long-term capital plans by 2030.

Supporting Actions

15. UBCM should work the Province to ensure that regional climate risk assessments are completed.

16. UBCM should work with the Province to create a framework under which all local governments adopt adaptation plans by 2030. These should address risks identified in the regional risk assessment.

    Adaptation plans will vary by community but could include:
    - A local asset management plan and associated long-term capital plan for infrastructure resilience:
    - Using land use planning to mitigate exposure to climate-related risks;
    - Identifying actions to increase local food supply;
    - Identifying actions to increase urban tree cover;
    - Identifying actions to increase local energy resilience;
    - Identifying actions to reduce risk from forest fire;
    - Identifying actions to increase social resilience.

    Adaptation plans should:
    - be done in consultation with community members;
    - contain appropriate links to mitigation reduction initiatives;
    - include clear action-oriented pathways for local government staff to implement in key areas of municipal operations; and,
    - a common results-based reporting framework that provides clear feedback information on what is and is not working so quick and effective adjustments can be implemented.

17. UBCM should advocate for a dedicated funding stream to implement adaptation plans.

18. UBCM should advocate that the provincial government ensure the resiliency of provincial programs and infrastructure critical to community well-being. This includes critical provincial roads and bridges, emergency management and flood containment infrastructure.

19. UBCM should work with BC Hydro and other energy providers on role of local generation and low carbon infrastructure, as part of integrated resource planning and implementation.

Governance

Signature Initiative

20. UBCM should work with British Columbia to renew the Climate Action Charter

through a re-energized Green Communities Committee under section 6 of the charter, focused on:

- joint UBCM/Provincial mitigation efforts to reduce emissions from buildings, vehicles and waste;
- a structure for effective adaptation;
- recognition of regional diversity and building the future low carbon economy;
- new decision-making tools for local governments including a clear means of determining the effectiveness of potential actions and a framework for measuring results.

This should include:

- up to date valid information on community level emissions;
- an accepted means of comparing the carbon intensity of alternatives including such things as vehicle types (electric, CNG, hydrogen) and transportation modes;
- opt-in tools, following the successful model of the energy step code;
- targeted additional authority for local governments;
- best practice guides, toolkits and other resources for local governments.

The newly re-energized Green Communities Committee should work with all orders and government and important partners in advancing a renewed Climate Action Charter.

Social Mobilization

Signature Initiative

21. UBCM should help facilitate with the Province and NGOs a competition to select 10 different trial communities to engage their citizens on local climate action. Each community would select up to 10 neighborhoods to host up to 10 climate champions, each of whom would engage at least 20 households in climate action.

BRITISH COLUMBIA

MODERNIZING BC'S

EMERGENCY MANAGEMENT LEGISLATION

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Minister's Message

When our government came into office, the province was in a provincial state of emergency. That time is still very vivid for me because of how widespread the impacts were. 2017 and 2018 were two of the worst flood and wildfire seasons this province has ever seen. Tens of thousands of people were evacuated from their homes. Cities, towns and villages were affected in every corner of the province. Transportation routes were shut down, and some communities were cut off completely, with remote and First Nations communities disproportionally affected by these events.

Business as usual just isn't enough anymore. We need to do more than just learn from these experiences – we must use them to drive real change in the way we manage emergencies. We're taking the lessons learned from the Abbott-Chapman Report, the report by the Tsilhqot'in National Government on the 2017 wildfires, and numerous after-action reports and bringing them into the way we do business.

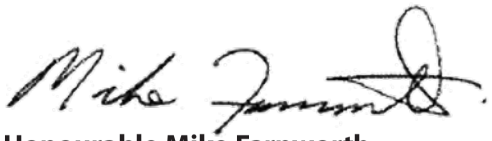
The Government of Canada has embraced the United Nations' Sendai framework, which is an internationally-acknowledged approach to emergency management disaster risk reduction. British Columbia is the first province to officially adopt the Framework, and our way forward will reflect these international best practices. We're developing new relationships with indigenous communities as emergency management partners, and we're finding ways to better support and provide protections to the thousands of volunteers BC's emergency system relies on every year for things like ground search and rescue, emergency support services, and evacuation centres. Many community partners – such as Prince George, Kamloops and Tk'emlúps First Nation – have worked hard to support evacuees from around the province during times of crisis.

All these critical shifts are reflected as we work to bring the Emergency Program Act in line with today's changing needs and realities. As BC's primary piece of legislation for emergency management, this act is the backbone of what we do, and it needs to be updated to reflect what we know, what we've learned, and how we must work together going forward.

Through this discussion paper, we hope to hear diverse views and get insights from all levels of government, Indigenous communities, partners and stakeholders. We want to know your views on how to modernize our emergency management approach to help mitigate risk, ensure we are better prepared, and strengthen our response efforts to more effectively recover from the psycho-social, financial and economic impacts of disasters.

The feedback will help government move forward with a clear legislative direction – one that reflects the challenges, needs and thoughts of communities, partners and stakeholders – when a modernized act is introduced in the fall 2020 legislative session.

Our government recognizes that the environment is changing in ways that will challenge all of us, and we're working towards a goal of a more resilient province. While many changes have already been made we also need the best legislative foundation to build on. I hope you take the time to provide your thoughts, input and suggestions into this legislative change, so we can move forward together to protect our communities.



Honourable Mike Farnworth
Minister of Public Safety and Solicitor General

TABLE OF CONTENTS

Background

Key Definitions

Stepping Up: An All-of-Society Approach for 21st Century Emergency Management

At a Glance: What will Change with Emergency Management Modernization?

Introduction

British Columbia's ***Emergency Program Act (EPA)***, which was passed in 1993, has its roots in Canada's ***War Measures Act***, particularly the declaration of states of emergency and the powers available to the provincial government and Local Authorities through those declarations. The EPA has guided the province through events such as the Kelowna interface fires in 2003, the Johnson's Landing landslide in 2012, and the Grand Forks flooding in 2018.

However, several factors are driving the need to modernize our approach to emergency management:

- BC's geography, geology and climate present diverse and complex hazards such as earthquakes, wildfires, flooding, and severe weather events (e.g., ice, snow and windstorms);
- Driven by climate change, natural disasters are increasing in frequency and severity, making it imperative for governments, businesses, non-profit organizations, citizens and visitors to be prepared and ready;
- Emergencies have devastating impacts – often long-lasting – on citizens, visitors, communities, businesses, and critical infrastructure. During the 2017 wildfires, over 65,000 people were evacuated and over 200 homes were lost;
- Responding to and recovering from these events takes a financial toll on governments, businesses, and individuals. From 2009 to 2018, the BC provincial government spent over $3.3 billion under the EPA and the ***Wildfire Act***. $1.6 billion of this was spent on flood and wildfire response and recovery in 2017 and 2018 alone;
- Indigenous communities are often disproportionately impacted by emergencies, due to their relatively remote locations, lack of access to services, and reliance on natural ecosystems;
- The needs of our most vulnerable citizens are not always sufficiently considered; and
- The recent unprecedented flood and wildfire seasons surfaced a number of gaps in the current legislation; applying the lessons learned from those events will ensure that BC continues to be resilient in the face of disasters and remains a recognized leader in emergency management.

2003: The Okanagan Mountain Park wildfire in Kelowna burned over 25,900 hectares and over 33,000 people were forced to evacuate.

2012: A landslide severely impacted the community of Johnsons Landing, causing four deaths and completely destroying four homes.

2018: Severe flooding occured in and around the city of Grand Forks, damaging more than 400 homes and 100 businesses.

Adopting the Sendai Framework

While the EPA itself hasn't changed significantly since 1993, BC's approach to emergency management has evolved. Practices, policies and processes have been strengthened in response to after-action reviews and more substantial reviews such as the 2014 Renteria Report on Earthquake Preparedness, the Auditor General's 2018 report on Managing Climate Change Risks, the Abbott-Chapman report on the 2017 wildfire and flood season, the Tsilhqot'in National Government report The Fires Awakened Us, and the Nadleh Whut'en report Trial by Fire. Local Authorities and First Nations have entered into a number of innovative and collaborative arrangements to plan, prepare for, and respond to emergencies. Provincial agencies such as Emergency Management BC (EMBC) and the BC Wildfire Service have improved their communications protocols and adopted a more inclusive approach, including respect for Indigenous knowledge and culture.

In Canada, provincial and territorial governments have primary responsibility for emergency management. In an emergency, the first response is almost always by the Local Authority or at the provincial or territorial level because most emergencies occur at a local or regional scale. If a provincial or territorial government requires resources beyond its capacity, the federal government will provide assistance. Canada is responsible for reserve lands, and this responsibility is delegated to the Minister of Indigenous Services. Indigenous Services Canada supports emergency mitigation, preparedness, response and recovery on-reserve, and has a service agreement with Emergency Management BC to ensure that First Nations have access to the provincial emergency management system.

But with increasing pressure on emergency management organizations, businesses and individual citizens, it is time to take a serious look at our approach. In 2015, in response to the challenges faced by jurisdictions around the world, the United Nations developed the Sendai Framework for Disaster Risk Reduction (Sendai Framework). The Sendai Framework has been adopted by 187 countries, including Canada. In October 2018, BC became the first province to adopt it. The Sendai Framework marks a shift from focusing on emergency preparedness and response to recognizing that risk identification and mitigation are key to managing hazards and reducing the impact of events. It aims for substantial reduction of disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries and calls for ***all of society*** to share responsibility for reducing disaster risk. Modernizing our legislation is one of the first key steps to implement the Sendai Framework.

The Sendai Framework's All-of-Society Approach

- The Sendai Framework for Disaster Risk Reduction 2015-2030 is a voluntary agreement that recognizes the responsibility for reducing disaster risk is shared between the State and other emergency management partners.
- The 'All of Society' approach is a key element of the United Nations' Sendai Framework that acknowledges the contribution of and important role played by all relevant partners in the four pillars of emergency management: Preparedness, Mitigation, Response and Recovery.
- Relevant emergency management partners include individuals, families, communities, private businesses, Local Authorities, First Nations, and the federal and provincial governments.
- Emergency management partners are encouraged to communicate, collaborate and coordinate in the design and implementation of emergency management legislation, regulations and policies.
- Strengthening overall society disaster resilience includes leveraging existing knowledge, experience and capabilities through accessible, inclusive and empowering engagement processes.

The Four Recovery Sectors:

People & Communities

- Physical, mental, and social wellbeing
- Health and safety
- Mental health
- Communitiy psycho-social, emotional, cultural, and spiritual wellbeing
- Interim housing

Infrastructure

- Private and public physical infrastructure
- Critical infrastructure such as utilities, communication networks, roads and bridges, and transportation
- Residential and commercial buildings
- Infrastructure planning

Environment

- Land degradation and contamination
- Biodiversity and ecosystem impacts
- Natural resource damage and loss

Economy

- Small, medium, and large enterprise
- Tourism
- Cultural livelihood
- Agriculture
- Broader economy

Interim Disaster Recovery Framework

Given the recovery challenges in 2017 and 2018, it was recognized that a new approach was needed in advance of developing new emergency management legislation. In May 2019, BC developed an Interim Disaster Recovery Framework for the 2019 and 2020 flood and wildfire seasons, establishing a strategic approach and clear roles and responsibilities, ensuring accountability, and providing overall guidance to recovery operations.

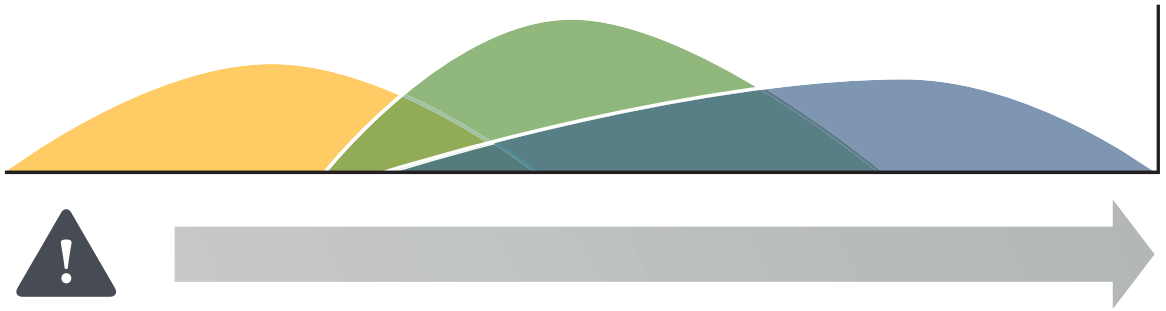
The interim framework organizes recovery by four sectors: People and Communities, Environment, Economy, and Infrastructure, each of which has an Assistant Deputy Minister responsible for overseeing the sector's recovery strategies and ensuring inclusivity and coordination with partners. It leverages existing operational and governance structures at the local, regional, and provincial levels. Similar to response operations, the Ministers' and Deputies' Emergency Council can be convened to ensure a coordinated provincial approach for significant recovery events such as the Telegraph Creek wildfires and Grand Forks flooding. The interim framework will need to be reassessed and finalized once the emergency management legislation is revised.

Recovery consists of three stages – short-medium- and long-term – and works towards minimizing future damage to communities and the environment.

The interim framework recognizes that there isn't a clear dividing line between response and recovery and that the earlier recovery efforts are initiated during response, the more effective those efforts will be. Recovery can take months or even years, particularly if additional events produce cumulative impacts.

BC's emergency management system is a true partnership, including federal, provincial, local and First Nations governments; critical infrastructure operators; thousands of volunteers; businesses; and people. This discussion paper outlines the key proposed attributes of a new emergency management Act, focusing on what would be new or different. Some of the proposed provisions will be supported by regulations to spell out requirements in more detail. We invite all British Columbians, stakeholders and emergency management partners, to tell us what they think about the proposals outlined in this paper to help us shape the new legislation and supporting regulations.

The Three Stages of Recovery:



Short-Term (DAYS - WEEKS)	Medium-Term (WEEKS - MONTHS)	Long-Term (MONTHS - YEARS)
■ Recovery Unit, Emergency Operations Centre(s) ■ Reception Centre(s) ■ Emergency Shelter ■ Rapid Damage Assessment ■ Public Information/Information posts ■ Initial Debris Clearance ■ Critical Infrastructure Restoration ■ Business Continuity ■ Disaster Psycho-social Support ■ Initial Post-Disaster Needs Assessment	■ Recovery Operations Centre(s) ■ Resilience Centre(s) ■ Temporary Lodging ■ Inspection/Damage Assessments ■ Demolition/Disaster Debris Management ■ Critical Infrastructure Repair ■ Business Resumption ■ Emotional/Psycho-social Support ■ Post-Disaster Needs Assessment	■ Recovery Steering Committee ■ Long-Term Recovery Structure ■ Permanent Housing ■ Engineering Assessment/Land Use Planning ■ Media and Community Services ■ Final Debris Disposal/Recycling ■ Critical Infrastructure Rebuild ■ Business Recovery ■ Counseling and Support Programs ■ Demobilization

A Four Pillars Approach to Emergency Management

Emergency management is a universal term for the systems and processes used for preventing or reducing the impacts of emergencies on communities. Emergency management is conceptualized in four phases:

- mitigation;
- preparedness;
- response; and
- recovery.

This approach is an internationally recognized system for defining and understanding different aspects of emergency management and is integral to the systems and processes used in BC to minimize exposure and vulnerability to hazards, prepare for and manage emergencies, and rebuild afterwards.

While the EPA is strong on the preparedness and response pillars, there are significant gaps when it comes to mitigation (pre-emergency activities) and recovery (post-event activities). The new Act will encompass all four pillars of emergency management, specifying the obligations of emergency management partners in each area.

Reconciliation

The Province of British Columbia has committed to full implementation of the United Nations Declaration on the Rights of Indigenous Peoples (the Declaration), the Truth and Reconciliation Commission's (TRC) Calls to Action and the principles articulated in the Supreme Court of Canada's Tsilhqot'in decision, and to reviewing its policies, programs and laws to bring these commitments into action.

Modernizing BC's emergency management legislation presents an opportunity to re-examine how the provincial government, Canada, Local Authorities and critical infrastructure operators work with First Nations on wildfire, flooding and other emergencies, and improve recognition of First Nations as partners in emergency management.

Long-standing, traditional knowledge about the land and natural forces has been handed down through generations since time immemorial—these stories and oral traditions are a rich and valuable source of knowledge that can complement scientific data and modern approaches to emergency management. For example, Indigenous prescribed burning practices were done in the past to reduce fuel loads, remove disease, and cleanse the land. Reduction in these practices over time has increased fire risk, but acknowledgement of the value of these traditions, and a renewed focus on practice, is being revitalized in BC.

Indigenous Nations and peoples have their own laws, governments, political structures, social orders, territories and rights inherited from their ancestors. Recognition of Indigenous peoples as emergency management decision-makers based on their inherent rights of self-government and self-determination will advance government's reconciliation efforts, facilitate a coordinated response to emergencies, and help create more predictability for other users of the land.

On October 24, 2019, BC introduced legislation that creates a framework for reconciliation in BC. The legislation will mandate government to bring provincial laws into alignment with the Declaration over time. This reconciliation legislation will also seek to create more flexibility for the legal status of Indigenous governments in BC, and to create opportunities for decision-making for Indigenous governments.

What Have We Done? What's Next?

In January 2016, EMBC issued a discussion paper outlining potential changes to the EPA. EMBC hosted a 15-week online consultation forum to allow an opportunity for the public, partners and stakeholders to submit input. EMBC received over 70 submissions from stakeholders, as well as comments from forum participants. With the 2017 provincial election and the scale of emergency events in both 2017 and 2018, work on the EPA was paused. The Province is now proceeding with a more comprehensive approach to prepare an entirely new Act that will replace the EPA. The feedback that was provided in 2016 has been considered in developing the proposals outlined in this discussion paper.

Keeping in mind that emergency management is a shared responsibility, EMBC had extensive discussions to inform the development of the proposals in this discussion paper. EMBC staff met with every provincial ministry, consulted with staff from Public Safety Canada and Indigenous Services Canada, briefed numerous groups, engaged with key partners such as the Union of BC Municipalities (UBCM), the First Nations Leadership Council, the First Nations Health Authority (FNHA), and the First Nations Emergency Services Society (FNESS), and conducted an all-day session with Indigenous emergency management champions.

The proposals in this discussion paper have been informed by experience, research into other leading jurisdictions, and the voices of emergency management partners. Over the next three months, engagement will broaden, welcoming input and dialogue from partners, stakeholders, and the public.

The Path to Modernization:

DESIGN PRINCIPLES FOR MODERNIZATION

Seven design principles are guiding development of BC's modernized emergency management legislation. The design principles reflect the key strategic shifts that underpin a more modern approach to emergency management in BC.

219

A Four-Pillar Approach

The Act will encompass all stages of emergency management: mitigation, preparedness, response, and recovery.

Shifting How We Think

The Act will reflect a shift from disaster response to managing and reducing disaster risk.

An All-of-Society Approach

Emergency management is a shared responsibility: individuals, governments, communities, private and non-profit sectors.

Putting Safety First

Protection of life, health, and safety is paramount.

Transparent Decisions

Decisions made under the Act and regulations will be transparent.

A Funding Mechanism that Works

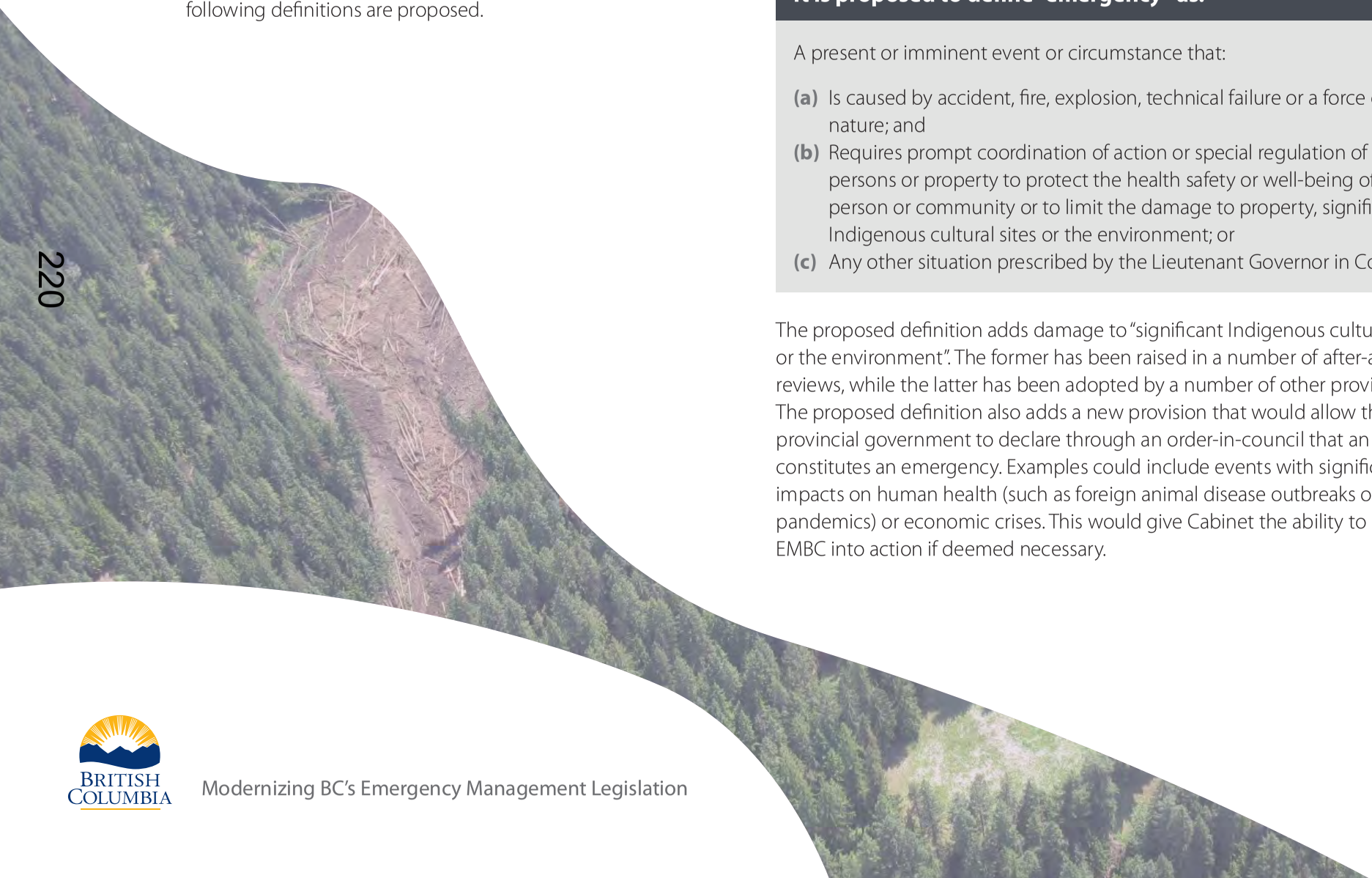
Responsive, flexible and disciplined funding mechanisms.

Focus on Inclusion

The Act will be inclusive and will consider the needs of vulnerable citizens.

KEY DEFINITIONS

The starting point for discussion about modernizing BC's emergency management legislation is the key definitions that will underpin the new Act. The following definitions are proposed.



220

Emergency

The definition of emergency is essential to emergency management legislation. In the current EPA, the term gives meaning to other important concepts such as emergency plans and measures, and states of emergency.

It is proposed to define "emergency" as:

A present or imminent event or circumstance that:

(a) Is caused by accident, fire, explosion, technical failure or a force of nature; and

(b) Requires prompt coordination of action or special regulation of persons or property to protect the health safety or well-being of a person or community or to limit the damage to property, significant Indigenous cultural sites or the environment; or

(c) Any other situation prescribed by the Lieutenant Governor in Council.

The proposed definition adds damage to "significant Indigenous cultural sites or the environment". The former has been raised in a number of after-action reviews, while the latter has been adopted by a number of other provinces. The proposed definition also adds a new provision that would allow the provincial government to declare through an order-in-council that an event constitutes an emergency. Examples could include events with significant impacts on human health (such as foreign animal disease outbreaks or pandemics) or economic crises. This would give Cabinet the ability to direct EMBC into action if deemed necessary.

Local Authority

Local Authorities are defined in the EPA as:

(a) For a municipality, the municipal council;
(b) For an electoral area in a regional district, the board of the regional district; or
(c) For a national park, the park superintendent.

There are additional circumstances under which it may be appropriate to designate an entity as a Local Authority:

- Under the terms of modern treaties, Treaty First Nations are considered Local Authorities under the EPA; however, there is no reference in the legislation itself to Treaty First Nations;
- The Stikine region is the only area of BC where there is no Local Authority; and,
- Many regions of the province have initiated collaborative emergency management partnerships across multiple municipalities or within an entire regional district (for example, through the Integrated Partnership for Regional Emergency Management in Metro Vancouver and the Regional Emergency Management Partnership in the Capital Regional District).

It is therefore proposed to:

Add the ability for the Minister to prescribe by regulation a new "Local Authority". This could include a Treaty First Nation whose Final Agreement defines it as a Local Authority, an appropriate body within the Stikine, or a group of willing First Nations, municipalities and/or electoral areas that wish to form a unified Local Authority for the purposes of undertaking some or all emergency management functions.

KEY DEFINITIONS: *The Four Pillars of Emergency Management*

1. Mitigation

In keeping with the Sendai Framework, and with a view to future risk associated with climate change, mitigation will be built into the new Act in order to:

- Enhance information about hazards, risks and vulnerabilities;
- Improve integration and hazard and risk information flow between communities, ministries, Crown corporations, and critical infrastructure operators;
- Mandate greater consideration of current and future risk when considering development in hazardous areas; and,
- Build resiliency and social cohesion of communities.

It is proposed to define "mitigation" as:

The phase of emergency management in which proactive steps are taken to prevent a hazardous event from occurring by eliminating the hazard, or to reduce the severity or potential impact of such an event before it occurs. Mitigation protects lives, property, cultural sites, and the environment, and reduces vulnerabilities to emergencies and economic and social disruption.

2. Preparedness

Building on the strong preparedness and planning requirements in the EPA, modernized emergency management legislation will:

- Establish clear and expanded emergency management responsibilities for key partners;
- Improve integration and information flow between ministries, Crown corporations, Local Authorities, First Nations, and critical infrastructure operators; and,
- Enhance emergency plan quality including more rigour on risk assessment, mitigation and recovery.

It is proposed to define "preparedness" as:

The phase of emergency management during which action is taken to ensure readiness to undertake emergency response and recovery. It includes, but it not limited to, hazard, risk, and vulnerability assessment, planning, resource planning, volunteer management, training, exercises, public/stakeholder education, and continuous improvement.

3. Response

Building on the response provisions in the EPA, modernized emergency management legislation will:

- Allow for setting standards for emergency public notifications and warnings to ensure clear responsibilities, timeliness, and accuracy;
- Enable the Province to enter into aid agreements with other jurisdictions (for example, to provide emergency management and other accredited professionals to assist during a catastrophic event); and,
- Clarify distinct powers for both the Province and Local Authorities during states of emergency, and the duration of states of emergency.

It is proposed to define "response" as:

The phase of emergency management during which actions are taken in direct response to an imminent or occurring emergency in order to prevent, limit and manage impacts. Response includes the initiation of plans and actions to support recovery and may include deployment of registered volunteer resources.

4. Recovery

The Sendai Framework includes the concept of "building back better" during recovery from events to reduce future risk and enhance resilience. A 2018 report prepared under the auspices of the World Bank expands this concept:

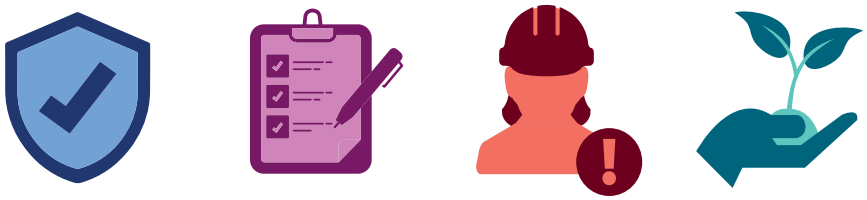
- Building back **stronger** refers to reconstructing buildings and infrastructure to ensure the built environment is better able to withstand future emergencies;
- Building back **faster** reduces disaster impacts by accelerating reconstruction through measures such as contingent reconstruction plans, pre-approved contracts, and financial arrangements; and,
- Building back **more inclusively** ensures that the most disproportionately impacted can access the support they need to rebuild. In the absence of such support, they are the most likely to experience the long-term consequences caused by health issues and disability, loss of schooling and education, or simply the inability to save or borrow to rebuild or replace lost assets.

With this in mind, modernized emergency management legislation will:

- Ensure Local Authorities, ministries, Crown corporations, First Nations, and critical infrastructure operators are prepared to recover from emergency events; and,
- Give Local Authorities and ministries the tools and powers required to build back stronger, faster, and inclusively.

It is proposed to define "recovery" as:

The phase of emergency management during which action is taken to re-establish social, cultural, physical, economic, personal and community well-being through inclusive measures that reduce vulnerability to emergencies, while enhancing sustainability and resilience. It includes taking steps to repair a community impacted by an emergency and restore conditions to a level that could withstand a potential future event or, when feasible, improve them to increase resilience in individuals, families, organizations, and communities.



Stepping Up & Sharing Responsibility

A Blueprint for 21st Century Emergency Management

While the provincial government has a leadership role in emergency management, fully committing to the Sendai Framework means that responsibility is shared with other partners including Local Authorities, First Nations, critical infrastructure operators, the private sector, industry, non-governmental organizations (NGOs), citizens and volunteers. We recognize that many of these proposals would impose additional obligations on emergency management partners, which will raise issues of capacity and resources and will require time to develop and implement new approaches. The Province is committed to work with emergency management partners to ensure the necessary supports are in place so that the proposed new framework can be delivered.

This section outlines the key proposed changes for BC's emergency management partners that would be incorporated in a modernized Act.

Minister Responsible for Emergency Management

Under the EPA, the Minister has a number of duties and powers, including preparing emergency plans, entering into agreements, conducting public information, training and exercising programs, and reviewing and recommending modifications to Local Authorities' plans. The Minister may declare a provincial state of emergency (PSOE) and must approve extensions to states of local emergency (SOLEs).

States of Emergency

The provisions in the EPA dealing with states of emergency have their roots in Canada's War Measures Act. A **state of emergency** is an extraordinary measure that provides powerful tools to provincial and/or local governments that curtail rights and freedoms.

SOLE Durations

Currently, SOLEs are initially established at seven days and may be extended for further seven-day periods; the Minister's approval is required for extensions. Experience has shown that SOLEs are frequently renewed, often repeatedly, to deal with high-impact events.

It is proposed that:

- The duration of a SOLE be set at 14 days, with extensions of 14 days at a time approved by the Minister or designate. Extensions may include changes to the geographical scope of the SOLE.

PSOE Durations

Currently, PSOEs are initially established at 14 days and may be extended for further 14-day periods, with approval of the Lieutenant Governor in Council (LGIC).

It is proposed that:

- The duration of a PSOE be set at a maximum of 28 days, with extensions of 28 days at a time approved by the LGIC. Extensions may include changes to the geographical scope of the PSOE.

Powers Availible During PSOEs & SOLEs

The EPA sets out the powers available to the Minister during a provincial state of emergency (s. 10(1)) and to a Local Authority for a local state of emergency (s. 13(1)). ***In order to ensure an appropriate suite of powers is in place during states of emergency, the following is proposed.***

It is proposed to:

- Clearly set out the powers available to the Minister and to Local Authorities, respectively, by listing these powers;
- Clarify that the Minister and Local Authorities may do all acts and implement all procedures necessary to mitigate, prepare for, respond to or recover from the effects of an emergency.

Continued use of a SOLE

Experience in 2017 and 2018 showed that continued use of a SOLE is not an appropriate tool as communities transition from response to recovery. ***To support Local Authorities to transition from reliance on SOLEs to their regular decision-making processes, the following is proposed.***

It is proposed to:

- Introduce a new provision to allow the Minister to grant a Local Authority the use of specific powers for a "transition period" between response and recovery of up to 90 days. A Local Authority would make an application to the Minister, citing what powers are required and demonstrating that they are in the public interest; necessary or desirable to ensure a timely and effective recovery; and proportionate in the circumstances. The Minister could approve multiple extensions, for up to 90 days each. Local Authorities would be required to report publicly on their use of the transition powers.

Powers During Catastrophic Events

Careful consideration was given to whether an additional suite of powers should be available to the Minister for a catastrophic event such as a subduction earthquake. The existing powers under the EPA, specifically section 10(1) and section 26, are extremely powerful. ***Minor amendments are proposed to clarify how these powers apply during a catastrophic event.***

It is proposed that:

- **S. 10(1)** would clarify that for the duration of a provincial state of emergency, the Minister may do all acts and implement all procedures considered necessary to mitigate, prepare for, respond to or recover from the effects of an emergency; and,
- **S. 26** would clarify that unless otherwise provided for in a declaration of a state of emergency, if there is a conflict between the emergency management Act, the regulations, orders, or authorized actions made under the Act, and the regulations, orders, or authorized actions under other Acts, the emergency management Act and its regulations, orders, or authorized actions prevail.

Entering Into Agreements

Accessing Support

The Minister currently has the authority to "enter into agreements with the government of Canada or any other province, or with any agency of such a government, dealing with emergency plans and programs." ***In order to ensure that BC can quickly and effectively access support from other jurisdictions as and when needed, the following is proposed.***

It is proposed to:

- Clarify that the Minister can enter into agreements with international jurisdictions. Agreements could include arrangements with one or more other jurisdictions to share resources in relation to emergency management.

Partnerships with First Nations

A number of First Nations have entered into emergency management agreements with the Province and/or local governments. For example, in 2018 the Central Coast Regional Emergency Management Partnership Memorandum of Understanding was signed between the Nuxalk Nation, Central Coast Regional District, and EMBC. In April 2019, a tripartite agreement was signed by Canada, BC and the First Nations Leadership Council to establish a formal relationship to hold collaborative, constructive and regular dialogue on emergency management issues. ***In order to facilitate partnerships with First Nations, the following is proposed.***

It is proposed to:

- Provide clear authority for the Minister and for Local Authorities to enter into emergency management agreements with First Nations. Agreements could address issues such as collaborative hazard and risk assessment and/or planning; delivery of emergency management services or programs; and/or joint recovery activities.

Enhancing Confidence in the Emergency Management System

BC is already a recognized leader in emergency management. Modernizing our legislative framework underscores our commitment to continuous improvement and will enshrine in legislation many of the best practices that are already commonplace in our province. That said, it is also important for the public to have confidence in our emergency management regime. To that end, we are proposing measures to enhance transparency and quality assurance.

Emergency Management System

Transparency

To increase transparency around risk, and coordination and consolidation of risk assessments and hazards across the province, the following is proposed.

It is proposed to:

- Establish a legislative requirement for the Province to centrally house and provide transparent data on hazard, risk and vulnerability assessments, or mitigation planning documents which are conducted or prepared by other bodies (provincial ministries, Crown corporations and agencies; Local Authorities; and critical infrastructure operators).

Quality Assurance

To provide quality assurance of emergency management plans prepared by other bodies, the following is proposed.

It is proposed to:

- Require provincial ministries, Crown corporations and agencies, Local Authorities, and critical infrastructure owners/operators to register their emergency management plans with EMBC; and
- Enable EMBC to audit emergency management plans. In the spirit of continuous improvement, audit results would be shared with the planning body and made public.

Provincial Ministries, Crown Corporations & Agencies

Provincial government bodies must lead by example to adopt a four-pillar approach to emergency management and increase confidence in the quality of emergency plans. This includes expanding the public sector entities required by law to do emergency planning. Under the EPA, all ministries and certain Crown corporations are required to prepare emergency plans to be followed in the event of an emergency or disaster. These plans can be divided into two categories: business continuity plans, which focus on the continuity of services, and emergency management plans. Content requirements for business continuity plans are identified in policy, not in regulation. The Emergency Management Program Regulation delegates responsibilities for some hazard-specific planning to some ministries but there is otherwise little direction on what content should be included in ministry emergency management plans. Currently, ministries are not obligated to include risk mitigation or recovery within their plans. The following table shows key hazards and the primary provincial ministries responsible for provincial level activities to provide expertise and direct support to Local Authorities in managing an incident.

Ministry Hazard Responsibilities (1/3)

HAZARD GROUP	HAZARD	MINISTRY
Accidents	Air crashes	Public Safety & Solicitor General
	Marine accidents	
	Motor vehicle crashes	
Atmosphere	Snowstorms	Emergency Management BC
	Blizzards	
	Ice storms	
	Fog	
	Hailstorms	
	Lightning	
	Hurricanes	
	Tornadoes	
	Heat waves	
Dam Failure	Dam failure (includes foundations and abutments)	Forests, Lands, Natural Resource Operations & Rural Development
Disease & Epidemics	Human diseases	Health
	Animal diseases	Agriculture
	Plant diseases	
	Pest infestations	

Ministry Hazard Responsibilities (2/3)

HAZARD GROUP	HAZARD	MINISTRY
Explosions & Emissions	Gas and gas leaks (pipeline)	Environment
	Gas and gas leaks (gas wells)	Energy, Mines & Petroleum Resources
	Mine	
	Other explosions	Municipal Affairs & Housing
Fire (Urban & Rural)	Fire (urban and rural — excludes interface fire)	Emergency Management BC; Forests, Lands, Natural Resources & Rural Development
Geological	Avalanches: highways/other	Transportation & Infrastructure; Emergency Management BC
	Debris avalanches and debris flows	Forests, Lands, Natural Resources & Rural Development
	Submarine slides	
	Landslides: highways/other	Transportation & Infrastructure; Emergency Management BC
	Land subsidence	Energy, Mines & Petroleum Resources
Hazardous Materials	Hazardous spills (on site or transport routes)	Environment
	Radiation	Health
	Infectious materials	
Hydrologic	Drought	Forests, Lands, Natural Resources & Rural Development
	Flooding	
	Erosion and accretion	Environment
	Ice jams	Transportation & Infrastructure

Ministry Hazard Responsibilities (3/3)

HAZARD GROUP	HAZARD	MINISTRY
Power Outage	Electrical power outage	Emergency Management BC
Riots	Riots & public disorder	Public Safety & Solicitor General
Seismic	Ground motion effects	Emergency Management BC
	Tsunamis	
Space Object	Space object crash	Emergency Management BC
Structural	Structural collapse	Emergency Management BC
Terrorism	Terrorism (hostile act against state)	Public Safety & Solicitor General
Volcanic	Ash falls	Emergency Management BC
	Pyroclastic flows	
	Lava flows	
	Mudflows	
Wildfire	Wildfire (includes interface fire)	Forests, Lands, Natural Resource Operations & Rural Development

Preparedness for Provincial Ministries, Crown Corporations & Agencies

Business Continuity Plans

To ensure transparency, consistency, quality, and oversight and to enhance information sharing of business continuity plans, the following is proposed.

It is proposed to:

- Require all ministries, Crown corporations, and agencies to have programs and plans to deal with the continuity of services. This could include school districts, universities, colleges, health authorities, and others;
- Enable the prescription (in regulation) of standards for plan content, process, training, exercising and review; and
- Establish a mechanism to enable EMBC to collect, review, and audit business continuity plans.

Emergency Management Plans

To ensure transparency, consistency, quality, and oversight and enhance information sharing of emergency management plans, the following is proposed.

It is proposed to:

- Require ministries, Crown Corporations, agencies and other public sector entities to develop emergency plans, participate in the development of integrated plans for which they are not the lead, and perform hazard, risk and vulnerability assessment, mitigation, preparedness, response, and recovery duties as assigned by the Minister. This could include school districts, universities, colleges, health authorities, and others;
- Enable the prescription (in regulation) of specific roles and responsibilities for mitigation, preparedness, response, and recovery, plan content, process, training, exercising and review; and
- Establish a provincial obligation to provide hazard data and coordinate with Local Authorities and First Nations as available and requested.

Continuity After Catastrophe

To ensure continuity of government operations following a catastrophic event such as a damaging earthquake, the following is proposed.

It is proposed to:

- Require the Province to develop continuity of government plans that ensure the continued operation of the executive, judicial, and legislative arms of government.

Local Authorities

Under the EPA, Local Authorities include municipal councils and regional district boards. Successful emergency management must be driven by, and responsive to, local communities. Local Authorities therefore have a vital role in emergency management at the community and regional level, as they are responsible for preparing and implementing emergency plans. However, events in 2017 and 2018 highlighted the importance of strengthening both up-front risk mitigation and post-event recovery. A modernized approach to emergency management can increase community resiliency by:

- Increasing the specificity of emergency planning requirements, including obligations to identify hazards, vulnerabilities, and risk and implement risk reduction measures;
- Enhancing community consultation and coordination;
- Empowering new and existing partnerships; and
- Providing a new "transition period" to enable a more seamless transition from response to recovery by allowing specific powers to continue for a longer period of time while providing public accountability on the use of the powers.

Mitigation for Local Authorities

Building & Development

Risk reduction starts with making sound decisions about where and how to build. To facilitate risk-based decision-making about building and development in hazardous areas, the following is proposed.

It is proposed to:

- Require Local Authorities, and the Province (through the Ministry of Transportation and Infrastructure's subdivision approval authority in unincorporated areas) to give greater consideration of current and future risk for new development approvals in hazardous areas; and,
- Require sustainable long-term mitigation measures when building and development is approved in hazardous areas.

Hazard & Risk Identification

To enhance the capacity to prevent and mitigate emergencies, and close gaps that exist in hazard and risk identification, the following is proposed.

It is proposed to:

- Include legislative and regulatory requirements for Local Authorities to identify, understand and assess hazards, risks, and vulnerabilities, and establish associated mitigation plans for risks and consequences.

Collaboration & Coordination

To increase transparency around risk, and enhance coordination and consolidation of risk assessments and hazards across the province, the following is proposed.

It is proposed to:

- Enable the Minister or designate to direct Local Authorities to collaborate and coordinate at a regional scale for risk assessment, mitigation planning and mitigative works; and
- Enable the establishment of non-regulatory or regulatory incentives to enhance regional collaboration and coordination for risk assessment, mitigation planning and mitigative works.

234

Preparedness for Local Authorities

Standardized Programs & Plans

To increase standardization and alignment of Local Authority emergency management programs and plans, the following is proposed.

It is proposed to:

- Establish a comprehensive list of requirements including: hazard, risk, and vulnerability assessment; mitigation plans; response; recovery; business continuity plans; training; exercising; and a review cycle; and
- Through regulation, provide detailed program and plan content requirements.

Collaborative Planning & Partnerships

To increase collaboration, enable community-driven planning and partnerships, provide transparency and accountability among partners and stakeholders, and enable the Province to understand local capacities and needs, the following is proposed.

It is proposed to:

- Require Local Authorities to provide plans to neighbouring jurisdictions (Local Authorities and First Nations), to the Province, and stakeholders such as critical infrastructure operators, school districts, and health authorities and consider any feedback;
- Enable Local Authorities and First Nations to enter into agreements with one another for the purposes of integrated or multi-jurisdictional plans; and
- Introduce a requirement for Local Authorities preparing emergency management plans to consult with First Nations. Consultation standards for Local Authorities could be specified in regulation or guidelines.

Response for Local Authorities

Response Provisions

Proposed changes to response provisions for Local Authorities are outlined in the section on the Minister's powers.

See Page 19

Recovery for Local Authorities

Recovery Plan Incentives

To provide incentives to develop strong recovery plans, the following is proposed.

It is proposed to:

- Enable regulations that would require post-disaster needs assessments and post-disaster recovery plans as a condition of receiving provincial recovery funds and the renewal of recovery powers.

Transitioning out of a SOLE

As described in the section on the Minister's powers, to create a mechanism for the use of emergency powers over an extended period of time and recognize the transition between response and recovery, the following is proposed.

It is proposed to:

- Introduce a 90-day "transition period" where Local Authorities can request the use of specific SOLE powers for up to 90 days at a time. Powers would be selected and justified for the circumstance, based on the whether the transition powers are in the public interest, necessary and desirable, and proportionate to the circumstances.

Tools to Support Recovery

To provide Local Authorities with additional tools to support recovery, particularly during the transition from response to recovery, the following is proposed.

It is proposed to:

- Enable Local Authorities, in consultation with the Minister responsible for the Community Charter, Vancouver Charter and Local Government Act and the Minister responsible for emergency management, to make emergency amendments to an Official Community Plan, Regional Growth Strategy, zoning, or bylaws.

Advancing Reconciliation with Indigenous Peoples

First Nations representatives have demonstrated a strong interest in all aspects of BC's emergency management regime. First Nations know their communities best, including making decisions on how and when to respond to events that impact their values and people.

Modernizing the legislation provides an opportunity to advance reconciliation with Indigenous peoples and address many of the challenges that were identified in 2017 and 2018, including investing in community planning, preparedness and mitigation, and respecting Indigenous knowledge and practices. Taking steps to recognize First Nations as partners in emergency management will demonstrate progress towards implementing the recommendations in First Nations community reports, the Abbott-Chapman Report, the Tsilhqot'in National Government report The Fires Awakened Us, and the Nadleh Whut'en report Trial by Fire.

Canada is responsible for reserve lands, and this responsibility is delegated to the Minister of Indigenous Services. Under the Emergency Management Act (2007), each federal minister is required to identify risks within their areas of responsibility and maintain emergency management plans to mitigate those risks. Indigenous Services Canada supports the four pillars of emergency management (mitigation, preparedness, response and recovery) on-reserve and has a service agreement with EMBC to ensure that First Nations have access to the provincial emergency management platform.

BC will continue to work with First Nations and Canada to provide clarity on jurisdictional roles and responsibilities for reserve lands and community members who live off-reserve.

First Nations, along with the federal, provincial and local governments, have already embarked on the path to partnerships. In addition to the tripartite agreement between Canada, BC and the First Nations Leadership Council that was mentioned earlier in this discussion paper, a number of First Nations have entered into collaborative arrangements, including:

- The ***Collaborative Emergency Management Agreement*** between the Tsilhqot'in National Government, Canada and BC;
- The ***Central Okanagan Regional Emergency Plan***, which supports local governments, the Regional District of Central Okanagan, and the Westbank First Nation; and,
- The ***Tofino-Ahousaht Protocol Agreement*** on areas of mutual interest, including infrastructure, health and emergency planning.

Under the Final Agreements of modern treaties, Treaty First Nations have the same powers, duties and responsibilities under the EPA as Local Authorities. Westbank First Nation and shíshálh Nation are self-governing, with the power to regulate public order, safety and emergency preparedness. Shíshálh Nation is a member of the Sunshine Coast Regional District Emergency Program and Westbank First Nation is a member of the Regional District of Central Okanagan Emergency Program.

The First Nations Health Authority (FNHA) coordinates activities in response to emergencies that may impact the health of BC First Nations community members. Since 2017, FNHA has strengthened its capacity to support First Nations communities to prepare for, respond to and recover from emergencies by establishing emergency management policies and procedures, developing an Emergency Operations Centre response mechanism, and creating additional staff positions focused on leading and supporting emergency management within its organization.

The First Nations Emergency Services Society (FNESS) works closely with First Nations communities, EMBC, Indigenous Services Canada (ISC) and other partners to support emergency management for First Nations communities in BC.

238

First Nations as Partners

It is recognized that First Nations will have interests in all the legislative changes under consideration. In order to further strengthen First Nations as partners in the governance and operations of emergency management and improve communications before, during and after an emergency, the following changes are proposed.

It is proposed to:

- Expand the definition of "emergency" to include actions to protect community well-being, significant Indigenous cultural sites and the environment;
- Provide clear authority for the Minister responsible for emergency management and for Local Authorities to enter into emergency management agreements with First Nations or First Nations groups, including Treaty First Nations. Agreements could address issues such as collaborative hazard and risk assessment and/or planning; delivery of emergency management services or programs; mutual aid; and/or joint recovery activities;
- Introduce a requirement for Local Authorities preparing emergency management plans to consult with First Nations;
- Introduce a requirement for critical infrastructure owners/operators to provide non-sensitive information to First Nations upon request. (Note: information would also be provided to Local Authorities and/or the public upon request.);
- Require consideration of Indigenous and traditional knowledge in the development of hazard risk and vulnerability assessments by provincial entities and Local Authorities. The entity conducting the assessments could be encouraged to communicate the results to affected First Nations; and,
- Establish that provincial entities and Local Authorities must consider cultural safety and inclusiveness when developing and implementing emergency management plans. Specific requirements could be established in regulation and supported by policies and guidance material.

Critical Infrastructure Operators

Federal, provincial and territorial governments in Canada define critical infrastructure as the processes, systems, facilities, technologies, networks, assets and services essential to the health, safety, security or economic well-being of people and the effective functioning of government. There are ten recognized critical infrastructure sectors:

Critical Infrastructure Sectors

SECTOR	SUB-SECTOR
Energy & Utilities	Electricity; Petroleum and Crude Oil; Natural Gas; Other
Communications	Telecommunications; Radio; Broadcasting; Satellite
Transportation	Rail; Road; Marine; Air
Water	Potable Water; Wastewater; Dams
Health	Critical Care; Extended Care; Blood/Organ Facilities; Pharmaceutical Facilities
Safety	Police/Law Enforcement; Fire; Ambulance; Emergency Management
Government	Federal; Provincial; First Nations; Local Authority
Food	Farming/Production; Processing/Packaging; Storage/Distribution
Finance	Banking/Financial Institutions; Securities/Investments; Point of Sale/ATM Machines
Manufacturing	Defense Industrial Base Manufacturing*; Critical Manufacturing**

* Defense industrial base manufacturing consists of businesses and government organizations involved in research, development, production and service of military equipment and facilities.
** Critical manufacturing varies across five key areas: primary metals, machinery, electrical equipment, transportation and heavy equipment, and chemical manufacturing.

The EPA does not reference critical infrastructure; it is regulated at both the provincial and federal levels within legislation that is typically specific to a single sector or sub-sector. This means that the requirements for emergency management activities are not consistent across sectors and may not be integrated with provincial or Local Authorities' emergency management plans.

240

In BC, many critical infrastructure operators already demonstrate exceptional emergency management practices, often going beyond existing regulatory requirements, as observed during the 2017 and 2018 flood and wildfire events as well as in many other instances. The proposals outlined below would serve to strengthen certain practices and close any gaps. It is recognized that the Province must respect federal jurisdiction over certain critical infrastructure sectors.

These recommendations are centered on adopting a cross-sector approach that defines expectations with respect to the development of four-pillar emergency management planning documentation that is registered provincially, exercised, subject to audit, and integrated with government emergency plans. The intention of these activities is to enhance the resilience of critical infrastructure in British Columbia, as well as those that rely on its services. The resilience of critical infrastructure assets and systems is essential to the functionality of critical supply chains such as food, water, fuel, shelter, and medical supplies, and is also a vital component of efficient and effective response and recovery efforts. Furthermore, awareness of downstream risks (i.e., scenarios that may result in critical service losses) and interdependencies (where one critical infrastructure asset relies on another, or there is a mutual dependency) may also help the Province, Local Authorities, First Nations, and other critical infrastructure operators develop and update their emergency management planning documentation appropriately.

In addition, consistent emergency management planning documentation can help ensure effective and efficient resource-sharing, as critical infrastructure operators are often the source of specialized resources and personnel. Understanding the needs of critical infrastructure operators in greater depth may also allow the Province to explore additional opportunities to provide support in return before, during, and after emergency events.

A modernized approach to emergency management would:

- Improve information sharing and coordination between critical infrastructure operators, the Province, Local Authorities, and First Nations; and,
- Establish minimum standards for emergency management and business continuity plans for critical infrastructure operators.

Preparedness for Critical Infrastructure

A Cross-Sector Approach

To build a foundation for a cross-sector approach that outlines expectations around emergency management planning, business continuity planning, information sharing, and exercising, the following is proposed.

It is proposed to:

- Establish a power to allow for creation of a registry that captures specific critical infrastructure assets and their respective emergency management planning documentation, which may include information on risks, contacts, operating procedures, resource requirements, and resource availability. This registry would also serve to clarify which critical infrastructure operators and respective assets are subject to the regulatory requirements, as it may include "tiers" to ensure appropriate attention is paid to the assets and systems with greater risk and/or consequence; and
- Establish cross-sector regulation for critical infrastructure emergency management activities to ensure consistency. This would include activities required for critical infrastructure sectors as defined by EMBC and include supplementary aspects to existing statutes and regulations with respect to their requirements related to emergency management activities. Attention will be paid to ensuring that existing requirements and efforts are not duplicated.

Risk and Resource Needs

To increase understanding of risk and resource needs of critical infrastructure operators, and increase coordination with other emergency partners, the following is proposed.

It is proposed to:

- Require critical infrastructure operators to develop specific emergency management planning documentation, which would be inclusive of planning for hazards created by the critical infrastructure, business continuity planning for service disruptions, and considerations for downstream impacts of service disruptions.

Information Sharing and Security

To improve coordination and information sharing while respecting critical infrastructure operators' proprietary information and minimize information security issues, the following is proposed.

It is proposed to:

Require that emergency management planning documentation be developed into two parts:

1. Information such as risks to critical infrastructure, risks caused by the critical infrastructure, general operating procedures, consequence of loss, estimated restoration timelines, anticipated resource requirements, and primary contact information; and,
2. Sensitive information that exposes vulnerabilities and any additional details within the plan such as additional staff contact information, internal procedures, etc.

Require that Part 1 be provided to the Province, and/or made available upon request to Local Authorities, First Nations, and/or the public.

Quality Assurance

242

To increase quality assurance of emergency management planning documentation, the following is proposed.

It is proposed to:

- Require certain critical infrastructure operators to provide a "Statement of Assurance" that would advise of measures they have taken to ensure that their emergency management documentation is of adequate quality. The Province would have authority to engage an accredited subject matter expert to validate the "Statement of Assurance"; and,
- Conduct prioritized audits of emergency management planning documentation. These audits would be done by either EMBC alone, or with the assistance of ministries with leadership/ regulatory roles for a particular sector.

Testing and Integration of Plans

To ensure that critical infrastructure emergency management and business continuity plans are tested consistently and to provide opportunities to integrate plans with other emergency plans, the following is proposed.

It is proposed to:

- Require critical infrastructure operators to conduct mandatory exercises for specific assets as designated by the Province through regulation or policy at a defined frequency and level (tabletop, full-scale, etc.); and,
- Require critical infrastructure operators to invite provincial regulators and emergency management authorities, as well as local participants such as Local Authorities, First Nations, and local organizations, to the mandatory exercises.

Improving Information Sharing

To increase information sharing both during and outside of emergency events, and to enhance planning related to catastrophic events, the following is proposed.

It is proposed to:

- Require critical infrastructure operators to provide emergency management information beyond that identified in Part 1 (see above) as requested by EMBC (or another provincial agency at the request of EMBC) including sensitive event-specific information, additional contact information, or internal procedures.

244

Supporting Volunteers & Non-Governmental Organizations

People who offer their services without expectation of compensation are a critical component of the emergency management process and contribute to an all-of-society approach, along with the many non-profit organizations involved in all four pillars of emergency management.

Currently, Public Safety Lifeline Volunteers provide services in five distinct functions:

- Search and Rescue services to locate and retrieve injured, lost, or missing individuals;
- Road Rescue services to extricate motorists trapped by an accident;
- Emergency Support Services to meet the temporary accommodation, meals and incidental needs of individuals and families evacuated during an emergency;
- Provincial Emergency Radio Communications services to provide additional or alternate radio connections in support of managing an emergency; and,
- Provincial Emergency Program Air to enable searches from the air, conduct reconnaissance (i.e., damage assessment), communications relay or transport personnel and supplies.

The Province also provides a means for a Local Authority or First Nation to organize convergent volunteers for general service tasks such as filling sandbags.

The skills and experiences of volunteers often go beyond their core functions, such as ensuring that in an emergency, residents are notified and advised of actions to take, or as a member of an Emergency Operations Centre. The Province supports these volunteers by providing training, reimbursing operational costs and providing WorkSafe and liability coverage.

Beyond formal provincially organized lines, volunteers make invaluable contributions to emergency management through non-government organizations (NGOs), community service organizations and other mechanisms.

Strengthening Supports for Volunteers & NGOs

Helping Volunteers Help BC

To strengthen support for the thousands of volunteers essential to emergency management, the following is proposed.

It is proposed to:

- Increase support and formal oversight of volunteers;
- Increase access to broader resources, including volunteers affiliated with third parties such as NGOs, and continue the ability of NGOs, philanthropic organizations, societies, and other organizations to enter into agreements with BC;
- Create more equitable treatment between a person ordered to provide support in an emergency and one who willingly provides support; and,
- Recognize that service provider organizations can be impacted by emergencies and may need support during response and recovery.

Preparedness for Volunteers & NGOs

New Definitions

To ensure consistent interpretation of new and existing laws and regulations related to volunteers and enable the Province to enter into agreements with third-party service providers, the following is proposed.

It is proposed to:

Have new definitions that would clearly distinguish the difference between a registered volunteer, convergent volunteer, and service provider:

Registered volunteers would be specialized disciplines prescribed by regulation and:

- Receive no remuneration for their service;
- Be provided with civil liability protection under the Act, workers' compensation and liability insurance;
- Obtain and retain registered status with the Province or other entities according to the regulation;
- Operate under Local Authority or direction of the requesting agency;
- May provide direction to convergent volunteers;
- Operate in all phases of emergency management; and,
- May receive time limited employment protection according to the Act.

Convergent volunteers would not be registered and would:

- Receive no remuneration for their service;
- Arrive on scene offering support and assistance;
- Be supervised by the Local Authority, the Province, or a registered volunteer to be able to receive workers' compensation and other benefits; and,
- Receive civil liability protection under the Act.

Service Providers may be a registered charity, philanthropic organization, society or other organization. The new legislation will include an explicit authority for the Minister (or designate) and Local Authorities to enter into agreements with Service Providers. Such agreements could:

- Authorize the Service Provider to deliver emergency response or recovery services or arrange for the deployment of staff or affiliated volunteer personnel. For clarity, personnel deployed on behalf of a Service Provider will be protected under workers' compensation and insurance policies secured by the Service Provider.

Legal Certainty

To provide greater legal certainty around the process to access workers compensation for injured volunteers and clarify provincial support and governance related to volunteers, the following is proposed.

It is proposed to:

- Ensure that the new legislation contains an authority to prescribe classes of registered volunteers, rules around supports for volunteers, and develop and implement a supporting regulation. Having the ability to prescribe classes of registered volunteers in a regulation allows for flexibility over time to accommodate new areas of specialized volunteer disciplines. Policy instruments would continue to be used for discipline-specific program rules and guidelines such as reimbursement rates and safety conditions.

Job-Protected Leaves

To provide job-protected leaves for persons ordered to provide assistance and for those registered volunteers specifically requested to provide support, the following is proposed.

It is proposed to:

Carry forward the existing section 25 of the EPA that provides that persons ordered to assist during a declared Provincial State of Emergency or a State of Local Emergency cannot have their employment terminated for complying with that order.

- Establish job-protected leave without pay for "registered volunteers." This provision would be restricted to those registered volunteers specifically requested by a Local Authority or a BC agency to support emergency response. Job-protected leaves would not be conditional on a State of Local Emergency or Provincial State of Emergency being declared.

Ensuring Fairness to Employers

To ensure fairness to affected employers, the following is proposed.

It is proposed to:

- Require Local Authorities or a BC agency requesting the registered volunteer to:
  - Document their initial request for the volunteer;
  - Confirm the duration of the deployment;
  - Confirm that the volunteer was in fact present for the emergency response; and,
  - Make this documentation available on request of the employer.
- Provide a process by which an employer could dispute the ongoing deployment of the employee in a volunteer capacity with the responsible Local Authority or BC agency because the employee is critical to business continuity or other hardship.

Protection from Civil Liability

To protect volunteers and others from civil liability, the following is proposed.

It is proposed to:

- Include a civil liability protection provision for registered and convergent volunteers, boards of search and rescue societies, authorized persons offering support from another jurisdiction, persons authorized or ordered to provide assistance under a State of Local Emergency or Provincial State of Emergency, provincial government employees and officials, Local Authority employees and officials, the Minister and the Provincial government as a whole, similar to what is set out in the Wildfire Act;
- A new civil liability clause will clarify that no legal proceedings can be commenced or maintained against a protected person or entity because of anything done or omitted in the course of undertaking a power, duty or obligation resulting from the legislation or associated regulations. Including the BC government and Local Authorities as protected entities is intended to acknowledge that unavoidable property damage or losses can result from governments' response to a given hazard, and that climate change is increasing the overall frequency of events; and,
- Bad faith or grossly negligent actions or omissions will be exempt from civil liability protection, as is the case under the current EPA.

Supporting & Empowering Citizens, Visitors & Businesses

Citizens can be encouraged to participate in an all-of-society approach to emergency management through information, education, building codes, access to information about hazards, risk, preparedness and response (e.g., evacuation routes), purchasing adequate personal insurance, and taking active roles during recovery. It's also important to provide citizens and visitors with accurate and timely information before, during and after emergencies, and to ensure that public notifications and warnings are widespread and well-understood.

The Province is not contemplating legislative changes that would specifically address the role of citizens and businesses in emergency management. We will build on existing programs and actions by enhancing the promotion of citizen and business involvement across all four emergency management pillars — mitigation, preparedness, response and recovery. This would build on current education and promotional initiatives at the provincial and local levels, such as:

- Strengthening provincial education and preparedness and mitigation initiatives such as Partners in Preparedness, Master of Disaster, High Ground Hikes, and FireSmart;
- Making materials available in additional languages;
- Developing initiatives to better reach vulnerable people;
- Strengthening and expanding the role of business partnerships (e.g., with the real estate community and tourism sector);
- Expanding social media such as Twitter, Facebook and webpages;
- Encouraging local governments to undertake more education and promotion and to encourage citizen participation in emergency management planning; and,
- Increasing citizens' awareness and participation in emergency planning, at an individual and community level, through transparent access to hazard information.

Citizen Preparedness

There are no identified jurisdictions that legislate citizens to be prepared or to undertake mitigation measures. Even Japan — often characterized as the "most prepared country in the world" for disasters — does not appear to mandate citizen preparedness, favouring instead robust public awareness programs, including regular drills (some of which involve hundreds of thousands of citizens), guides and brochures, and access to hazard and response planning information.

250

Financial Considerations

The Province recognizes that not all of the financial elements required to support the modernization of the emergency management system will be enabled through changes to legislation.

Signalling a commitment to a modernized emergency management system will require new investment with the objective of ensuring all four pillars are supported by stable, responsive and transparent funding mechanisms while meeting the Province's fiscal mandate and maintaining the flexibility to invest year-end funds when available.

The resourcing implications for provincial government bodies, local governments, First Nations, other emergency management partners and stakeholders required to deliver on any new emergency management obligations will be considered as legislation is developed, recognizing the importance of supporting their capacity to deliver. The capacity of partners to deliver will also inform the phasing-in of any new obligations.

The Province will continue to work to maximize opportunities to partner with the federal government to fund or co-fund emergency management activities as their support is essential in modernizing the emergency management system. The Province will also continue to advocate at the federal level for increased funding supports to meet the needs of British Columbians.

The Province continues work to improve its policies, procedures and administrative processes to ensure Local Authorities, First Nations, and service providers are transparently and efficiently reimbursed for response and recovery costs.

The Province recognizes that investments in mitigation and preparedness can reduce risk and reduce or avoid expenditures associated with emergency events.

In addition to traditional financial approaches currently being utilized, the Province will be guided in this consultation process with input on any new or emerging funding approaches, such as incentives to shift behaviour, as well as public and private partnerships that encourage disaster mitigation efforts.

Compliance & Enforcement

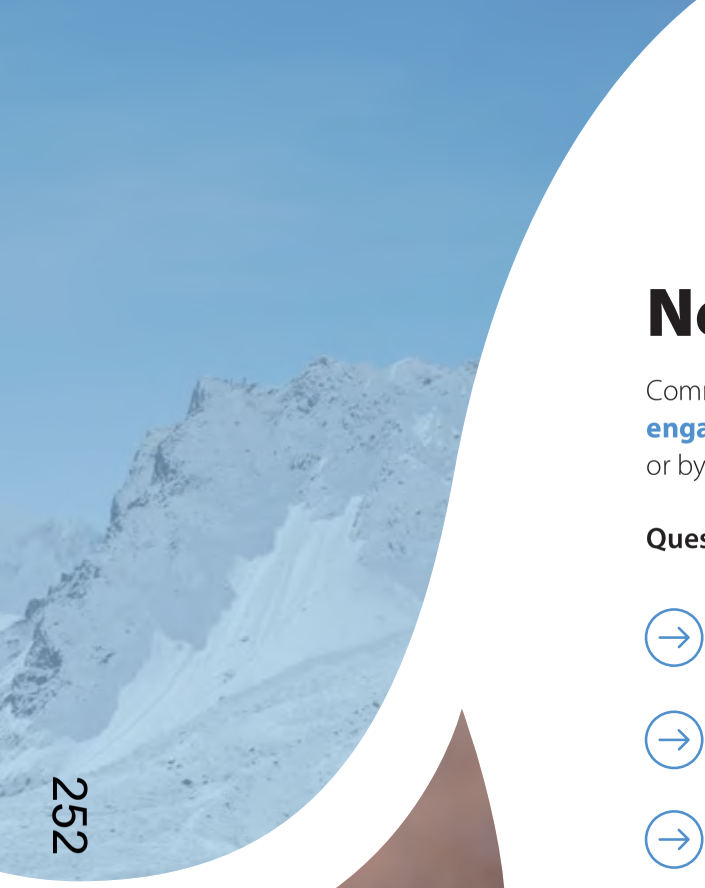
Many of the proposed changes to BC's emergency management legislation involve obligations for emergency management partners to reduce risk and enhance resilience. The Province will work with partners on voluntary measures to enhance compliance with these requirements (e.g. training, guidance documents, phased implementation, planning assistance, etc.). Voluntary compliance is the preferred mechanism for reducing risk and improving resilience. At the same time, mechanisms are required to ensure that obligations under the Act are met where voluntary compliance is not achieved.

The current EPA does not have an extensive compliance and enforcement regime. It includes a provision that creates an offence for any contravention of the Act or its regulations or for interference with the exercise of powers or performance of duties under the Act. The penalty for committing an offence is imprisonment for not more than one year or a fine of not more than $10,000, or both. As part of modernizing the Act, consideration will be given to what additional compliance and enforcement provisions (e.g., fines or other penalties) may be appropriate.

251

Tell us more:

- What tools should be available (in legislation or otherwise) to ensure compliance with the new Act?
- What incentives may be useful or appropriate?
- What penalties or enforcement mechanisms may be appropriate for non-compliance with the new Act?



Next Steps & How to Participate

Comments on the proposals outlined in this discussion paper can be submitted online at **engage.gov.bc.ca/govtogetherbc/consultation/emergency-program-act-modernization**, or by email at **EmergencyProgramAct@gov.bc.ca**, until January 31, 2020.

Questions to consider include:

- Will the proposed legislative changes promote a shift to a focus on disaster risk reduction?
- Will the proposals encourage an all-of-society approach to emergency management?
- Are there other measures that could be considered to improve our approach to emergency response?
- Are the proposed new recovery tools useful and appropriate?
- Are there other ways to advance reconciliation and recognize First Nations as emergency management partners?
- What issues are important to consider with regard to critical infrastructure?
- What support would be needed to implement these proposals? Examples include training on the new requirements, templates for emergency management plans, and additional expertise and capacity.

Feedback will inform next steps regarding the proposed changes to ensure they successfully deliver a modernized emergency management framework. In the spring of 2020, we will release a What We Heard report that summarizes the feedback received. The feedback will be used to inform and shape the final legislative changes, culminating in a new emergency management Act planned to be introduced in the Legislative Assembly in the fall of 2020.

What Will Change with Emergency Management Modernization? A Hypothetical Scenario

Scenario:

In December, a massive landslide occurs in BC's interior. Road access is cut off to a small municipality and a First Nations reserve. Several homes in a new subdivision within the municipality suffer major damage. A natural gas pipeline is damaged. Supply is interrupted, and service may need to be shut off to communities in the Lower Mainland. With a forecasted long-term cold spell, there are significant concerns about homes, businesses and critical infrastructure, such as schools and health care facilities, having heat during the winter.

The reason for the landslide is still being investigated, but slope instability due to a wildfire five years ago and associated deforestation are main contributors.

See the next page for an illustration of how this event could unfold under the current EPA, compared to under a modernized emergency management act.

How this hypothetical event could unfold under the current Emergency Program Act (EPA):

- As is the case with many emergencies, the landslide catches the impacted municipality and First Nation by surprise.
  - The risk of such a landslide was not assessed by the municipality, in part because its plan was not updated for post-wildfire risks.
  - Provincially-held post-wildfire risk data for previous years was not readily available to the municipality through a central location.
  - As a result, planning for alternate supply and egress routes for the municipality and the First Nation did not occur, resulting in significant challenges (e.g. transport of acute care patients to hospital, and delivery of food and fuel to the community).
- Landslide risk was not accounted for when the new subdivision was approved. Without a full risk assessment or mitigation strategies, some houses were constructed in a landslide hazard area.
- The municipality's emergency plan was not exercised, leading to confusion and delays in the early stages of response for both the municipality and the neighbouring First Nation.
- Response efforts by the Province are hampered by a lack of information regarding the gas line operator's emergency plan. While the gas line owner has plans in place, these plans have not been shared with EMBC, the municipality, or the First Nation.
- The Lower Mainland municipalities that may have their gas supply cut off are unaware that a shutoff strategy is included in the gas line operator's plan regarding pipeline breaches and are unaware that service may take up to three months to restore if it is shut off.
- The municipality's emergency plan does not address the recovery phase, hampering community recovery efforts in the coming weeks and months.

How this hypothetical event could unfold under a modernized emergency management act:

- The event creates challenges, but the impacted partners are not caught by surprise and are able to mount a quick and cohesive response effort.
- The risk of a landslide is identified in the municipality's mandated emergency plan. Risk identification and assessment are aided by simplified access to provincially-held risk data.
- The placement of several lots in the new subdivision was altered to account for the landslide risk, and no homes are significantly damaged in the landslide.
- Based on the identified landslide risk, the community has established access to an adjacent Forest Service Road to act as an alternate supply and egress route.
- The municipality and the First Nation recently held a small joint exercise of their mutually-shared emergency plans, which greatly improves response operations following the landslide.
- The Province, impacted municipality and First Nation, and Lower Mainland municipalities have access to key information about the gas line operator's emergency plan, allowing them to plan for gas line risks and interruptions. Lower Mainland municipalities work with the gas line operator to suggest customer prioritization (e.g. critical facilities and vulnerable populations) and shutdown procedures that will safeguard public safety. Emergency Management BC and the Ministry of Energy, Mines and Petroleum Resources have already worked with the gas line operator to complete provincial energy disruption planning.
- The municipality has a basic plan in place for the recovery phase, which speeds recovery in the weeks and months ahead.
- Overall, the partners can respond to and recover from this event, having previously identified the risks, engaged in mitigation where practical and cost effective, and shared and exercised plans together.

Modernizing BC's Emergency Management Legislation: Key Policy Shifts at a Glance

All four emergency management pillars (mitigation, preparedness, response, recovery) are recognized in legislation:

- Require provincial ministries, Crown corporations and agencies to:
  - Have programs and plans to deal with continuity of services;
  - Develop emergency management plans;
  - Exercise and review their plans; and
  - Carry out duties related to mitigation, preparedness, response and recovery as assigned by the Minister responsible for emergency management.
- Require Local Authorities to:
  - Meet clear requirements for the content and exercising of plans, and their review cycle;
  - Identify, understand and assess hazards, risks and vulnerabilities, and establish associated mitigation plans for high-risk hazards; and,
  - Develop post-disaster needs assessments and post-disaster recovery plans.
- Require Local Authorities and provincial subdivision approving officers to give greater consideration to current and future risk for development and building approvals, and require mitigation measures when development and building are approved in hazardous areas.

First Nations are recognized as emergency management partners:

- Expand the definition of "emergency" to include actions to protect community well-being, significant Indigenous cultural sites, and the environment;
- Provide clear authority for the Minister and Local Authorities to enter agreements with individual First Nations or First Nations groups;
- Require Local Authorities preparing emergency management plans to consult with First Nations;
- Require critical infrastructure operators to provide emergency management information to First Nations upon request;
- Require consideration of Indigenous and traditional knowledge in the development of hazard risk and vulnerability assessments by provincial entities and Local Authorities; and,
- Establish that provincial entities and Local Authorities must consider cultural safety and inclusiveness when developing and implementing emergency management plans.

Greater recognition of critical infrastructure as an integral part of emergency management:

- Enable creation of a registry of critical infrastructure to better understand both risk and the assets available during response and recovery and inform development of supply chain management strategies;
- Require critical infrastructure emergency plans to address all four pillars; and,
- Require specific emergency management planning documentation, which could include a "statement of assurance" for certain operators, to ensure information is readily available before, during and after events.

Better tools for response and recovery:

- Set the initial duration and renewal period for a provincial state of emergency at a maximum of 28 days (currently 14) and for a local state of emergency at 14 days (currently 7);
- Create a new provision to allow the Minister to grant a Local Authority the use of specific powers for a "transition period" between response and the end of the recovery phase of up to 90 days;
- Enable Local Authorities to make emergency amendments to Official Community Plans, Regional Growth Strategies, zoning, or bylaws;
- Enable, by regulation, standards for emergency public notifications and warnings; and,
- Clarify how existing provincial powers would apply during a catastrophic event.

Greater recognition and protection for volunteers:

- Define service providers and provide clear authority for the Minister to enter into agreements with them;
- Clearly define different types of volunteers;
- Modernize civil liability protection to better deter nuisance lawsuits; and,
- Establish job-protected leaves for volunteers with specialized skill sets.

Stronger coordination, collaboration and provision of information between emergency management partners:

- Require ministries, Crown corporations, agencies and other public sector entities (such as school districts, universities, colleges, and health authorities) to participate in the development of integrated plans for which they are not the lead;
- Enable Local Authorities and First Nations to enter into agreements to do integrated or joint planning and to voluntarily form unified Local Authorities to do some or all emergency management functions;
- Enable the Minister to direct Local Authorities to collaborate and coordinate at a regional scale for risk assessment, mitigation planning and mitigative works, and enable establishment of regulatory or non-regulatory incentives for collaboration and coordination;
- Require Local Authorities to provide plans to neighbouring jurisdictions (including First Nations), to the Province, and stakeholders such as critical infrastructure operators and consider any feedback; and,
- Require Local Authorities preparing emergency plans to consult with First Nations.

Greater confidence in the emergency management system:

- Establish a requirement for the Province to centrally house and provide transparent data on hazard, risk and vulnerability assessments or mitigation planning documents conducted or prepared by provincial ministries, Crown corporations and agencies, Local Authorities, and critical infrastructure operators;
- Require provincial ministries, Crown corporations and agencies and Local Authorities to register their emergency management plans with EMBC; and,
- Enable EMBC to audit emergency management plans and make the results public.