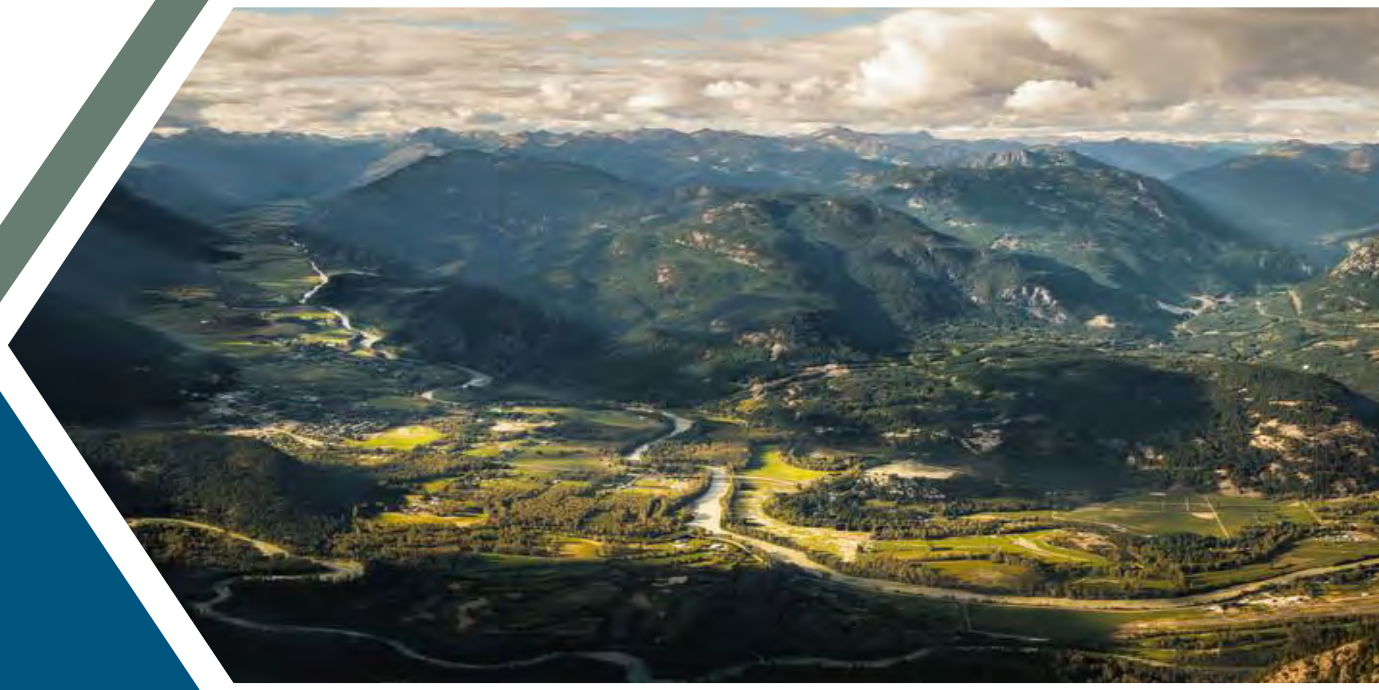
Community Climate Action Plan



Village of Pemberton

March 2022

Community Energy Association

Village of PEMBERTON

Table of Contents

Table of Figures

Acknowledgments

The Community Climate Action Plan (CCAP) was developed by the Village of Pemberton in collaboration with the Community Energy Association (CEA). Partial funding for this CCAP was provided by BC Hydro. We would like to acknowledge the many stakeholders, both individuals and organizations, who participated in the development of this Plan. We truly appreciate your time and comment.

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Executive Summary

The Village of Pemberton Community Climate Action Plan (CCAP) carves a path towards a low carbon future, one in which residents thrive in a connected, healthy, and prosperous community and act collaboratively and individually to address the challenges of climate change.

The Village of Pemberton has a legislative requirement to set targets to reduce greenhouse gas (GHG) emissions and develop plans to mitigate emissions. Having a CCAP ensures the Village of Pemberton is ready to apply for federal and provincial funding to implement strategies for climate change mitigation.

Village of Pemberton Community Greenhouse Gas Reduction Targets

50% reduction from 2007 levels by 2030

100% reduction from 2007 levels by 2050

The development of the Village of Pemberton CCAP included extensive research, analysis, modelling and engagement with the community. The CCAP identifies priority areas for actions to reduce community-wide GHG emissions. The CCAP focuses on lowering emissions created from local transportation, buildings and waste by applying six "Big Moves".

The six Big Moves are broad categories of actions that have the biggest impact on reducing the types of emissions over which the Village of Pemberton has the most influence, and that are unique to our emissions inventory.

The six Big Moves are:

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

The Community Climate Action Plan lays out strategies and actions under each of the Big Moves, based on the following municipal powers:

Infrastructure	Policy & Regulation	Engagement & Outreach
Investments in Village of Pemberton owned infrastructure that enable residents to make lower-emissions choices, such as active transportation networks and public charging stations.	Changes to Village of Pemberton policy and regulations 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 informed choices to reduce energy and emissions and prepare for a low carbon future.

The Village of Pemberton's energy and emissions inventory reveals that the community's largest source of carbon emissions is tied to passenger and commercial vehicles. Eighty-three per cent (83%) of Pemberton's emissions are generated by the combustion of mobility fuels such as gasoline or diesel. The remaining 17% of emissions mainly come from residential buildings and the community's waste decomposing in landfills. These statistics make it clear that the greatest potential emissions reductions will come from reducing the use of mobility fuels.

The Community Energy Association (CEA) modeled Pemberton's 'Business as Usual' scenario based on current demographic projections and technological developments with clear government policy support. The actions in this plan are designed to close the gap between the 'Business as Usual' scenario and our emissions reductions targets. The following table lists all the actions required for full implementation of Pemberton's CCAP:

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 land use policies and bylaws for compact growth			
	SHIFT 2: Enable walking, cycling and other forms of zero emission mobility			
	SHIFT 2.1 – Enable active transportation through plans and policies			
	SHIFT 2.2 – Build safe routes for walking, cycling and other forms of zero emission mobility			
	SHIFT 2.3 – Develop and deliver an active transportation outreach strategy			
	SHIFT 2.4 – Normalize car-free and zero-emission zones			
	SHIFT 2.5 – Promote micro e-mobility and on-demand mobility services			
	SHIFT 3: Promote transit ridership and support a zero-emissions transit network			

Big Move	Strategy	Timeframe		
		Short	Med	Long
	SHIFT 3.1 – Collaborate with government stakeholders to increase service and promote transit ridership			
	SHIFT 3.2 – Collaborate with transit providers to transition to a zero-emissions transit network			
	Total annual GHG emissions reductions for this Big Move: 472 $tCO2_e$ in 2030			
Electrify Transport 	**ELECTRIFY 1: Enable charging on-the-go**			
	ELECTRIFY 1.1 – Design, fund and build a public Electric Vehicle (EV) charging network			
	ELECTRIFY 2: Enable charging at home and work			
	ELECTRIFY 2.1 – Accelerate EV-ready building requirements for new buildings			
	ELECTRIFY 2.2 – Enable EV charging in existing residential, multi-family and commercial buildings			
	ELECTRIFY 3: Encourage Electric Vehicles (EVs) through outreach and supportive policies			
	ELECTRIFY 3.1 – Develop and deliver an EV outreach strategy			
	ELECTRIFY 3.2 – Accelerate EV adoption through supportive policies and incentives			
	ELECTRIFY 4: Support businesses to transition to a low-carbon fleet			
	ELECTRIFY 4.1 – Engage commercial stakeholders to facilitate transition			
	Total annual GHG emissions reductions for this Big Move: 2,945 $tCO2_e$ in 2030			
Step Up New Buildings 	**NEW BUILDINGS 1: Adopt the Energy Step Code with a Low Carbon Approach**			
	NEW BUILDINGS 1.1 – Accelerate implementation of the BC Energy Step Code			
	NEW BUILDINGS 1.2 – Adopt a low carbon approach to the BC Energy Step Code			
	NEW BUILDINGS 2: Build Industry Capacity to Deliver High Performance Buildings			
	NEW BUILDINGS 2.1 – Continue to provide outreach and incentives			
	NEW BUILDINGS 2.2 – Continue to provide training and coordination			
	Total annual GHG emissions reductions for this Big Move: 184 $tCO2_e$ in 2030			
`Decarbonize Existing	**EXISTING BUILDINGS 1: Improve Energy Efficiency**			
	EXISTING BUILDINGS 1.1 – Encourage and enable deep energy retrofits			
	EXISTING BUILDINGS 2: Encourage and Enable Fuel Switching			
	EXISTING BUILDINGS 2.1 – Encourage and enable building electrification			
	EXISTING BUILDINGS 3: Build Industry Capacity and Increase Demand			

Big Move	Strategy	Timeframe		
		Short	Med	Long
Buildings 	EXISTING BUILDINGS 3.1 – Establish a long-term energy efficiency and decarbonization campaign			
	EXISTING BUILDINGS 3.2 – Build industry capacity for energy efficiency and decarbonization			
	Total annual GHG emissions reductions for this Big Move: 448 $tCO2_e$ in 2030			
Close the Loop on Waste 	**WASTE 1: Divert Organics from Landfill**			
	WASTE 1.1 – Collaborate to adopt policies that increase organics diversion			
	WASTE 1.2 – Partner to enhance organics collection and processing			
	WASTE 1.3 – Identify strategies to Divert construction, demolition, agricultural and industrial wood waste			
	WASTE 1.4 – Promote the Regional District's comprehensive zero-waste outreach program			
	Total annual GHG emissions reductions for this Big Move: 980 $tCO2_e$ in 2030			
Organizational Leadership 	LEADERSHIP 1.1 – Establish Broad Support for the Community Climate Action Plan			
	LEADERSHIP 1.2 – Building Staff and Financial Capacity for implementation			
	LEADERSHIP 1.3 – Institutionalize the Community Climate Action Plan			
	LEADERSHIP 1.4 – Communicate the Village's Intended Actions on Climate Change			
	Total Annual Plan Reductions by 2030	**5,029 $tCO2_e$**		

Introduction

Pemberton's Commitment to Climate Action

Climate change is occurring, and local governments, like the Village of Pemberton, have a unique role to play to help residents reduce community-wide emissions of greenhouse gases. In June 2008, the Village signed the **BC Climate Action Charter**, a voluntary agreement between the Province of British Columbia, the Union of British Columbia Municipalities (UBCM), and individual local government signatories. By signing the Charter, the Village of Pemberton committed to:

- Create complete, compact, and more energy-efficient communities;
- Measure and report corporate greenhouse gas emissions; and
- Become carbon neutral in corporate operations.

Provincial legislation, the *Local Government (Green Communities) Statutes Amendment Act* (Bill 27, 2008), requires local governments to incorporate tailored GHG targets, policies, and actions into their Official Community Plans (OCPs).

Developing a Community Climate Action Plan allows the Village to establish those targets, strategies and actions and do our part to reduce global emissions. It also ensures that the Village of Pemberton is ready to apply for federal and provincial funding to implement strategies in the Plan. Implementing the Plan will deliver numerous social, economic, and environmental co-benefits to the Village of Pemberton, as outlined in
Figure 1. A summary of Climate Action occurring at provincial and federal government levels is attached as **Appendix A**.

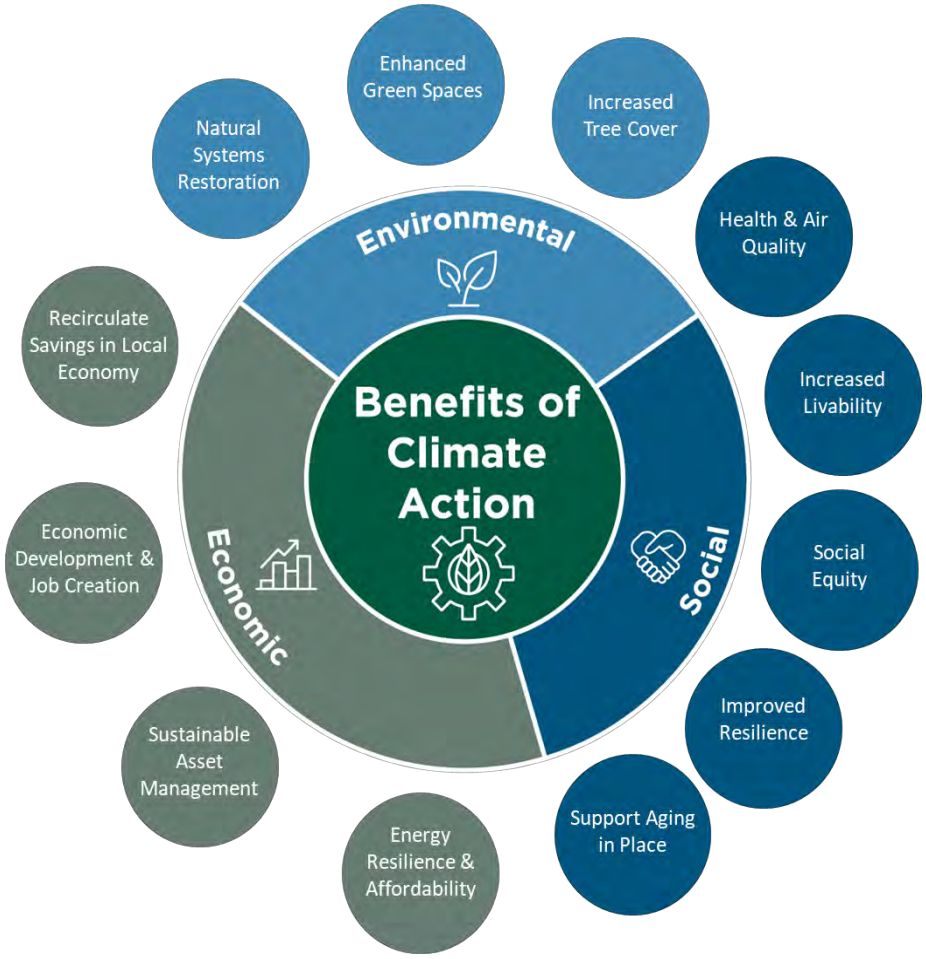


Figure 1 - Climate Action Co-Benefits (Source: Community Energy Association or CEA)

The Process Used to Develop the Community Climate Action Plan

The development of the Community Climate Action Plan (CCAP) CCAP included extensive research, analysis and engagement with key community stakeholders, subject-matter experts and residents. The steps taken to create the CCAP are outlined in Figure 8. The Village worked with the Community Energy Association (CEA) to complete the modelling and data analysis. Throughout the process, the Village offered several community engagement opportunities. A summary of the engagement and the results is presented in **Appendix B**.

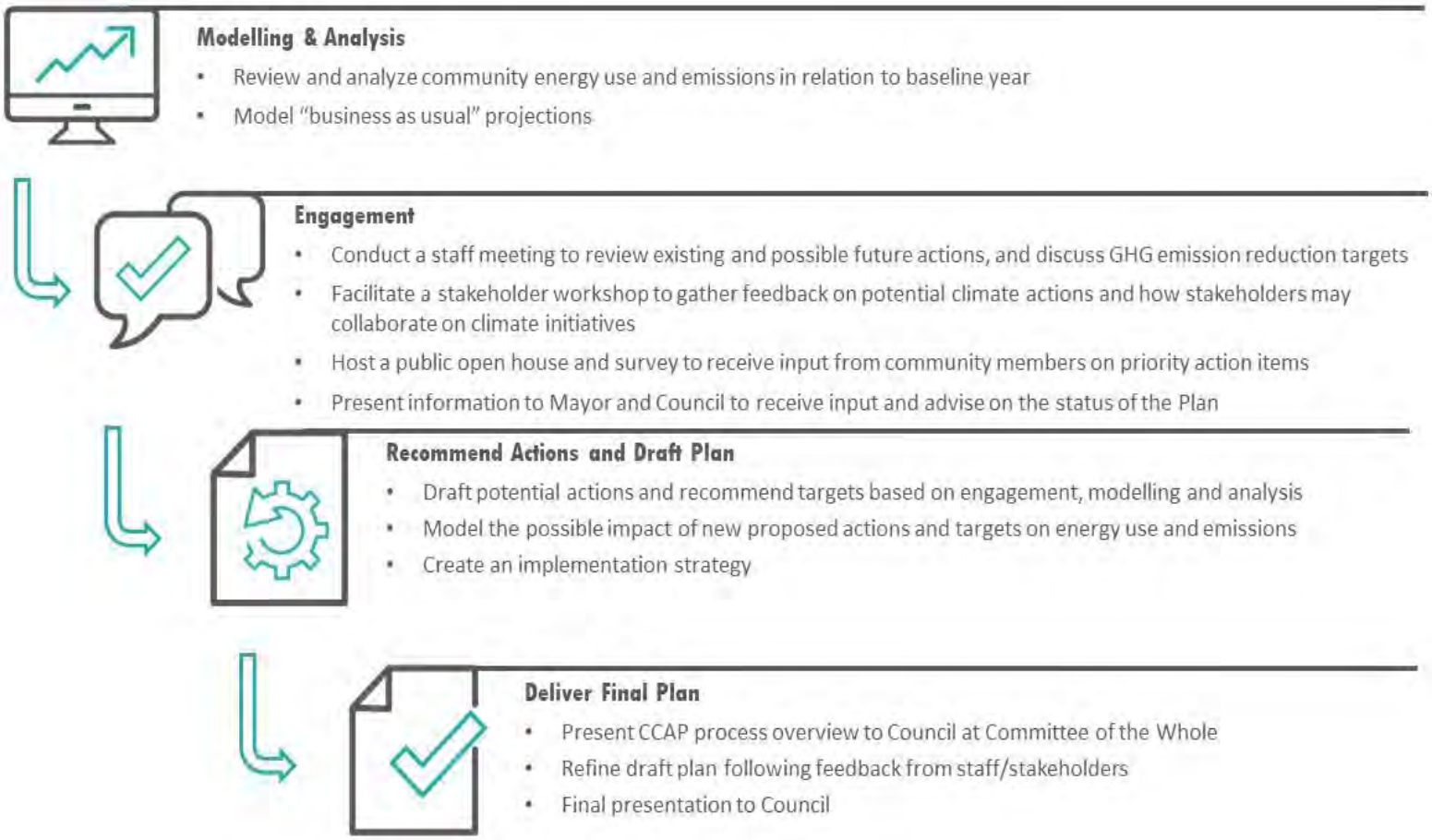


Figure 2 - Process Diagram for Community Climate Action Plan Creation (Source: CEA)

A Note on Community Engagement

While **Appendix B** presents a full description of community engagement undertaken to help inform the CCAP, the inclusion of various findings from the community climate action survey are presented throughout the CCAP in the following way:

91% of survey respondents either strongly agreed or somewhat agreed that *climate change constitutes an emergency for Pemberton.*

When asked what their household was doing on climate action, the top three responses in the survey were; *buying second-hand items, eating less meat and dairy, and growing their own food*.

What is the focus of the Community Climate Action Plan?

Climate action consists of both reducing greenhouse gas[1] (GHG) emissions, known as mitigation, and preparing for the impacts of a changing climate, known as adaptation. The CCAP focuses on mitigation efforts to reduce or prevent GHG emissions[2]. As shown in Figure 3, emissions can be categorized in different ways. Consumptive emissions are all the GHG emissions that are released in the process of producing and transporting the goods and services we consume. Territorial emissions are all emissions that occur within a certain geographic boundary (for example, within our municipal boundary).

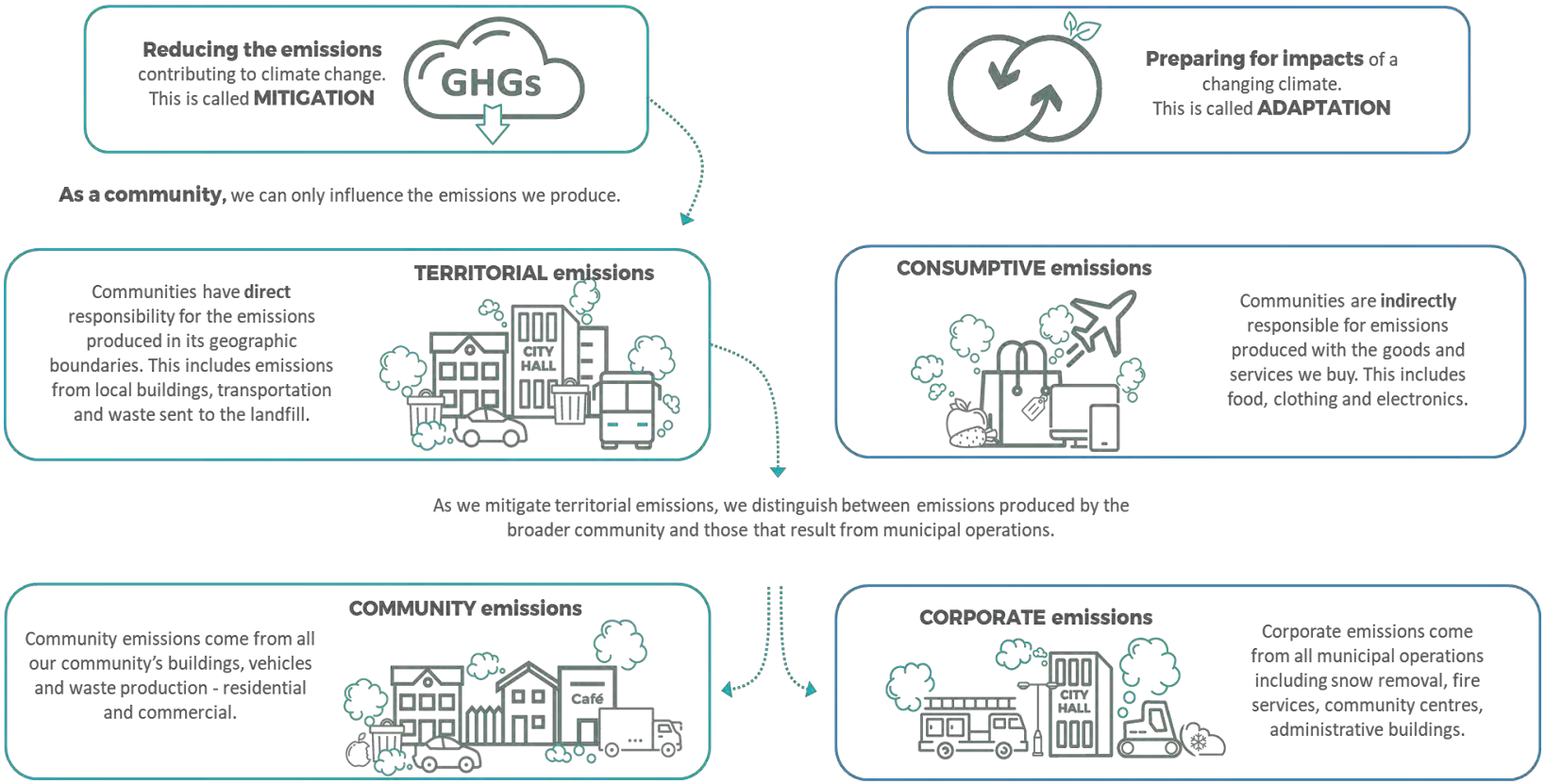


Figure 3 - Ways of Categorizing Emissions (Source: CEA)

[1] A greenhouse gas (or GHG for short) is any gas in the atmosphere that absorbs and re-emits heat, and thereby keeps the planet's atmosphere warmer than it otherwise would be. The main GHGs in the Earth's atmosphere are water vapour, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O) and ozone.

[2] GHGs occur naturally in the Earth's atmosphere, but human activities, such as the burning of fossil fuels, are increasing the levels of GHG's in the atmosphere, causing global warming and climate change.

Local Government has greater influence over territorial emissions than over consumptive emissions or embodied carbon[3], so the CCAP focuses on mitigating territorial or 'place-based' emissions. While consumptive emissions and embodied carbon are currently outside the scope of the CCAP, they are important considerations for Village of Pemberton residents and businesses when buying goods or services. Survey engagement results demonstrate Pemberton residents are already making sustainable purchasing decisions like buying second-hand and growing their own food, which is very positive. It is important to critically examine how far a consumer item must travel, and how it is packaged when making purchasing choices. One obvious alternative is to 'buy local' and support local food production where possible, which supports our local economy, reduces the community's carbon footprint, and helps create a net zero future. Many other online resources exist to help individuals reduce consumption-related emissions and become more conscientious consumers[4].

Figure 4 - A Net Zero Future (Source: BC Climate Leaders Playbook/CEA)

Territorial emissions can be further broken down into emissions directly resulting from the operations of the local government, referred to in this report as corporate emissions, and those that result from the activities across the entire community, called community emissions. The CCAP outlines broad actions that the municipality can influence at a community-wide level to mitigate community territorial emissions. While mitigation is an important component of Pemberton's overall climate action strategy, an adaptation plan is also critical, which is why development of an Adaptation Plan is also identified as an action in this plan. An updated Corporate Energy and Emissions Reduction Plan is another action that is recommended in the CCAP.

[3] Consumptive emissions are emissions influenced by consumer activity and refers to the volume of imports and the mix of energy sources used to produce the goods consumed. Embodied carbon is another way to categorize emissions and refers to the emissions associated with extracting raw materials, manufacturing products, and transporting materials throughout the value chain.

[4] See for example: https://news.climate.columbia.edu/2020/12/16/buying-stuff-drives-climate-change / ; https://www.wri.org/climate/expert-perspective/changing-behavior-help-meet-long-term-climate-targets and https://davidsuzuki.org/what-you-can-do/four-places-cut-carbon/

Leveraging Municipal Authority to Reduce Community Emissions

The Village of Pemberton CCAP focuses on leveraging municipal powers or authorities to help residents and businesses reduce emissions and thereby help mitigate the effects of climate change. These actions will have the added benefit of helping community members save money on energy. Residents and businesses in the Village of Pemberton also play a key role: a significant reduction in territorial GHG emissions depends on individual and communal choices about how to get around, where to live and how to handle food waste and yard material. The CCAP lays out actions the Village can undertake to influence individual and communal choices across six 'Big Moves' related to transportation, buildings, waste and organizational leadership:

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

The actions identified in the CCAP fall into three categories of municipal powers:

Infrastructure	Policy & Regulation	Engagement & Outreach
 Investments in the Village of Pemberton owned infrastructure that enable residents to make lower-emissions choices, such as active transportation networks and public charging stations.	 Changes to Village of Pemberton policy and regulations 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.

Where We Are Starting From - Current Energy, Emissions and Costs

The CCAP utilizes detailed data on energy use, emissions and energy expenditures from British Columbia's Community Energy & Emissions Inventory (CEEI) data. This data set was chosen as it is the most granular available to understand Pemberton's territorial emissions. It includes community specific data gathered from utilities and industry associations. See **Appendix C** for further discussion on the inventory and modelling methodology.

Pemberton is a small community with a population of 3,407 people according to the 2021 Census. Pemberton is comprised of several neighbourhoods that are relatively close to each other. About one third of our residential buildings are single-family homes, just over one third are townhouses and the remaining are mostly apartments. About 75% of residents own their home, and the remaining 25% rent. Over half of all dwellings were built between 1990 and 2005. Pemberton does not have natural gas utility services, but some homes are heated with propane. Data on the number of structures heated with propane was not available when the CCAP was prepared.

Most residents get around by car and truck; however, Pemberton does have local transit and is expanding its cycling network. The Village of Pemberton currently provides two Level 2 electric vehicle-charging stations. There is also charging stations available through a commercial accommodation business within the Village. Some of Pemberton's organic waste goes to a nearby compost processing facility for local processing.

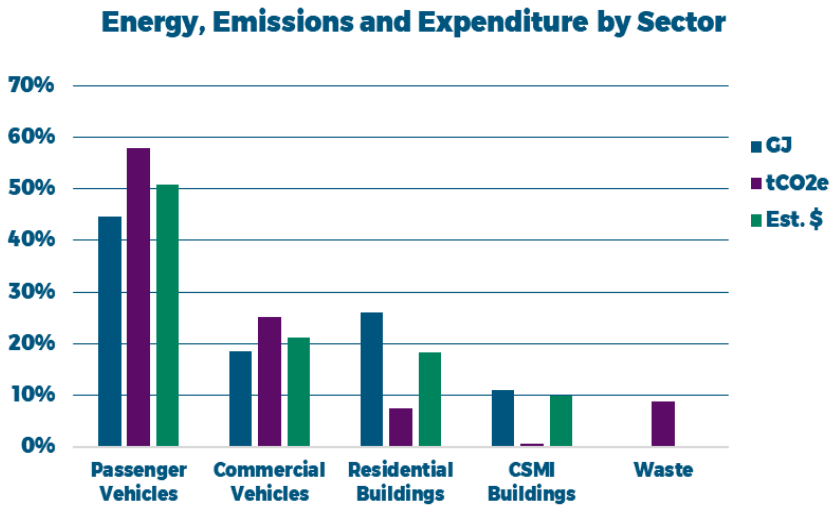


Figure 5 - Current Energy, Emissions and Expenditure by Sector (Source: CEA - Appendix A)

Figure 5 shows energy consumption (GJ), GHG emissions (tCO2e) and energy expenditure (estimated $) by sector in 2018. The chart includes the five main sources of territorial emissions:

- Passenger Vehicles
- Commercial Vehicles
- Residential Buildings
- Commercial and Small-Medium Industrial (CSMI) buildings
- Waste

In 2018, for the whole of the Village of Pemberton:

- Total energy consumption was estimated at 470,808 gigajoules (GJ)
- Total GHG emissions were estimated at 24,485 tonnes of carbon dioxide equivalent ('tCO2e'[5])
- Total energy expenditure was estimated at $14,662,202

[5] 'Carbon dioxide equivalent' or 'CO2e' is a term for describing different greenhouse gases in a common unit. For any quantity and type of greenhouse gas, CO2e signifies the amount of CO2, which would have the equivalent global warming impact.

Eighty-three per cent (83%) of Pemberton's emissions are generated by the combustion of mobility fuels such as gasoline or diesel. Passenger vehicles account for 58% of Pemberton's GHG emissions and commercial vehicles account for 25%. Residential buildings account for 7% of GHG emissions and emissions from Commercial, Small, and Medium Industry (CSMI) buildings account for 1%. The decomposition of Pemberton's waste in landfill accounts for 9% of emissions. The Village of Pemberton does not have a landfill within its boundaries, so our waste decomposes in landfills located in other jurisdictions.

Passenger vehicles are responsible for 51% of energy expenditure with the Village of Pemberton. This is the money spent by Pemberton residents at the pump filling the tank of their personal vehicles, and most of the money spent on fuel leaves the community. As well, a significant amount of money is spent on residential energy consumption, accounting for 18% of Pemberton's total energy expenditure. Most of a residential energy bill is due to heating, and this can be a financial burden for many people.

There is no energy consumption or expenditure associated with waste in this inventory. The energy consumption and expenditure required to transport the waste to the transfer station and then on to a landfill is included in the Commercial Vehicles category. The Village does not operate a landfill, therefore, the transport of waste does use fuel sources, and its decomposition in external landfills contributes to GHG emissions attributable to our community.

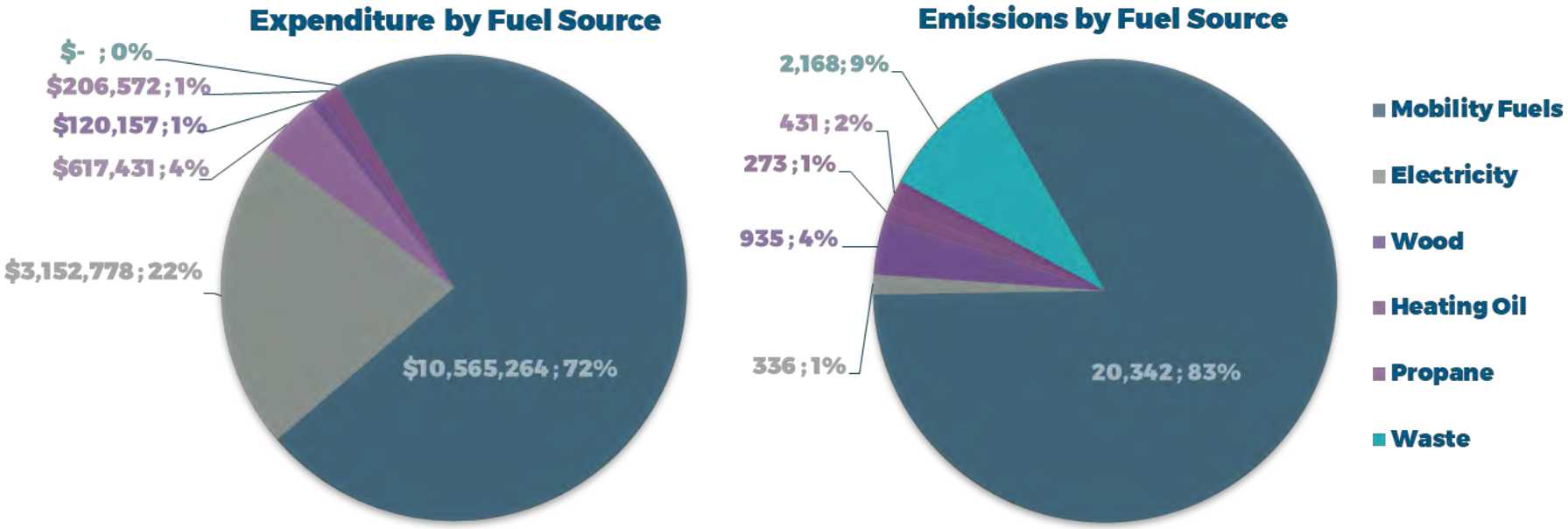


Figure 6 - Energy Expenditure ($) and Emissions (tCO2e) by Fuel Source (Source CEA – Appendix E)

Figure 6 shows Pemberton's energy expenditure and emissions in terms of fuel source rather than sector. Looking at expenditure and emissions in this way can reveal some interesting trends. Pemberton is not connected to the natural gas grid and therefore most homes use electricity for heating. Electricity in British Columbia (BC) has very low emissions associated with it, but it is more expensive per unit of energy than natural gas. Electricity is primarily used in buildings, but small amounts may be used in other sectors, such as passenger vehicles (electricity for electric vehicles or EVs). Heating oil, propane and wood account for 7% of emissions and 6% of expenditure combined because they are not the main source of energy in most buildings.

Gasoline and diesel are mobility fuels. These are the fuels that are used to power most personal and commercial vehicles. They contribute 83% of total community emissions and account for 72% of energy expenditure. These statistics highlight that the greatest potential emissions reductions will come from reducing the use of mobility fuels.

A Note on Climate Change and Health

Vancouver Coastal Health (VCH) was an important stakeholder in the development of the CCAP. VCH urged the Village of Pemberton Staff to consider the health impacts of climate change, which have been well documented.[6] Our Health Region has begun to see an increase in illness and morbidity related to severe weather events, and it is anticipated that negative effects will become more frequent and severe as the climate continues to change. Collectively, we must take action to reduce these growing human health impacts. To align with the *Paris Agreement*[7] goal of keeping warming below 1.5 degrees Celsius, actions to reduce emissions now will be key to preventing negative health impacts in the future.

Figure 7 - Climate Change Health Impacts / Populations at Highest Risk (Source: Vancouver Coastal Health)

Climate change presents a number of risks to human health that range from heat-related illness to exacerbations of cardiovascular and respiratory disease, to impacts on food security. These impacts are felt disproportionately across our population, and targeted actions are needed to mitigate the negative health and equity impacts for those who are most susceptible. Figure 8 summarizes current and expected risks as well as the populations at highest risk of being impacted.

In 2021 alone, BC has experienced unprecedented heat waves that resulted in deaths across the VCH region. Significant wildfire events across the province over the past few years leading to smoke in the region impacted respiratory and cardiovascular health; and several extreme weather events in the fall, including strong winds and heavy precipitation leading to flooding, landslides, and displacement caused impacts to agriculture and our supply chain, in addition to injury and death. Forecasts predict that these events will not only become more common over time, but they will also be more intense with greater potential for damage. It is anticipated that along with these predictions, the negative health effects associated with climate change will also become more frequent and severe as the climate continues to change. This is an important consideration for a small community with limited health services and an aging population. Figure 8 shares a VCH infographic to help communities envision a healthy, low-carbon, climate-resilient future.

[6] Sources include https://www.who.int/news-room/fact-sheets/detail/climate-change-and-health; https://www.cma.ca/news/cma-continues-support-actions-tackling-climate-change-ahead-cop26; https://climatechoices.ca/reports/the-health-costs-of-climate-change/

[7] The Paris Agreement is a legally binding international treaty on climate change. It was adopted by 196 Parties at COP 21 in Paris, on 12 December 2015. https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement

Figure 8 - Creating a Healthy, Low-Carbon, Climate-Resilient Future (Source: Vancouver Coastal Health)

In contrast, climate action has numerous positive health effects. For example, complete, compact, and connected communities encourage the use of active transportation increasing residents' physical activity and strengthening social connections. Land uses that do not prioritize vehicle movement with high speed, wider roads and large distances between destinations, are associated with decreases in collisions and fatalities. Moving away from a dependence on fossil fuel vehicles decreases exhaust, a major source of air pollution in our region. Scientific evidence shows that pollution of this type is associated with negative health outcomes including asthma onset and exacerbation, reduced lung function, lung cancer and cardiovascular disease.

Backcasting and Forecasting

There were two different approaches used in the development of the Village of Pemberton CCAP: 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 experiences. Used in combination, these two approaches provided us with a clear positive vision of the future and a measurable plan to start us on the pathway to our destination.

Figure 9 - Backcasting Diagram (Source: The Natural Step 2011)

Backcasting is a planning approach that starts by defining the future vision before working backwards to identify and prioritize creative solutions to reach that desired future

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

Over the course of two workshops, Village of Pemberton staff and stakeholders developed a Vision of their desired low carbon future, focusing on three sectors: transportation, buildings, and waste, which included

- Identifying the current state of the sectors
- Brainstorming creative solutions to compliment the Big Moves
- Prioritizing the solutions.

The Vision - Pemberton's Low Carbon Future

During the CCAP planning process, community stakeholders went through a visioning backcasting exercise to imagine what a low carbon future for the Village of Pemberton could look like. The group chose the year 2040 as our visioning year to allow for a slightly longer time horizon than to 2030 (less than eight years from now) to give sufficient time to imagine the changes happening. Pemberton's low carbon future vision is stated below:

In 2040, emissions in Pemberton will be reduced by more than 50%. The water and the air we breathe will be cleaner and natural systems will be in thriving. In 2040, you will walk out the front door into a liveable community where concrete has dwindled and natural spaces are abundant. A variety of new mobility services are available to support the needs of all residents and visitors. Congestion is reduced and you arrive at your destination more efficiently. You can also choose to travel by e-bike, scooter or zero-emission public transit.

The air in Pemberton is cleaner because there are far fewer cars on the street and most are electric. There is less noise and much more space for parks and pedestrian-only streets as active and alternative transportation has been prioritized.

People are trying out new types of living arrangements with more shared functions and spaces. More houses are built with wood, which makes them more comfortable to live in and much better for the climate than concrete buildings with less embodied carbon.

Almost all waste generated in Pemberton is diverted from landfill. Residents take their food scraps and yard trimmings to a local organics processing facility which produces compost for local food production.

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

The Future of Transportation	The Future of Buildings	The Future of Waste
A complete zero-emission transportation system connects our community and region.	Our community's buildings are exceptionally energy efficient, and powered, heated and cooled with 100% renewable energy.	Our community diverts all organic waste, such as food scraps and yard trimmings, from landfills and recovers value from everything that enters the waste stream.

Pemberton's Targets for Reducing Emissions

Provincial legislation – the *Local Government (Green Communities) Statutes Amendment Act* (Bill 27, 2008) requires that each local government establish emission reduction targets to mitigate climate change. Setting a 'target' is the first step towards accomplishing a goal. Stakeholders and residents agreed that the Village of Pemberton needs an ambitious target to help spur change. Our region should also attempt to align our targets with those established at provincial, federal, and international levels. International treaties, such as the legally binding *Paris Agreement* reached during the United Nations Climate Change Conference (COP21), call for emissions to peak as soon as possible to limit the impact of climate change. The *Canadian Net-Zero Emissions Accountability Act*, which became law on June 29, 2021, enshrines in legislation Canada's commitment to achieve net-zero emissions by 2050. These ambitious agreements create a strong call to action to reduce our GHG emissions.

The Village of Pemberton's long-term community target for territorial emissions mitigation aligns with the *Intergovernmental Panel on Climate Change* (*IPCC*)[8] and are as follows:

The Village of Pemberton's Community Emissions Reduction Targets are:

50% reduction in territorial GHG emissions below 2007 levels by 2030

100% reduction in territorial GHG emissions below 2007 levels by 2050

To meet the 2030 target, the Village of Pemberton needs to reduce greenhouse gas emissions by at least 10,688 tonnes of carbon dioxide equivalent (tCO2e) per year, relative to 2007 levels. As the CCAP will demonstrate, under a 'Business as Usual' Scenario, annual emissions are expected to be reduced by 4,248 tonnes CO2e as a result of federal and provincial climate policy. The actions that will be presented later in the CCAP are designed to address this gap.

[8] https://www.ipcc.ch/sr15/

Modelling the 'Business as Usual' Forecast

'Business as Usual' and or 'BAU' is a way of describing what is estimated to happen to Pemberton's emissions if the Village takes no further action to decrease emissions beyond what they are already doing and plan to do. Figure 10 shows emissions from the five sectors stacked on top of one another to show Pemberton's GHG emissions inventory from 2007 to 2018 and its 'Business as Usual' forecast from 2019 to 2050. The modelling methodology used to by the Community Energy Association to determine these calculations for the Village of Pemberton is described in detail in **Appendix C**.

Several factors are considered to develop 'Business as Usual' emissions scenarios, population growth being one of the most important. As the number of people increase in a community, more buildings are needed/used and more vehicles are expected on local roads.

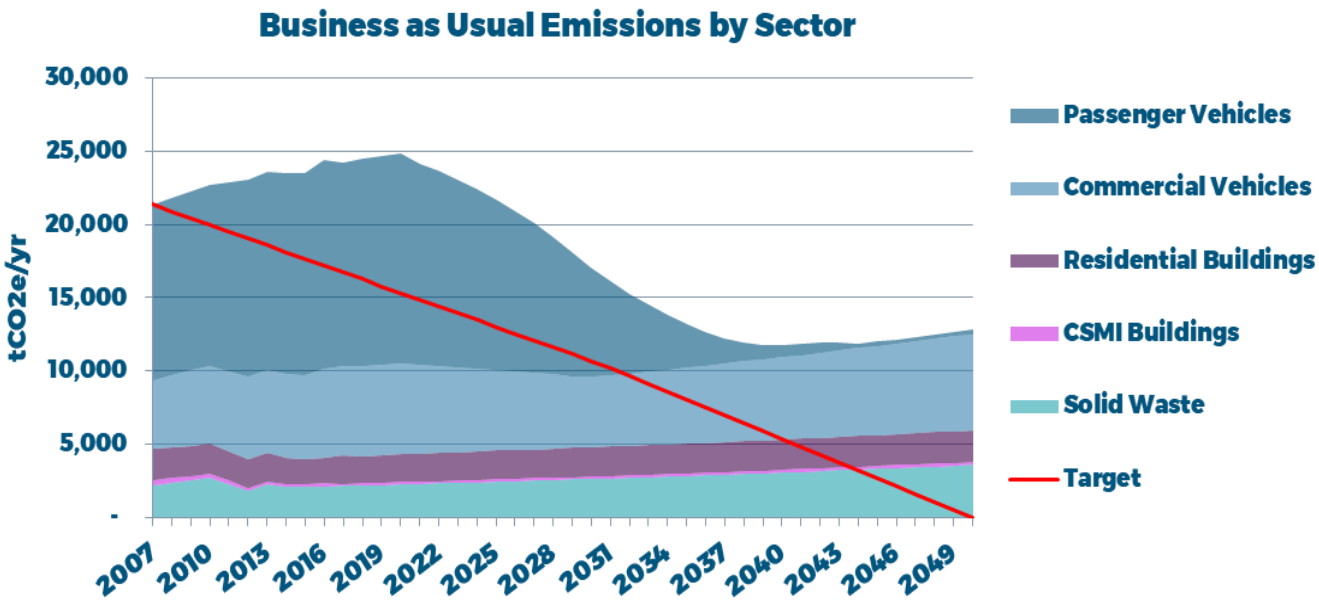


Figure 10 - 'Business as Usual' GHG Emissions by Sector (Source CEA – Appendix C)

Other factors that were considered to develop the Village of Pemberton's BAU emissions scenario for this report include how climate patterns are changing. IPCC (2021) predicts drier, hotter summers and warmer winters that will change the way energy is consumed in buildings. The BAU projection also attempts to factor in technological improvements that are supported by policies already adopted by other levels of government, such as: renewable and low carbon fuel standards implemented by the provincial government which reduce the carbon intensity of mobility fuels

- Vehicle tailpipe emissions standards which mandate fuel efficiency improvements for all new vehicles sold
- Zero-Emission Vehicle (ZEV) mandates 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* ready buildings by 2032 (progressive steps towards net zero energy).

The Business as Usual projection does not account for technological improvements such as electrification of commercial vehicles that do not have a clear policy time horizon.

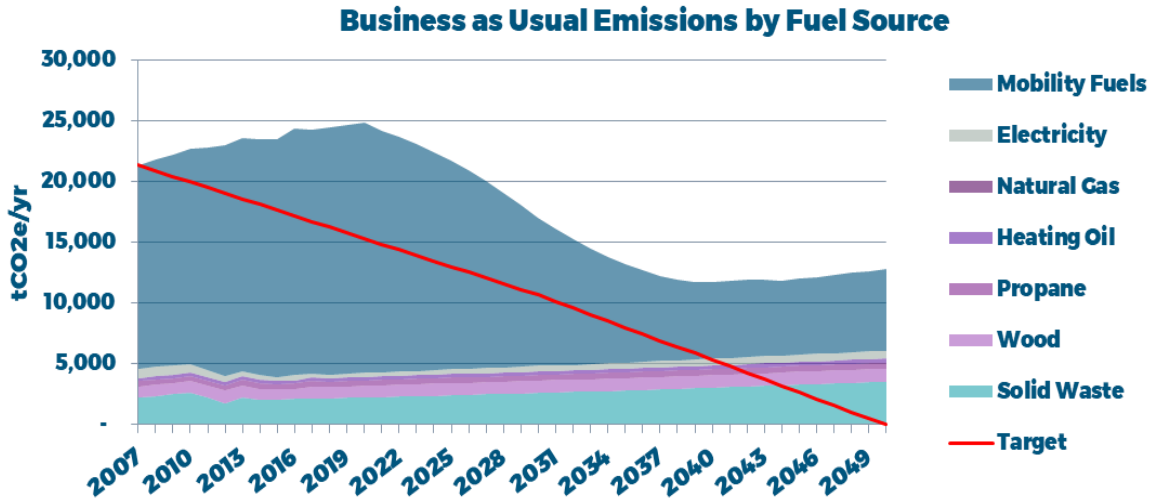


Figure 11 - 'Business as Usual' GHG Emissions by Fuel Source (Source CEA – Appendix C)

Figure 11 shows emissions by fuel source. Between 2007 and 2018, emissions increased by 14.5%, with some annual fluctuations in between. Emissions are expected to decline from 2021 onwards. Under a Business as Usual scenario, annual emissions are expected to be reduced by 4,248 tonnes per year as a result of federal and provincial climate policy. The biggest reductions are expected to come from passenger vehicles and mobility fuels. This is due to Provinical Climate Policy such as the *Zero Emission Vehicles Act* in British Columbia.

The red line indicates Pemberton's emissions reduction target. As can be seen from the chart, in a Business as Usual scenario, Pemberton will not meet this target at any point between now and 2050.

Forecasted Emissions Reductions Through Full Implementation

The actions in this plan are designed to address the gap between BAU emissions reductions and the Village's emissions reductions targets. Figure 12 shows the modelled emissions reduction by each Big Move, relative to Business as Usual. If all **Big Moves** are implemented to the degree outlined in the CCAP, the Village of Pemberton will nearly meet its 2030 target. Although the 2050 emission reduction target is not met, it is anticipated that new technologies will become available, supported by clear government policy requirements for adoption, which will close the gap.

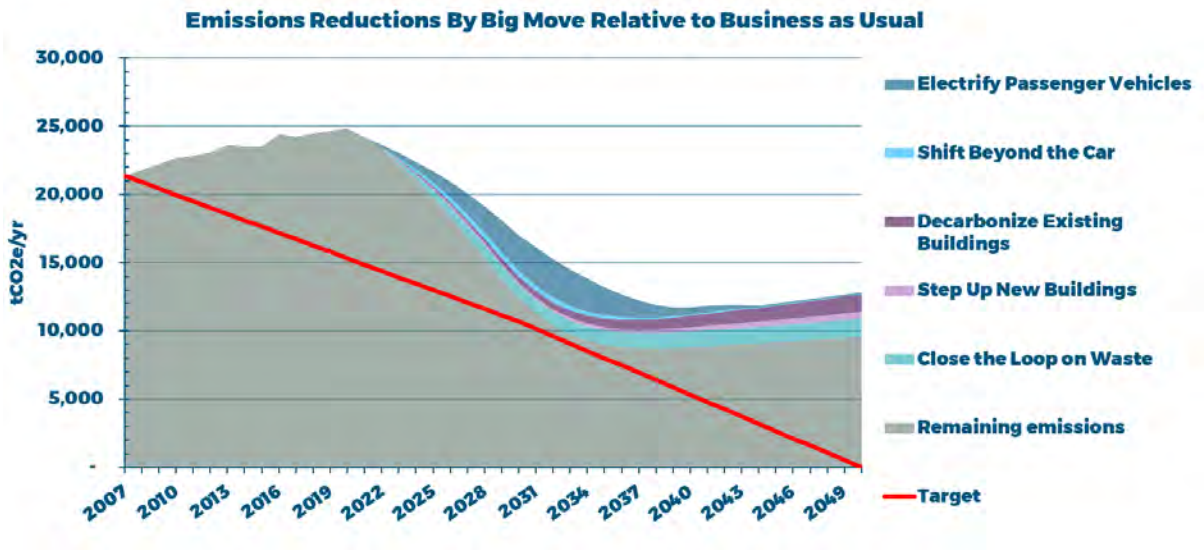


Figure 12 - Modelled Emissions Reduction (Source CEA – Appendix C)

Figure 13 shows the emissions reduction per Big Move in 2030 relative to BAU. While the BAU scenario assumes a certain level of passenger vehicle electrification, this Big Move presents the greatest opportunity for further emission reductions, at 2,945 tonnes CO_2e. Retrofitting the existing building stock to make homes more energy efficient and fuel switching for those still using fossil fuel heating presents savings of 448 tonnes CO_2e. Improving the rate of organics diversion from landfill could save 980 tonnes CO_2e annually by 2030.

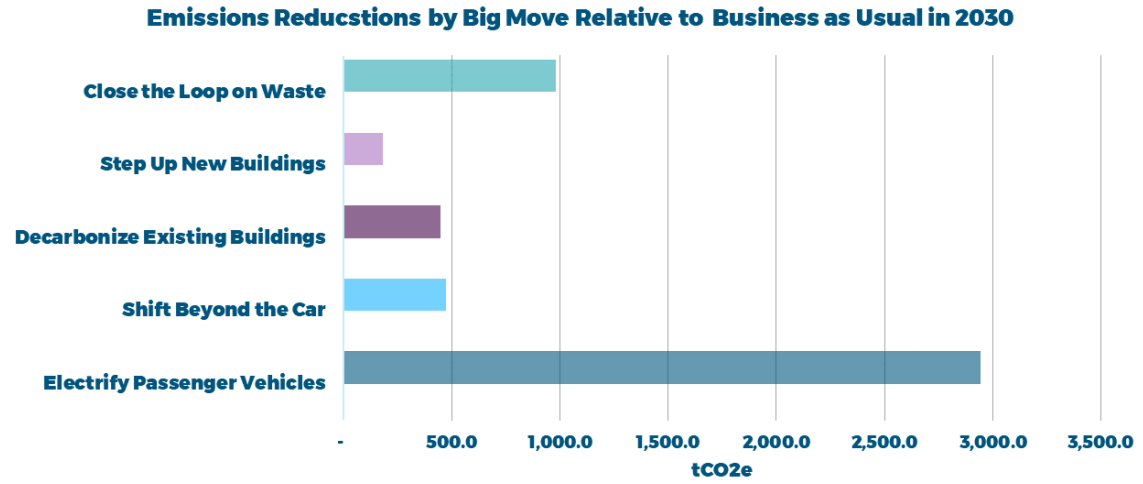
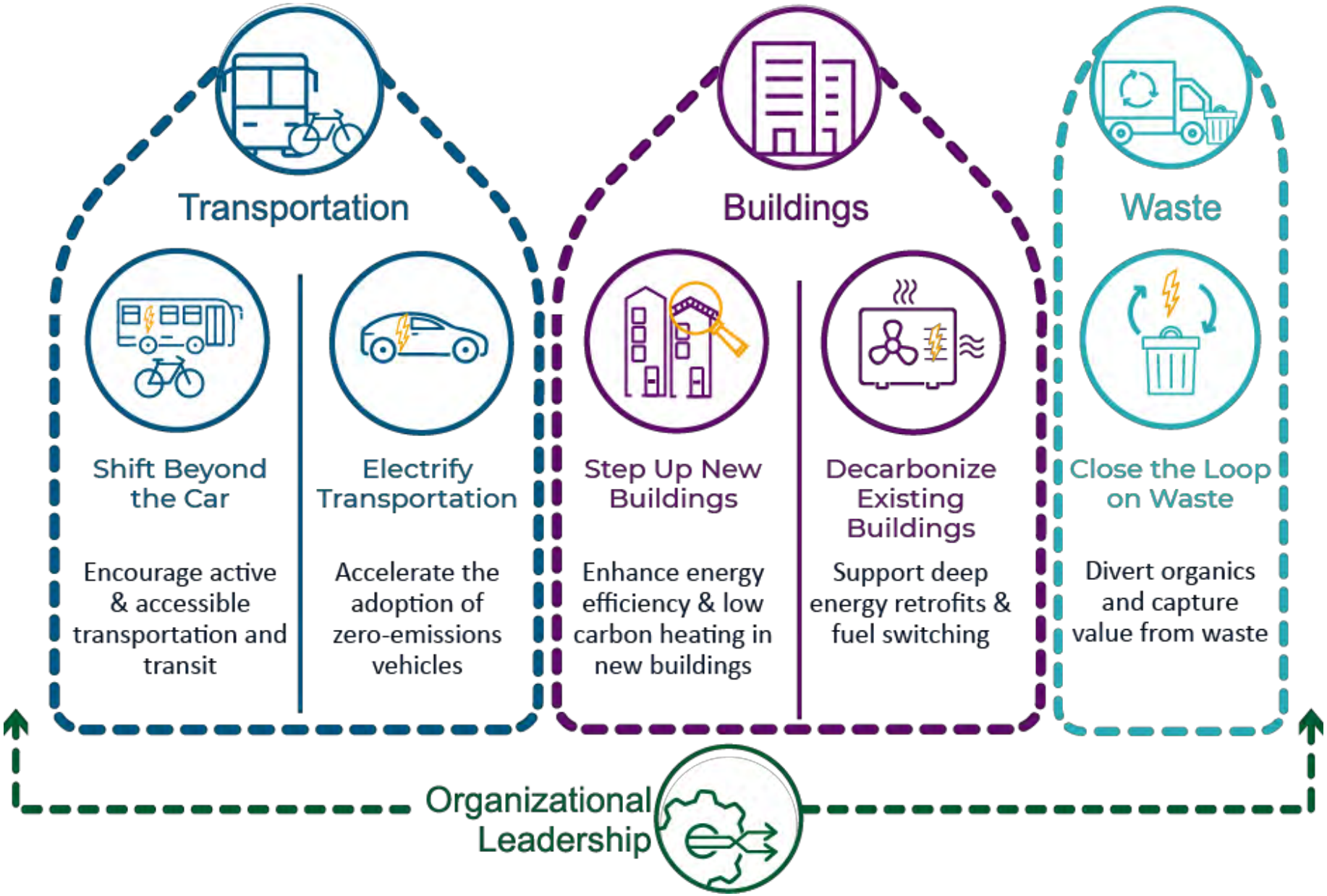


Figure 13 - Emissions Reduction by Big Move in 2030, Relative to BAU (Source CEA – Appendix C)

Action Plan


Transportation
Buildings
Waste
Shift Beyond the Car
Encourage active & accessible transportation and transit
Electrify Transportation
Accelerate the adoption of zero-emissions vehicles
Step Up New Buildings
Enhance energy efficiency & low carbon heating in new buildings
Decarbonize Existing Buildings
Support deep energy retrofits & 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, waste and organizational leadership) that will allow us to achieve our 2030 target. It is recommended that the CCAP be revisited every two to three years to keep it relevant and effective. Below is an example of a strategy from 'Shift Beyond the Car', showing the type of information displayed. Implementation details for each of the Big Moves is presented in **Appendix D**.

Objective

Timeframe (short, med, long)

Strategy	Actions Summary	Lever	Time	Cost
SHIFT 1: Compact community growth				
SHIFT 1.1 – Optimize land use policies and bylaws for compact growth	Employ Regional Growth Strategy (RGS) strategic directions, Official Community Plan (OCP) policies, Development Permit Area guidelines, Zoning Bylaw regulations and other land use policy tools that focus development in complete, compact centres and multi-modal transportation corridors and nodes.			$

Strategy

Summary of actions under the strategy

Primary local government lever (infrastructure, policy, engagement)

Investment (low, med, high)

Legend

Lever	
Infrastructure	
Policy & Regulation	
Engagement & Outreach	

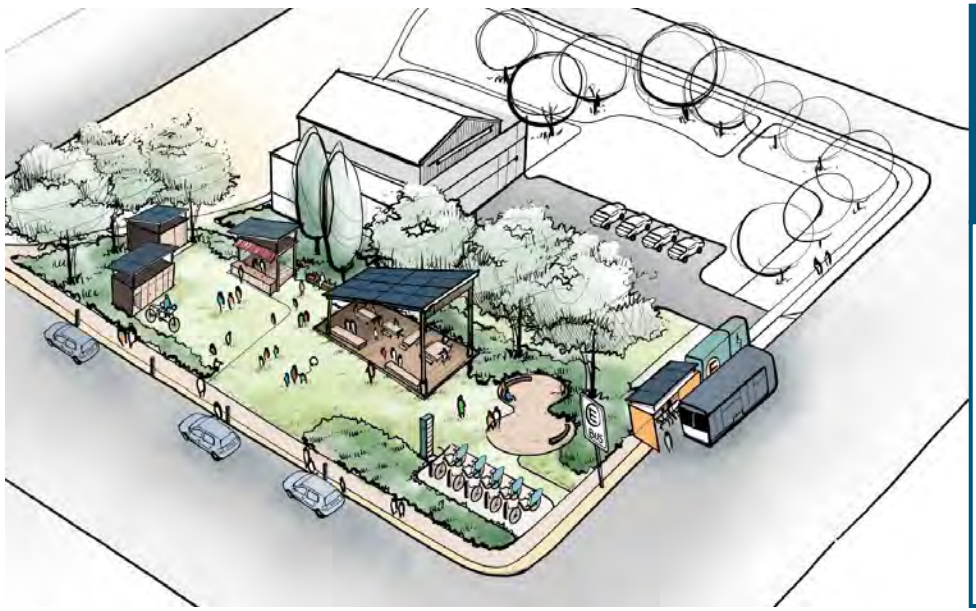
Timeframe			
Short (1-2 years)			
Medium (3-5 years)			
Long (6+ years)			

Cost	Definition	
Low	<$25,000	$
Med	$25,000 - $100,000	$$
High	>$100,000	$$$

Notes:

- Lever: Many strategies utilize more than one local government lever. The following tables show only the primary lever; however **Appendix D** indicates 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:

A complete zero-emission transportation system connects our community and region.

Current State:

Passenger and Commercial vehicles are responsible for 83% of the greenhouse gas emissions generated by residents and businesses in Pemberton. Transportation fuels such as gasoline and diesel are the largest expenditure on energy in the community at $10.6 million per year.

Big Moves for Transportation

Shift Beyond the Car	Electrify Transportation
	
Encourage active and accessible transportation and transit	Accelerate the adoption of zero-emission vehicles

The Way We Move

Shift Beyond the Car

Encourage active and accessible transportation and transit

Overview

Walking and cycling are very popular recreational activities in Pemberton – but they are more than pure enjoyment - they are viable, beneficial, economical and environmentally friendly modes of transportation. The Village of Pemberton's Cycling Network Plan (2020) outlines a strategy to design and build well-connected, accessible, safe and enjoyable routes that will encourage residents and visitors to choose an active mode of travel such as walking and cycling. Including sidewalks, bike lanes and trails in development plans make active transportation a viable choice when traveling through and between neighbourhoods. The same infrastructure also affords access for those who use mobility aids, such as scooters and wheelchairs.

However, planning for a zero-carbon transportation system requires a paradigm shift. Pemberton residents are quite dependent on fossil-fuel powered cars and trucks; at the same time, they show little tolerance for increased traffic and perceive a scarcity of parking. Instead of solving traffic and infrastructure problems by expanding roads or building more parking lots, the Village can support all transportation options and facilitate alternative travel choices by investing in active transportation infrastructure and transit. Not only does this reduce local transportation-related emissions, but this shift can also result in reduced infrastructure and lowered maintenance costs not to mention improved community health benefits.

Looking Forward to 2030

- 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 land use policies and bylaws for compact growth	a. Employ SLRD Regional Growth Strategy (RGS) strategic directions, Official Community Plan (OCP) policies, Development Permit Area Guidelines, Zoning Bylaw regulations and other land use policy tools that focus development in complete, compact centres and multi-modal transportation corridors and nodes. b. Use density bonusing[9] in strategic areas like the hillsides and infill locations to encourage compact developments. This will help achieve densities that can support transit, commercial centres and protect more green space. c. Implement fast tracking as an incentive to encourage lower emissions in new, compact developments. Give processing priority to applications for compact developments that meet certain energy-efficient and sustainability criteria. For example, use an established rating system such as LEED™ or Built Green™ or create a Pemberton-specific list of desired features for compact community growth.			$
SHIFT 2: Enable walking, cycling and other forms of zero emission mobility				
SHIFT 2.1 – Enable active transportation through plans and policies	a. Address active transportation through the Official Community Plan review, which will further identify gaps in the network and prioritize transportation options in the following recommended order: walking, cycling, public transit, commercial vehicles and then private vehicles. b. Implement supportive policies such as a 'Complete Streets Policy'[10] and update the Subdivision & Development Control Bylaw and other relevant bylaws to require all ages and abilities (AAA) cycling infrastructure. c. Prioritize the creation of a multi-modal transportation hub (expanded park and ride facility) along a main commuter route with infrastructure designed to support active transportation combined with public transit.			$

[9] https://www.toolkit.bc.ca/tool/density-bonusing
[10] https://www.completestreetsforcanada.ca/what-are-complete-streets/

Strategy	Actions Summary	Lever	Time	Cost
SHIFT 2.2 – Build safe routes for walking, cycling and other forms of zero emission mobility	a. Accelerate the implementation of the Cycling Network Plan that prioritizes end-of-trip facilities (more bike racks and showers), an expanded cycle network and safer routes. b. Continuously improve public and private active transportation infrastructure including reconfiguring existing streets and building safe and convenient active transportation paths to connect all neighbourhoods. c. Ensure new developments include suitable pedestrian corridors for active transportation and consider the need for shade/tree canopy coverage to protect users from the heat/sun.			$$$
SHIFT 2.3 – Develop and deliver an active transportation outreach strategy	a. Connect with community members to learn about their active transportation needs in support of the development of an Active Transportation Strategy. b. Dedicate staff time for promotion and education around active transportation. Align with the Cycling Network Plan.			$
SHIFT 2.4 – Normalize car-free and zero-emission zones	a. Beginning with a single car-free day on a key Village street (i.e., Frontier Street) one day a year, progress to more frequent car-free days in different locations over the year (i.e., one in the spring/one in the fall) combined with sidewalk sales, farmers markets or other special events, such as the Pemberton Slow Food Cycle Event. b. Support and encourage participation of Village of Pemberton Staff, residents, businesses and students in annual Bike-to-Work and Bike-to-School events. Wager friendly competitions with other businesses/government offices to spark interest and celebrate victories. c. Reward residents who use active transportation to commute or run errands by 'issuing' good karma tickets (opposite of parking tickets) on bikes, strollers, scooters, etc.			$
SHIFT 2.5 – Promote micro e-mobility[11] and on-demand mobility services	a. Host awareness events for e-bikes (and other forms of micro e-mobility like e-scooters) in association with other community events like Canada Day Celebration, BMX track nights or local bike races. Offer test drives or contests to encourage up-take. b. Work with vendors to promote the availability of e-mobility devices (e.g. e-bikes and e-scooters) locally and encourage bulk discounts from outside suppliers.			$

[11] Micro e-mobility refers to a range of small, lightweight vehicles operating at speeds typically below 25 km/h (15 mph) and driven by users personally (unlike rickshaws). Micro e-mobility devices include bicycles, e-bikes, electric scooters, electric skateboards, shared bicycles, and electric pedal assisted (pedelec) bicycles.

Strategy	Actions Summary	Lever	Time	Cost
	c. Support on-demand mobility services (e.g. bike sharing and ride hailing). Undertake research and understanding of when and where on-demand services are most useful. Seek measures to remove policy barriers, acknowledging that the role of e-mobility transportation must fit with a multi-modal transportation approach. d. Purchase e-bike(s) for shared use by Village Staff use and encourage other large employers to do the same. Install additional bike racks around town to accommodate e-bike parking.			
SHIFT 3: Increase transit ridership and a support a transition to a zero-emissions transit network				
SHIFT 3.1 – Collaborate with transit providers to identify innovative options to increase service and promote transit ridership	a. Continue to advocate for and collaborate with the Province, regional partners and BC Transit for a regional transit service to increase transit service and ensure implementation of regional objectives and local needs of Pemberton/Mount Currie. b. Promote transit ridership by offering free transit days and celebrating new additions to the transit schedule. Lobby the local School Districts to offer free bus passes to students. Ultimately, explore universal free transit with potential partnership with neighbouring communities in promotion of free transit programs. c. Review ridership model with options to supplement services with community-based models such as on-demand transit.			$$
SHIFT 3.2 – Collaborate with transit providers to transition to a zero emissions transit network	a. Work with BC Transit and neighbouring communities to ensure that transit progressively transitions to zero emissions vehicles (e.g. electric busses). b. Advocate for and pursue opportunities for grant funding to install electric vehicle (EV) charging capabilities for transit vehicles.			$
Total annual GHG emissions reductions for this Big Move: 472 $tCO2_e$ in 2030				

When asked what would encourage bicycle, e-bike or e-scooter use more frequently for getting around the Village, the top three responses were *improved end of trip facilities (e.g. bike racks and lockers), an expanded cycle network, and safer transportation nodes*

The Way We Move

Electrify 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.

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

If every local government in British Columbia 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, because it would lead to removing half a million internal combustion (fossil fuel) vehicles from our roads. At the individual community level, this move could yield 5 to 25% emissions reductions by 2030.

Looking Forward to 2030

- 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.
- The Village of Pemberton 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
4. Support businesses to transition to a low-carbon fleet

Provincial Action

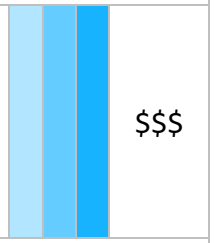
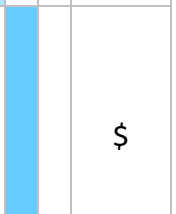
In May 2019, the Province of British Columbia enacted the ***Zero Emissions Vehicle Act*** to follow through on the transportation commitments in its **CleanBC** climate plan. The legislation requires manufacturers to ensure that a steadily increasing proportion of all new light-duty cars and trucks 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.

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 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	a. Leverage grant opportunities to install more EV charging stations at key locations throughout the community on a continual basis. b. Collaborate with other local governments on a regional charging network strategy. c. Plan for the installation of a certain percentage of EV fast chargers in all new public parking lots.			$$$
ELECTRIFY 2: Enable charging at home and work				
ELECTRIFY 2.1 – Accelerate EV-ready[12] building requirements	a. Require all parking for new homes to be EV-ready. b. Require 25% of stalls at new non-residential buildings to be EV ready.			$
ELECTRIFY 2.2 – Enable EV charging in existing residential, mixed-use and commercial buildings	a. Advocate strata corporations and property management companies to begin navigating the process to retrofit existing parking stalls with EV charging equipment. b. Consider implementation of incentives to encourage installation of EV chargers.			$
ELECTRIFY 3: Encourage electric vehicle (EV) use through outreach and supportive policies				
ELECTRIFY 3.1 – Develop and deliver an EV outreach strategy	a. Educate residents, builders and developers on the benefits of zero-emissions vehicles, available rebates and EV charging requirements though Builders' Bulletins and the Village's social media channels. b. Collaborate with other organizations to host public demonstration events for e-bikes, e-scooters and EVs such as test-drive and ride-along events.			$
ELECTRIFY 3.2 – Accelerate EV adoption through supportive policies and incentives	a. Maintain residential speed limits of 30 km/hr to enable low-speed EVs on select residential streets. b. Provide perks to EV drivers such as priority parking. c. Encourage ride hailing, taxi operators and other fleet operators to switch to EVs by providing information during the Business License Application Process.			$

[12] 'EV Ready' means that residential and commercial developments must have energized electrical outlets installed at the time of construction that can charge an EV when a charging station is installed the future.

Strategy	Actions Summary	Lever	Time	Cost
	d. Create a policy that leads to the reduction of parking requirements in multi-family developments based on provision of more EV parking, EV car shares, more bike parking and other active transportation amenities.			
ELECTRIFY 4: Support businesses to transition to a low-carbon fleet				
ELECTRIFY 4.1 – Engage commercial stakeholders to facilitate transition	a. Engage with businesses to understand how the Village can support them in their transition to a low-carbon fleet. b. Provide information to businesses about the Specialty Use Vehicle Incentive (SUVI) Program. c. Encourage fleet operators to switch to EVs by providing information during the Business License Application Process.			$
Total annual GHG emissions reductions for this Big Move: 2,945 $tCO2_e$ in 2030				

When asked where would be your preferred locations for more electric vehicle charging stations, survey respondents #1 answer was *"additional chargers at the Pemberton Community Centre"; #2 at a dedicated Park 'n Ride, #3 Downtown next to the Barn, #4 Den Duyf Park (Rec Site) and #5 Downtown next to Pioneer Park.*

Where We Live and Work

Vision:

Our community's buildings are exceptionally energy efficient, and powered, heated and cooled with 100% renewable energy.

Our homes and commercial buildings are responsible for 8% of the greenhouse gas emissions generated in Pemberton. The main source of emissions are propane, wood and heating oil used for space and water heating.

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

Where We Live and Work

Step Up New Buildings

Enhance energy efficiency and low carbon heating in new buildings

Overview

While existing buildings generate most building-related GHG emissions, local governments have greater authority to influence new construction. The *BC Energy Step Code* is a section of the *BC Building Code* that enables local governments 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 completely address emissions from new buildings. Local governments can also influence emissions by implementing the *Energy Step Code* in tandem with incentives that target zero-emission heating and cooling systems.

The Village of Pemberton is experiencing the rapid development of new housing. Since the Village of Pemberton implemented the *Energy Step Code* in 2020, many new homes have already been constructed to high performance standards. Pemberton also boasts a multi-family development built to the highest energy efficient standards in Canada. Every new building built to exceed code standards is an opportunity to establish Pemberton as a leader for improved building energy efficiency and one less building that will have to be retrofitted down the road.

Looking Forward to 2030

- All new buildings meet the highest step (Step 5) of the *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 have a better understanding of the long-term operational cost of the home.
- Homes are quiet, comfortable and durable. Energy costs are minimized through efficient design that reduces energy demand.

Objectives

1. Accelerate adoption of a low carbon Energy Step Code
2. Build industry capacity for energy efficiency and decarbonization

Provincial Action

The Province of British Columbia'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 the previous 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 BUILD 1.1 – Accelerate implementation of the *BC Energy Step Code*	a. Plan to move up through the Step Code levels for both *BC Building Code* Part 9 (residential) and Part 3 (more complex, i.e. commercial, industrial, and mixed-use) buildings, based on industry support, before the provincially mandated timeline. b. Adopt policies and programs to incentivize adoption of higher steps before they are due, e.g., density bonus, rebates.			$
NEW BUILD 1.2 – Adopt a low-carbon approach to the *BC Energy Step Code*	a. Adopt the op-in provincial carbon pollution standards for new buildings, based on industry support as soon as more information becomes available. b. Add low carbon energy system requirements to the Village's Building Bylaw, based on industry support, to implement carbon pollution performance standards that reduce emissions and achieve higher levels of energy efficiency.			$
NEW BUILDINGS 2: Build Industry Capacity to Deliver High Performance Buildings				
NEW BUILD 2.1 – Continue to provide outreach and incentives	a. Continue to promote existing Clean BC new construction incentives and provide additional incentives, as available, to subsidize costs of heat pumps, working with an energy advisor and airtightness testing.			$
NEW BUILD 2.2 – Continue to provide training and coordination	a. Continue to collaborate with educational institutions and regional partners to provide relevant training to the building industry and realtors. Assemble a list of local or regional Energy Advisors to share with builders.			$
Total annual GHG emissions reductions for this Big Move: 184 $tCO2_e$ by 2030				

74% of survey respondents said when purchasing a new home, *a low-carbon heating system was either the top priority or that it was very important*.

Where We Live and Work

Decarbonize Existing Buildings

Support deep energy retrofits and fuel switching

Overview

In 2030, over three quarters of all buildings in Pemberton will be those that were already standing in 2021. 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 2 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 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.

The Village of Pemberton 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.

Looking Forward to 2030

- 25% of our existing building stock has undergone a deep energy retrofit.
- All replacement heating and hot water systems are zero emissions.

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.

Strategies for Decarbonizing Existing Buildings

Strategy	Actions Summary	Lever	Time	Cost
EXISTING BUILDINGS 1: Improve Energy Efficiency				
EXISTING BUILD 1.1 – Encourage and enable deep energy retrofits	a. Educate building owners on how to make their home or business more energy efficient and the benefits of doing so, using resources such as Better Homes BC and Better Buildings BC. b. Continue to post information that helps building owners understand the rebates and incentives available or financing options that might assist with implementation of energy retrofits. c. Encourage the use of energy labelling and benchmarking.			$
EXISTING BUILDINGS 2: Encourage and Enable Fuel Switching				
EXISTING BUILD 2.1 – Encourage and enable building electrification	a. Identify and remove barriers to heat pump installation, including streamlining permitting processes, optimizing noise regulations and restructuring permit fees. b. Top-up Provincial air source heat pump incentives.			$
EXISTING BUILDINGS 3: Build Industry Capacity and Increase Market Demand				
3.1 – Establish a long-term energy efficiency and decarbonization[13] marketing campaign	a. Establish a 10-year program for a community-wide marketing campaign to encourage building envelope improvements, electrification or other low carbon fuel sources.			$
3.2 – Build industry capacity for energy efficiency and decarbonization	a. Educate renovators and realtors on energy efficiency and low carbon choices for space and water heating.			$
Total annual GHG emissions reductions for this Big Move: 448 $tCO2_e$ by 2030				

When asked what they would look for when considering an energy retrofit, the top three survey responses were *increased resale value, reduced emissions, and less than a 5-year payback.*

[13] Decarbonization is the reduction of carbon dioxide emissions using low carbon power sources, achieving a lower output of greenhouse gasses into the atmosphere.

How We Manage 'Waste'

Vision:

Our community diverts all of our organic waste, such as food scraps and yard trimmings, from landfills and recovers value from everything that enters the waste stream.

Organic waste ending up in the landfill accounts for 9% of our community's GHG emissions. The Squamish-Lillooet Regional District (SLRD) is responsible for waste management for the Village of Pemberton. Some of Pemberton's organic waste is currently diverted from landfill and goes to a local organic waste processing facility located 10km south of Pemberton.

Close the Loop on Waste

Divert organics and capture value from waste

How We Manage '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. In general, organic waste makes up about 35-40% of landfill waste[14], 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 landfill. Organic diversion reduces or eliminates the amount of new waste added to the regional waste stream every year.

By diverting organic waste from the waste stream, it can be converted into valuable compost that can be sold and used to support local food production. Pemberton is fortunate that an organic waste processing facility is located just 10km south of the Village centre and is the destination of some of the community's organic waste.

Looking Forward to 2030

- All our community's residential food and yard waste will be converted to useable compost at the existing facility or at another regional processing facility.
- The Village of Pemberton, in coordination with the Squamish-Lillooet Regional District, will be a leader in Integrated Resource Management.

Objectives

1. Divert organics from the waste stream

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.

[14] SLRD Waste Composition Audit for the Pemberton Transfer Station, 2020

Strategies for Closing the Loop on Waste

Strategy	Actions Summary	Lever	Time	Cost
WASTE 1: Divert Organics from Landfill				
WASTE1.1 – Collaborate to adopt policies that increase organics diversion	a. Work with the Squamish-Lillooet Regional District (SLRD) to adopt organics diversion targets for Pemberton and initiate public consultation on organics, processes and targets. b. Work with the SLRD to engage with businesses and strata corporations to provide opportunities for source-separation of waste into three streams; organics, recyclables and waste to landfill.			$
WASTE 1.2 – Partner to enhance organics collection and processing	a. Work with SLRD to evaluate local opportunities for organics handling and diversion, including the provision of suitable containers for storage. b. Work with the SLRD to consider implementing curbside organic (kitchen/yard-waste) collection for single-family home neighbourhoods. c. Work with the SLRD to install central collection points for organics that are regularly picked up for multi-family units or strata neighbourhoods, etc.			$$
WASTE 1.3 – Identify strategies to divert construction, demolition, agricultural and industrial wood waste	a. Work with the SLRD to identify producers of wood waste in the community, develop inventory and attempt to evaluate opportunities for resource recovery. Identify and pursue options to support and grow the market for salvaged forest clearing and deconstruction materials.			$
WASTE 1.4 – Promote the Squamish-Lillooet Regional District's comprehensive zero-waste outreach program	a. Work with the SLRD to share more zero-waste messaging on Village social media channels. b. Post information on the SLRD partnership with local non-profit community organizations to provide a Zero Waste Outreach program in schools. c. Continue to participate in and promote the "Love Food Hate Waste" campaign.			$
Total annual GHG emissions reductions for this Big Move: 980 $tCO2_e$ by 2030				

When asked what would encourage them to separate their household organic waste, the top two survey responses were *curbside collection and provision of a suitable container for storage*.

Organizational Leadership

Institutionalize Action

Embed Climate Action into Village of Pemberton Operations

Overview

Research conducted by Community Energy Association (CEA), QUEST Canada Organization, and Smart Prosperity highlights several key factors that are important for the successful implementation of a Community Climate Action Plan. These include establishing broad support for implementation, building staff and financial capacity for implementation, and institutionalizing the plan to withstand political change and staff turnover. In addition, it is important for the Village to communicate its efforts and share success stories on not only what needs to be done, but also on what has been done.

Funding

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

Internal Funding Sources	External Funding Sources
1. General revenue (e.g. property taxes) 2. Building permit fees and other service fees charged by Development Services	1. UBCM Gas Tax Agreement Funds 2. Federation of Canadian Municipalities (FCM) Green Municipal Funds. These support plans, studies, capital projects and pilot projects for environmental initiatives in several 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 BC Hydro energy efficiency incentives for new home construction and for increasing energy efficiency in existing buildings 7. BC Housing for education or demonstration projects to encourage the building industry to construct low energy and low GHG emission homes

Monitoring and Evaluation

Monitoring and evaluating the implementation of the Village of Pemberton Community Climate Action Plan is critical for its success. Key Performance Indicators (KPIs) enable the Village to measure the outcomes of the Plan's implementation. When KPIs are monitored regularly, the community can determine how to best allocate resources to support implementation, and clearly evaluate what success different actions are having.

Suggested indicators are presented in **Appendix E**.

Strategies for Organization Leadership

Strategy	Actions Summary	Lever	Time	Cost
LEADERSHIP 1.1 – Establish Broad Support for the Community Climate Action Plan	a. Host regular meetings to discuss implementation with internal and/or external stakeholders. b. Support the efforts of other levels of government, First Nations, improvement districts, not-for-profit and community organizations who are undertaking climate action in the Village of Pemberton. c. Prepare for plan renewal approximately every five to eight years.			$
LEADERSHIP 1.2 – Building Staff and Financial Capacity for implementation	a. Report on climate action or sustainability implications in relevant reports to Council. b. Establish a new position in the Village to oversee implementation, monitoring and future updates to the Community Climate Action Plan. Incorporate climate action into other relevant municipal staff policies. c. Embed climate action into the budgeting process. Ensure that budget is included to support implementation of the Actions noted in the Community Climate Action Plan and funds are set aside for future climate action work. d. Encourage professional development opportunities that focus on green infrastructure, natural assets management, ecosystem protection/restoration, and similar topics that foster staff awareness of climate action opportunities within their scope.			$
LEADERSHIP 1.3 – Institutionalize the Community Climate Action Plan	a. Embed climate action into other documents such as the Official Community Plan (OCP), Strategic Plans, Asset Management Plan, Purchasing Policies, Infrastructure and Servicing bylaws and policies, Staff Reports and departmental work plans. Include electrification of the Village's own fleet as a key priority to reduce Corporate GHG emissions. b. Develop a complementary Climate Action Adaptation Plan that includes an extreme weather response plan. c. Develop and implement a Corporate Energy and Emissions Reduction Plan and perform comprehensive climate audits on all new civic facilities and upgrades.			$

Strategy	Actions Summary	Lever	Time			Cost
	d. Monitor and evaluate performance with key performance indicators and report regularly to Council and the community at large on progress and accomplishments. Include performance indicators reporting in the Village's Annual Report.					
LEADERSHIP 1.4 – Communicate the Village's Intended Actions on Climate Change	a. Declare a climate emergency to acknowledge that climate impacts are already causing loss of life and destroying vital ecosystems, and that the Village is prepared to mobilize its resources to take effective action at the necessary scale and speed. b. Make a promise to the youth of Pemberton to address the items noted in their 2020 Climate Petition, to the best of the Village's abilities, to create a healthy, low carbon and climate-resilient future. c. Feature 'Climate Action Success Stories' on the Village's communication channels and publications, by sharing successful Village carbon-reducing initiatives and encourage residents to also share stories of individual and group successes.					$

When asked what more could the Village do, the survey responses were numerous and varied:

Build Community Resilience *Enhance Food Security* *Ban Plastics*

Improve Transit *Increase Recycling* *Promote Eco-tourism*

Educate the Public *Preserve Old Growth Forests* *Cut VoP Emissions*

Other Opportunities - Local Renewable Energy, Sequestration and Food

Overview

Other opportunities of note lie outside the identified six 'Big Moves' but still within the Village's immediate influence. They include the pursuit of local renewable energy, sequestration and local food production opportunities, all valuable areas given the Village is situated within natural surroundings that include rivers, forests and productive farmland.

Strategies for Other Opportunities

Strategy	Actions Summary	Lever	Time	Cost
LOCAL RENEWABLE ENERGY				
RENEWABLE 1.1 Pursue community-scale renewable energy systems	a. Conduct a renewable energy scan to determine financially and technically feasible renewable energy options.			$
RENEWABLE 1.2 Support building-level renewable energy projects	a. Identify and remove barriers to building-level renewable energy projects e.g. solar. b. Provide municipal incentives for renewable energy installations in buildings.			$
SEQUESTRATION				
SEQUESTER 1.1 Preserve natural assets including forested lands and wetlands within the municipal boundary	a. Identify, broadly define and then use policy measures to prevent clearing of old growth forests[15], and other forests of other special significance (cultural, archaeological, etc.). b. Use policy measures to reduce clearing of other forested lands, e.g. Tree Preservation Bylaw or use density bonus for developments that cluster development. Identify and then use policy measures to protect wetlands.			$
SEQUESTER 1.2 Encourage low-carbon buildings	a. Consider ways to support or encourage building materials like timber that store carbon / are low carbon.			$

[15] Part of this action would involve creating an agreed upon broad definition of what constitutes an 'old growth forest' that takes into account both its economic value based on forestry practices and its environmental value, in terms of the value of a preserved, unaltered natural eco-system.

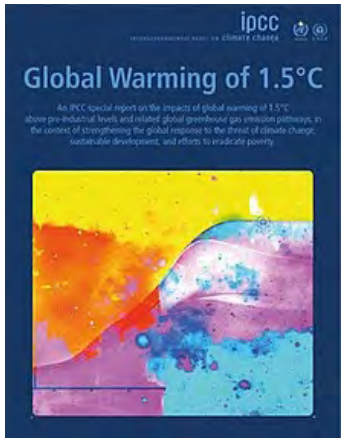
SEQUESTER 1.3 Collaborate with other governments, organizations and industry to pursue low-carbon and carbon capture technologies	a. Encourage and support local industrial emitters of CO^2 to capture and store CO^2 to reduce their industrial emissions. b. Keep abreast of ways that local governments can be involved in and support carbon capture & sequestration, e.g. through Province of BC, Community Energy Association, and Pacific Institute for Climate Solutions.					$
FOOD						
FOOD 1.1 Support local food production and consumption	a. Accelerate implementation of the Village of Pemberton Community Agricultural Parks Master Plan. b. Support local food production through the encouragement of farmer's markets and community gardening space within multi-family developments.					$
FOOD 1.2 Reduce regional food waste/increase regional food recovery	a. Implement relevant actions from the Sea to Sky Food Recovery Strategy and Action Plan. b. Continue to work with community stakeholders and regional partners to advance food recovery, security and resiliency in the Sea to Sky.					$

Appendices

Appendix A: Climate Action at All Levels

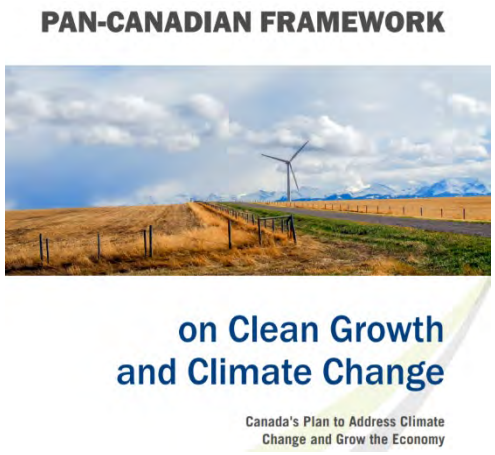
Global Action

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 future generations and ourselves. 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 mega tonnes of CO2 equivalent (Mt CO2e), which is a 2% decrease from 2005 levels. This means that 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.

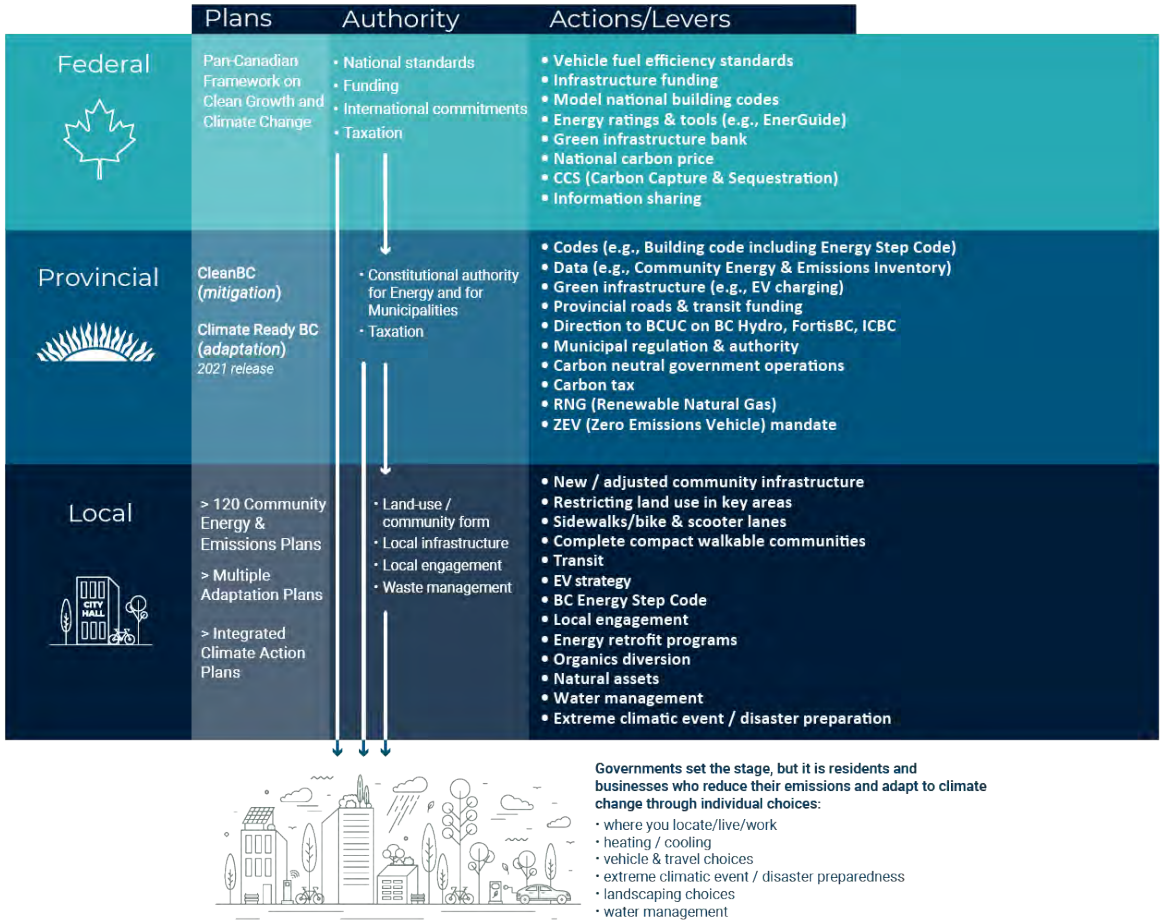
Actions available to the federal government include vehicle fuel-efficiency standards, model national building codes, energy ratings, and carbon pricing.

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% 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 for BC to meet its emissions reduction target, a decrease of 40% from 2007 levels in just ten years is required.

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.



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

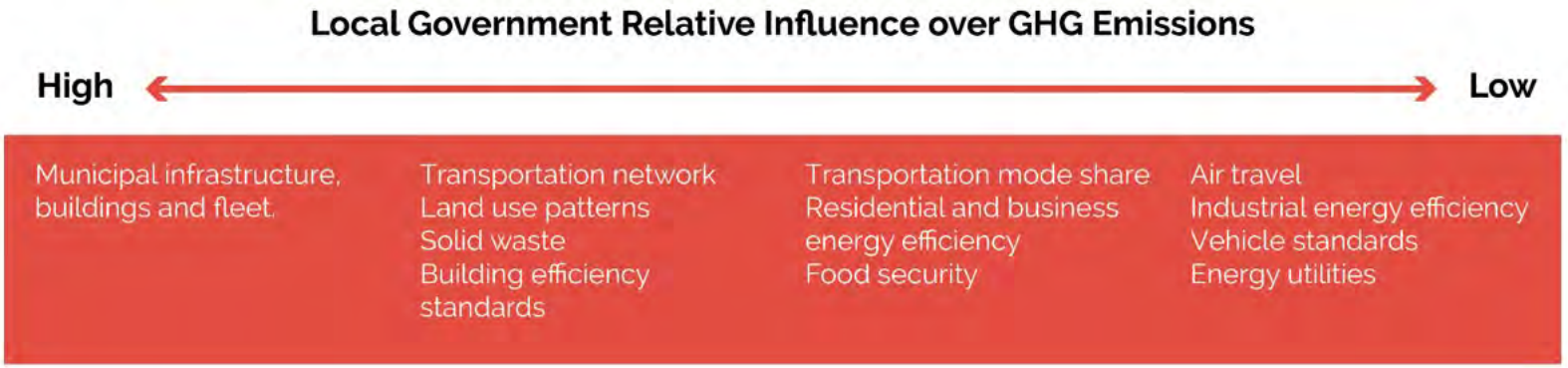
CleanBC outlines a path to meeting the 2030 targets, establishing a range of actions to meet 75% of the target. These actions include sourcing clean and renewable electricity, incremental increases in building-energy performance in the *BC Building Code*, tailpipe emissions standards, and measures to 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*.

Senior levels of government have recognized the need for strong climate action (particularly on mitigation) and provide support to local governments.

Local Action

More than 120 British Columbia local governments have to date enacted Community Energy and Emission Reduction Plans or Community Climate Action Plans (CCAPs), 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 support from other orders of government, as well as commitments from residents and businesses. Further, the outputs of a Plan or CCAP and the targets and actions prioritized for implementation will need to be embedded into relevant policy, operational, budgetary and asset management plans and strategies. Communities and regional municipalities play an important role in climate mitigation and adaptation. Almost every British Columbia local government has committed to some degree of action under the *BC Climate Action Charter*. Across Canada, local and regional governments directly and indirectly influence approximately 60% of the nation's overall energy use and 50% of its GHG emissions.

Residents and Businesses

Residents and businesses also have an important role in climate action, through individual choices on where to live, how to heat or cool, how to travel, how to handle household waste, and by 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. Similarly, businesses' decisions regarding current and future operations, as well as factors such as leadership and innovation, also influence community-based emissions and affect a community's resilience to a changing climate. Resident and business decisions are shaped by all levels of government, creating an opportunity for governments to influence those choices in a way that addresses environmental issues and climate action.

Appendix B: Engagement Summary

Stakeholder Engagement

On January 28th and February 9th 2021, Pemberton community stakeholders gathered via Zoom to discuss Pemberton's Community Climate Action Plan. The workshops, facilitated by Community Energy Association (CEA) staff, utilized an online collaborative platform called Miro. The workshops featured in-depth discussion on the current community emissions in Pemberton as well as the envisioning of a low carbon future and review of the opportunities and actions to reduce community emissions. Workshop participants and community stakeholders represented the following groups:

- Village of Pemberton Staff: Nikki Gilmore, CAO; Lisa Pedrini, Development Services; Chris Derouin, Development Services; Joanna Rees, Development Services; Tom Csima, Operations; Lena Martin, Finance; Christine Burns, Recreation
- Emily Peterson, Vancouver Coastal Health
- Kevin Clark, Pemberton Valley Diking District
- Dawn Johnson and Veronica Woodruff, Stewardship Pemberton
- Brant Schrage, Nurture in Nature
- Bronson Bullivant, BC Transit
- Christine Dürfeld, BC Passive House
- Steve McCloskey, Pemberton and District Chamber of Commerce
- Gus Cormack, Tourism Pemberton
- Claire Dewar and Marie-Lou Leblanc, Squamish-Lillooet Regional District
- Jaye Russell, Sea to Sky Community Services
- Jaye-Jay Berggren, Sea to Sky Soils
- Kim Slater, Local Resident Expert
- Mark Robichaud, Pemberton Wildlife Association
- Steve Evans and Reime Shishido, Pemberton Secondary School
- Rod Nadeau, Innovation Building
- Nigel Protter, Shape Energy
- Tyler Reaves, Rootdown Organic Farm
- Kristina Schrage, Red Willow Learning Society
- Stuart Gillis, Pemberton Valley Trails Association
- Ian Currie, School District #48

The workshops followed the "backcasting" approach, which first envisions a low carbon future and defines success, then identifies the current state before brainstorming creative solutions and prioritizing actions. Workshop 1 focused on A and B of the" backcasting" approach. Workshop 2 focussed on C and D of the "backcasting" approach.

Workshop participants were divided into four breakout groups and remained in the same group throughout. The breakout groups were:

- Transportation
- New Buildings
- Existing Buildings
- Waste & Other

Pemberton Secondary School (PSS) Climate Action Petition

On March 19, 2021 as part of Fridays for Future, a group of PSS students led by Grade 8 student Sam Tierney, visited Village Hall and presented Mayor Richman with a petition signed by approximately 50 students outlining their vision for items to be included in a Community Climate Action Plan. The student's climate action plan petition reads:

"We, the students of PSS, as the future stewards of this community would like to be recognized as stakeholders in the climate action plan being developed and as such, feel the plan should include these things.

1. **Improved transportation in and out of the community.**
2. **Students of PSS should get bus passes because the $8 round trip fee might be unaffordable to some.**
3. **Launch an education campaign to try to get citizens to waste less food and buy more locally grown produce.**
4. **Put more water bottle filling stations around the town and especially places youth frequent like the skate park or the REC.**
5. **Ensure that no old growth forest is logged within the Community Forest and lobby the provincial government for more old growth forest protection.**
6. **Put more recycling bins around town, with separate bins to tell people what type of plastic to put in that bin."**

Mayor Richman thanked the students and expressed the Village's appreciation for their involvement.

Public Engagement

Public engagement consisted of a virtual open house "Let's Talk Climate Action" held on the evening of 8th April 2021 and a public survey 'Pemberton Climate Action Conversation Survey' which ran from 8th – 30th April 2021.

The virtual open house was attended by approximately 25 members of the public and included a variety of interested residents, various professionals and students. During this virtual open house, a representative from the Community Energy Association, the non-profit agency hired to assist in the development of the Plan, gave a presentation on the development of the Plan to date. Village Planning Staff facilitated a question-and-answer session afterward. Attendees were encouraged to take the online survey to capture more details of their climate action opinions.

Pemberton Climate Action Conversation Survey Results

The online survey received 34 responses. A summary, of the highlights/results of the survey follows:

- 82% of the survey respondents lived in Pemberton, the remaining 18% lived outside the Village boundaries.
- 35% of the survey respondents worked in Pemberton, the majority of the remaining 65% worked outside the Village boundaries.
- 91% of the survey respondents either definitely agreed (65%) or somewhat agreed (26%) that Climate Change constitutes an emergency for Pemberton, and the community, including local government, needs to accelerate Climate Action.
- One Pemberton Secondary School student stated, "*It is time we take large and influential steps to reverse our damage to the climate."*
- Another Pemberton resident who rents, bike and shops at Farmers' Markets, stated, *"Climate change is absolutely an emergency for the entire global population. We are privileged to live in Canada but that does not absolve us of our actions and contributions toward climate change. Pemberton itself is vulnerable to flooding, rockslides, wildfires which will only accelerate and become more extreme with climate change.*"
- In answer to the question, what is your household currently doing on climate action; the #1 response was "buying second-hand items", followed by eating less meat and dairy (#2), and growing my own food (#3).
- 60% of the respondents stated that buying an energy efficient home was **very important**.
- 56% of the respondents stated that low-carbon heating was a priority.
- Only 25% of the respondents stated they were likely to install a heat pump, 37% noted they were unlikely.
- 35% of the respondents noted that they had a renewable energy system (cordwood or wood pellet stove) in their home.

- When asked what would encourage you to use a bicycle, e-bike or e-scooter, the #1 response was tied equally between “an expanded cycle network” and “improved end of trip facilities”, followed closely by “safer transportation nodes”.
- When asked what would encourage you to use bus service more, the top response was “increased frequency of service.”
- When asked where would be your preferred locations for more electric vehicle charging stations, respondents #1 answer was “additional chargers at the Pemberton Community Centre”; #2 at a dedicated Park ‘n Ride, and #3 Downtown next to the barn, #4 Den Duyf Park (rec site) and #5 downtown next to Pioneer Park.
- When asked what would encourage you to separate your household organic waste? The #1 response was tied between provision of a container for storage and curbside collection.
- When asked what would encourage you to grow more of your own food? #1 response was more community garden space) and the #2 response was access to local compost/seeds.
- 82% of respondents shopped at Farmers’ Markets
- When asked on climate education, what would you like to know more about, the #1 response was community-wide solutions, #2 was new technology, and #3 was what I can do.
- When asked for open-ended responses on what the Village can do, the following summarizes the results by theme and by the number of times it was mentioned:

BUILD COMMUNITY RESILIENCE

Empower grassroots energy around building a healthy community, rather than just imposing top-down restrictions (affordability-hurdles that build anti-authority resentment)/creating a culture that values alternatives/become a transition town. Community book club and all read From What Now to What If /Co-op workspaces to allow people to work from home but experience a change of scenery (and a sense of community)/Do community asset and strengths-based work – what we have, what we can support/amplify. A strong and resilient community is less of a carbon monster/ Plan and create central hubs for gathering/recreating/meeting/shopping and don’t sprawl/Poverty reduction - Make Pemberton more affordable so we can afford to shop locally and buy EV’s.

IMPROVE TRANSIT

Make the bus free and more frequent/Provide more public transit to avoid single care use/increase the frequency of buses in town and heading to Whistler/Improve transit service to areas such as the Sunstone/Ridge to reduce car use from these neighbourhoods, taking into account future use/double down on transit/Improved public transit could dramatically reduce the amount of daily traffic between Pemberton, Whistler, Squamish and Vancouver/An hourly bus service to Whistler connecting Squamish and Vancouver. If decent, reliable, frequent public transit is provided more people will start to use it regularly/Enhanced regional transportation system is critical - electric and increased service.

INCREASE RECYCLING/ COMPOSTING OPTIONS

Public compost bins next to all public transit trash cans and use compostable doggie poo bags/Recycling bins in town/More recycling and compost options; free collection of these items bi-weekly/Curb-side pick-up of garbage, compost and organic waste/No burning of large yard waste in the spring and fall/encourage large logs to be used as firewood and dispersed in the community/Remember that EV's are a short term solution as are solar panels, eventually the metals and rare earths that make up solar panels and EV batteries will end up as waste – consider the cost of creating and then disposing these materials/Create a waste diversion/re-use it centre.

ENHANCE FOOD SECURITY

More community gardens/support a community farm-garden-orchard/don't allow development that doesn't provide a food growing space for inhabitants/Weekend farmers markets (Fridays don't always work)/guaranteed garden space for every resident/double down support for farmers market/Encourage grocery stores to stock more local produce/encourage local grocery stores to devote more space to local produce/set food security targets.

PROMOTE ECO-TOURISM

Encourage travel to Pemberton for longer, more slowly, not day trips. Host forest-bathing experiences and retreats/slower, more immersed vibe. Municipal campground with reserved or priority space for cycle-tourists. Host a local economies film festival/screening or gathering. Promote Local Made in a big way. Have road close down Sundays and street parties or bike only days or festivals in town.

ENHANCE TRAILS

More trails/Improve covered bike parking/Keep plowing the Friendship Trail to make winter cycling possible for commuters/Allow folks to ride their bikes across the train bridge and Dikes on private land/more bike trails in the Valley away from the roads (on rivers rather than next to the highway).

EXPLORE RENEWABLE ENERGY

Provide communal sustainable energy sources such as solar and wind/Look at ways to incentivize homeowners/stratas to add renewable energy sources to improve energy resilience/Rebates for solar power (would love to have solar at our house but it is too expensive to install)/Community level Geo-thermal heating (volcano down the meadows)?

BAN PLASTICS

Reduce the amount of plastic purchased (encourage to buy bread in paper bags rather than plastic/use mesh bags as opposed to plastic bags for produce)/Retail bulk facility/Living more lightly/consume less new stuff/Pass a bylaw to ban single use plastics.

CUT EMISSIONS

Ensure vehicles are inspected for emissions standards/enforce no idling/Ensure natural gas network does not reach the community so that we cannot use natural gas for buildings.

EDUCATE THE PUBLIC

More education sessions like you did on April 8/more outdoor education programs/Educate residents on the use of e-bikes as second vehicles.

PRESERVE OLD GROWTH FOREST

Dedicate a large parcel of land with old growth to conservation. No old growth cuts/PSS STUDENTS – No more cutting of old growth forest.

Presentation to Committee of the Whole

On April 13, 2021 Lisa Pedrini, former Manager of Development Services and Alison Jenkins from Community Energy Association presented a status report to update Council on the progress of the Community Climate Action Plan. A recording of the presentation can be found here: https://www.youtube.com/watch?v=mH9JmtyYAZc

Appendix C: Inventory and Modelling Methodology

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

Inventory

Pemberton'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, 2012, 2013, 2014, 2015, 2016, 2017 and 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	0.065	0.069	0.069	0.069	0.069	0.070	0.068	0.068
Diesel	0.070	0.067	0.070	0.070	0.070	0.070	0.071	0.070	0.070
Electricity	0.007	0.007	0.004	0.004	0.004	0.003	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 Province's *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. See the textbox below regarding future changes in emissions factors for electricity.

Transportation data was sourced from a previous release of the Province of BC's Community Energy & Emissions Inventory (CEEI) data,[1] 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.[2]

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

Electricity emissions factor subject to change

Information received from the Province of British Columbia 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. However, 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 were 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 electricity emissions factor to be 10.67 tCO_2e/GWh for 2018. Based on the 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 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 emissions from natural gas on a per unit of energy basis, and electricity used in the Village 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).

Assumptions made with respect to the inventories are as follows:

- The Province of British Columbia 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 British Columbia 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
- In creating the inventories, Community Energy Association (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.

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' (BAU) 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 forward using a population forecast provided based on census data.

There are full or partial inventory years that describe the community's emissions profile from 2007-2018. From 2019 onwards, all 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 of British Columbia'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).
- An annual decrease in natural gas consumption per residential connection is included, as per Fortis BC 2017 Long Term Gas Resource Plan: https://fbcdotcomprod.blob.core.windows.net/libraries/docs/default-source/about-us-documents/regulatory-affairs-documents/gas-utility/171214_fei_2017_ltgrp_ff.pdf
- 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 natural gas consumption assumed to be proportional to decreases in HDDs and the proportions of natural gas consumed for space heating for each sector, and that proportion obtained from the Navigant 2017 Conservation Potential Review for FortisBC Gas.
- 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) 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 specifically for Pemberton.

GHG emission reductions by Big Move are described in the main body of this report in the Action Plan 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 vehicle kilometres travelled (VKT) reduction after 20 years from Active Transportation, Transit and Land Use
	40%	Attribution of VKT reduction to Active Transportation
	40%	Attribution of VKT reduction to Transit
	20%	Attribution of VKT reduction to Land Use

Electrify Passenger Vehicles	9%	Current % of vehicle sales as Electric Vehicles (EV)
	20%	Compound Annual Growth Rate of new car purchases as EV in year 1
	12%	Compound Annual Growth Rate of new car purchases as EV in year 5
Waste	75%	Percentage GHG reduction from organics diversion or landfill gas capture
	5	Full implementation takes 5 years.

If a lower level of ambition were 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 D: Implementation Details

The following pages describe detailed actions for each of the Big Move strategies. The actions are presented in four tiers: Tier 1 represents foundational actions that our 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 Village of Pemberton CCAP.

Municipal levers are noted for each strategy:

Infrastructure	**Policy & Regulation**	**Engagement & Outreach**
 Investments into Village of Pemberton owned infrastructure that enable residents to make lower-emissions choices, such as active transportation networks and public charging stations.	 Changes to Village of Pemberton 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.

Transportation – Shift Beyond the Car

The combination of land use (being near where you need to go daily), infrastructure (active and accessible paths & prioritization, transit) and policy (e.g. reducing parking minimums) combine to shift away from passenger vehicles to active transportation and transit. Land use policy effects are long-term due to the long timescale of development. Pilot Projects and Tactical Urbanism additions (bollards, road bumps, bus only zones) have more immediate effects on day-to-day activities.

Strategy	Tier 1	Tier 2	Tier 3	Tier 4
SHIFT 1.1 **Optimize land use policies and bylaws for compact growth**  Lead: Planning	Review OCP and planned development to identify opportunities for infill development; Create and use a Sustainability Checklist to assess and encourage developments and proposed land uses that support compact growth and advance climate action; Review employment locations and link location and land use to local Economic Development Strategy.	Leverage Community Lifecycle Infrastructure Costing tool to assess financial impacts of development proposals; Increase density along the Downtown-Portage-Gateway Corridor / core Transit Network.	Create a density bonus structure for development within short walking distance of the Downtown-Portage-Gateway corridor and specific nodes.	Require all new developments to have walk-scores greater than the community average and expected transportation emissions below the community average.
SHIFT 2.1 **Promote active transportation through plans and policies**  Lead: Planning	Develop an Active Transportation Plan; Survey the community on travel habits and what services / opportunities are needed within the community to reduce out-of-community travel, link to local Economic Development Strategy.	Develop a Complete Streets Policy to include formalizing hierarchy (pedestrian - bike - transit – commercial truck - car); Apply trip-end facility requirements (bike lockers, showers/change room) to all commercial and industrial buildings regardless of gross floor area.	Update Subdivision Servicing Bylaw to require any new subdivisions to include active transportation infrastructure; Strategically place time limited parking or price parking to incentivize active transportation options.	

SHIFT 2.2 **Build safe routes for walking, cycling and other forms of zero emission mobility**  Lead: Operations	Continuously improve active transportation infrastructure on existing routes.	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 (all ages and abilities) 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 2.3 **Develop and deliver an active transportation outreach strategy**  Lead: Climate Action Lead, Communications	Promote new routes and end of trip facilities; Promote events such as Bike to Work Week and Car-Free Days.	Expand active transportation education with events for new AAA (all ages and abilities) routes (e.g. priority for disabled users, etiquette when passing others).	Contract dedicated permanent, part-time outreach capacity to engage the community on active transportation and transit.	Collaborate with communities in the region on shared outreach capacity.
SHIFT 2.4 **Normalize car-free and zero-emission zones**  Lead: Climate Action Lead, Communications	Establish car-free days on a key street - 1 day a year. Combine with a special event and create a festival experience.	Expand car free days on a key street to more days of the year / more streets; Consider car free days once a week during warmer seasons (e.g. combined with weekly farmers market).	Establish high-profile car-free areas and routes within the community. This may include multi-modal trails and connections across barriers like dyking infrastructure, CN Rail Right-of-Way, and Watercourses.	
SHIFT 2.5	Host awareness events for e-bikes, e-scooters and EV golf	Conduct an analysis to understand when and where	Collaborate with a technology vendor to bring e-mobility on	

Promote micro e-mobility (e.g. e-bikes, e-scooters) and on-demand mobility services (e.g. shared bikes, ride hailing)  Lead: Climate Action Lead, Communications	carts, including demonstrations.	on-demand service will be most useful (e.g. ride hailing and shared mobility such as scooters).	demand solutions to the community, such as electric kick-scooters or e-bikes available for rent through an app.	
SHIFT 3.1 **Collaborate with transit providers to increase service and promote transit ridership**  Lead: Climate Action Lead, Office of the CAO	Promote transit ridership by celebrating new times, routes, and offering free transit days.	Collaborate with transit providers and School Districts to enable free transit programs for students/children/seniors, and especially during bad air quality or very cold weather.	Collaborate with neighboring communities on convenient inter-community transit that is safe and responsive to the needs of the communities.	Explore universal free transit with transit providers.
SHIFT 3.2 **Collaborate with transit providers to transition to a zero emission transit network**  Lead: Climate Action Lead, Office of the CAO			Collaborate with transit providers and neighbouring communities to ensure that transit shifts to zero emissions vehicles (e.g. electric).	Collaborate on a 10-year transit investment program to eliminate transit vehicle emissions. Investment will retrofit maintenance yards and infrastructure to support Zero Emission Vehicles.

Transportation – Electrify Transportation

New vehicle sales account for approximately 10% of total vehicle stock annually. Switching from a fossil fuel vehicle to an electric vehicle (EV) eliminates almost 100% of the emissions in BC. In 2019, 10% of car sales (not including trucks and sport utility vehicles) were EVs, though this is not consistent across BC. Provincial Zero Emission Vehicles mandates do not require an even distribution of EV sales across the province; therefore, the Village of Pemberton 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**  Lead: Operations, Climate Action Lead	Install public Level 2 charging at one or more existing municipally owned parking lots to demonstrate leadership, and mandate that new charging stations be installed in all new parking areas owned by the Village of Pemberton.	Develop a community EV charging infrastructure strategy (current/future demand for Level 2 (L2) and Direct Current Fast Chargers (DCFC) and for residents without off-street parking). Through engagement and network design, consider opportunities to leverage public institutional (or other Part 3) charging infrastructure to address "garage orphans"[3].	Collaborate with other local and regional governments on a regional charging network strategy. Ensure high profile apps include Pemberton charging locations on all platforms.	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 **Accelerate EV-ready building requirements for new buildings** 	Educate building community about new requirements for new construction to install EV-ready charging infrastructure. Amend Building Bylaw to integrate Part 9 EV readiness requirement for 100% of all new non-street parking.	Consult with industry regarding Part 3 EV ready requirements Develop a Part 3 EV Charger readiness policy	Implement Part 3 EV charger readiness policy as per best practice (Residential Electric Vehicle Charging) (i.e., 100% electrified, EV-ready stalls for new multi family buildings (energized outlet capable of supporting Level 2 charger - integrate load management);	Require EV readiness reflective of new Part 3 construction for rezoning or development permits for major redevelopment /renovation.

[3] Garage orphans refer to residents who own electric vehicles, but do not have access to a garage with EV charging capacity (i.e., apartment and condominium dwellers with nowhere to charge in their building).

Lead: Climate Action Lead, Building			25% of stalls at new, non-residential Part 3 buildings).	
ELECTRIFY 2.2 **Enable EV charging in existing residential and commercial buildings**  Lead: Climate Action Lead, Planning, Building	Provide information to building owners about provincial EV charging incentives and educational resources for strata corporations and rental buildings.	Advocate strata corporations and property to begin navigating the process to retrofit existing parking stalls with EV charging equipment.	Top up, as funding permits, provincial residential (single family and multi-family) and workplace level 2 retrofit incentives.	
ELECTRIFY 3.1 **Develop and deliver an EV outreach strategy**  Lead: Climate Actin Lead, Communications	Advise local groups of EV outreach incentives from Emotive. Create a communications plan to support engagement of the broader community that raises awareness of the benefits of EV ownership and use in Pemberton. Deliver builder/developer education on EV charging requirement for Part 9 and Part 3 buildings such as an Open House for electrical trades to engage on EV charging readiness requirement.	Continue outreach to builders, residents, related businesses such as nearby auto dealers including workshops and stakeholder engagement to raise awareness and promote EV use. Partner with other organizations (e.g., Stewardship Pemberton, Protect Our Winters, etc.) to host awareness or engagement events such as EV 101 presentations, EV information tables at community events, movie	Facilitate a regional workshop in association with Tourism organizations to identify opportunities to leverage community EV charging network implementation to support regional travel. Collaborate with neighboring communities on ongoing active outreach to public and car dealers, implementing the communications plan (Tier 1) to support community identity around EVs.	Work with sea to sky corridor communities to establish a regional brand around electric vehicle adoption, reflective of the local priorities and context to encourage adoption.

		nights, test-drives and ride-alongs.		
ELECTRIFY 3.2 **Accelerate EV adoption through supportive policies and incentives**  Lead: Climate Action Lead, Operations, Communications, Corporate	Undertake a multi-family residential parking study to understand parking utilization rates. Use the study to inform policy development, which explores reducing parking requirements in multi-family residential developments that support transportation alternatives (i.e., provision of more EV parking or EV car shares).	Maintain speed limit for select Village streets to 30km/h, where practical, to allow for low speed EV's.	Leverage Provincial decal program (EV-OK) program to provide a suite of EV priority parking spaces (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 4.1 **Engage commercial stakeholders to facilitate transition to low emission vehicles**  Lead: Climate Action Lead, Communications, Office of the CAO	Develop communications strategy to support outreach/engagement with the commercial sector to facilitate a transition to low emission/EVs; Provide information to fleet operators about the CleanBC Go Electric Specialty Use Vehicle Incentive Program Advocate to provincial government for commercial decarbonization legislation and actions that enable accelerated decarbonisation; Leverage collaborations with commercial sector and regional municipalities.	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 Districts to identify early adoption opportunities of electric bus and transit options (recognizing 100% electric transit target for BC Transit, and currently available school bus funding for School Districts).	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 medium duty and heavy-duty fleet operators, and facilitation of driver training courses on emission-reducing techniques.

Buildings – Step Up New Buildings

The BC Energy Step Code is an energy efficiency code, not a greenhouse gas (GHG) reduction code. Efficiency is a valuable first step, but to achieve deep emissions reductions, building heating systems must use low or zero emissions fuels. In British Columbia (BC), electricity is a sound choice as it is nearly emissions free[4] and heat pumps, which use 1/2 to 1/4 the energy of a baseboard heater, save energy and money over the long run. Each new building that is not energy efficient, or uses a fossil-based heating system, is one more building that will need to be retrofitted. The Village of Pemberton, exceeding provincial standards, currently requires Part 9 buildings to meet Step 4 of the *BC Energy Step Code*. Strategies are intended to further incentivize energy-efficiency and low emission building techniques to reach higher steps, or to encourage programs that address other aspects of energy-efficient buildings.

Strategy	Tier 1	Tier 2	Tier 3	Tier 4
NEW BUILD 1.1 **Accelerate implementation of the BC Energy Step Code**  Lead: Climate Action Lead, Building	Engage the Part 3 building industry on Step Code requirements.	Continue to seek funding and provide rebates to incentivize voluntary adoption of a higher step for Part 9 buildings; Implement Part 3 Step Code requirements i.e. adopt Step 2 ahead of more stringent energy requirements in the *BC Building Code* (expected Dec 2022).	Consult with the building industry to determine readiness and timelines for adopting Step 5 for Part 9 buildings; Transition to upper steps for Part 3 buildings.	Adopt the highest step for each building type.
NEW BUILD 1.2 **Adopt a low-carbon approach to the BC Energy Step Code**	Engage with the Local Government Step Code Peer Network to receive up to date information on the opt-in Carbon Pollution standards in development as of fall 2021.	Conduct consultation with the local building industry about upcoming Carbon Pollution standards.	Adopt the opt-in Carbon Pollution standards into the Building Bylaw when they become available.	Investigate opportunities to address embodied carbon in the Construction sector.

[4] The Village acknowledges that the generation of electricity in British Columbia does create some GHG emissions and has environmental and social impacts, but an analysis of these impacts is beyond the scope of this study.

 Lead: Climate Action Lead, Building				
NEW BUILD 2.1 **Continue to provide outreach and incentives**  Lead: Climate Action Lead, Building, Communications	Continue to seek funding to offer incentives to builders who voluntarily exceed the *Energy Step Code* to offset the additional cost of energy advisors and/or provide incentives for mid-construction air tightness testing; Promote existing incentives for building more efficient new homes via Clean BC's Better Homes BC and Better Buildings BC; Work with the Community Energy Coach System program to gain free support, resources and information on promoting CLEANBC rebate programs; Organize a series of lectures or demonstrations of high-energy efficiency techniques used locally; Invite different builders to highlight their work and its success.	Leverage provincial and BC Hydro funding to provide rebates specifically for heat pump systems to builders. Consider fee rebates for new homes that install solar or electric vehicle charging stations, as funds are available.	Top up provincial incentives offered through Better Homes BC and Better Buildings BC for heat pumps to replace fossil heating systems in new buildings, as funds are available.	
NEW BUILD 2.2 **Continue to provide training and coordination**	Collaborate across the region and with educational institutions such as BC	Continue providing locally relevant training;	Continue collaborating to provide training to building industry, focusing on meeting	

 Lead: Climate Action Lead, Building, Communications	Institute of Technology (BCIT)[5] to provide ongoing training to building industry, building officials and realtors; Assemble and promote a list of local or regional Certified Energy Advisors.	Work with building industry partners to accelerate Energy Advisor training.	Upper Steps of the *BC Energy Step Code.*	

[5] In 2019, the Village of Pemberton collaborated with the Community Energy Association and BCIT to host course in Pemberton entitled "Zero Energy Buildings for a Complex World". The course was taught by a BCIT instructor and was intended for builders, tradespeople and building officials to learn how to build to the BC *Energy Step Code*.

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 can save 50% to 60%. Heat pumps use 1/2 to 1/4 of the energy of baseboard heaters. Electricity generates >80% less emissions than propane.

Strategy	Tier 1	Tier 2	Tier 3	Tier 4
EXISTING BUILD 1.1 **Encourage and enable deep energy retrofits**  Lead: Climate Action Lead, Building, Communications	Promote Clean BC's Better Homes BC and Better Buildings BC regarding rebates at the Village front counter and by providing information in property tax and business license renewal mailings. Share information on deep energy retrofits and rebates on the Village's website, through CloudPermit and the Village's social media channels.	Require EnerGuide assessments (for Part 9 buildings) and building energy benchmarking (for Part 3 buildings) as a condition of a renovation permit over a certain valued threshold.	Require minimum energy performance standards aligning with the province's upcoming retrofit code (as more information becomes available).	
EXISTING BUILD 2.1 **Encourage and enable building electrification**  Lead: Climate Action Lead, Building	Provide information about heat pumps to renovators and homeowners at time of building permit.	Identify and remove any barriers to heat pump installation	Top up Provincial Clean Better Homes BC and Better Buildings BC heat pump incentives.	
EXISTING BUILD 3.1	Promote Better Homes BC and Better Buildings BC at front	Establish a 10-year program for a community-wide	Collaborate with local governments in the region on	

Establish a long-term marketing campaign  Lead: Climate Action Lead, Building, Communications	counter and in property tax and business license renewal mailings.	marketing campaign to encourage building envelope improvements, electrification or other low carbon fuel sources.	a coordinated 10-year campaign to market deep energy retrofits and fuel switching from heating oil, propane and natural gas to heat pumps.	
EXISTING BUILD 3.2 **Build industry capacity**  Lead: Climate Action Lead, Building, Communications	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

Emissions from waste occur when organic waste mixed in with garbage decomposes in the landfill and produces methane. Typically, organic waste makes up 35-40% of landfill waste. In Pemberton, the amount of compostable (organic) waste in 2020 is approximately 38.3% with avoidable food waste being 10%[6]. The Squamish-Lillooet Regional District (SLRD) is responsible for waste management for the Village of Pemberton, and therefore all actions described here will need to be in partnership with the SLRD.

Strategy	Tier 1	Tier 2	Tier 3	Tier 4
WASTE 1.1 **Collaborate to adopt policies that increase organics diversion**  Lead: Climate Action Lead, SLRD Resource Recovery Coordinator, Office of the CAO	Collaborate with the SLRD to initiate Staff consultation on programs to divert organic waste and recyclables from the landfill; Adopt a bylaw to reduce or ban non-essential single use plastics (e.g., shopping bags, straws, etc.) aimed at the business community.	Collaborate with the SLRD to adopt organics diversion targets for the community; Require all businesses and strata corporations to collect and separate waste into three streams; organics, recyclables, and waste to landfill (e.g., see Resort Municipality of Whistler (RMOW) regulation) refer to RMOW example).	Work with the SLRD to require waste diversion plans (away from landfill) for construction and demolition sites requiring permits; Require organics diversion for special event permitting.	Partner with the Squamish-Lillooet Regional District with a stepped program to eliminate organics and recyclable materials from landfill within a targeted time frame.
WASTE 1.2 **Partner to enhance organics collection and processing**  Lead: Climate Action Lead, SLRD Resource Recovery Coordinator	Support the SLRD's efforts to inventory community organic waste volumes and feasibility of landfill diversion.	Reinvestigate curbside collection for all waste streams including organics collection; Investigate how other communities have dealt with bear conflicts; Install central collection points that are regularly picked up for multi-family units.	Integrate organics collection in streetscapes or in public facilities, where appropriate.	

[6] SLRD Waste Composition Audit, 2020

WASTE 1.3 **Identify strategies to divert construction, demolition, agricultural and industrial wood waste**  Lead: Climate Action Lead, SLRD Resource Recovery Coordinator		Identify wood waste producers 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 and wood waste.	Identify opportunities to salvage surplus and used construction materials, wood waste and promote reuse, donation, repair, and sharing opportunities.
WASTE 1.4 **Develop and deliver a comprehensive zero-waste outreach program**  Lead: Climate Action Lead, SLRD Resource Recovery Coordinator	Support community-led composting projects located in community gardens or community agricultural parks; Support existing and new capacity for reusable resources, including Free Swaps, Share Sheds, Free-Store for unwanted goods, and building materials depot; Continue to promote the SLRD's Zero Waste Outreach programs in schools.	Partner with SLRD to conduct annual community zero-waste drives to enhance awareness, streamline with school and business programs.	Educate and communicate the source-separation requirements for businesses; Outreach to wood waste producers, and other people who can help identify the opportunity.	Establish a Waste Reduction Working Group consisting of key staff from the Village and SLRD that institutionalizes support for organic diversion and zero waste initiatives, include external organizations where possible.

Appendix E: 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 and data sources for each indicator. The Village of Pemberton should plan annual progress reporting.

	Indicators	Measures of Success	Data Sources
Overall	1. Community GHG emissions	50% reduction in emissions from 2007 levels by 2030 100% 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) decrease over time to 2050	Provincial energy & emissions data at the community level, Kent Group fuel sales data for area gas stations.
Transportation	3. kWh/year used recharging EVs at public charging stations	Increase in amount of kWh/year of charging at EV stations	Usage data from service provider.
	4. Infrastructure to promote active transportation	Progress towards outcomes of the following plans: • Cycling Network Plan • Official Community Plan • Active Transportation Plan	Development Services, Operations & Recreation
	5. Commuting / personal travel mode split	Increase in travel around Pemberton by public transit, walking or cycling	BC Transit ridership data, and Census

	Indicators	Measures of Success	Data Sources
Existing buildings	6. Number of energy efficiency incentives distributed for building efficiency upgrades	Average increase in incentive use	Summary data from BC Hydro (and other entities as applicable, e.g., Province)
New buildings	7. Number 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	Building Permit applications
Renewable Energy	8. Number of renewable energy building 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	Squamish-Lillooet Regional District
	10. Recycling rates	Increase in recycling rates	Squamish-Lillooet Regional District
	11. Tonnes of waste per capita to landfill	Decrease in waste per capita sent to landfill	Squamish-Lillooet Regional District
Other	12. Urban tree canopy cover	Increase in canopy	Development applications; Tree Preservation Bylaw permit applications Operations tree planting data; Air Photos
	13. Per capita water consumption	Decline in water use	Usage data on water utility bills / metering system
	14. Number of participants at building, community & citizen educational events / workshops	High participation levels at events	Registration/Attendee lists for events

	Indicators	Measures of Success	Data Sources
	15. Number of plots in community gardens available for rent for personal food production	Increase in number of plots	Village of Pemberton; Stewardship Pemberton Society