Community Climate Mitigation Plan

Township of Esquimalt

April 2022

Approved by Council July 11, 2022

Township of
ESQUIMALT

Community Energy
Association

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Acknowledgments

The Community Climate Mitigation Plan (CCMP) was developed by the Township of Esquimalt in collaboration with the Community Energy Association (CEA). We would like to acknowledge the many individuals and organizations who participated in the development of this Plan.

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The Township of Esquimalt acknowledges with respect that we are within the Traditional Territories of the Esquimalt and Songhees First Nations.

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Executive Summary

The Esquimalt Community Climate Mitigation Plan (CCMP) carves a path towards a low carbon future. A future where Esquimalt residents experience the benefits of a connected, healthy, and economically prosperous community while taking action on climate change and adapting to climate impacts.

The climate is changing in British Columbia (BC) and globally. The average global temperature has already increased by 1 degree Celsius (°C) above pre-industrial levels. The United Nations Intergovernmental Panel on Climate Change (IPCC) is urging a limit of 1.5°C warming, which would require global emissions to be net-zero by 2050. Aligning with this target, Esquimalt Council declared a climate emergency in 2019 and made a commitment to 100% renewable energy in the community by 2050.

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

- **Infrastructure**: Investments into the Esquimalt owned infrastructure that enable residents to make lower-emissions choices, such as active transportation networks, and public charging stations
- **Policy**: Changes to Esquimalt 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.
- **Engagement**: Outreach, education, and incentives that inspire residents and businesses to make choices to reduce energy and emissions and prepare for a low carbon future.

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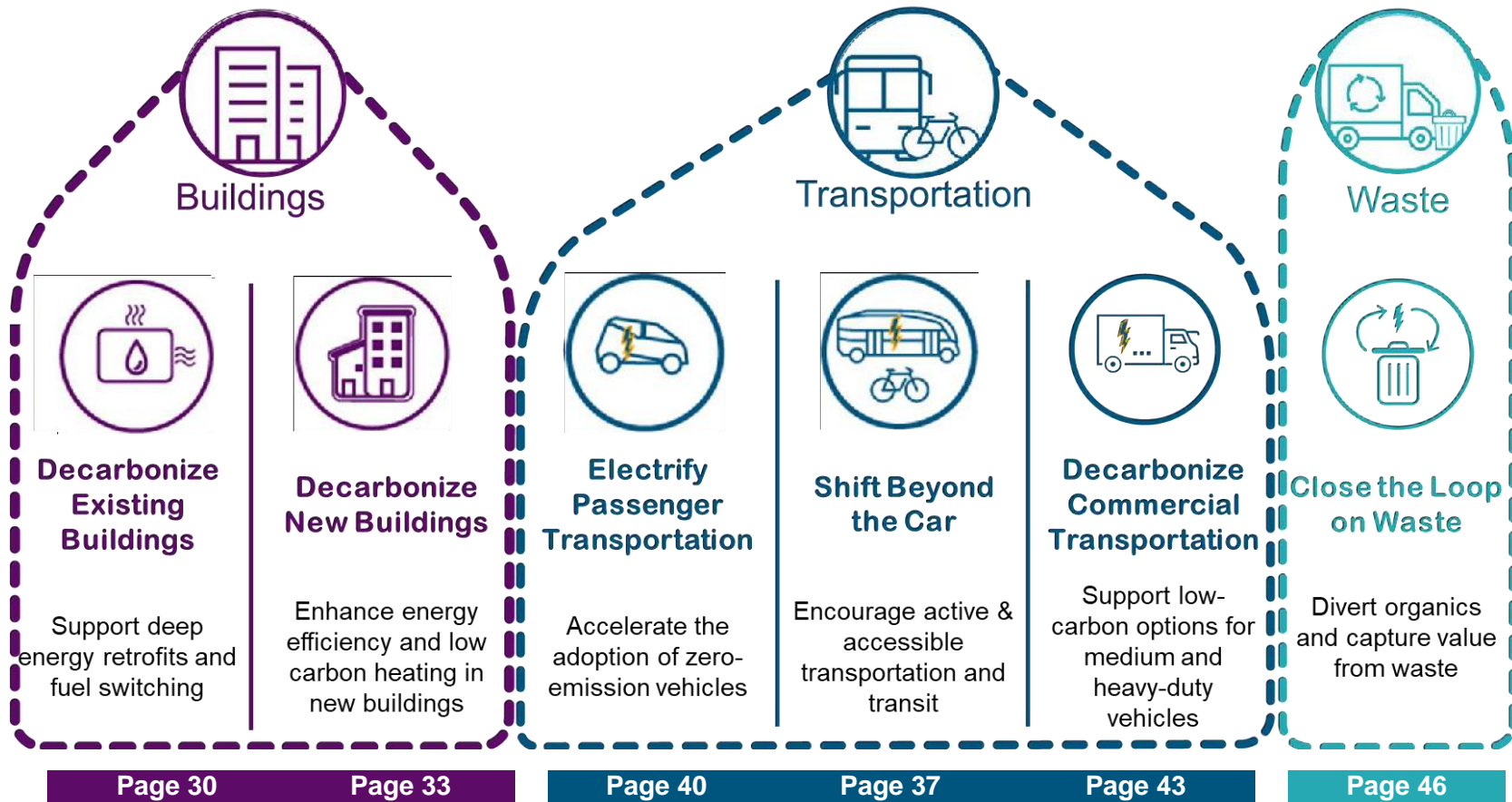
Esquimalt Community Greenhouse Gas Reduction Targets

38% reduction from 2007 levels by 2030

Net-zero emissions by 2050

The Big Moves

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

Buildings

Transportation

Waste

Decarbonize Existing Buildings

Support deep energy retrofits and fuel switching

Decarbonize New Buildings

Enhance energy efficiency and low carbon heating in new buildings

Electrify Passenger Transportation

Accelerate the adoption of zero-emission vehicles

Shift Beyond the Car

Encourage active & accessible transportation and transit

Decarbonize Commercial Transportation

Support low-carbon options for medium and heavy-duty vehicles

Close the Loop on Waste

Divert organics and capture value from waste

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There is one more important category of actions – **Organizational Leadership**. This "seventh Big Move" is very important because it ensures that climate action becomes a part of regular decision-making and operational process within Esquimalt. **Page 52**

Our Community's Low Carbon Vision

During the CCMP planning process, community stakeholders went through a visioning exercise called "backcasting" to imagine what a low carbon future for Esquimalt could look like. We chose 2040 as our visioning year to allow for a slightly longer time horizon than 10 years but short enough to imagine the changes taking place.

In 2040, GHG emissions in Esquimalt will be reduced by at least 50% and we will be on our way to net-zero emissions by 2050. In 2040, you will walk out your front door into a liveable community where all the services you need are close by and natural spaces are abundant. A variety of new mobility services are available to support the needs of all Esquimalt residents and visitors. Congestion is reduced and you arrive at your destination more efficiently. You can choose to travel by foot, bike, e-bike, scooter, or zero-emission public transit.

The air in Esquimalt 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. All new buildings and most existing buildings no longer use fossil fuels for heating.

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

The Future of Transportation	The Future of Buildings	The Future of Waste
A complete zero-emission transportation system connects our community and region.	Our community's buildings are exceptionally energy efficient, being powered, heated, and cooled with 100% renewable energy.	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.

Where We're Starting From

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

Esquimalt is a small suburban community with a population of approximately 18,000 people and is expected to grow at a rate of about 1.3% per year. The residential buildings are predominantly a mix of single and two family houses, and low and mid-rise apartment buildings. Most residents get around by car, however transit ridership in Esquimalt is relatively high, and the community has a new Active Transportation Network Plan (ATNP). Esquimalt operates one dual-head level 2 electric vehicle charging station. There are no DC fast chargers in the community. Curbside kitchen waste pickup is in place for residents, which is processed at a facility operated by the Capital Regional District.

Current Energy, Emissions and Costs by Sector

The last complete inventory year dataset available from the Stantec report was from 2018 and was used to describe Esquimalt's current energy consumption and emissions. See Appendix D for a full description.

In 2018, for the whole community of Esquimalt:
- Total energy consumption is estimated at 1.66 PJ, (pega joules) (461.48 giga watts) equivalent to heating about 11,000 single family houses
- Total GHG emissions are estimated at 85,800 tonnes of CO_2e, or about 19,000 light-duty vehicles
- Total energy expenditures are estimated at $43.4 million, $2,400 per capita.

Figure 1 shows the proportion of energy consumption, emissions, and estimated energy expenditures, organized by sector.

Figure 1 - Proportion of Energy, Emissions and Cost by Sector, 2018, %
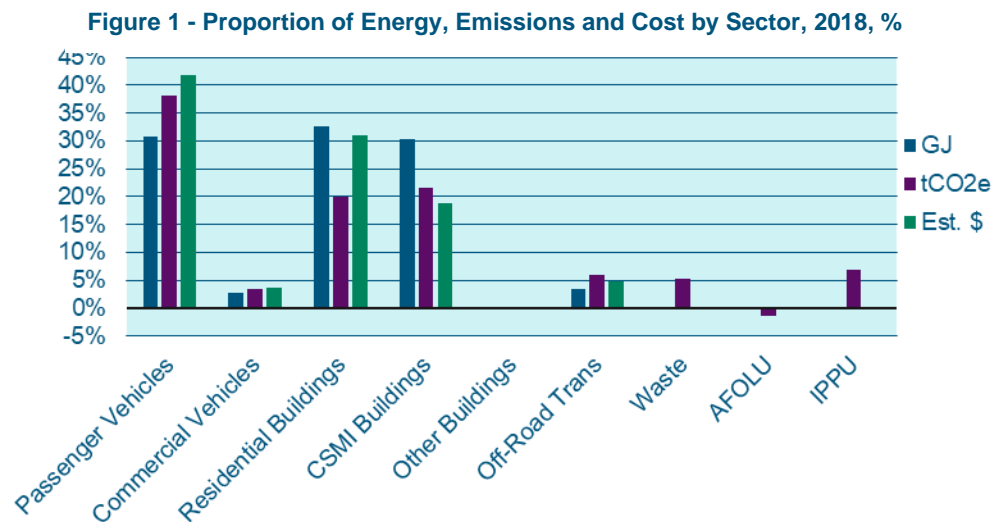
- *CSMI: Commercial, Small, Medium Industrial buildings*
- *AFOLU: Agriculture, Forestry and Other Land Use*
- *IPPU: Industrial Processes and Product Use*

Working Towards our Future Vision and Target

This Community Climate Mitigation Plan carves a pathway towards our low carbon vision and emissions reduction target of 38% below 2007 levels by 2030. The two graphs below compare the sources of emissions in the business as usual scenario with the fully implemented plan scenario.

Business as Usual

The Business as Usual (BAU) scenario, Figure 2 shows anticipated GHG emissions reductions due to policy commitments made by the Government of Canada and Province of BC.

Planned Implementation

By implementing this plan, the Township of Esquimalt can meet the 2030 target and be on its way to meet the 2050 target.

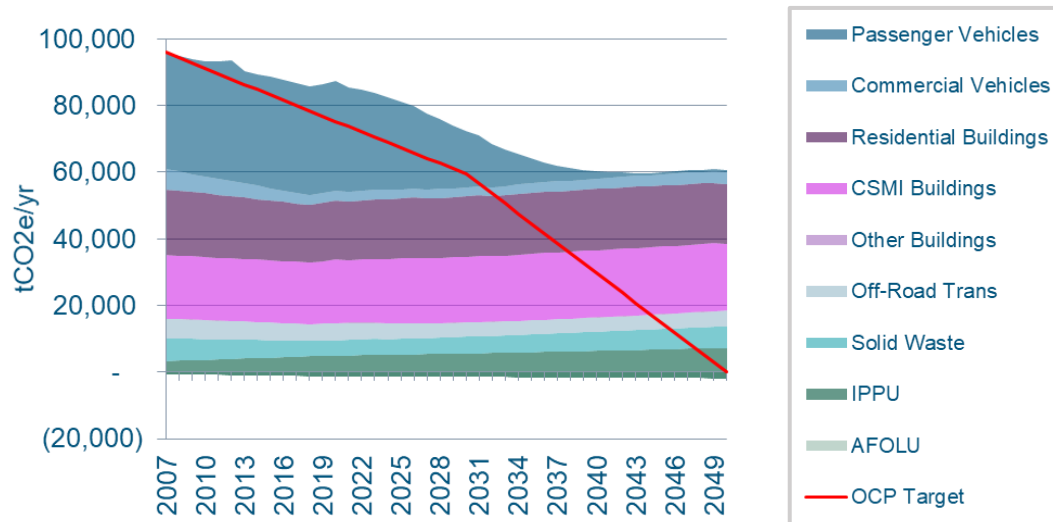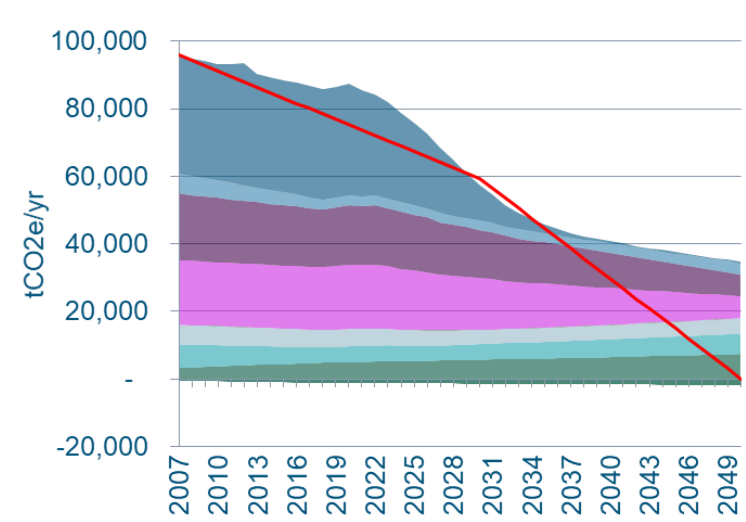**Figure 2- Emissions Under Business as Usual Scenario**

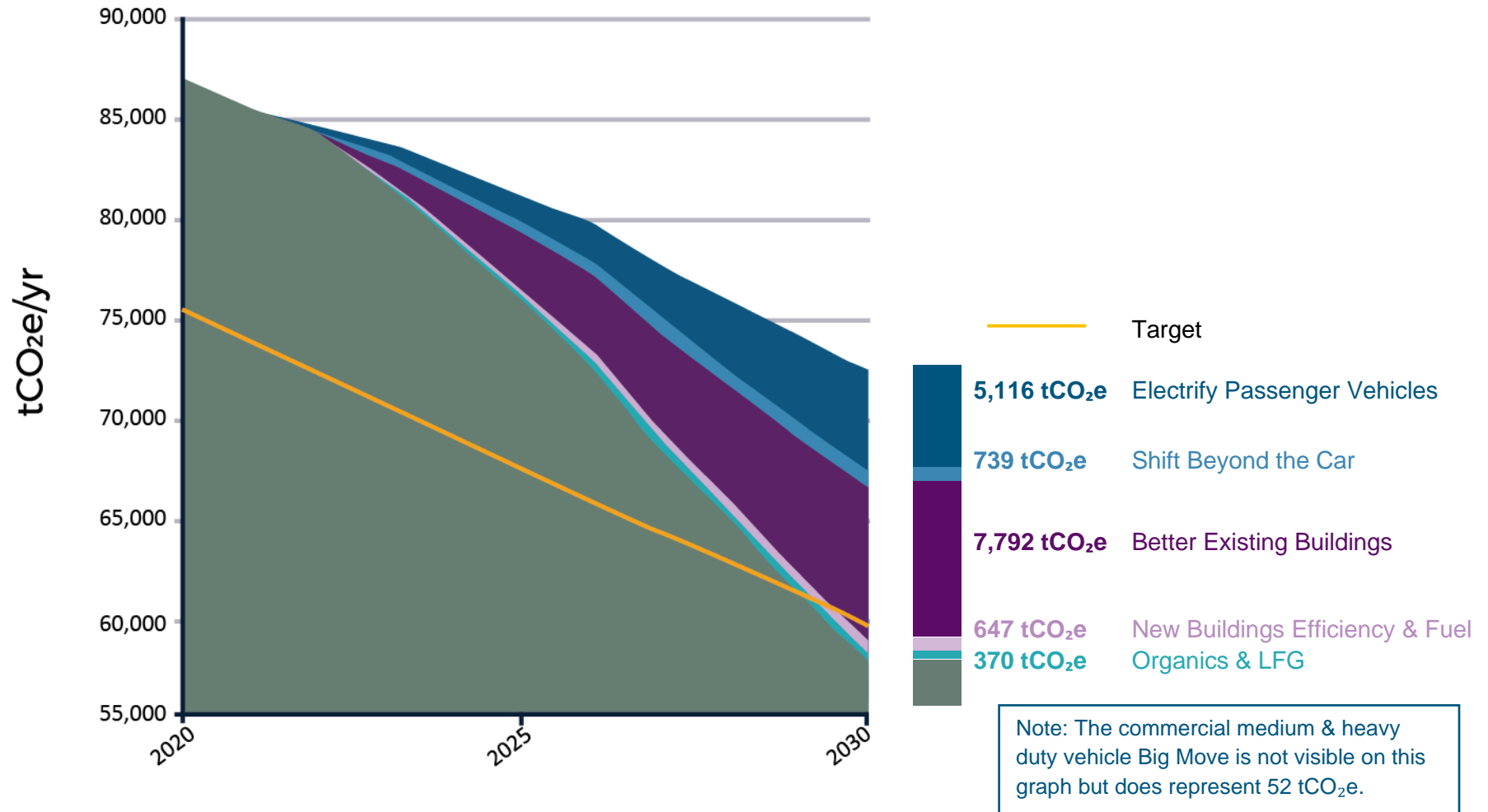**Figure 3 – Emissions Under Planned Implementation Scenario**

Meeting our 2030 Target - GHG Reductions by Big Move

Esquimalt is on track for meeting their 2030 GHG Reduction Target.

Figure 4 demonstrates how each Big Move impacts Esquimalt's overall emissions profile between 2020 and 2030.

Figure 4 – GHG Reductions by Big Move to 2030

Legend:
- Target
- **5,116 tCO₂e** Electrify Passenger Vehicles
- **739 tCO₂e** Shift Beyond the Car
- **7,792 tCO₂e** Better Existing Buildings
- **647 tCO₂e** New Buildings Efficiency & Fuel
- **370 tCO₂e** Organics & LFG

Note: The commercial medium & heavy duty vehicle Big Move is not visible on this graph but does represent 52 tCO₂e.

Plan Summary

Big Move	Strategy	Timeframe		
		Short	Med	Long
Retrofit Existing Buildings	**EXISTING BUILDINGS 1: Improve Energy Efficiency and Enable Fuel Switching**			
	EXISTING BUILDINGS 1.1 – Encourage and enable deep energy retrofits.	■	■	■
	EXISTING BUILDINGS 1.2 – Encourage and enable building electrification or renewable gas	■	■	■
	EXISTING BUILDINGS 2: Build Industry Capacity and Increase Demand			
	EXISTING BUILDINGS 2.1 – Establish a long-term marketing campaign	■	■	
	EXISTING BUILDINGS 2.2 – Build industry capacity	■	■	
	Total GHG emissions reductions for this Big Move	**7,792 tCO2e**		
Decarbonize New Buildings	**NEW BUILDINGS 1: Prioritize a low carbon approach**			
	NEW BUILDINGS 1.1 – Encourage low carbon heating in new buildings	■	■	■
	NEW BUILDINGS 2: Build Industry Capacity			
	NEW BUILDINGS 2.1 – Provide outreach and incentives	■		
	NEW BUILDINGS 2.2 – Collaborate to provide training and coordination	■	■	■
	Total GHG emissions reductions for this Big Move	**647 tCO2e**		
Shift Beyond the Car	**SHIFT 1: Augment land use planning tools to enable compact community growth**			
	SHIFT 1.1 – Augment policies and bylaws for compact growth	■	■	■
	SHIFT 2: Increase 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, on-demand services (e.g., e-bikes, ride-hailing)	■	■	■
	SHIFT 3: Promote transit ridership and support a zero-emissions transit network			
	SHIFT 3.1 – Collaborate with transit providers to promote transit ridership	■	■	■
	SHIFT 3.2 – Encourage BC Transit to transition to a zero-emissions transit network		■	■
	Total GHG emissions reductions for this Big Move	**739 tCO2e**		

Big Move	Strategy	Timeframe		
		Short	Med	Long
Electrify Passenger Transport	**ELECTRIFY 1: Enable charging on-the-go**			
	ELECTRIFY 1.1 – Design, fund and build a public EV charging network	■	■	■
	ELECTRIFY 2: Enable charging at home and work			
	ELECTRIFY 2.1 – Adopt EV-ready building requirements	■	▫	▫
	ELECTRIFY 2.2 – Enable EV charging in existing residential and commercial buildings	▫	■	■
	ELECTRIFY 3: Encourage EVs through outreach and supportive policies			
	ELECTRIFY 3.1 – Develop and deliver an EV outreach strategy	■	▫	▫
	ELECTRIFY 3.2 – Provide incentives for EV adoption	▫	■	■
	Total GHG emissions reductions for this Big Move	**5,116 tCO2e**		
Decarbonize Commercial Transport	**COMMERCIAL 1: Accelerate the adoption of ZEVs for commercial fleets**			
	COMMERCIAL 1.1 Develop a Community Vision and Strategy	▫	■	■
	COMMERCIAL 1.2 Engage Commercial and Industrial Stakeholders	▫	▫	■
	COMMERCIAL 2: Lead by example by transitioning municipal fleet			
	COMMERCIAL 2.1 Update corporate policies to prioritize low carbon options if feasible	■	■	■
	Total GHG emissions reductions for this Big Move	**59 tCO2e**		
Close the Loop on Waste	**WASTE 1: Divert Organics from Landfill**			
	WASTE 1.1 – Adopt policies that increase organics diversion.	■	▫	▫
	WASTE 1.2 – Enhance organics collection and processing.	■	▫	▫
	WASTE 1.3 – Divert construction, demolition, agricultural, and industrial wood waste.	▫	■	■
	WASTE 1.4 – Develop and deliver a comprehensive zero-waste outreach program	■	▫	▫
	WASTE 2: Explore other Resource Recovery Technologies			
	WASTE 2.1 – Evaluate and implement other resource recovery opportunities	■	■	■
	Total GHG emissions reductions for this Big Move	**370 tCO2e**		
	Total Reductions (This Plan only)	**14,716 tCO2e**		
	Total Reductions vs. 2007 baseline (This Plan + BAU actions)	**38,247 tCO2e**		
	Percent reduction vs. 2007 baseline	**40%**		

1. Introduction

1.1 Municipal Commitment

On April 12, 2019, Esquimalt joined over 30 communities in BC and over 1700 communities around the world and declared a "Climate Emergency". Since then, the Township has embarked on a Climate Action Planning Project that will address climate mitigation *(reducing greenhouse gas (GHG) emissions that we are currently emitting that cause climate change)* and adaptation *(taking action to help our communities and ecosystems cope with the consequences of climate change)* in the Township's operations and community-wide.

Esquimalt is a signatory to the BC Climate Action Charter, which is a voluntary agreement between the Province of British Columbia, the Union of B.C. Municipalities, and individual local governments. Local governments commit to:

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

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

Implementing the plan will result in numerous social, economic, and environmental benefits to the community, as outlined in Figure 5.

Figure 5 – Benefits of Climate Action
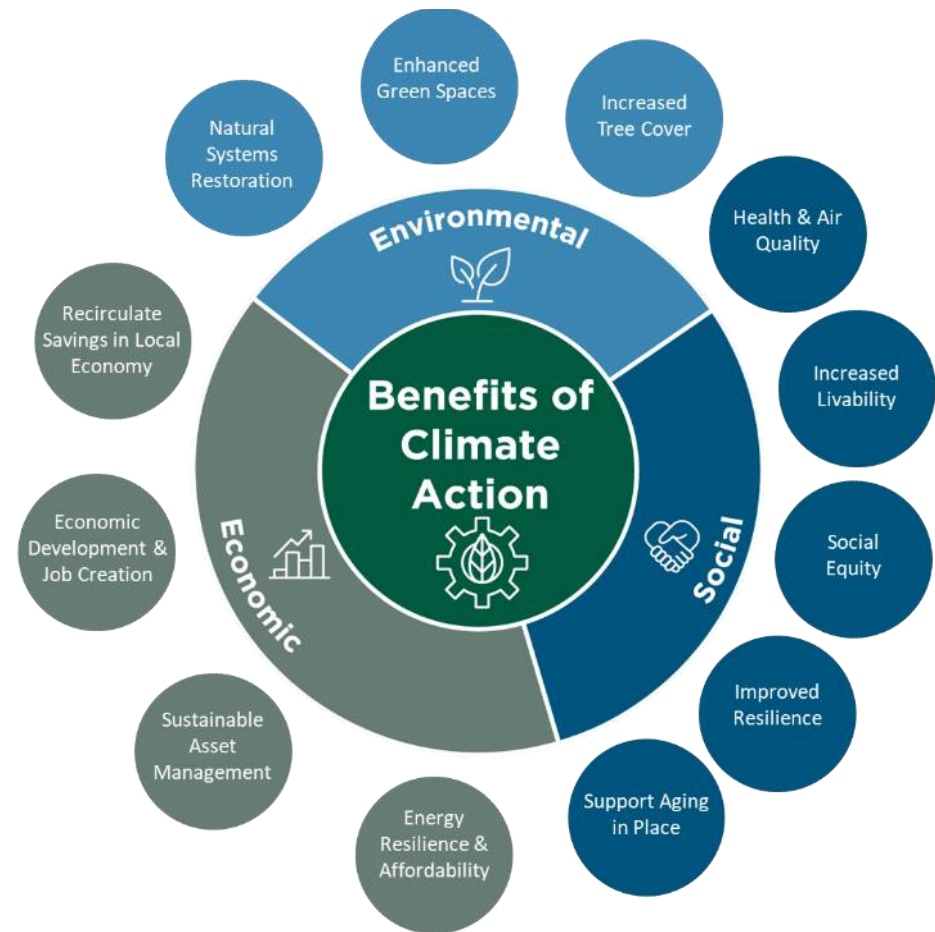
Local governments have specific levers to take action on climate change, as shown in Figure 6. The scope of this plan includes the elements on the left: mitigation, territorial emissions, and community emissions. Corporate emissions, which are generated from municipal operations, are typically addressed separately in a Corporate Climate Action Plan, while Consumptive Emissions, also known as embodied emissions, require a different scope of data entirely, and is beyond the scope of this plan.

Local governments take climate action by:

Reducing the emissions
contributing to climate change

This is called MITIGATION

GHGs

Preparing for impacts
of a changing climate

This is called ADAPTATION

As a community, we can only influence the emissions we produce.

TERRITORIAL emissions

Communities have **direct** responsibility for the emissions produced in its geographic boundaries. This includes emissions from local buildings, transportation and waste sent to the landfill.

CITY HALL

CONSUMPTIVE emissions

Communities are **indirectly** responsible for emissions produced with the goods and services we buy. This includes food, clothing and electronics.

As we mitigate territorial emissions, we distinguish between emissions produced by the broader community and those that result from municipal operations.

COMMUNITY emissions

Community emissions come from all our community's buildings, vehicles and waste production - residential and commercial.

Café

CORPORATE emissions

Corporate emissions come from all municipal operations including snow removal, fire services, community centres, administrative buildings.

CITY HALL

Figure 6 - Local Government Climate Action

1.2 What is the Community Climate Mitigation Plan?

Climate action consists of both reducing emissions, or *mitigation*, and preparing for the impacts of a changing climate, *or adaptation*. This Community Climate Mitigation Plan (CCMP) is an important component of Esquimalt's overall climate action strategy, which will also include a plan to address emissions from the Township's own operations and a climate adaptation plan.

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

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

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

Actions fall into three categories of municipal powers:

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

1.3 Targets for Reducing Our Emissions

Community targets show the urgency of the challenge we are facing and the call to action to reduce our GHG emissions. Esquimalt's long-term community target is aligned with the IPCC recommendation[1] to reduce GHG emissions by 100% by 2050 to meet the maximum 1.5 degree Celsius target to keep impacts of climate change to a minimum.

To meet our 2030 target of 38% below 2007 levels, we need to collectively produce at least 36,439 fewer tonnes of greenhouse gasses in a year, relative to 2007. The actions in this plan are projected to achieve emission reductions of 14,716 tonnes CO2e by 2030. Combined with the expected reductions from the BAU forecast, this equates to a total reduction of 38,189 tCO2e vs. 2007 levels, a 40% reduction that exceeds the 2030 target.

Figure 7 shows Esquimalt's inventory and business as usual (BAU) forecast (purple line) in comparison to various reduction targets. Esquimalt's target is the OCP (Official Community Plan) target in red. The remaining target lines show the Provincial, Federal and International (IPCC 1.5C) targets respectively.

The BAU shows a reduction between now and approximately 2035 due to Provincial and Federal commitments that will help reduce Esquimalt's emissions. The biggest contributor is the Provincial Zero Emissions Vehicle Act, which mandates an increasing proportion of new passenger vehicles sold to be zero emission.

Esquimalt's Community GHG Reduction Targets

2030
38% reduction in GHG emissions below 2007 levels

2050
Net-zero emissions (100% reduction in GHG emissions)

Figure 7 – Targets and Business as Usual (BAU) Emissions

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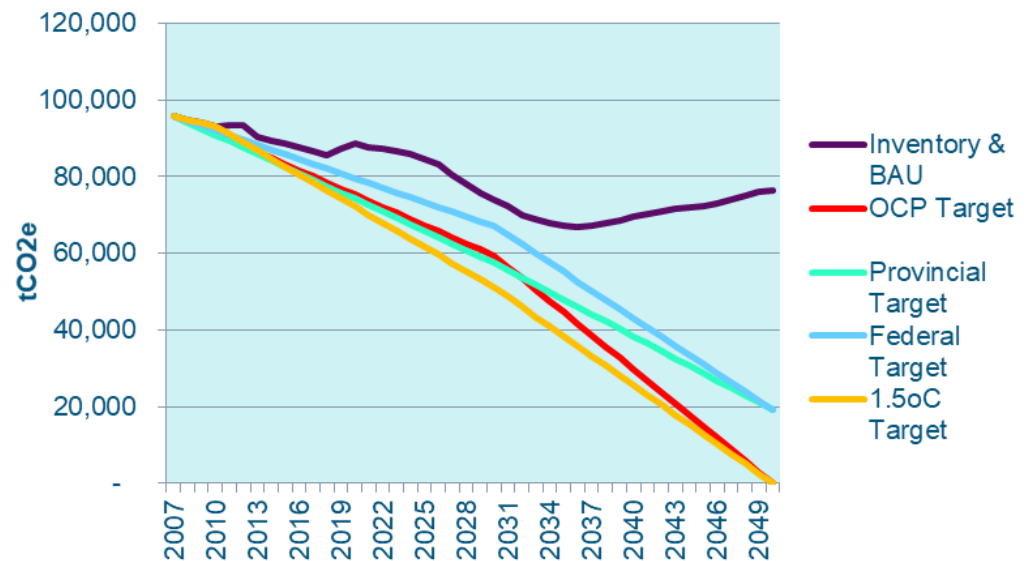
1. Intergovernmental Panel on Climate Change Special Report on Global Warming of 1.5°C

In addition to overall community targets, this plan identifies sectoral targets and progress indicators to support the overall target. These are outlined in the table below.

Sector	Target or Indicator
New building construction	22.5% of new homes built with low carbon heating each year (electricity or locked in renewable natural gas)
Retrofits for, residential, commercial and industrial buildings	3% of existing buildings undergoing 33% energy reduction retrofits each year
Renewable fuels and electrification	2% of buildings converting to electric heat pump each year
Transportation mode split (pedestrian, cycling, transit, personal vehicle etc.)	5.5% of vehicle kilometres travelled shifted to pedestrian, cycling, and transit by 2030
Electrification of transportation	4% of commercial vehicles are electric by 2030 60% of passenger vehicles are electric by 2030
Waste diversion	7.5% reduction in organics going to landfill by 2025

1.4 Inventories: What is measured in this plan?

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

Esquimalt's GHG reduction target references only local (territorial) emissions. These emissions are measured in the Energy and Emissions Inventory using the GPC Basic+ inventory methodology. The major categories of emissions included in this inventory are: buildings (commercial and residential), transportation (passenger, commercial and off-road), waste, industrial processes and product use (IPPU), and agriculture, forestry and other land use (AFOLU) emissions.

This plan does not comprehensively address embodied carbon (the emissions associated with creating something), or life cycle emissions (how many GHGs are emitted over the lifetime of an energy source or object). This is outside of the scope of what municipalities can meaningfully address currently but is an important thing for everyone to think about when they are buying goods or services. How was your item created, how far did it travel, how is it packaged, or can you do without it? These are all important questions to consider when buying consumer goods. We do include a short section on local food, although these emissions are not in the scope of the energy and emissions inventory.

While not a main consideration in this Plan, residents and businesses in Esquimalt can reduce the embodied carbon of goods and materials by considering the full lifecycle of purchasing decisions. For example, thrifted clothing has lower embodied carbon than new clothing, and wood as a building material has lower embodied carbon than concrete.

1.5 Current Energy, Emissions and Costs by Sector

The last complete inventory year dataset available from the CRD regional inventory report is from 2018. This was used to describe Esquimalt's current energy consumption and emissions. See Appendix D for a full description.

In 2018, for the whole community of Esquimalt:

- Total energy consumption is estimated at 1.66 PJ (1,650,000 GJ), 92 GJ per capita
- Total GHG emissions are estimated at 85,800 tonnes of CO_2e, 4.8 tonnes of CO_2e per capita
- Total energy expenditures are estimated at $43.4M, $2,400 per capita

Figure 8 – Proportion of Energy, Emissions and Cost by Sector, 2018, %
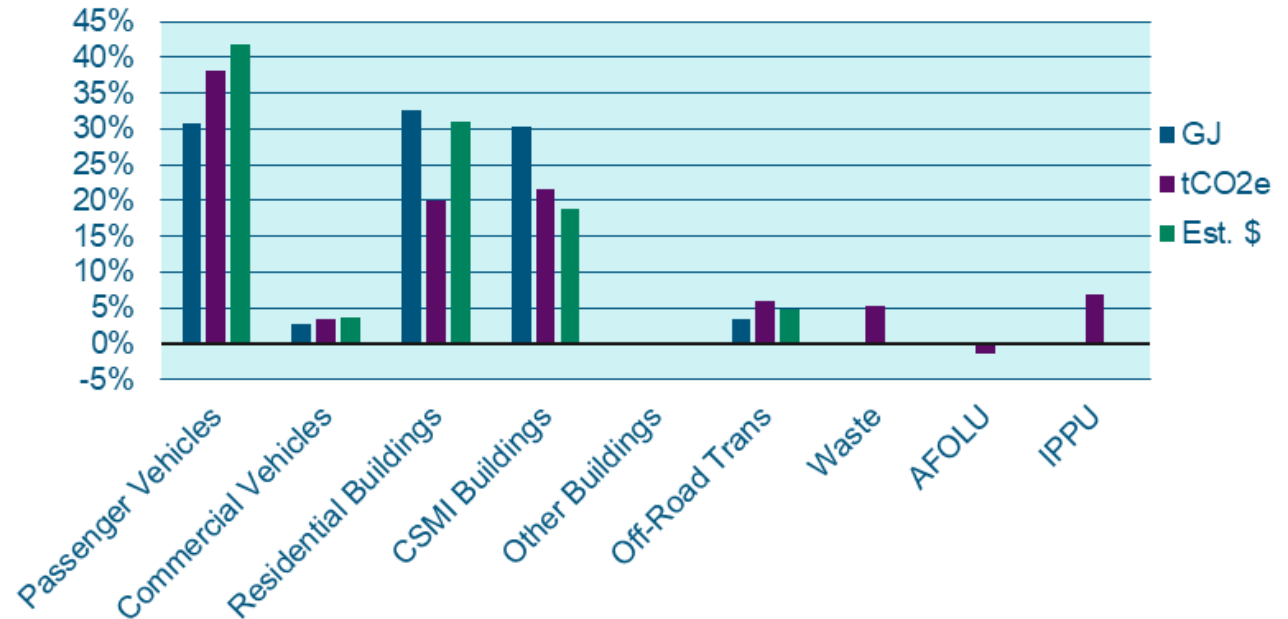
Figure 8 shows the proportion of energy consumption, emissions, and estimated energy expenditures, organized by sector. See below for an explanation of abbreviations.

- *CSMI: Commercial, Small, Medium Industrial buildings*
- *AFOLU: Agriculture, Forestry and Other Land Use*
- *IPPU: Industrial Processes and Product Use*

Note that AFOLU emissions are net negative. This is due to the amount of sequestered carbon cropland, grassland, and wetlands being greater than emissions from agricultural and other land use activities associated with this category.

Energy consumption (GJ) for buildings is in the form of electricity as well as natural gas and oil. Electricity in BC is primarily produced with hydro generation and has a low emissions factor compared to fossil fuels like natural gas and oil, which is why the consumption bar is higher than emissions bar for residential and commercial buildings. For passenger and commercial vehicles this is reversed, since almost all energy consumed is in the form of gas and diesel, which both have a high emissions intensity.

GHG emissions (in tonnes of CO2e) split by energy type are shown in Figure 9. The vast majority of emissions in Esquimalt are due to the use of mobility fuels (gasoline & diesel), and natural gas heating, combining for 75% of total emissions. Heating oil and waste contribute small proportions, while electricity, non-mobility diesel, propane, and wood are minimal.

As seen in Figure 10, mobility fuels and electricity are the two largest costs, but natural gas is also significant. Note that although electricity has very low GHG emissions, energy efficiency in electrically heated homes is still important to keep energy costs affordable.

Figure 9 – Community GHG Emissions in 2018 (tCO₂e)

Other 6%
Waste 5%
Propane 1%
Heating Oil 11%
Wood 1%
Natural Gas 23%
Electricity 1%
Non-mobility Fuel 3%
Mobility Fuels 49%
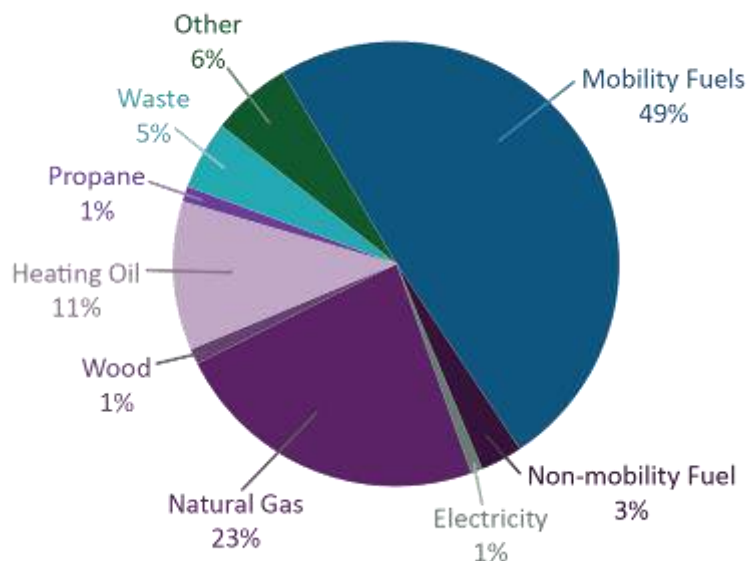
Figure 10 – Community Energy Costs in 2018

Propane $558,000
Heating Oil $4,300,000
Wood $533,000
Natural Gas $4,100,000
Electricity $11,100,000
Mobility Fuels $21,800,000
Non-mobility Fuel $1,100,000
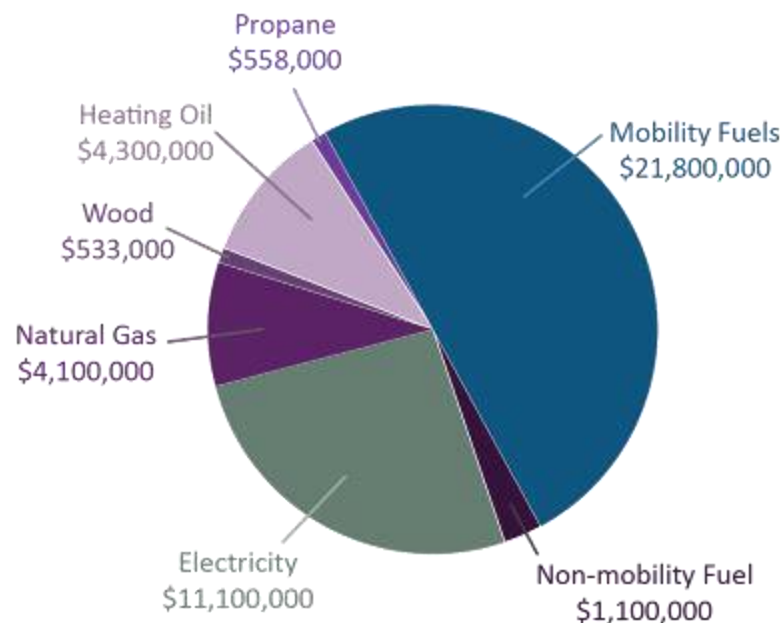
1.6 Process

The development of this Community Climate Mitigation Plan follows the Climate Emergency Response report brought to Council on April 27, 2020, meetings with staff, two stakeholder workshops, three sessions of engagement with the Environmental Advisory Committee, and public engagement using the Ethelo e-Democracy online platform. Feedback received during these various engagement processes has been factored into the development of this Plan.
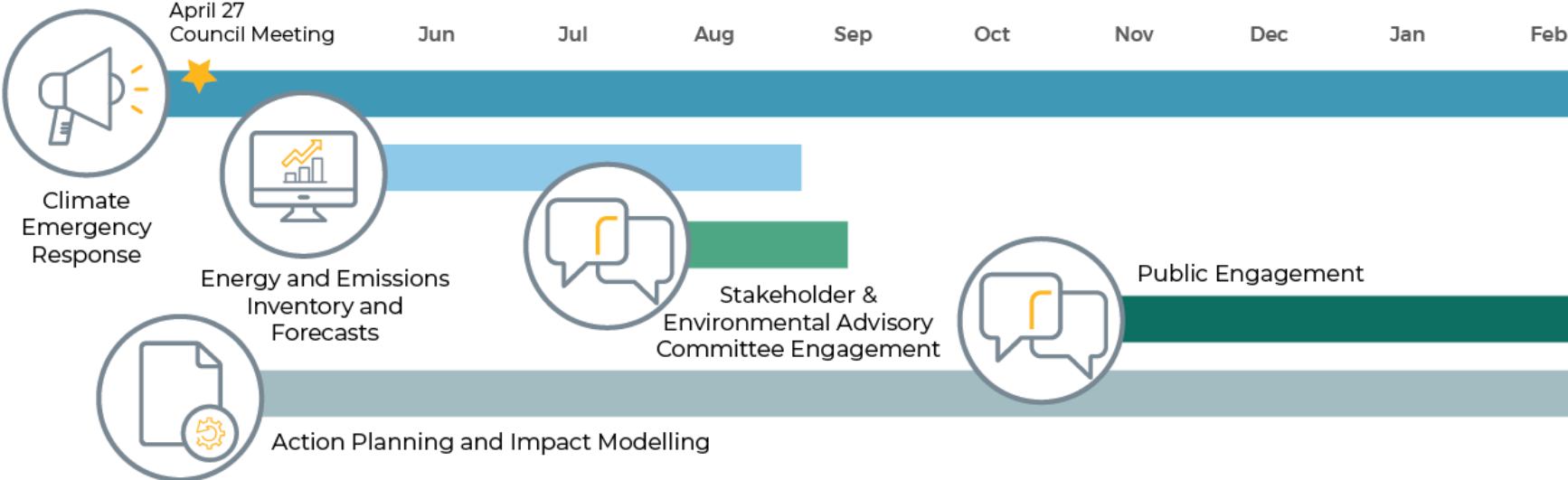
1.7 Engagement Results

During the two stakeholder workshops, participants worked in breakout groups organized by emissions sector (transportation, buildings, waste) to identify the top priority strategies under each Big Move. These included:

Big Move	Top Strategies
Shift Beyond the Car	Collaborate with BC Transit to promote transit ridership
	Build safe routes for walking, cycling and other forms of zero emission mobility
	Develop and deliver an active transportation outreach strategy
	Augment zoning bylaw and other policies for compact growth
Electrify Passenger Transportation	Adopt EV-ready new building requirements
	Design, fund and build a public EV charging network (regional collaboration)
	Lead by example by electrifying the corporate fleet and providing workplace charging
Decarbonize Commercial Transportation	Engage commercial and institutional fleet operators
Decarbonize New Buildings	Adopt the Step Code and prioritize a low carbon approach
	Encourage the construction of high performance buildings through outreach and incentives
Decarbonize Existing Buildings	Enable retrofits through supportive policies and removing barriers
	Work with the Province to regulate and phase out oil heating
Close the Loop on Waste	Support CRD efforts to improve landfill gas capture and utilization
	Adopt policies that increase organics diversion
	Develop and deliver a comprehensive zero waste outreach program
	Collect construction, demolition, agricultural, and industrial wood waste

Public engagement using the Ethelo e-Democracy platform focused on identifying the areas of community consensus and polarization. The most supported suites of actions included:

- Low carbon new buildings
- Organics diversion
- Improved bus routes
- Electrify passenger vehicles
- Energy retrofits for homes and businesses

Appendix E outlines more detailed results of the stakeholder and public engagement.

1.8 Backcasting and Forecasting

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

Backcasting Approach: Envisioning our Future

Backcasting is a planning approach that starts by defining the future vision 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, Esquimalt staff and stakeholders:

- Developed a vision of their desired low carbon future, focusing on three sectors: transportation, buildings, and waste.
- Identified the current state of the sectors
- Brainstormed creative solutions to compliment the Big Moves
- Prioritized the solutions.

Forecasting Approach: Inventory and Modelling

What does 'Business As Usual' mean?

Business As Usual, or BAU, is a way of describing what is estimated to happen to Esquimalt's emissions if the Township takes no further action to decrease emissions beyond what is already planned. A number of factors are taken into account to develop BAU emissions scenarios, population growth being one of the most important considerations. As the number of people increase in a community, new buildings are constructed, and more vehicles are driven on roads (although the portion of vehicles per person can be reduced if development is concentrated in walkable and transit-connected urban centres).

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

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

See Figure 11 and Figure 12 to the right for BAU projections by sector and energy type.

Figure 11 – Inventory and BAU Projections by Sector, with OCP Target
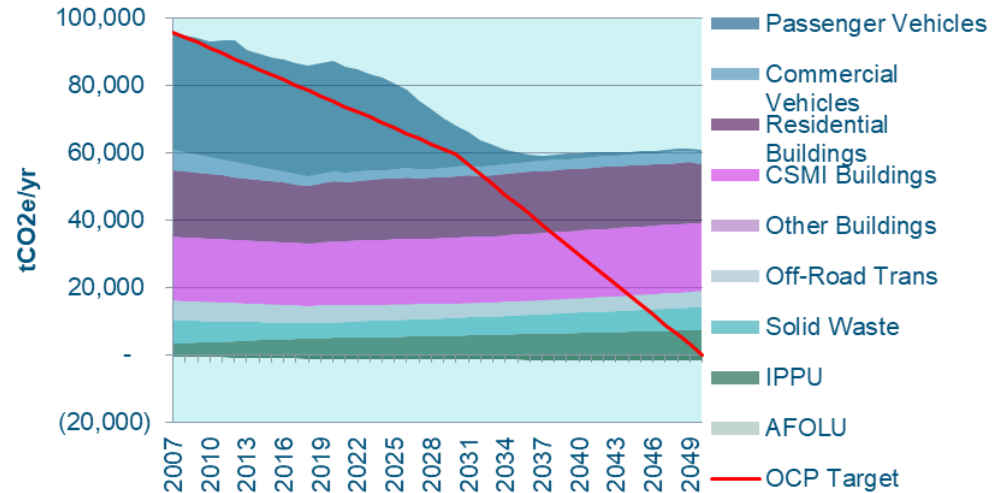
Figure 12 – Inventory and BAU Projections by Energy Type, with OCP Target
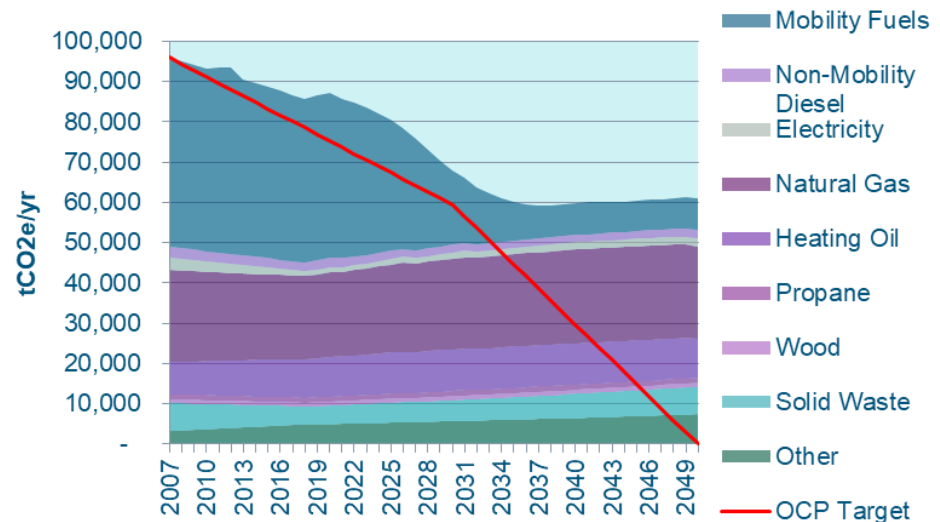
Forecasted Emissions Reductions

Based on the feedback from Esquimalt Council, staff, and other stakeholders on implementation ambition of the Big Moves actions, GHG emissions in 2030 could be reduced by 14,716 tonnes of CO_2e below BAU, or 38,247 tonnes of CO_2e (40%) below 2007 levels, exceeding the Township's 38% reduction target. Therefore, there is some leeway in delaying the onset of certain strategies and selecting those with the highest impact.

Figure 13 shows the GHG emission profiles by sector for the baseline year of 2018, and for 2030 as a result of the implementation of the Big Moves. The largest reductions are from passenger vehicles at nearly 22,000 tonnes of CO_2e. The next largest reductions are from CSMI buildings at over 3,200 tonnes of CO_2e, and residential buildings at nearly 2,900 tonnes of CO_2e.

Figure 13 – GHG Emission Profiles by Sector in 2018 (Left) and 2030 (Right)
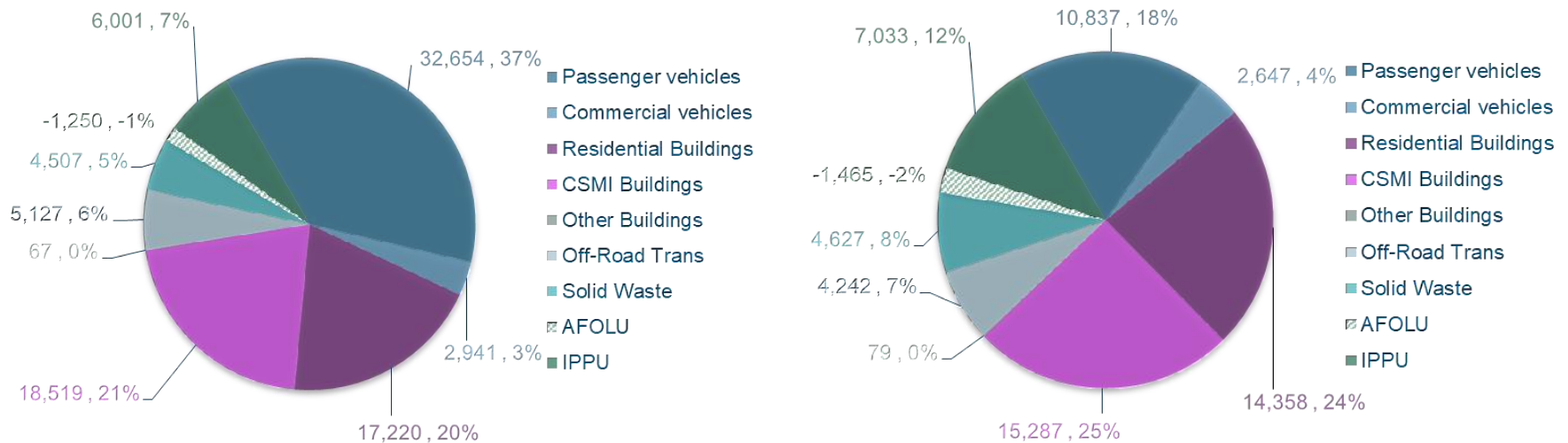
Figure 14 below shows a wedge graph shows the relative impact of each of the Big Moves towards meeting or exceeding the 2030 reduction target.

Figure 14 – Wedge Chart of GHG Reductions by Big Move to 2030
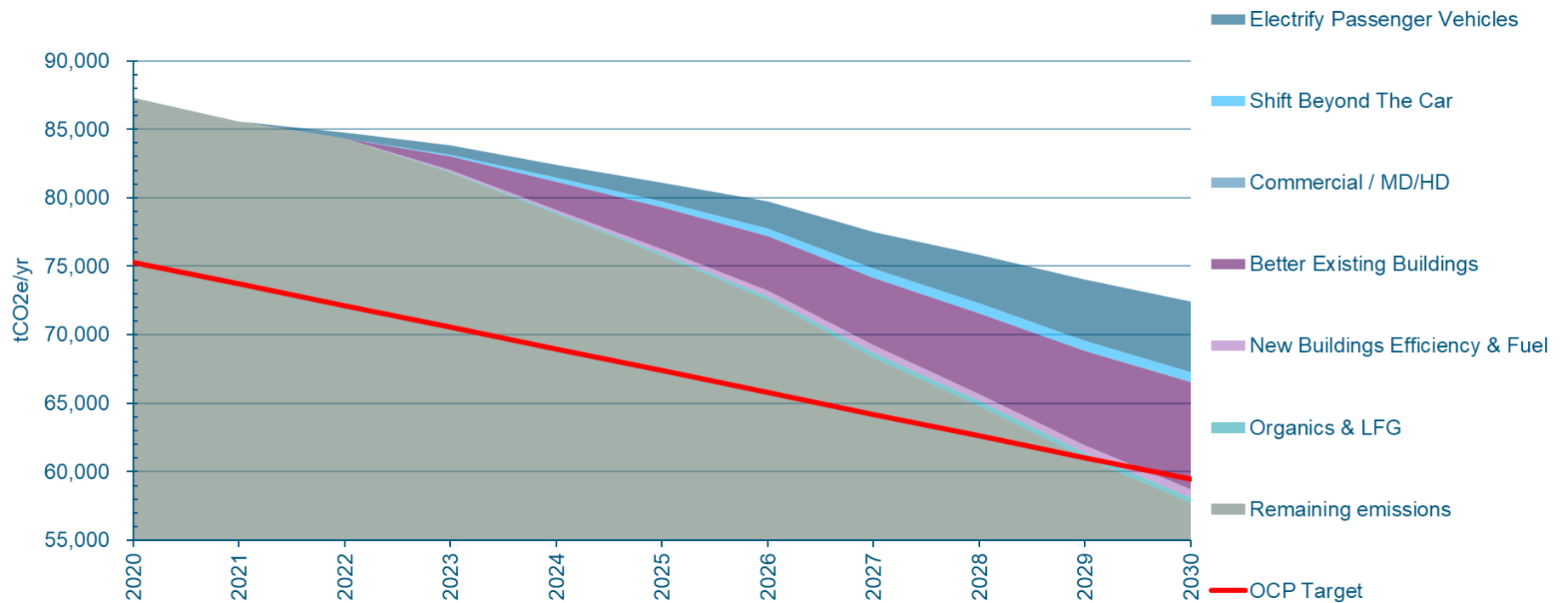
Figure 15 below shows how each of the Big Moves contributes to reductions in GHG emissions towards 2050. Note that although the net-zero target is not met, it is important to recognize that the majority of remaining emissions are from commercial vehicles, where electric and hydrogen vehicle options are still very limited. Additional remaining emissions are from sectors which are included in the GPC Protocol Basic + inventory; but are typically omitted from the Community Energy & Emissions Inventory (CEEI) sectors, which is more commonly applied in the Province of BC. Big Moves actions primarily address emissions included in the CEEI since these are most within the influence of local governments. Please see Appendix D for a more detailed explanation on the GPC and CEEI inventories.

Figure 15 – Wedge Chart of GHG Reductions by Big Move to 2050

2. Action Plan Overview

Buildings

Decarbonize Existing Buildings

Support deep energy retrofits and fuel switching

Decarbonize New Buildings

Enhance energy efficiency and low carbon heating in new buildings

Transportation

Electrify Passenger Transportation

Accelerate the adoption of zero-emission vehicles

Shift Beyond the Car

Encourage active & accessible transportation and transit

Decarbonize Commercial Transportation

Support low-carbon options for medium and heavy-duty vehicles

Waste

Close the Loop on Waste

Divert organics and capture value from waste

Organizational Leadership

Action Plan Guide

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

Objective

Timeframe (short, medium, long)

Relative GHG reductions for the Big Move

Strategy	Actions Summary	Lever	Time	Cost	% Impact
SHIFT 1: Compact community growth					
SHIFT 1.1 – Augment policies and bylaws for compact growth	Apply OPC policies, development permit guidelines and zoning bylaws that focus development in complete, compact centres and transit-oriented corridors.	✎		$	20%

Strategy

Summary of actions under the strategy

Primary local government lever (infrastructure, policy, engagement)

Investment (low, med, high)

Legend

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

Notes:

- Lever: Many strategies utilize more than one local government lever. The following tables show only the primarly lever, however Appendix A indicate all levers involved.
- Timeframe: Many strategies span more than one timeframe, with some actions starting in the short term and full deployment of the strategy occuring in the longer term.

3. Where We Live and Work

Vision:

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

Current State:

Residential and commercial buildings are responsible for 42% of the greenhouse gas emissions generated in Esquimalt. The main source of emissions is natural gas used for space and water heating, followed by heating oil.

Other 5%

Waste 6%

47%

Residential Buildings 20 %

Commercial Buildings 22 %

Transportation

Buildings total 42%
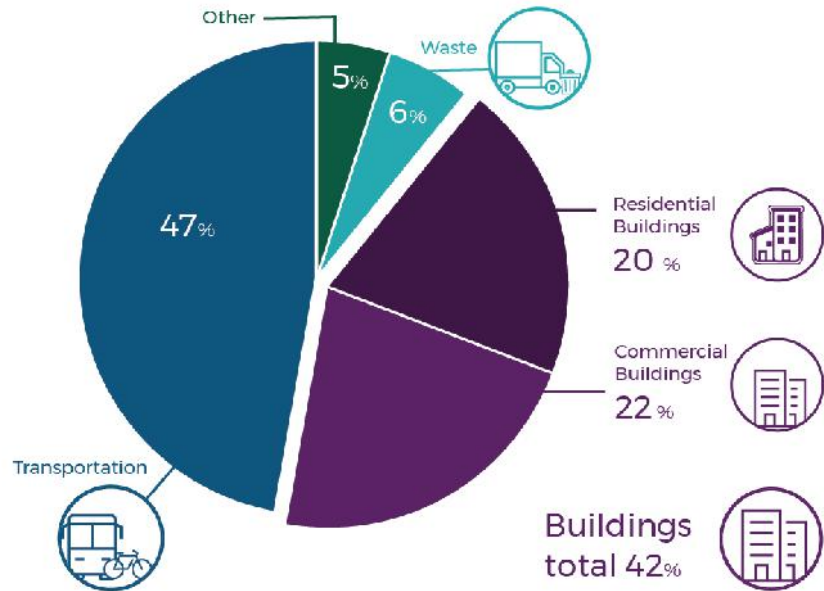
Big Moves for Buildings

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

3.1 Decarbonize Existing Buildings

Support deep energy retrofits and fuel switching

Overview

In 2030, over 85% of the buildings in Esquimalt will be ones that are already standing today and many of these buildings use more energy than is necessary. Owners of 20-year-old oil and gas-heated homes can lower their energy bills by as much as 30% through energy efficiency retrofits and reduce about 4.5 tonnes of greenhouse gas emissions per year. Homeowners can pursue various degrees of building energy retrofits—from replacing individual pieces of equipment to comprehensive overhauls of the whole building, known as deep energy retrofits.

Deep energy retrofits involve changes to the entire building, including insulation, windows and doors, and air barrier, as well as ventilation and space and water heating equipment. To ensure emissions reductions as well as energy reductions, the energy retrofit must include fuel switching, from fossil fuel sources to zero-carbon sources such as electricity or 100% renewable gas. Such projects usually rely on the expertise of an energy advisor, who conducts energy modelling and airtightness testing.

Esquimalt 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. The Township can build on its current participation in the regional Bring it Home 4 the Climate program, which includes free virtual home energy check-ups, EnerGuide Home Evaluation subsidies, free CleanBC Energy Coach services, and free education and special offers.

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 Canada Greener Homes **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.

Co-Benefits of Decarbonizing Existing Buildings	
Environmental	• Enhanced green spaces when energy efficiency is paired with nature-based solutions such as green roofs
Social	• Improved indoor air quality due to fewer air pollutants from fossil fuel heating • Improved comfort for building occupants
Economic	• Lower energy costs for residents • Job creation opportunities for local high performance building suppliers, contractors, trades, and others • Through energy labelling, more information for prospective home buyers about the efficiency of the building

Objectives

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

Sectoral targets for 2030

➢ 3% of homes (60 houses, 180 apartments) undergo retrofits saving 33% of heating energy consumption annually
➢ 2% of homes (40 houses, 120 apartments) convert to low-carbon heating annually
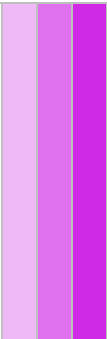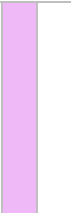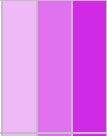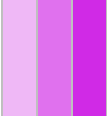
Looking Forward to 2030

- All replacement heating and hot water systems are zero emissions, powered by either electricity or renewable gas.
- Our buildings are more comfortable, healthier, and quieter.

Image: Adding ceiling insulation to an existing home to make it more energy efficient and comfortable.

Strategies for Decarbonizing Existing Buildings

Strategy	Actions Summary	Lever	Time	Cost	% Impact
EXISTING BUILDINGS 1: Improve Energy Efficiency					
EXISTING BUILDINGS 1.1 – Encourage and enable deep energy retrofits.	Educate building owners about how to make their home or business more energy efficient and the benefits of doing so at time of building permit. Help building owners to understand the rebates and incentives available through programs such as *Better Homes* and *Better Buildings BC*. Explore a building permit rebate program focused on energy efficiency retrofits. Explore financing options to assist homeowners with implementation of energy retrofits. Increase the use of energy labelling and benchmarking.			$$	27%
EXISTING BUILDINGS 2: Encourage and Enable Fuel Switching					
EXISTING BUILDINGS 2.1 – Encourage and enable building electrification or renewable gas	Identify and remove barriers to heat pump installation, including streamlining permitting processes, optimizing noise regulations, and restructuring permit fees. Increase rebate top-ups for Provincial air source heat pump incentives through Bring it Home 4 the Climate.			$	66%
EXISTING BUILDINGS 2: Build Industry Capacity and Increase Market Demand					
EXISTING BUILDINGS 3.1 – Establish a long-term marketing campaign	Establish a 10-year program for a community-wide marketing campaign to encourage building envelope improvements, electrification or other low carbon fuel sources.			$	5%
EXISTING BUILDINGS 3.2 – Build industry capacity	Educate renovators and realtors on energy efficiency and low carbon choices for space and water heating.			$	2%
Total GHG emissions reductions for this Big Move: 7,792 tCO2$_e$ by 2030					

3.2 Decarbonize New Buildings

Enhance energy efficiency and low carbon heating in new buildings

Overview

While existing buildings generate the majority of building-related greenhouse gas emissions, local governments have greater authority to influence new construction. The base Building Code will change to require 20% better energy efficiency at the end of 2022 (equivalent to Step 3 for smaller buildings). Esquimalt's approach could include a plan to introduce further step increases in 2024 or 2025, in advance of the Building Code increasing to 40% higher energy efficiency in 2027, and then set a future date for implementing the top step (Step 5 for homes). Step 5 will be the minimum in the Building Code in 2032.

While the Step Code is a great tool for improving overall building energy performance, it does not explicitly address emissions from new buildings. The Province is currently exploring opt-in carbon pollution standards for new buildings, which will be available in 2022. Esquimalt can start engaging its development community about low carbon energy systems and then adopt the provincial regulation in 2023 or 2024.

In addition to the Energy Step Code, Esquimalt can encourage widespread use of Passive Design Guidelines that use natural building features, such as overhangs, roofing and siding materials, shared walls, or vegetation, that increase solar gain in winter, reduce solar gain in summer, and reduce heat losses. Esquimalt could also provide density bonuses for the use of low carbon building materials, such as mass timber; advanced building standards above the current requirements of the BC Energy Step Code, such as the Canada Green Building Council (CaGBC) Zero Carbon Building Standard; and renewable energy generated on-site.

Provincial Action

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

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

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

Federal Action

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

Co-Benefits of Stepping Up New Buildings	
Environmental	• Enhanced green spaces when energy efficiency is paired with nature-based solutions such as green roofs
Social	• Improved indoor air quality due to fewer air pollutants from fossil fuel heating • Improved comfort for building occupants
Economic	• Lower energy costs for residents • Economic development opportunities for local high performance building suppliers, builders, trades, and others

Objectives

1. Prioritize a low-carbon approach
2. Build industry capacity

Sectoral target for 2030

➢ 22.5% of new homes built each year use low-carbon heating

Looking Forward to 2030

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

Image: Step Code Regulatory Timeline

Timeline for Energy Efficiency Regulatory Requirements in the BC Building Code
Here's what the province's CleanBC plan will mean for new-construction requirements.

			NET-ZERO ENERGY-READY
2032	STEP 5	STEP 4	UP TO: 80%
2027*	STEP 4	STEP 3	40%
2022*	STEP 3	STEP 2	20%
*NEW TARGET DEADLINES	PART 9 BUILDINGS	PART 3 BUILDINGS	Energy-efficiency improvement above 2018 BC Building Code requirements

Strategies for Decarbonizing New Buildings

Strategy	Actions Summary	Lever	Time	Cost	% Impact
NEW BUILDINGS 1: Prioritize a Low-Carbon Approach					
NEW BUILDINGS 1.1 – Prioritize a low-carbon approach	Opt-in to Provincial carbon metrics for new buildings when they become available.	✏️		$	95%
NEW BUILDINGS 2: Build Industry Capacity					
NEW BUILDINGS 2.1 – Provide outreach and incentives	Promote existing Clean BC new construction incentives and provide additional incentives to subsidize costs of working with an Energy Advisor and/or mid-construction testing. Encourage the use of energy labelling and benchmarking.	✏️		$	2.5%
NEW BUILDINGS 2.2 – Collaborate to provide training and coordination	Collaborate across the region to provide relevant training to the building industry and realtors.	💬		$	2.5%
Total GHG emissions reductions for this Big Move: 647 tCO2$_e$ by 2030					

The graphic to the right illustrates that the Energy Step Code alone does not sufficiently address GHG emissions in new buildings. The fuel source for heating is the biggest influencer of emissions.

Source: Metro Vancouver Climate 2050 Buildings Roadmap.

Greenhouse Gas Emissions by Heating Type

4. The Way We Move

Vision:

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

Current State:

Transportation is responsible for 47% of the greenhouse gas emissions generated from residents and businesses in Esquimalt. Transportation fuels such as gasoline and diesel are the largest expenditure on energy in the community at almost $22 million per year. There are currently 0.6 personal vehicles per person in Esquimalt.

Commercial Vehicles 3%

Off-Road Transportation 6%

Passenger Vehicles 38%

Transportation total 47%

Other 5%

Waste 6%

42% Buildings

Big Moves for Transportation

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

4.1 Shift Beyond the Car

Encourage active and accessible transportation and transit.

Overview

Esquimalt is a compact community that is well-positioned to enable active and accessible transportation and transit. Esquimalt's Official Community Plan (OCP) is supportive of sustainable development and transportation, and clearly defines nodes and corridors to densify, which would support increased active transportation and transit ridership.

The Township has initiated complete street projects on some street sections and is currently developing an Active Transportation Network Plan to identify gaps in the walking and cycling network. Residents travel between Esquimalt, Victoria and other neighbouring communities using several routes, including the E&N Rail Trail, a high quality multi-use path that runs through the Township and connects to the Galloping Goose Trail and major regional destinations. The Township can build on progress to-date and make active transportation an easier choice for residents by developing an attractive walking/cycling network connecting most local destinations, including schools, residential areas, institutions, and commercial areas via multi-use paths and greenways. The same infrastructure also affords access for those who use mobility aids, such as scooters and wheelchairs.

BC Transit's Esquimalt/View Royal Local Area Transit Plan is currently in development. There are plans to increase service along a Rapid Bus route that connects the West Shore to downtown Victoria and a new Rapid Bus along route 15 with improved bus stop amenities along Esquimalt Road. There is a need for improved local service, such as a local circulator route to connect most local destinations.

Planning for a multi-modal zero-carbon transportation system depends on supporting all transportation options and facilitate alternative travel choices that reduce the need for more, or bigger, roads. Not only does this reduce transportation-related emissions, but this shift can also result in reduced infrastructure and maintenance costs down the road.

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 as investing in infrastructure.

Co-Benefits of Shifting Beyond the Car	
Environmental	• Enhanced green spaces and habitat connectivity from expanded greenway network
Social	• Improved air quality due to fewer cars on the road leading to fewer health impacts • Improved health from increased physical activity • More social connection due to people moving around on sidewalks and trails instead of in single-passenger vehicles
Economic	• Lower infrastructure maintenance costs from fewer cars on the road • Cost savings for residents that can get recirculated in the local economy

Objectives

1. Augment land-use planning for compact community growth
2. Increase walking, cycling and other forms of zero emission mobility
3. Increase transit ridership and support a transition to a zero emissions transit network

Sectoral Target for 2030

• 25% of commutes are through transit (170 transit trips per capita per year)
• 20% of commutes through cycling (135 cycling trips per capita per year).

Looking Forward to 2030

• 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.

"I love the protected bike lanes in Victoria, and the E&N bike trail through Esquimalt is a wonderful piece of infrastructure for commuting and recreation." – Public engagement participant

Image: E&N Bike Trail

(Source: Capital Regional District)

Strategies for Shifting Beyond the Car

Strategy	Actions Summary	Lever	Time	Cost	% Impact
SHIFT 1: Augment land-use planning for compact community growth					
SHIFT 1.1 – Augment policies and bylaws for compact growth	Apply OPC policies, development permit guidelines and zoning bylaws that focus development in complete, compact centres and transit-oriented corridors.	✎		$	10%
SHIFT 2: Increase walking, cycling and other forms of zero emission mobility					
SHIFT 2.1 – Enable active transportation through plans and policies	The Active Transportation Network Strategy identifies gaps in the network. Implement supportive policies such as a Complete Streets Policy and updated Subdivision Servicing Bylaw and others to increase AAA infrastructure. Develop a parking strategy for public parking, including pay parking in key areas to encourage other travel modes. Update the Parking Bylaw to ensure that parking supply does not outstrip demand.	✎		$$	10%
SHIFT 2.2 – Build safe routes for walking, cycling and other forms of zero emission mobility	Implement the Active Transportation Network Strategy by continuously improving active transportation infrastructure, including reconfiguring existing streets, and building safe and convenient active transportation paths to connect all neighbourhoods.	⚒		$$$	25%
SHIFT 2.3 – Deliver an active transportation outreach strategy	Connect with community members to learn about their active transportation needs. Dedicate staff time for promotion and education around active transportation.	💬		$	10%
SHIFT 2.4 – Normalize car-free and zero-emission zones	Beginning with a car free day on a key street 1 day a year, progress to more frequent car free days on a variety of streets. This may lead to a permanent establishment of a car free zone in the Town Centre.	✎		$	2.5%
SHIFT 2.5 – Promote micro e-mobility and on-demand mobility services	Understand when and where on-demand services are most useful and remove policy barriers and update bylaws. Host awareness events for e-bikes (and other forms of micro mobility) and work with vendors. Work with car sharing and ride hailing providers to expand programs and transition to electric fleets.	💬		$	2.5%
SHIFT 3: Increase transit ridership and a support a transition to a zero-emissions transit network					
SHIFT 3.1 – Collaborate with transit providers to promote transit ridership	Promote transit ridership by offering free transit days and celebrating new routes. Ultimately explore universal free or reduced transit with transit providers.	💬		$$	30%
SHIFT 3.2 – Collaborate with BC Transit to transition to zero emissions transit	Work with BC Transit and neighbouring communities to progressively transition transit to zero emissions vehicles (e.g., electric)	💬		$	10%
Total GHG emissions reductions for this Big Move: 739 tCO2e by 2030					

4.2 Electrify Passenger Transportation

Accelerate the adoption of zero-emission vehicles

Overview

Electric vehicles (EVs) are clean, efficient, and cost-effective. In British Columbia, where at least 94% of all electricity is renewable, electric vehicles (EVs) are already a viable near zero-emission option. According to the 2018 Provincial Community Energy and Emissions inventory, of the approximately 12,000 personal and commercial vehicles in Esquimalt, only about 140 of them are electric. The Township of Esquimalt can make EVs an easier choice for residents and businesses by investing in infrastructure, enacting supportive policies, such as EV-ready building requirements, and engaging with companies and organizations that operate large fleets, such as car-sharing and ride-hailing providers. The Township and Capital Regional District could also deliver community outreach and education on zero-emission transportation choices.

Esquimalt's support for EVs should be part of a larger shift towards a sustainable transportations system that first prioritizes walking, cycling and transit – see the Shift Beyond the Car Big Move. The goal is to shift as much from single passenger vehicles to these alternative modes, and then support the electrification of remaining vehicles over time. Due to Esquimalt's regional context, it's important to develop a coordinated regional approach to determine the best combination of public and private charging and identify priority areas for the Township to provide public charging where needed most. There is a particular need for public charging stations to support early adopters and those in older buildings and rentals without access to charging.

> *"I live in an apartment where charging an EV would be difficult, so having more charging stations to leave it overnight would be ideal."*
>
> - Public engagement participant

Provincial Action

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

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

Federal Action

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

Co-Benefits of Electrifying Passenger Vehicles	
Environmental	• Reduced air pollution • Fewer oil leaks and non-point source pollution of nearby water bodies
Social	• Improved air quality due to fewer internal combustion engines on the road leading to fewer health impacts • Quieter streets
Economic	• Cost savings for residents that can get recirculated in the local economy. Compared with gasoline vehicles, EVs cost about 60 per cent less to "fuel," and require very little ongoing maintenance.

Objectives

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

Sectoral Target for 2030

➢ 60% of passenger transportation vehicles are

Looking Forward to 2030

- 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.
- Esquimalt continues to demonstrate leadership by prioritizing electric for their fleet replacement policy where feasible
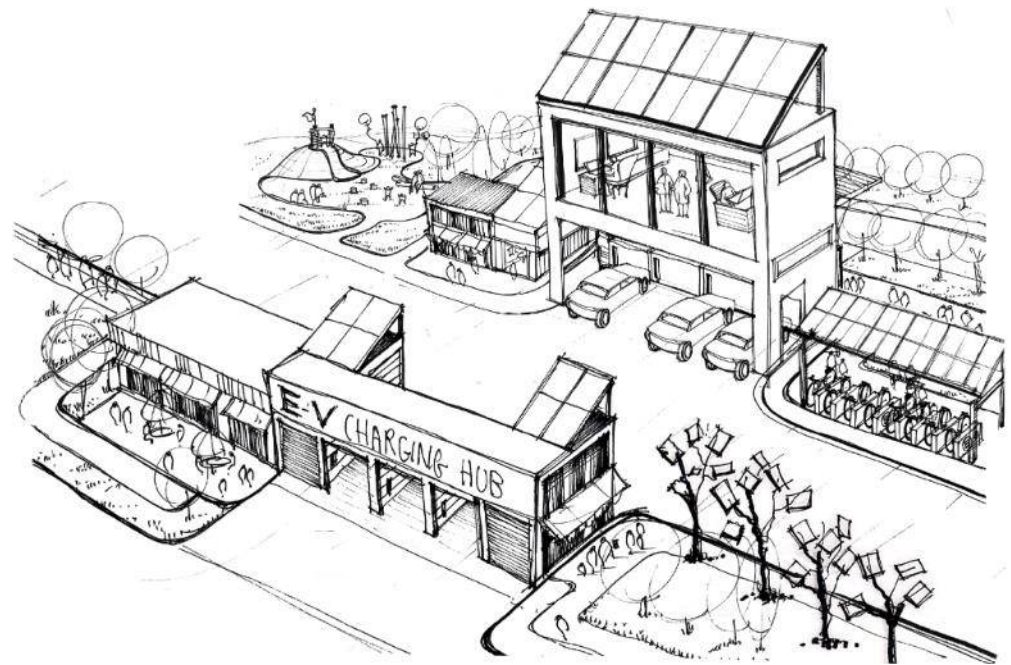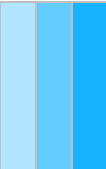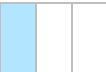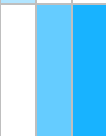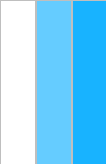

Image: Early concept design of an e-mobility hub featuring EV charging integrated with e-bike charging, transit, bike parking, and amenities.

Source: East Kootenay E-Mobility Visioning, Community Energy Association with Frank Ducote Urban Design

Strategies for Electrifying Passenger Transportation

Strategy	Actions Summary	Lever	Time	Cost	% Impact
ELECTRIFY 1: Enable charging on-the-go					
ELECTRIFY 1.1 – Design, fund and build a public EV charging network	Leverage grant opportunities to install an annually increasing number of public EV charging stations at key locations throughout the community. Collaborate with other local governments on a regional charging network strategy. Identify gaps in the charging network and install new level 2 stations at strategic locations.	🛠		$$$	25%
ELECTRIFY 2: Enable charging at home and work					
ELECTRIFY 2.1 – Adopt EV-ready building requirements	Incentivize or require all new homes to be EV-ready including single family houses, townhouses, and apartments. (new EV bylaw adopted in 2021)	✏		$	20%
ELECTRIFY 2.2 – Enable EV charging in existing residential and commercial buildings	Work with or seek professional guidance to work with stratas and property management companies on navigating the process to retrofit existing parking stalls with EV charging equipment.	💬		$	45%
ELECTRIFY 3: Encourage EVs through outreach and supportive policies					
ELECTRIFY 3.1 – Develop and deliver an EV outreach strategy	Educate builders and developers on EV charging requirements though open houses and workshops. Partner with other organizations to host engagement events such as test-drives and ride-alongs.	💬		$	5%
ELECTRIFY 3.2 – Provide incentives for EV adoption	Adjust speed limits to enable low-speed EVs on select streets. Provide perks to EV drivers such as priority parking. Collaborate with private sector fleet operators and others to find innovative ways to encourage ride hailing, taxi operators and other fleet operators to switch to EV's, such as by providing EV-only car share stalls and on-street charging for car share and ride-hailing.	💬		$	5%
Total GHG emissions reductions for this Big Move: 5,116 tCO2$_e$ by 2030					

4.3 Decarbonize Commercial Transportation

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

Overview

Esquimalt has limited influence over emissions from medium and heavy-duty commercial vehicles and off-road vehicles; however, these vehicles represent 9% of our community emissions. Esquimalt can start to engage with fleet operators, so they are aware of technology changes. Additionally, Esquimalt can show leadership by transitioning its own fleet to electric or other low-carbon options such as biodiesel. Fully electric trucks such as the Ford F-150, Rivian R1T, and Tesla's Cybertruck are nearing being commercially ready, while medium/heavy-duty options are also expected to increase considerably in the next few years.

Looking Forward to 2030

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

Image: For 2021-2025, BC Transit will acquire over 130 electric buses. Source: BC Transit

Provincial Action

The Province has set targets for 10% of heavy-duty vehicles and 94% of buses to be electric, and 16% of heavy-duty vehicles to run on LNG by 2030.

Federal Action

The Federal Government has set a target of a 40% reduction in tailpipe emission intensity by 2025 from 2015 levels.
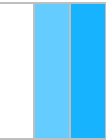
Objectives
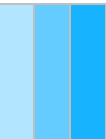
1. Accelerate the adoption of zero-emission vehicles for commercial fleets where possible
2. Lead by example by transitioning the municipal fleet

Sectoral Target for 2030

➢ 4% of commercial vehicles are low-carbon

Strategies for Decarbonizing Commercial and Off-Road Transportation

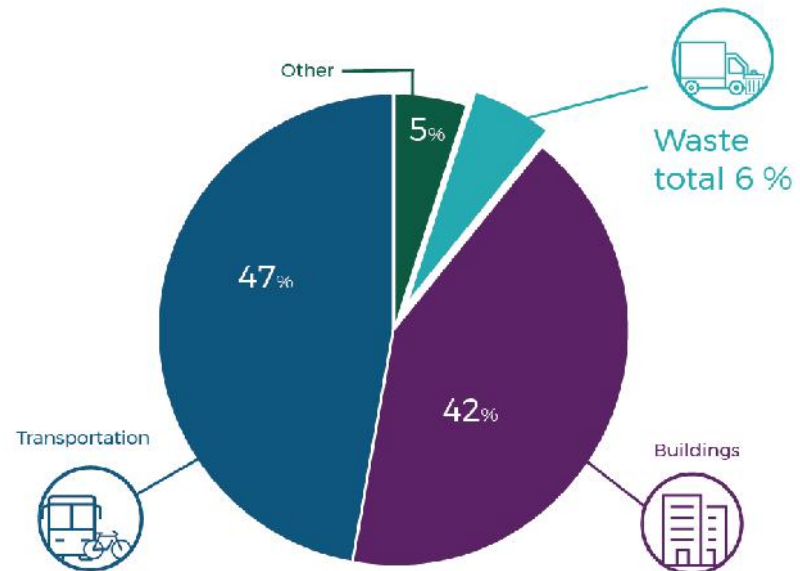| Strategy	Actions Summary	Lever	Time	Cost	% Impact
COMMERCIAL 1: Accelerate the adoption of ZEVs for commercial fleets					
COMMERCIAL 1.1 – Develop a Community Vision and Strategy for Commercial ZEV Infrastructure	Carry out a needs assessment through to 2040 and design a commercial/institutional charging network strategy.	✎		$	5%
COMMERCIAL 1.2 – Engage Commercial and Industrial fleets	Support a pilot fleet electrification program with a commercial/institutional partner.	💬		$$	55%
COMMERCIAL 2: Lead by example by transitioning municipal fleet					
COMMERCIAL 2.1 – Update corporate policies to prioritize low carbon options	Review and integrate contractual requirements for municipal services to require lower emissions vehicles, increasing over time; Commit to electrifying the Township's fleet of light-duty vehicles. Update purchasing policy to buy used vehicles if no low-carbon options are available or cost effective.	✎		$$$	40%
Total GHG emissions reductions for this Big Move: 59 tCO2$_e$ by 2030					

5. 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.

Current State:

Waste contributed a total of 5% of Esquimalt's emissions in 2018 These emissions are the result of methane emissions from waste decomposition. Esquimalt currently has a kitchen scraps pick-up program for single family residences, where organics are sent to a facility operated by the Capital Regional District.

Other

5%

Waste total 6 %

47%

42%

Transportation

Buildings

Big Move for Waste

Close the Loop on Waste

Divert organics and capture value from waste

5.1 Close the Loop on Waste

Divert organics and capture value from waste

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.

Overview

Emissions from waste occur when organic waste mixed in with garbage decomposes in the landfill and produces methane, a potent greenhouse gas that is released into the atmosphere. Organic waste makes up about 30% of landfill waste, and includes food waste from homes and businesses, yard and garden waste, wood waste, and paper that cannot be recycled, such as food-soiled paper. Organic material decomposes over approximately 10 years in the local landfill. Organic diversion reduces or eliminates the new waste added every year but the waste that is already in place at the landfill continues its decomposition process. Because of this, it takes a number of years for the emissions reductions from organics diversion to scale up. Of course, how much waste is diverted (the diversion rate) is key to emissions savings.

Esquimalt is currently in the process of examining opportunities for integrated resource management (IRM) and conducted public engagement about a possible gasification plant in the community.

By diverting organic waste from the landfill, it can be turned into compost that can be sold. There are other technologies that can capture value from the waste stream, such as landfill gas capture, biogas digestors, and waste heat recovery systems. Part of this Big Move is investigating opportunities for these technologies locally or regionally.

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.

Objectives

1. Divert organics from the landfill
2. Explore other resource recovery technologies
3. Support zero-waste initiatives

Looking Forward to 2030

- All of our community's residential food and yard waste will be converted to useable compost at a regional processing facility.
- The Township will be a leader in Integrated Resource Management.

Sectoral target for 2030

➢ Organics diversion is increased by 7.5%

Strategies for Closing the Loop on Waste

Strategy	Actions Summary	Lever	Time	Cost	% Impact
WASTE 1: Divert Organics from Landfill					
WASTE 1.1 – Enhance organics collection and processing.	Partner with CRD to evaluate local opportunities to enhance organic handling and diversion.	🛠		$	70%
WASTE 1.2 – Divert construction, demolition, agricultural, and industrial wood waste.	Partner with CRD and regional municipalities to institute a ban on construction and demolition waste in the landfill; identify and pursue options to support and grow the market for deconstruction materials.	✏		$	20%
WASTE 2: Capture Landfill Gas and Explore Other Resource Recovery Technologies					
WASTE 2.1 – Evaluate and implement other resource recovery opportunities	Review the Integrated Resource Management Plan and public engagement results to determine a way forward regarding the potential gasification plant.	🛠		$$$	5%
WASTE 3: Support Zero-Waste Initiatives					
WASTE 3.1 – Develop and deliver a comprehensive zero-waste outreach program	A zero-waste outreach program may include community-led composting projects, school programs, participation in Provincial "Love Food Hate Waste" campaign and education around source-separation requirements.	💬		$$	2.5%
WASTE 3.2 – Enact policies to support zero-waste initiatives	Adopt the Checkout Bag Regulation Bylaw. In the future, expand the bylaw to include regulation of other single-use plastics. Develop guidelines for zero-waste large public events led by Esquimalt.	✏		$	2.5%
Total GHG emissions reductions for this Big Move: 370 tCO2$_e$ by 2030					

6. Related Stategies

The six Big Moves are key to influencing community emissions reductions that are measured in Esquimalt's Community Energy and Emissions Inventory. However, there are other related themes that are part of climate action and are not measured in territorial emissions inventories. Two such themes that are of interest to the community are local food and nature-based solutions.

6.1 Consumption-Based Emissions and Food

The Big Moves address local, or territorial emissions from operating our buildings, getting around the community, and organics ending up in the landfill. But there is a whole other segment of emissions, called consumption-based emissions that our community can influence and reduce. These are harder to measure, but can be just as, or more, significant, than territorial emissions.
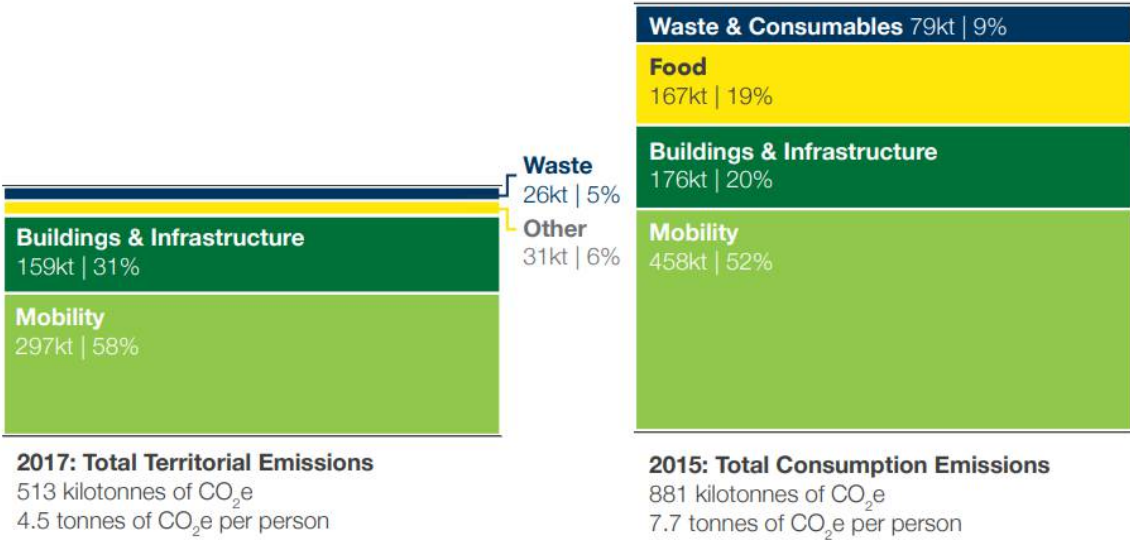
As part of their 2020 Climate Plan, the District of Saanich conducted a consumption-based emissions inventory in addition to the territorial inventory and found that the consumption based inventory was over 70% higher than the territorial emissions (Figure 5). It is likely that Esquimalt's consumption-based inventory is similar to that of Saanich.

Emissions from food make up about 20% of the consumption-based inventory. Nearly 75% of those emissions come from the consumption of animal products, particularly red meat and dairy.

The Township of Esquimalt does not have direct influence over these emissions; however, residents can make an impact with their purchasing choices.

Figure 16 Saanich community GHG emissions inventories (Territorial vs. Consumption-based).

Source: 100% Renewable & Resilient Saanich Climate Plan

Waste & Consumables 79kt | 9%

Food 167kt | 19%

Buildings & Infrastructure 176kt | 20%

Mobility 458kt | 52%

Waste 26kt | 5%

Other 31kt | 6%

Buildings & Infrastructure 159kt | 31%

Mobility 297kt | 58%

2017: Total Territorial Emissions
513 kilotonnes of CO_2e
4.5 tonnes of CO_2e per person

2015: Total Consumption Emissions
881 kilotonnes of CO_2e
7.7 tonnes of CO_2e per person

During the stakeholder and public engagement for this Plan, food security was identified as an area of interest, both due to concerns over how food security can be impacted by climate change, and as an opportunity area for mitigation.

Next steps for Esquimalt:

1. Encourage residents to reduce food waste and choose lower carbon intensive foods through outreach and educational campaigns.
2. Encourage existing and new community gardens and other small-scale urban food production such as backyard sharing.
3. Collaborate with the CRD on implementing the Regional Food and Agriculture Strategy

Reducing Food Emissions at Home

Our household has already reduced our consumption of meat, and we buy local or organically grown produce when possible. Nowadays I definitely pay attention to where the food I'm purchasing was produced. If a plane ride was required, or thousands of miles of transport by truck, it's usually a "no" for me.

- Public engagement participant

6.2 Nature-Based Solutions

This CCMP is focused on strategies with measurable impacts on community energy and emissions reductions, however there is another area of emerging focus connected to local government climate action: Nature-based solutions. There is increasing research and emphasis being put on the role of the natural environment, ecosystem services, and natural assets in both mitigating and adapting to climate change. Natural assets are natural features that provide services to the community, much like traditional infrastructure. Natural assets include streams, wetlands, trees, ditches, and many others. Just some of the services natural assets provide include rainwater management and filtration, shading, temperature regulation, wind control, and aesthetic and cultural value.

The Township of Esquimalt already includes natural assets in its Asset Management Policy. The Township can build from this by attempting to value the services from natural assets alongside its engineered assets. The Municipal Natural Assets Initiative (MNAI) provides support to municipalities in identifying, valuing and accounting for natural assets in their financial planning and asset management programs.

As we move closer to net-zero emissions by 2050, there will be a greater emphasis on carbon storage and sequestration to offset emissions from sources that can't be eliminated. There are various methods of sequestering carbon, including both engineered and nature-based solutions such as preserving forests and wetlands.

Esquimalt's Adaptation Planning Guide outlines rationale and strategies for protecting biodiversity and enhancing ecosystem functions. In addition to the adaptation benefits of urban forestry, a healthy urban forest supports climate change mitigation by storing carbon. According to the Province of BC, Community Energy and Emissions Inventory deforestation calculations, approximately 680 tonnes of CO_2e is released for every hectare that's permanently deforested. By permanently foresting land (afforestation) that same amount could be sequestered once the forest has grown. Individual trees provide a small carbon storage benefit, but its through protecting and restoring healthy forest ecosystems that the greatest mitigation and adaptation benefits can be met.

Next steps for Esquimalt:

1. Participate in the Municipal Natural Assets Initiative (MNAI) to undertake a natural asset inventory
2. Incorporate nature-based solutions into the Big Moves, specifically:
   a. Restore healthy ecosystems while building out active transportation routes via a greenway network
   b. When redeveloping streets for sustainable transportation or other reasons, integrate natural water management features such as bioswales and rain gardens.
   c. Integrate natural systems into new developments, such as green roofs and walls, and natural water management.
3. Increase the number and health of urban trees on public and private property. Implement Strategies 4.1, 4.2, and 4.3 in Esquimalt's Adaptation Planning Guide.
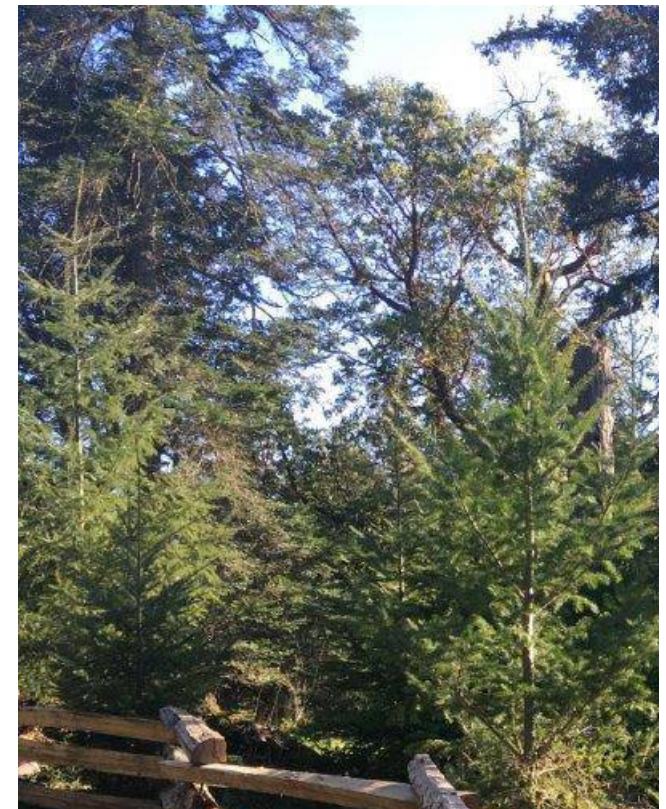
Intersection of nature-based solutions and Shift Beyond the Car

"Walking places is encouraged when the aesthetics are pleasurable. Grass ditches can be converted to wetland habitats. Grass and weed corners can be meadows that attract beneficial insects and biodiversity. Improve land beyond basic grass."

- Public engagement participant

6.3 Adaptation and Mitigation Synergies

Esquimalt's final Climate Action Plan will incorporate both mitigation and adaptation. While some solutions fall clearly on one side of climate action, some of the best solutions are those that lead to both adaptation and mitigation benefits.
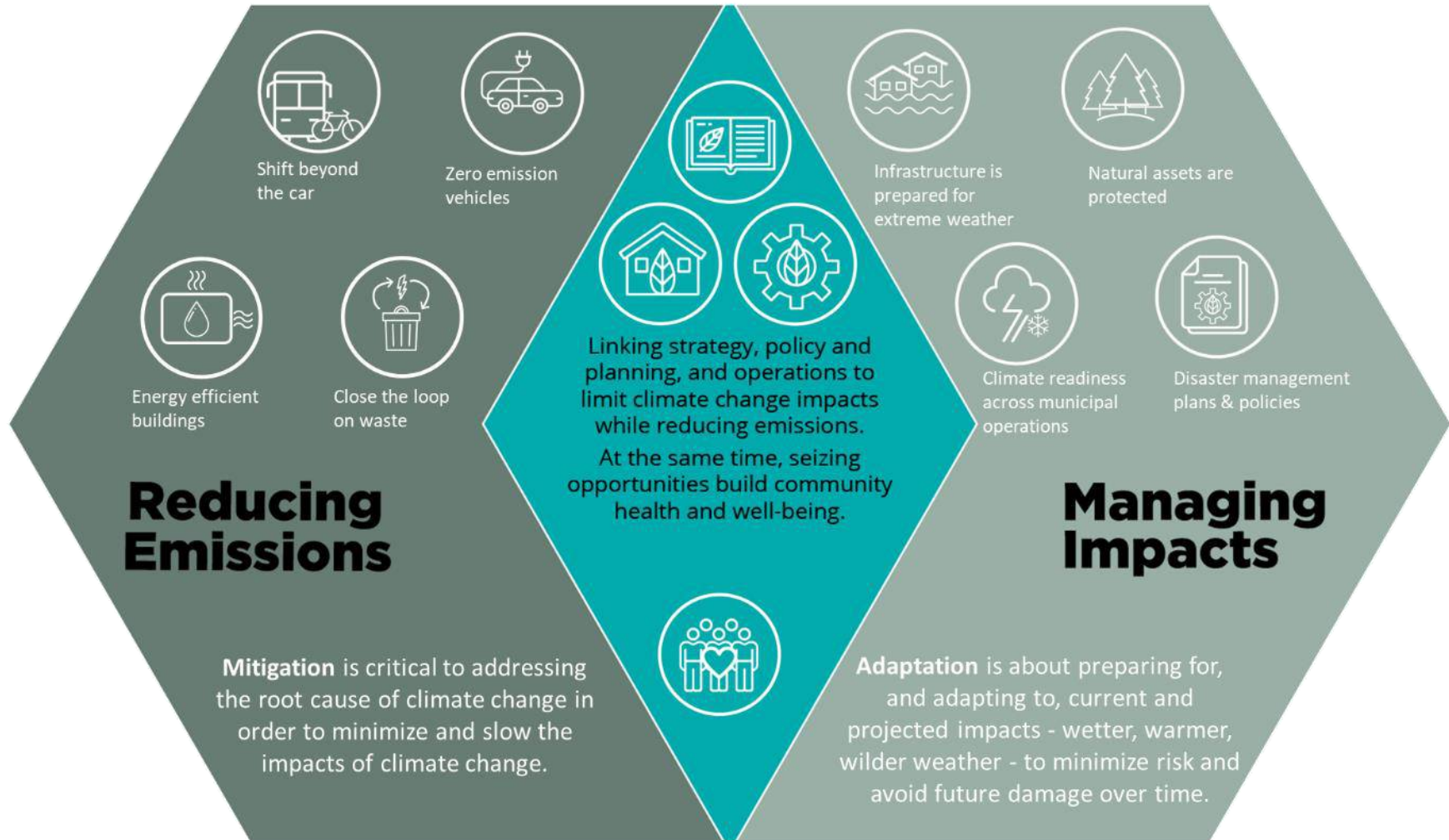

Reducing Emissions

Shift beyond the car

Zero emission vehicles

Energy efficient buildings

Close the loop on waste

Linking strategy, policy and planning, and operations to limit climate change impacts while reducing emissions.

At the same time, seizing opportunities build community health and well-being.

Managing Impacts

Infrastructure is prepared for extreme weather

Natural assets are protected

Climate readiness across municipal operations

Disaster management plans & policies

Mitigation is critical to addressing the root cause of climate change in order to minimize and slow the impacts of climate change.

Adaptation is about preparing for, and adapting to, current and projected impacts - wetter, warmer, wilder weather - to minimize risk and avoid future damage over time.

Figure 17 Mitigation and Adaptation Synergies

Below are several identified linkages between the mitigation strategies in this plan and the Township's Adaptation Strategy.

Adaptation Plan Actions	Mitigation Plan Synergies
Objective 1: Integrate Climate Change Thinking and Response	
1.1: Incorporate climate change considerations into municipal operations and decision making.	
1.1a: Complete Municipal Climate Action Plan	This Community Climate Mitigation Plan addresses the mitigation component of the overarching Climate Action Plan
1.1b: Integrate climate change considerations into new and existing plans and policies, as well as Council reports and the Strategic Plan.	Similar actions are outlined in this plan under the Organizational Leadership Big Move below.
1.1c: Collaborate with local governments and First Nations in the CRD area to explore joint funding opportunities, research best practices and ensure consistency of policies.	Collaboration is key to implementing this Mitigation Plan. Specific collaboration opportunities include a regional E-Mobility Strategy, and regional retrofit programs (Bring it Home for the Climate).
1.2: Increase community level of knowledge on Climate Change.	
1.2a: Enhance climate change education and awareness initiatives for Township residents and staff.	Successful implementation of this plan will require ongoing engagement with residents and staff.
Objective 2: Strengthen Infrastructure Resiliency	
2.2: Create new capacity for rainwater absorption and slow runoff to allow stormwater system time to respond.	
2.2a: Incorporate green infrastructure considerations into development plans and policies.	Nature-based solutions such as planted ditches, rain gardens, and bioswales are also a mitigation action as they don't require the use of carbon-intensive concrete.
2.2b: Encourage rainwater landscaping in small scale residential settings.	
Objective 3: Reduce Risk to Buildings and Property	
3.1: Prepare building stock for effects of more severe weather.	
3.1a: Encourage residents and building owners to maintain and upgrade their buildings to be more resilient to extreme weather events.	Include both adaptation and mitigation objectives when designing programs and outreach materials for residential retrofit programs. Heat pumps have an adaptation benefit since they provide cooling in addition to heating.
Objective 4: Protect Biodiversity and Enhance Ecosystem Functions	

4.1: Protect and expand the existing urban forest.	Urban forests can store carbon and provide shading, reducing the cooling demand in buildings.
4.2: Increase the number of trees planted on private property.	
4.3: Use current best management practices for maintaining health of existing urban forest.	
4.5: Encourage community stewardship within natural areas in the Township.	
Objective 5: Build Community Resilience	
5.1a: Encourage community social connectedness.	Social connectedness also has mitigation benefits as residents see local examples and are encouraged to make low carbon choices by their neighbours.
5.1b: Advance the work of reconciliation with the Esquimalt and Songhees First Nations.	There may be collaboration opportunities with the Esquimalt and Songhees First Nations on mitigation projects.
5.1c: Look for opportunities to increase access to locally grown food	Increasing local food access can reduce the consumption-based emissions from transporting food.
Objective 6: Protect Public Health and Safety	
6.2: Ensure new residential buildings are climate-ready.	
6.2a: Encourage the use of passive construction techniques in new residential developments.	Passive heating, cooling, and ventilation techniques can result in reduced usage of mechanical systems.
6.2b: Encourage deep home retrofits of existing buildings to improve both efficiency and comfort for residents.	Building envelope upgrades make the home more efficient but also help reduce the impact of extreme temperatures. Fuel switching to heat pumps reduces GHG emissions and provides cooling during heat waves.
6.4: Support efforts to reduce urban air pollution.	
6.4a: Advocate and support low emission transportation modes including active and public transportation as well as vehicle electrification.	Shifting beyond the car reduces emissions as well as air pollutants from internal combustion engines.

7. Organizational Leadership

The Township can show organizational leadership by leading by example in implementing the Big Moves in its own operations and by integrating climate action across the organization.

7.1 Leading by Example

The Township of Esquimalt can lead by example by implementing the Big Moves across its own assets and operations. A full Corporate Climate Action Plan will map out the pathway for the Township to meet greenhouse gas reduction targets that meet or exceed the community targets. Below are some key actions the Township can take to lead by example:

Big Move	Corporate Strategies
Shift Beyond the Car	Provide bicycle and e-bike parking for employees and access to showers
	Participate in Bike to Work Week
	Provide transit passes to employees
Electrify Passenger Transportation	Invest in EVs for light-duty fleet
	Install workplace charging for employee EVs
Decarbonize Commercial Transportation	Develop a vehicle purchasing policy that prioritizes low carbon options when feasible
Decarbonize New Buildings	Adopt a High Performance Building policy for all new civic buildings that includes energy and GHG metrics, optimized siting and orientation, and other green building features.
Retrofit Existing Buildings	Conduct building energy audits at all major buildings and implement recommended measures
	Conduct energy-focused operational review of buildings and incorporate energy management into annual and monthly building maintenance procedures
Close the Loop on Waste	Adopt zero-waste policies for all Township events
	Enhance organics and recycling collection at all facilities through improved signage, education and collection facilities
	Investigate opportunities for energy recovery at facilities

7.2 Integration Across the Organization

Several key factors are important for the successful implementation the Community Climate Mitigation Plan based on research conducted by CEA, QUEST, and Smart Prosperity.[2] Among others, they include establishing broad support for implementation, building staff and financial capacity, and institutionalizing the plan in order to withstand political and staff turnover.

Category	Description	Esquimalt Next Steps
Incorporate	Embed climate action into other planning documents such as the OCP, bylaws and policies, and departmental/master plans. Incorporate into other documents and processes.	• Update Council report templates to include climate action (mitigation and adaptation) considerations • Update bylaws and policies to support plan implementation • Identify which departments and staff are responsible for implementing aspects of this plan
Budget	Embed climate action into the budgeting process.	• Update Budgeting process and criteria to increase priority to climate action
Monitor	Monitor indicators as outlined in the Monitoring and Evaluation section.	• Integrate specific climate action indicators into existing performance management and reporting processes
Convene	Host regular meetings to discuss implementation with internal and/or external stakeholders.	• Formalize the internal staff climate action working group (formed in 2021) • Formalize Environmental Advisory Committee as the external implementation advisory group
Report	Report regularly to Council on progress and accomplishments. Annual reporting is recommended.	• Develop an annual progress report that ties to specific strategies in this plan • Work with the CRD to regularly update the community energy and emissions inventory
Renew	Prepare for plan renewal approximately every five years.	• Set out a renewal schedule that includes annual progress reporting, updates every 2 years to monitor and incorporate new opportunities, and a full renewal every 5 years

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

Monitoring and Evaluation

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

Funding

Funding sources that communities typically use for climate action are shown in the table below. A full list is in the CEA Funding Guide.

Internal Funding Sources	External Funding Sources
1. Allocation from operating budget 2. Revolving energy efficiency fund (from corporate projects) 3. Internal carbon fund (put an internal price on carbon for corporate operations and pay into reserve fund) 4. General revenue (e.g., property taxes) 5. Fees charged in relation to new developments 6. Potential funding from CARIP replacement (TBD)	1. UBCM Gas Tax Agreement Funds 2. FCM's Green Municipal Fund supports plans, studies, capital projects and pilot projects for environmental initiatives in a number of focus areas 3. FCM Community Efficiency Financing Program for financing community-scale retrofit infrastructure 4. Federal government programs such as the Greener Homes Grant, Low Carbon Economy Challenge, and Clean Energy Innovation Program 5. Provincial government programs such as the Clean Energy Vehicle Program, BikeBC Program, and CleanBC Communities Fund 6. Emotive grants for EV educational events to foster greater EV adoption 7. CleanBC and FortisBC energy efficiency incentives for new construction and for increasing energy efficiency in existing buildings 8. BC Housing and FortisBC for education or demonstration projects to encourage the building industry to construct low energy and GHG emission homes. 9. FortisBC free energy grants for municipal buildings, and subsequent rebates for retrofits 10. BC Hydro Sustainable Communities Implementation Offer funding

Appendix A. Implementation Details

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

At the bottom of each column is the relative cost, uncertainty, difficulty, and impact of each tier of the Big Move.

Cost	Low – Staff time and minimal consulting fees	Moderate – More extensive staff time and consulting fees	High – Capital investments, new staff positions
Uncertainty	Low – History of success in other jurisdictions and clear policy direction	Moderate – Some previous examples or studies and likely policy direction	High – Significant dependence on Sr. Gov policy or technology advancements
Difficulty	Low – High public acceptance and implementation feasible with existing resources	Moderate – May require further research and outside support	High – Likely to require outside support for implementation
Impact	High – Significant GHG emissions reductions relative to other actions in the plan	Moderate – GHG emissions impact is moderate relative to other action	Low – Within margin of error of projections

Municipal levers are noted for each strategy:

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

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

Buildings – Retrofit Existing Buildings

Building envelope improvements reduce energy needed to heat the building. An average retrofit can save 10% to 20% of energy while a deep retrofit ($80,000-$100,000) can save 50% to 60%. Heat pumps use 1/2 to 1/4 of the energy of baseboard heaters. Electricity has >80% less emissions than natural gas. Perpetual locked in renewable gas contracts (buying the environmental benefits of renewable gas produced somewhere) may be an option in the future.

Strategy	Tier 1	Tier 2	Tier 3	Tier 4
EXISTING BUILD 1.1 **Encourage and enable deep energy retrofits.**	Provide information about deep energy retrofits to renovators and homeowners at time of permit.	Provide top ups of Provincial (*Better Homes and Better Buildings)* incentives for envelope improvements.	Require EnerGuide assessments (Part 9 buildings) and building energy benchmarking (Part 3 buildings) as a condition of a renovation permit over a value threshold.	Require minimum energy performance standards aligning with the Province's upcoming retrofit code (*as more information becomes available).
EXISTING BUILD 2.1 **Encourage and enable building electrification or renewable gas**	Provide information about heat pumps to renovators and homeowners at time of permit.	Top up Provincial (*Better Buildings* and *Better Homes BC*) heat pump incentives.	Collaborate to provide further funding opportunities for building electrification.	Collaborate with the Regional District to establish a regional service to rent/lease heat pumps to replace fossil fuel heating and to assure quality and manage installers.
EXISTING BUILD 3.1 **Establish a long-term marketing campaign**	Promote "Better Buildings and Better Homes BC" at front counter and in property tax mailings as well as business license renewal mailings.	Establish a 10-year program for a community-wide marketing campaign (based on 'energy diets') to encourage building envelope improvements, electrification, or other low carbon fuel sources.	Continue to collaborate with local governments in the region on 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**	Educate renovators and realtors on energy efficiency and low carbon	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	Signal intention to adopt 'retrofit code' when it becomes available

	Tier 1	Tier 2	Tier 3	Tier 4
	choices for space and water heating.		and development for heat pump system designers and installers.	(outreach to public, retailers, realtors, trades).
Cost	🟩	🟨	🟨	🟨
Uncertainty	🟩	🟩	🟨	🟥
Difficulty	🟩	🟩	🟨	🟥
Impact	🟥	🟨	🟩	🟩

Buildings – Decarbonize New Buildings

To get deep emissions reductions a building's heating fuel must be low/no emissions. Electricity is nearly emissions free in BC and heat pumps use 1/2 to 1/4 the energy of a baseboard heater, saving energy and money over the long run. Each new building that is inefficient and has a fossil heating system is one more building that will need to be retrofitted at some point.

Strategy	Tier 1	Tier 2	Tier 3	Tier 4
NEW BUILD 1.1 **Prioritize a low-carbon approach**	Collaborate with regional partners to conduct consultation with the local building industry about low carbon approaches to the Energy Step Code.	Adopt the Provincial GHG metrics when they become available.	Adopt more stringent carbon pollution standards in future years aligned with other municipalities in the region.	Investigate opportunities to address embodied carbon in the construction sector.
NEW BUILD 2.1 **Provide outreach and incentives**	Promote existing incentives for building more efficient new homes via Better Homes BC.	Leverage BC Hydro funding to provide subsidies to builders that offset the additional cost of Energy Advisors and/or provide incentives for mid-construction air tightness testing. Fee rebates could also be considered for new homes	Top up provincial incentives (betterhomesbc.ca) for heat pumps to replace fossil heating systems in new buildings.	

		that install solar or electric vehicle charging stations.		
NEW BUILD 2.2 **Collaborate to provide training and coordination**	Collaborate across the region to provide relevant training to building industry and realtors.

Assemble and promote a list of local or regional Energy Advisors. | Continue providing locally relevant training.

Work with building industry partners to accelerate Energy Advisor training. | Continue partnering with regional partners to provide training to building industry, focusing on meeting Upper Steps and more stringent carbon pollution standards. | |
	Tier 1	**Tier 2**	**Tier 3**	**Tier 4**
Cost	🟩	🟩	🟩	🟩
Uncertainty	🟨	🟨	🟨	🟨
Difficulty	🟩	🟩	🟩	🟨
Impact	🟥	🟥	🟨	🟨

Transportation – Shift Beyond the Car

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

Strategy	Tier 1	Tier 2	Tier 3	Tier 4
SHIFT 1.1 **Augment policies and bylaws for compact growth**	Apply OCP policies that focus development in complete, compact centres and transit-oriented corridors; Review employment locations and link location/land use to local economic development strategy	Leverage Community Lifecycle Infrastructure Costing (CLIC) tool to assess financial impacts of development proposals; Increase density along core Transit Network	Create a density bonus structure for development within short walking distance of the core transit network; Increase Density for neighbourhood node viability; Support densification by applying recommendations from the *Designing Density (2019)* report; Utilize DCC to support densification;	Require all new developments to have walk-scores greater than the community average and expected transportation emissions below the community average. Review the potential for additional density and provision of neighbourhood centre commercial nodes in future OCP reviews
SHIFT 2.1 **Enable active transportation through plans and policies**	Implement Active Transportation Network 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 including formalizing hierarchy (pedestrian - bike - transit - truck - car); apply trip-end facility requirements to all commercial and industrial buildings regardless of gross floor area;	Update Subdivision Servicing bylaw to require any new subdivisions of appropriate size to include active transportation infrastructure; Strategically price parking to incent active transportation	Develop a mobility pricing strategy and conduct engagement.
SHIFT 2.2 **Build safe routes for walking, cycling and other forms of zero emission mobility**	Continuously improve active transportation infrastructure per existing plans; Initiate a 10-year program to connect all neighborhoods to safe and	Implement Complete Streets Policy to reconfigure streets to be 'complete streets' as streets are regularly scheduled for resurfacing / reconstruction for pavement maintenance	Pending results of Active Transportation Study, prioritize budgeting for key AAA transportation infrastructure that will connect major destinations (schools, shopping) to main	Finish the 10-year program to connect all neighborhoods to safe and convenient active transportation paths.

(icon)	convenient active transportation paths.	or installation of utilities. If new streets are required, design to support connectivity	residential areas; Invest in enhanced transit where appropriate	
SHIFT 2.3 **Develop and deliver an active transportation outreach strategy** (icon)	Promote new active transportation routes and end of trip facilities; Promote events such as Bike to Work Week.	Expand active transportation promotion. E.g., education events for new '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** (icons)	Establish car free days on a key street - 1 day a year. Combine with special events like Rib Fest, Farmer's Market, or Buccaneer Days 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 within the community	
SHIFT 2.5 **Promote micro e-mobility and on-demand mobility services** (icons)	Host awareness events for e-bikes, e-scooters and EV golf carts, including demonstrations	Conduct an analysis to understand when and where on-demand service will be most useful	Collaborate with a technology vendor to bring e-mobility on demand solutions to the community, such as electric kick-scooters or e-bikes available for rent through an app	Collaborate on a regional approach to ride-hailing and other on-demand services
SHIFT 3.1 **Collaborate with transit providers to promote transit ridership** (icon)	Promote transit ridership by celebrating new routes and offering free transit days.	Collaborate with transit providers to enable free transit programs for children/seniors, and during bad air quality or very cold weather; Offer free transit days or "loonie days"	Collaborate with transit providers to enable free transit programs for children/seniors, and during bad air quality or very cold weather;	Explore universal free transit with transit providers

SHIFT 3.2 **Collaborate with transit providers to transition to a zero emission transit network**		Collaborate with neighboring communities on safe and convenient inter-community transit that is safe and responsive to the needs of the communities.	Start working with transit providers and neighbouring communities to encourage progressive transition transit to zero emissions vehicles (e.g., electric).	
	Tier 1	**Tier 2**	**Tier 3**	**Tier 4**
Cost	Staff time for policy development and outreach, consulting for plans			Extensive capital investment to redevelop many streets in the community and significant transit investment
Uncertainty				
Difficulty				
Impact				

Transportation – Electrify Passenger Vehicles

New vehicle sales are approximately 10% of total vehicle stock annually, and currently about 140 out of 12,000 cars in Esquimalt are EVs. Switching to an EV from an internal combustion powered vehicle eliminates almost 100% of the emissions from passenger vehicles. The more that people can walk, cycle and take transit in the community and between communities may reduce the % of EV's required for the first target year. In 2019, 10% of car sales (not including trucks and SUVs) were EV's, though this is not even across BC. Provincial ZEV mandates do not require even portions of sales regionally so Esquimalt 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 (subject to budget approval)**	Install public Level 2 charging at one municipally owned parking lot to demonstrate leadership. Consider up to 4 Level 2s as a demonstration at that location.	Work with the CRD to develop a community and regional EV charging infrastructure strategy (current/future demand for L2 and DCFC, garage orphans). Through engagement and network design, consider opportunities to leverage public institution (or other Part 3) charging infrastructure to address garage orphans.	Collaborate with other local and regional governments on a regional charging network strategy.	Leverage grants to implement community EV charging infrastructure strategy. Consider implementation to focus on supporting other actions, such as integrated transportation hubs (connectivity of charging infrastructure to e-bike shares, transit options, etc.).
ELECTRIFY 2.1 **Adopt EV-ready building requirements**	Initiate staff consultation on Part 9 and Part 3 new construction charging infrastructure requirements.	Draft building bylaw amendment to integrate Part 9 EV readiness requirement for 100% of all new non-street parking. For Part 3 residential and possibly Part 3 commercial, consider requiring smart chargers, to facilitate load management in the future.	Implement Part 3 EV charger readiness policy (I.e., 100% electrified, EV-ready stalls for new MURBs (energized outlet capable of supporting Level 2 charger - integrate load management); 25% of stalls at new, non-residential Part 3 buildings)	Require EV readiness reflective of new Part 3 construction for rezoning or development permits for major redevelopment/renovation.
ELECTRIFY 2.2 **Enable EV charging in existing residential and commercial buildings**	Provide information to homeowners about Provincial EV charging incentives	Work with or seek professional advice to work with stratas and property management companies on	Top up provincial residential/MURB and workplace L2 retrofit incentives.	Provide or advocate for Tier 2 exemptions or kWh allowances to protect EV

	Tier 1	Tier 2	Tier 3	Tier 4
		navigating the process to retrofit existing parking stalls with EV charging equipment.		owners against increased electricity prices.
ELECTRIFY 3.1 **Develop and deliver an EV outreach strategy**	Advise local groups of EV outreach incentives from Emotive. Create a communications plan to support engagement. Deliver builder/developer education on EV charging requirement for part 9 and part 3 such as an Open House for electrical trades to engage on EV charging readiness requirement.	Continue outreach to builders, public, auto dealers in including workshops and stakeholder engagement. Partner with other organizations to host engagement events such as test-drives and ride-alongs.	Facilitate a regional workshop to identify opportunities to leverage community EV charging network implementation to support regional travel. Partner with neighboring communities on ongoing active outreach to public and car dealers, implementing the communications plan (Tier 1) to support community identity around EVs.	Create a community or regional brand around electric vehicle adoption, reflective of the local priorities and context to encourage adoption.
ELECTRIFY 3.2 **Provide incentives for EV adoption**		Provide incentives for e-bikes and other forms of e-mobility and/or provide marketing to other incentive programs	Leverage Provincial decal program (EV-OK) to provide a suite of EV priority parking (may include free parking or just priority).	Find innovative ways to encourage 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.
	Tier 1	**Tier 2**	**Tier 3**	**Tier 4**
Cost	🟩	🟨	🟥	🟥
Uncertainty	🟩	🟩	🟨	🟨
Difficulty	🟩	🟨	🟨	🟥
Impact	🟥	🟥	🟨	🟨

Transportation – Decarbonize Commercial Transportation

Strategy	Tier 1	Tier 2	Tier 3	Tier 4
COMMERCIAL 1.1 **Develop a community vision and strategy for commercial ZEV infrastructure**	Conduct a needs assessment for fleet charging requirements, through to 2040.	Design a non-municipal commercial/institutional EV charging network strategy, with emphasis on hub-style charging to leverage fleet needs and electrification of delivery bays.	Support a pilot fleet electrification initiative with one commercial/institutional partner. (e.g., land use/zoning change to allow for transit charging hub, etc.), OR: (Renewable) Natural gas vehicle collaboration for heavy duty vehicles. (Collaborating with other local return-to-base fleets such as BC Transit, school board, waste haulers, and industry / commercial operators).	Facilitate joint procurement/joint funding in coordination with commercial fleet operators for the implementation of the commercial/institutional EV charging network strategy.
COMMERCIAL 1.2 **Engage commercial and industrial stakeholders**	Develop communications strategy to support outreach/engagement with commercial sector. Advocate to provincial government for commercial decarbonization legislation, leveraging collaborations with commercial sector and regional districts.	Convene a Commercial & Industrial fleet operators' workshop to discuss current and future opportunities around low emissions/electrification of fleets; Engage with BC Transit to identify early adoption opportunities of electric bus and transit options (recognizing 100% electric transit target for BC Transit).	Engage with stakeholders on design of the commercial EV charging network. Integrate as much as possible with public and municipal charging strategies.).	Host an emerging and future technology workshop for MD/HD fleet operators, and facilitation of driver training courses on emission-reducing techniques.
COMMERCIAL 2.1 **Update corporate policies to prioritize low carbon options**	Identify opportunities for improved logistics, driver efficiency training and EV	Review and integrate contractual requirements for municipal services to require low emission	Require Corporate fleet electrification policy to buy used vehicles at time of replacement if no low-	Corporate fleet electrification policy fully implemented (to extent that

	education opportunities for all staff.	vehicles, increasing over time with 100% requirement by 2040. (Applies to commercial entities that are contracted for municipal services.)	carbon options are available as a bridging solution when electric options become available.	available technology allows) for 100% EV.
	Tier 1	**Tier 2**	**Tier 3**	**Tier 4**
Cost	🟩	🟩	🟨	🟥
Uncertainty	🟩	🟩	🟩	🟨
Difficulty	🟩	🟩	🟩	🟨
Impact	🟥	🟥	🟥	🟨

Waste – Close the Loop on Waste

Strategy	Tier 1	Tier 2	Tier 3	Tier 4
WASTE 1.1 **Enhance organics collection and processing**	Collaborate with the Regional District to initiate staff consultation on further diversion of organics, processes & targets. Partner with CRD to complete assessment (inventory) of community organic waste volumes and feasibility of increased landfill diversion. Require organics diversion for event permitting.	Adopt organics diversion targets for community and corporate. Evaluate local opportunities for increased organic handling and composting.	Allocate resources (include in five- year budget) for dedicated compost facility manager and required training (site management, odour, leachate, safety, etc.). Install central collection points that are regularly picked up for multi-family units.	Establish public program for compost pick-up from all buildings. Integrate organics collection in streetscapes, where appropriate. Regional - Ban all (residential, commercial, institutional) organics (food waste, yard waste, etc.) from landfill.
WASTE 1.2 **Divert construction, demolition, agricultural and industrial wood waste**	Support the CRD in investigating developing a bylaw to require the recycling of demolition waste.	Identify wood waste landfills in the region, develop inventory, and attempt to evaluate opportunity from those.	Identify and pursue options to support and grow the market for salvaged deconstruction materials. Regional – require diversion for construction and demolition waste	Identify opportunities to salvage surplus and used construction materials, and promote reuse, donation, repair, and sharing opportunities.
WASTE 2.1 **Evaluate and implement other resource recovery technologies**	Review the Integrated Resource Management Plan and public engagement results to determine a way forward regarding the potential gasification plant.	Future steps depend on the results of the IRM plan and potential feasibility studies.		
WASTE 3.1 **Develop and deliver a comprehensive zero- waste outreach program**	Support (funding or land donation) community-led composting projects. Support existing and new capacity for reusable	Conduct annual community zero-waste drives to enhance awareness, streamline with school and business programs.	Educate and communicate the source-separation requirements. Outreach to wood waste landfill owners, and other	Establish a waste reduction working group consisting of key staff across the organizational structure that institutionalizes support for

	resources, including Free Swaps, Share Sheds, free-store for unwanted goods, and building materials depot.		people who can help identify the opportunity.	organic diversion and zero waste initiatives, include external organizations where possible.
	Tier 1	**Tier 2**	**Tier 3**	**Tier 4**
Cost				
Uncertainty				
Difficulty				
Impact				

Appendix B. Sample Key Performance Indicators

Primary indicators measure community energy consumption and GHG emissions, while secondary indicators can quantify the indirect success of various actions. The following table provides a description of these indicators, the measures of success, data sources for each indicator, and frequency of reporting. Annual progress reporting should be planned by Esquimalt (see Implementation for Success section).

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

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

Appendix C. Climate Action at All Levels

Global Action

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

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

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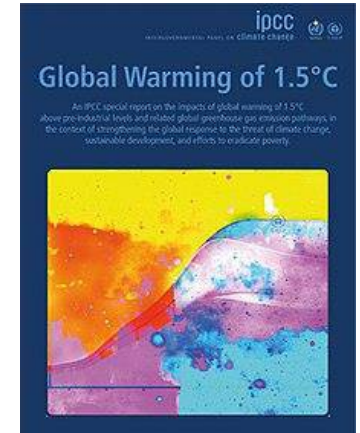
National Action

In 2016, the Government of Canada released its Pan-Canadian Framework on Clean Growth and Climate Change. The framework sets out the federal government's strategy to meet its commitment under the Paris Agreement to reduce national greenhouse gas (GHG) emissions 30% below 2005 levels by the year 2030. In 2017, the most recent emissions inventory year, Canada's emissions were 716 megatonnes of CO_2 equivalent (Mt CO_2e), which is a 2% decrease from 2005 levels. This means that in order for Canada to meet its emissions reduction target, we need a decrease of 28% from 2005 levels in just ten years. More recently, the Government of Canada has established a target of net-zero emissions by 2050, requiring an acceleration of action by all levels of government.

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

Provincial Action

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

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

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

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

The federal government uses national standards and funding in climate action because provinces have constitutional jurisdiction over both energy and local governments.
Local governments are the front lines of climate action because communities are where the buildings, vehicles & infrastructure are.

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

Governments set the stage, but it is residents and businesses who reduce their emissions and adapt to climate change through individual choices:
· where you locate/live/work
· heating / cooling
· vehicle & travel choices
· extreme climatic event / disaster preparedness
· landscaping choices
· water management

Local Action

More than 120 British Columbia local governments have to date enacted community climate action plans or Community Climate Mitigation Plans (CCMPs), 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.

Local Government Relative Influence over GHG Emissions

High ←——————————————————————————————→ Low

| Municipal infrastructure, buildings and fleet. | Transportation network
Land use patterns
Solid waste
Building efficiency standards | Transportation mode share
Residential and business energy efficiency
Food security | Air travel
Industrial energy efficiency
Vehicle standards
Energy utilities |

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

Residents and Businesses

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

Appendix D. Inventory and Modelling Methodology

This appendix contains details on the methodology and assumptions for creating the GHG inventory and projections for Esquimalt.

Inventory Methodology

Esquimalt's GHG inventory was created using data for buildings, transportation, waste, and other sectors sourced from the Stantec report *Capital Regional District – Municipalities and Electoral Areas 2007 Base Year and 2018 Reporting Year Energy & GHG Emissions Inventory*, herein referred to as the "Stantec Municipal Report". Selected methodological data will be made available in this report; for a full list of methodologies employed, please consult the following Stantec report: *Capital Regional District 2018 GPC BASIC+ Community Greenhouse Gas (GHG) Emissions Inventory Report*, herein referred to as the "Stantec CRD report". Based on the data compiled, full inventory years were created for 2007 and 2018.

The 2007 base year inventory was updated from the province's Community Energy & Emissions Inventory Protocol to align with the GPC Basic+ reporting level. GHG emissions for the 2007 year using each protocol are illustrated in Table 1.

Table 1 – 2007 Emissions using CEEI and GPC Protocols

Aspect	Quantification Protocol	2007 GHG Base Year (tCO2e)
Original Base Year	CEEI Protocol	75,793
Updated Base Year	GPC Protocol BASIC+	95,893

The following emission sources were included as part of this inventory, and divided into the appropriate scope:

Scope 1 Emissions

Stationary Energy
- Residential buildings
- Agriculture, forestry, and fishing activities
- Commercial and institutional buildings, and facilities
- Energy industries
- Fugitive emissions from oil and natural gas systems

Transportation
- On-road
- Waterborne
- Aviation
- Off-road

Industrial Process & Produce Use (IPPU)

- Product Use

Agriculture, Forestry, and Other Land Use (AFOLU)

- Land-Use
- Livestock
- Aggregate Sources and Non-CO2 Emissions Sources on Land

Scope 2 Emissions

Stationary Energy

- Emissions from the consumption of grid-supplied electricity, steam, heating, and cooling

Scope 3 Emissions

Stationary Energy

- Transmission and distribution losses of electricity, steam, heating, and cooling

Transportation

- On-road
- Waterborne
- Aviation
- Off-road

Waste

- Solid waste disposal
- Biological treatment of waste
- Wastewater treatment and discharge

The Stantec CRD report states that:

BC Hydro and Fortis BC provided the Province of BC electricity and natural gas consumption data in MWh and GJ, respectively.

The Province developed 2007, 2010 and 2012 residential fuel oil, propane and wood GHG energy use estimates from the number and type of dwellings and the average dwelling consumption by authority and region from the BC Hydro Conservation Potential Review. This data was used to estimate the reporting year GHG emissions for all CRD members except for the District of Saanich and the City of Victoria who provided fuel oil estimates for residential and commercial buildings.

Fortis BC provided the fugitive emission estimate.

The CRD provided landfill gas energy generation data from the Hartland landfill.

Applicable, off-road GHG emissions included in the Stationary Energy Sector are based on the 2020 NIR as prepared by Environment and Climate Change Canada. These emissions are pro-rated to the CRD on a per capita basis.

The Province of BC provided 2007, 2010 and 2018 ICBC vehicle registration data.

BC Transit provided total diesel and gasoline fuel use. This data was used to estimate GHG emissions from busses serving the CRD.

The 2017 CRD Origin Destination Travel Survey was used to estimate on-road in-boundary and transboundary split for registered vehicles and busses. The CRD Origin Destination Travel Survey is based on travel patterns observed in the Capital Regional District (CRD) level.

Aviation GHG emissions from the Victoria International Airport were estimated using 2015 aircraft flight profiles, and the total number of aircraft movements reported in 2018. These data sets were provided by the Victoria International Airport.

Victoria harbour aviation GHG emissions were estimated using Victoria harbor aircraft movement statistics, estimated taxi times, and estimated fuel use for the DHC-6 Twin Otter type of plane. This data was taken from Statistics Canada.

Marine watercraft GHG emissions were estimated using published BC Ferries fuel statistics. GHG emissions from the Coho Ferry, the Victoria Clipper Ferry, personal and commercial watercraft, were estimated based on a Study entitled "Marine Vessel Air Emissions in BC and Washington State Outside of the GVRD and FVRD for the Year 2000". The Transport Canada Vessel Registration System provided the total number of registered waterborne vehicles for the reporting year.

The Greater Victoria Harbour Authority provided an estimate of cruise ship emissions.

Other off-road transportation emissions are based on the 2020 NIR as prepared by Environment and Climate Change Canada.

Emissions factors for the 2007 base year, and 2018 inventory year are shown in Table 2 and are sourced from the 2020 National Inventory Report.

Table 2 – Emissions factors used for inventory years

GHG/GJ, by Year	2007	2018
On-road Mobility fuels	0.071	0.065
Off-road Mobility fuels	0.097	0.089
Non-Mobility Diesel	0.077	0.073

Electricity	0.007	0.003
Natural gas	0.050	0.050
Wood	0.023	0.023
Heating Oil	0.068	0.068
Propane	0.061	0.061

Note: some of the emission factors have changed over time. For example, the emission factors for mobility fuels have decreased as a result of the Renewable and Low Carbon Fuel Requirements Regulation and the emissions factor for electricity has decreased as a result of ongoing efforts to decarbonise the BC Hydro electricity grid.

Inventory Assumptions

Assumptions made with respect to the inventory are as follows:

- The Province of BC made a series of standard assumptions in the creation of the CEEI data for 2007, which are outlined on the CEEI webpage: https://www2.gov.bc.ca/gov/content/environment/climate-change/data/ceei.

Additonal assumptions were derived from the Stantec Municipal Report as follows:

- *Stationary Energy: Propane, Wood and Fuel Oil – Residential Buildings. Propane, and wood GHG emissions were estimated using linear regression methods. The data used in the estimates included historical propane and wood energy data published in the 2007, 2010 and 2012 CEEIs, and heating degree days (HDD) published by Environment Canada. This approach was also applied to the estimate of heating oil for all local governments, except the City of Victoria and District of Saanich. For the District of Saanich and the City of Victoria, heating oil GHG emissions were estimated based on the number of known tanks, average heated floor areas and estimated average fuel volumes.*
- *Stationary Energy: Electricity and Natural Gas Consumption - All Buildings. Prior to releasing the electricity and natural gas consumption data, the Province completes a series of quality assurance and control checks which has resulted in the re-allocation of energy between local governments. This data is then published on the Province's website. When the published 2007-2018 natural gas data was trended, several unexplained data anomalies and trends were identified for several local governments in the CRD. As these data anomalies and trends could not readily be explained, the raw natural gas data sets were acquired from FortisBC, reviewed and compared to the published data. In the 2007 and 2010 reporting years, the published data was under reporting natural gas volumes by upwards of 17% at the CRD level and had several large allocations between the City of Victoria and other local governments in 2012. Based on the issues with the published data, and on the basis the annual raw natural gas consumption trends align with the reported 2018 consumption data and align with historical raw data provided to the City of Victoria and the District of*

Saanich for their energy and GHG emissions inventories, the raw FortisBC dataset was used to estimate GHG emissions. A similar issue was noted for the Juan de Fuca electoral area and electricity data for the 2007, 2010 and 2012 reporting years (i.e., the under reporting of energy consumption) in the published data. As such, the raw electricity data from BC Hydro was used to estimate GHG emissions.

- *Stationary Energy: Fugitives. FortisBC provided total fugitive emissions for the 2018 reporting year at the regional level. To estimate local government fugitive emissions, the value was prorated based on the number of reported natural gas connections (provided by Fortis BC). Since no historical numbers were provided, the 2018 value was applied to the 2007 base year as well. The estimate of fugitive emissions is an understatement of GHG emissions as FortisBC did not estimate the upstream GHG emissions as recommended by the GPC Protocol.*

- *Transportation: On-Road. The Province of BC provided Insurance Corporation of BC (ICBC) vehicle registration data from April 1, 2018 – March 31, 2019. When compared to local government population trends, there appears to be a high degree of uncertainty as to the accuracy of the 2018 vehicle registration data in terms of total registered vehicles. Without having reliable historical (e.g., 2011-2017) and current (2019) data to compare this dataset against, the reasonableness of the data was too uncertain to be applied in the estimation of GHG emissions for the 2018 reporting year. Therefore, to estimate on-road energy and GHG emissions for the 2018 reporting year, 2010 vehicle populations were grown in proportion to the reported changes in local government populations. Each of the local government vehicle profiles were then adjusted to match the proportion of vehicle classes reported in the 2018 ICBC data.*

- *Transportation: On-Road. In cases where vehicle registration counts were 10 or less, the Province assigned a value of "<10" rather than report the actual number. In these cases, the inventory assumes there was 10 vehicles of that particular classification. This is likely to result in an over-estimation of GHG emissions, but it will be immaterial to the overall GHG inventory.*

- *Transportation: On-Road. Vehicle fuel consumption rates and Vehicle Kilometer Travelled (VKT) were taken from the activity data summary for British Columbia on-road transportation from the 2018 National Inventory Report (1990-2018) as prepared by Environment Canada. Based on the clear diesel and clear gasoline consumption values reported by the Province of BC for the Victoria region, the VKT and fuel efficiency values are reasonable and result in a similar estimate of fuel consumption for the Region.*

- *Transportation: Aviation. 2018 aviation GHG emissions were estimated using 2015 aircraft flight profiles (the last available data), and the total number of aircraft movements reported in 2018. The emissions were prorated to each local government on a per capita basis.*

- *Transportation: Waterborne Recreational Watercraft. GHG emissions from recreational watercraft and US/Canada ferries were estimated based on a publicly available year 2000 study for the Victoria, Vancouver, and Washington harbors. These GHG emissions were prorated to each local government on a per capita basis.*

- *Transportation: Cruise Ships. The Greater Victoria Harbour Authority reported on cruise ship emissions for the 2018 reporting year but did not provide an estimate for 2007. As a result, no cruise ship emissions are included in the 2007 base year inventory.*

- *Waste: Solid Waste. To quantify GHG emissions from the Hartland Landfill, the CRD utilized the waste-in-place (WIP) method which is accepted under the GPC Protocol. The WIP assigns landfill emissions based on total waste deposited during that year. It counts GHGs emitted that year, regardless of when the waste was disposed. Except for the City of Victoria, who claims 31% of the CRD's landfill GHG emission, the remaining landfill GHG emissions were allocated to each local government on a per capita basis. Using this allocation method, the CRD members may over, or underestimate associated solid waste GHG emissions as the current year landfill GHG emissions are based upon cumulative waste over time, and each member may have contributed more waste in past years than the current year (and vice versa).*
- *AFOLU: Aggregate Sources And Non-CO2 Emission Sources On Land. These emissions are based on the 2019 NIR as prepared by ECCC and the total area of farmland BC in 2016 as reported by Statistics Canada. These GHG emissions were assigned to each local government on a per hectare (ha) of cropland basis.*
- *AFOLU: Land-Use. The land cover change analysis requires a consistent land-use category attribution and spatial resolution for the 2007 base and 2018 reporting years. For the land use change analysis, land cover data was available for the 2007, 2011 and 2017 years for only part of the CRD. Unfortunately, no more recent or higher quality data source was available to represent the land cover consistently for all three years. Furthermore, since annual data was not available, the change between land cover data years (2007-2011, 2011-2017) was averaged and may not represent actual changes in each year.*
- *AFOLU: Land-Use. There was limited land-use datasets for the Juan de Fuca, Salt Spring Island and Gulf Island Electoral Areas and this data was only available for 2007 and 2011. On this basis, land-use GHG emissions estimates for these electoral areas has been withheld.*

Projections

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

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 related to projections are as follows:

- The Province's incremental steps to net zero energy ready buildings by 2032, via the BC Energy Step Code
- Federal and provincial tailpipe emissions standards: new light duty vehicle emissions decline from 200 g CO_2e/km in 2015 to 119 g CO_2e/km in 2025 (federal policy), and then decline again to 105 g CO_2e/km in 2030 (provincial strengthening of this policy). This is for new vehicles, and is included in the projections taking account of vehicle turnover rates
- Renewable & low carbon transportation fuel standards: 20% by 2030, as in CleanBC Plan

- An average annual decrease of 0.6-1.1% in natural gas consumption per residential connection is included, to align with FortisBC planning
- The Province's CleanBC Plan Zero Emission Vehicle Mandate of 100% of new vehicles by 2040. From the impacts of this, in our BAU scenario we assume that the proportion of electric vehicles on Esquimalt roads will be:
  - 5% in 2025
  - 15% in 2030
  - 68% in 2040
  - 96% in 2050 (even with 100% of all new vehicles sold having zero emissions, there is still a lag with vehicle turnover rates)
- How the impacts of a changing climate will affect building energy consumption:
  - Climate change data for the region was obtained from ClimateData.ca. CEA obtained this from the "downloads" section of the website, selected the BCCAQv2 (annual) dataset, Heating Degree Days (HDD's) or Cooling Degree Days (CDD's) variables, and the location on the map to be analysed
  - 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. As RCP 6.0 scenario not available on ClimateData.ca, RCP 4.5 (median values) were used as a proxy even though this is a more conservative scenario
  - Decreases in residential and commercial natural gas consumption are assumed to be proportional to decreases in HDD's and the proportions of natural gas consumed for space heating for each sector, with this data obtained from the Navigant 2017 Conservation Potential Review for FortisBC Gas
  - Based on ClimateData.ca RCP 4.5 median values, the 30 year average of HDD's around 2018 are 2,333, and in 2050 they will be 1,864
  - Decreases in residential and commercial electricity consumption are assumed to be proportional to decreases in HDD's and the proportions of electricity consumed for space heating for each sector. However, for residential this is partially offset by, and for commercial more than offset by the proportions of electricity consumed for space cooling by each sector and how this will increase proportional to projected increases to CDD's. These proportions were obtained from the Navigant 2016 Conservation Potential Review for BC Hydro
  - Based on ClimateData.ca RCP 4.5 median values, the 30 year average of CDD's around 2018 are 30, and in 2050 they will be 101

Appendix E. Engagement Results

Stakeholder Workshop 1

The first workshop included context-setting presentations, introducing the objectives and scope of the CCMP, and GHG reduction targets. The backcasting approach was introduced as a framework for defining success and brainstorming solutions. Workshop one focused on A and B of the backcasting approach – Defining success and identifying the current state.
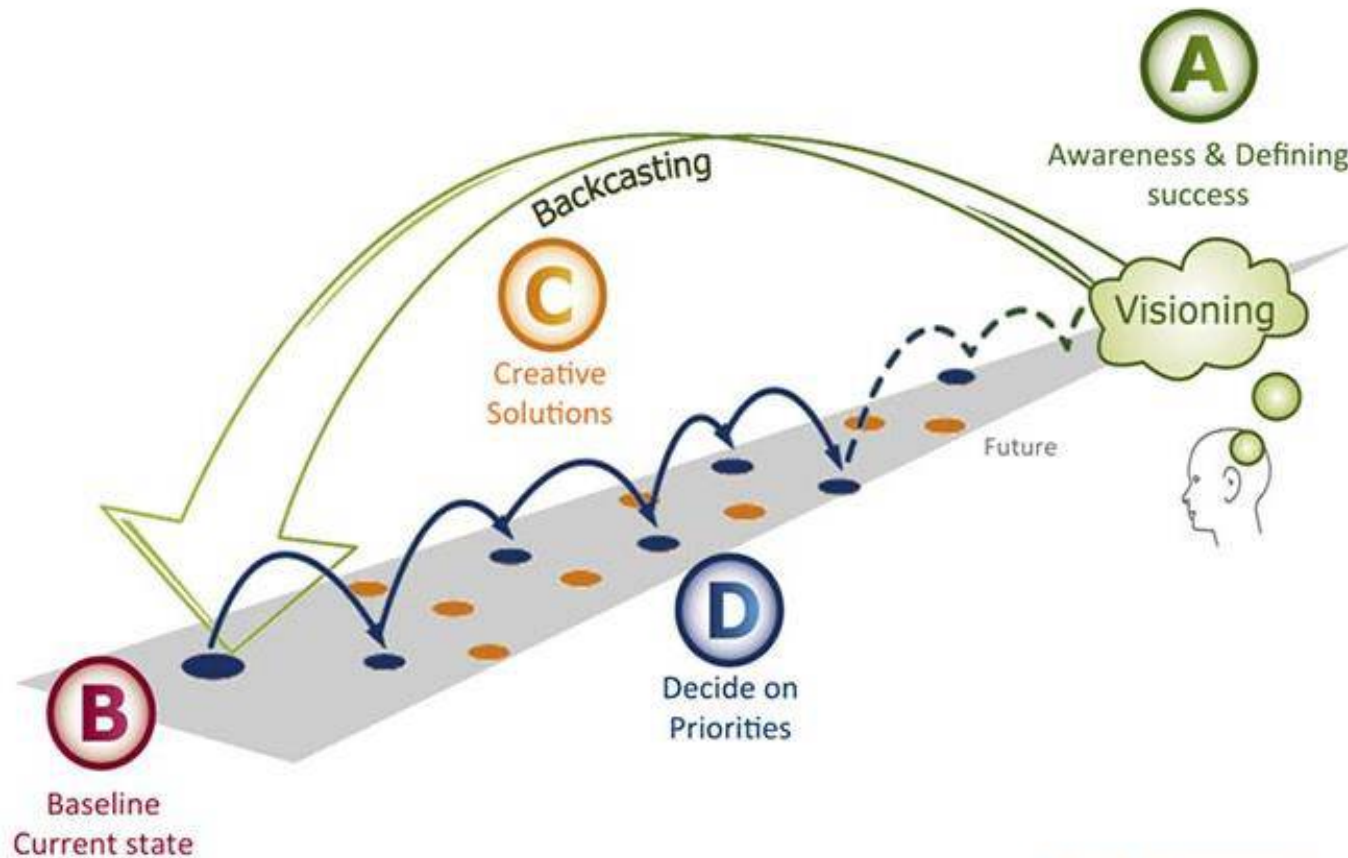
In the first of two breakout discussions, participants discussed long-term visions for Esquimalt climate action in general and for the 3 key sectors: building, transportation, and waste. The second breakout discussion focused on Esquimalt's current state across the three sectors. Participants were divided into four groups and used Miro, an online whiteboard tool, to capture their discussion.

Buildings

The Baseline Current State

A — Awareness & Defining success

C — Creative Solutions

Visioning

D — Decide on Priorities

B — Baseline Current state

Backcasting

© 2001 The Natural Step

EXERCISE

Identify & Refine the Current State

Write the elements that make up the current state for this sector (B1).

Afterward we will arrange them in common Themes or patterns and refine the elements into a single vision statement (B2).

B1 current state in the Township

your answer on a sticky and

older buildings are not specific to one area

many old multi-family residential buildings

most of Esquimalt is single family and duplex homes

Ensure new approaches are taken vs business as usual with those who have always been awarded the infrastructure contacts. Create a more equitable bidding system.

use of heating oil is higher than in other communities

Developers no longer seem to be working with established trees and nature but instead are clearing lots of all life, including earthworms. We need to start from the ground up when building

many homes using heating oil

Provincial incentives for heat pumps, no LG incentives that we're aware of

no incentives seem to be in place to encourage green development and buildings

New buildings often built with high levels of embodied carbon (carbon used to make building materials) and often limited stored carbon. Step code doesn't address this.

Current buildings are relatively inefficient (almost 75% built before 1980)

B2 Consolidate themes and refine
- Assign a scribe, gather themes and work to create a single representation of the current state from your groups ideas.

it seems like Esquimalt has alot of redevelopment, bt as an absolute number of buildings it is quite small

consider adding density along e/n rail trail as it is active transportation friendly

opportunity for efficiency improvements and fuel switching

New development focused on main corridors

Remember to be specific and identify someone to report back

Transportation – Shift Beyond the Car

The Baseline Current State

Awareness & Defining success

A

Backcasting

C Creative Solutions

Visioning

D Decide on Priorities

Future

B Baseline Current state

EXERCISE

Identify & Refine the Current State

Write the elements that make up the current state sector (B1).

Afterward we will arrange them in common themes and refine the elements into a single vision state (B2).

Describe the current state in the Township
- Write your answer on a sticky and place it below **B1**

widening of side walks

awareness of bike lanes

some areas are well served by transit- timing could be improved

B2 **Consolidate themes and refine**
- Assign a scribe, gather themes and work to create a single representation of the current state from your groups ideas.

Awareness/Accomodation of drivers to be cautious around bikers and pedestrians

a single car share station (MODO)

existing signage

good starting points to leverage from but long way to go and tremendous opportunity to improve

some areas have bike racks and locks (i.e. secure cage)

supportive policy for car share for rezoning

free parking is available

piloted a bike share previously (not ebike)

there are docks where privately run ferries operate - could they be public access ini the future with a pass?

there are some walking paths in-place (esquimalt road and craigflower area)

starting to densify developments

trail corridors for bikes

some end-of-use amenities but not enough

Some work from home already in place, Thanks Covid!

Covered bike parking at the base

ammenity sharing between rec centre and city hall for staff to shower

Remember to be specific and identify someone to report back

Transportation – Electrify Passenger Vehicles

Breakout 1 - Transportation - Electrification
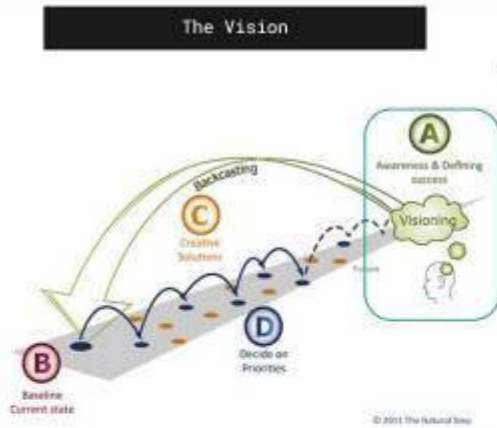
The Vision

A1 Describe your vision for this sector in the year 2040
- Write your answer on a sticky and place it below. Imagine a future scenario that is unimpeded by limitations or constraints of your past experience. You are not limited by current trends or projections.

A2 Consolidate themes and refine the vision
- Assign a scribe, gather themes and work to create a single vision from your groups ideas.

Wuppertal

The naval base (dnd) need to buy in

'current taxi' seems to work Encourage like solutions

SHARING

Shared electric vehicles as transportation alternative

Walkable neighbourhoods

Larger sidewalks & bike paths to accomodate electric scooters, wheelchairs, etc

Electric community buses for persons with mobility challenges

Wider sidewalks - Esquimalt Rd, Songhees Trail, Craigflower

No vehicle ownership— automated Evs with most people walking and cycling

EV are cheap o

Leverage interest in evs to electrify building/everyt hing!

Electric charging stations at major hubs

electric ferry from colwood. need a port

Incentives for old buildings to retrofit for electric charging

Electric Transportation provided as a service (fully integrated and multi-modal)

Need to address range

Hubs - Westbay, Saxe Point, City Centre, Craigflower

elevated rail with other uses below electric rail

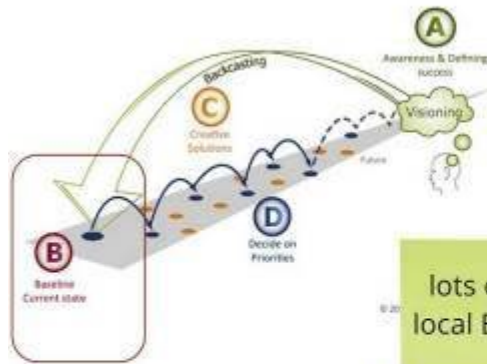Incentives for new buildings to incorporate charge stations

densification in Esquimalut Road, Old E Road and Craigflower and Admirality Road

Electric rail or boat to connect Westshore, Esquimalt & downtown

Remember to be s... dentify someone to report back

EXERCISE

Identify & Refine the 2040 Vision

Write the elements that make up your vision for this sector
(A1).

afterward we will arrange them in common themes or patterns and refine the elements into a single vision statement
(A2).

Breakout 1 - Transportation - Electrification

The Baseline Current State

EXERCISE

Identify & Refine the Current State

Write the elements that make up the current state for sector (B1).

Afterward we will arrange them in common themes or groups and refine the elements into a single vision statement (B2).

B1 — Describe the current state in the Township
- Write your answer on a sticky and place it below.

- Unprotected bikelanes on main roads, fairly narrow (not great for mixed use or all ages)
- Standard size sidewalks that are on the small side - not great for shared use
- lots of local EVs
- New step code for buildings - does it include electric charging stations?
- Reasonable transit network using diesel and CNG
- 10 E buses on order for next year for Vic transit
- aspiration to be one of the most walkable communities
- Songhees Wellness Centre is Leeds Certified
- issues with MURB dwellers
- 2 electric car chargers at Songhees
- neighbouring comms have 100% EV ready development...Esquimault is aware as is development industry
- Dedicated bike path that is used for different modes of active transportation
- Move moving towards more electric vehicles (not sure about availability in Esquimalt)
- climate is conducive to EVs and heat pumps
- No shared electric bikes/scooters in community
- In the midst of creating community 'hubs' (downtown, West Bay) - which is good for walkability, shareability
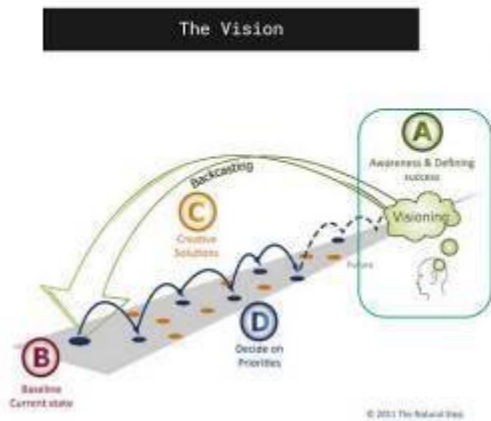
B2 — Consolidate themes and refine
- Assign a scribe, gather themes and work to create a single representation of the current state from your groups ideas.

- its on the radar
- potentail for collaboration
- Room for improvement in terms of walkability, active transportation
- Provincial incentives for electrification, but no LG that we're aware of

Remember to be specific and identify someone to report back

Waste (and other strategies)

The Baseline Current State

© 2011 The Natural Step

EXERCISE

Identify & Refine the Current State

Write the elements that make up the current state for this sector (B1).

Afterward we will arrange them in common themes or patterns and refine the elements into a single vision statement (B2).

Produce about 6,500 tonnes of waste per year

Goes to Hartland landfill. Cost of driving it there, cost of Township paying for Hartland. Tipping fees $110 / tonne.

Lost opportunity, that waste not being used. E.g. energy purposes, we are using natural gas instead of energy from waste.

Current Hartland landfill LFG system is for electricity only. No use of the heat

Consider domestic waste audits... right now you can see where people are throwing things out based on their blue bins

There is some local food occurring, but not enough. And we may not know everything that is occuring.

GHG numbers... GHG reduction is about 4,500 tonnes a year, if we can convert the waste to energy. And 3,500 sequestered as biochar. Potential 8,000 tonne reduction

B2

Consolidate themes and refine
- Assign a scribe, gather themes and work to create a single representation of the current state from your groups ideas.

Waste: is currently a liability but should be thought of as or converted to a resource that could be used for the maximum benefit of the community. There is great emission reduction potential, including through negative emissions tech (biochar). This needs to be done as a region.

Food: 6 days worth of food on the Island. So this needs to be expanded. And nobody is taking leadership on this, huge economic potential, greater than with energy. This needs to be done as a region.

Negative emissions: currently no projects in Township, although some carbon being stored through land use. This needs to be done as a region.

Remember to be specific and identify someone to report back

Stakeholder Workshop 2

The second stakeholder workshop continued with the Backcasting approach, this time focusing on C and D – Finding creative solutions and deciding on priorities. The workshop included a presentation on the Big Moves as a starting point for creative solutions, since we already know the highest impact local governments actions for emissions reduction. Participants expanded on the Big Moves, adding other creative solutions and then prioritized the strategies.

Buildings
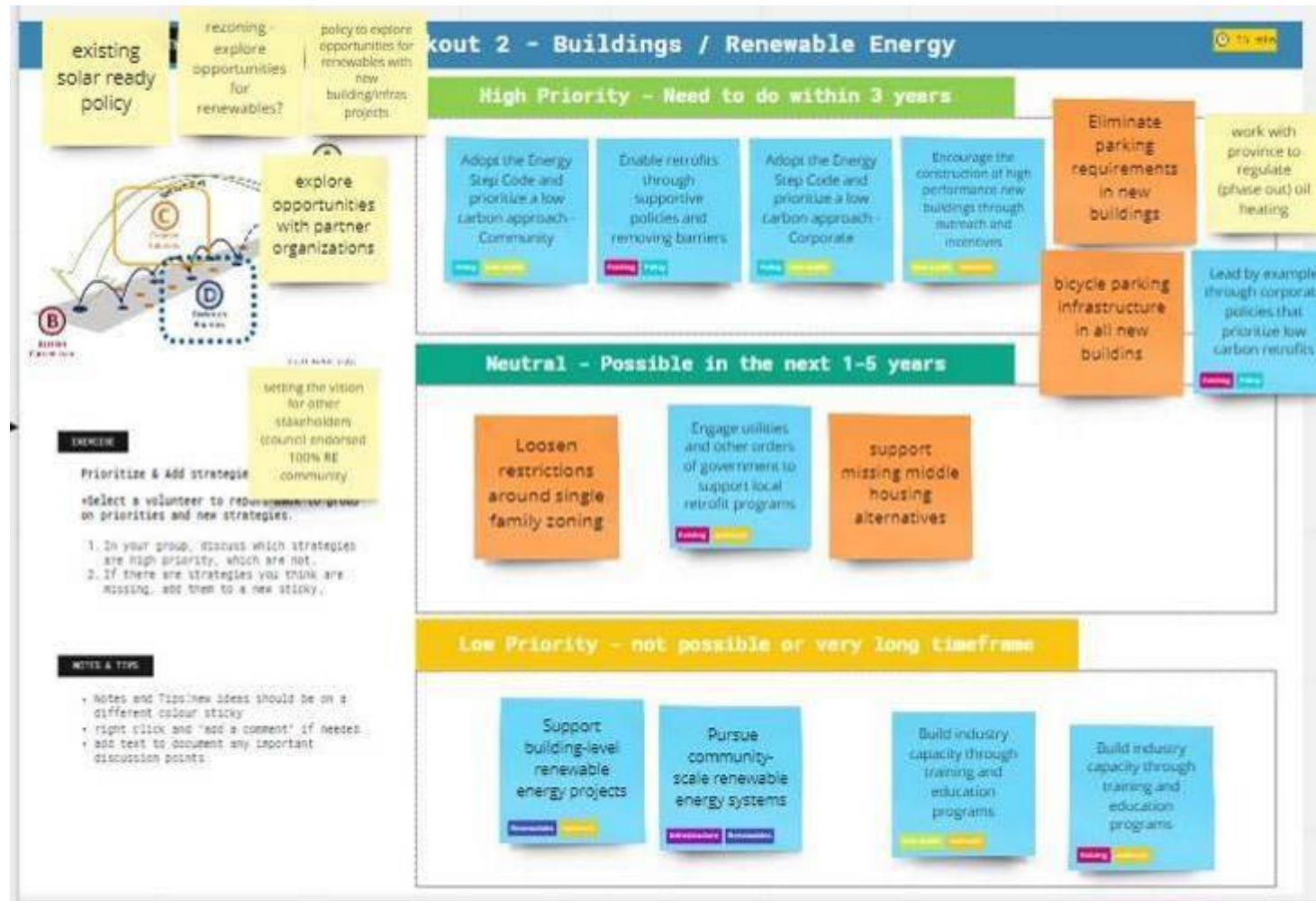
The groups chose one or more top strategies and identified various considerations, such as co-benefits, local leverage points (what is already in place that will help), barriers, collaboration opportunities, equity considerations and next steps.
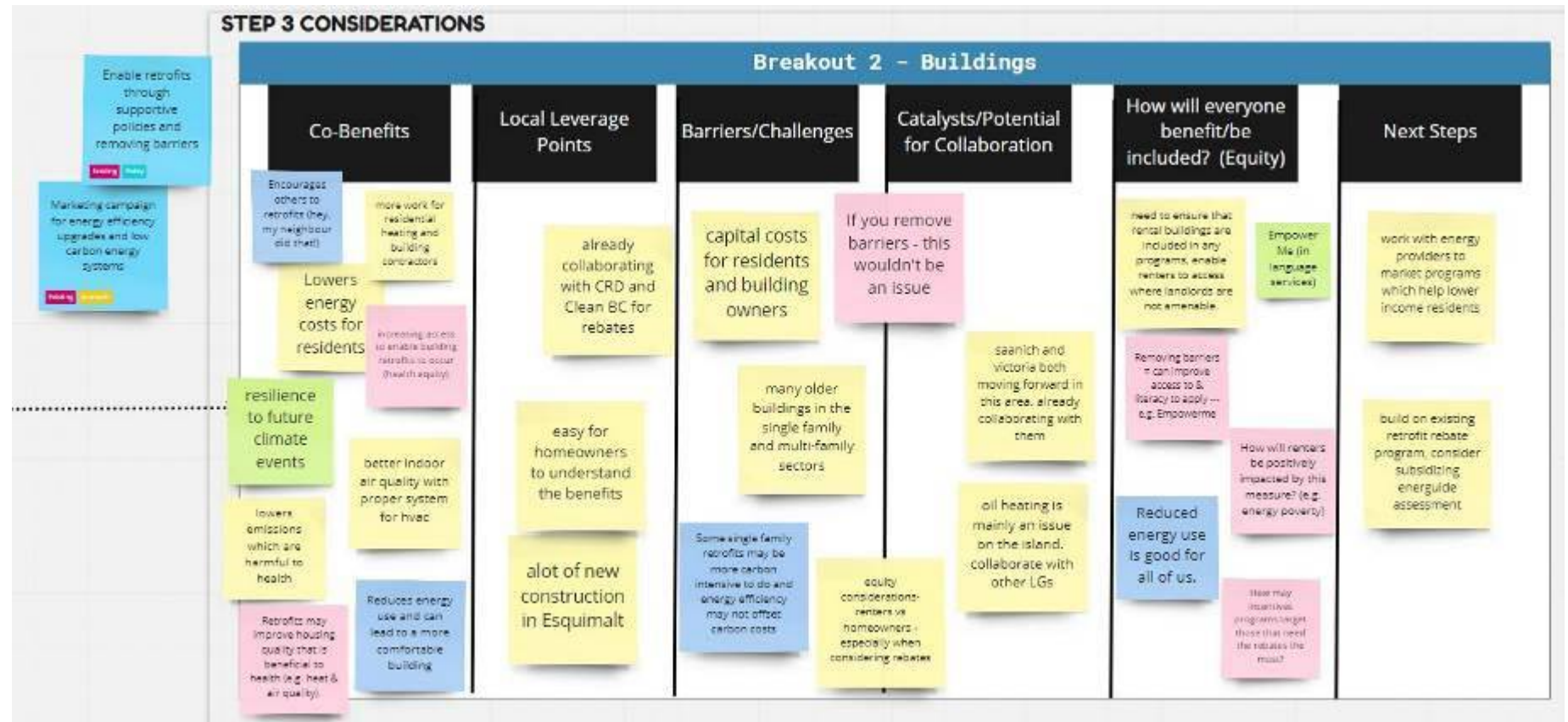
Transportation – Shift Beyond the Car

Breakout 4 - Transportation - Shift Beyond the Car

High Priority

- Collaborate with transit providers to promote transit ridership
- Develop and deliver an active transportation outreach strategy
- Optimize zoning bylaw and other policies for compact growth
- Support car share initiatives
- Regional collaboration across these issues
- Build safe routes for walking, cycling and other forms of zero emission mobility *"funding is a challenge"*
- Support a zero-emission transit network
- Lead by Example - Corporate "Work from Home" Policy *Already in place for COVID, keep after COVID*

Neutral - Possible in the next 1-5 years

- Optimize parking policies and mobility pricing
- Collaborate with ride-hailing providers *regional approach* and require low emission vehicles
- Raise awareness and availability of micro e-mobility *a component of active transportation planning piece*
- Enable e-mobility on demand

Low Priority - not possible or very long timeframe

- Normalize car-free and zero-emission zones

EXERCISE
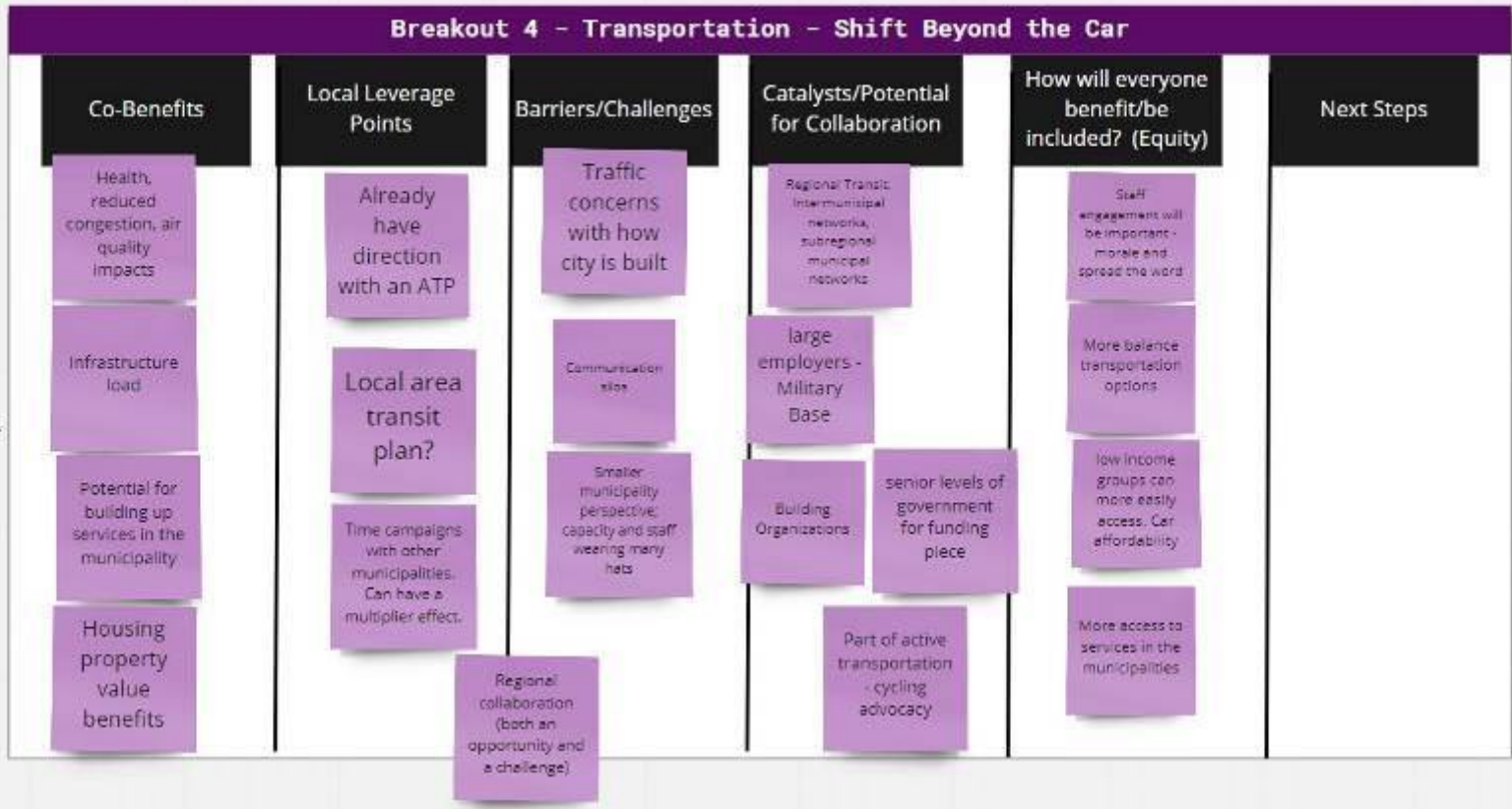
Prioritize & Add strategies

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

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

NOTES & TIPS

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

New frame

STEP 3 CONSIDERATIONS

Regional collaboration across these issues

Breakout 4 - Transportation - Shift Beyond the Car					
Co-Benefits	**Local Leverage Points**	**Barriers/Challenges**	**Catalysts/Potential for Collaboration**	**How will everyone benefit/be included? (Equity)**	**Next Steps**
Health, reduced congestion, air quality impacts	Already have direction with an ATP	Traffic concerns with how city is built	Regional Transit: Intermunicipal networks, subregional municipal networks	Staff engagement will be important - morale and spread the word	
Infrastructure load	Local area transit plan?	Communication silos	large employers - Military Base	More balance transportation options	
Potential for building up services in the municipality	Time campaigns with other municipalities. Can have a multiplier effect.	Smaller municipality perspective; capacity and staff wearing many hats	Building Organizations / senior levels of government for funding piece	low income groups can more easily access. Car affordability	
Housing property value benefits		Regional collaboration (both an opportunity and a challenge)	Part of active transportation - cycling advocacy	More access to services in the municipalities	

Transportation – Electrify

New frame

STEP 3 CONSIDERATIONS

Breakout 1 – Transportation – Electrify/Decarbonize

Co-Benefits	Local Leverage Points	Barriers/Challenges	Catalysts/Potential for Collaboration	How will everyone benefit/be included? (Equity)	Next Steps
Air quality improvements	Existing collaboration with Victoria and Saanich...they are pushing the market - good to align with their timing	Additional cost to developer	Existing collaboration with Victoria and Saanich...they are pushing the market - good to align with their timing	Social/ supported housing would be included	cutting edge - pilot project
noise reduction		may alienate certain developers - those that build "social housing stock"		Incentives/ funding support for certain types of housing	"marketing" the good work that is being done already
might bring out the "right type of developer"					Identify/ seek out developers that are ready

Adopt EV-ready building requirements - Part 9

Higher % EV ready

Adopt EV-ready building requirements - Part 3

Waste

Develop and deliver a comprehensive zero-waste outreach program

New frame

Organics diversion

develop

Breakout 3 – Waste

IRM

Co-Benefits	Local Leverage Points	Barriers/Challenges	Catalysts/Potential for Collaboration	How will everyone benefit/be included? (Equity)	Next Steps
Engages the community	Champions throughout the community	Challenge - education and willingess on source separation	Bring together different community groups - ECO	Lower GHGs	Apply lifecycle economic & environmental business cases in decision making on IRM (e.g. plastic recycling)
Links with IRM strategy		CRD looking at a single stream approach	Regional partners - e.g. CRD, where possible. But Esquimalt may be able to show leadership	Lower costs	
Maximise value		Residential concerns on air emissions, and WWTP push back example		District energy	
Don't need to be as strict on specific source separation of waste		Difficulties in describing differences between gasification & incineration	DND, C Span	Direct impacts on these issues	

Public Engagement – Ethelo

Public engagement for the Community Climate Mitigation Plan was originally meant to be an in-person open house and survey, but due to the COVID-19 pandemic the plan shifted to online engagement using the Ethelo E-Democracy platform. Similar to an open house, the purpose of the tool was both to educate participants and give residents a say in ensuring the solutions to be implemented are chosen in a fair, effective way, with proven community buy-in. The process educated residents on aspects of the Township's various proposed solutions, such as their associated difficultly level and the potential efficacy of implementing each solution. Ethelo used the results to show which set of climate actions are predicted to have the most community support.

The game-like online tool asked participants to create their ideal plan, which had to meet the GHG reduction target and stay within a defined difficulty score. The online engagement was open in November and December 2020 with **221 community members** participating in the process. The final result indicates which suites of actions have the most support and which are more polarized. Below is a summary of the engagement results.

Most Supported Strategies

The Ethelo platform identifies the policy options with the least polarization. The platform takes into account not only participant's likes, but also their dislikes, and uses these to identify where there is community consensus and where there is potential conflict.

Most Supported	Section	% Support*
Zero-Carbon New Buildings	100% = 3,600 tonnes GHG	72%
Composting	75% = 3750 tonnes GHG	69%
Bus Routes	700 cars = 1,000 tonnes GHG	66%
Electrify Personal Vehicles	5250 EVs = 7,500 tonnes GHG	60%
Deep Energy Retrofits for Homes	15% = 800 tonnes GHG	58%

Note that "% Support" does not indicate overall support for the strategy but indicates the percentage of participants that chose the particular scale of action. For example, looking at "Deep Energy Retrofits for Homes", 58% of respondents chose that 15% of homes should undergo deep energy retrofits, however other respondents could have selected a higher percentage, so are in agreement with the strategy.
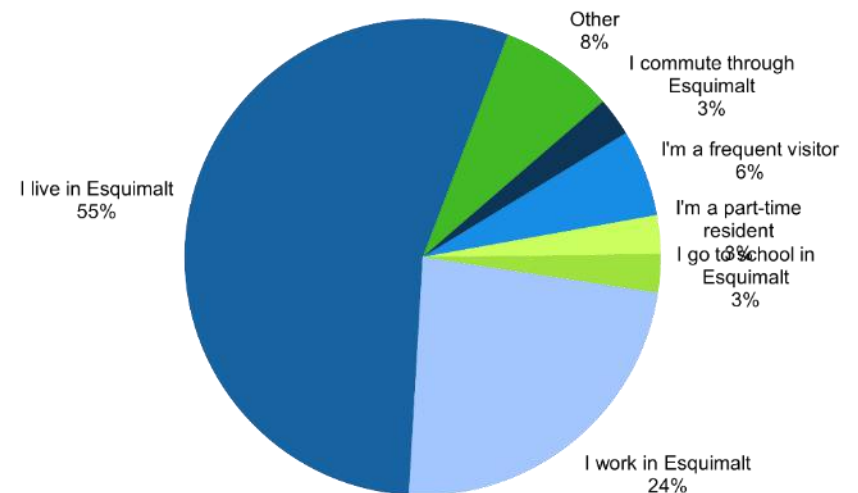
Polarization

Ethelo identifies the potential areas of polarization, or conflict, which is a measure of the level of disagreement in a group. Higher conflict scores represent internal resistance and risk of failure. The image below shows the level of conflict for each of the suites of actions. None of them indicated major polarization, but it's clear that retrofits and heat pump conversions for homes and businesses, increased transit, electrifying passenger vehicles, and decarbonizing commercial vehicles are the least polarized strategies.
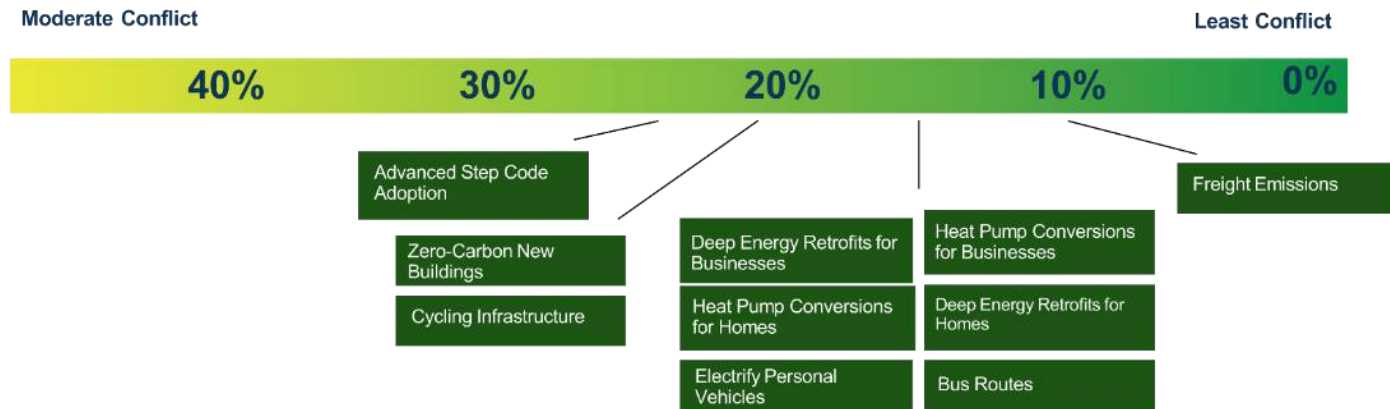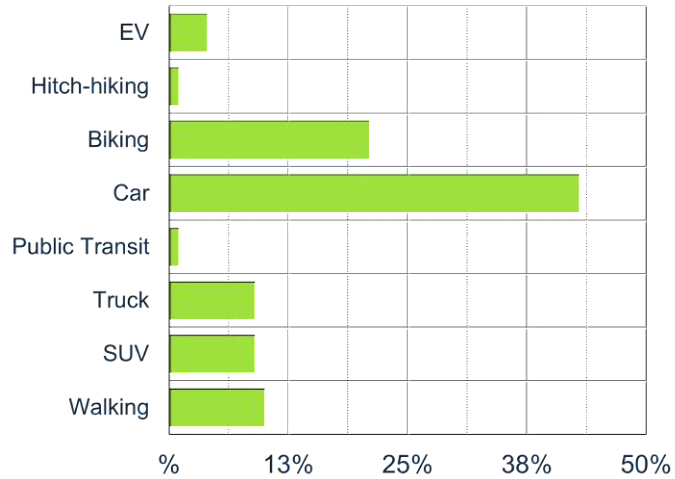

Survey Results

In addition to gathering feedback on the proposed strategies, the Ethelo tool also included survey questions to better understand some of the opportunities and barriers residents face in making lower carbon choices.
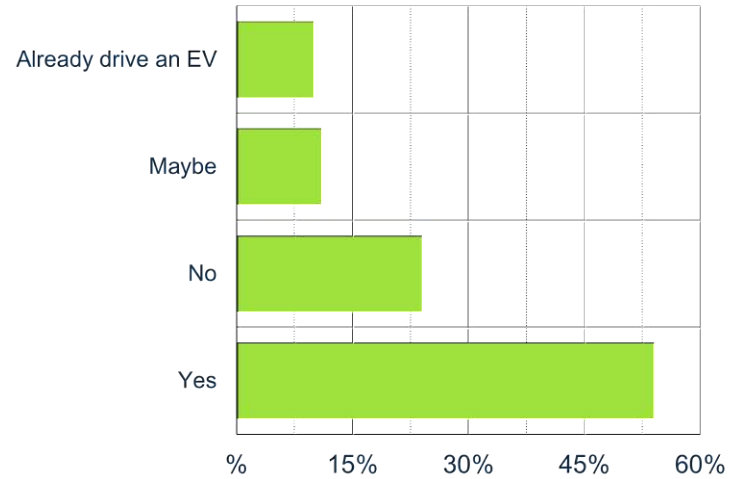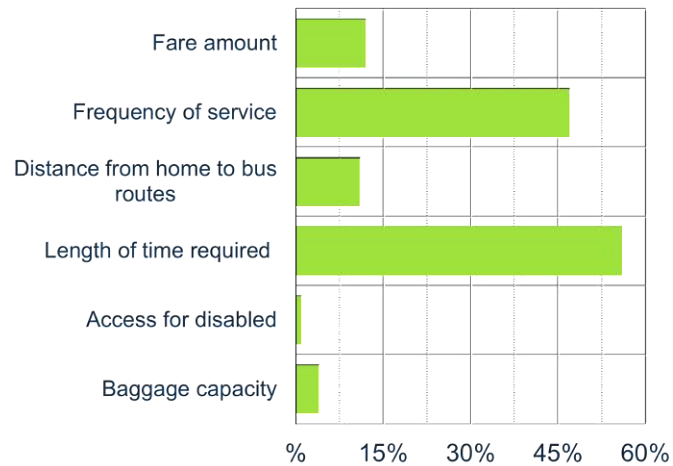
Transportation

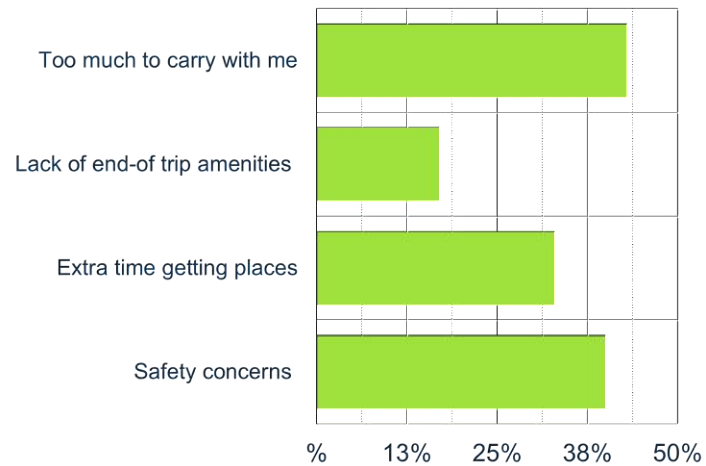### What are your main modes of transportation currently?

Mode	Percentage
EV	
Hitch-hiking	
Biking	
Car	
Public Transit	
Truck	
SUV	
Walking	

(Bar chart, x-axis: %, 13%, 25%, 38%, 50%)

Are you (or would you) considering buying an electric vehicle as your next vehicle?

Response	
Already drive an EV	
Maybe	
No	
Yes	

(Bar chart, x-axis: %, 15%, 30%, 45%, 60%)

What are your major barriers around public transportation?

Barrier	
Fare amount	
Frequency of service	
Distance from home to bus routes	
Length of time required	
Access for disabled	
Baggage capacity	

(Bar chart, x-axis: %, 15%, 30%, 45%, 60%)

What are major barriers for you to walk, cycle or scoot from home to your destinations?

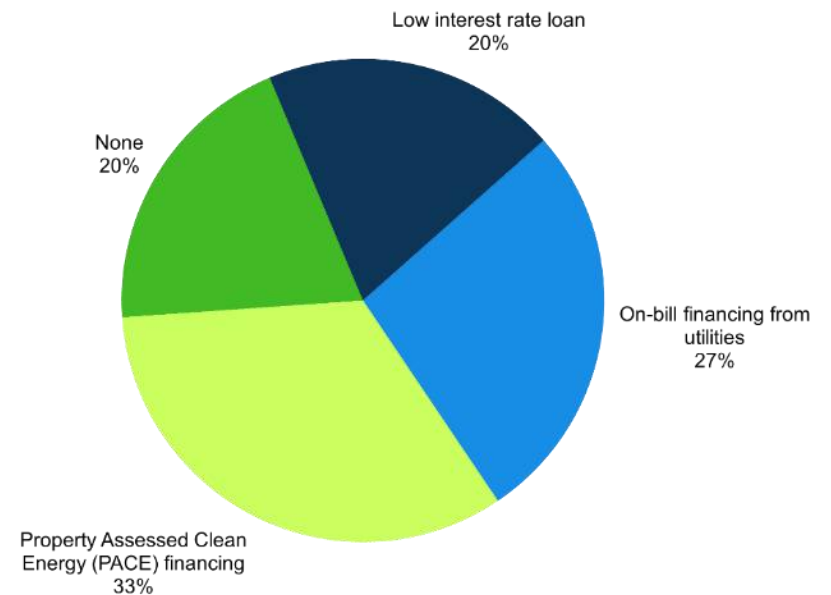| Barrier	
Too much to carry with me	
Lack of end-of trip amenities	
Extra time getting places	
Safety concerns	

(Bar chart, x-axis: %, 13%, 25%, 38%, 50%)

Buildings

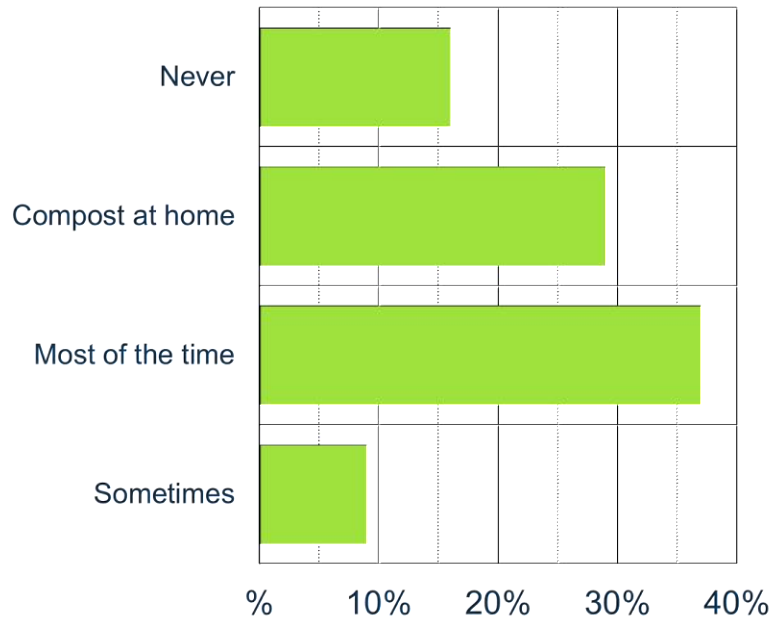Have you done anything to make your home more energy efficient?
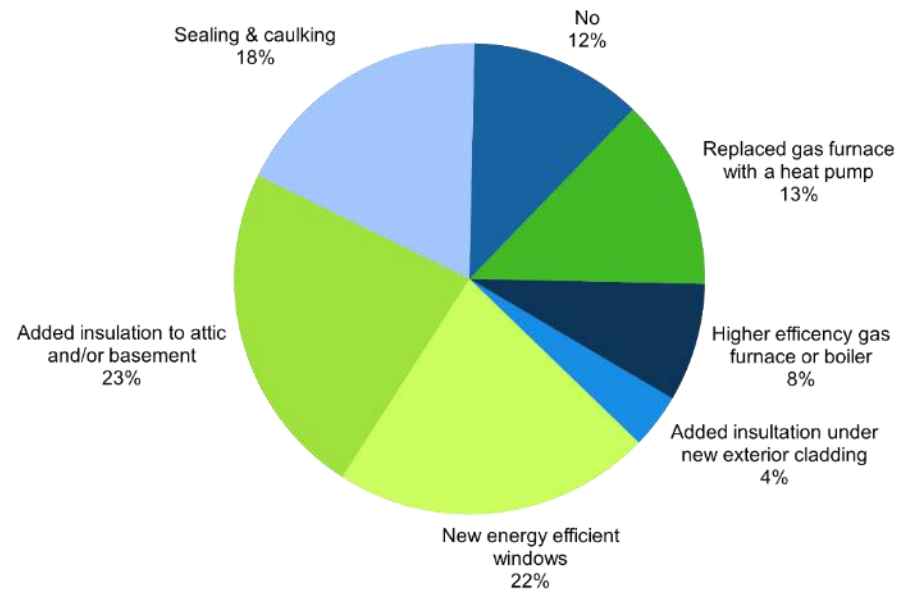
Would any of the following help you decide to make your home more energy-efficient?

Waste

How often do you compost?

Category	
Never	~16%
Compost at home	~30%
Most of the time	~37%
Sometimes	~9%

How often do you recycle?

Category	
Less than 25% of the time	
Everything I can, all the time	~58%
Most of the time	~29%
Half the time	
Never	
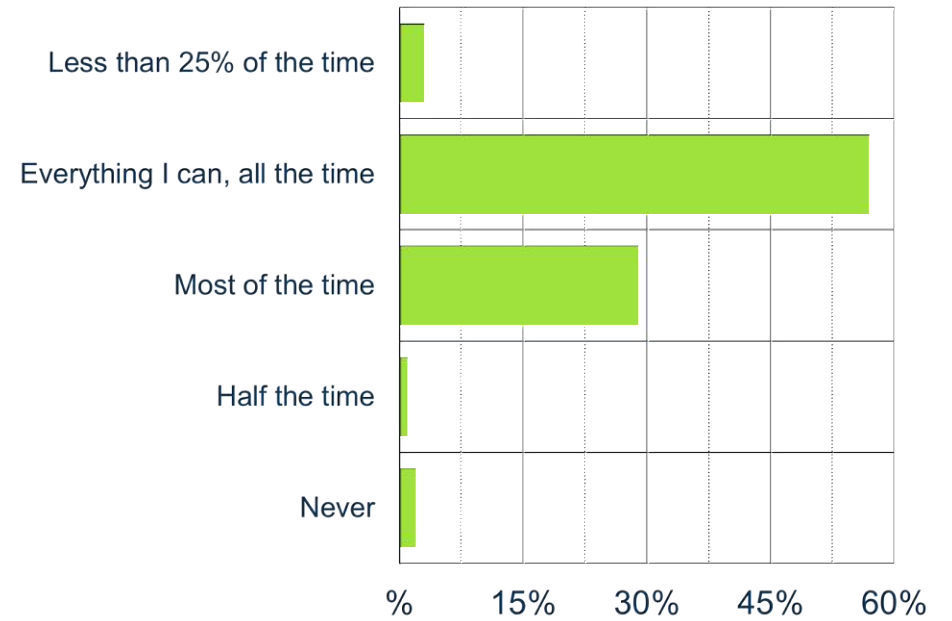
Food

How willing are you to choose **lower carbon foods** and/or **eat less meat** and **dairy**?

How willing are you to **eat more locally produced food**, including produce, prepared goods, meat, and dairy?
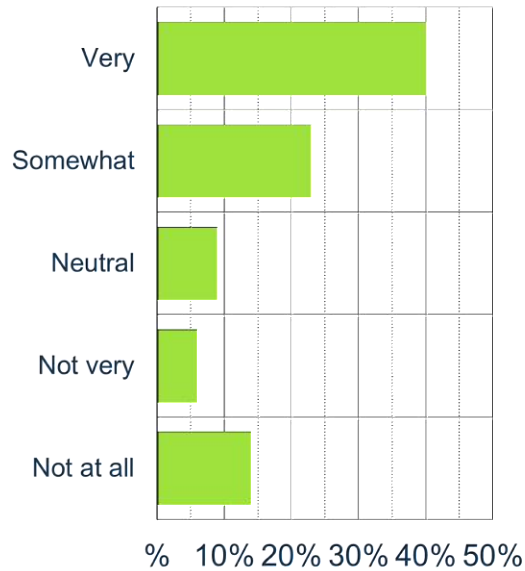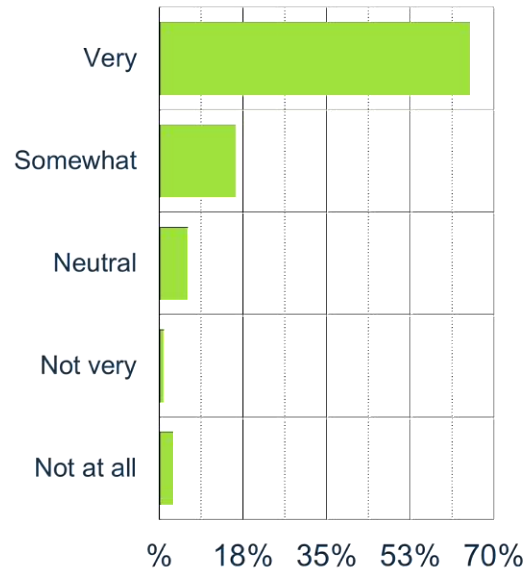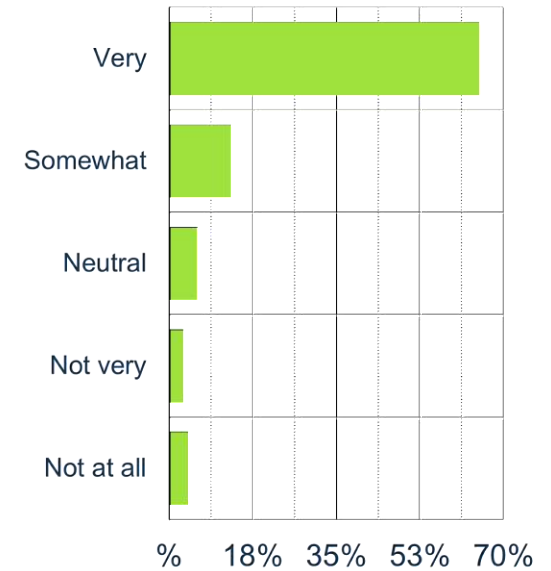

How willing are you to generally **consume and dispose of fewer consumer goods**, or choose that can be reused?

Esquimalt 2020 inventory update memo

The Capital Regional District (CRD) commissioned Stantec Consulting to complete a region-wide energy and greenhouse gas (GHG) inventory report for the 2018 year, with profiles available for each municipality, including for the Township of Esquimalt. This report was based off the GPC Basic+ inventory criteria. The Community Climate Mitigation Plan for Esquimalt was based off this 2018 inventory.

An updated GHG inventory was developed for the 2020 year for the CRD, again using the GPC Basic+ inventory criteria. This memo describes the results of the 2020 inventory, along with any findings of note.

Overall, emissions decreased by over 10% between 2018 and 2020, from 90,308 to 80,889 tCO₂e. 9,414 tCO₂e in emissions were removed, or about 10.4% of total emissions in Esquimalt (Figure 1). The decrease was due primarily to a 28% drop in passenger and light truck/vans/SUV vehicle emissions resulting from public health restrictions from the COVID-19 pandemic reducing work and leisure traffic (Figure 2). The decrease in travel led to people spending more time indoors, as denoted by the modest increases in natural gas and fuel oil emissions, amounting to 1,425 tCO2e, or 1.6% of total emissions.
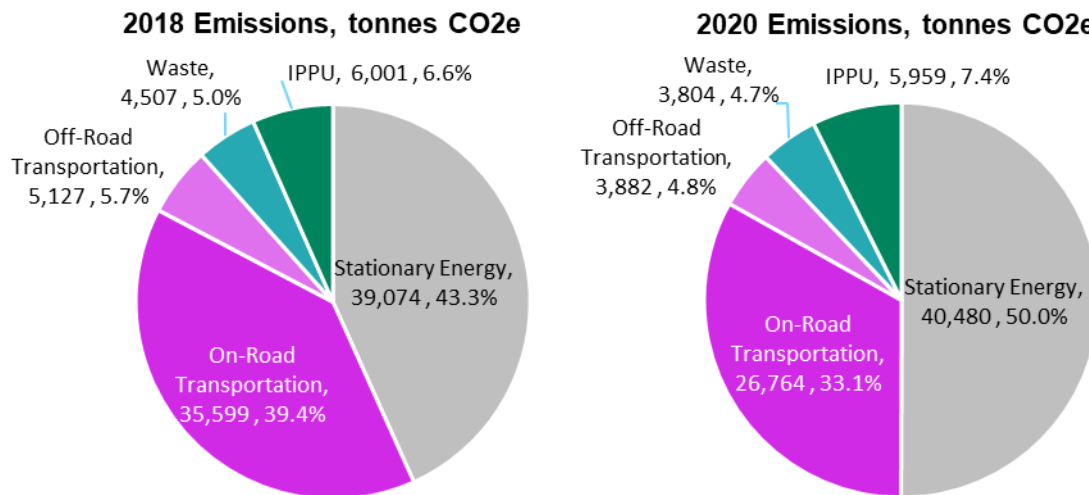

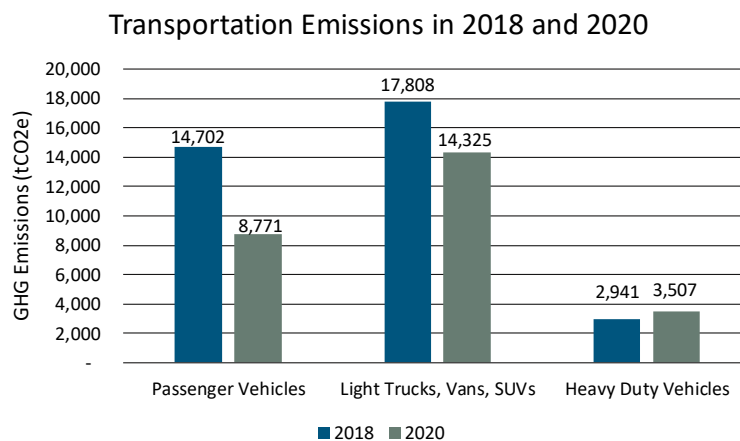**FIGURE 1 – 2018 AND 2020 ESQUIMALT EMISSIONS BY SECTOR**

FIGURE 2 – CHANGES IN TRANSPORTATION EMISSIONS BETWEEN 2018 AND 2020

The emission factor for electricity was updated in 2019 to incorporate electricity imported from other provinces/states, resulting in electricity emissions increasing by approximately 3.7 times. This update was applied to all years, including back to 2007, shown in Figure 3. We have taken this new emission factor and updated the 2018 electricity emissions to reflect this change. Despite the higher emission factor though, electricity remains a relatively minor contributor to GHG emissions, rising from 0.8% to 3.1% of all emissions.
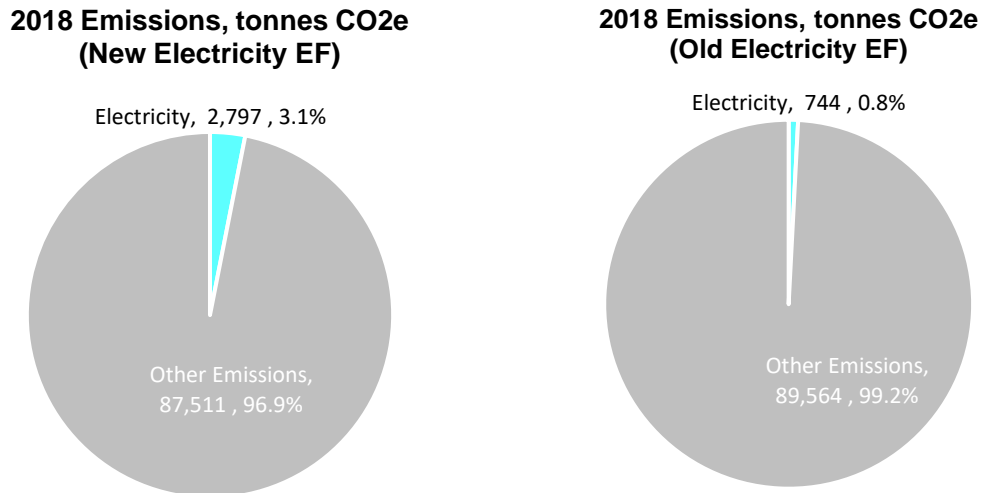
2018 Emissions, tonnes CO2e (New Electricity EF)

Electricity, 2,797 , 3.1%

Other Emissions, 87,511 , 96.9%

2018 Emissions, tonnes CO2e (Old Electricity EF)

Electricity, 744 , 0.8%

Other Emissions, 89,564 , 99.2%

FIGURE 3 - IMPLICATION OF NEW ELECTRICITY EMISSION FACTOR ON OVERALL COMMUNITY EMISSION PROFILE

Implications of 2020 Emissions on Emission Projections

Since 2020 was heavily influenced by the COVID pandemic, it is not recommended to use 2020 to base emission projections off of, but it does show the effect that legislation and behaviour chance can have on transportation and building emissions alike. It may be worthy though to update projections due to new proposed mandates from the CleanBC Roadmap to 2030 (e.g., all new heating equipment as of 2030 must have efficiency ≥ 1, new buildings to be zero carbon by 2030, accelerated zero-emission vehicle mandate) once legislation has passed.

Appendix – 2018 and 2020 Energy and Emissions Data

Cells of note where emission reductions were highest are shown in green, while the electricity emissions using the new emission factor are shown in blue (these are approximately 3.7 times higher than those shown in the 2018 inventory).

	Energy Usage (GJ)			Emissions (tCO2e)		
	2007	2018	2020	2007	2018	2020
Total	1,782,561	1,657,205	1,564,484	96,177	90,308	80,889
Stationary Energy	1,124,727	1,044,306	1,085,070	40,231	39,074	40,480
Residential Buildings	609,642	542,531	569,586	20,639	19,273	20,748
Electricity	282,544	251,073	258,816	2,802	2,797	2,883
Natural Gas	133,315	78,594	87,824	6,648	3,919	4,380
Fuel Oil	116,338	141,755	159,889	7,955	9,693	10,933
Propane	20,190	19,058	16,460	1,231	1,165	1,007
Wood	44,358	42,338	36,952	1,042	994	868
Diesel	12,897	9,713	9,645	961	705	677
Commercial & Industrial Buildings	515,085	501,775	515,484	19,548	19,735	19,680
Electricity	167,991	148,757	172,756	1,666	1,657	1,924
Natural Gas	323,843	332,138	321,319	16,149	16,563	16,023
Diesel	23,251	20,880	21,409	1,733	1,515	1,733
Natural Gas Fugitive Emissions	-	-	-	44	67	52
On-Road Transportation	578,476	555,342	425,159	39,314	35,599	26,764
Electric Vehicles	-	532	1,968	-	6	22
Passenger Vehicles	263,197	229,014	139,858	17,819	14,702	8,771
Light Trucks, Vans, SUVs	215,762	278,401	225,218	14,805	17,808	14,325
Heavy Duty Vehicles	97,205	45,334	55,964	6,551	2,941	3,507
Motorcycles	2,312	2,061	2,151	139	142	139
Off-Road Transportation	79,358	57,558	54,255	5,933	5,127	3,882
Marine, Aviation, Other Off-Road	79,358	57,558	54,255	5,933	5,127	3,882
Waste	-	-	-	6,880	4,507	3,804
Wastewater				1,388	1,470	1,037
Composting				-	95	95
Solid Waste				5,493	2,942	2,672
IPPU	-	-	-	3,819	6,001	5,959
Process Use Emissions				3,819	6,001	5,959