Revelstoke Community Energy and Emissions Plan

City of Revelstoke

March 2021

Community Energy Association

CITY OF REVELSTOKE

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Acknowledgments

The Community Energy and Emissions Plan (CEEP) was developed by the City of Revelstoke in collaboration with the Community Energy Association (CEA). Partial funding for this CEEP QuickStart process was provided by BC Hydro. We would like to acknowledge the many individuals and organizations who participated in the development of this Plan. We truly appreciate your time and participation, and willingness to engage through a new, online approach due to the travel and gathering restrictions presented by the Covid-19 pandemic.

Thank you to Marianne Wade for leading this process on behalf of the City of Revelstoke, in collaboration with Caitlin Hinton, and Paul Simon. Thank you also to Kelly Learned, Official Community Plan (OCP) consultant for participating and connecting important elements to the OCP process.

A Focus Group was established to engage a variety of community groups and stakeholders through the series of workshops in development of the Community Energy and Emissions Plan. The participants of the Focus Group, and their associations are listed below:

Name	**Organization/Affiliation**
Connie Brothers	Collective Impact Leadership Committee
Kent Christensen	North Columbia Environmental Society
Kevin Dorrius	Community Futures
Megan Tabor	Tourism Revelstoke, Executive Director
Melissa Hemphill	Food Security Coordinator, Community Futures, LFI
Miriam Manley	Revelstoke Arts Council
Roberta Bobicki	Economic Development Commission, RCU
Sally Carmichael	Chamber of Commerce, Rotary
Stephanie Melnyk	RCMP Victims Services
Todd Hicks	SD19
Cathy English	Revelstoke Museum and Archives
Cindy Pearce	Public at Large
Leslie Hogg	Revelstoke Youth Network
Mike Hooker	SD19
Nathan Weston	Straight Up Construction
Peter Neilsen	Revelstoke Mountain Resort
Sheena Bell	Community Connections

Executive Summary

The City of Revelstoke Community Energy and Emissions Plan (CEEP) carves a path towards a low carbon future: A future where City of Revelstoke residents experience the benefits of a connected, healthy, and economically prosperous community while taking action on climate change and adapting to climate impacts.

The climate is changing in British Columbia (BC) and globally. The average global temperature has already increased by 1 degree Celsius (°C) above pre-industrial levels. The United Nations Intergovernmental Panel on Climate Change (IPCC) is urging a limit of 1.5°C warming, which would require global emissions to be net-zero by 2050.

The City of Revelstoke CEEP focuses on leveraging municipal powers to help residents, businesses, and visitors save energy, emissions, and money. It is residents and businesses in City of Revelstoke that have the biggest role: A significant reduction in community greenhouse gas (GHG) emissions depends on their individual choices about how to get around, where to live, and how to handle food waste and yard material. The Plan lays out actions for transportation, buildings, waste, and organizational readiness. Actions fall into three categories:

- **Infrastructure**: Investments into the City of Revelstoke owned infrastructure that enable residents to make lower-emissions choices, such as active transportation networks and public charging stations
- **Policy**: Changes to City of Revelstoke policy and regulation that lead to energy and emission reductions in the community, such as requirements and incentives for enhanced energy efficiency in new buildings through Step Code adoption.
- **Engagement**: Outreach, education and incentives that inspire residents and businesses to make choices to reduce energy and emissions and prepare for a low carbon future.

The purpose of this Plan is to outline a practical approach for City of Revelstoke to use its municipal powers to help residents and businesses save energy and, by doing so, save money and reduce greenhouse gas emissions.

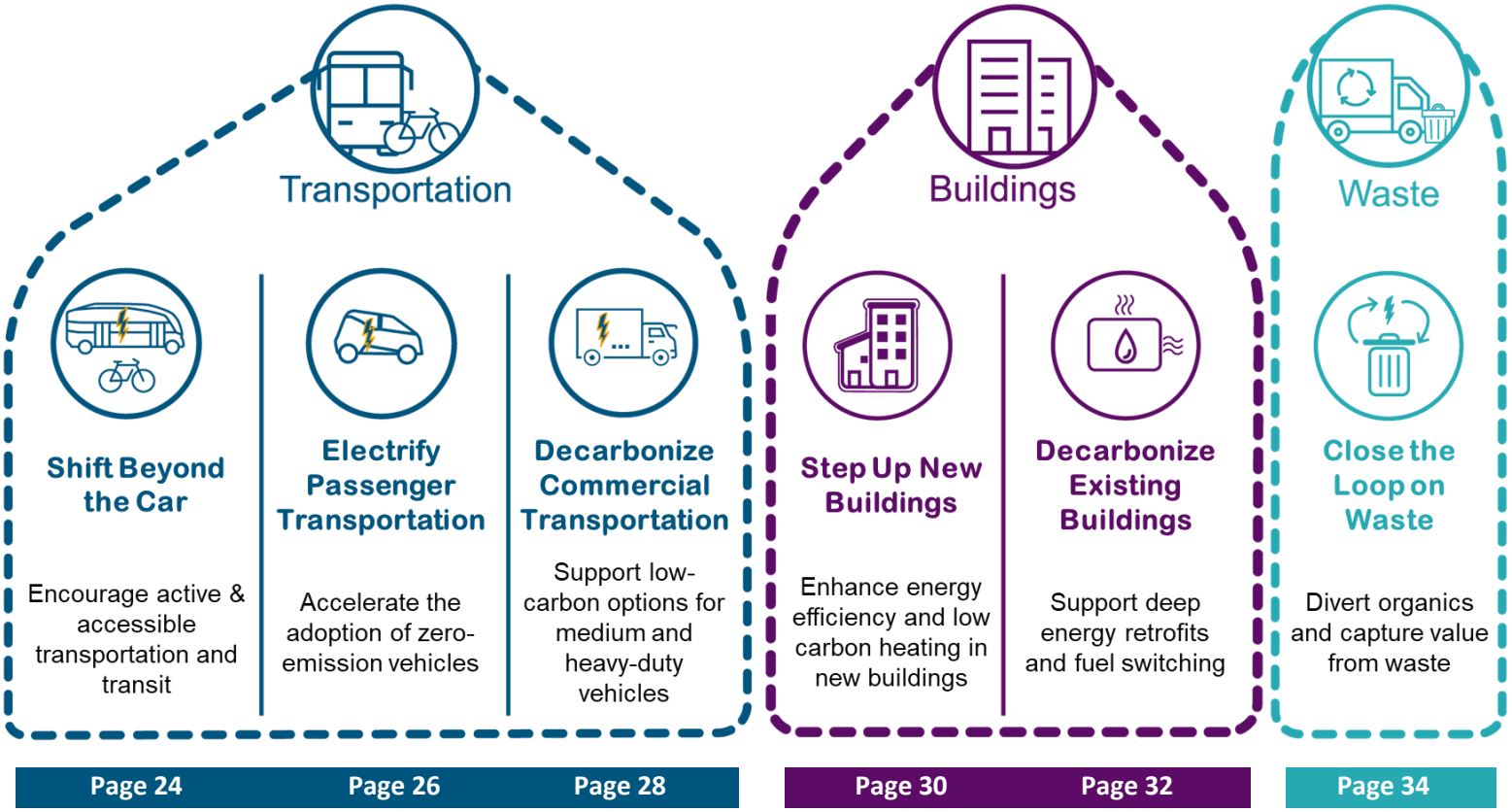
Revelstoke Community Greenhouse Gas Emissions Reduction Target

40% reduction from 2007 levels by 2030

Net-zero emissions by 2050

The Big Moves

The six Big Moves are broad categories of actions that have the biggest impact on reducing emissions in the community. The Big Moves focus on the types of emissions that are most in control of the local government and that are measured in the emissions inventory. The CEEP lays out strategies and actions under each of the six Big Moves.



There is one more important category of actions – Organizational Leadership. This "seventh Big Move" is very important because it ensures that climate action becomes a part of the City of Revelstoke's regular decision-making and operational process. **Page 37**

Our Community's Low Carbon Vision

During the CEEP planning process, community stakeholders went through a visioning exercise called "backcasting" to imagine what a low carbon future for City of Revelstoke could look like. We chose 2040 as our visioning year to allow for a slightly longer time horizon than 10 years but short enough to imagine the changes happening. Pulling together the visions established in the sector-specific groups, a picture is created of Revelstoke's future:

In 2040, emissions in the City of Revelstoke will be working toward net-zero, having achieved a 40% reduction of GHG emissions in 2030. The groundwork laid in the twenty years prior has resulted in opportunities for businesses and residents to thrive in the transition to a low-carbon community. By 2040, neighbourhoods will have been built and revitalized to optimize renewable on-site resources, including rainwater, solar and district energy. These neighbourhoods are connected by multi-modal trails and dedicated active transportation lanes, supporting alternative options to vehicle use.

The air in City of Revelstoke is cleaner because there are far fewer cars on the street and most are electric. Right-sized, user-friendly and responsive electrified transit provides low-cost opportunities for citizens and tourists to get around the community. Collaborations with tourism and recreational organizations have positioned Revelstoke as a low-carbon, sustainable destination.

There are community gardens and local food producers that provide access to healthy, local food. Waste is managed in a closed loop system, with organics being processed locally to produce useable compost, repair shops are supported by local retailers and producers, and industry has achieved near zero waste through enhanced management.

In addition to this community vision, workshop participants defined success for each major sector of community emissions:

The Future of Transportation	The Future of Buildings	The Future of Waste
Viable mobility alternatives have reduced # of vehicles. There are more EV charging stations available, and multi-model trails, lanes and roadways exist. Planning and development emphasizes people movement over vehicles. Right-sized, user friendly, electrified transit supports community mobility.	New buildings are constructed using locally sourced materials. They optimize renewable resources including rainwater, solar and district energy. Buildings in Revelstoke are net-zero, using only as much energy as is produced on-site. They are built and retrofitted to be exceptionally high performance.	Food will be produced locally, and waste organics composted to produce local Class A product. All waste streams will be manged locally, including by industry. Waste heat will be captured and used locally, expanding on community energy production. A closed-loop waste management system exists.

Where We're Starting From

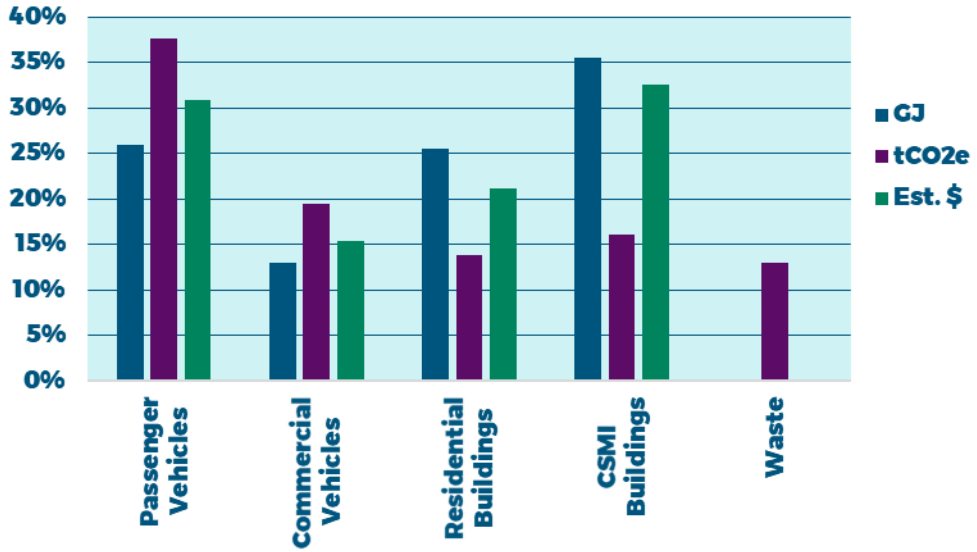
Understanding where we're starting from is just as important as knowing where we want to get to. After visioning, the next phase of the "backcasting" approach identifies our starting point – the current state. Participants identified the current state of buildings, transportation, and waste in the City of Revelstoke.

Revelstoke is a small rural community with a population of 8,100 people. The community is growing at a rate of 0.8% per year. The majority of residential buildings are single-family homes built before 1970, except for a small number of low-rise apartment buildings in the town centre. There is reported to be a lack of local resources and supplies for high performance construction and retrofits, though there are some home builders leading, constructing new homes with higher efficiency standards.

Most residents get around by personal cars and trucks, however Revelstoke has started making roadway improvements to facilitate safer and more convenient walking and cycling. Typical of many small and rural communities, passenger vehicles accounts for a significant component of the community's emissions.

Current Energy, Emissions and Costs by Sector

The current state of energy end emissions is shown in the graph below for each sector.



The City of Revelstoke operates one level 2 electric vehicle charging station and there is one DC fast charger in the community, owned and operated by BC Hydro. Tesla owns and operates a Supercharger bank, and Electrify Canada will be constructing a DC fast charging bank in 2021.

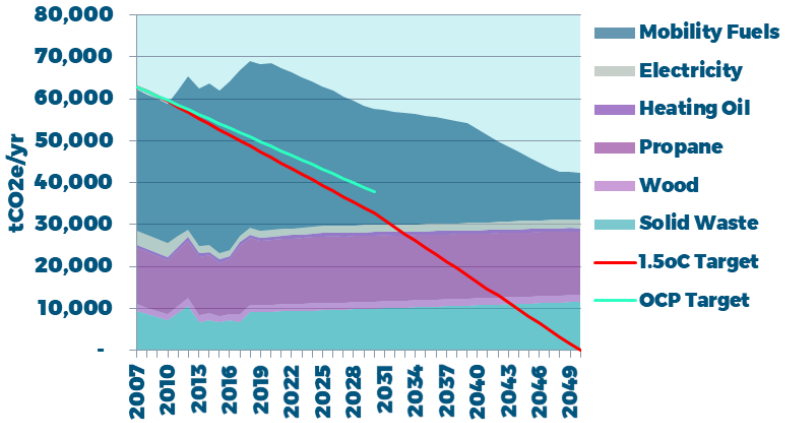
There is currently no organic waste collection service, however the Columbia-Shuswap Regional District is constructing a processing facility in Revelstoke, providing opportunity for future diversion activities.

While passenger vehicles are the highest contributor to greenhouse gas emissions, commercial buildings consume the most energy. Mobility fuels are the greatest cost of energy to local residents.

Working Towards our Future Vision and Target

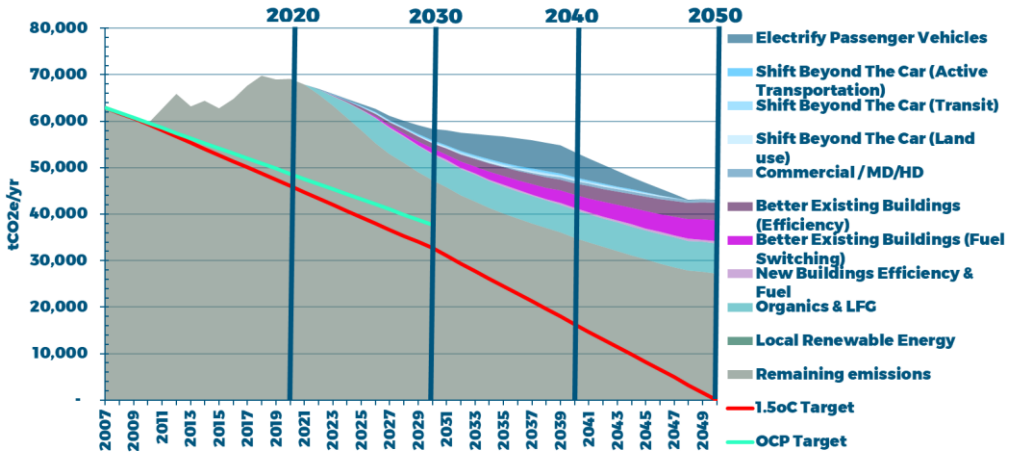
This CEEP carves a pathway towards our low carbon vision and emissions reduction target of 40% below 2007 levels by 2030. The two graphs below compare the business as usual scenario with the fully implemented plan scenario.

Business as Usual



The Business as Usual (BAU) scenario shows anticipated GHG emissions reductions due to policy commitments made by the Government of Canada and Province of BC. These policy commitments are particularly evident in the mobility fuel sector, due to the 100% zero-emission vehicle mandate in BC.

Plan Implementation



By implementing this CEEP, Revelstoke joins the Provincial and Federal governments in taking action on climate change and plays a significant role in meeting the GHG reduction target. Achieving the longer term goal of net-zero would require supplementing with carbon sequestration, or increasing renewable generation.

Plan Summary

The following table summarizes the actions selected by the Focus Group, with the implementation timeframe indicated as short, medium or long-term.

Big Move	Strategy	Timeframe		
		Short	Med	Long
Shift Beyond the Car 	**SHIFT 1: Optimize land use planning tools to enable compact community growth**			
	SHIFT 1.1 – Optimize policies and bylaws for compact communities and growth	■	■	■
	SHIFT 2: Enable walking, cycling and other forms of zero emission mobility			
	SHIFT 2.1 – Build safe routes for walking, cycling and other forms of zero emission mobility	■	■	■
	SHIFT 2.2 – Develop and deliver an active transportation outreach strategy			■
	SHIFT 2.3 – Promote micro e-mobility and on-demand mobility services		■	■
	SHIFT 3: Promote transit ridership and support a zero emissions transit network			
	SHIFT 3.1 – Collaborate with transit providers to promote transit ridership	■	■	■
	SHIFT 3.2 – Transition to a zero emissions transit network	■	■	■
	Total GHG emissions reductions for this Big Move	**597 $tCO2_e$ by 2030**		
Electrify Passenger Transport 	**ELECTRIFY 1: Enable charging on-the-go**			
	ELECTRIFY 1.1 – Design, fund and build a public EV charging network	■		
	ELECTRIFY 2: Enable charging at home and work			
	ELECTRIFY 2.1 – Adopt EV-ready building requirements	■		
	ELECTRIFY 3: Encourage EVs through outreach and supportive policies			
	ELECTRIFY 3.1 – Develop and deliver an EV outreach strategy and Revelstoke branding initiative	■		
	ELECTRIFY 3.2 – Provide incentives for EV adoption		■	■
	ELECTRIFY 3.3 – Lead by example - Electrify the corporate fleet and providing workplace charging		■	■
	Total GHG emissions reductions for this Big Move	**2,483 $tCO2_e$ by 2030**		
Decarbonize Commercial Transport 	**COMMERCIAL 1: Accelerate the adoption of ZEVs for commercial fleets**			
	COMMERCIAL 1.1 Develop a Community Vision and Strategy			■
	COMMERCIAL 1.2 Engage Commercial and Industrial Stakeholders			■
	COMMERCIAL 2: Lead by example by transitioning municipal fleet			
	COMMERCIAL 2.1 – Update corporate policies to prioritize low carbon options			■
	Total GHG emissions reductions for this Big Move	**0 $tCO2_e$ by 2030**		

Big Move	Strategy	Timeframe		
		Short	Med	Long
Step Up New Buildings 	**NEW BUILDINGS 1: Adopt the Energy Step Code with a low carbon approach**			
	NEW BUILDINGS 1.1 – Adopt the BC Energy Step Code	■	■	
	NEW BUILDINGS 1.2 – Prioritize a low-carbon approach		■	
	NEW BUILDINGS 2: Build Industry Capacity			
	NEW BUILDINGS 2.1 – Provide outreach and incentives – Building Permit fee rebate	■		
	NEW BUILDINGS 2.2 – Provide training and coordination	■	■	■
	Total GHG emissions reductions for this Big Move	**268 $tCO2_e$ by 2030**		
Retrofit Existing Buildings 	**EXISTING BUILDINGS 1: Improve Energy Efficiency and Enable Fuel Switching**			
	EXISTING BUILDINGS 1.1 – Encourage and enable deep energy retrofits.	■	■	■
	EXISTING BUILDINGS 1.2 – Encourage and enable building electrification		■	■
	EXISTING BUILDINGS 2: Build Industry Capacity and Increase Demand			
	EXISTING BUILDINGS 2.1 – Establish a long-term marketing campaign and support demonstration	■	■	
	EXISTING BUILDINGS 2.2 – Build industry capacity	■	■	
	Total GHG emissions reductions for this Big Move	**2,141 $tCO2_e$ by 2030**		
Close the Loop on Waste 	**WASTE 1: Divert Organics from Landfill**			
	WASTE 1.1 – Adopt policies that increase organics diversion.	■		
	WASTE 1.2 – Implement (or enhance) organics collection and processing.	■	■	
	WASTE 1.3 – Divert construction, demolition, agricultural, and industrial wood waste.	■	■	
	WASTE 1.4 – Develop and deliver a comprehensive zero-waste outreach program	■	■	
	WASTE 2: Capture Landfill Gas and Explore other Resource Recovery Technologies			
	WASTE 2.1 – Evaluate and implement landfill gas capture		■	■
	WASTE 2.2 – Evaluate and implement other resource recovery opportunities	■	■	■
	Total GHG emissions reductions for this Big Move	**5,591 $tCO2_e$ by 2030**		
	Total Plan Reductions	**11,081 $tCO2_e$ by 2030**		

Introduction

Municipal Commitment

The City of Revelstoke, like most communities across British Columbia, is responding to climate change. The City of Revelstoke signed on to the BC Climate Action Charter, which is a voluntary agreement between the Province of British Columbia, the Union of B.C. Municipalities, and individual local government signatories. Local governments commit to:

- Carbon neutrality in corporate operations;
- Measure and report their corporate greenhouse gas emissions; and
- Create complete, compact, and more energy-efficient communities.

Provincial legislation – the Local Government (Green Communities) Statutes Amendment Act (Bill 27, 2008) – also requires that each local government establish targets, plans, and strategies to do their part to mitigate climate change. Having an up-to-date plan such as this Community Energy and Emissions Plan (CEEP) helps with this, and also makes City of Revelstoke ready to apply for funding from the Federal or Provincial governments and other funders to implement strategies in the plan.

Implementing the plan will result in numerous social, economic and environmental benefits to the community, as outlined in Figure 1.

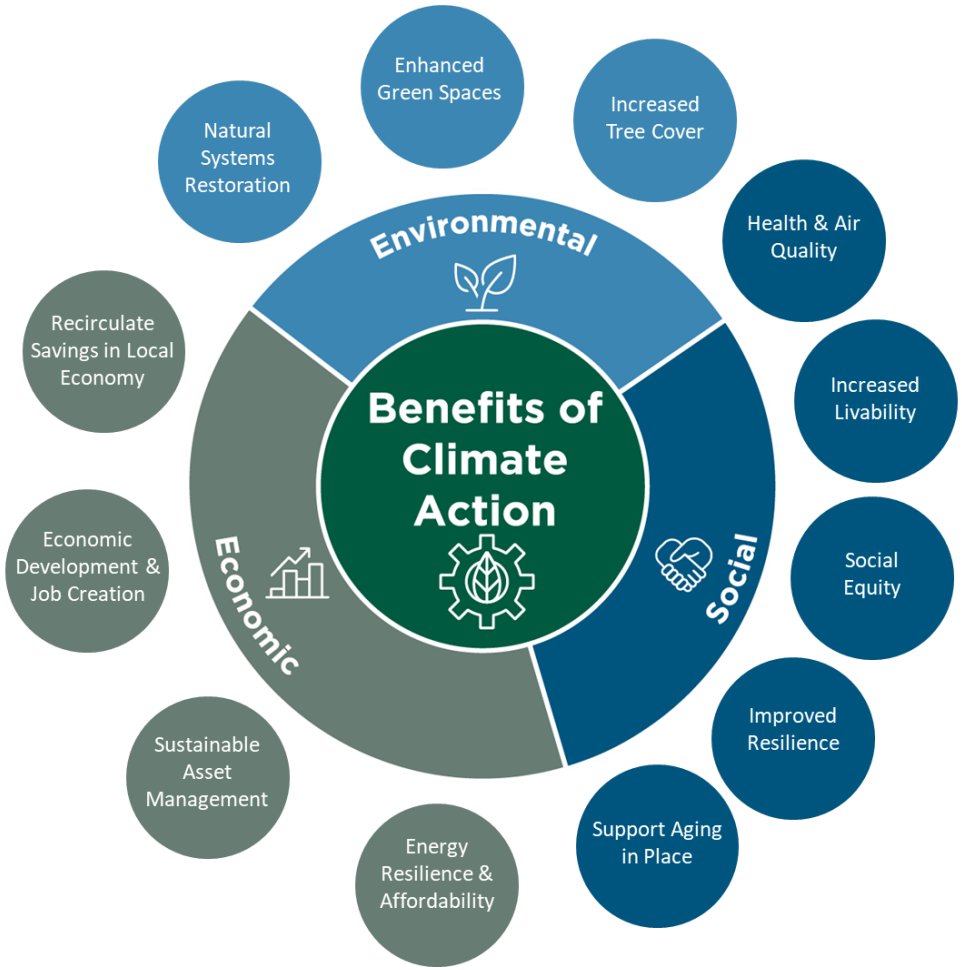


Figure 1 - Climate Action Co-Benefits

Local governments take climate action by:

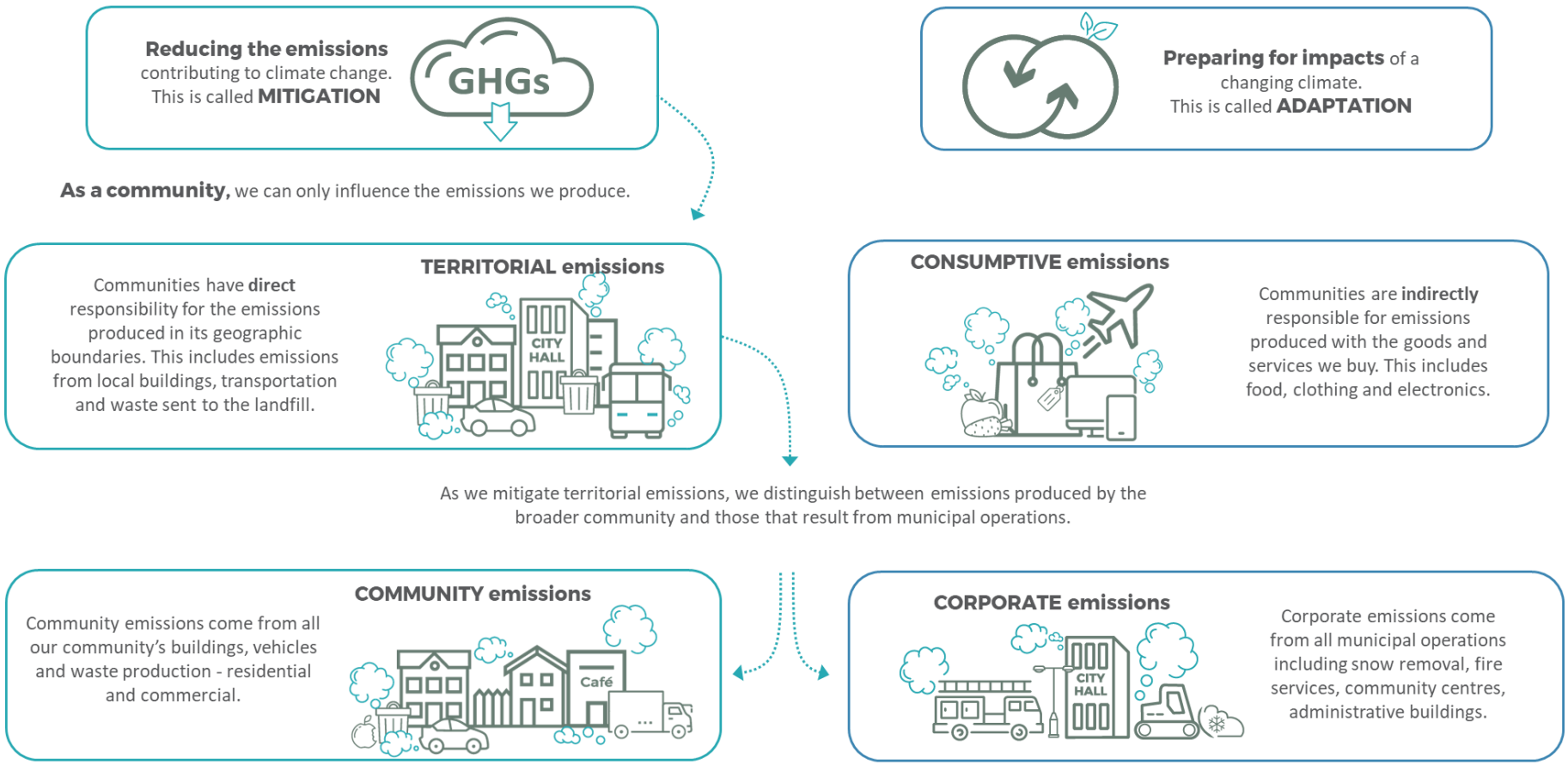


Figure 2 Local Government Climate Action - The scope of this plan includes the elements on the left: mitigation, territorial emissions, and community emissions

What is the Community Energy and Emissions Plan?

Climate action consists of both reducing emissions, or *mitigation*, and preparing for the impacts of a changing climate, *or adaptation*. This Community Energy and Emissions Plan (CEEP) is an important component of a local government's overall climate action strategy, which should also include a plan to address emissions from the local government's own operations and a climate adaptation plan.

The City of Revelstoke CEEP focuses on leveraging municipal powers to help residents and businesses save energy, emissions, and money. It is the residents and businesses in City of Revelstoke that have the biggest role: A significant reduction in community greenhouse gas (GHG) emissions depends on their individual choices about how to get around, where to live, and how to handle food waste and yard material. Successful implementation of this plan depends on ongoing, sustained engagement to help residents and businesses sort through what their choices are and how those choices impact the direction of the community. This CEEP is a component of a broader Official Community Plan process, which will integrate elements of this plan.

The Plan lays out actions across 7 Big Moves for transportation, buildings, waste, and organizational readiness.

Shift Beyond the Car	Electrify Passenger Transportation	Decarbonize Commercial Transportation	Step Up New Buildings	Decarbonize Existing Buildings	Close the Loop on Waste	Organizational Leadership
						

Actions fall into three categories of municipal powers:

Infrastructure	Policy & Regulation	Engagement & Outreach
 Investments into the City of Revelstoke owned infrastructure that enable residents to make lower-emissions choices, such as active transportation networks and public charging stations	 Changes to City of Revelstoke policy and regulation that lead to energy and emission reductions in the community, such as requirements and incentives for enhanced energy efficiency in new buildings.	 Outreach, education and incentives that inspire residents and businesses to make choices to reduce energy and emissions and prepare for a low carbon future.

Process

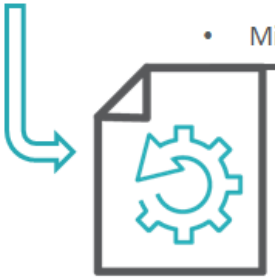
The following process guided the development of the CEEP. The minutes of each workshop with the Focus Group are included in Appendix G, along with the outputs of the online workshop sessions. Miro was used as a collaboration tool for the workshop, with breakout groups divided by sector.

Modelling & Analysis

- Review and analyze community energy use and emissions in relation to baseline year, including integration with population projections developed through the OCP process
- Model "business as usual" projections

Engagement

- On-line Miro-based workshops and follow-up surveys:
  - Workshop #1 – October 1, 2020 – Backcasting exercise and review of preliminary modeling outputs + inventory
  - Workshop #2 – October 19, 2020 – Dig into 'Big Moves, GHG targets and actions by sector
  - Workshop #3 – December 7, 2020 – Review of priory actions identified in Workshop 2 and evaluated through follow-up surveys. Confirmation of priority actions during workshop.
- Minutes of all workshops are provided in Appendix G



Recommend Actions and Draft Plan

- Draft potential actions and recommend targets based on engagement, modelling and analysis
- Model the possible impact of new proposed actions and targets on energy use and emissions

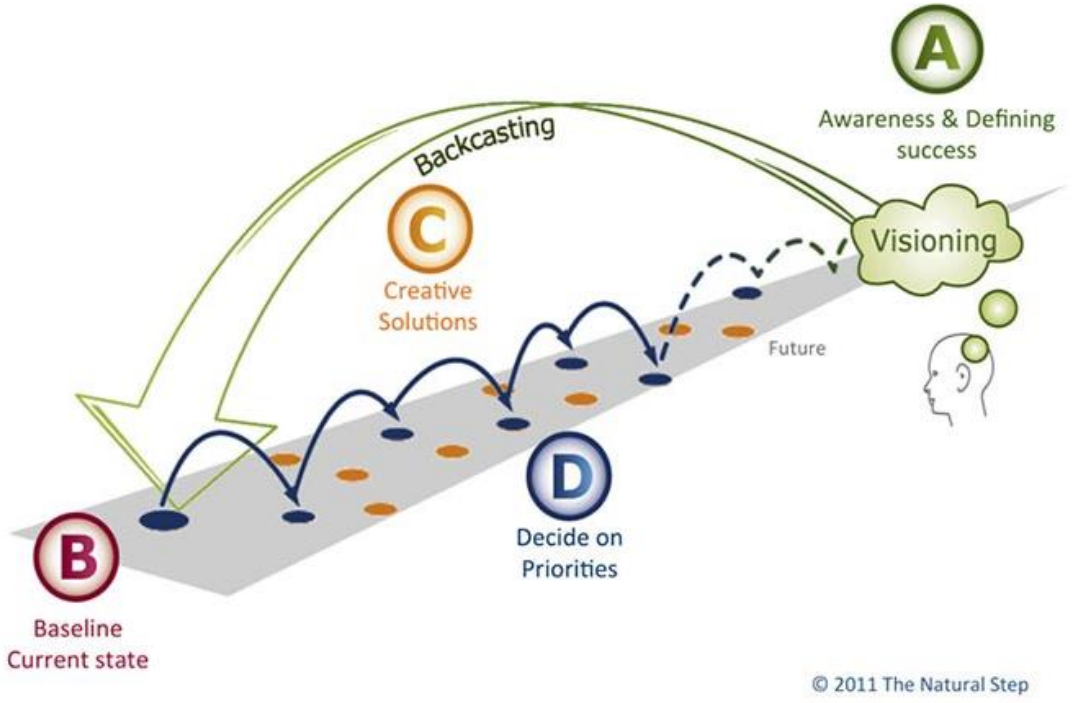
Deliver Final Plan

- Refine draft plan following feedback from staff
- Present final draft plan to Council
- Community engagement and final edits
- Final presentation to Council

Backcasting and Forecasting

There were two different approaches used in the development of the Revelstoke CEEP: Forecasting and Backcasting. Forecasting is a common approach used to create estimates of future emissions using current inventory data and projections. Backcasting, on the other hand, starts by imagining the desired future scenario that is not limited by current projections or past experience. Used in combination, these two approaches provide us with a clear positive vision of the future and a measurable plan to start us on the pathway to our destination.

Backcasting Approach: Envisioning our Future



Backcasting is a planning approach that starts by defining the future vision and

The concept of "backcasting" as used in this planning processes was developed by the Natural Step.

Over the course of three workshops, City of Revelstoke staff and stakeholders:

- Developed a vision of their desired low carbon future, focusing on three sectors: transportation, buildings, and waste.
- Identified the current state of the sectors
- Brainstormed additional solutions to compliment the Big Moves
- Prioritized the solutions and identified supporting organizations or external partnership opportunities

Forecasting Approach: Inventory and Modelling

Local governments have varying degrees of influence over different sources of emissions within their boundaries. GHG emissions come from both 'local' sources (emissions that are created here) and 'global' sources from local consumption (emissions that include everything from the extraction of raw materials through to processing and transport as well as emissions that may be counted elsewhere but are still ultimately our emissions).

Revelstoke's GHG reduction target references only local (territorial) emissions. The major categories of emissions included in this inventory are: buildings (commercial and residential), transportation (passenger and commercial), and waste.

The last complete inventory year dataset available was from 2018, and was used to describe Revelstoke's current energy consumption and emissions. See Appendix E: Inventory and Modelling Methodology for a full description.

In 2018, for the whole community of Revelstoke:

- Total energy consumption is estimated at 1,498,985 GJ
- Total GHG emissions are estimated at 69,782 tonnes of CO2e
- Total energy expenditures are estimated at $44,795,130

As Figure 3 shows, passenger vehicles produced the highest emission split at 38%, at a considerable cost split of 31%. Commercial-Small Medium and Industrial (CSMI) buildings had the highest cost split at 33%, and energy consumption at 36%. Figure 4 shows a breakdown of emissions by fuel, with Mobility Fuels at 39,864 tCO_2e (58%), followed by propane at 16,131 tCO_2e (23%).

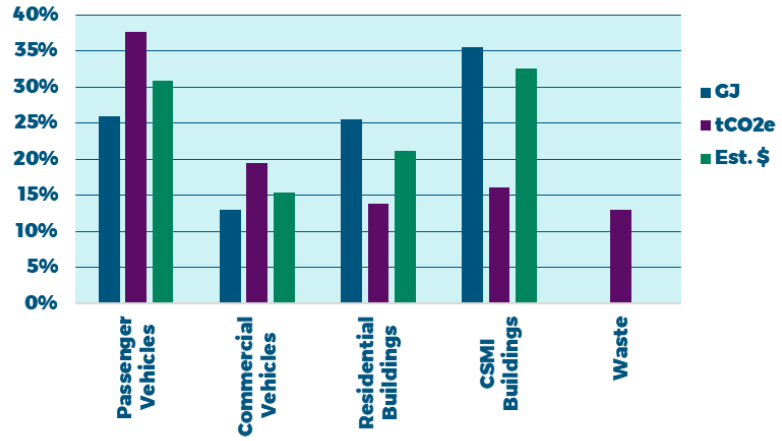


Figure 3 Community Energy, Emissions, and Cost Split in 2018

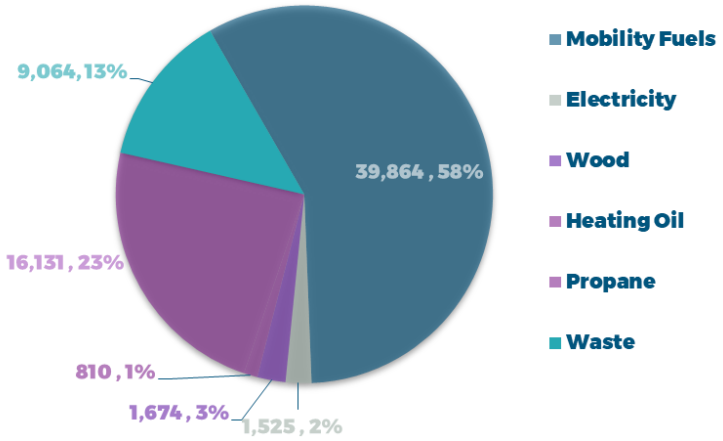


Figure 4 Community Emissions by Fuel in 2018

What does 'Business As Usual' mean?

Business As Usual, or BAU, is a way of describing what is estimated to happen to Revelstoke's emissions if the City takes no further action to decrease emissions beyond what they are already doing and plan to do. A number of factors are taken into account to develop BAU emissions scenarios, population growth being one of the most important considerations. As the number of people increase in a community, more buildings are needed/used and more vehicles are driven on roads.

Other considerations that were taken into account to develop City of Revelstoke's BAU emissions scenario for this report include the following:

- Changing climate patterns — as warmer winters and hotter summers occur, they are and will continue to change the way that energy is consumed in buildings
- Likely future impacts of policies already adopted by other orders of government, such as:
    - Renewable and low carbon fuel standards
    - Vehicle tailpipe emissions standards
    - Zero-Emission Vehicle (ZEV) mandate as part of the CleanBC Plan, requiring 10% of new vehicle purchases by 2025 as ZEVs, 30% by 2030, and 100% by 2040
    - The greening of the BC Building Code by 2032 (progressive steps towards net zero energy).

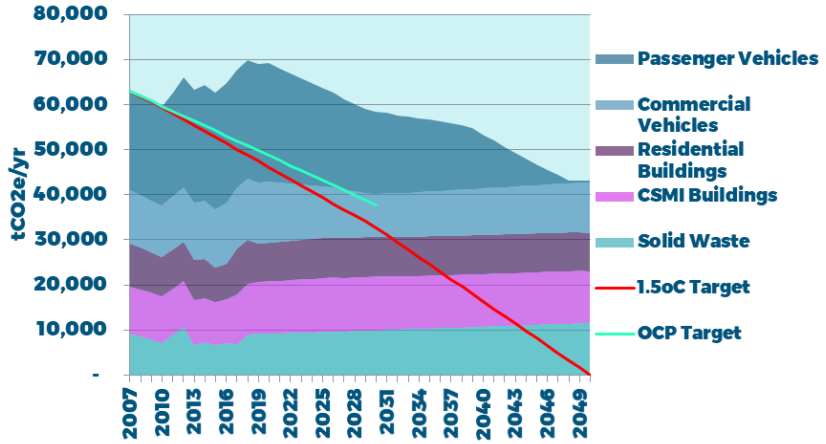


Figure 5 *BAU Emissions Projections Breakdown by Sector*

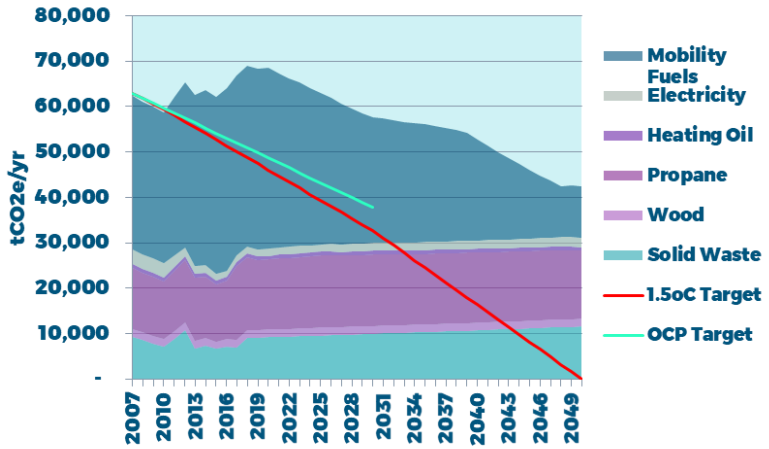


Figure 6 *BAU Emissions Projections Breakdown by Fuel*

Forecasted Emissions Reductions

Based on the discussions during the workshops, and surveys completed by the Focus Group, GHG emissions in 2030 are expected to be reduced by 15,648 tonnes of CO_2/year, or 25% below 2007 levels, achieving nearly two-thirds of the community's 2030 target of 40%. Versus the 2030 BAU scenario, these reductions amount to 11,081 tCO_2e/yr.

Figure 7 provides a breakdown of 2030 reductions vs. BAU by Big Move. Organics & LFG have the highest reductions at 5,591 tonnes of CO_2e/yr, followed by Electrify Passenger Vehicles at a total reduction of 2,483 tCO_2e/yr, then Better Existing Buildings sub-actions Efficiency and Fuel Switching at 1,168 and 973 tCO_2e/yr, respectively.

Annual reductions by Big Move category up to 2050 are shown in Figure 8. In 2050, GHG emissions are reduced by over 35,700 tCO_2e vs. 2007, or 57%. Of note, reductions from Electrify Passenger Vehicles reduce starting in 2039, as the share of EVs under the project scenario is nearly capped at 100%, while the BAU scenario EV share begins to catch up starting in 2040. Better Existing Buildings become the dominant reduction Big Moves towards 2050.

Note that although the 2050 emission reduction target is not met, this forecast does not account for potential electrification of commercial vehicles on a broad level, nor for possible action at the regional level on organics diversion or landfill gas capture.

For a description of the methodology, see Appendix E: Inventory and Modelling Methodology.

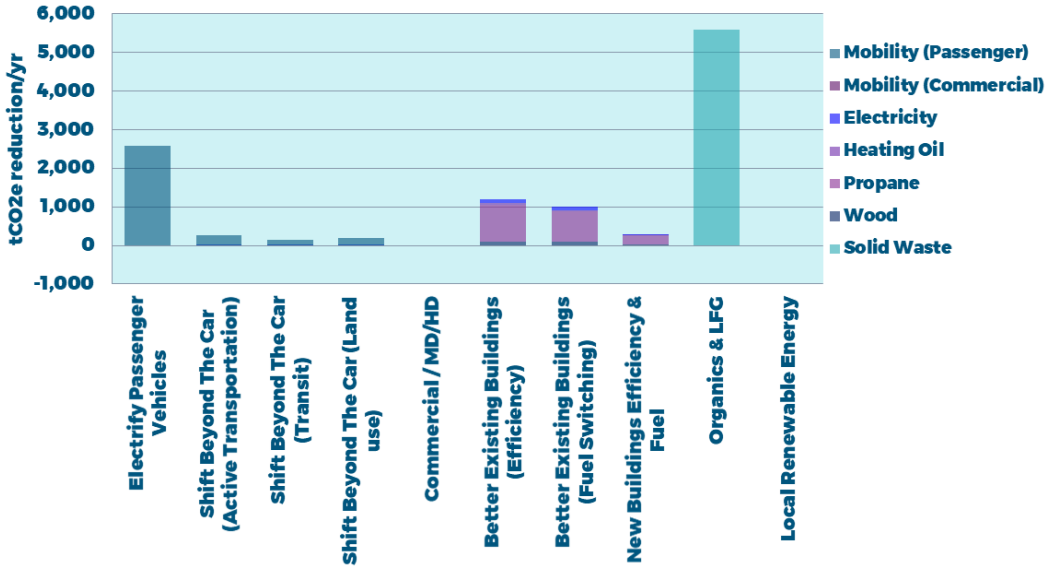


Figure 7 Emission Reductions in 2030 by Big Move

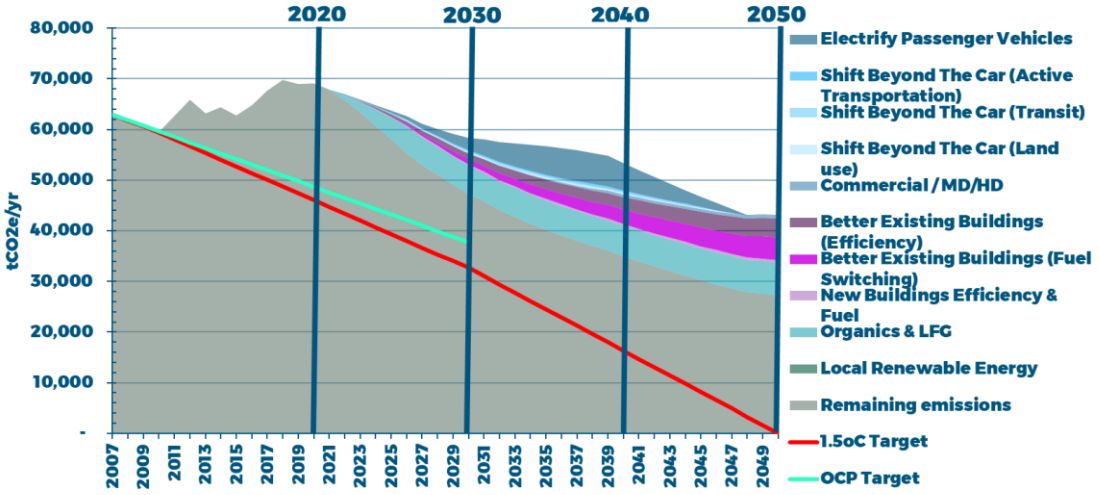
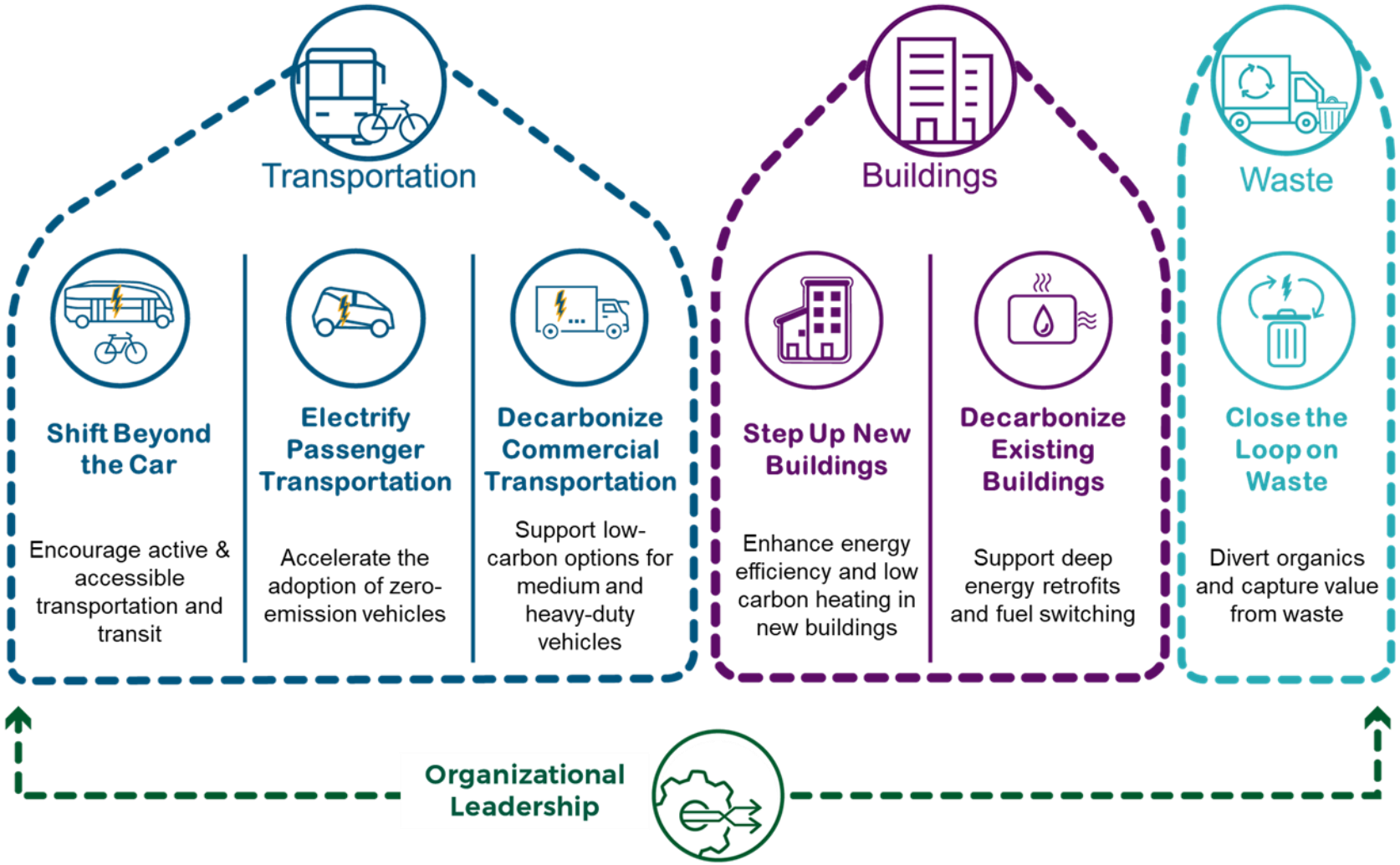


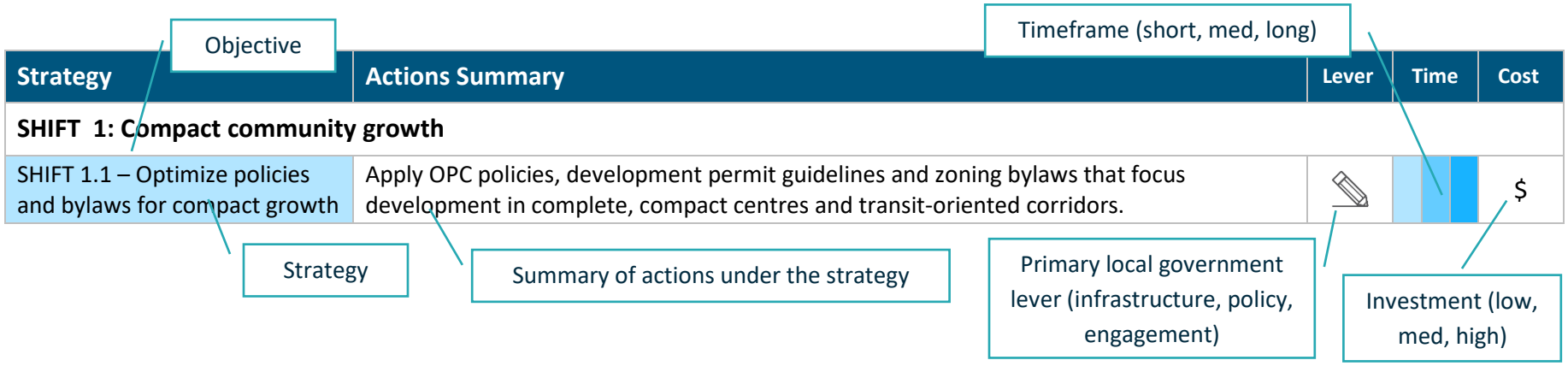
Figure 8 Emission Reductions by Big Move to 2050

Action Plan


Transportation
Buildings
Waste
Shift Beyond the Car
Encourage active & accessible transportation and transit
Electrify Passenger Transportation
Accelerate the adoption of zero-emission vehicles
Decarbonize Commercial Transportation
Support low-carbon options for medium and heavy-duty vehicles
Step Up New Buildings
Enhance energy efficiency and low carbon heating in new buildings
Decarbonize Existing Buildings
Support deep energy retrofits and fuel switching
Close the Loop on Waste
Divert organics and capture value from waste
Organizational Leadership

Action Plan Guide

The following pages outline each of the six Big Moves – and their associated objectives, strategies and actions – organized by sector (transportation, buildings, and waste). Below is an example of a strategy from Shift Beyond the Car, showing the types of information displayed.



Legend

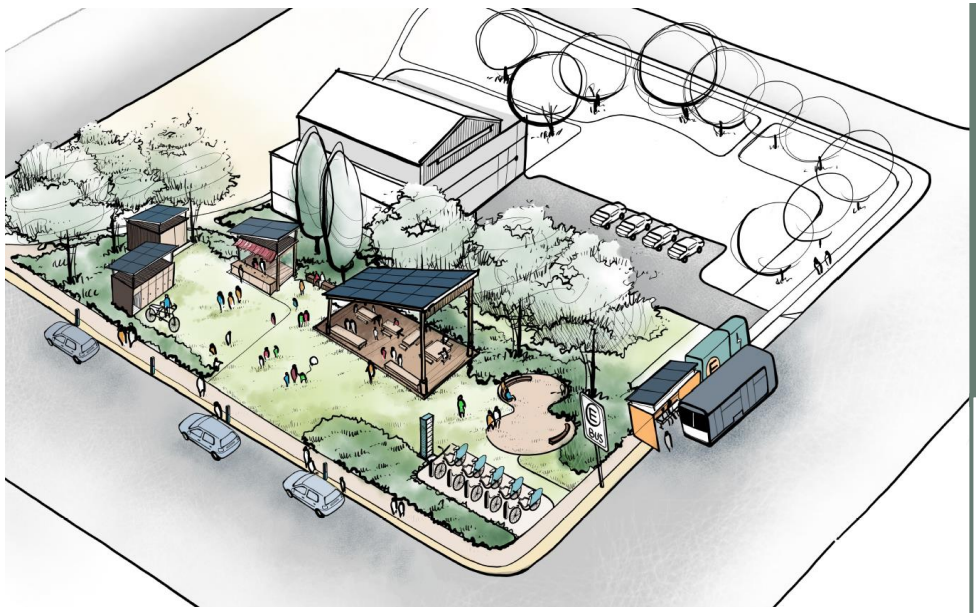
Lever			Timeframe					Cost	Definition	
Infrastructure			Short (1-2 years)					Low	<$25,000	$
Policy & Regulation			Medium (3-5 years)					Med	$25,000 - $100,000	$$
Engagement & Outreach			Long (5+ years)					High	>$100,000	$$$

Notes:

Lever: Many strategies utilize more than one local government lever. The following tables show only the primarly lever, however Appendix 1: Implementation Plan Details, indicate all levers involved.

Timeframe: Many strategies span more than one timeframe, with some actions starting in the short term and full deployment of the strategy occuring in the longer term.

The Way We Move



Vision:

Viable mobility alternatives have reduced # of vehicles. There are more EV charging stations available, and multi-model trails, lanes and roadways exist. Planning and development emphasizes people movement over vehicles. Right-sized, user friendly, electrified transit supports community mobility.

Current State:

Vehicles are responsible for 58% of the greenhouse gas emissions generated from residents and businesses in Revelstoke. Transportation fuels such as gasoline and diesel are the largest expenditure on energy in the community at almost $21 million per year.

Big Moves for Transportation

Shift Beyond the Car	Electrify Passenger Transportation	Decarbonize Commercial Transportation
Encourage active and accessible transportation and transit.	Accelerate the adoption of zero-emission vehicles.	Support low carbon options for medium and heavy-duty vehicles.

Shift Beyond the Car

Encourage active and accessible transportation and transit.

Overview

Walking and cycling are not just weekend recreational activities – they are viable, beneficial, economical and environmentally-friendly modes of transportation. City of Revelstoke can expand off of progress to date and continue to build well-connected, accessible, safe and enjoyable routes. This will encourage residents and visitors to choose an active mode of travel such as walking and cycling. Good sidewalks, bike lanes, and trails make active transportation a viable choice when traveling through neighbourhoods, communities, and town centers. The same infrastructure also affords access for those who use mobility aids, such as scooters and wheelchairs.

Planning for a zero-carbon transportation system requires a paradigm shift. Rather than solve traffic and infrastructure problems by expanding roads or building more of them, communities can support all transportation options and facilitate alternative travel choices that reduce the need for more, or bigger roads. Not only does this reduce transportation-related emissions, but this shift can also result in reduced infrastructure and maintenance costs down the road.

Looking Forward to 2030 – Aspirations for BC Communities

The following aspirational targets can inform future policy development, and are not specific to Revelstoke and the actions identified by the Focus Group.

- Half of all trips taken in our community are with active/assisted transportation or transit.
- Streets have been reimagined to prioritize active, public and low carbon transportation options.
- New neighbourhoods are designed to maximize car-free options and are fully connected via bike paths and transit options.
- Appropriate facilities for bike storage and e-bike charging are located in strategic hubs to support emission-free commuting.

Objectives

1. Optimize land use planning tools to enable compact community growth
2. Enable walking, cycling and other forms of zero emission mobility
3. Promote transit ridership and support a zero emissions transit network

Provincial Action

As part of the Province of British Columbia's commitment through **CleanBC** to embrace clean and renewable energy across the board, the government developed **Move Commute Connect – B.C.'s Active Transportation Strategy.** The strategy established a new target for active and assisted transportation:

By 2030, double the percentage of trips taken with active transportation

Federal Action

The Government of Canada's **Pan Canadian Framework on Clean Growth and Climate Change** commits to supporting a shift from higher- to lower-emitting modes of transportation as well was investing in infrastructure.

Strategies for Shifting Beyond the Car

Strategy	Actions Summary	Lever	Time	Cost
SHIFT 1: Optimize land-use planning for compact community growth				
SHIFT 1.1 – Optimize policies and bylaws	Apply OCP policies, development permit guidelines and zoning bylaws that focus development in complete, compact centres and transit-oriented corridors. Consider new development applications, and how an active transportation plan is reflected in those to ensure connectivity and alternative transportation modes considered. Revelstoke's OCP is currently under review, providing opportunity for integration.			$
SHIFT 2: Increase walking, cycling and other forms of zero emission mobility				
SHIFT 2.1 – Build safe routes for walking, cycling and other forms of zero emission mobility	Continuously improve active transportation infrastructure including reconfiguring existing streets and building safe and convenient active transportation paths to connect all neighbourhoods. Leverage the extensive expertise and knowledge in the community to design trail connectivity, addressing tourism and recreation opportunities as well. Consider ways to use car parking for bike parking to encourage active transportation.			$$$
SHIFT 2.2 – Deliver an active transportation outreach strategy	Connect with community members to learn about their active transportation needs. Dedicate staff time for promotion and education around active transportation.			$
SHIFT 2.3 – Promote micro e-mobility and on-demand mobility services	Understand when and where on-demand services are most useful and remove policy barriers and update bylaws. Host awareness events for e-bikes (and other forms of micro mobility) and work with vendors. Work with car sharing and ride hailing providers to expand programs and transition to electric fleets.			$
SHIFT 3: Increase transit ridership and a support a transition to a zero emissions transit network				
SHIFT 3.1 – Collaborate with transit providers to promote transit ridership	Work with BC Transit to access insights and data from recent surveying and community consultation in Revelstoke. Promote transit ridership by offering free transit days and celebrating new routes. Ultimately, explore universal free transit with transit providers.			$$
SHIFT 3.2 – Transition to a zero emissions transit network	Work with BC Transit and neighbouring communities to ensure that transit progressively transitions to zero emissions vehicles (e.g. electric).			$
Total GHG emissions reductions for this Big Move: 597 $tCO2_e$ by 2030				

Electrify Passenger Transportation

Accelerate the adoption of zero-emission vehicles.

Overview

Zero-emission vehicles (ZEVs) are clean, efficient, and cost-effective. In British Columbia, where at least 94% of all electricity is renewable and non-emitting, electric vehicles (EVs) are already a viable near zero-emission option.

Local governments can make zero-emission vehicles an easier choice for residents and businesses by investing in infrastructure, enacting supportive policies, and by engaging with companies and organizations that operate large fleets, such as car-sharing and ride-hailing providers. Local governments also deliver community outreach and education on zero-emission transportation choices.

If every British Columbia local government implemented this Big Move, by 2030 they would collectively reduce the province's total greenhouse gas emission inventory by 1.5 to 2 million tonnes. This is the equivalent of removing half a million internal combustion vehicles from our roads. At the individual community level, this move could yield 2 to 9% emissions reductions by 2030.

Looking Forward to 2030 - Aspirations for BC Communities

- Half of the kilometers driven in our community are by zero emission vehicles.
- New buildings are required to provide an electrified, dedicated service for EV charging.
- A robust and strategically designed charging network ensures infrastructure is available at workplaces and public parking spaces.
- City of Revelstoke continues to demonstrate leadership by prioritizing electric for their fleet replacement policy and all service contracts require low emission vehicles as part of municipal contracts.

Objectives

1. Enable charging on-the-go
2. Enable charging at home and work
3. Encourage EVs through outreach and supportive policies

Provincial Action

In May 2019 the Province enacted the **Zero Emissions Vehicle Act** to follow through on the transportation commitments in its **CleanBC** climate plan. The legislation requires manufacturers to ensure that a steadily increasing proportion of all new light-duty cars and trucks sold or leased in British Columbia will be zero-emission vehicles, leading up to 100% by 2040.

The Province established its **Clean Energy Vehicle Program** to support the transition. The program provides incentives to reduce the price of new zero-emissions vehicles and charging stations, and works to raise awareness of the benefits of such vehicles. businesses.

Federal Action

The Government of Canada also provides purchase and lease **incentives** for new zero-emission vehicles, and offers tax deductions for businesses.

Strategies for Electrifying Passenger Transportation

The following strategies were identified by the Focus Group as strategic to supporting electrification of passenger transportation.

Strategy	Actions Summary	Lever	Time	Cost
ELECTRIFY 1: Enable charging on-the-go				
ELECTRIFY 1.1 – Design, fund and build a public EV charging network	Leverage grant opportunities to install an annually increasing number of EV charging stations at key locations throughout the community. Collaborate with other local governments on a regional charging network strategy. Collaborate locally with the carshare to support electrification of shared vehicles in the community (including dedicated charging infrastructure, parking, etc.).			$$$
ELECTRIFY 2: Enable charging at home and work				
ELECTRIFY 2.1 – Adopt EV-ready building requirements	Incentivize or require all new homes to be EV-ready including single-family homes, townhouses and apartments. Engage with builders in Revelstoke already voluntarily doing this to gain insights and peer learning within local industry.			$
ELECTRIFY 3: Encourage EVs through outreach and supportive policies				
ELECTRIFY 3.1 – Develop and deliver an EV outreach strategy	Educate builders and developers on EV charging requirements though open houses and workshops. Partner with other organizations to host engagement events such as test-drives and ride-alongs. Consider how to integrate accommodators to encourage promoting a sustainable 'brand' for Revelstoke. Integrate trailhead electric vehicle charging to accommodate longer dwell time at those locations for EVs.			$
ELECTRIFY 3.2 – Provide incentives for EV adoption	Adjust speed limits to enable low-speed EVs on select streets. Provide perks to EV drivers such as priority parking. Incent ride hailing, taxi operators and other fleet operators to switch to EVs.			$
ELECTRIFY 3.3 – Lead by example - Electrify the corporate fleet and providing workplace charging	Adapt corporate vehicle purchasing policy to incorporate EV purchases at end of life as technology permits. Where technology is unavailable, consider purchasing used vehicles in the interim until technology is available. Install Level 2 chargers for workplace staff to encourage more staff to use EVs.			$$$
Total GHG emissions reductions for this Big Move: 2,483 $tCO2_e$ by 2030				

Decarbonize Commercial Transportation

Accelerate the transition to zero emission medium and heavy-duty vehicles

Overview

Limited actions available for the community, but this is an area of growing interest and activity. Note that all actions are identified for the longer-term and should be revisited as technology advances in the medium/heavy duty vehicle sector.

Looking Forward to 2030 - Aspirations for BC Communities

- Commercial fleets have leveraged their investment in charging infrastructure to establish high-powered charging hubs.
- Transit buses and school buses are electric, providing clean, emission-free travel options for the young and old.

Objective

1. Accelerate the adoption of zero-emission vehicles for commercial fleets

Provincial Action

10% of heavy-duty vehicles electric by 2030

94% of buses electric by 2030

16% of heavy-duty vehicles run on LNG

Provincial low carbon fuel standard

Federal Action

Tailpipe reduction standards – 40% reduction in tailpipe emission intensity by 2025 from 2015 levels

Strategies for Decarbonizing Commercial Transportation

Strategy	Actions Summary	Lever	Time	Cost
COMMERCIAL 1: Accelerate the adoption of ZEVs for commercial fleets				
COMMERCIAL 1.1 – Develop a Community Vision and Strategy	Carry out a needs assessment through to 2040 and design a commercial/institutional charging network strategy.			$
COMMERCIAL 1.2 – Engage Commercial and Industrial fleet	Support a pilot fleet electrification program with a commercial/institutional partner.			$$
COMMERCIAL 2: Lead by example by transitioning municipal fleet				
COMMERCIAL 2.1 – Update corporate policies to prioritize low carbon options	Review and integrate contractual requirements for municipal services to require lower emissions vehicles, increasing over time; Update purchasing policy to buy used vehicles if no low-carbon options are available or cost effective.			$$$
Total GHG emissions reductions for this Big Move: 0 $tCO2_e$ by 2030				

Where We Live and Work

Vision:

New buildings are constructed using locally sourced materials. They optimize renewable resources including rainwater, solar and district energy. Buildings in Revelstoke are net-zero, using only as much energy as is produced on-site. They are built and retrofitted to be exceptionally high performance.

Current State:

Our homes and commercial buildings are responsible for 30% of the greenhouse gas emissions generated in City of Revelstoke. The vast majority of emissions are from propane used for space and water heating.

Big Moves for Buildings

Step Up New Buildings	Decarbonize Existing Buildings
Enhance energy efficiency and low carbon heating in new buildings	Support deep energy retrofits and fuel switching

Step Up New Buildings

Enhance energy efficiency and low carbon heating in new buildings

Overview

While existing buildings generate the majority of building-related greenhouse gas emissions, local governments have greater authority to influence new construction. They can do so via the BC Energy Step Code, a section of the BC Building Code that local governments may use to require or incentivize better-than-code energy performance in new construction. While the Step Code is a great tool for improving overall building energy performance, it does not explicitly address emissions from new buildings. Local governments can address influence emissions by implementing the regulation in tandem with incentives that target zero-emission heating and cooling systems.

City of Revelstoke is growing at a rate of 0.8%. (Or, there are about 50 new buildings constructed every year in City of Revelstoke.) Every new building built to minimum code standards is a lost opportunity for improved energy efficiency and reduced carbon emissions and is one more building that will have to be retrofitted down the road.

Looking Forward to 2030 - Aspirations for BC Communities

- All our community's new buildings are built to meet the requirements of the top step of the BC Energy Step Code, and use only zero carbon energy sources for space and water heating.
- The building industry is now focused on whole building performance, as opposed to prescriptive code requirements.
- Energy performance is quantified and verified, so homeowners and buyers now have a better understanding on the long-term operations cost of the home.
- Homes are quiet, comfortable and durable. Energy costs are minimized through efficient design that reduces demand.

Objectives

1. Adopt the Energy Step Code with a low carbon approach
2. Build industry capacity

Provincial Action

The province's CleanBC climate plan outlines the dates when the base *BC Building Code* will adopt BC Energy Step Code performance targets:

- In 2022, all new buildings will be 20% more energy efficient than those built to meet today's minimum code requirements.
- By 2027, all new buildings will be 40% more energy efficient
- By 2032, all new buildings will be "net zero energy ready".

CleanBC **Better Homes** links homeowners and residential builders to rebates and resources, and CleanBC **Better Buildings** provides funding and capital incentives to encourage energy efficient design, construction and renovation in larger buildings.

Federal Action

Natural Resources Canada's **Build Smart: Canada's Buildings Strategy** establishes the goal that all provinces and territories will adopt a net-zero energy-ready model building code by 2030.

Strategies for Stepping Up New Buildings

Strategy	Actions Summary	Lever	Time	Cost
NEW BUILDINGS 1: Adopt the Energy Step Code with a Low Carbon Approach				
NEW BUILDINGS 1.1 – Adopt the Energy Step Code	Begin by adopting one of the lower levels of the Energy Step Code with a plan to move up through the levels. Adopt policies and programs to incentivize adoption of higher steps, e.g. density bonus. Revelstoke staff are currently working on this as an early implementation action.			$
NEW BUILDINGS 1.2 – Prioritize a low-carbon approach	Opt-in to Provincial carbon metrics for new buildings if/when they become available or adopt a tiered approach (eg. Step 3 or Step 2 with a low carbon energy system).			$
NEW BUILDINGS 2: Build Industry Capacity				
NEW BUILDINGS 2.1 – Provide outreach and incentives	Promote existing Clean BC new construction incentives and provide additional incentives to subsidize costs of working with an Energy Advisor and/or mid-construction testing. Preliminary engagement with the building industry has been initiated, and can be expanded upon, leveraging resources such as the Building A Legacy Toolkit (https://www.communityenergy.ca/bal/). Consider ways to encourage smaller or more compact building footprint.			$
NEW BUILDINGS 2.2 – Provide training and coordination	Collaborate across the region to provide relevant training to the building industry and realtors, recognizing that no Revelstoke-specific building industry group exists. Ensure training and engagement precedes Step Code adoption, and continues as the Province advances performance standards. Assemble a list of local or regional Energy Advisors and identify partner opportunities to train more energy advisors, or coordinate needs on a regional scale.			$
Total GHG emissions reductions for this Big Move: 268 $tCO2_e$ by 2030				

Decarbonize Existing Buildings

Support deep energy retrofits and fuel switching

Overview

In 2030, 90% of the all buildings in City of Revelstoke will be ones that are already standing today. Many buildings use more energy than is necessary. Owners of 20-year-old propane-heated homes can lower their energy bills by as much as 30% through energy efficiency retrofits and reduce about 0.7 tonnes of greenhouse gas emissions per year. Homeowners can pursue various degrees of building energy retrofits—from replacing individual pieces of equipment to comprehensive overhauls of the whole building, known as deep energy retrofits.

Deep energy retrofits involve changes to the entire building, including insulation, windows and doors, and air barrier, as well as ventilation and space and water heating equipment. To ensure emissions reductions as well as energy reductions, the energy retrofit must include fuel switching, from fossil fuel sources to zero-carbon sources such as electricity. Such projects usually rely on the expertise of an energy advisor, who conducts energy modelling and airtightness testing.

City of Revelstoke has limited jurisdiction over requirements for existing building retrofits but has an opportunity to influence and enable building owners to make investments in the energy efficiency of their buildings.

Objectives

1. Improve energy efficiency
2. Encourage and enable fuel switching
3. Build industry capacity and increase demand

Provincial Action

CleanBC **Better Homes** links homeowners and renovators to rebates and resources, and CleanBC **Better Buildings** provides funding and capital incentives to encourage energy efficient renovation in larger buildings. The Province is currently working on an Existing Buildings Renewal Strategy, which will enable increased energy efficiency retrofits in the existing building stock.

Federal Action

The Government of Canada's **Home Energy Retrofit Initiative** provides grants for energy efficiency upgrades and free EnerGuide assessments. The program also supports training Energy Advisors across Canada to meet increasing demand.

Looking Forward to 2030 – Aspirations for BC Communities

- All replacement heating and hot water systems are zero emissions, powered by electricity.

Strategies for Decarbonizing Existing Buildings

Strategy	Actions Summary	Lever	Time	Cost
EXISTING BUILDINGS 1: Improve Energy Efficiency				
EXISTING BUILDINGS 1.1 – Encourage and enable deep energy retrofits.	Educate building owners about how to make their home or business more energy efficient and the benefits of doing so, including resources such as *Better Homes* and *Better Buildings BC*. Help building owners to understand the rebates and incentives available, as well as the energy cost savings associated with retrofits. Explore financing options to assist homeowners with implementation of energy retrofits, including promotion of future Federal programs (i.e. home retrofit loan program). Increase the use of energy labelling and benchmarking.			$
EXISTING BUILDINGS 1.2 – Engage utilities and other orders of government to support local retrofit programs	Work with BC Hydro and FortisBC to target retrofit incentives and funding for Revelstoke residents, and promote Federal level incentive and financing programs as they are introduced.			$
EXISTING BUILDINGS 2: Encourage and Enable Fuel Switching				
EXISTING BUILDINGS 2.1 – Encourage and enable building electrification	Identify and remove barriers to heat pump installation, including streamlining permitting processes, optimizing noise regulations, and restructuring permit fees. Explore opportunities to top-up Provincial air source heat pump incentives through Better Homes BC. Identify early leaders in Revelstoke in heat pump design and install.			$
EXISTING BUILDINGS 2.2 – Lead by example through corporate policies that prioritize low carbon retrofits	City of Revelstoke does have some energy efficiency studies already complete. Funding to complete upgrades could be identified. Integrate carbon and energy efficiency into decision-making matrix.			$$
EXISTING BUILDINGS 3: Build Industry Capacity and Increase Market Demand				
EXISTING BUILDINGS 3.1 – Establish a long-term marketing campaign	Establish a 10-year program for a community-wide marketing campaign to encourage building envelope improvements, electrification or other low carbon fuel sources. Support and engage with builders leading on this space as a means of encouraging peer learning.			$
EXISTING BUILDINGS 3.2 – Build industry capacity	Educate renovators and realtors on energy efficiency and low carbon choices for space and water heating, provide incentives for energy advisors to increase knowledge around opportunity. Explore opportunities to collaborate on a demonstration home for industry.			$
Total GHG emissions reductions for this Big Move: 2,141 $tCO2_e$ by 2030				

How We Manage 'Waste'

Vision:

Food will be produced locally, and waste organics composted to produce local Class A product. All waste streams will be manged locally, including by industry. Waste heat will be captured and used locally, expanding on community energy production. A closed-loop waste management system exists.

Current State:

Organic waste ending up in our landfill accounts for 13% of our communities GHG emissions. Currently, City of Revelstoke does not have an organics collection program or processing facility, however the Columbia-Shuswap Regional District is constructing a composting facility.

Big Move for Waste

Close the Loop on Waste

Divert organics and capture value from waste

Close the Loop on Waste

Divert organics and capture value from waste

Overview

Emissions from waste occur when organic waste mixed in with garbage decomposes in the landfill and produces methane, a potent greenhouse gas that is released into the atmosphere. Organic waste makes up about 35-40% of landfill waste, and includes food waste from homes and businesses, yard and garden waste, wood waste, and paper that cannot be recycled, such as food-soiled paper. Organic material decomposes over approximately 10 years in the local landfill. Organic diversion reduces or eliminates the new waste added every year but the waste that is already in place at the landfill continues its decomposition process. Because of this, it takes a number of years for the emissions reductions from organics diversion to scale up. Of course, how much waste is diverted (the diversion rate) is key to emissions savings.

Diverting organic waste from the landfill and processing it locally can present new opportunities to create valuable end product (compost) which can be used for municipal purposes or packaged and sold in the community. There are other technologies that can capture value from the waste stream, such as landfill gas capture, biogas digesters, gasification plants, and waste heat recovery systems. Part of this Big Move is investigating opportunities for these technologies locally or regionally.

Objectives

1. Divert organics from the landfill
2. Capture landfill gas and/or explore other resource recovery technologies

Provincial Action

The Province of British Columbia has committed to ensuring that, by 2030, 95% of organic waste will be diverted from landfills, and 75% of landfill gas will captured. The province has also committed to fund workforce training.

Federal Action

The Government of Canada, through its Investing in Canada Infrastructure Program (ICIP) provides funding for infrastructure that enables resource recovery, such as generating renewable fuel from waste.

Looking Forward to 2030 – Aspirations for BC Communities

- All of our community's residential food and yard waste will be converted to useable compost at a regional processing facility
- All construction, demolition, agricultural, and industrial wood waste will be collected

Strategies for Closing the Loop on Waste

Strategy	Actions Summary	Lever	Time	Cost
WASTE 1: Divert Organics from Landfill				
WASTE 1.1 – Adopt policies that increase organics diversion.	Initiate staff consultation on organics, processes and targets. Adopt organics diversion targets for the community that also integrates Bear Smart Practices. Consider looking into other jurisdictions of similar climate/wildlife contexts, e.g. Jasper, Canmore, Banff.			$
WASTE 1.2 – Implement (or enhance) organics collection and processing.	Leverage CSRD construction of organics processing facility. Consider implementing curbside kitchen waste collection/neighbourhood drop-off for single-family homes. Current challenge with the Revelstoke is limitations of waste collection truck, however private collection services could fill the void, once the facility is complete. Evaluate the benefits of centralized drop-off options for solid waste, organics and recycling as a means to reduce emissions associated with collections. A drop-off location(s) could be established once the facility is operational, to provide immediate opportunity for diversion.			$$
WASTE 1.3 – Divert construction, demolition, agricultural, and industrial wood waste.	Identify wood waste landfills in the community, develop inventory, and attempt to evaluate opportunity from those. Identify and pursue options to support and grow the market for salvaged forest clearing and deconstruction materials. Explore opportunities for chipping/integration into biomass if applicable.			$
WASTE 1.4 – Develop and deliver a comprehensive zero-waste outreach program	A zero-waste outreach program may include community-led composing projects, school programs, participation in Provincial “Love Food Hate Waste” campaign and education around source-separation requirements. Look at Canmore example for community-built marketing campaign around waste.			$$
WASTE 2: Capture Landfill Gas and Explore Other Resource Recovery Technologies				
WASTE 2.1 – Evaluate and implement landfill gas capture	Analyze the opportunities for landfill gas capture, including potential to capture and sell to the gas grid. This is within the CSRD scope, but can be brought forward and supported by member municipalities.			$$
WASTE 2.2 – Evaluate and implement other resource recovery opportunities	Analyze the opportunities for an anaerobic digester facility to convert organic waste into compost and biogas. Evaluate opportunities for resource recovery in partnership with CSRD, and local industry.			$$$
Total GHG emissions reductions for this Big Move: 5,591 $tCO2_e$ by 2030				

Organizational Big Move

Organizational Leadership

Implementation for Success

Several key factors are important for the successful implementation of community energy and emission reduction plans based on research conducted by CEA, QUEST, and Smart Prosperity.[1] Among others, they include establishing broad support for implementation, building staff and financial capacity for implementation, and institutionalizing the plan in order to withstand political and staff turnover.

With regards to institutionalization, ideas on how this can be done are shown in the table below.

Incorporate	Embed climate action into other planning documents such as the OCP, bylaws and policies, and departmental/master plans. Climate action could also be incorporated into City staff job descriptions. Some communities report on climate action or sustainability implications in reports to Council. Embedding these processes into workplans ensures longevity of the commitment.
Budget	Embed climate action into the budgeting process. Consider integrating GHG and carbon costing into evaluation of specific budget, such as fleet replacement budgets.
Monitor	Monitor indicators as outlined in the Monitoring and Evaluation section.
Convene	Host regular meetings to discuss implementation with internal and/or external stakeholders. Support the establishments of committees or working groups that convene active and leading organizations.
Report	Report regularly to Council on progress and accomplishments. Annual reporting is recommended. It can be integrated with CARIP reporting.
Renew	Prepare for plan renewal approximately every five years.

Monitoring and Evaluation

Monitoring and evaluating the implementation of the Community Energy & Emissions Plan is critical for its success. Key Performance Indicators (KPIs) enable communities to measure the outcomes of a plan's implementation. When KPIs are monitored regularly, communities can determine how to best allocate resources to support implementation, and what success different actions are having. Suggested indicators are shown in Appendix B.

[1] Community Energy Implementation Framework, https://questcanada.org/project/getting-to-implementation-in-canada/?dc=framework

Funding

Funding sources that communities typically use for climate action are shown in the table below.

Internal Funding Sources	External Funding Sources
1. CARIP rebate allocated for climate action 2. Allocation from operating budget 3. Revolving energy efficiency fund (from corporate projects) 4. Forgone revenue (charge less for a municipal service to use the difference to fund a climate initiative) 5. General revenue (e.g. property taxes) 6. Recycling and solid waste user fees 7. Building permit fees and other service fees charged by Development Services 8. Electrical utility and water user fees	1. UBCM Gas Tax Agreement Funds 2. FCM's Green Municipal Fund supports plans, studies, capital projects and pilot projects for environmental initiatives in a number of focus areas 3. Federal government programs such as the Low Carbon Economy Challenge and Clean Energy Innovation Program 4. Provincial government programs such as the Clean Energy Vehicle Program, BikeBC Program, and CleanBC Communities Fund 5. Emotive grants for EV educational events to foster greater EV adoption 6. CleanBC and FortisBC energy efficiency incentives for new home construction and for increasing energy efficiency in existing buildings 7. BC Housing and FortisBC for education or demonstration projects to encourage the building industry to construct low energy and GHG emission homes.

Appendix A: Implementation Details

The following pages include detailed actions for each of the Big Move strategies. The actions are presented in four tiers: Tier 1 represents foundational actions that any community can begin with and Tier 4 represents full deployment of the strategy. The Big Move will be considered fully deployed when all four tiers are complete. Highlighted columns indicate the level of implementation modelled in the City of Revelstoke CEEP.

Municipal levers are noted for each strategy:

Infrastructure	Policy & Regulation	Engagement & Outreach
 Investments into the City of Revelstoke owned infrastructure that enable residents to make lower-emissions choices, such as active transportation networks and public charging stations	 Changes to City of Revelstoke policy and regulation that lead to energy and emission reductions in the community, such as requirements and incentives for enhanced energy efficiency in new buildings.	 Outreach, education and incentives that inspire residents and businesses to make choices to reduce energy and emissions and prepare for a low carbon future.

Note that the tables below provide an overview of **all** of the Big Moves so that the City of Revelstoke has a quick reference to future opportunities and actions that could be considered by the community or your implementation partners. The actions in this section are generally those recommended for implementation of the Big Moves, the actions suggested by the Focus Group are included in the action tables in the main part of this report.

Transportation – Shift Beyond the Car

The combination of land use (being near where you need to go daily) and infrastructure (active and accessible paths & prioritization, transit) and policy (parking pricing) combine to shift from fossil vehicles to active accessible and transit. Land use policy effects are long term rather than short term partly due to the long time-scale of development.

Strategy	Tier 1	Tier 2	Tier 3	Tier 4
SHIFT 1.1 **Optimize policies and bylaws for compact growth** 	Review OCP and planned development to identify opportunities to further incent or require infill development; Review employment locations and link location/land use to local economic development strategy; Add mixed-use neighborhood commercial as a permitted use in the RS-1 and RS-2 zone in specified locations such as corner lots and centrally located larger properties.	Leverage CLIC tool to assess financial impacts of development proposals; Increase density along core Transit Network;	Create a density bonus structure for development within short walking distance of the core transit network; Increase Density for neighbourhood node viability; Utilize DCC to support densification	Require all new developments to have walk-scores greater than the community average and expected transportation emissions below the community average
SHIFT 2.1 **Build safe routes for walking, cycling and other forms of zero emission mobility** 	Continuously improve active transportation infrastructure per existing plans	Implement Complete Streets Policy to reconfigure streets to be 'complete streets' as streets are regularly scheduled for resurfacing / reconstruction for pavement maintenance or installation of utilities. If new streets are required, design to support connectivity	Prioritize budgeting for key AAA transportation infrastructure that will connect major destinations (schools, shopping) to main residential areas; Invest in enhanced transit	Initiate a 10-year program to connect all neighborhoods to safe and convenient active transportation paths.
SHIFT 2.2	Promote new routes and end of trip facilities; Promote	Expand active transportation promotion. E.g. education events for new 'all ages and	Contract dedicated, permanent, part-time outreach capacity to engage	Collaborate with communities in the region on shared outreach capacity

Develop and deliver an active transportation outreach strategy 	events such as Bike to Work Week.	abilities' routes (e.g. priority for disabled users, etiquette when passing others).	the community on active transportation and transit.	
SHIFT 2.3 **Promote micro e-mobility and on-demand mobility services** 	Host awareness events for e-bikes, e-scooters and EV golf carts, including demonstrations	Conduct an analysis to understand when and where on-demand service will be most useful	Collaborate with a technology vendor to bring e-mobility on demand solutions to the community, such as electric kick-scooters or e-bikes for rent through an app.	
SHIFT 3.1 **Collaborate with transit providers to promote transit ridership** 	Promote transit ridership by celebrating new routes and offering free transit days.	Collaborate with transit providers to enable free transit programs for children/seniors, and during bad air quality or very cold weather		Explore universal free transit with transit providers
SHIFT 3.2 **Collaborate with transit providers to transition to a zero emission transit network** 		Collaborate with neighboring communities on safe and convenient inter-community transit that is safe and responsive to the needs of the communities.	Start working with transit providers and neighbouring communities to ensure that transit shifts to zero emissions vehicles (e.g. electric).	Initiate a 10-year transit investment program to connect all neighborhoods and connect to other communities with zero emissions transit.
	Tier 1	**Tier 2**	**Tier 3**	**Tier 4**

Transportation – Electrify Passenger Vehicles

New vehicle sales are approximately 10% of total vehicle stock annually. Switching to an EV from a fossil vehicle eliminates almost 100% of the emissions in BC. The more that people can walk, cycle and take transit in the community and between communities may reduce the % of EV's required for the first target year. In 2019, 10% of car sales (not including trucks and SUVs) were EV's, though this is not even across BC. Provincial ZEV mandates do not require even portions of sales regionally so City of Revelstoke can help influence local EV adoption.

Strategy	Tier 1	Tier 2	Tier 3	Tier 4
ELECTRIFY 1.1 **Design, fund and build a public EV charging network** 	Install public Level 2 charging at one municipally owned parking lot to demonstrate leadership. Consider up to 4 Level 2s as a demonstration at that location.	Develop a community EV charging infrastructure strategy (current/future demand for L2 and DCFC, garage orphans). Through engagement and network design, consider opportunities to leverage public institution (or other Part 3) charging infrastructure to address garage orphans.	Collaborate with other local and regional governments on a regional charging network strategy.	Leverage grants to implement community EV charging infrastructure strategy. Consider implementation to focus on supporting other actions, such as integrated transportation hubs (connectivity of charging infrastructure to e-bike shares, transit options, etc.).
ELECTRIFY 2.1 **Adopt EV-ready building requirements** 	Initiate staff consultation on Part 9 and Part 3 new construction charging infrastructure requirements.	Draft building bylaw amendment to integrate Part 9 EV readiness requirement for 100% of all new non-street parking. For Part 3, consider requiring smart chargers, to facilitate load management in the future.	Implement Part 3 EV charger readiness policy (I.e.. 100% electrified, EV-ready stalls for new MURBs (energized outlet capable of supporting Level 2 charger - integrate load management); 25% of stalls at new, non-residential Part 3 buildings)	Require EV readiness reflective of new Part 3 construction for rezoning or development permits for major redevelopment/renovation.
ELECTRIFY 3.1 **Develop and deliver an EV outreach strategy** 	Advise local groups of EV outreach incentives from Emotive; Create a communications plan to support engagement; Deliver builder/developer education on EV charging	Continue outreach to builders, public, auto dealers in including workshops and stakeholder engagement. Partner with other organizations to host	Facilitate a regional workshop to identify opportunities to leverage community EV charging network implementation to support regional travel;	Create a community or regional brand around electric vehicle adoption, reflective of the local priorities and context to encourage adoption.

	requirement for part 9 and part 3 such as an Open House for electrical trades to engage on EV charging readiness requirement.	engagement events such as test-drives and ride-alongs.	Partner with neighboring communities on ongoing active outreach to public and car dealers, implementing the communications plan (Tier 1) to support community identity around EVs.	
ELECTRIFY 3.2 **Provide incentives for EV adoption**  Lead: Communications, Community Services		Adjust speed limit for more streets to 30km/h when possible to allow for low speed EV's.	Leverage Provincial decal program (EV-OK) to provide a suite of EV priority parking (may include free parking or just priority).	Incent ride-hailing, taxi operators and other fleet operators to switch to EV's (e.g. priority parking for EV taxis, business permit reduction for electrified fleets); Create EV-only zones in core downtown areas.
ELECTRIFY 3.3 **Lead by example - Electrify the corporate fleet and providing workplace charging** 	Take inventory of vehicle fleet, determine expected end of life for each vehicle; amend vehicle purchasing policy to consider electric vehicles for replacement;	Integrate vehicle purchasing policy with budgeting to build capital for vehicle replacement	Examine current vehicle technologies available for replacement; install Level 2 chargers at City Hall and other staff-heavy corporate buildings for staff (and possibly public use)	Replace vehicles at end of life with electric vehicles where available, or with used vehicles as interim solution until electric options become available.

Transportation – Decarbonize Commercial Transportation

Commercial vehicles represent 20% of Revelstoke's GHG emissions profile, however there are limited solutions available for local governments at present due to limited jurisdictional levers, as well as the lack of technologies available for medium and heavy-duty electric trucks. This is expected to change significantly over the next 2-5 years, though, so the City can and should anticipate this by taking a proactive approach.

Strategy	Tier 1	Tier 2	Tier 3	Tier 4
COMMERCIAL 1.1 **Develop a community vision and strategy for commercial ZEV infrastructure** 	Conduct a needs assessment for fleet charging requirements, through to 2040.	Design a non-municipal commercial/institutional EV charging network strategy, with emphasis on hub-style charging to leverage fleet needs and electrification of delivery bays.	Support a pilot fleet electrification initiative with one commercial/institutional partner. (e.g. land use/zoning change to allow for transit charging hub, or electric school bus parking zone, etc.), OR: (Renewable) Natural gas vehicle collaboration for heavy duty vehicles. (Collaborating with other local return-to-base fleets such as BC Transit, school board, waste haulers, and industry / commercial operators).	Facilitate joint procurement/joint funding in coordination with commercial fleet operators for the implementation of the commercial/institutional EV charging network strategy.
COMMERCIAL 1.2 **Engage commercial and industrial stakeholders** 	Develop communications strategy to support outreach/engagement with commercial sector; Advocate to provincial government for commercial decarbonization legislation, leveraging collaborations with commercial sector and regional districts.	Convene a Commercial & Industrial fleet operators workshop to discuss current and future opportunities around low emissions/electrification of fleets; Engage with BC Transit and School District to identify early adoption opportunities of electric bus and transit options (recognizing 100%	Engage with stakeholders on design of the commercial EV charging network. Integrate as much as possible with public and municipal charging strategies.).	Host an emerging and future technology workshop for MD/HD fleet operators, and facilitation of driver training courses on emission-reducing techniques.

		electric transit target for BC Transit, and currently available school bus funding for School Districts).		
COMMERCIAL 2.1 **Update corporate policies to prioritize low carbon options** 	Review and integrate contractual requirements for municipal services to require low emission vehicles, increasing over time with 100% requirement by 2040. (applies to commercial entities that are contracted for municipal services).		Require Corporate fleet electrification policy to buy used vehicles at time of replacement if no low-carbon options are available.	Corporate fleet electrification policy fully implemented (to extent that available technology allows) for 100% EV.

Buildings – Step Up New Buildings

Step Code is an efficiency code, not a GHG code. Efficiency is a good first step, but to get deep emissions reductions the heating fuel must be low/no emissions. Electricity is nearly emissions free in BC and heat pumps use 1/2 to 1/4 the energy of a baseboard heater, saving energy and money over the long run. Each new building that is inefficient and has a fossil heating system is one more building that will need to be retrofitted at some point.

Strategy	Tier 1	Tier 2	Tier 3	Tier 4
NEW BUILD 1.1 **Adopt the Energy Step Code** 	Designate departments and individuals to attend the local government Step Code Peer Network and start working on an implementation strategy.	Adopt the Energy Step Code with a community-wide requirement for one of the lower steps; Adopt policies and programs to incentivize adoption of higher steps.	Determine timelines for adopting upper steps; Adopt a rezoning policy to require upper steps for new developments that add significant density.	Adopt upper steps of the Energy Step Code community-wide at the earliest opportunity, and signal intent require top step in advance of 2032.
NEW BUILD 1.2 **Adopt a low-carbon approach to the Energy Step Code** 	Conduct consultation with the local building industry about low carbon approaches to the Energy Step Code.	Adopt a tiered approach encouraging low carbon energy systems (e.g. Step 3 community wide, Step 2 if they connect their project to a district energy system or implement a low carbon energy system.	Adopt the Provincial GHG metrics when they become available.	Investigate opportunities to address embodied carbon in the construction sector.
NEW BUILD 2.1 **Provide outreach and incentives** 	Promote existing incentives for building more efficient new homes via Better Homes BC.	Leverage BC Hydro funding to provide subsidies to builders that offset the additional cost of Energy Advisors and/or provide incentives for mid-construction air tightness testing; Fee rebates could also be considered for new homes that install solar or electric vehicle charging stations.	Top up provincial incentives (betterhomesbc.ca) for heat pumps to replace fossil heating systems in new buildings.	

NEW BUILD 2.2 **Provide training and coordination** 	Collaborate across the region to provide relevant training to building industry and realtors; Assemble and promote list of local or regional Energy Advisors.	Continue providing locally relevant training; Work with building industry partners to accelerate Energy Advisor training; Develop quota for minimum number of local Energy Advisors by 2022.	Continue partnering to provide training to building industry, focusing on meeting Upper Steps;	

Buildings – Retrofit Existing Buildings

Building envelope improvements reduce energy needed to heat the building. An average retrofit can save 10% to 20% of energy while a deep retrofit ($80,000-$100K) can save 50% to 60%. Heat pumps use 1/2 to 1/4 of the energy of baseboard heaters. Electricity has >80% less emissions than propane.

Strategy	Tier 1	Tier 2	Tier 3	Tier 4
EXISTING BUILDINGS 1.1 **Encourage and enable deep energy retrofits.** 	Promote *Better Buildings* and *Better Homes BC* at front counter and in property tax mailings as well as business license renewal mailings.		Require EnerGuide assessments (Part 9 buildings) and building energy benchmarking (Part 3 buildings) as a condition of a renovation permit over a value threshold.	Require minimum energy performance standards aligning with the Province's upcoming retrofit code (*as more information becomes available).
EXISTING BUILDINGS 1.2 **Encourage and enable building electrification** 	Provide information about heat pumps to renovators and homeowners at time of permit.	Identify and remove barriers to heat pump installation, including streamlining permitting process, optimizing noise regulations, restructuring permitting fees, and others.	Top up Provincial (*Better Buildings* and *Better Homes BC*) heat pump incentives.	Establish a local government department or company to rent/lease heat pumps to replace fossil fuel heating and to assure quality and manage installers.
EXISTING BUILDINGS 2.1 **Establish a long-term marketing campaign** 	Promote "Better Buildings and Better Homes BC" at front counter and in property tax mailings as well as business license renewal mailings.	Establish a 10-year program for a community-wide marketing campaign (based on 'energy diets') to encourage building envelope improvements, electrification or other low carbon fuel sources.	Collaborate with local governments in the region on a coordinated 10-year campaign to market deep energy retrofits and fuel-switching from propane and heating oil to heat pumps.	
EXISTING BUILDINGS 2.2 **Build industry capacity** 	Educate renovators and realtors on energy efficiency and low carbon choices for space and water heating.	Provide a building energy benchmarking workshop to large portfolio operators.	As part of the 10-year marketing campaign, collaborate with others to provide extensive training and development for heat pump system designers and installers.	Signal intention to adopt 'retrofit code' when it becomes available (outreach to public, retailers, realtors, trades).

Waste – Close the Loop on Waste

Strategy	Tier 1	Tier 2	Tier 3	Tier 4
WASTE 1.1 **Adopt policies that increase organics diversion.** 	Collaborate with the Regional District to initiate staff consultation on organics, processes & targets.	Adopt organics diversion targets for community and corporate.	Require diversion (away from landfill) for construction and demolition waste; Require organics diversion for event permitting.	Ban all (residential, commercial, institutional) organics (food waste, yard waste, etc.) from landfill.
WASTE 1.2 **Implement (or enhance) organics collection and processing** 	Complete assessment (inventory) of community organic waste volumes and feasibility of landfill diversion.	Evaluate local opportunities for organic handling and composting. Consider partnering with Regional District and neighboring communities; Implement curbside kitchen waste collection for single-family homes.	Allocate resources (include in five- year budget) for dedicated compost facility manager and required training (site management, odour, leachate, safety, etc.); Install central collection points that are regularly picked up for multi-family units.	Establish public program for compost pick-up from all buildings; Integrate organics collection in streetscapes, where appropriate.
WASTE 1.5 **Divert construction, demolition, agricultural and industrial wood waste** 		Identify wood waste landfills in the community, develop inventory, and attempt to evaluate opportunity from those.	Identify and pursue options to support and grow the market for salvaged deconstruction materials.	Identify opportunities to salvage surplus and used construction materials, and promote reuse, donation, repair, and sharing opportunities.
WASTE 1.4 **Develop and deliver a comprehensive zero-waste outreach program**	Support (funding or land donation) community-led composting projects; Support existing and new capacity for reusable resources, including Free	Fund/Support a part or full-time position dedicated to organic diversion (and waste reduction) to support implementation;	Educate and communicate the source-separation requirements; Outreach to wood waste landfill owners, and other	Establish a waste reduction working group consisting of key staff across the organizational structure that institutionalizes support for organic diversion and zero

	Swaps, Share Sheds, free-store for unwanted goods, and building materials depot; Provide funding to School District to implement programs on educating about waste reduction/diversion.	Conduct annual community zero-waste drives to enhance awareness, streamline with school and business programs.	people who can help identify the opportunity.	waste initiatives, include external organizations where possible.
WASTE 2.1 **Evaluate and implement landfill gas capture** 	Establish a target for landfill gas capture from municipal / Regional District landfill.	Analyze the opportunities for landfill gas capture, including potential to capture and sell to the gas grid.	Implement or increase efficiency of landfill gas capture. Extract maximum use possible, e.g. sell to FortisBC for Renewable Natural Gas. At minimum capture & flare. Investigate selling credits to the Province's Climate Investment Branch.	Capture maximum landfill gas from wood waste landfills.
WASTE 2.2 **Evaluate and implement other resource recovery technologies** 		Investigate anaerobic digestion facility for organics.		Implement anaerobic digestion facility for organics to produce biomethane (waste to gas) and compost.

Appendix B: Other Opportunities

Local Renewable Energy, Sequestration and Food

Strategy	Actions Summary	2021	2022	2023	2024	2025	Later
LOCAL RENEWABLE ENERGY							
RENEWABLE 1.1 Pursue community-scale renewable energy systems.	Conduct a renewable energy scan to determine financially and technically feasible renewable energy options. These may include biomass district heat, solar, wind and renewable gas.						
RENEWABLE 1.2 Support building-level renewable energy projects.	Provide Municipal incentives for renewable energy installations in buildings. Engage with BC Hydro to confirm opportunities for net metering.	X	X	X			
SEQUESTRATION							
SEQUESTER 2.1 Preserve forested lands, wetlands and swamps within the municipal boundary	Identify and then use policy measures to prevent clearing of old growth forests, and other forests of other special significance (cultural, archaeological, etc.). Use policy measures to reduce clearing of other forested lands, e.g. density bonus for developments.						
SEQUESTER 2.2 Encourage low-carbon buildings	Consider ways to support or encourage building materials that store carbon / are low carbon, e.g. by relaxing Step Code requirements for wood-frame Part 3 buildings and encouraging larger wood-frame Part 3 buildings.						
SEQUESTER 2.3 Collaborate with other governments, organizations and industry to pursue low-carbon and carbon capture technologies	Encourage and support local industrial emitters of CO2 to capture and store CO2 to reduce their industrial emissions. Keep abreast of ways that local governments can be involved in, and support carbon capture & sequestration, e.g. through Province of BC, CEA, and Pacific Institute for Climate Solutions.						

Appendix C: Sample Key Performance Indicators

Two types of indicators are recommended. Primary indicators measure community energy consumption and GHG emissions, while secondary indicators can quantify the indirect success of various actions. The following table provides a description of these indicators, the measures of success, data sources for each indicator, and frequency of reporting. Annual progress reporting should be planned by the City of Revelstoke.

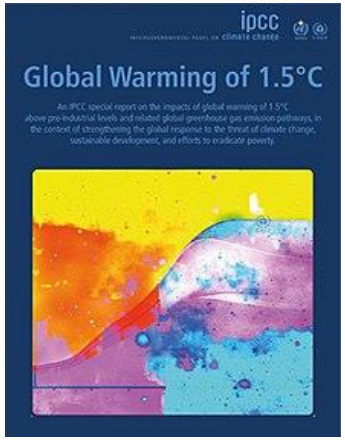
	Indicators	Measures of Success	Data Sources
Overall	1. Community GHG emissions	17% reduction in emissions from 2007 levels by 2025 80% reduction in emissions from 2007 levels by 2050	Provincial energy & emissions data at the community level, and Kent Marketing Group fuel sales data for area gas stations converted into emissions using latest factors from the Province
Overall	2. Per capita energy usage	Average household and commercial energy use declines over time to 2050 Annual fuel sales (gas & diesel) decreases over time to 2050	Provincial energy & emissions data at the community level, Kent Group fuel sales data for area gas stations, Summerland electrical utility usage data
Transportation	3. kWh/year used recharging EVs at public charging stations	Increase in number of kWh/year of charging at EV stations	Usage data already available to the City
	4. Infrastructure to promote active transportation	Progress towards outcomes of the following plans: • Parks & Recreation Master Plan • Trails Master Plan • Cycling Master Plan Sidewalk Master Plan	Public Works & Recreation
	5. Commuting / personal travel mode split	Increase in travel around Summerland and between Summerland and Penticton / Kelowna by ride share, public transit, walking or cycling	BC Transit ridership data, and Census
Existing buildings	6. # of energy efficiency incentives distributed for building efficiency upgrades	Average increase in incentive use	Summary data from FortisBC (and other entities as applicable, e.g. Province)

	Indicators	Measures of Success	Data Sources
New buildings	7. # of buildings at each level of the BC Energy Step Code	Increase in number or percentage of new buildings constructed to various levels of the Step Code	Permit applications *(Notes: suggest setting this up in advance for GIS; Some builders may currently be building to Step Code and getting FortisBC rebates without the City knowing, by following the prescriptive pathway. Advising local builders and front counter staff of the Step Code compliance pathway in the building code should solve this.)*
Renewable Energy	8. # of renewable energy buildings installations	Increase in percentage of buildings adding solar and other renewable energy sources	Distributed Generation Program applications *(Note: this only covers renewable energy systems that generate electricity. Others will not be possible to track.)*
Waste	9. Amount of organics diverted from landfill	Increase in organics at composting facility	City of Revelstoke
	10. Recycling rates	Increase in recycling rates	City of Revelstoke
	11. Tonnes of waste per capita to landfill	Decrease in waste per capita sent to landfill	City of Revelstoke
Other	12. Urban tree canopy cover	Increase in canopy	Development applications; Public Works tree planting data *Note: due to complications with GIS, this indicator will only be possible to track in the medium-term, if at all.*
	13. Per capita water consumption	Decline in water use	Usage data on water utility bills / metering system
	14. # of participants at building community & citizen educational events / workshops	High participation levels at events	Registration/Attendee lists for events

Appendix D: Climate Action at All Levels

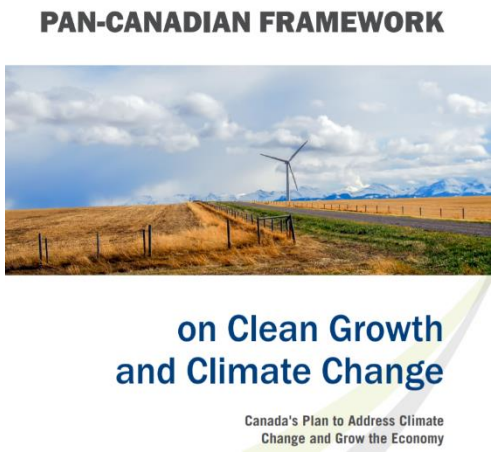
Global Action

When Canada signed the Paris Agreement in 2015, we joined a global commitment to keep global warming below 2°C, and as close to 1.5°C as possible. In October 2018, the United Nations Intergovernmental Panel on Climate Change (IPCC) released a major report that emphasized the dramatic difference in consequences between a 1.5°C and 2°C world. Every degree of warming beyond this threshold will lead to increased impacts of extreme weather, more wildfires and floods, increases in sea-level rise, and severe threats to human health and well-being.



By limiting these impacts, we can ensure a healthy environment, economy and society for ourselves and future generations. While it is not too late, time is of the essence.

The key finding of the IPCC report is that limiting warming to 1.5°C is possible, but requires deep emissions reductions across all areas of society – reducing global emissions by 45% from 2010 levels by 2030 and reaching net zero emissions by 2050.



National Action

In 2016, the Government of Canada released its Pan-Canadian Framework on Clean Growth and Climate Change. The framework sets out the federal government's strategy to meet its commitment under the Paris Agreement to reduce national greenhouse gas (GHG) emissions 30% below 2005 levels by the year 2030. In 2017, the most recent emissions inventory year, Canada's emissions were 716 megatonnes of CO2 equivalent (Mt CO2e), which is a 2% decrease from 2005 levels. This means that in order for Canada to meet its emissions reduction target, we need a decrease of 28% from 2005 levels in just ten years. More recently, the Government of Canada has established a target of net-zero emissions by 2050, requiring an acceleration of action by all levels of government.

Actions available to the federal government include vehicle fuel-efficiency standards, model national building codes, energy ratings, and carbon pricing.

Provincial Action

In December 2018, the Province of British Columbia released its CleanBC climate plan. The plan reaffirmed the province's previous target to reduce emissions 80 per cent below 2007 levels by the year 2050, and established a new interim target to reduce emissions 40 per cent by 2030. In 2017, BC's provincial emissions were 0.5% below 2007 levels, which means that in order for BC to meet its emissions reduction target, we need a decrease of 40% from 2007 levels in just ten years.

CleanBC outlines a path to meeting the 2030 targets, outlining a range of actions to meet 75% of the target. These actions include sourcing clean and renewable electricity, incremental increases in building-energy performance in the BC Building Code, tailpipe emissions standards, and measures to reduce emissions from industry. The Province is currently identifying the actions to achieve the remaining 25% of emissions reductions.

CleanBC builds on a history of provincial climate action: The provincial government has enacted laws and regulations to reduce emissions and transition to a low-carbon economy. These include the Climate Change Accountability Act, Carbon Tax Act, Greenhouse Gas Industrial Reporting and Control Act, and Clean Energy Act.

As shown in **figure (#),** senior levels of government have recognized the need for strong climate action (particularly on mitigation), and provide support to local governments.

The federal government uses national standards and funding in climate action because provinces have constitutional jurisdiction over both energy and local governments.

Local governments are the front lines of climate action because communities are where the buildings, vehicles & infrastructure are.

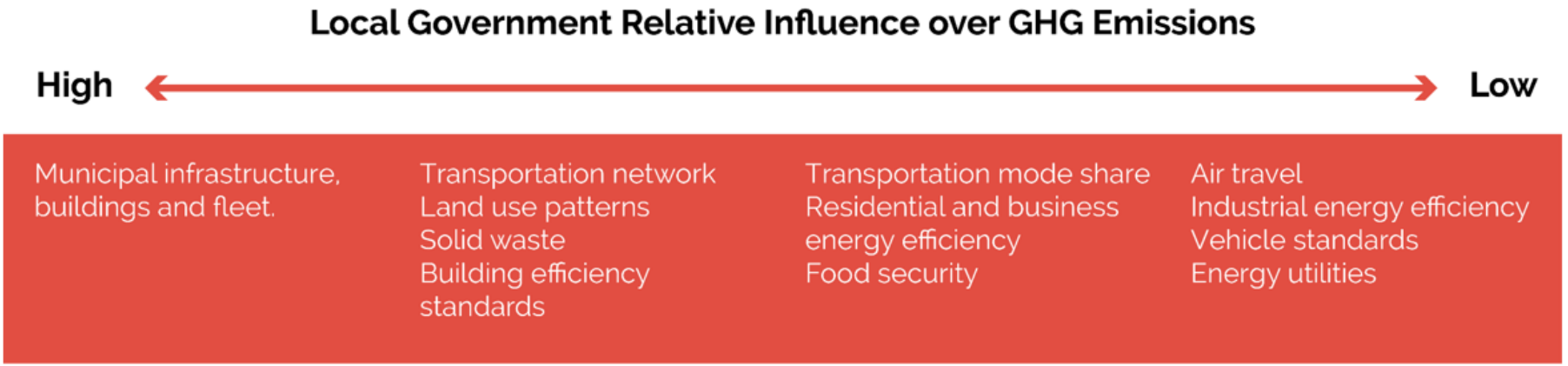
	Plans	Authority	Actions/Levers
Federal	Pan-Canadian Framework on Clean Growth and Climate Change	• National standards • Funding • International commitments • Taxation	• Vehicle fuel efficiency standards • Infrastructure funding • Model national building codes • Energy ratings & tools (e.g., EnerGuide) • Green infrastructure bank • National carbon price • CCS (Carbon Capture & Sequestration) • Information sharing
Provincial	CleanBC (*mitigation*) Adaptation Strategy coming in 2020	• Constitutional authority for Energy and for Municipalities • Taxation	• Codes ie Building code (including Step Code) • Data (e.g., Community Energy & Emissions Inventory) • Green infrastructure (e.g., EV charging) • Provincial roads & transit funding • Direction to BCUC on BC Hydro, FortisBC, ICBC • Municipal regulation & authority • Carbon neutral government operations • Carbon tax • RNG (Renewable Natural Gas) • ZEV (Zero Emissions Vehicle Mandate)
Local	> 120 Community Energy & Emissions Plans > Multiple Adaptation Plans	• Land-use / community form • Local infrastructure • Local engagement • Waste management	• New / adjusted community infrastructure • Restricting land use in key areas • Sidewalks/bike & scooter lanes • Complete compact walkable communities • Transit • EV Strategy • BC Energy Step Code • Local engagement • Energy retrofit programs • Organics diversion • Natural assets • Water management • Extreme climatic event / disaster preparation

Governments set the stage, but it is residents and businesses who reduce their emissions and adapt to climate change through individual choices:

- where you locate/live/work
- heating / cooling
- vehicle & travel choices
- extreme climatic event / disaster preparedness
- landscaping choices
- water management

Local Action

More than 120 British Columbia local governments have to date enacted community climate action plans or Community Energy and Emissions Plans (CEEPs), which outline actions they can take, or are taking, to reduce greenhouse gas emissions. Local governments have varying degrees of influence over different sources of emissions within their boundaries, as shown below.



If local governments are to succeed, they will need leadership and/or support from other orders of government, as well as commitments from residents and businesses. Further, the outputs of this Plan and the targets/actions prioritized for implementation will need to be embedded into relevant policy, operational, budgetary and asset management plans or strategies. Communities and regional districts play an important role in climate mitigation and adaptation. Almost every British Columbia local government has committed to some degree of action under the B.C. Climate Action Charter. Across Canada, local and regional governments directly and indirectly influence approximately 60 per cent of the nation's overall energy use and 50 per cent of its GHG emissions.

Residents and Businesses

Residents and businesses also have an important role in climate action, such as individual choices on where to live, how to heat or cool, how to travel, how to handle household waste, preparing for extreme events such as extreme heat, making landscaping choices that affect the urban tree canopy and are wildfire smart, and being careful with water use. Meanwhile, businesses' decisions regarding their current operations and future plans as well as factors such as leadership and innovation also impact community-based emissions and affect a community's resilience to a changing climate. Residential and business decisions are shaped by other levels of government, including local government, creating an opportunity for governments to influence those choices in a way that addresses environmental issues and climate action.

Appendix E: Inventory and Modelling Methodology

This appendix contains details on the community energy & emissions inventory and projections for City of Revelstoke.

Inventory

Revelstoke's inventories were created using data for buildings, transportation and waste obtained from the Province of BC. Full inventory years for buildings and waste are: 2007, 2010, and 2012-2018. Full inventory years for transportation are 2007 and 2010.

Emissions factors for inventory years are shown in the following table, and are sourced from the Province of BC.

Table 1 – Emissions factors used for inventory years

GHG/GJ, by Year	2007	2010	2012	2013	2014	2015	2016	2017	2018
Gasoline	0.068	0.067	0.066	0.065	0.065	0.065	0.065	0.065	0.065
Diesel	0.069	0.069	0.068	0.067	0.067	0.067	0.067	0.067	0.067
Electricity	0.007	0.007	0.007	0.007	0.005	0.004	0.004	0.003	0.003
Wood	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019
Heating oil	0.068	0.068	0.068	0.068	0.068	0.068	0.068	0.068	0.068
Propane	0.061	0.061	0.061	0.061	0.061	0.061	0.061	0.061	0.061

As can be seen, some of the emission factors have changed over time. The emission factors for gasoline have decreased as a result of the Renewable and Low Carbon Fuel Requirements Regulation. The emissions factor for electricity has decreased as a result of ongoing efforts to decarbonise the electricity grid, however this will be updated as detailed below.

Electricity emissions factor subject to change

Information received from the Province of BC in December 2020 and January 2021 states that the electricity emissions factor used for electricity consumption across BC will change, effective for reporting for the 2021 year. But because of the lag in reporting cycles it will not appear in reports until June 1st 2022, and the Province will not officially change the electricity emission factors in the forthcoming *2019 BC Methodological Guidance for Quantifying Greenhouse Gas Emissions.*

Despite this, it is official that there is an intention to change, which will take effect in 2022, and the change will be backdated as well for previous years.

Previously, emissions from electricity use was calculated using a three-year rolling average of emissions from BC utility owned and operated facilities, and did not include emissions associated with importing electricity from outside of BC. Those emissions will now be included. (Note that no credit will be made for clean electricity generated in BC used to displace electricity generated in other jurisdictions.)

Under the old methodology the Province calculated the Town of Smithers's electricity emissions factor to be 10.67 tCO_2e/GWh for 2018. Based on the limited information currently available, under the new methodology the Province has calculated the figure for the 2019 year to be 29.9 tCO_2e/GWh. *If* the 2018 and 2019 years are comparable (and it is probable that they are at least approximately comparable), this would be an increase of 2.8 times. Despite the increase, emissions from electricity would still be far lower than for natural gas on a per unit of energy basis, and electricity used in the Town would still have among the lowest GHG emissions in the world (e.g. still about 30 times lower than Australia's, 8 times lower than New York's, or 40% lower than Ontario's).

If the 2018 and 2019 figures are comparable, this change would increase the Town's corporate 2019 GHG emissions from electricity from 28 to 78 tCO_2e, and increase its overall 2019 GHG emissions from 962 to 1,012 tCO_2e, or 5%.

This change would slightly impact how actions that reduce electricity or generate renewable electricity are considered as they would reduce more GHG emissions than previously anticipated. This change would also slightly impact the consideration of actions that may increase electricity consumption, e.g. heat pumps.

Transportation data was sourced from a previous release of the Province of BC's Community Energy & Emissions Inventory (CEEI) data,[2] and building energy and landfill waste data was sourced from the latest CEEI data and the Province's release of Provincial Inventory data at the community level.[3]

Assumptions made with respect to the inventories are as follows:

- The Province of BC made a series of standard assumptions in the creation of the CEEI data, which are outlined on the CEEI webpage: https://www2.gov.bc.ca/gov/content/environment/climate-change/data/ceei. The CEEI inventory years in the preceding charts are 2007, 2010, and 2012.
- The Province of BC made assumptions for buildings and landfill waste emissions information, which are outlined in the community level spreadsheets on the Provincial Inventory webpage: https://www2.gov.bc.ca/gov/content/environment/climate-change/data/provincial-inventory

[2] https://www2.gov.bc.ca/gov/content/environment/climate-change/data/ceei
[3] https://www2.gov.bc.ca/gov/content/environment/climate-change/data/provincial-inventory

- In creating the inventories, CEA made other assumptions in addition to these:
    - Because the Province removed transportation data from its most recent release of the 2007 and 2010 CEEI data, and has not provided this data for any other year, CEA has used population data to extrapolate transportation data for any year post-2010.

Solid waste emissions data provided by the Province had two calculation methodologies:

- Waste-In-Place (WIP): WIP calculates based on the landfill that community solid waste is sent to. Decomposition emissions occur over the span of 15+ years, are landfill-specific, and incorporate physical and meteorlogical characteristics of the landfill. This method has been used historically by the Province, but is subject to significant changes in emissions if a community switches landfills despite similar tonnage.
- Waste Commitment (WC): WC assumes that all waste emissions are released in the span of one year, and is independent of the physical characteristics of the landfill that the waste is being sent to, except in the case of a landfill gas capture system present. This method eliminates issues associated with emission allocation being split into two or more landfills if the community switches landfills. **This emissions calculation method was selected for the inventory.**

The following are not included in the inventory:

- Emissions from Agriculture, Forestry and Other Land Use (AFOLU)
- Emissions from large industry
- Consumptive emissions (e.g. food, services, consumer goods)

Business As Usual Projection

CEA's QuickStart model was used both to calculate the BAU trajectory, and to estimate the potential GHG reductions that could be achieved. Developed in 2010 on behalf of BC Hydro and used by approximately 65 communities to date, the model builds on information including population and community energy and emissions inventory data.

The model uses formulas both to calculate the BAU trajectory, and to estimate the impacts of implementing each Big Move.

The BAU trajectory was calculated by using available inventory data, and then projecting forwards using a population forecast that was determined in consultation with the City's consultants currently engaged on development of population projections for the community.

There are full or partial inventory years that describe the community's emissions profile from 2007-2018. From 2019 onwards, all of the data is an estimate as a BAU projection.

For the BAU projection modelling, the assumption is that energy consumption and emissions will increase proportionally with increases to population, although the impact of policies from higher levels of government are also incorporated, and other assumptions. Only policies that have already been adopted and that will have quantifiable impacts are incorporated. Assumptions are:

- The Province's incremental steps to net zero energy ready buildings by 2032.
- Tailpipe emissions standards.
- Renewable & low carbon transportation fuel standards.
- Zero-Emissions Vehicle Act, requiring every new LDV sold in B.C. to be a zero-emission vehicle by 2040 (with a ramp up in advance of that date).
- How the impacts of a changing climate will affect building energy consumption, as outlined below.

The final assumption had the following methodology:

- Climate change data for the region obtained from ClimateData.ca.
- Projected global emissions to 2030 currently places the world in the range for the IPCC's Fifth Assessment Report's Representative Concentration Pathway (RCP) 6.0 scenario.
- RCP 6.0 scenario not available on ClimateData.ca, therefore RCP 4.5 (median impact scenario) used as a (conservative) proxy.
- Decreases in residential heating oil and propane consumption assumed to be proportional to projected decreases in Heating Degree Days (HDDs).
- Decreases in residential and commercial propane consumption assumed to be proportional to decreases in HDDs and the proportions of propane consumed for space heating for each sector, with that proportion obtained from the Navigant 2017 Conservation Potential Review for FortisBC Gas. It is assumed that the space heating proportion for residential and commercial is the same with propane heating as it is for natural gas heating.
- Decreases in residential and commercial electricity consumption assumed to be proportional to decreases in HDDs and the proportions of electricity consumed for space heating for each sector. However, proportions of electricity consumed for space cooling for each sector and how this will increase proportional to projected increases to Cooling Degree Days (CDDs) also included. These proportions obtained from the Navigant 2016 Conservation Potential Review for FortisBC Electric.

Although CEA's model assumes that projections will be linear, there will be annual variability due to factors such as economic conditions (on mobility fuels and building energy consumption) and climatic variations (particularly on building energy consumption). These variations mean that it may often be necessary to collect several years of data before one can see the success or lack of it in implementation of an action, in the primary indicators.

Modelling the Big Moves

The QuickStart model estimates the impacts of the Big Moves compared to the BAU trajectory. The impacts of the Big Moves can vary greatly between communities, and depend on the assumptions made. The assumptions made for each Big Move are based on research that CEA has conducted and can be tailored for individual communities.

GHG emission reductions by Big Move are described in the main body of this report in the **Error! Reference source not found.** section.

The QuickStart model allows Big Move implementation at five levels; 0%, 25%, 50%, 75% and 100%. This allows for varying levels of ambition within each Big Move. The model also requires an implementation start year.

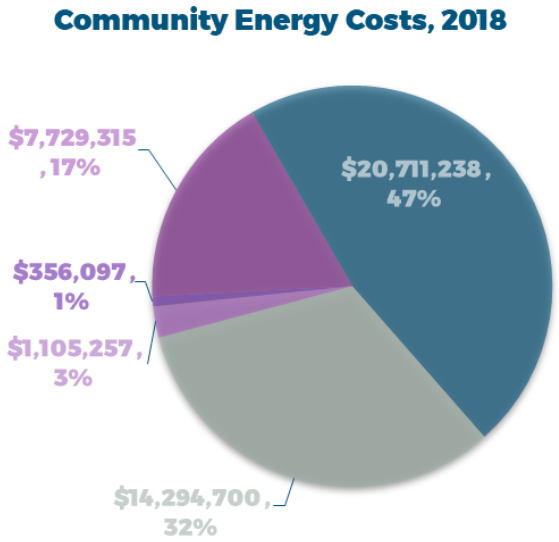
The QuickStart model makes the following assumptions based on full implementation (100% ambition level).

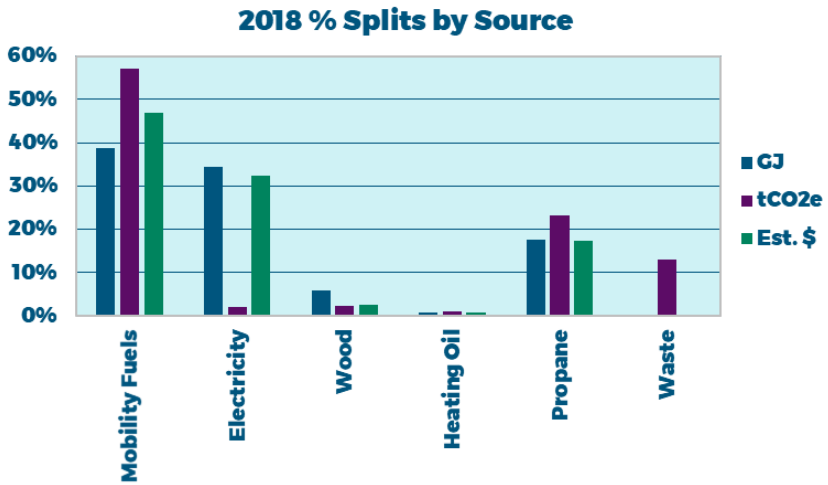
Big Move	Modelling Assumptions	
Step Up New Buildings	90%	New homes with zero-carbon heating
Decarbonize Existing Buildings	3%	Homes retrofit per year
	33%	Energy reduction per retrofit
	2%	Homes replacing fossil fuel heating with heat pumps
Shift Beyond the Car	1 year	Lag time from implementation for initial impact
	20 years	Full implementation takes 20 years
	17%	Maximum VKT reduction after 20 years from Active Transportation, Transit and Land Use
	33%	Attribution of VKT reduction to Active Transportation
	33%	Attribution of VKT reduction to Transit
Electrify Passenger Vehicles	5%	Current % of vehicle sales as EV
	50%	Compound Annual Growth Rate of new car purchases as EV in year 1
	20%	Compound Annual Growth Rate of new car purchases as EV in year 5
Decarbonize Commercial Transportation	1%	Percentage GHG reduction per year
	10%	Maximum GHG reduction after 10 years
	5	Lag time from implementation for initial impact
Waste	75%	Percentage GHG reduction from organics diversion or landfill gas capture
	5	Full implementation takes 5 years.

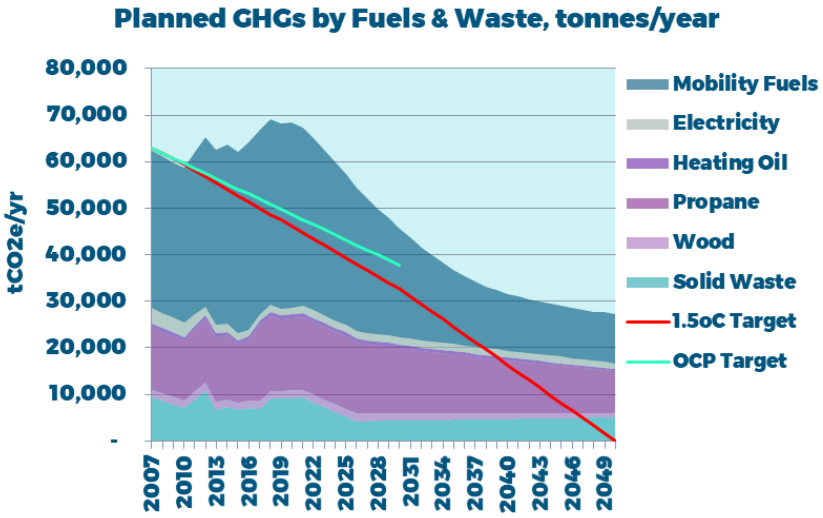
If a lower level of ambition is selected, then that would be applied in the model. For example, if a community selects a 50% ambition level for Waste, then the GHG reduction would be 50% of 75% (or 37.5%) but would still take 5 years to ramp up to that diversion level.

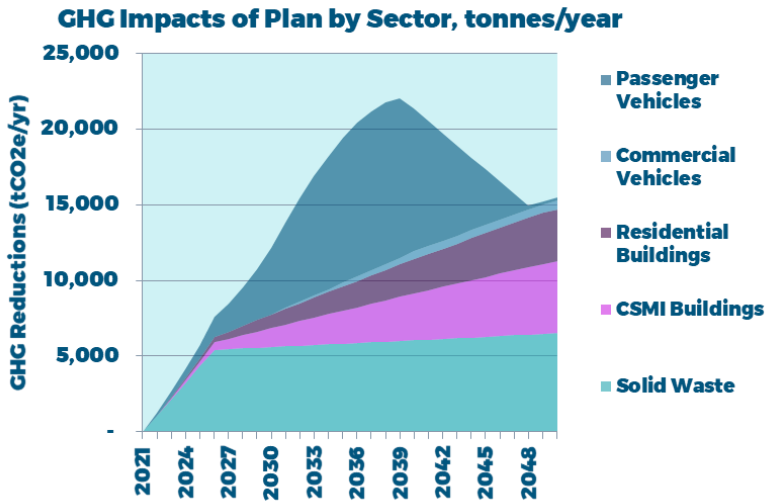
Appendix F: Inventory and Modelling Details

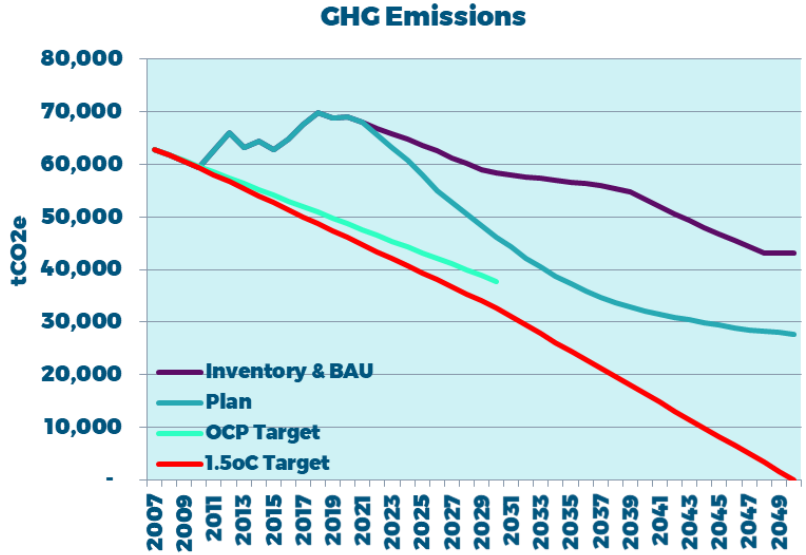
Below are some additional charts that were not included in the main body of the report, but provide additional context.

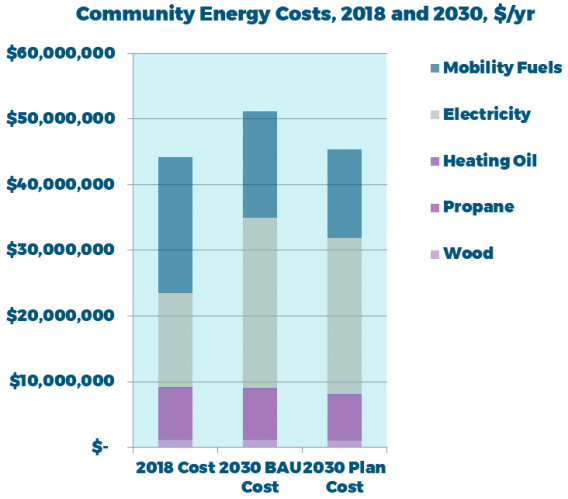





Planned GHGs by Fuels & Waste, tonnes/year
tCO2e/yr
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
-
2007
2010
2013
2016
2019
2022
2025
2028
2031
2034
2037
2040
2043
2046
2049
Mobility Fuels
Electricity
Heating Oil
Propane
Wood
Solid Waste
1.5oC Target
OCP Target


GHG Impacts of Plan by Sector, tonnes/year
GHG Reductions (tCO2e/yr)
25,000
20,000
15,000
10,000
5,000
-
2021
2024
2027
2030
2033
2036
2039
2042
2045
2048
Passenger Vehicles
Commercial Vehicles
Residential Buildings
CSMI Buildings
Solid Waste


GHG Emissions
tCO2e
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
-
2007
2009
2011
2013
2015
2017
2019
2021
2023
2025
2027
2029
2031
2033
2035
2037
2039
2041
2043
2045
2047
2049
Inventory & BAU
Plan
OCP Target
1.5oC Target


Community Energy Costs, 2018 and 2030, $/yr
$60,000,000
$50,000,000
$40,000,000
$30,000,000
$20,000,000
$10,000,000
$-
2018 Cost
2030 BAU Cost
2030 Plan Cost
Mobility Fuels
Electricity
Heating Oil
Propane
Wood

Appendix G: Engagement Summary

Workshops

Workshop #1

Date: October 1st, 2020

Description: This workshop introduced the concept of the Big Moves, and the backcasting approach. Attendees were split into three sectors (transportation, buildings, waste), and went through visioning exercises to coalesce on concise visions for Revelstoke, in the absence of any technological or financial barriers. Attendees then were led through an exercise to determine the current state of each sector as means of setting a benchmark, and to balance the vision against reality, to ultimately determine a practical approach forward. The concept of GHG emission reduction targets, short and long-term was introduced at the meeting. A survey followed the workshop to identify preferences for ambition. Full minutes of this workshop are available from the City of Revelstoke, and the summary outputs from the visioning are in the following section.

Stakeholders in attendance:

Name	Organization
Connie Brothers	Collective Impact Leadership Committee
Kent Christensen	North Columbia Environmental Society
Kevin Dorrius	Community Futures
Megan Tabor	Tourism Revelstoke, Executive Director
Melissa Hemphill	Food Security Coordinator, Community Futures, LFI
Miriam Manley	Revelstoke Arts Council
Roberta Bobicki	Economic Development Commission, RCU
Sally Carmichael	Chamber of Commerce, Rotary
Stephanie Melnyk	RCMP Victims Services
Todd Hicks	SD19

Workshop #2

Date: October 19th, 2020

Description: GHG target survey results were shared with the group, the results of which are included below. The Big Moves were reviewed in detail so that the group had an understanding of the actions that would be evaluated and prioritized during the workshop. The details of the Big Moves are outlined in the main document of this CEEP report. The group was split into four breakouts groups to consider the priorities and opportunities for the City of Revelstoke based on the following themes: Electrify/Decarbonize Transportation, Shift Beyond the Car, Waste and Buildings. Business as usual and forecasted emissions were reviewed and options for the targets were discussed. There was desire for an aspirational target, which the participants agreed should be 'net-zero by 2050' – or aligning with the federal government. For the shorter-term target, the Province's target of 40% reduction by 2030 was agreed to be most suitable for the City. Significant emission reductions would be required from the transportation sector, which will be supported by the Province of BC's Zero-Emission Vehicle Mandate.

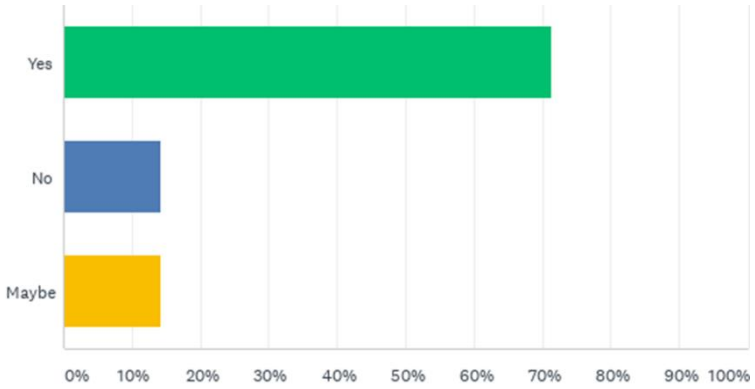
Stakeholders in attendance:

Name	**Organization**
Cindy Pearce	Public at Large
Connie Brothers	Collective Impact Leadership Committee
Kent Christensen	North Columbia Environmental Society
Kevin Dorrius	Community Futures
Leslie Hogg	Revelstoke Youth Network
Megan Tabor	Tourism Revelstoke
Melissa Hemphill	Food Security Coordinator, Community Futures, LFI
Miriam Manley	Revelstoke Arts Council
Roberta Bobicki	Economic Development Commission, RCU
Sally Carmichael	Chamber of Commerce, Rotary
Sheena Belll	Community Connections
Stephanie Melnyk	RCMP Victims Services
Todd Hicks	SD19

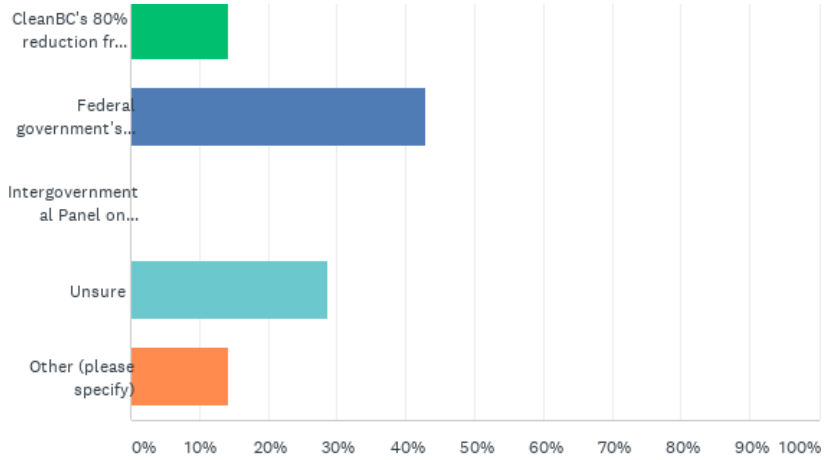
Survey results – Revelstoke targets

Prior to the second workshop, the group was asked to reflect on the targets they'd like to see for their community, including the inclusion of short and long-term targets, as well as level of ambition. The following page summarizes the survey feedback. Combined with the discussion at the second workshop with the group, it was determined that net-zero by 2050, and 40% by 2030 were appropriate targets for the community.

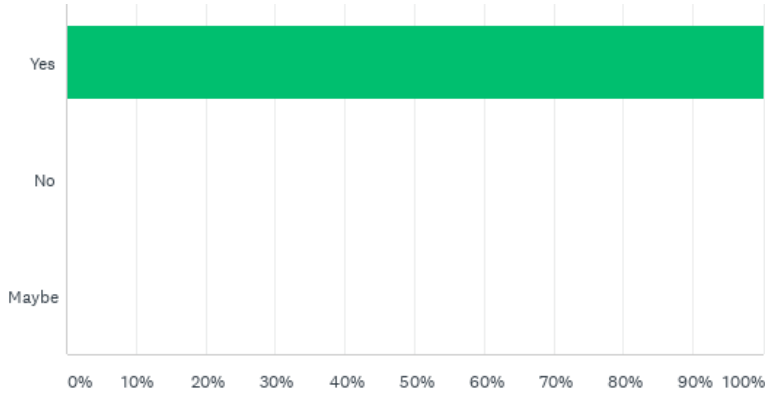
Should Revelstoke have a longer-term, aspirational GHG reduction target?



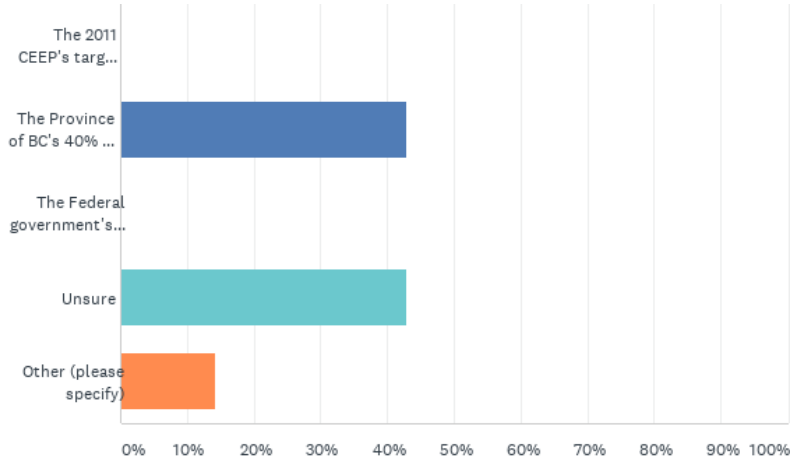
What long-term target should Revelstoke align with? (Federal government, or net-zero by 2050 was selected)



Should Revelstoke have a short-term, 2030 target?



What short-term target should Revelstoke align with? (Province of BC 40% by 2030 was selected)



Workshop #3

Date: December 7th, 2020

Though CEEP Quickstarts typically have just two workshops, the Focus Group were keen to learn more about the previous CEEP (completed in 2011) and to understand some of the barriers to implementation. Further, the group wanted the opportunity to walk through the priority actions and provide additional feedback. An opportunity to provide written feedback was then provided post-workshop. Those comments have been integrated into the main action tables of this CEEP.

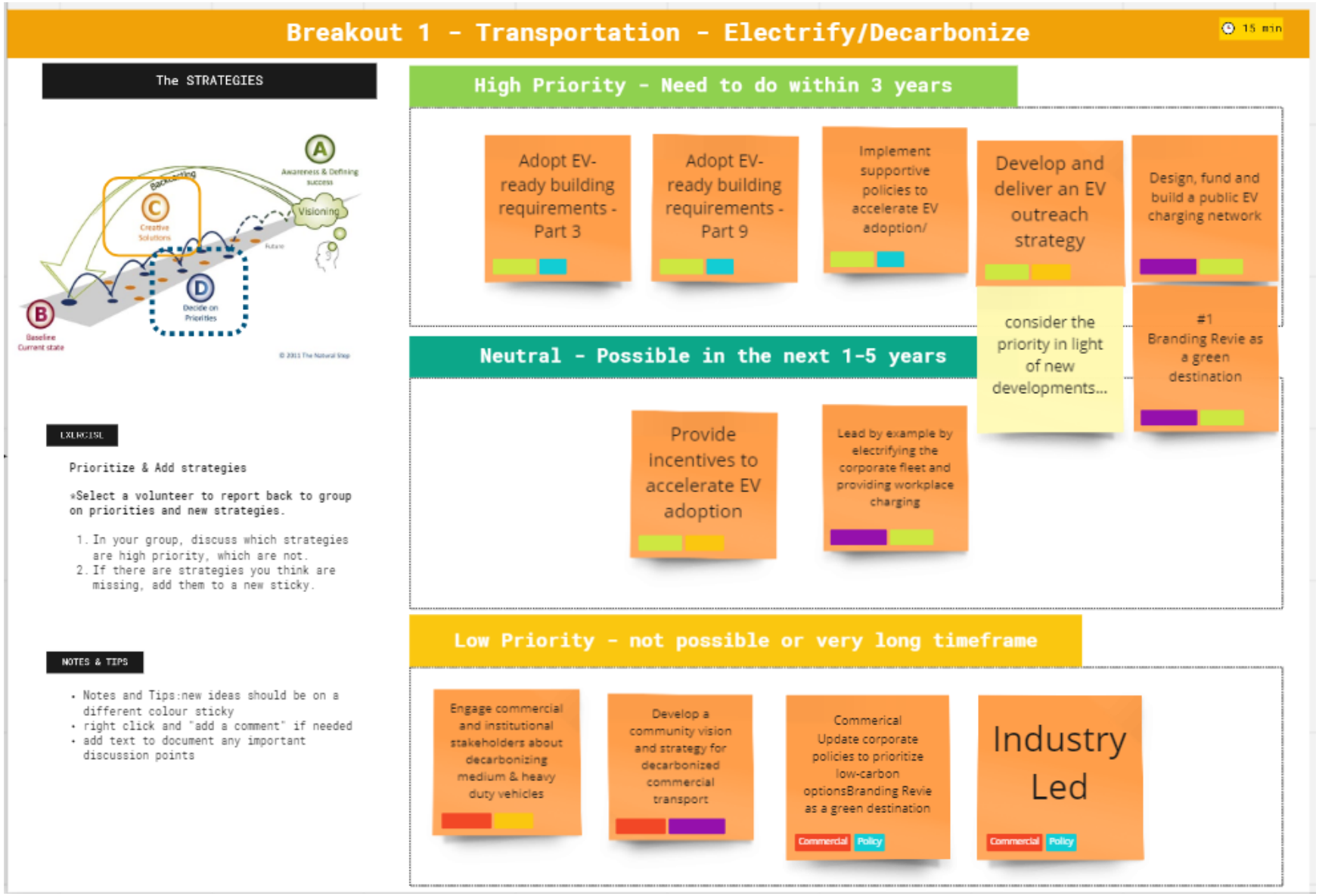
At the third workshop, the City of Reveltoke presented the 2011 CEEP outcomes and progress. Discussion took place around the challenges with implementation. The City of Revelstoke then provided an overview of the direction of climate action the City intends to take, including the extension of a climate action plan, and commitment to evaluate corporate emission reduction targets and actions.

The priority actions identified in Workshop 2 and reviewed through the post-workshop survey were presented to the group, and a discussion on implementation opportunities and barriers took place. The feedback was compiled into a Priority Actions summary document and presented back to the group post-workshop for consideration and comment.

Stakeholders in attendance:

Name	**Organization**
Cathy English	Revelstoke Museum and Archives
Cindy Pearce	Public at Large
Connie Brothers	Collective Impact Leadership Committee
Kent Christensen	North Columbia Environmental Society
Kevin Dorrius	Community Futures
Leslie Hogg	Revelstoke Youth Network
Megan Tabor	Tourism Revelstoke, Executive Director
Melissa Hemphill	Food Security Coordinator, Community Futures, LFI
Miriam Manley	Revelstoke Arts Council
Sally Carmichael	Chamber of Commerce, Rotary
Sheena Bell	Community Connections
Stephanie Melnyk	RCMP Victims Services
Todd Hicks	SD19

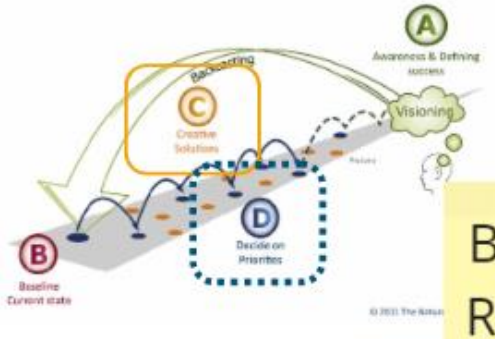
Miro board output – Action sorting, customizing and priortizing



Breakout 2 - Buildings / Renewable Energy

15 min

The STRATEGIES



EXERCISE

Prioritize & Add strategies

*Select a volunteer to report back to group on priorities and new strategies.

1. In your group, discuss which strategies are high priority, which are not.
2. If there are strategies you think are missing, add them to a new sticky.

NOTES & TIPS

- Notes and Tips:new ideas should be on a different colour sticky
- right click and "add a comment" if needed
- add text to document any important discussion points

High Priority - Need to do within 3 years

- Lead by example through corporate policies that prioritize low carbon retrofits
- Adopt the Energy Step Code and prioritize a low carbon approach - Community
- Build industry capacity through training and education programs
- Adopt the Energy Step Code and prioritize a low carbon approach - Corporate
- Encourage the construction of high performance new buildings through outreach and incentives
- BP Fee Rebate
- Build industry capacity through training and education programs
- Money /saving is the major driver for decisions. Find a way to make green solution more attractive financially
- Part 9 Single Family homes: - Financing - Incentives (Better Homes BC) - Identify and promote incentive programs
- Engage utilities and other orders of government to support local retrofit programs
- Support building-level renewable energy projects
- Enable retrofits through supportive policies and removing barriers
- Lead by example by retrofitting municipal facilities and investing in demonstration projects
- Marketing campaign for energy efficiency upgrades and low carbon energy systems
- Demo house for education - industry collaboration
- Pursue community-scale renewable energy systems

Low Priority - not possible or very long timeframe

- City becomes a leader in engagement and incentives (promotion and matching)
- Establish requirements for labelling, benchmarking and energy performance
- Incentives for energy advisors - 50% - in order to increase knowledge around opportunity

Breakout 3 - Waste

15 min

The STRATEGIES

EXERCISE

Prioritize & Add strategies

*Select a volunteer to report back to group on priorities and new strategies.

1. In your group, discuss which strategies are high priority, which are not.
2. If there are strategies you think are missing, add them to a new sticky.

NOTES & TIPS

- Notes and Tips:new ideas should be on a different colour sticky
- right click and "add a comment" if needed
- add text to document any important discussion points

High Priority - Need to do within 3 years

- Adopt policies that drive increased organics diversion
- continue to support bear-proof backyward composting (incentives)
- Find out what is biggest waste sources
- Implement and enhance organics collection (bear smart)
- CSRD is contstructing a composting facility
- Build a local or regional organics processing facility
- Collect construction, demolition, agricultural, and industrial wood waste

Neutral - Possible in the next 1-5 years

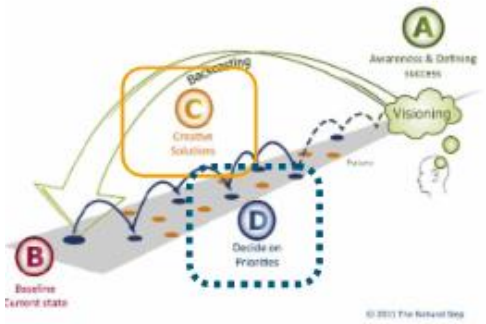
- Repair and reuse campaign and business / spaces
- Preserve forested lands within the municipal boundary
- Evaluate opportunities for landfill gas capture
- re-evaluate if new technology
- Develop and deliver a comprehensive zero-waste outreach program
- second home owners
- challenge due to transient population (link to Welcome Week)
- Need special strategy for hospitality

Low Priority - not possible or very long timeframe

- split - low carbon is high priority, CC is lower priority
- Engage industries to pursue low carbon and carbon capture technologies

Breakout 4 - Transportation - Shift Beyond the Car

The STRATEGIES



EXERCISE

Prioritize & Add strategies

*Select a volunteer to report back to group on priorities and new strategies.

1. In your group, discuss which strategies are high priority, which are not.
2. If there are strategies you think are missing, add them to a new sticky.

NOTES & TIPS

- Notes and Tips:new ideas should be on a different colour sticky
- right click and "add a comment" if needed
- add text to document any important discussion points

High Priority - Need to do within 3 years

- Build safe routes for walking, cycling and other forms of zero emission mobility
- Collaborate with transit providers to promote transit ridership
- Support a zero-emission transit network
- Pedestrianize zones (e.g. downtown core, grizzly plaza/ mackenzie)
- Optimize zoning bylaw and other policies for compact growth
- Collaborate with Engineering department (Steve Blacks) and community on the active trail development
- The combination of the safe routes and the transit shoudl address high and low mobility user groups
- Enable e-mobility on demand

...n the ...rs

- Optimize parking policies and mobility pricing
- Expand and invest in Kootenay Car Share
- Collaborating with ride-hailing providers
- "less high" priorities. still important

Low Priority - not possible or very long timeframe

- Develop and deliver an active transportation outreach strategy
- Raise availability of micro e-mobility
- Lead by Example - Corporate "Work From Home" Policy
- Develop "Work From Home" community and business engagement strategy
- note of strategies not being a priority..