Port Moody | Coquitlam | Port Coquitlam

Zero Emission Mobility Plan

Final | October 2023

wsp

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EXECUTIVE SUMMARY

In recognition of the Global Climate Emergency, the Tri-Cities (City of Port Moody, City of Coquitlam, and City of Port Coquitlam) acknowledge the imperative to reduce emissions and prepare for a changing climate through an action-oriented plan that itemizes far reaching yet practical steps the communities should take, especially in the near term. The Tri-Cities have identified their own emissions reductions targets through various plans, which are as follows:

- **City of Port Moody:** Port Moody has committed to a 40% reduction of GHG emissions by 2030 from 2007 levels and carbon neutrality by 2050. Port Moody's Climate Action Plan follows an integrated climate action framework that considers both climate mitigation and adaptation[1].
- **City of Coquitlam:** The City of Coquitlam has committed to reducing corporate and community GHG emissions by 45% from 2007 levels by 2030 and achieving carbon neutrality by 2050[2].
- **City of Port Coquitlam:** The City of Port Coquitlam is in the process of developing a new Climate Action Plan with a commitment to reducing emissions by 50% below 2007 levels by 2035, and to achieve net zero emissions for community emissions by 2050 and corporate emissions by 2040.

Considering the transportation sector currently accounts for 40% of Metro Vancouver's total emissions, of which 75% is from light duty vehicles[3], a transition to low-carbon mobility is essential to reach Provincial and Regional targets of carbon neutrality by 2050. A strong coordinated approach must be taken by all levels of government to reach this urgent goal.

This plan sets clear goals and an action roadmap for accelerating zero emissions mobility (ZEM) within the Tri-Cities to reach its climate targets. Zero-emissions mobility is all mobility that produces zero greenhouse gas emissions. This includes walking, cycling, electric micromobility and electric vehicles. Actions arising from the Zero Emissions Mobility Plan are targeted towards encouraging the uptake of light-duty electric vehicles and e-micromobility devices.

Planning Toward an Electric Mobility Future

A significant driver for the electric vehicle infrastructure needs identified within this study is the Federal Zero Emissions Vehicle Sales mandate, which sets to reshape the automotive industry toward a zero-emissions future from 2035 onward. This mandate presents both challenges and opportunities that will require the Tri-Cities towork together and collaborate with other levels of government, private industry, institutions, and other non-profit organizations. The actions within this plan are designed to prepare the Tri-Cities for this new future and support zero-emissions vehicle growth.

EV Uptake in Tri Cities

This study modeled three EV adoption scenarios to reflect low, medium, and high EV adoption based on established trends and the incorporation of federal, provincial, and regional sustainable mobility targets. As noted in **Tables ES-1** and **ES-2**, by 2030, the low, medium, and high adoption scenarios project between 22,500 and 57,500 light duty electric vehicles registered in the Tri-Cities, with EVs representing between 16 and 40% of the total light duty vehicle fleet. By 2050, the low, medium, and high adoption scenarios project

113,800, 170,700, and 173,100 light duty EVs, respectively, representing between 65 and 100% of the total light duty fleet.

Table ES-1: 2030 EV Total Light Duty Vehicle Fleet Projections by Municipality

	Low Adoption (BAU)	Medium Adoption[3]	High Adoption
Port Moody	3,400	3,400	8,600
Coquitlam	14,000	14,000	36,000
Port Coquitlam	5,000	5,000	13,000
Tri-Cities	22,500	22,500	57,500

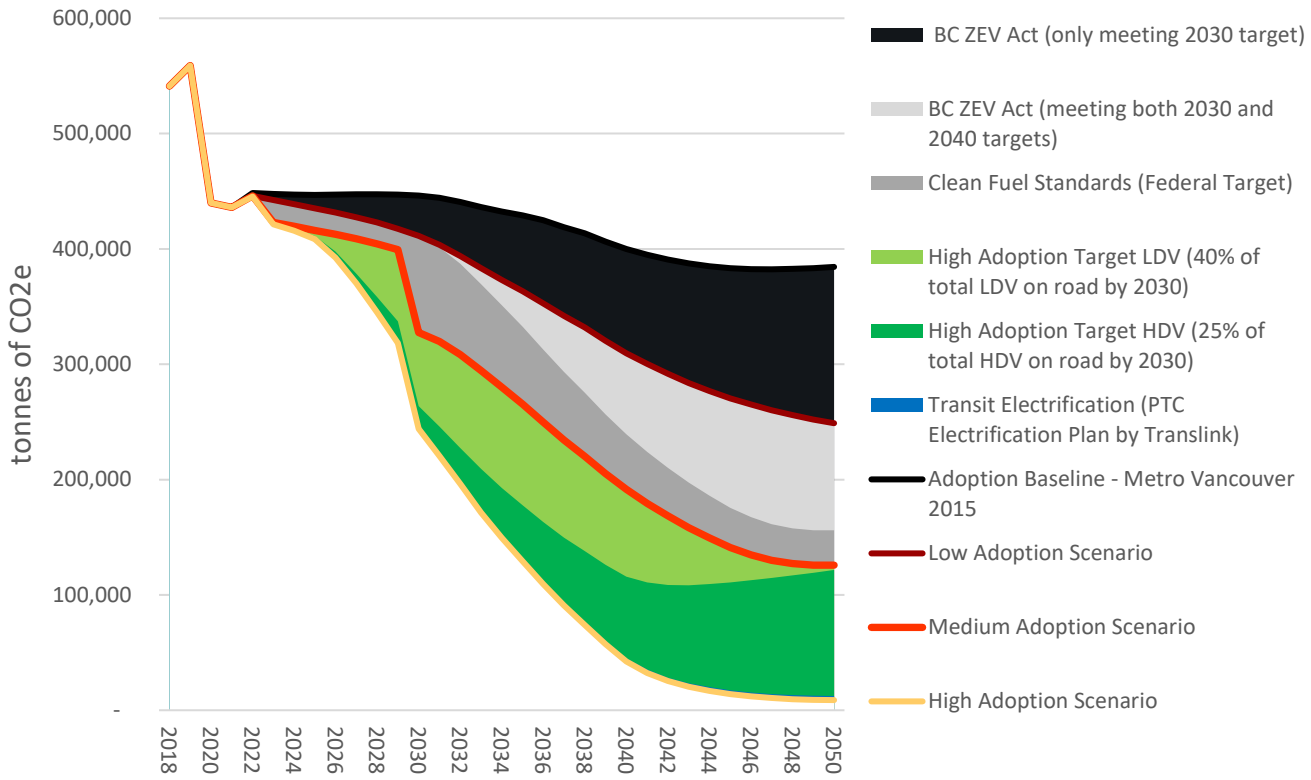
Table ES-2: 2050 EV Total Light Duty Vehicle Fleet Projections by Municipality

	Low Adoption (BAU)	Medium Adoption	High Adoption
Port Moody	16,500	25,400	25,800
Coquitlam	71,300	106,900	108,400
Port Coquitlam	26,000	38,400	38,900
Tri-Cities	113,800	170,700	173,100

A low adoption scenario, which assumes partial implementation of the BC ZEV act, reduces overall emissions by 35% as compared to the Metro Vancouver baseline. A medium adoption scenario represents a further 32% reduction in overall emissions, while a high adoption scenario further reduces emissions by 30%, compared to Metro Vancouver baselines.

[3] Both low- and medium-adoption scenarios assume achievement of the 30% new light-duty vehicle sales target as stipulated in BC's ZEV Act, resulting in equivalent LDV fleet projections in 2030; beyond 2030, the low and medium adoption scenarios diverge, with the medium adoption scenario assuming 100% new light-duty vehicle sales by 2040.

Figure ES-1: Tri-Cities Transportation Sector GHG Emissions to 2050



EV Infrastructure Analysis

The analysis identifies a shortage of charging infrastructure, particularly in public areas, and stresses the importance of expanding charging access to support wider ZEV adoption. A significant charger infrastructure gap exists between what is available today and what will be required in the near future. In all, between 850 and 2,220 Level 2 public chargers and 75 and 200 public DC fast chargers are projected to be required in the Tri-Cities by 2030 to support anticipated adoption rates. The Plan recommends various actions to bridge this gap, including setting charging goals, collaborating with regional entities, seeking funding partnerships, and prioritizing charger placement in dense areas and mobility hubs.

Additionally, to facilitate widescale transition to EVs it is crucial to equip both homes and workplaces, where the majority of charging takes place, with necessary infrastructure. This involves supporting the retrofitting of multi-unit residential building (MURBs) and mandating that new buildings be prepared for EV charging. Ensuring equitable access to charging especially in multi-unit residential buildings, is an important focus. The Plan recommends legislative changes, retrofit support, and updated bylaws to ensure equitable charging opportunities for all residents. Leveraging low carbon fuels credits (LCFC) is proposed as an opportunity to support charging infrastructure expansion, while partnerships between municipalities and private businesses are deemed essential for widespread Electric Vehicle Supply Equipment (EVSE) development.

Goals, Objectives, Actions

The Plan sets forth seven overarching goals, driving 45 prioritized actions to enhance sustainability, reduce emissions, and promote infrastructure growth. Goals, objectives, and actions are presented in **Table ES-3.**

Table ES-3: Tri-Cities Zero Emissions Mobility Roadmap

Actions		Action Type	Responsibility	Relative Cost ($ to $$$)
GOAL A: Expand Public EV Charging				
Objectives: 1. Significantly expand public charging infrastructure to 864 Level 2 and 75 DC Fast chargers by 2030 support a medium adoption scenario where approximately 23,000 EVs are registered in the Tri-Cities by 2030, representing approximately 16% of the total light duty vehicle fleet. 2. Distribute public charging infrastructure in line with population density, housing type as well as key locations and trip generators; with consideration given to equity of access.				
A-1	Coordinate and facilitate the expansion of the public charger network to 864 Level 2 and 75 DC Fast Charger public charger ports across the Tri-Cities by 2030.	Investment	Municipality, Business Owners, Utilities, TransLink, EVSE companies	$$$
A-2	Expand the publicly accessible charging network in higher density and mixed-use locations such as designated urban centres, mobility hubs and frequent transit development areas as well as locations with greater proportions of multi-unit residential buildings (MURBs). Strong consideration should be given to on-street charger placement.	Policy	Municipality, TransLink	-*
A-3	Work with private and public agency property owners at destinations such as workplaces, office parks, malls, parkades, and park and ride lots to enhance destination-based charging opportunities.	Partnerships	Business owners, Utilities, EVSE Companies, Municipality, TransLink	-*

Actions		Action Type	Responsibility	Relative Cost ($ to $$$)
A-4	Develop charging hubs with multiple charging stations and types to ensure charger availability.	Policy	Municipality or Private Sector	-*
A-5	Ensure a fair and inclusive distribution of charging infrastructure across the community through an equity lens.	Policy	Municipality	-*
A-6	Continue to engage with Metro Vancouver and TransLink to support regional charging coverage in alignment with the results of the Regional EV Infrastructure Study.	Partnerships	Municipality, Metro Vancouver, TransLink	-*
A-7	Formalize responsibility for the public EV charger network (management of costs, management of data, and assessment of options for operations and maintenance).	Policy	Municipality	-
A-8	Embed public EV charging considerations in all new developments and planning processes; consider eligible developer contributions for funding new public charger infrastructure generated by new developments.	Policy	Municipality	+
A-9	Consider imposing business license fees or discounts to require EV charging at select business types (i.e. license fees to encourage or mandate the installation of EV chargers at gas stations).	Policy	Municipality	-
A-10	Develop design standards for all publicly accessible charging stations, including on-street charging, adhering to universal design best practices and ensuring stations are accessible to all users. Ensure that public chargers in municipal lots are clearly marked with attractive and informative signage through the development of EV signage standards.	Study	Municipality, Utilities	$

Actions		Action Type	Responsibility	Relative Cost ($ to $$$)
A-11	Where possible, use EV energy management systems (EVEMS) to reduce costs for municipal infrastructure and in policy development	Policy	Municipality, Utilities	-
GOAL B: Expand Home and Workplace Charging				
Objectives: 1. Improve access to EV charging at home and at work. 2. Ensure new residential builds are 100% EV Ready.[4]				
B-1	Encourage MURB owners, management companies, or condo boards to assess the feasibility of upgrading electrical infrastructure to support EV charging in their complexes through educational support or by directing City web traffic to BC Hydro resources and incentives.	Outreach/ Advocacy	Municipality, Utilities	$
B-2	Promote existing federal and provincial incentives for EV charging retrofits in existing single-detached homes and multi-unit residential buildings and consider providing short-term municipal 'top-ups' to augment federal and provincial funding.	Investment & Outreach/ Advocacy	Municipality	$$
B-3	Amend by-laws to require EV-ready parking stalls in all new residential, commercial and institutional construction (i.e. through zoning and parking	Policy	Municipality	-

[4] *EV Ready* refers to parking spaces that feature a complete electrical circuit terminating in an electrical outlet for the purpose of EV charging. Implementation of the Electric Vehicle Supply Equipment (EVSE) is not required.

Actions		Action Type	Responsibility	Relative Cost ($ to $$$)
	bylaws).			
B-4	Create a centralized webpage to educate residents and businesses on EV charging options, multifamily unit retrofits, and available financial incentives for home charging with links to broader Provincial and regional resources such as Emotive and Plug-In BC.	Education	Municipality	$
B-5	Continue to advocate to the Province for "Right to Charge" legislation to make installing EV charging in existing multi-unit buildings easier and more cost-effective.	Advocacy	Municipality, BC Hydro, Metro Vancouver, Province of BC	-
GOAL C: Accelerate Light-Duty EV Adoption				
Objective: 1. Support a target for 20% of light-duty vehicles registered in the Tri-Cities to be Zero Emission Vehicles by 2030.				
C-1	Develop standards and policies to facilitate 100% EV Car Share in the Tri-Cities.	Policy & Partnerships	Municipality	-
C-2	Continue to share knowledge and experience with federal and provincial EV working groups to guide policy direction.	Outreach/ Advocacy	Municipality, Metro Vancouver	-
C-3	Advocate that utilities, regional, provincial and federal governments maintain and expand supportive incentives and policies.	Outreach/ Advocacy	Municipality, Metro Vancouver	-

Actions		Action Type	Responsibility	Relative Cost ($ to $$$)
C-4	Advocate that higher levels of government work to reduce barriers to EV adoption, which could include advancing Provincial "right to charge" legislation alongside incentivization, and vehicle purchase rebates to reduce purchase cost disparity with ICE vehicles.	Outreach/ Advocacy	Municipality. Metro Vancouver	-
C-5	Advocate to higher levels of government to attract EV and EV battery manufacturing to strengthen and support the local EV industry as part of a broader economic development strategy.	Outreach/ Advocacy	Municipality, Metro Vancouver	-
GOAL D: Support and Promote the Transition to E-Micromobility				
Objective: 1. Build a vibrant e-micromobility ecosystem.				
D-1	Consider rebranding cycling facilities as 'micromobility facilities' to communicate to all road users the preferred travel location for this expanded user group within the road Right-of-Way. Expedite the completion of the Tri-Cities' All Ages and Abilities (AAA) micromobility network as laid out in the municipalities' respective Transportation Master Plans in recognition that the transition to e-mobility will generate an additional user-base for cycling facilities.	Investment	Municipality	$$$[#]
D-2	Identify and plan for infrastructure to ensure the safety and security of e-micromobility device users, cyclists, and others.	Study	Municipality	$

Actions		Action Type	Responsibility	Relative Cost ($ to $$$)
D-3	Increase awareness of e-bikes and other e-mobility devices through a comprehensive communications campaign.	Policy	Municipality, TransLink	-
D-4	Initiate an update of Zoning Bylaws and Off-Street Parking Regulations to enhance storage options for e-bikes and other micromobility devices in new multi-unit buildings to support their secure storage and charging.	Outreach/ Advocacy	Municipality	$
D-5	Explore the feasibility of micromobility hub creation alongside e-micromobility device public charging (outdoor outlets) at strategic locations, with the co-benefit and consideration of accessibility standards for mobility scooters.	Policy	Municipality, TransLink	-
D-6	Refine bylaws and/or permit programs to regulate businesses renting shared e-mobility devices, pending a review of Coquitlam's e-scooter share pilot program. Aim to expand permanent e-micromobility sharing to include all the Tri-Cities by 2026, through regional partnership and pending updates to the BC MVA.	Study	Municipalities, Metro Vancouver, TransLink	$
D-7	Advocate to the Provincial and Federal governments to expand the current BC e-bike rebate program to include other forms of e-micromobility beyond e-bikes.	Policy	Municipality	-
D-8	Incorporating lessons learned from e-micromobility pilot programs taking place across BC, including in Coquitlam, advocate to the Province for permanent updates to the BC MVA to allow for the continued operation of e-scooters and other e-micromobility devices on public roadways.	Partnerships	Municipality, Private Sector, TransLink	-

Actions		Action Type	Responsibility	Relative Cost ($ to $$$)
D-9	Advocate to TransLink to update their infrastructure design guidelines and policies to support e-micromobility devices.	Outreach/ Advocacy	Municipality	-
GOAL E: Lead by Example				
Objectives: 1. Achieve 100% zero emissions fleet vehicles by 2040 or sooner. 2. Guide investment decisions toward zero-emissions options. 3. Visibly demonstrate the Tri-Cities commitment to sustainable transportation.				
E-1	Develop a corporate carbon price policy to help guide investment decisions toward zero emission options.	Policy	Municipality	-
E-2	Prioritize the installation of chargers in municipal lots.	Policy	Municipality	-
E-3	Conduct charging infrastructure feasibility studies at all municipal facilities as an input to determining charger siting priorities. Consider oversizing electrical conduits to prepare for future expansion.	Study	Municipality	$
E-4	Complete a Municipal Zero-Emission Fleet and Infrastructure Plan.[40]	Policy	Municipality	$$$
E-5	Hire a dedicated, shared, Tri-Cities full-time staff member responsible for Zero Emission Mobility.	Investment	Municipality	$

Actions		Action Type	Responsibility	Relative Cost ($ to $$$)
GOAL F: Generate Revenue Generation from sale of Low Carbon Fuels Credits				
Objective: 1. Monetize the sale of Low Carbon Fuels from municipally-owned public EV chargers to charger costs and advance sustainable mobility projects.				
F-1	Review bylaws and transition to user-fees at all new municipally-owned public chargers based on kWh. Review bylaws for the transition to a kWh-based fee for all new chargers. Ensure that all new public-facing chargers have the ability to measure kWh directly from the charger.	Policy	Municipality	+
F-2	Conduct a business case for assessing estimated revenues from Low Carbon Fuels Credit (LCFC) compared to infrastructure cost over time. Capitalize on LCFCs as a revenue generating opportunity through municipal investment in public charging infrastructure.	Study	Municipality	$
F-3	Implement a climate reserve or alternative funding pool and enact a policy to dictate how LCFC funds will be reinvested in sustainable mobility projects.	Policy	Municipality	-
F-4	Explore alternative fee structures for existing time-based charging and consider retrofitting existing chargers that do not have the ability to charge based on kWh; at the same time, consolidate / remove paid parking at EV chargers (if applicable) to reduce redundancy in payment.	Policy	Municipality	-

Actions		Action Type	Responsibility	Relative Cost ($ to $$$)
GOAL G: Monitor and Evaluate Progress				
Objectives: **1**. Monitor adoption rates and charging infrastructure utilization across the Tri-Cities. 2. Monitor and evaluate grid integration and load management. 3. Evaluate cost savings and revenues. 4. Monitor and Evaluate equitable access.				
G-1	Develop a Tri-Cities data sharing agreement on charger utilization data and establish a central repository for EV-related data.	Investment/ In-kind	Municipality	-
G-2	Work with TransLink to ensure that the regional Trip Diary specifically includes and tracks Electric Vehicle and e-micromobility device uptake and usage patterns.	Partnerships	Municipality & TransLink	-
G-3	Monitor costs and revenues related to installing and maintaining public charging infrastructure.	Routine monitoring	Municipality	-
G-4	Examine public charger usage and utilization trends. Analyze charging station utilization data across different neighbourhoods to identify areas with lower access to charging and advance social equity.	Routine monitoring	Municipality	-
G-5	Monitor load management and grid integration.	Routine monitoring	Municipality, Utilities	-
G-6	Periodically review the Zero Emissions Mobility Plan and update as needed	Study	Municipality	$

*No incremental costs. Relates to the distribution of chargers accounted for in Action A-1.

#Costs already accounted for in other planning processes including municipal TMPs and ATMPs.

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GLOSSARY OF TERMS

Term/Acronym	*Description*
ZEM	Zero Emissions Mobility
ZEV	Zero Emission Vehicle
EV	Electric Vehicle
EVSE	Electric Vehicle Supply Equipment (e.g., “EV Chargers)
BEV	Battery Electric Vehicle
PHEV	Plug-in Hybrid Electric Vehicle
HEV	Hybrid Electric Vehicle
HDV	Heavy Duty Vehicle
LDV	Light Duty Vehicle
L2 Charger	Level 2 Charger (commonly provides AC power of 7.2 kW)
DCFC	Direct Current Fast Charger (also commonly referred to as Level 3 Charger – providing a power output of 50-350 kW)
EV Charging Port	Any charging connector that is able to charge an electric vehicle, regardless of plug type or standard.
EV Ready	EV Ready refers to parking spaces that feature a complete electrical circuit terminating in an electric outlet for the purpose of EV charging. Implementation of EVSE is not required.
EV Capable	Refers to situations where sufficient electrical capacity is available for EV charging, typically requiring space on electrical panels for EV loads, calculated as a function of the number of parking spaces.
ICE	Internal Combustion Engine

GHG	Greenhouse Gas Emissions
IPCC	International Panel on Climate Change (an international body of the United Nations dedicated to advance scientific knowledge about climate change caused by human activities)
LCFC	Low carbon fuels credits
LCFS	Low carbon fuels standard; was introduced in British Columbia to reduce the carbon intensity of fuels used in the Province.
MURBs	Multifamily building: sometimes referred to as multi-unit residential building (e.g., apartment or strata buildings)
Public Charging Station	Publicly available charging infrastructure where electric vehicle owners can recharge their vehicle's battery.

1 Introduction

In the dynamic landscape of Metro Vancouver, urgent action is imperative to confront the escalating challenge of global warming. The Intergovernmental Panel on Climate Change (IPCC) unequivocally stresses the critical need to limit global temperature rise to 1.5 degrees Celsius above pre-industrial levels, averting severe impacts such as extreme weather, rising sea levels, and diminishing Arctic Sea ice. Capping global warming at 1.5°C can avoid the worst consequences, offering clear benefits to people, natural ecosystems, and fostering a more sustainable and equitable society. Achieving this ambitious target requires a 45% reduction in human-caused greenhouse gas (GHG) emissions from 2010 levels by 2030, ultimately reaching net zero by 2050.

Among various sectors, on-road transportation stands out as a significant contributor to greenhouse gas emissions, urging municipalities to prioritize the adoption of a robust zero-emissions mobility strategy. As the City of Coquitlam, City of Port Coquitlam, and City of Port Moody - collectively referred to as the Tri-Cities - play their part in reducing regional emissions, it becomes essential to address the pressing issue of on-road transportation emissions and pave the way towards a zero-emissions future. By embracing a zero-emissions mobility strategy, the Tri-Cities can demonstrate leadership in combating climate change on the local level.

The transition towards zero-emissions mobility presents a unique opportunity for the Tri-Cities to significantly reduce their carbon footprint. By promoting electric vehicles and electric micro-mobility as well as their infrastructure, the Tri-Cities can curb on-road emissions and set a precedent for sustainable transportation solutions in the region. As the Tri-Cities commit to zero-emissions mobility, they not only contribute to the broader global effort but also actively work to secure a more sustainable and resilient future for their residents.

Drawing inspiration from successful case studies both within British Columbia and globally, this report will present practical insights and best practices to guide the Tri-Cities' efforts. By building upon the experiences of progressive municipalities, the Tri-Cities can tailor their zero-emissions mobility plan to address specific challenges and capitalize on unique opportunities.

The Tri-Cities stand at a pivotal juncture in their journey towards sustainability and climate resilience. By embracing a zero-emissions mobility plan, the municipalities can lead the charge in reducing on-road transportation emissions, thereby playing an instrumental role in the global climate emergency. This commitment to sustainability will not only inspire other municipalities in Metro Vancouver but also set a progressive example for the region and beyond.

How This Plan Will Be Used

In its pursuit of a sustainable transportation paradigm, the Tri-Cities have embarked on the development of a comprehensive zero-emissions mobility plan, a pivotal component of its broader sustainable transportation agenda. This strategic initiative seamlessly integrates into existing transportation plans within the municipalities, aligning with overarching sustainability. By supporting electric vehicle infrastructure, promoting the use of electric vehicles, and facilitating micromobility, the Zero-Emissions Mobility Plan not only contributes substantially to climate goals but also stimulates innovation and attracts private investments in renewable energy infrastructure.

The Zero-Emissions Mobility Plan encompasses targeted policies, investments in sustainable infrastructure, and impactful public awareness campaigns. This multifaceted approach involves the enactment of regulations promoting electric vehicles, incentivizing businesses and residents to adopt zero-emissions transport, and the development of a robust charging infrastructure network. To maximize the strategy's impact, developing dynamic public-private partnerships and involving the community through consultations are essential. Clear, measurable milestones, alongside vigilant monitoring and adaptive policy measures, will help achieve effectiveness.

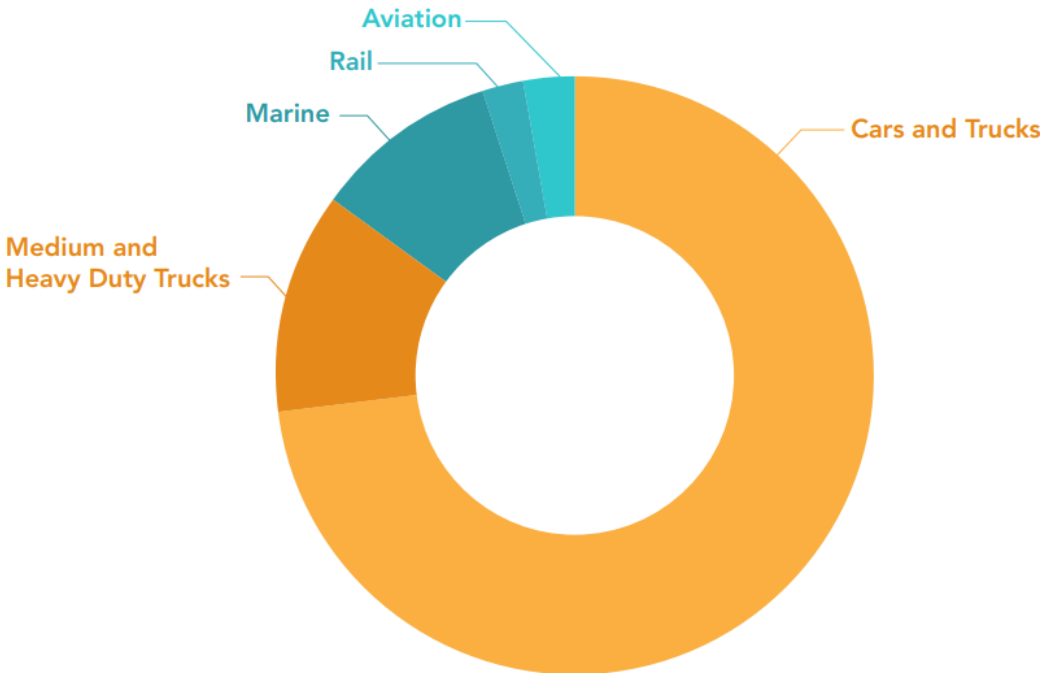
This zero-emissions mobility plan is not intended to collect dust on the shelf; it is an action-packed roadmap for the Tri-Cities, which includes clear and measurable actions, both individually and collaboratively, for the Tri-Cities to achieve, steering the sub-region towards a zero emissions future.

2 Current State of Mobility

2.1 Municipal, Regional, Provincial Context

The transportation sector is the leading contributor of community greenhouse gas emissions (GHGs) in British Columbia[vii]. In Metro Vancouver, the 1.5 million passenger cars and trucks registered in the region make up almost 75% of transportation emissions, with medium and heavy-duty trucks being the second highest contributors, as shown in **Figure 2-1**.

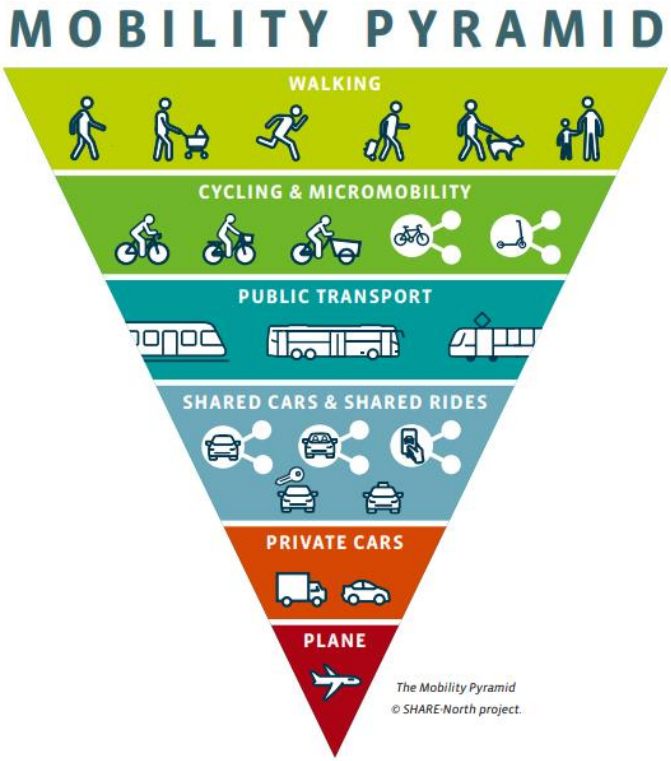
Figure 2-1: Breakdown of Metro Vancouver Transportation GHG Emissions



Source: Metro Vancouver Transportation Roadmap

Through the *CleanBC Plan*, the Province is taking action to meet its climate goals and prepare for the impacts of climate change, however their plan requires collaboration at all levels of government to reach a net zero-emission future. Municipal governments have been tackling on-road vehicle emissions through transportation plans that encourage the reduction of vehicle kilometers travelled and mode shifts which prioritize active, shared, and public transportation over personal vehicles. These initiatives help to reprioritize modes to generally reflect a Clean Transportation Hierarchy (**Figure 2-2**).

Figure 2-2: Clean Transportation Hierarchy/ Mobility Pyramid



Most preferred methods are at the top and least preferred are at the bottom.
Source: SHARE-North Academy

Accelerating the transition to zero emission vehicle (ZEV) adoption is also a key element of the broader sustainable transportation framework that improves mobility and reduces on-road emissions. Municipal governments are well positioned to impact local ZEV adoption through policies, programs, and infrastructure provision.

In recognition of the Global Climate Emergency, the Tri-Cities (City of Port Moody, City of Coquitlam, and City of Port Coquitlam) acknowledge the imperative to reduce emissions and prepare for a changing climate through an action-oriented plan that itemizes far reaching yet practical steps the communities should take, especially in the near term. The Tri-Cities have identified their own emissions reductions targets through various plans, which are as follows:

- **City of Port Moody:** Port Moody has committed to a 40% reduction of GHG emissions by 2030 from 2007 levels and carbon neutrality by 2050. Port Moody's Climate Action Plan follows an integrated climate action framework that considers both climate mitigation and adaptation[viii].
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Considering the transportation sector currently accounts for 40% of Metro Vancouver's total emissions, of which 75% is from light duty vehicles[x], a transition to low-carbon mobility is essential to reach Provincial and Regional targets of carbon neutrality by 2050. A strong coordinated approach must be taken by all levels of government to reach this urgent goal.

2.2 Tri-Cities Travel Snapshot

2.2.1 2017 REGIONAL TRIP DIARY

TransLink's 2017 Trip Diary provides a travel snapshot of Metro Vancouver prior to the Covid-19 pandemic, including the Tri-Cities subregion. Trip generation, mode share, travel patterns, average trip length, and total vehicle kilometres travelled are reviewed for Port Moody, Coquitlam, and Port Coquitlam as well as the Tri-Cities as a whole. Comparisons to Metro Vancouver averages are provided for contextualization.

2.2.2 TRIP GENERATION

In 2017, approximately 745,800 trips were made each weekday in the Tri-Cities, or approximately 3.2 trips per person, which is similar to the Metro Vancouver average.[xi]

Table 2-1 displays a detailed breakdown of trip generation across the Tri-Cities. As displayed, trip rates are highest in the 8-9 am and 3-4pm hours, with trips to work and school, as well as escorting trips dominating in the AM peak, and shopping and social trips dominant in the midday period. Port Moody generates a greater number of trips per capita than both Port Coquitlam and Coquitlam.

Table 2-1: 2017 Weekday Trip Generation in the Tri-Cities

	Port Moody	Coquitlam	Port Coquitlam	Tri-Cities (combined)	Metro Vancouver
Total Weekday Trips	120,100	438,700	187,000	745,800	7,848,000
Weekday Trip Rate (trips per capita)	3.6	3.2	3.2	3.2	3.2

Source: 2017 TransLink Trip Diary

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Source: 2017 TransLink Trip Diary

2.3.3 MODE SHARE

In 2017, 18% of trips in the Tri-Cities were completed by sustainable transportation modes including walking, cycling, and public transit, which is significantly lower than the Metro Vancouver average of 27%. **Table 2-2** displays a detailed breakdown of trips by mode and mode share across the Tri-Cities. A total of 456,000 vehicle trips are made in the Tri-Cities each weekday, corresponding to 10% of Metro Vancouver's total auto trip share. Travel by auto modes (driver and passenger) accounts for 82% of person trips in the Tri-Cities as a whole, representing 599,000 total trips each weekday. Active transportation and transit mode shares were marginally higher in Coquitlam than Port Moody and Port Coquitlam.

Table 2-3: 2017 Weekday Trips (Mode Share) by Travel Mode

Travel Mode	Weekday Trips (x 1000 trips)				
	Port Moody	Coquitlam	Port Coquitlam	Tri-Cities (Combined)	Metro Vancouver
Auto Driver	78 (65%)	258 (60%)	120 (66%)	456 (62%)	4,379 (56%)
Auto Passenger	22 (18%)	85 (20%)	36 (20%)	143 (19%)	1,315 (17%)
Transit	10 (8%)	42 (10%)	11 (6%)	63 (9%)	923 (12%)
Walk	10 (8%)	46 (11%)	15 (8%)	71 (10%)	1,103 (14%)
Bike	- (0%)	1 (0%)	- (0%)	1 (0%)	128 (2%)
TOTAL	120 (100%)	432 (100%)	182 (100%)	734 (100%)	7,848 (100%)

2.3.4 TRAVEL PATTERNS AND AVERAGE TRIP LENGTHS

Approximately 69% of trips originating in the Tri-Cities remain in the Tri-Cities. Burnaby, Vancouver, and Surrey account for the following 9%, 5%, and 3% of trips, respectively, with the remaining 13% travelling to other locations in the region.

In 2017, average weekday trip lengths across all modes were noted at 10.0km, which is 1.2km longer than the 8.8km Metro Vancouver average. As displayed in **Table 2-3**, trip lengths vary by mode and location (with Port Coquitlam recording longer trips). While auto trips averaged in the 8 – 11 km range, average transit trip lengths were 20.1km, reflecting the comparatively greater use of transit (SkyTrain and West Coast Express) modes for travel outside of the subregion. Average walking and bike trip lengths were noted at 0.8km and 4.4km, respectively.

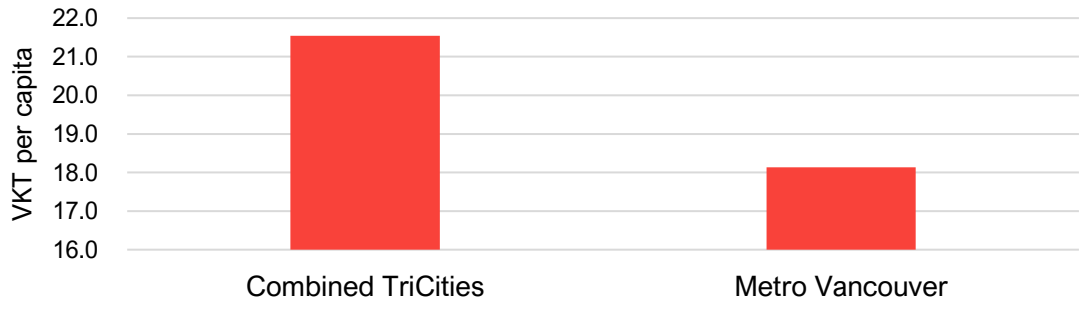
Table 2-4: 2017 Average Trip Length by Mode (km)

	Port Moody	Coquitlam	Port Coquitlam	Tri-Cities (Combined)	Metro Vancouver
Auto Driver	10.5	10.9	11.2	10.9	10.2
Auto Passenger	7.5	8.3	10.0	8.6	7.9
Transit	20.1	19.3	22.9	20.1	13.4
Walk	0.9	0.9	0.9	0.9	0.8
Bike	-	5.8	-	4.4	4.4
TOTAL	9.6	9.9	10.6	10.0	8.8

2.3.5 VEHICLE KM TRAVELLED

In 2017, approximately 4,986,600 vehicle KM were travelled each weekday on the Tri-Cities' roadway network, about 21.5 vehicle-km per capita. As displayed in **Figure 2-3**, vehicle usage is higher in the Tri-Cities as compared to the Metro Vancouver average, which is generally reflective of both higher Tri-Cities overall auto mode shares and longer auto trips, relative to regional averages.

Figure 2-3: 2017 Average Weekday Vehicle-KM Travelled in the Tri-Cities and Metro Vancouver



2.3.6 2022 CITY OF COQUITLAM TRAVEL DIARY

The Covid-19 pandemic and associated restrictions have permanently changed long-established travel patterns and behaviours. Approximately 25% of Canadians now work from home full time, up from 4% prior to the pandemic.[xiii] Moreover, the last three years have seen a 90% growth in eCommerce, now valued nationwide at $3.6B per month.

The City of Coquitlam completed a travel diary in 2022 to update local understanding of travel behaviour following the Covid-19 pandemic. In line with national findings, the survey found that 18% of the workforce now work ***exclusively*** from home.[xiv] This figure does not include those working in a hybrid work-home arrangement, which is increasingly common.

Critical results from the Coquitlam's 2022 travel diary are displayed in **Table 2-4**. The 2022 trip diary revealed a 12% reduction in total trips compared with 2017 levels, despite a 6% increase in population over that period. Altogether, daily per capita trip rates reduced from 3.2 in 2017 to 2.3 in 2022, a reduction of 27%. Overall reductions in the 20-25% range were noted for each mode, except for cycling, which grew by 240%.

In line with reductions in overall vehicle trips, weekday vehicle-KM travelled decreased from 2.83M in 2017 to 2.11M in 2022, a reduction of over 700,000 vehicle-KM, or 25%. Per capita VKT decreased from 20.3 in 2017 to 14.3 in 2022, a reduction of 29%. This change in travel behaviour has had enormous environmental benefits. Changes in the baseline between 2017 and 2022 have resulted in estimated reductions of approximately 110,000 T of CO2e annually.

No appreciable changes were noted in the City's overall mode share.

Table 2-5: Coquitlam 2017 and 2022 Weekday Travel Profiles

	2017	2022	Change	
			Value	%
TRIP RATE PER PERSON				
Population	139,284	147,176	7,892	6%
Daily Trip Rate	3.2	2.3	- 0.9	- 27%
TRIP TOTALS				
Auto Driver	258,000	196,340	- 61,660	- 24%
Auto Passenger	85,000	65,779	- 19,221	- 23%
Walk	42,000	32,894	- 9,106	- 22%
Transit	46,000	36,791	- 9,209	- 20%
Bike	1,000	3,415	2,415	242%
Other	-	3,093	3,093	-
TOTAL	383,400	338,312	- 45,088	- 12%
MODE SHARE				
Auto Driver	60%	58%	-2%	-
Auto Passenger	20%	19%	0%	-
Walk	10%	10%	0%	-
Transit	11%	11%	0%	-
Bike	0%	1%	1%	-
Other	0%	1%	1%	-
TOTAL	100%	100%	0%	-
TRAVEL BY SUSTAINABLE MODES				

	2017	2022	Change	
Auto Trips	343,000	262,119	- 80,881	- 24%
Auto Mode Share	79%	77%	-2%	-
Sustainable Mode Trips	89,000	76,193	- 12,807	- 14%
Sustainable Mode Share	21%	23%	2%	-
AVERAGE TRIP LENGTH BY MODE (KM)				
Auto Driver	10.9	10.9	-	0%
Auto Passenger	8.3	7.7	- 0.6	- 7%
Walk	0.9	1.0	0.1	11%
Transit	19.3	17.6	- 1.7	- 9%
Bike	5.8	3.7	- 2.1	- 36%
TOTAL	9.9	9.9	- 0.0	0%
DAILY VKT				
Total	2,827,700	2,111,925	- 715,775	- 25%
Per Capita	20.3	14.3	- 6.0	- 29%

2.3.7 VEHICLE OWNERSHIP AND MAKE-UP

According to ICBC statistics, 129,024 vehicles were registered in the Tri-Cities 2021, or approximately 1.4 vehicles per household, which is slightly higher than the Provincial average of 1.3 vehicles per household.

2021 vehicle population by propulsion type is displayed in **Table 2-5**.

Table 2-6: 2021 Vehicle Population by Propulsion Type

	Port Moody	Coquitlam	Port Coquitlam	Tri-Cities (Combined)	British Columbia
2021 Households	13,110	55,945	22,885	91,940	2,041,835
Internal Combustion Engine Vehicles	16,927	70,453	32,266	119,646	2,520,943
Hybrid Vehicles	796	3,233	1,280	5,309	93,211
Electric Vehicles	696	2,395	978	4,069	58,973
Total Vehicles	18,419	76,081	34,524	129,024	2,673,127
Vehicles Per Household	1.4	1.4	1.5	1.4	1.3

Vehicle Source: ICBC Vehicle Population Dashboard (2021 passenger vehicles)
Household Source: Census 2021

2.4 Electric Vehicles in the Tri-Cities

Approximately 80 to 85% of trips in the Tri-Cities are taken in a personal automobile, with only 15-20% currently being accommodated by sustainable modes. While mode shifts away from personal vehicles to sustainable transportation modes will aid in the reduction of GHGs, these shifts will be eclipsed by gains derived from the gradual conversion of the personal vehicle fleet from a predominantly non-sustainable internal combustion engine (ICE) propelled fleet to a predominantly sustainable zero emission, mainly electric, fleet.

2.4.1 FEDERAL AND PROVINCIAL EV CONTEXT

Electric vehicles are a clean alternative to internal combustion engine (ICE) vehicles, especially in British Columbia where approximately 90% of the electricity comes from hydroelectric power[xv]. For this reason, electric vehicles can have a significant impact in reducing on-road transportation emissions and are becoming a key tool for municipalities to meet their climate goals.

British Columbia is leading the way in electric vehicle adoption, with the highest uptake rates of ZEVs in North American in 2020[xvi]. In 2020, there were 15,450 new ZEVs registered in BC, representing 9.4% of all new light-duty vehicle registrations in the province. From 2020 to 2021 alone, battery electric vehicle (BEVs) sales have grown by 51% and Plug-in Hybrid electric vehicle (PHEVs) sales have grown by 73%[xvii], now representing 15.5% of all new light duty vehicles sold in British Columbia[xviii].

Overall within Canada, approximately 1 in 12 new vehicles registered are a zero-emission vehicle (ZEV), according to an IHG Markit report in 2022 Q2. This is up 1.5% from the fourth quarter of 2021, which is a sizable increase in EV adoption, despite semiconductor shortages and overall vehicle registration decline.

2.4.2 EV ADOPTION IN THE TRI-CITIES

Adoption of EVs in the Tri-Cities is in line with Provincial trends. According to ICBC vehicle statistics, EV sales as a proportion of total passenger vehicle sales have grown steadily from 2019 to 2021, with 2021 proportions in the 13-14% range for each of the Tri-Cities, as displayed in **Table 2-6**. This has resulted in EVs steadily representing a greater proportion of the passenger vehicle fleet. In 2021, EVs made-up between 2.7% and 3.5% of the total passenger fleet for each of the Tri-Cities.

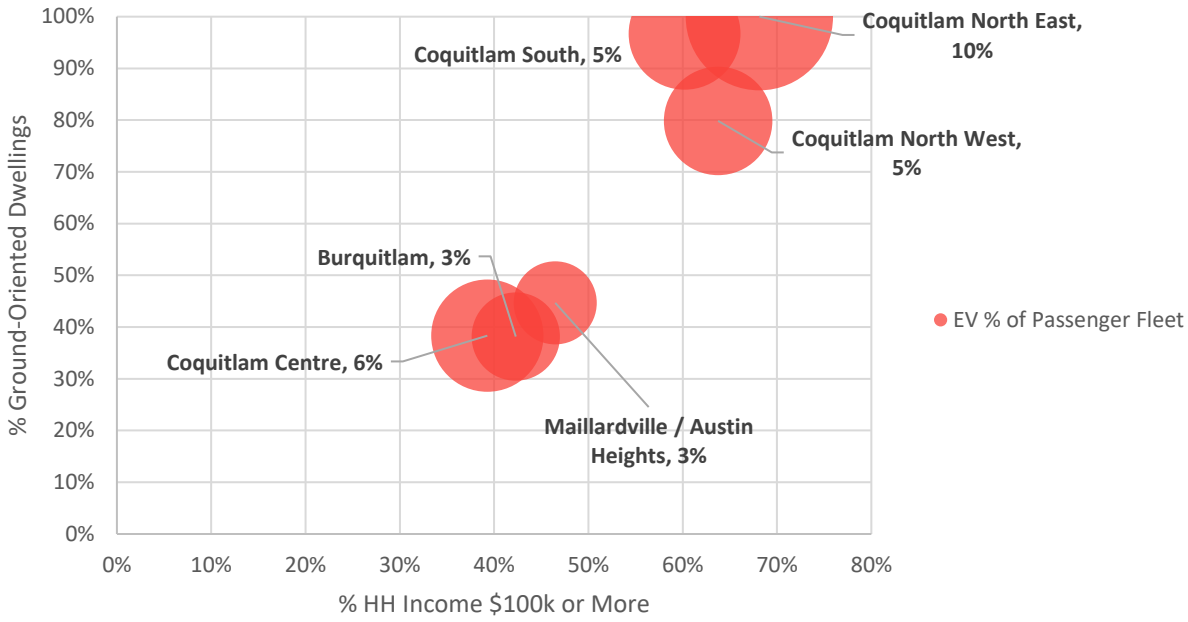
Table 2-7: Historic Tri-Cities EV % of New Vehicle Shares (% of Total Vehicles on the Road)

	2019	2020	2021
Port Moody	9.0% (1.9%)	8.4% (2.4%)	13.7% (3.5%)
Coquitlam	9.0% (1.6%)	10.3% (2.2%)	13.1% (3.0%)
Port Coquitlam	10.5% (1.5%)	11.1% (2.0%)	12.7% (2.7%)
Tri-Cities Average	9.4% (1.6%)	10.2% (2.2%)	13.1% (3.0%)

Source: ICBC

Coquitlam's 2022 travel survey estimates that EVs currently comprise 5.3% of the total passenger fleet. EV adoption rates vary by neighbourhood and may be influenced by income and household type. As displayed in **Figure 2-5**, EV fleet share was found to be highest in Coquitlam North East, where 100% of households are ground-oriented dwellings and over 68% of households earn $100,000 per year or more. Lowest EV fleet shares were noted in Burquitlam and Maillardville / Austin Heights, where 38 and 45% of dwelling units are ground-oriented and 42 and 46% of households earn over $100,000 per year, respectively.

Figure 2-4: EV Fleet Share by Neighbourhood



Scenario modeling conducted for this exercise projects EV sales as a proportion of total new light duty vehicle shares to rise to between 30 to 100% of total vehicle sales by 2030, resulting in EVs making up between 16 and 40% of total vehicles on the road at that time. Projections are discussed in detail in **Section 9.**

3 Electric Mobility

3.1 EV Charging Infrastructure

Plug-in electric vehicles are recharged by plugging into the electricity grid. Charging can generally be accommodated at three different charging levels, as shown in **Figure 3-1** and described in **Table 3-1**.

Figure 3-1: Level 1, 2 and 3 Charging Types

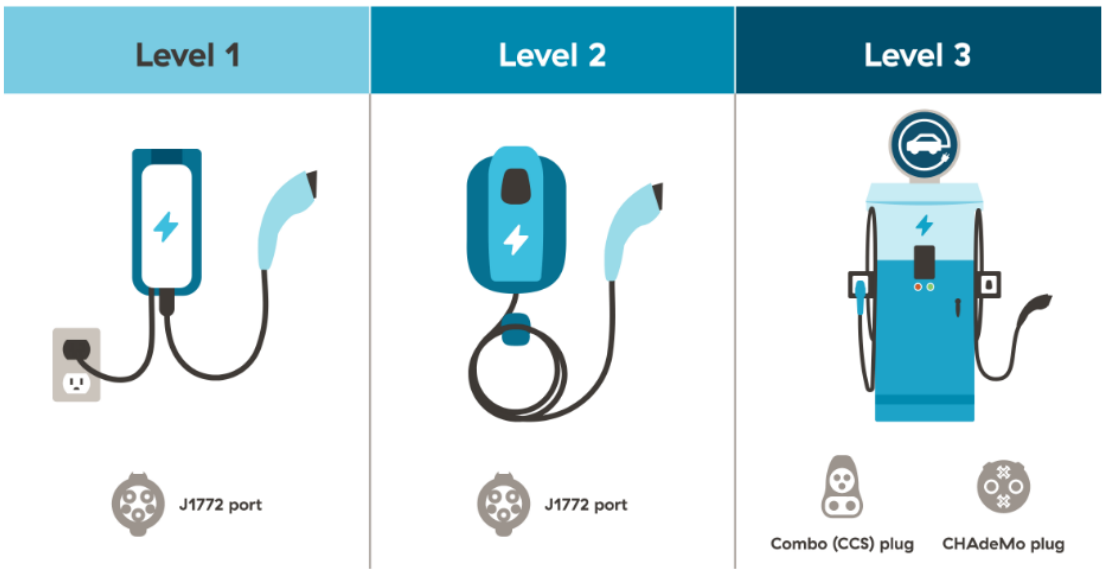


Image taken from BC Hydro[xix]

Table 3-1: Charging Type Outputs, Installation Costs, Typical Use, and Charging Time

	Level 1 (AC)	Level 2 (AC)	Level 3 (DCFC)
Output	120V wall outlet, 1 kW	240V dryer outlet, 3-19 kW	480+V, 50-350 kW
EVSE and Installation Cost	$500 - $1500	$2,500 - $10,000	$50,000 - $200,000
Typical Use	Level 1 charging uses 120-volt (V) alternating current (AC), delivered by a standard three-prong household plug. New 120 V outlets are rarely installed for EV charging, but existing outlets can provide easy access to charging where Level 2 is not available. Level 1 charging is the slowest of all charging levels, and can take up to 16 hours to charge a vehicle with 380km range.	Level 2 charging uses the same voltage as a dryer or oven, and can provide between 30 to 50 km of range per hour. Level 2 charging stations are the most common for both public and at-home charging, and many allow for networking, and/or incorporation into electric vehicle energy management systems.	Level 3 charging, also known as Direct Current Fast Charging (DCFC) uses high voltage electricity to deliver charging that can be up to 30 times faster than Level 2. The higher cost equipment and upstream infrastructure make this level impractical for most residential applications and is better suited to major centres.
Charge Time (400 km range)[xx]	Up to 16 hours	8 – 12 hours	0.5 – 2 hours

3.2 Types of Electric Vehicles

This study focuses on battery EV (BEV) and plug-in hybrid (PHEV) technologies (**Figure 3-2**). Alternative fuel technologies such as hydrogen fuel cells (FCEV) can also be a key part of the solution, however they are at an earlier stage of market-readiness and are not considered in this assessment. Hydrogen fuel cell vehicles may be particularly useful for heavy duty commercial vehicles such as large transport trucks as well as buses. Hybrid electric vehicles are powered by an internal combustion engine in combination with an electric motor, however they will always rely on gasoline (unlike PHEVs which can run on a battery only) and therefore will not be the focus of this study as they do not contribute to zero emissions mobility.

A comparison of BEV and PHEVs is summarized in **Table 3-2**.

Figure 3-2: Difference between EV Types

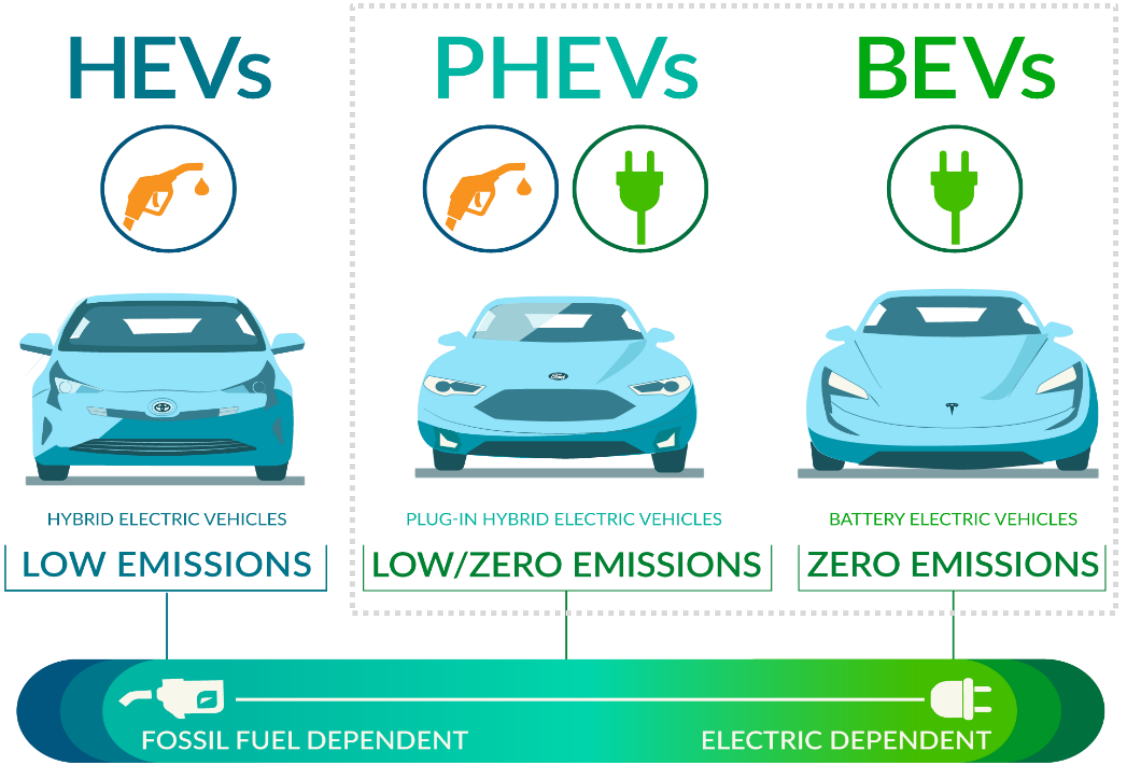


Image from Maryland EV[xxi]. PHEVs and BEVs will be the focus of this study.

Table 3-2: Comparison of BEV and PHEVs

Plug-in Hybrid Electric Vehicles (PHEV)	Battery Electric Vehicles (BEV)
— A partially electric vehicle which uses two types of fuel: (1) gasoline or diesel, and (2) electrical energy from a battery. — Can operate in hybrid mode, EV-only mode, or gas only mode — Smaller battery size — Requires additional maintenance	— A 100% electric vehicle which uses an electric motor and battery — Zero tailpipe emissions — Can utilize regenerative braking

3.2.1 BENEFITS OF EVS

Cost

Electric vehicles have a low cost of maintenance and repair because they do not have as many moving components as conventional vehicles powered by the Internal Combustion Engine (ICE). Costs associated with ICE vehicle maintenance include oil changes, engine issues, spark plugs, and brake replacements. Electric vehicles on the other hand, do not require an oil change and

maintenance is limited to brake pads and tires. Moreover, regenerative braking helps reduce the wear of the brake pads.

In addition to maintenance and repair, fuel costs are typically lower in electric vehicles, especially in BC which has reasonably low electricity costs. For example, driving 20,000 kilometers per year may cost approximately $2,300 per year in a conventionally-powered sedan (i.e. 2022 Chevrolet Trax) while the same distance in an electric vehicle will cost only $343 per year[xxii].

Reduced GHG Emissions

Electric vehicles are much more efficient than internal combustion engine (ICE) vehicles. The electric system that drives the electric motor is completed with a single speed transmission, which does not lose much heat or friction compared to ICE vehicles. Also, EVs have the ability to recover electricity through regenerative braking, and do not idle when stopped. Combined, this makes EVs much more energy efficient, resulting in less total energy needed to travel the same distance compared with gas- or diesel-powered vehicle.

EVs also produce zero tailpipe emissions and significantly less total lifecycle emissions compared to ICE vehicles. British Columbia has one of the cleanest electric grids in North America, with 98% of electricity generation coming from renewable or clean sources[xxiii], resulting in a much lower carbon intensity than conventional ICE vehicles.

Improved Community Health

Electric vehicles have zero tailpipe emissions, resulting in significant reductions in localized greenhouse gas emissions and air pollutants. Eliminating ICE tailpipe emissions would likely improve local urban heat island effects and reduce respiratory disease caused by vehicle emissions. Additionally, a much quieter engine can reduce road noise, leading to quieter communities.

Potential For Improved Equity

E-mobility has the potential to improve equitable access to transportation options while also enhancing energy and environmental justice. Electric vehicles reduce operating costs associated with vehicle ownership. That noted, as is the case with any new technology, early adopters of electric vehicles have been predominantly of higher socioeconomic status. This is largely due to higher upfront costs as well as the availability of overnight charging infrastructure, which is easier to access for those who live in detached homes with private garages as compared to multi-unit residential buildings with shared, limited, or no garage access. That noted, the benefits of electric vehicles extend beyond ownership. EVs lead to reduced community-level air and noise pollution, which positively impacts the community at large.

Moreover, advances in electric micro mobility, such as e-bikes and e-scooters, extends the travel range of relatively inexpensive active transportation, which can increase opportunities for those without a driver's license or access to a personal automobile and expand travel choices. Increased active transportation range may additionally lead to the reduction of vehicle ownership dependence and through this, a potential for reduced household transportation costs.

However, the distribution of charging infrastructure, high upfront cost, and electric model availability often renders electric vehicles inaccessible to lower income populations. Inequities may be enhanced if equity is not carefully considered and prioritized. Ensuring that EV charging

infrastructure is equitably distributed is necessary for EVs to be a viable option for those without access to a private overnight electric hook-ups.

3.2.2 FACTORS AFFECTING EV ADOPTION

Electric vehicles accounted for 17% of new vehicle sales in 2021. While adoption rates are steadily increasing, despite Federal and Provincial targets, associated legislation, and millions of dollars of incentives available, real and perceived barriers remain to widespread adoption.

Affordability/ High Purchase Cost

While the total cost of ownership of EVs even without incentives is often lower than ICE vehicles in BC[xxiv], the upfront cost of EVs can be much higher than that of ICE vehicles, which can pose a barrier for many purchasers. Also, few older or used EVs exist at this time, rendering EVs inaccessible to purchasers looking to buy less expensive or used vehicles. The price gap between new EVs and ICE vehicles has narrowed significantly over the years with battery costs falling, however cost parity between the two may not be reached for another few years. Recognizing this, Canadian government incentives have helped to close the gap, especially in BC where provincial incentives can be coupled with federal incentives to provide up to $9,000 in savings[5]. However, these incentives are not guaranteed to renew in the future and there are fewer incentives for heavy-duty electric vehicles and their electric vehicle supply equipment (EVSE).

Electric Range

“Range anxiety” is the fear that EVs will run out of power during a trip, leaving travellers stranded. This is often a significant barrier for those who are looking to make the shift from an ICE vehicle to electric, and is often cited as a reason for not purchasing an EV. While electric vehicle ranges have improved significantly over the last few years with an average range of about 320km and EV charging infrastructure has expanded, EV range anxiety still exists among much of the population.

With the exception of infrequent intercity travel, most drivers travel significantly less than 320km each day, rendering existing electric vehicles well suited to meet daily needs. For longer trips, a growing network of fast charging stations can generally be accessed along commonly travelled routes. Additionally, regenerative braking can recapture some of the car’s kinetic energy and charge the batteries when the brakes are applied, making the vehicle more efficient. Careful route planning with chosen charging locations can help drivers ease range anxiety on longer trips as charging networks continue to develop over time.

There are also a number of other factors that may impact EV range. In Canada, where temperatures are frequently cooler in winter months (an optimal range for an EV battery is 20 to 25 degrees Celsius), EV range can drop significantly as the cabin heater draws additional energy. Poor driver behaviour, such as hard braking and acceleration can also reduce EV range.

Education for drivers can help to extend the range of an electric vehicle, which may in turn reduce concerns among new EV users and prospective buyers. As new vehicle models with longer battery

[5] Based on 2021 Federal and Provincial Incentives available

ranges are developed, public charging infrastructure is expanded, and access to home and workplace charging is broadened, range anxiety is expected to ease.

Model Availability / Vehicle Supply

The limited availability of electric vehicles is among the major barriers to EV adoption. This refers to both limited selection of models and availability in terms of wait times. While there are hundreds of electric vehicle models available worldwide, there are only 92 light-duty vehicle options available within Canada[xxv].

The options are even fewer for medium and heavy-duty trucks. According to the International Energy Association, electric trucks accounted for just 0.3% of global truck sales in 2021[xxvi]. Short-haul trucks which may not need a wide charging network if depot charging is available could be the first to be electrified, as they require little infrastructure outside of their depots. However, long-range trucks and buses will require high-power chargers along the route, which will require significant grid upgrades and can come with high costs. Early planning, partnerships and investments will be important to expand heavy-duty vehicle electrification.

Access To Home Charging

A significant barrier to ownership is access to home charging. While individuals living in single-detached houses generally have access to garage or outdoor charging outlets, this is often not the case for individuals in multi-unit residential buildings (MURBS). Those living in apartment or strata buildings often face challenges installing EV charging equipment in their building due to strata corporations and building managers. Those without access to charging at home are often referred to as “garage orphans”. Garage orphans have been slow to adopt electric vehicles because they are solely reliant on publicly available charging.

3.3 Electric Micromobility

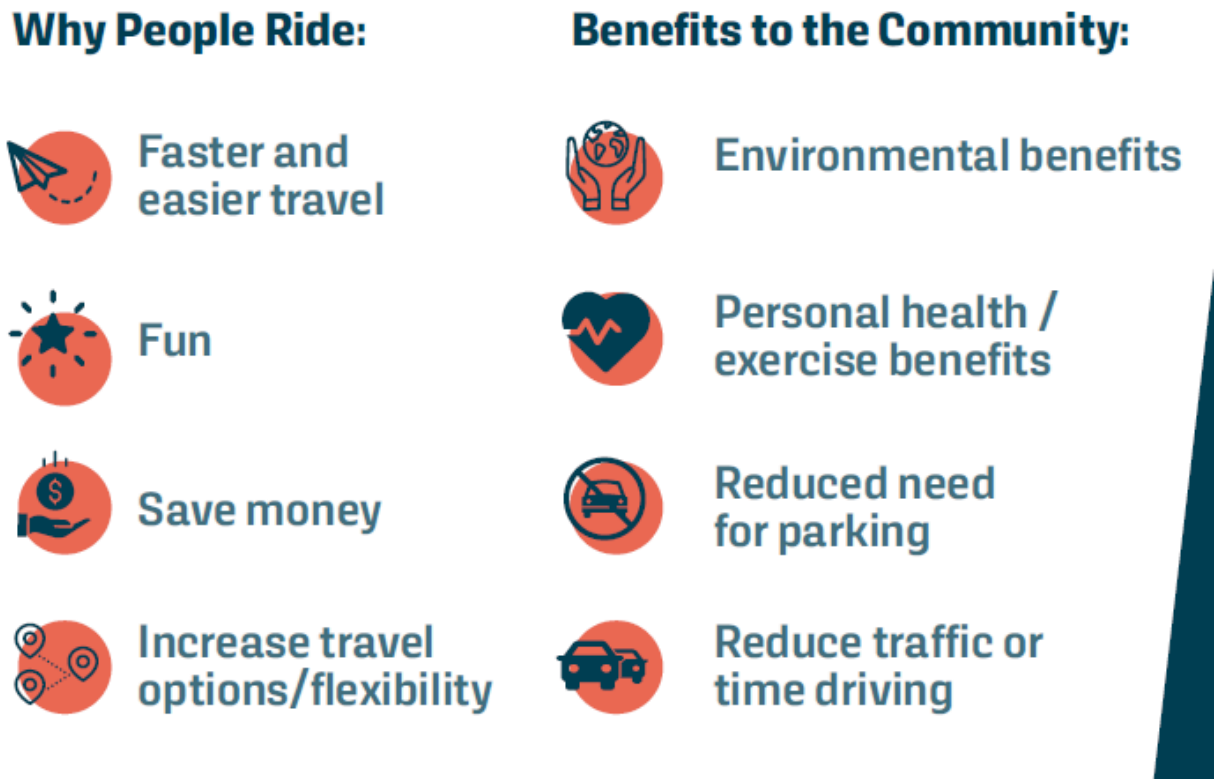
While there is no standardized definition of micromobility, it is generally used to describe small lightweight single-person vehicles, such as bikes, scooters, and skateboards, that are operated at low speeds. Often popular in urban areas, micromobility devices are designed for short trips and are agile for navigating around people. Micromobility devices can be privately owned or operated as a fleet and shared. Increasingly, micromobility devices are powered by electric motors, such as e-bikes and e-scooters. This is called electric micromobility, and is the focus of the micromobility offerings reviewed in this study. The benefits of micromobility are overviewed in **Figure 3-3** and described as follows:

- **Efficiency and convenience:** Electric micromobility devices are faster than walking and can provide independent travel options to those without access to a private automobile. Geared to short 1-5 km trip lengths, they provide travel autonomy for those who need to travel around urban areas quickly and efficiently, reducing reliance on public transit. Micromobility devices also provide users with the opportunity to avoid some of the negative aspects of auto travel, such as parking availability, operating and maintenance costs, and traffic congestion.
- **Enhanced mobility and comfort:** E-bikes are pedal-assisted bikes that use motor to help riders propel up hills, especially those who would otherwise struggle without them. The ability to propel

up hills with greater ease can change someone's decision to commute by bike, as the hill may no longer be a barrier to active transportation.

- **Affordability:** Buying or renting an electric micromobility device is more cost-effective than purchasing a full-sized vehicle and paying for insurance, maintenance, and fuel.
- **GHG and Air Quality improvements:** Electric micromobility devices can help reduce greenhouse gas emissions by shifting short automobile trips to micromobility trips, reducing overall VKT.
- **Noise reduction:** Micromobility devices are quiet, as they do not have internal combustion engines, and therefore help to reduce noise in urban areas, in contrast to ICE vehicles.

Figure 3-3: Benefits of Micromobility Devices



3.3.1 FACTORS AFFECTING E-BIKE AND E-SCOOTER ADOPTION

While there are many benefits to e-bikes and e-scooters, there are still many barriers that may limit their uptake. In 2018, the Capital Regional District (CRD) identified several barriers to e-bike ownership, which included high purchase price, lack of secure parking and fear of theft, road safety concerns, and social norms[xxvii].

- **Purchase Cost:** E-bikes are generally more expensive than their equivalent non-motorized bikes due to the cost of the battery and level of technology, though these costs are decreasing with a variety of e-bike models now on the market. The Province of BC is now offering rebates towards the purchase of new e-bikes for businesses, and rebates are available for individuals trading in a vehicle.
- **Road Safety Concerns:** A primary barrier for cycling has been the concern of sharing road space with fast-moving vehicles, and e-bikes are no different. An added dimension to e-bikes is their higher operating speed, compounding the risk of accidents with vehicles. A survey conducted by the CRD, for example, found that approximately 22% of respondents stated that concern about their safety on e-bikes was a barrier to ownership[xxviii]. Additionally, for communities participating in the Provincial e-scooter pilot, e-scooters are required by provincial regulation to use the road – not sidewalks. Improved cycling infrastructure such as protected cycling lanes and intersection reconfigurations that improve rider safety could help mitigate this barrier.
- **Secure and accessible parking**: Bike theft is a big issue in British Columbia. In Vancouver alone, more than 2000 bicycles are reported stolen each year despite police enforcement[xxix]. While bike theft is not as high in the Tri-Cities as it is in Vancouver due to its geography, it is still an issue according to the Port Moody police department [xxx]. E-scooters are also easy to steal, and while they can be easier to carry than bikes due to their ability to fold, secure parking is important for these devices as well. This may include locked or supervised areas, secure designated e-bike and e-scooter parking facilities, surveillance cameras, lighting improvements, bike valets, and paid parking facilities.

Regulations: In BC, it is illegal to use an electric kick scooter on a road or highway in any community that is not participating in the pilot project . This is a clear barrier for those who are looking to purchase an e-scooter within the Tri-Cities. Participation in the pilot project and enacting relevant bylaws for their use will help remove this barrier for those who are ready to make the purchase.

4 Electric Vehicle Policy & Planning Context

4.1 Federal

A review of relevant policies, plans, and targets was conducted at the federal, provincial, regional, and municipal level within the last ten years.

4.1.1 ZERO EMISSION VEHICLES SALES TARGETS

The Government of Canada has committed to reducing on-road transportation greenhouse gas emissions. Through its "*A Healthy Environment and a Healthy Economy"* Plan in 2020, the federal government established electric vehicle sales targets of 10% by 2025, 30% by 2030, and 100% by 2040[xxxi]. In June 2021, a mandatory target for 100% of new light-duty vehicle sales was set for 2035, accelerating Canada's previous goal[xxxii]. This aligns with other leading jurisdictions such as the United Kingdom, California, British Columbia, and Quebec who had already set 100% zero emissions sales requirements. Canada's new strengthened interim targets for zero emission vehicle sales are now 20% by 2026 and 60% by 2030.

This mandate will accelerate the uptake of electric vehicles within the Tri-Cities. With the accelerated EV sales target mandate, more residents and visitors to the area will be looking to charge their vehicles within the coming years. The Tri-Cities will need to ensure that there will be enough charging infrastructure to support this transition to electric mobility.

4.1.2 EV AND INFRASTRUCTURE INCENTIVES

The federal government has already invested over $1 billion to support zero-emission vehicle adoption and continues to provide this support through its Zero Emission Vehicle Infrastructure Program (ZEVIP), which is a $680 million initiative for electric and hydrogen refuelling stations, ending in 2027[xxxiii]. In addition to charging stations, the Incentives for Zero-Emissions Vehicles Program has been helping Canadians purchase zero-emissions vehicles since 2019 and has recently been expanded to models such as minivans, light-duty pick-up trucks, and SUVs.

Federal electric vehicle infrastructure incentives should be leveraged to expand public EV charging infrastructure within the community. Private businesses and landowners may also look to this incentive to support EV infrastructure expansion within the sub-region.

4.1.3 CLEAN FUEL STANDARD

In July 2022, the federal government annexed the Clean Fuel Regulations (CFR) through sections 140 and 326 and subsection 330(2) of the Canadian Environmental Protection Act, 1999. The CFR sets increasingly stringent requirements on producers and importers to reduce the carbon intensity of gasoline and diesel and will require primary suppliers (i.e. producers and importers) to reduce the carbon intensity (CI) of the gasoline and diesel they produce in, and import into, Canada from 2016 CI levels by 3.5 grams of carbon dioxide equivalent per megajoule (gCO2e/MJ) in 2023, increasing to 14 gCO2e/MJ in 2030[xxxiv].

The Clean Fuel Standard provides three ways to earn credits:

1. **Compliance category 1:** Undertaking projects that reduce the lifecycle carbon intensity of fossil fuels (e.g., carbon capture and storage, on-site renewable electricity, co-processing);
2. **Compliance category 2:** Supplying customers with low carbon intensity fuels (e.g., ethanol, bio-diesel); and,
3. **Compliance category 3:** Investing in advanced vehicle technologies (e.g., electric or hydrogen fuel cell vehicles).

The federal clean fuel standard will help to reduce on-road emissions from existing ICE vehicles, assuring that those ICE vehicles that are still on the road beyond 2040 will emit fewer emissions than if the standard had not been introduced. This means that on-road emissions from internal combustion vehicles will be lower over the long-run.

4.2 Provincial

4.2.1 BC ZERO EMISSIONS VEHICLES ACT

The BC ZEV Act (Bill 28-2019) establishes ZEV sales targets of 10% of light-duty vehicle sales by 2025, 30% by 2030, and 100% by 2040. According to the act, all light-duty motor vehicle sales must be ZEV on and after January 1, 2040. The BC ZEV Act aligns with federal targets for zero-emissions vehicle sales. While the BC ZEV Act has longer targets than federal legislation, the new CleanBC roadmap promises to accelerate the targets to align with federal targets. The Tri-Cities will need to ensure that there will be sufficient charging infrastructure to support this planned transition.

4.2.2 BC MINISTERIAL ORDER M104

The Ministerial Order No. 104 exempts anyone who is not a public utility (ie. persons, landlords, strata corporations) who provide EV charging services for compensation from the Utilities Commission Act. Therefore, they are allowed to own and/or operate an EV charging service for the resale of electricity.

This act is an important step for British Columbia to encourage the installation of electric vehicle infrastructure within the province, as the infrastructure provider (strata corporations, businesses, individuals) can make a return on the investment. This legislation complements municipal by-laws requiring developers to install Level 2 chargers in new buildings and redevelopments, as developers can now receive a return on their investment.

4.2.3 CLEAN BC ROADMAP TO 2030

The CleanBC Roadmap to 2030 is the province's plan to achieve their emissions target while building a cleaner economy that benefits everyone. It includes a range of accelerated and expanded actions across eight pathways.

Foundational parts of the roadmap related to transportation include:

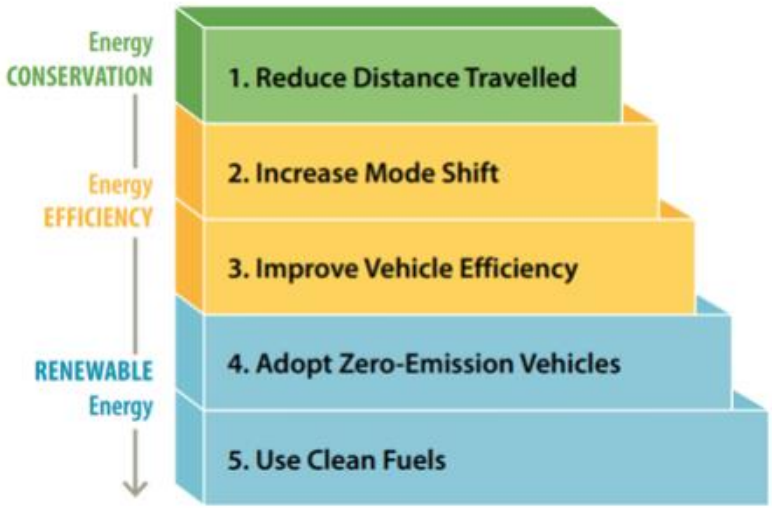
- An accelerated zero-emission vehicle (ZEV) law (26% of new light-duty vehicles by 2026, 90% by 2030, 100% by 2035);

- Completing B.C.'s Electric Highway by 2024 and a target of the province having 10,000 public EV charging stations by 2030;
- Reducing distance travelled in Light Duty Vehicles by 25% by 2030 compared to 2020;
- Encouraging mode shifting to more energy efficient forms of transport, increasing the share of trips made by walking, cycling, transit to 30% by 2030, 40% by 2040 and 50% by 2050;
- Low Carbon Fuels Standard (LCFS): Increasing stringency by doubling the carbon-intensity reduction of gasoline and diesel from 10% to 20% by 2030 as well as expanding the standard to cover marine and aviation fuels beginning in 2023;
- Completing the Clean Transportation Action Plan (2023); and,
- A promise to bring in "right-to-charge" legislation, allowing more people to install EV charging infrastructure in strata and apartment buildings.

The Clean BC Roadmap to 2030 (**Figure 4-1**) accelerates existing EV sales targets to align with federal targets while also introducing numerous other strategies to reduce emissions by 2030. While electric vehicles have zero tailpipe emissions, there are still emissions associated with where the electricity is generated. BC has some of the cleanest electricity generation in Canada with the majority of it coming from hydroelectric power. The Province's commitment to the implementation of a 100% Clean Electricity Delivery Standard for the BC Hydro grid would reduce the percentage of power coming from fossil fuels, thereby reducing the impact of electric vehicles on our climate even further.

- Additionally, to date, some EV owners have been refused installation of EV charging infrastructure in their stall by strata corporations. While not yet enacted, the 'Right to Charge' legislation will make it easier for anyone who wants to own an electric vehicle to install charging infrastructure in their building. With new Federal requirements that all new passenger car and truck sales be zero emission by 2035, it's important that strata corporations plan for the needs of owners and residents through adequate provision of charging infrastructure.
- Electric vehicles have zero tailpipe emissions and are a much cleaner alternative to internal combustion engines, however their production still emits GHGs. The province prioritizes reducing total vehicle kilometers travelled, prioritizing active transportation and public transit when possible before the personal vehicle.

Figure 4-1:CleanBC Roadmap to 2030 Transportation Prioritization for lowering GHG emissions



4.2.4 ELECTRIC KICK SCOOTER PILOT REGULATION

Part 13 of the BC Motor Vehicle Act (BC MVA) has been amended to allow pilot projects that would research, test, and evaluate new regulatory approaches to matters not currently set out in the MVA framework[xxxv]. This provides an opportunity for the Province to work with local governments to support active transportation and improve road safety.

The first phase of pilot projects were announced in 2020 and focused on the use of emerging zero-emission mobility devices such as electric scooters. The Motor Vehicle Act Pilot Project Proposal outlines the process and timelines for pilot projects, which are initiated by local governments through an application process to the Ministry of Transportation and Infrastructure (MOTI) and may remain in force for a maximum of 3 years to promote the goals of research and evaluation.

Within BC, kick scooters are only allowed on roads and highways in participating pilot communities and in accordance with the Electric Kick Scooter Pilot Project Regulation[xxxvi] and bylaws of each pilot community.

The City of Coquitlam has officially launched an e-scooter pilot program which runs from January 2023 to April 2024 under the Provincial pilot program[xxxvii]. Coquitlam will monitor and refine their program, so it best aligns with overall goals.

4.3 Regional

The regional context around zero emissions mobility can be summarized through three main plans: The Metro Vancouver Clean Air Plan, the Metro Vancouver Climate 2050 Roadmap, and TransLink's Regional Transportation Strategy.

The Metro Vancouver Clean Air Plan is a comprehensive strategy to manage air quality and greenhouse gas emissions in the region over the next decade. The plan aims to achieve a 45% reduction in greenhouse gas emissions by 2030 and lays the foundation for a carbon-neutral region

by 2050. Key metrics include tracking annual emissions reduction progress and evaluating the adoption of cleaner technologies and practices.

The Transportation Roadmap under Metro Vancouver Climate 2050 sets a goal for the region's personal travel to be made using active transportation or zero-emission technologies by 2050, with an interim target of a 65% reduction in transportation greenhouse gas emissions by 2030 compared to 2010 levels. Key metrics include monitoring the percentage of personal travel using zero-emission technologies and assessing the expansion of active transportation infrastructure.

Transport 2050, TransLink's Regional Transportation Strategy, aims to improve transportation in Metro Vancouver over the next 30 years. The strategy outlines ten transformative actions, including expanding rapid transit networks by 300km, providing frequent local transit service within a 5-minute walk of communities, and transitioning to zero-emission vehicles. Key metrics include tracking the expansion of rapid transit networks, assessing the percentage of communities with accessible transit service, and monitoring the adoption of zero-emission vehicles.

Municipal collaboration is vital for the success of these strategies. Metro Vancouver's initiatives require support and leadership from local governments to promote active transportation, develop climate-resilient networks, and ensure sufficient charging infrastructure for electric vehicles. Partnership between various stakeholders, including local governments, TransLink, and provincial and federal governments, is crucial to implementing the transformative actions outlined in Transport 2050. The shared commitment is to create an efficient, reliable, and accessible transportation system that prioritizes sustainability and supports a carbon-free future. Key metrics include evaluating the implementation of active transportation initiatives and monitoring progress towards achieving carbon neutrality in transportation by 2050.

4.4 Sub-regional (Municipal)

4.4.1 CITY OF COQUITLAM

Coquitlam Environmental Sustainability Plan

The Environmental Sustainability Plan (ESP) serves as a guide for Coquitlam's long-term environmental resiliency and sustainability. It is organized into five themes: Climate Action, Built Environment, Waste Management, Water Management and Natural Areas, and Wildlife and Habitat. The Climate Action theme focuses on reducing greenhouse gas (GHG) emissions by 45% below 2007 levels by 2030 and achieving 100% reduction by 2050. Strategies include tracking emissions, supporting renewable energy, preparing for climate change impacts, promoting green jobs, and demonstrating city leadership in sustainability efforts. The Built Environment theme aims to encourage sustainable transportation with a 30% sustainable mode share target by 2031, develop well-connected neighborhoods that protect natural areas, and promote sustainable building and development. Strategies include prioritizing walking, cycling, and transit, increasing electric vehicle usage, supporting sustainable building practices, and incorporating sustainable development to protect natural areas and create livable and green neighborhoods.

Coquitlam Zoning Amendment By-law 4905 (Section 714)

An amended Section 714 requires one Level 2-capable energized outlet per dwelling unit or parking space (whichever is less) excluding visitor stalls. The by-law amendment applies for both Multi-Unit Residential Buildings and single detached homes.

4.4.2 CITY OF PORT COQUITLAM

Port Coquitlam Master Transportation Plan

Port Coquitlam is in the process of updating their Master Transportation Plan. The 2023 MTP will guide improvements and funding of the City's road, transit and active transportation networks in the years to come in a way that is practical, cost-effective, technically sound and supported by the community

The overarching MTP goal is to provide a connected transportation network that gives people safe and direct options to get to key destination points, using their preferred mode of transportation. The plan has 7 focus areas with goals and objectives:

- Walking/Wheeling: Ensure people have safe, direct and comfortable routes to walk or wheel to key destination points in the city.
- Cycling/Rolling: Provide safe, comfortable and attractive cycling/rolling facilities that encourage people of all ages and abilities to cycle/roll through the city.
- Trails: Provide a trail network that connects to key destination points and encourages people to get out in the community and enjoy nature.
- Transit: Encourage the use of transit with attractive and accessible stops, and road improvements that support efficient and reliable transit service.
- Auto: Ensure roads, corridors and intersections are constructed to support traffic, new development, and population growth so that people and goods can flow through the city.
- Urban Design: Design selected streets in the City's more urban, commercial areas as attractive 'people places' that support local businesses, walking/wheeling/rolling, a healthy environment, places to gather, as well as less congestion, speed and noise.
- Sustainability: Support a healthy environment and livable community through the use of technology and services that reduce traffic congestion, pollution, and/or dependence on vehicle ownership.

Port Coquitlam Climate Change Action Plan

The City of Port Coquitlam is currently updating their Climate Action Plan with a commitment to reducing emissions by 50% below 2007 levels by 3025. Additionally, the City aims to achieve net zero emissions for both community emissions by 2050 and corporate emissions by 2040.

This Climate Action Plan is a roadmap for the actions that the City of Port Coquitlam will take over the next 10 years and beyond to act against climate change. The Plan builds on the foundation set by our City's Corporate and Community Climate Action Plan (2010) and reflects a low-carbon resilience approach to both reduce greenhouse gas emissions (mitigation) and manage climate risks (adaptation). The Plan takes an equity-centred lens to put the needs and priorities of key vulnerable

groups in focus, including lower income, under-housed, and people with pre-existing health conditions that make them more vulnerable to climate change impacts.

The actions in the plan build on the climate action initiatives the City already has underway and reflect regional best practices to make climate action as affordable and cost-effective as possible, by:

- Building on initiatives being led by Metro Vancouver, the Province and Federal government.
- Focusing on opportunities to embed climate change considerations into existing City plans, policies and programs in efforts to build on and beyond the work City departments are already leading; and
- Prioritizing new projects and initiatives to leverage shared and external funding sources to amplify City funding (e.g. Provincial and Federal grant and subsidy programs, collaborating with neighbouring communities on cross-boundary projects, and implementing actions gradually through new planning and development)

Port Coquitlam Zoning Amendment By-law 4035

Under By-law 4035, one parking space or dwelling unit shall be provided with roughed-in Level 2 electric vehicle charging infrastructure including an electric outlet box located within 3 metres of a unit's required parking space.

4.4.3 CITY OF PORT MOODY

Port Moody has developed comprehensive plans and regulations to address transportation, climate change, and electric vehicle (EV) readiness within the city.

Port Moody Master Transportation Plan (TransPort Moody)

The TransPort Moody is a strategic master transportation plan guiding decisions on transportation, land use, and public investments over the next 20 years. The plan envisions Port Moody as a vibrant waterfront city with a sustainable transportation system that offers choices for all ages and abilities. Key targets for 2045 include:

- Double the proportion of trips by walking, cycling, and transit from 20% to 40%.
- Reduce average vehicle kilometers traveled by 30% from 10 km per person per day to 7 km.
- Reduce traffic-related injuries and fatalities.

Port Moody Climate Action Plan

The Climate Action Plan is a community-wide initiative aimed at adapting to climate change and reducing greenhouse gas emissions. The plan follows a low carbon resilience approach with mitigation and adaptation measures. The city's GHG emissions reduction goal is to achieve a 40% reduction from 2007 levels by 2030 and over 50% reduction from current emission levels. Notable targets include:

- A 40% walk, cycle, or transit mode share by 2030 (up from 17% in 2017).

- Electric vehicle fleet share targets of 40% for passenger vehicles and 25% for commercial vehicles by 2030.
- Transitioning all new heating and hot water systems to generate zero emissions by 2025.
- Ensuring new buildings are net-zero energy ready (Step Code 5) by 2030, using 80% less energy.
- Replacing 20% of existing heating and hot water systems with zero emission systems by 2030.
- Replacing all oil and propane heating with zero emission systems by 2030.

Minimizing waste going to landfill and achieving zero emissions from waste before 2050.

Port Moody EV Ready Requirements

The City of Port Moody's Zoning Bylaw, No. 2937 (section 6.11) includes the following requirements for EV charging infrastructure:

- 100% of required parking spaces for new dwelling units (excluding visitor parking spaces, secondary suite parking spaces, and new parking spaces servicing existing dwelling units) must include an energized outlet capable of providing Level 2 charging for an electric vehicle;
- A minimum of 20% of commercial parking spaces (excluding visitor and new parking spaces servicing existing units) must include an energized outlet capable of providing Level 2 charging for an electric vehicle;
- Each energized outlet must be labelled for its intended use; and,
- Plans submitted for development permit applications and building permit applications must indicate an energized outlet at all applicable spaces.

There are two ways to comply with these requirements:

1. Provide a dedicated circuit and energized outlet to each required EV parking space; or,
2. Utilize an EV Energy Management System (EVEMS) that meets the following minimum performance standard: The system must be capable of supplying a minimum performance level of 12 kWh average per EVSE, over an 8-hour period, assuming that all parking spaces are in use by a charging EV. The EVEMS must be installed (online and/or as hardware) as part of the EV electrical infrastructure.

4.4.4 SUB-REGIONAL SUMMARY

Table 4-1: Mode Share Objectives, Targets, and Municipal EV Readiness Policies

Scenario	Canada / Province	Regional	Coquitlam	Port Coquitlam	Port Moody
Residential & Commercial EV Target (Registration Data)	-	-	-	-	Residential: 40% by 2030, Commercial: 25% by 2030
EV Sales Target	Federal: 20% by 2026, 60% by 2030, and 100% by 2035. Provincial: Legislated: 10% by 2025, 30% by 2030, and 100% by 2040. CleanBC Plan: 26% by 2026, 90% by 2030, 100% by 2035;	Advocate to Province for accelerated EV sales targets (100% by 2030 instead of 2040)	-	-	-
Sustainable Transportation Mode Share	Provincial: 30% by 2030, 40% by 2040 and 50% by 2050	50% by 2050	50% by 2050 (STP)	25% target (no horizon year noted) (MTP)	40% by 2030 (Climate Action Plan) TBC during MTP update

Scenario	Canada / Province	Regional	Coquitlam	Port Coquitlam	Port Moody
VKT and GHG Reductions (Community)	Provincial: Reduce distance travelled in LDV by 25% by 2030 compared to 2020	65% reduction in transportation GHGs by 2030 (over 2010 levels).	45% reduction in transportation GHGs by 2030 (over 2007 levels)	50% emissions reduction by 2035 (over 2007 levels), net zero emissions at a corporate level by 2040 and community-wide by 2050.	40% reduction in transportation GHGs by 2030 (over 2007 levels)
Carbon Neutrality	2050	2050	2050	Draft 2050	2050
EV Ready Requirements	Provincial: Plan to introduce a 'Right to charge legislation' providing a pathway to install EV charging infrastructure in strata and apartment buildings.	-	All new constructions must have one energized outlet capable of L2 charging for every dwelling unit (100% of required spaces) or required parking spaces (includes single family and MURBs) (except for visitor parking).	One parking space per dwelling unit shall be provided with roughed-in electric vehicle charging infrastructure including an electrical outlet box located within 3 metres of the unit's required parking space (also applies to commercial zones).	100% of required parking spaces for new dwelling units (excluding visitor parking spaces) must include an energized outlet capable of providing L2 charging for an EV (20% of commercial spaces) [L2 energized outlet is 208-240V AC and minimum 32A (40A branch breaker)].

5 Approach & Methodology for the Zero Emissions Mobility Plan

5.1 Plan Purpose

The purpose for this Zero Emissions Mobility Plan is to create an actions list and roadmap for the Tri-Cities to follow to 2030 to support zero-emissions mobility in the sub-region. The Plan promotes the adoption of zero-emission vehicles (ZEVs) and charging infrastructure, as well as e-micromobility, as a means to support the rapid transformation of the transportation system to more sustainable forms of mobility, reducing greenhouse gas (GHG) emissions.

5.2 EV Adoption Scenario Modeling

Emissions modeling was conducted to quantify the current GHG impacts of mobility in the Tri-Cities and project future condition GHG impacts based on Business-as-Usual trends and a range of alternative EV adoption scenarios. A Simplified Bass Technology Diffusion Model was utilized to model market adoption from innovators to laggards, from an emerging market to a mature market. Primary data sources are noted in **Table 5-1**.

Table 5-1: Emission Model Primary Data Sources

Input	Data Source
Passenger and commercial fleet	ICBC vehicle population
Population projections	BC Stats
Fuel economy projections	U.S. EIA
GHG conversion factors	2017 BC Best Practices Guide
Aggregate VKT Projections	Metro Vancouver 2015 EI MOVES model; 2022 Coquitlam Travel Diary
Mode share and trip length by mode	2017 TransLink trip diary

The City of Coquitlam's 2022 travel survey was referenced to adjust the Tri-Cities' aggregate vehicle-km travelled downward by 20% to reflect a new post-COVID-19 travel paradigm. The travel survey noted per person trip rate reductions of 27%, and a reduction of over 700,000 vehicle-km

travelled daily in Coquitlam (a 29% per capita reduction), compared to 2017 regional trip diary results.

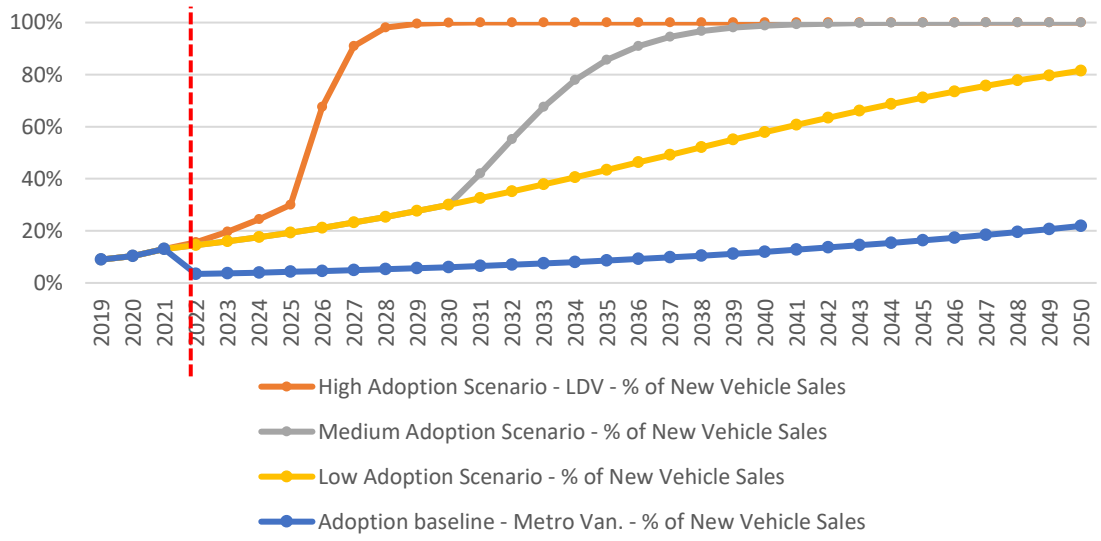
Alongside the Metro Vancouver (MV) baseline developed in 2015, three adoption scenarios were modeled to reflect low, medium, and high EV adoption. Scenarios are described in **Figure 5-1** and summarized in **Figure 5-2**. The Metro Vancouver Adoption Baseline was established in 2015 at a time when no legislated targets were considered and a conservative growth in EV sales was assumed. The MV baseline is outdated and does not reflect a current Business-as-Usual projection. For example, actual EV sales proportions registered in 2021 were projected to occur in 2042 in the MV baseline. The low, medium, and high adoption scenarios developed for this exercise reflect degrees of alignment with applicable federal, provincial, and municipal EV adoption targets.

Figure 5-1: Modeled EV Adoption Scenarios

Aggressiveness

Scenario 3	High EV Adoption Scenario	• Port Moody expedited target ○ 40% of total light-duty vehicles on the road to be ZEV by 2030; 100% by 2040 ○ 25% of total heavy-duty vehicles on the road to be ZEV by 2030
Scenario 2	Medium EV Adoption Scenario	• Full achievement of BC ZEV Act ○ 30% of new sales ZEV by 2030; 100% by 2040 • Clean Fuel Standards
Scenario 1 (BAU)	Low EV Adoption Scenario	• Partial achievement of BC ZEV Act ○ 30% of new sales ZEV by 2030
Scenario 0	Metro Vancouver Adoption Baseline	

Figure 5-2: EV Adoption Scenario Summary (% of New Vehicle Sales)



5.2.1 KEY RESULTS

The impact of the adoption scenarios on vehicle fleet is detailed in **Table 5-2** and **Table 5-3**. By 2030, the low, medium, and high adoption scenarios project 22,500, 22,500, and 57,500 light duty electric vehicles, respectively, registered in the Tri-Cities, with EVs representing between 16 and 40% of the total light duty vehicle fleet. By 2050, the low, medium, and high adoption scenarios project 113,800, 170,700, and 173,100 light duty electric vehicles, respectively, with EVs representing between 65 and 100% of the light duty vehicle fleet.

Table 5-2: 2030 EV Total Light Duty Vehicle Fleet Projections by Municipality

	Low Adoption (BAU)	Medium Adoption[6]	High Adoption
Port Moody	3,400	3,400	8,600
Coquitlam	14,000	14,000	36,000
Port Coquitlam	5,000	5,000	13,000
Tri-Cities	22,500	22,500	57,500

Table 5-3: 2050 EV Total Light Duty Vehicle Fleet Projections by Municipality

	Low Adoption (BAU)	Medium Adoption	High Adoption
Port Moody	16,500	25,400	25,800
Coquitlam	71,300	106,900	108,400
Port Coquitlam	26,000	38,400	38,900
Tri-Cities	113,800	170,700	173,100

Annual GHG emissions projections for the modeled scenarios are displayed for Port Moody, Coquitlam, and Port Coquitlam in **Figures 5-3** through **5-5**.

[6] Both low- and medium-adoption scenarios assume achievement of the 30% new light-duty vehicle sales target as stipulated in BC's ZEV Act, resulting in equivalent LDV fleet projections in 2030; beyond 2030, the low and medium adoption scenarios diverge, with the medium adoption scenario assuming 100% new light-duty vehicle sales by 2040.

Figure 5-3: Port Moody Transportation-Sector GHG Projections to 2050

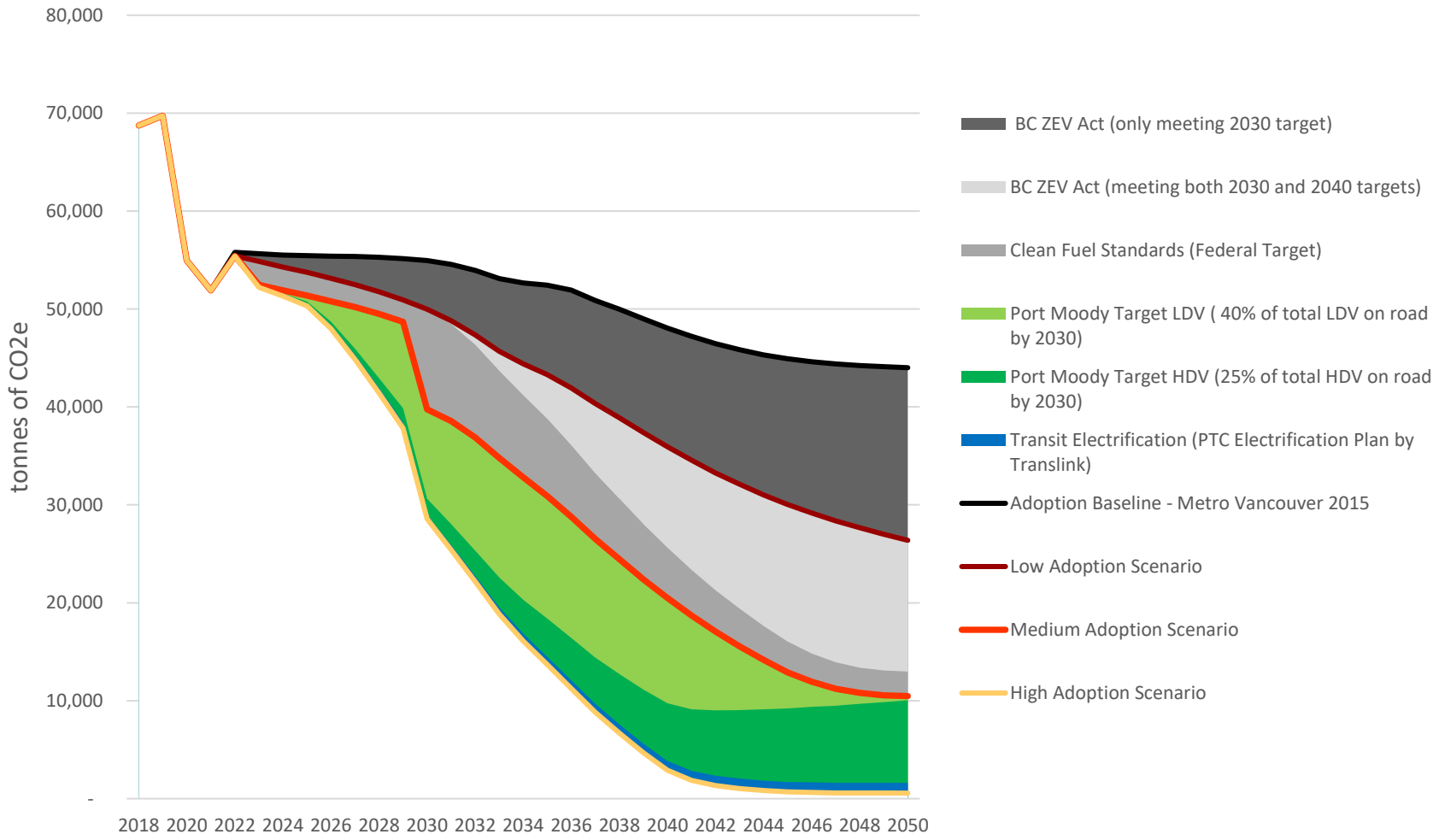


Figure 5-4: Coquitlam Transportation-Sector GHG Projections to 2050

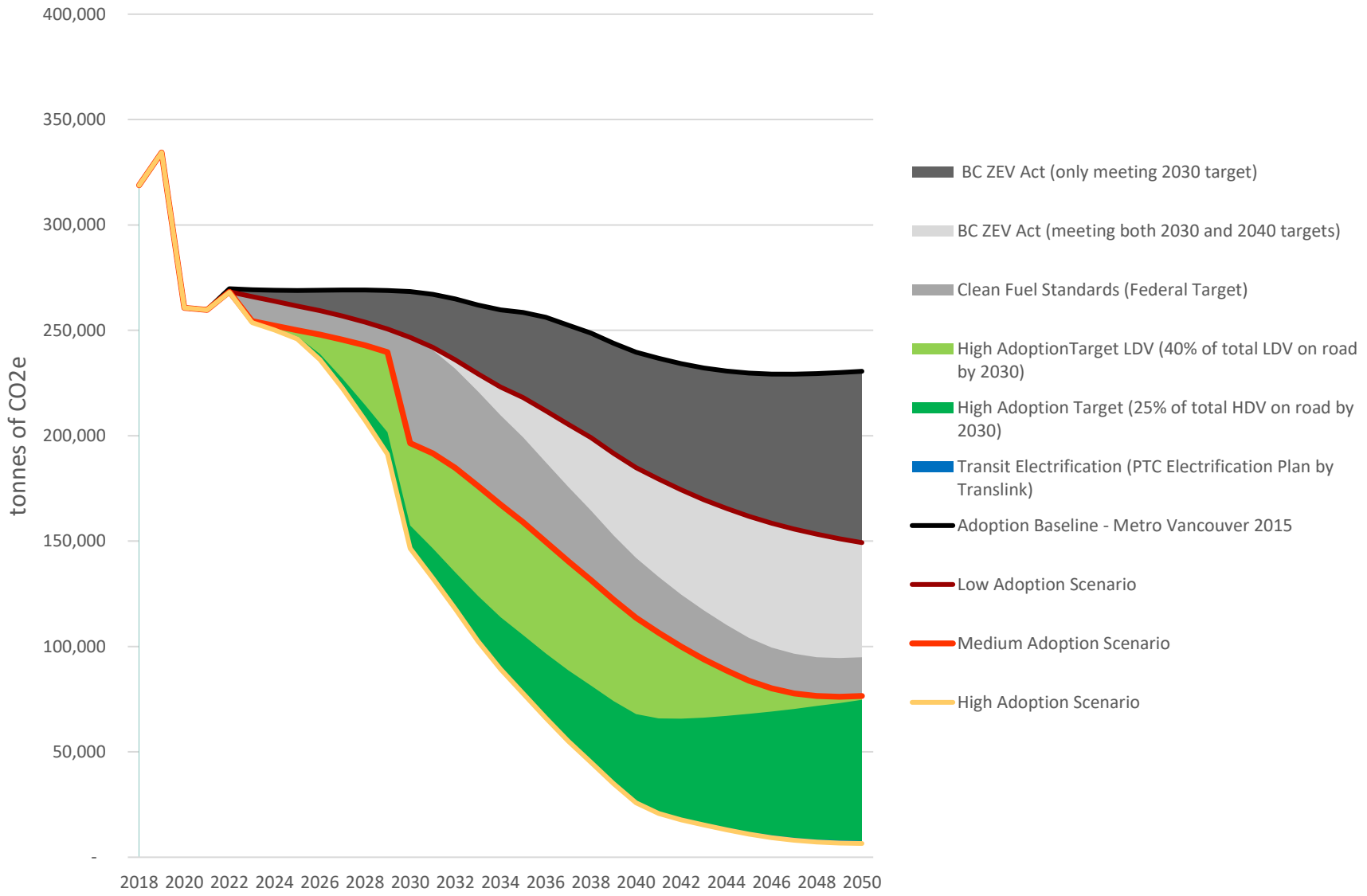
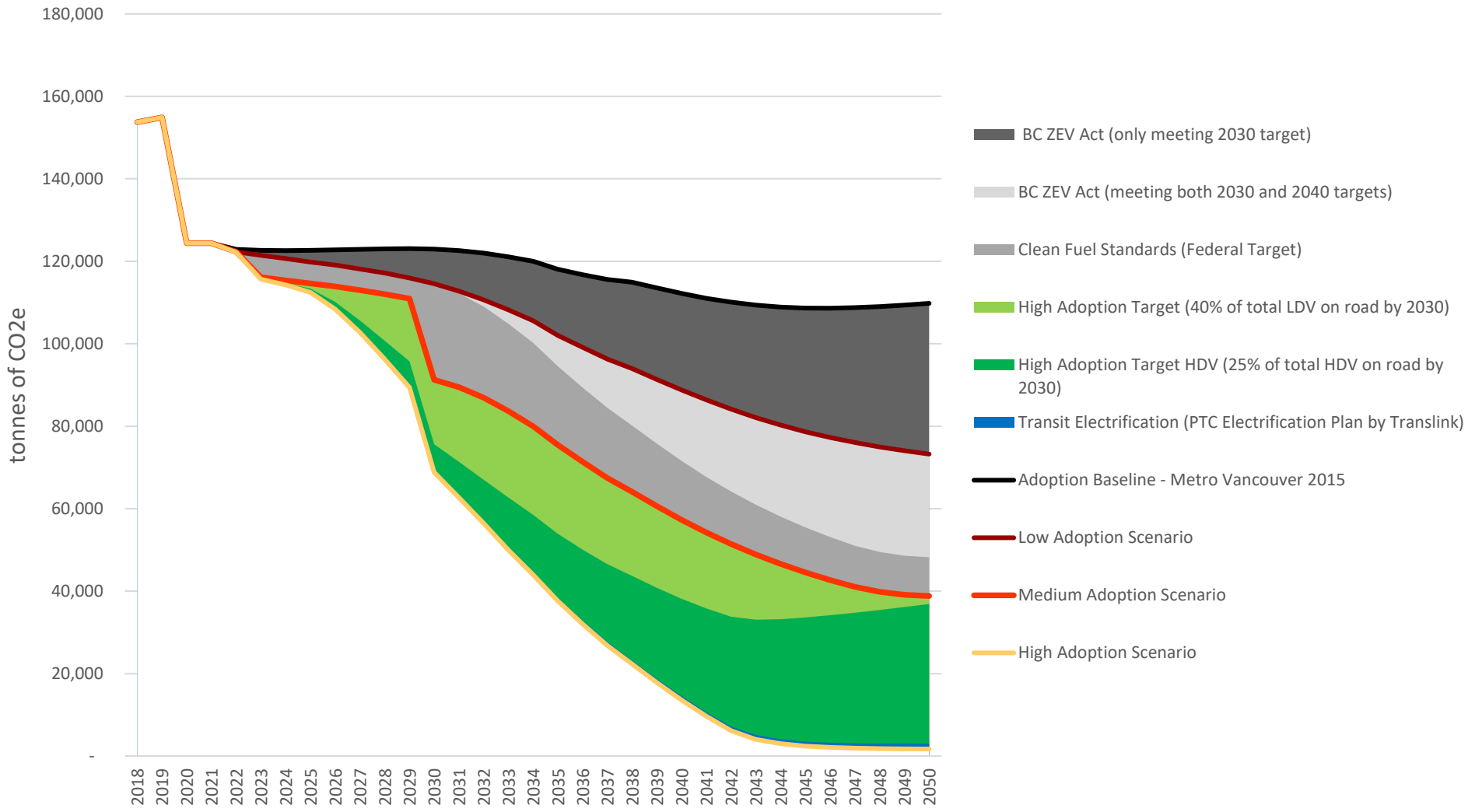


Figure 5-5: Port Coquitlam Transportation-Sector GHG Projections to 2050



5.2.2 SCENARIO GHG EMISSIONS REDUCTION RESULTS

Significant GHG reductions are noted as a result of travel behaviour adjustments and related societal restructuring following the Covid-19 Pandemic. Based on the City of Coquitlam's 2022 travel survey, baseline GHG emissions are estimated to have fallen by 20% as compared to projections anchored in pre-pandemic conditions. This has resulted in current year GHG reductions of 13,000 T, 64,900 T, and 31,100 T, for Port Moody, Coquitlam and Port Coquitlam, respectively.

Scenario 1 (BAU) reflects a low adoption scenario and assumes partial achievement of the BC Zero Emissions Vehicle Act. The scenario achieves a 73% ZEV share for light duty vehicles by 2050. As shown, this scenario greatly contributes to emissions reductions, compared to the MV baseline. By 2050, the reduction due to this partial achievement represents approximately 35% of total emissions for the Tri-Cities as a whole as compared to the MV baseline or 17,600 T, 81,200 T, and 36,600 T, for Port Moody, Coquitlam and Port Coquitlam, respectively.

Scenario 2 reflects a medium adoption scenario and assumes full achievement of the BC Zero Emission Vehicle Act targets, including the implementation of clean fuel standards. The scenario results in an approximately 100% ZEV share for light-duty vehicles by 2048. Scenario 2 results in a further reduction of 15,900 T, 72,300 T, and 34,400 T, for Port Moody, Coquitlam, and Port Coquitlam, respectively, in 2050. This represents a further 32% reduction in overall emissions compared to MV baselines.

Scenario 3 reflects a high adoption scenario which incorporates all Scenario 2 assumptions as well as the City of Port Moody's aggressive ZEV conversion schedule. Scenario 3 assumes 40% of light-duty vehicles and 25% of heavy-duty vehicles are ZEV by 2030, which results in an approximately 100% ZEV share for LDVs by 2041 and HDVs by 2043. Scenario 3 results in a further reduction of 9,900 T, 70,000 T, and 37,100 T, for Port Moody, Coquitlam, and Port Coquitlam, respectively, in 2050. This represents a further 30% reduction of Tri-Cities emissions over MV baselines.

Further details pertaining to scenario modeling are included in **Appendix A.**

5.3 Infrastructure Gap Analysis

EV owners charge their vehicles in three general locations, as displayed in **Figure 5-6**.

- **Base (Home)** – Most common and affordable form of charging. EV owners typically charge overnight using a Level 1 or Level 2 charger. Access to home charging is the most important factor in determining whether households will purchase an EV.
- **Destination (Workplace/Business/Depot)** – Typically a Level 2 charger which can be free to use or charged based on time or kWh. Approximately 15% of all charging occurs at work.
- **Route (On the go/ Fast Charging/Curbside)** – Typically a Level 2 or Level 3 (DCFC) charger which can be charged based on time or kWh. Level 3 charging is the most expensive to own and operate. It is an important charger for those without access to home or workplace charging and for those on longer road trips.

Figure 5-6: The Charging Pyramid

Source: BC Hydro adapted from US DOE

With the regulatory changes to increase electric vehicle supply, an expansion of charging infrastructure is needed to avoid infrastructure becoming a potential bottleneck of EV adoption. While many early adopters of electric vehicles had access to private charging, the next generation of EV buyers may depend more heavily on public charging. According to a CarGurus survey, approximately 64% of Canadian consumers say they would be more likely to purchase an electric vehicle if there were more charging stations available in their area[40] and 60% said they are likely to own an electric vehicle within the next 10 years[41].

An analysis of infrastructure gaps in the Tri-Cities in relation to public charging and access to home charging is conducted to identify critical barriers to adoption that will need to be addressed in the short- to mid-term future.

5.3.1 CURRENT PUBLIC CHARGING CONTEXT

A summary of public EV charging stations in Metro Vancouver was computed from Natural Resources Canada (NRCAN)'s database and is displayed in **Table 5-4**. As of late January 2023, there are 648 Level 2 charging stations and 1,669 individual Level 2 charging ports in Metro Vancouver. With 39,921 EVs registered in Metro Vancouver, this results in a ratio of approximately 24 EVs for each public Level 2 charging port.

Port Moody, Coquitlam, and Port Coquitlam have 7, 20, and 5 public Level 2 EV charging ports, respectively. With EV to charger ratios in the 40s-80s, the Tri-Cities have considerably lower levels of infrastructure provision than the regional average and are significantly behind other municipalities including Burnaby, Delta, New Westminster, North Vancouver, Richmond, Vancouver, and White Rock.

There are 68 DC Fast Charging stations in Metro Vancouver and 234 individual DC Fast Charging ports, resulting in a ratio of 170 EVs for each public DC Fast Charging port. While Coquitlam has 21 DC Fast Charging ports, Port Moody and Port Coquitlam each have only 1 DC fast charging port.

Table 5-4: Public Charging Stations in Metro Vancouver as of January 2023

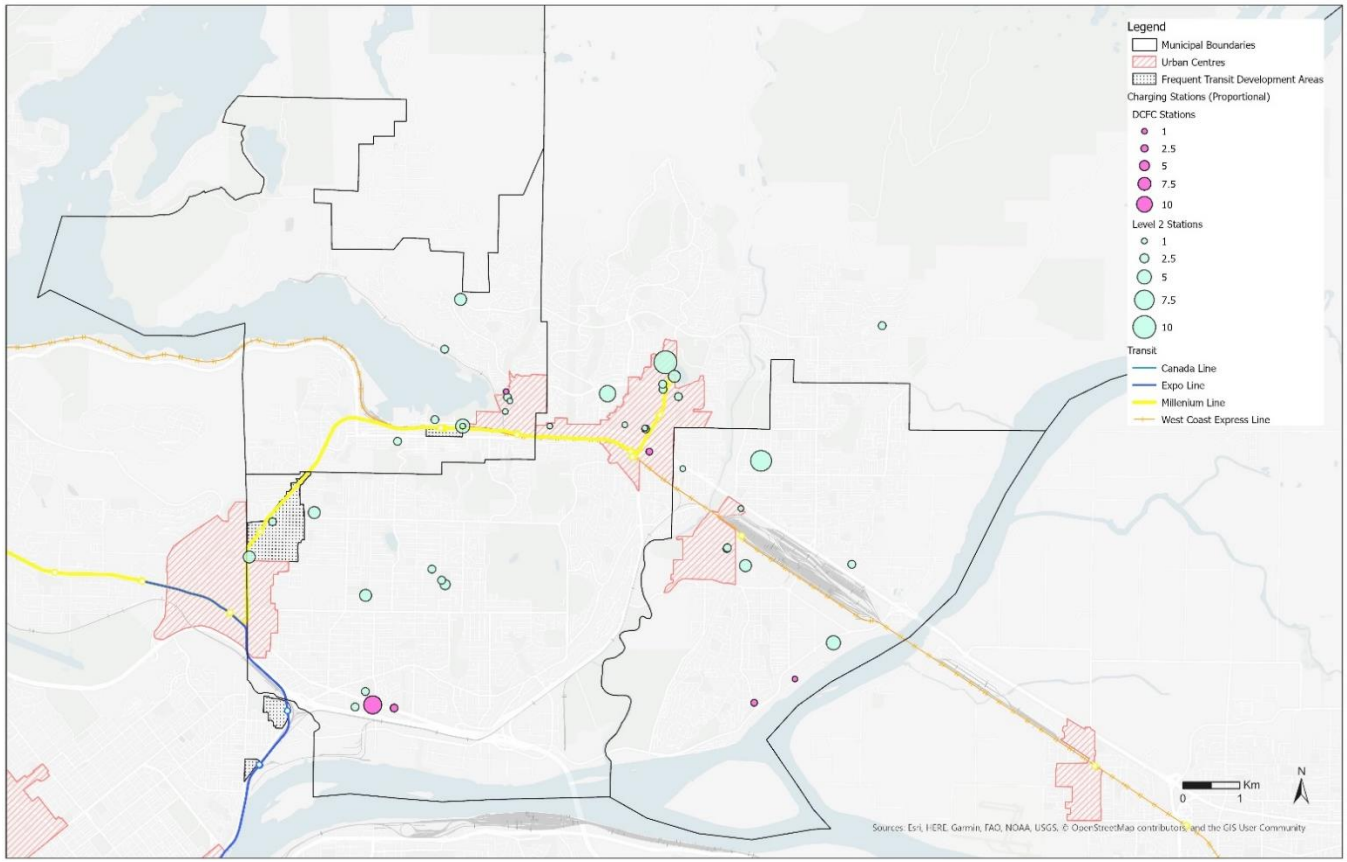
Municipality	2021 Passenger EV Population	Number of Level 2 Charging Stns	EVs per Level 2 Charger	Number of DC Fast Charge Stns	EVs per DCFC
Anmore	76	0	-	0	-
Belcarra	24	0	-	0	-
Bowen Island	111	1	55.5	0	-
Burnaby	3,240	83	12.9	2	231.4
Coquitlam	2,395	20	47.0	3	114.0
Delta	1,719	35	17.5	2	132.2
Langley	2,293	26	40.2	3	573.3
Lions Bay	105	0	-	0	-
Maple Ridge	1,264	10	48.6	0	-
New Westminster	862	11	19.2	1	431.0
North Vancouver	2,897	32	45.3	7	144.9
Pitt Meadows	289	10	15.2	0	-

Municipality	2021 Passenger EV Population	Number of Level 2 Charging Stns	EVs per Level 2 Charger	Number of DC Fast Charge Stns	EVs per DCFC
Port Coquitlam	978	5	81.5	1	978.0
Port Moody	696	7	46.4	1	696.0
Richmond	3,426	87	17.8	12	87.8
Surrey	7,342	69	44.5	12	131.1
Vancouver	10,392	222	16.8	23	167.6
West Vancouver	1,448	13	72.4	1	1448.0
White Rock	364	16	13.0	0	-
Metro Vancouver	39,921	648	23.9	68	170.6

Source: NRCAN Alt Fuel Stations Database

Figure 5-7 shows the proportional distribution of public EV chargers[7] overlayed with urban centres and transit development areas. EV chargers are generally located in or near designated urban centres or close to provincial roads.

Figure 5-7: Proportional distribution of EV chargers (Level 2 and DCFC)



[7] Data obtained from NR Can, October 2022.
**Note that the actual number of chargers may vary. This was the most up-to-date information at the time of writing.*

5.3.2 PROJECTED INFRASTRUCTURE NEEDS IN THE TRI-CITIES TO 2050

2022 Canada-wide public charging infrastructure needs were identified by Natural Resources Canada (NRCAN) in a study conducted by Dunsky Energy + Climate Advisors.[42] The study identified Level 2 and DC Fast Charger infrastructure requirements to support the Government of Canada's updated mandatory target of achieving 100% zero-emission vehicle market share for new light-duty vehicle sales by 2035.

The analysis breaks down charging needs into two overall cases:

- **Highway corridor charging** which is critical to providing adequate geographic coverage or connectivity to ensure BEV drivers can get where they need to go.
- **Community cluster charging** which provides public charging opportunities within population centres at retail locations, workplaces, and curbside. The study notes that the need for public charging in community clusters is closely linked to home charging availability.

Needs are reflected in EV-to-charger ratios and are presented for both Level 2 and DC Fast Chargers. Canada-wide projected cluster infrastructure needs and ratios are provided in **Table 5-5**.

Table 5-5: Canada-wide projected cluster infrastructure needs and ratios until 2050

		2025	2030	2035	2040	2045	2050
Scenario 1: High access to home charging	DCFC Ports	3,000	11,600	28,200	44,500	55,500	60,900
	BEVs / DCFC	240	300	340	370	400	430
	Level 2 Ports	48,000	181,000	410,000	593,000	673,000	658,000
	EVs / Level 2	21	26	30	35	40	47
Scenario 2: Low access to home charging	DCFC Ports	3,000	12,000	30,000	49,400	65,300	76,800
	BEVs / DCFC	310	300	310	330	330	340
	Level 2 Ports	49,000	186,000	436,000	659,000	791,000	830,000
	EVs / Level 2	21	25	28	31	34	37

Source: NRCAN 2022

High-level NRCAN EV to charger ratios were applied to medium and high EV adoption scenarios to generate a projection of local infrastructure needs by 2030 and 2050. Infrastructure needs are

summarized in **Table 5-6** and **Table 5-7.** As noted, given a medium-adoption scenario by 2030 the Tri-Cities collectively will require 864 to 899 Level 2 chargers and 75 DC Fast Chargers, depending on the degree of access to home charging. This represents between 786 and 821 Level 2 chargers and 52 DC Fast Chargers more than what is provided in the network today. By 2050, between 3,632 and 4,613 Level 2 chargers and 397 to 502 DC Fast Chargers will be required altogether.

A high adoption scenario will require between 2,210 and 2,299 Level 2 chargers and 192 DC Fast Chargers by 2030, which is 2,132 to 2,221 more Level 2 chargers and 169 more DC Fast chargers than what is provided today. By 2050, between 3,684 to 4,680 Level 2 chargers and 403 to 509 DC Fast chargers will be required altogether. Of note, both the medium and high-adoption scenarios project similar levels of EV populations by 2050, with EVs representing approximately nearly 100% of the light-duty vehicle fleet.

Table 5-6: Public EV Charger Infrastructure Needs (Medium Adoption Scenario)

	Type	Charger Target	Current Provision	Infrastructure Gap
2030 Horizon	Level 2	864 to 899	78	786 to 821
	DC Fast	75	23	52
2050 Horizon	Level 2	3,632 to 4,613	78	3,554 to 4,535
	DC Fast	397 to 502	23	374 to 479

Table 5-7: 2050 Public EV Charger Infrastructure Needs (High Adoption Scenario)

	Type	Charger Target	Current Provision	Infrastructure Gap
2030 Horizon	Level 2	2,210 to 2,299	78	2,132 to 2,221
	DC Fast	192	23	169
2050 Horizon	Level 2	3,684 to 4,680	78	3,606 to 4,602
	DC Fast	403 to 509	23	380 to 486

Detailed calculations, operating assumptions, and breakdowns by municipality to the 2030 and 2050 horizon are noted in **Table 5-8** and **Table 5-9** for the medium- and high-adoption scenarios, respectively. It should be noted that projections are based on high-level national averages for population clusters and do not take into consideration regional and local variations in BEV density, population density, temperature, and terrain. Moreover, the calculations do not account for technological improvements in battery capacity, charging speed, or consumer charging tendencies.

Table 5-8: Tri-Cities Public Charger Infrastructure Needs (Medium-Adoption Scenario)

		Port Moody	Coquitlam	Port Coquitlam	Tri-Cities
Current EV Population (2021)		696	2,395	978	4,069
Current Level 2 Chargers (2022)		15	51	12	78
Current DC Fast Chargers (2022)		1	21	1	23
2030 EV Population (Medium Adoption Scenario)		3,387	14,037	5,043	22,467
High Access to Home Charging	NRCAN 2030 EV to Level 2 Charger Ratio	26	26	26	26
	2030 Level 2 Chargers Required	130	540	194	864
	2030 Level 2 Charger Gap vs Current	115	489	182	786
	NRCAN 2030 EV to DCFC Ratio	300	300	300	300
	2030 DC Fast Chargers Required	11	47	17	75
	2030 DC Fast Charger Gap vs Current	10	26	16	52
Low Access to Home Charging	NRCAN 2030 EV to Level 2 Charger Ratio	25	25	25	25
	2030 Level 2 Chargers Required	135	561	202	899

		Port Moody	Coquitlam	Port Coquitlam	Tri-Cities
	2030 Level 2 Charger Gap vs Current	120	510	190	821
	NRCAN 2030 EV to DCFC Ratio	300	300	300	300
	2030 DC Fast Chargers Required	11	47	17	75
	2030 DC Fast Charger Gap vs Current	10	26	16	52
2050 EV Population (Medium Adoption Scenario)		25,432	106,874	38,379	170,685
High Access to Home Charging	NRCAN 2050 EV to Level 2 Charger Ratio	47	47	47	47
	2050 Level 2 Chargers Required	541	2,274	817	3,632
	2050 Level 2 Charger Gap vs Current	526	2,223	805	3,554
	NRCAN 2050 EV to DCFC Ratio	430	430	430	430
	2050 DC Fast Chargers Required	59	249	89	397
	2050 DC Fast Charger Gap vs Current	58	228	88	374
	NRCAN 2050 EV to Level 2 Charger Ratio	37	37	37	37

		Port Moody	Coquitlam	Port Coquitlam	Tri-Cities
Low Access to Home Charging	2050 Level 2 Chargers Required	687	2,888	1,037	4,613
	2050 Level 2 Charger Gap vs Current	672	2,837	1,025	4,535
	NRCAN 2050 EV to DCFC Ratio	340	340	340	340
	2050 DC Fast Chargers Required	75	314	113	502
	2050 DC Fast Charger Gap vs Current	74	293	112	479

Sources:
Current EV Population: ICBC
Current charger data: NRCAN Database
EV-Charger ratios: NRCAN/Dunsky (2022)

Table 5-9: Tri-Cities Public Charger Infrastructure Needs (High-Adoption Scenario)

		Port Moody	Coquitlam	Port Coquitlam	Tri-Cities
Current EV Population (2021)		696	2,395	978	4,069
Current Level 2 Chargers (2022)		15	51	12	78
Current DC Fast Chargers (2022)		1	21	1	23
2030 EV Population (High Adoption Scenario)		8,554	35,959	12,956	57,469
High Access to Home Charging	NRCAN 2030 EV to Level 2 Charger Ratio	26	26	26	26
	2030 Level 2 Chargers Required	329	1,383	498	2,210
	2030 Level 2 Charger Gap vs Current	314	1,332	486	2,132
	NRCAN 2030 EV to DCFC Ratio	300	300	300	300
	2030 DC Fast Chargers Required	29	120	43	192
	2030 DC Fast Charger Gap vs Current	28	99	42	169

		Port Moody	Coquitlam	Port Coquitlam	Tri-Cities
Low Access to Home Charging	NRCAN 2030 EV to Level 2 Charger Ratio	25	25	25	25
	2030 Level 2 Chargers Required	342	1,438	518	2,299
	2030 Level 2 Charger Gap vs Current	327	1,387	506	2,221
	NRCAN 2030 EV to DCFC Ratio	300	300	300	300
	2030 DC Fast Chargers Required	29	120	43	192
	2030 DC Fast Charger Gap vs Current	28	99	42	169
2050 EV Population (HIGH Adoption Scenario)		25,801	108,425	38,935	173,161
High Access to Home Charging	NRCAN 2050 EV to Level 2 Charger Ratio	47	47	47	47
	2050 Level 2 Chargers Required	549	2,307	828	3,684
	2050 Level 2 Charger Gap vs Current	534	2,256	816	3,606

		Port Moody	Coquitlam	Port Coquitlam	Tri-Cities
	NRCAN 2050 EV to DCFC Ratio	430	430	430	430
	2050 DC Fast Chargers Required	60	252	91	403
	2050 DC Fast Charger Gap vs Current	59	231	90	380
Low Access to Home Charging	NRCAN 2050 EV to Level 2 Charger Ratio	37	37	37	37
	2050 Level 2 Chargers Required	697	2,930	1,052	4,680
	2050 Level 2 Charger Gap vs Current	682	2,879	1,040	4,602
	NRCAN 2050 EV to DCFC Ratio	340	340	340	340
	2050 DC Fast Chargers Required	76	319	115	509
	2050 DC Fast Charger Gap vs Current	75	298	114	486

Sources:
Current EV Population: ICBC
Current charger data: NRCAN Database
EV-Charger ratios: NRCAN/Dunsky (2022)

5.3.3 PUBLIC CHARGING – CRITICAL ACTIONS

- Determine a public charger provision goal in line with projections. Altogether between 850 and 2,220 Level 2 chargers and 75 and 200 DC fast chargers are projected to be required in the Tri-Cities by 2030.
- Prepare and develop a process for significantly increasing public charger provision throughout the Tri-Cities.
- Work with Metro Vancouver, TransLink and other partners to develop a region-wide charger implementation strategy in the short-term.
- Seek funding partnership opportunities with the private sector and senior levels of government to advance implementation.
- Examine opportunities to install Level 2 and DC Fast chargers on municipal or TransLink-owned infrastructure, including in municipal parking lots/structures, West Coast Express Park and ride lots, and in select curbside locations.
- Direct public chargers to areas of higher density such as designated urban centres and frequent transit development areas.
- Work with private property owners at destinations such as workplaces, office parks, and malls to enhance destination-based charging opportunities.
- Advance home and workplace charging initiatives to lessen the need for public charging.
- Prioritize on-route charging in areas with greater concentrations of MURBs where residents may not have free access to home-base charging.
- Ensure that adequate charging infrastructure and e-mobility amenities are in vulnerable communities.
- Explore partnerships and leverage Low Carbon Fuels Credits to expand City-owned chargers.

5.3.4 ACCESS TO HOME & WORKPLACE CHARGING

EV charging at home has been critical for the high adoption to date, as public charging infrastructure has been slower to expand. Those who live in single-detached homes with access to a garage or driveway, have not had to face as many barriers to EV adoption due to ease of access to a private charging location. Low installation costs coupled with provincial and federal funding has helped to cover the cost of installation for these early adopters. Those living in multi-unit residential buildings (MURBS) on the other hand, have had significant challenges installing infrastructure, especially for those renting their unit.

Many who live in a condo or apartment can face difficulties in installing an EV charger due to the need to get permission from landlords or strata councils, and sometimes the cost of installation can be prohibitive if the electrical box is far from the parking stall.

The number and proportion of residential units by simplified dwelling type is displayed in **Table 5-10** based on Census 2021 results. 33% of residential units in the Tri-Cities are MURBs, most of which would not have direct access to home-based charging.

Table 5-10: Total Residential Units (Proportion) by Dwelling Type

	Ground-Oriented Dwelling	Multi-Unit Residential Building	TOTAL
Port Moody	8,000 (61%)	5,105 (39%)	13,105 (100%)
Coquitlam	32,535 (66%)	16,475 (34%)	49,010 (100%)
Port Coquitlam	16,410 (72%)	6,480 (28%)	22,890 (100%)
Tri-Cities	56,945 (67%)	28,060 (33%)	85,005 (100%)
Metro Vancouver	590,490 (57%)	452,835 (43%)	1,043,325 (100%)

Source: Census 2021

The distribution of simplified land-uses can be seen in **Figure 5-8**. While the majority of the community is zoned for single family homes, there are multiple zones of mixed-use and multi-family buildings. These are areas where there is a high proportion of 'garage orphans' or those without the ability to privately charge an electric vehicle at their home (as shown in **Figure 5-9**). Providing home-based charging for these units is a significant challenge that will need to be addressed to facilitate wide-scale, equitable, adoption of EVs.

Figure 5-8 additionally displays the location of industrial, commercial and institutional areas as well as comprehensive development districts; all of which are destination zones where public charging should be strongly considered.

5.3.5 CRITICAL ACTIONS

- A 'right to charge' legislation that would bar stratas from prohibiting residents from installing electric vehicle charging infrastructurein their parking spots and plugging in their EVs would help reduce the barrier for those living in MURBS. Through the new CleanBC Plan, the Province has committed to bring in a 'right to charge' legislation to help those who live in MURBS. This legislation is not yet in force, but it will remove a key barrier for many.[8]
- Recognizing the challenges and high costs of installing EVSE after buildings have been built, the Tri-Cities have enacted bylaws to ensure that all new homes and buildings will have at least one energized outlet per parking stall. This will allow new buildings to be considered 'EV Ready'.
- Recognizing that MURB retrofits are essential to rendering the community EV ready, the Tri-Cities could consider working with senior levels of government to avail building owners, strata corporations, or residents of grants to support required garage upgrades.

[8] This is assuming it could be installed within the building's current electrical capacity. Building upgrades for electrical capacity should be negotiated by the strata and resident.

- Consider amending applicable bylaws to require EVSE provision for any new parking facility or lot constructed. This would include workplaces, institutions, community facilities and other private and public lots.

Figure 5-8: Distribution of housing types and existing charging infrastructure

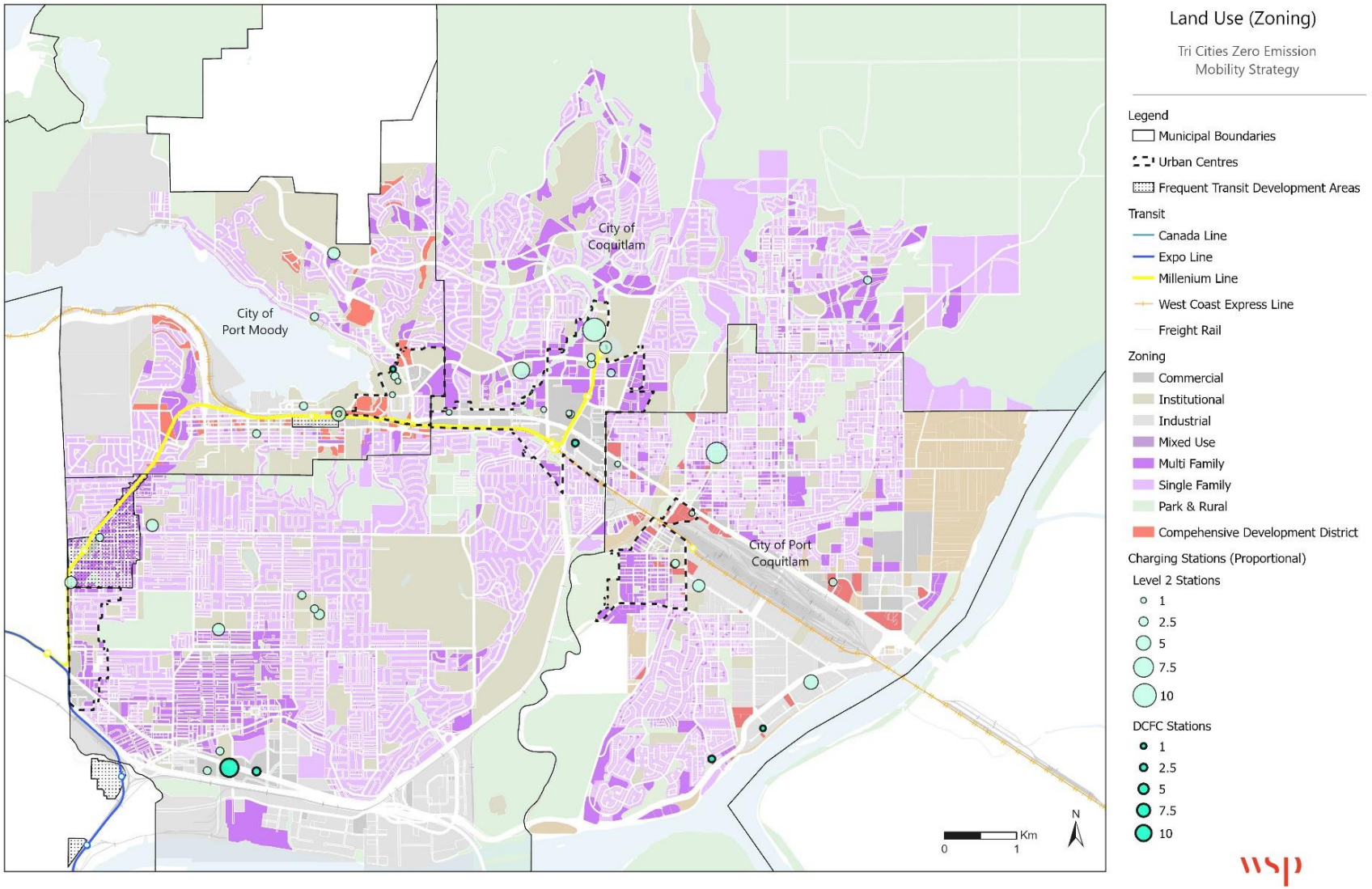
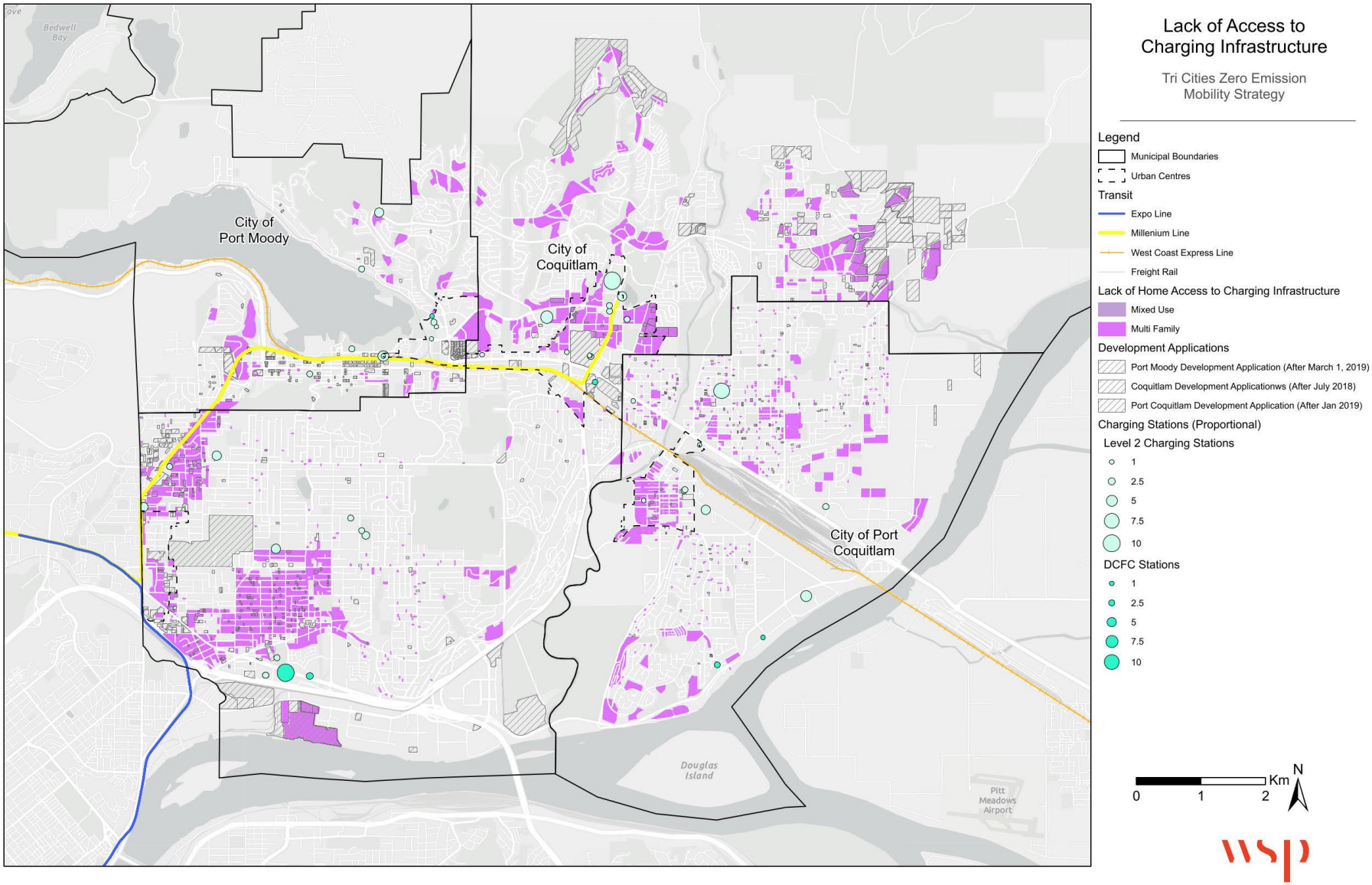


Figure 5-9: Lack of access to charging infrastructure where garage orphans live



5.3.6 ADDRESSING THE HOME & WORKPLACE CHARGING GAP

We developed and modeled low, medium, and high EV adoption scenarios, reflecting differing degrees of alignment with relevant legislation and targets. These scenarios are expected to bring about significant reductions in transportation GHGs compared to current Metro Vancouver baseline projections.

By 2030, the low and medium adoption scenarios project 22,500 EVs on the road in the Tri-Cities, constituting approximately 16% of the total vehicle fleet. The high adoption scenario, on the other hand, aims for 57,500 EVs, making up 40% of the total fleet by the same year. Looking ahead to 2050, the projections show that the Tri-Cities could see between 113,800 and 173,100 EVs, representing an impressive 65% to 100% of the total fleet.

To successfully transition communities to EVs, it will be crucial to commit to providing a large number of public chargers throughout the area. Additionally, enacting various policies to enhance the availability of home and workplace charging, particularly in existing Multi-Residential Urban Buildings (MURBs), will be essential.

A needs analysis based on Natural Resource Canada's methodology suggests that in order to support the medium adoption levels described above, the Tri-Cities will require approximately 900 Level 2 chargers and 75 DC Fast chargers by 2030. Looking further ahead to 2050, the estimates indicate a need for between 3,600 and 4,600 Level 2 chargers and 400 to 500 DC Fast chargers.

For the high adoption scenario, by 2030, the area will require 2,200 to 2,300 Level 2 chargers and 200 DC fast chargers. By 2050, both the medium and high adoption scenarios will necessitate similar levels of chargers, ranging from 3,600 to 4,700 Level 2 chargers and 400 to 500 DC Fast chargers.

6 Low Carbon Fuels Credit Opportunity

While administration of obtaining low carbon fuels credits (LCFC) through the Province's Low Carbon Fuels Standard (LCFS) can be time consuming, it may be advantageous for the Tri-Cities to work together under one reporting system to obtain low carbon fuel credits. This reduces the administrative burden and can be beneficial for selling higher bundles of carbon credits to interested buyers. It is important to note that as long as low carbon fuels, such as electricity for electric vehicles are sold, there is a legal requirement to report the quantity of fuels through the province's LCFS online reporting portal.

6.1 Municipal Installation & Ownership

Governments can provide the necessary incentives, regulations, and funding to encourage the development of electric vehicle supply equipment (EVSE). For example, they can offer tax credits or grants to businesses that invest in charging stations or require new buildings to have charging infrastructure installed. With the current state of charging station need within the Tri-Cities, municipalities still have an important role to play in zero emissions infrastructure expansion.

Installing and maintaining infrastructure is one such way of ensuring that there is equitable access to infrastructure, especially in low-income neighborhoods and areas with lack of access to private infrastructure. While the changes to the LCFS in 2022 is expected to incentivise more private investment in EVSE, there may still be a delay until widespread expansion of infrastructure can be championed by the private sector. Therefore, at this stage, provision of zero-emission vehicle infrastructure could be considered as a public benefit.

The level of infrastructure that municipalities should focus on installing depends on several factors, including the local demand for electric vehicle charging, the existing charging infrastructure, revenue potential and the local government's goals for promoting sustainability and reducing emissions.

6.2 LCFS Revenue Allocation

To ensure that revenue from the low carbon fuels credits is used effectively, it's crucial to establish a clear framework and policy for revenue allocation. This will ensure that the funds are directed towards their intended use. A possible strategy is to reinvest revenues into charging infrastructure and other low carbon mobility programs, which can generate a steady revenue stream to support the expansion of zero-emissions infrastructure. Creating a policy for the use of these revenues can also help secure long-term funding for such infrastructure. With a focus on investing in electric vehicle charging infrastructure, the resulting cycle of revenue generation can ideally be self-sustaining, leading to a self-funded expansion of charging infrastructure.

6.3 Private Sector Installation & Ownership

Private landowners can now take advantage of the LCFC marketplace to help reduce the costs associated with EVSE installation. Municipalities should encourage knowledge sharing and

partnerships with local businesses to expand charging infrastructure in areas of high-demand, such as commercial districts, shopping centres, and public parking lots.

In short, both governments and the private market have important roles to play in investing in electric vehicle infrastructure. A partnership between the two can be a powerful way to accelerate the adoption of electric vehicles and the development of the necessary infrastructure to support them.

6.4 Advantages & Challenges of Owning and Operating Charging Infrastructure

Given the changes to low carbon fuels regulation, the enhanced ability for fuel suppliers to generate low carbon fuels credits makes it a compelling option for municipalities looking to expand public charging infrastructure. Taking advantage of the LCFS can help to recover the costs of installation and can lead to a profit in the long-run.

The following table notes advantages and challenges to consider when making the decision to install zero emissions vehicle infrastructure.

Table 6-1: Advantages and challenges of installing zero emissions vehicle infrastructure.

Advantages	Challenges
Rapid expansion of EV charging infrastructure and **promoting emission reductions:** Municipalities can promote emission reductions by providing infrastructure for electric vehicles, reducing greenhouse gas emissions from transportation and supporting the transition to zero-emission vehicles.	**Upfront costs:** The cost of purchasing and installing charging infrastructure can be significant, especially for fast charging stations, which require more equipment and installation work. Cost associated with networking chargers may also fluctuate.
Site selection: Municipalities can deploy best practices in site selection to ensure that charging stations are located in convenient and high-demand areas, such as commercial districts, shopping centres, and public parking lots.	**Maintenance and repair:** Like any equipment, charging stations require regular maintenance and occasional repairs, which can be costly and time-consuming.
Data management: Owning and maintaining electric vehicle charging infrastructure allows municipalities to collect data on charging behaviour, demand patterns, and usage rates, which can help inform future infrastructure planning.	**Electricity costs:** The cost of electricity needed to power charging stations can fluctuate based on the local electricity rates and demand, which can impact profitability.

Advantages	Challenges
Equity and access: By owning and maintaining electric vehicle charging infrastructure, municipalities can ensure that charging stations are accessible and equitable for all residents, including those who live in apartment buildings or other areas without access to personal charging options. Municipalities can also control the fee for use and provide subsidized charging rates.	**Competition:** With the growing number of electric vehicles on the road, there is an increasing number of charging stations being installed, which can lead to competition and lower profit margins (especially if the revenue stream is being relied upon). However, once this point is reached, municipalities may not need to continue to install infrastructure as the private market will have successfully caught up.
New revenue stream: By owning and operating charging stations, municipalities can create a new revenue stream from selling electricity to electric vehicle drivers and LCFCs to the LCFS marketplace.	**Electrical capacity constraints:** Municipalities may need to upgrade electrical infrastructure to support charging stations, which can be expensive and require significant planning and coordination with utilities.

7 Goals & Recommended Actions

This section presents a focused and purposeful set of actions aimed at promoting sustainable mobility in the Tri-Cities. These actions draw on insights from the mobility landscape analysis and GHG reduction identification, strategically addressing the region's distinct challenges. The recommendations have been carefully tailored to the Tri-Cities' context, building upon the quantification and benchmarking of the mobility landscape. Prioritized based on the area's unique needs and informed by best practices from British Columbia and beyond, the curated list presents tangible actions well-suited for municipal implementation. While not exhaustive, these actions offer a viable pathway towards a greener and more sustainable transportation system paving the way forward towards zero emission mobility.

Approximately 121 actions were initially identified across 11 themes. Municipal staff within the Tri-Cities were asked to rank the original long-list actions on a three-point scale from low to high priority. Through collaboration and synthesis, the original long-list was reduced and reorganized into a high priority shortlist consisting of 45 actions that align with seven goals. Broad goals and action counts are noted in **Table 7-1** and described in detail in the following subsections.

Table 7-1: Goals for the Tri Cities' Zero Emissions Mobility Plan

Goal Item	Goal	Action Count (Shortlist)
A	Expand Public EV Charging	11
B	Expand Home and Workplace Charging	5
C	Accelerate Light-Duty EV Adoption	5
D	Support and Promote the Transition to E-Micromobility	9
E	Lead by Example	5
F	Generate Revenue from the Sale of Low Carbon Fuels for Revenue	4
G	Monitor and Evaluate Progress	6
Total Actions		**45**

7.1 A – Expand Public EV Charging

Public charging stations are an integral part of the infrastructure that supports the adoption and use of electric vehicles (EVs). While many EV owners have the convenience of charging their vehicles at home or at their workplace, not all drivers have access to such charging facilities. This is especially true for individuals who reside in apartments, condos, or rental properties, where installing private charging infrastructure might not be feasible or allowed.

For drivers who embark on longer journeys or face unexpected charging needs, public charging stations become essential. These stations provide the necessary infrastructure for recharging EV batteries while on the go, ensuring that drivers can confidently plan and execute their trips without 'range anxiety'.

Expanding electric vehicle (EV) charging infrastructure in cities is vital to accelerate the adoption of electric vehicles and achieve broader sustainability goals. A robust charging network reduces range anxiety for EV owners, encouraging more people to make the switch and contributing to lower greenhouse gas emissions and improved air quality. Moreover, it aligns with regulatory targets and economic growth by creating jobs, reducing fossil fuel dependence, and stimulating local economies.

Furthermore, investing in EV charging infrastructure positions cities as innovative leaders in clean technology, attracts tourists with EVs, and promotes equitable access to cleaner transportation options. Smart grid integration enhances energy management, while the transition to EVs prepares cities for the future of transportation, ensuring a more resilient, eco-friendly, and economically vibrant urban landscape.

7.1.1 OBJECTIVES

1. Significantly expand public charging infrastructure to 864 Level 2 and 75 DC Fast chargers by 2030 to support a medium adoption scenario where approximately 23,000 EVs are registered in the Tri-Cities by 2030, representing approximately 16% of the total light duty vehicle fleet.

2. Distribute public charging infrastructure in line with population density, housing type as well as key locations and trip generators; with consideration given to equity of access.

7.1.2 ACTIONS

A-1: Coordinate and facilitate the expansion of the public charger network to 864 Level 2 and 75 DC Fast Charger public charger ports across the Tri-Cities by 2030.

To support a 16% light duty vehicle share (approximately 23,000 EVs), 864 Level 2 and 75 DC fast EV charging stations will need to be provided across the Tri-Cities within the next seven years. This represents an almost 10-fold increase in Level 2 charging infrastructure and 2.2-fold increase in DC Fast Charger infrastructure by 2030 over 2022 levels.

As the charger target is in line with a medium adoption scenario, the rate of EV adoption should be periodically monitored to ensure that sufficient chargers are being provided and adjusted accordingly.

While distribution within the municipalities will vary, the following public charger targets are recommended per municipality:

Table 7-2: 2030 Public Charger Targets by Municipality

	Port Moody	Coquitlam	Port Coquitlam	Tri-Cities
Level 2 Charger Target	130	540	194	864
DC Fast Charger Target	11	47	17	75

A-2: Expand the publicly accessible charging network in higher density and mixed-use locations such as designated urban centres and frequent transit development areas as well as locations with greater proportions of multi-unit residential buildings (MURBs). Strong consideration should be given to on-street charger placement.

Areas with high population and employment density should be prioritized for public charger placement. Designated urban centres and frequent transit development areas are hubs where people live, work, and commute, making EV charging readily available in these locations critical for encouraging EV adoption among a diverse range of users. The term "publicly accessible" implies that these charging stations are not limited to specific groups or memberships; instead, they are open for use by any electric vehicle owner, promoting the widespread adoption of electric vehicles by ensuring easy access to charging infrastructure.

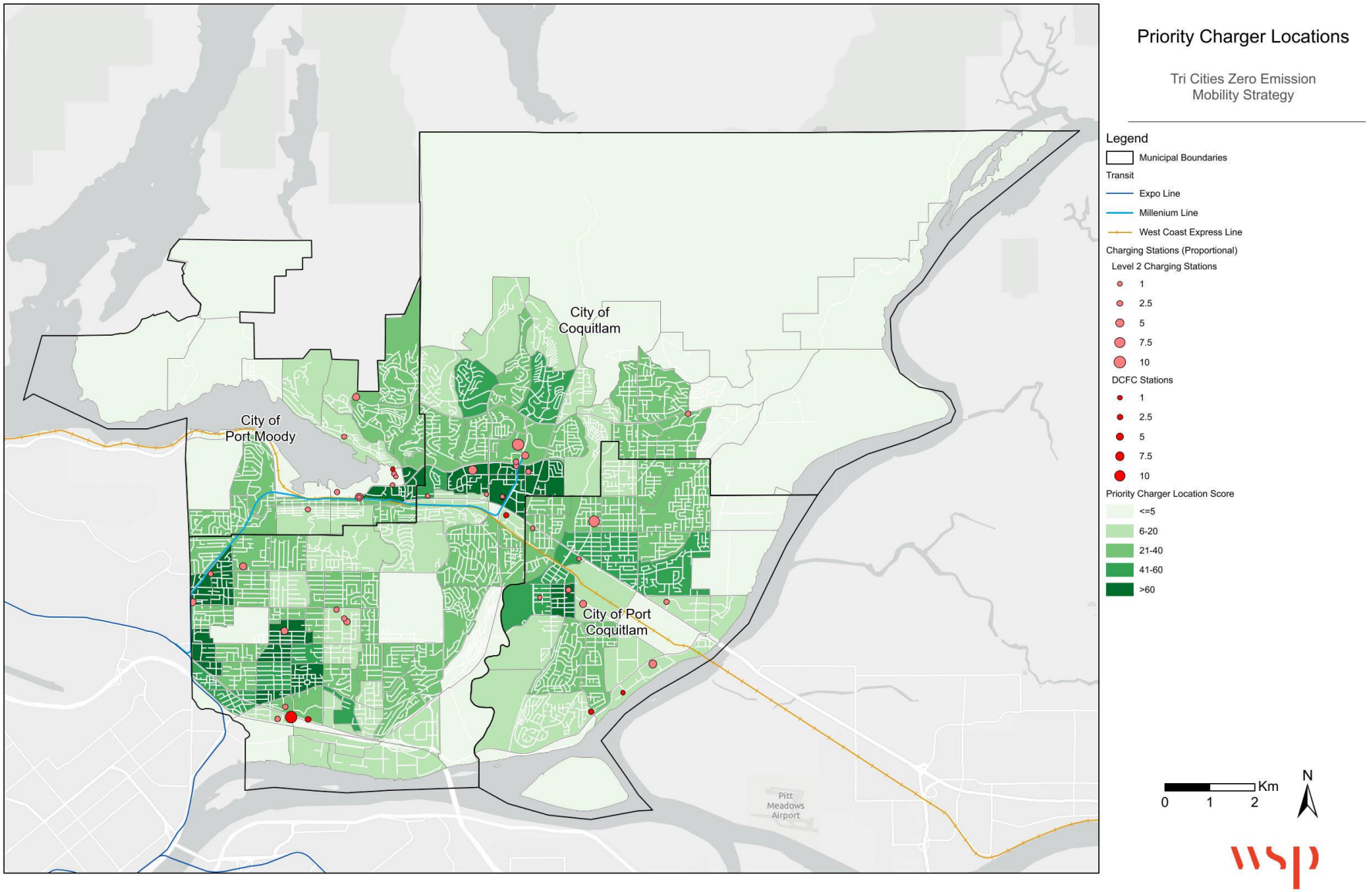
Additionally, focusing on locations with a significant presence of multi-unit residential buildings (MURBs) acknowledges the challenge of EV charging access for residents who lack personal garages or dedicated parking spaces. Installing charging stations in or around these buildings enables apartment and condo dwellers to conveniently charge their EVs, ensuring equitable access to clean transportation options.

The suggestion to prioritize on-street charger placement recognizes the practicality of utilizing existing infrastructure. On-street charging stations can capitalize on curbside parking spaces, integrating EV charging into the urban landscape without requiring major construction.

Priority charger locations are mapped in **Figure 7-1**. Priority charger area scores are a function of both population and employment density as well as land-use, with priority weighted for areas with mixed-use and high-density dwellings. As displayed, Lougheed Town Centre, Burquitlam, Downtown Coquitlam, central Austin Heights, Maillardville, East Port Moody-Inlet Centre, and Downtown Port Coquitlam are identified as the highest priority areas for public EV chargers. Of note, many of the high priority areas indicated do not currently have EV chargers.

The methodology used in this exercise to generate priority charger locations is detailed in **Appendix B.**

Figure 7-1: Tri-Cities Priority Charger Locations



A-3: Work with private and public agency property owners at destinations such as workplaces, office parks, malls, parkades, and park and ride lots to enhance destination-based charging opportunities.

While the municipalities may lead the direction the process, achieving the Tri-Cities' 2030 EV charger target will take collaboration with other public agencies and the private sector. Collaborating with private and public property owners to enhance destination-based EV charging can help drive widespread electric vehicle adoption, while advancing the sub-region towards its public charger targets. By strategically placing charging infrastructure at locations like workplaces, malls, office parks, and park and ride lots, EV users can effortlessly charge their vehicles during their daily activities, reducing range anxiety and promoting cleaner transportation choices. This approach capitalizes on extended dwell times at destinations, enabling gradual charging and fostering behavioral shifts towards EV usage.

A-4: Develop charging hubs with multiple charging stations and types to ensure charger availability.

Creating charging hubs featuring multiple charging stations and types is a strategic move to ensure convenient and readily available public EV charging. Moreover, charging hubs serve as educational showcases, promoting public awareness about EV technology while optimizing resource utilization and potentially leading to cost savings through economies of scale.

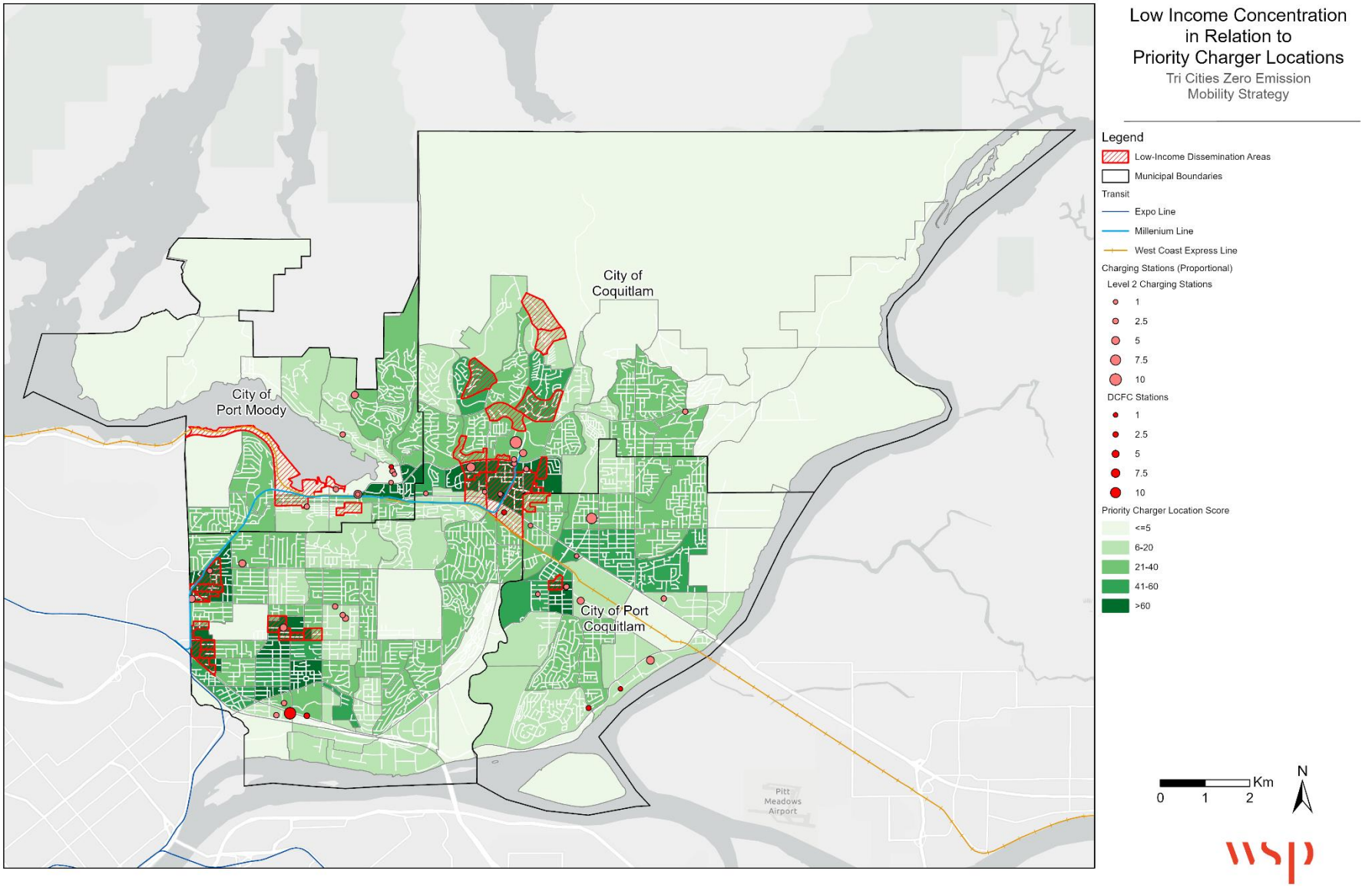
A-5: Ensure a fair and inclusive distribution of charging infrastructure across the community through an equity lens.

The Tri-Cities should consider equity, among other criteria, when siting publicly-owned EV chargers to ensure fair distribution across the community. As well, consideration should be given to install Level 2 and DCFC charging infrastructure specifically in areas that might not be targeted by private investment to accelerate the pace of installation and improve overall equity.

By prioritizing equitable placement, charging stations become accessible to a diverse range of residents, including those in underserved or disadvantaged neighborhoods. This approach helps bridge gaps in access to clean transportation options and contributes to environmental justice by reducing disparities in EV adoption. Additionally, it promotes social and economic equity by providing all residents with the opportunity to benefit from the convenience and environmental advantages of electric vehicles.

Figure 7-2 displays Priority Charger Locations alongside areas of low income concentration, represented as Census Dissemination Areas where more than 25% of constituent households fall below the low income line, as defined by Statistics Canada. While many neighbourhoods with high low income concentrations align with priority charger areas, others are outside prioritized areas, and may require specific attention.

Figure 7-2: Priority Charger Locations and Areas of Low Income Concentration



A-6: Continue to engage with Metro Vancouver and TransLink to support regional charging coverage in alignment with the results of the Regional EV Infrastructure Study.

By working closely with regional authorities such as Metro Vancouver and TransLink, the deployment of charging stations can be strategically planned to address the specific needs and priorities identified in the study. This coordination helps avoid duplication of efforts and ensures that charging infrastructure is placed in areas with high demand and potential for widespread EV adoption. Furthermore, this partnership leverages existing regional transportation networks and infrastructure, optimizing the integration of EV charging into the broader mobility ecosystem.

A-7: Formalize responsibility for the public EV charger network (management of costs, management of data, and assessment of options for operations and maintenance).

Establishing a formalized structure to oversee the public EV charger network is vital for efficient management. This entails assigning responsibility for cost management, data handling, and operations and maintenance. Clearly defining roles ensures effective budget allocation, expenditure tracking, and financial planning, optimizing the allocation of resources for infrastructure development and maintenance. Centralized data management allows for insights to be derived from charging usage patterns and user behavior, informing decisions for network expansion and enhancements. Additionally, designating responsibility for operations and maintenance guarantees regular upkeep, troubleshooting, and repairs, ensuring reliable charging availability and a positive user experience.

A-8: Embed public EV charging considerations in all new developments and planning processes; consider eligible developer contributions for funding new public charger infrastructure generated by new developments.

Embedding public EV charging considerations in new developments and planning processes is a forward-looking strategy that aligns urban growth with sustainable transportation. As cities expand, integrating EV charging infrastructure from the outset ensures that the transportation landscape evolves in harmony with the increasing demand for electric mobility.

EV charging considerations should be integrated into the core planning processes of new developments. This involves collaborating closely with city planners, developers, and stakeholders to assess EV charging needs based on factors like anticipated population density, vehicle ownership projections, and the evolving EV landscape. Incorporating charging infrastructure into architectural designs, parking layouts, and utility planning ensures that electric mobility remains seamlessly accessible to residents and visitors as the city evolves.

By considering developer contributions to fund new public chargers necessitated by these developments, the costs associated with expanding the charging network are shared responsibly and in proportion to the demand generated by urban growth.

A-9: Consider imposing business license fees or discounts to require EV charging at select business types (i.e. license fees to encourage or mandate the installation of EV chargers at gas stations).

Introducing business license fees or discounts to incentivize EV charging at specific business types presents a strategic opportunity to accelerate the adoption of electric vehicles and promote

sustainable practices. By incorporating such measures, cities can encourage businesses to actively participate in expanding the charging infrastructure. Specifically targeting gas stations for these incentives means that cities can facilitate the transformation of conventional refueling stations into dual-purpose charging stations, contributing to the diversification of energy sources along important transportation routes.

A-10: Develop design standards for all publicly accessible charging stations, including on-street charging, adhering to universal design best practices and ensuring stations are accessible to all users. Ensure that public chargers in municipal lots are clearly marked with attractive and informative signage through the development of EV signage standards.

The Tri-Cities should work together with regional partners (i.e. Metro Vancouver) to collaboratively develop comprehensive design standards for all publicly accessible EV charging stations, encompassing on-street charging while aligning with universal design best practices. Concurrently, the development of EV signage standards for public chargers in municipal lots and on-street is recommended. This signage should effectively communicate the presence of charging stations, provide guidance on usage, and include relevant contact information. The strategic placement of standardized signage within municipal lots guarantees heightened visibility and user engagement, facilitating a user-friendly and efficient charging experience.

A-11: Where possible, use EV energy management systems (EVEMS) to reduce costs for municipal infrastructure and in policy development

EVEMS (Electric Vehicle Energy Management Systems) are a technology designed to regulate the charging rate and identify optimal charging times for electric vehicles. By utilizing EVEMS, multiple chargers can efficiently share the same branch circuit, which refers to the wire connecting the charger to the electrical panel breaker. This intelligent coordination ensures an optimized and balanced charging process, maximizing the utilization of available electrical capacity while minimizing the risk of overloading the circuit.

Implementing Electric Vehicle Energy Management Systems (EVEMS) would allow the Tri-Cities to optimize electric vehicle charging schedules, leading to cost savings through reduced electricity expenses, efficient infrastructure planning, and load management. By strategically managing charging demand, EVEMS helps stabilize the grid and aligns with environmental goals, while data collected informs policy development, fostering cleaner transportation practices.

7.2 B – Expand Home & Workplace Charging

Surveys in peer jurisdictions indicate that most EV charging happens at home, with about 15% of charging occurring at destinations, such as workplaces. By improving access to residential charging solutions, critical barriers can be reduced for residents who may lack dedicated parking spaces or face challenges in installing private charging infrastructure. Expanding home and workplace charging for electric vehicles is pivotal in enhancing the convenience and feasibility of EV ownership. Home charging offers EV owners the convenience of overnight recharging, overcoming range anxiety and promoting more confident vehicle usage. Similarly, workplace charging enables EV users to charge while at work, accelerating the transition to cleaner transportation options and reducing reliance on fossil fuel-powered vehicles.

7.2.1 OBJECTIVES

1. Improve access to EV charging at home and at work.
2. Ensure new residential builds are 100% EV Ready.

7.2.2 ACTIONS

B-1: Encourage MURB owners, management companies, or condo boards to assess the feasibility of upgrading electrical infrastructure to support EV charging in their complexes through educational support or by directing City web traffic to BC Hydro resources and incentives.

Many MURBs face challenges in retrofitting their existing electrical systems to accommodate EV charging demand. By offering educational resources, the Tri-Cities can empower MURB stakeholders with knowledge about the benefits of EV charging, technological advancements, and potential cost savings associated with upgrading their electrical infrastructure. Connecting them with BC Hydro incentives further incentivizes investment by alleviating financial burdens.

The Tri-Cities should work together and with Metro Vancouver to provide this education and may consider promoting alternatives such as PACE (property assessed clean energy) financing. PACE financing is an innovative payment system where property owners can purchase energy efficiency upgrades and infrastructure through a long-term repayment system through property taxes with low interest rates.

B-2: Promote existing federal and provincial incentives for EV charging retrofits in existing single-detached homes and multi-unit residential buildings and consider providing short-term municipal 'top-ups' to augment federal and provincial funding.

The Tri-Cities should leverage current federal and provincial incentives aimed at encouraging the retrofitting of residential EV charging infrastructure. This could include providing short-term municipal incentives to further enhance, or ‘top-up’ the impact of federal and provincial funding.

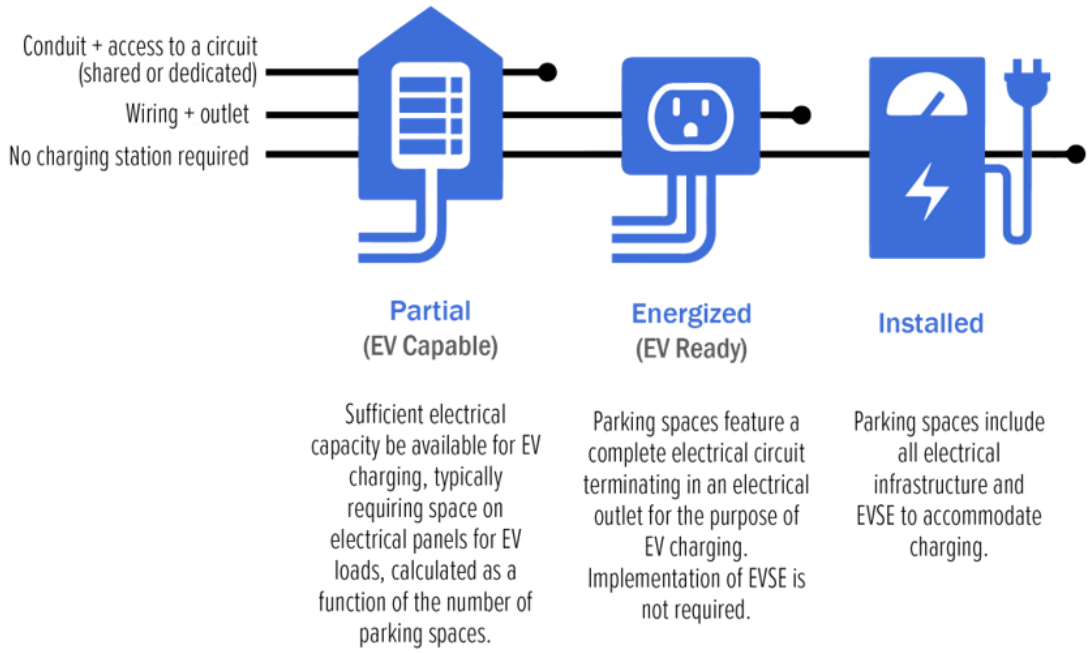
A description of current incentives, as per August 2023, is included in **Section 9.**

B-3: Amend by-laws to require EV-ready parking stalls in all new residential, commercial and institutional construction (i.e. through zoning and parking bylaws).

Ensuring EV-friendliness in a building doesn't require an immediate installation of EV chargers. Instead, a proactive approach involves installing outlets or junction boxes near parking spaces, enabling residents to conveniently connect to chargers in the future. While electrifying a few parking spaces at a time or installing shared chargers in common areas might seem practical initially, this piecemeal strategy can become unsustainable and costly as demand for charging grows. If inadequate forward planning is done, the early chargers might exhaust the electrical capacity, leading to potential challenges for additional installations when more drivers desire dedicated charging spots. To avoid these issues, comprehensive planning is essential to accommodate the increasing demand for EV charging effectively.

EV-readiness is defined as displayed in **Figure 7-3.**

Figure 7-3: EV Ready explanation



*EV Capable requirements are not enough as it will result in only minimal cost savings for developers and can increase challenges for residents to install the outlet and charger. It is also more challenging to enforce than EV ready requirements.

The following **EV ready** requirements are recommended for new builds:

- Residential and Hotels: 100% EV Ready for residence-assigned stalls (45% EV Ready for visitor stalls)
- Commercial & Institutional: 45% EV Ready
- Shared-vehicle parking: 100% EV Ready
- Other land uses: 45%

B-4: Create a centralized webpage to educate residents and businesses on EV charging options, multifamily unit retrofits, and available financial incentives for home charging with links to broader Provincial and regional resources such as Emotive and Plug-In BC.

The Tri-Cities should together establish an online platform or a page on their municipal websites that serves as a centralized hub for educating both residents and businesses about EV charging alternatives, retrofitting options for multi-unit dwellings, and the array of existing financial incentives for home charging, with links to existing provincial and regional initiatives.

B-5: Continue to advocate to the Province for “Right to Charge” legislation to make installing EV charging in existing multi-unit buildings easier and more cost-effective.

This action may be advanced through the UBCM conference, letters and resolutions, policy submissions, engagement with local MLAs, and requests through appropriate committees and working groups.

7.3 C – Accelerate Light-Duty EV Adoption

Accelerating electric vehicle (EV) adoption requires a collaborative effort among multiple levels of government, as well as private industry and community stakeholders. While different levels of government play distinct roles, a holistic approach involving all levels is essential for effective and comprehensive progress.

7.3.1 OBJECTIVES

1. Support a target for 20% of light-duty vehicles registered in the Tri-Cities to be Zero Emission Vehicles by 2030.

7.3.2 ACTIONS

C-1: Develop standards and policies to facilitate 100% EV Car Share in the Tri-Cities.

Embracing 100% EV car sharing promotes public awareness and familiarity with electric mobility, contributing to a cultural shift toward more environmentally conscious transportation choices. To realize the vision of 100% EV car sharing in the Tri-Cities, policies for minimum EV-to-gasoline ratios with deadlines for full transition may be considered.

C-2: Continue to share knowledge and experience with federal and provincial EV working groups to guide policy direction.

The action involves active involvement in collaborative federal and provincial EV working groups, engaging in meetings, sharing experiences within a local government EV peer networking group, and advocating for EV-related policies. Staying updated with industry developments, sharing insights, and influencing policy direction all contribute to becoming a key advocate for the growth of the EV sector.

C-3: Advocate that utilities, regional, provincial and federal governments maintain and expand supportive incentives and policies.

The federal government plays a significant role in setting overarching policies, standards, and incentives that can drive EV adoption on a national scale. It can establish regulated sales targets, mandate emissions and GHG reduction targets, provide financial incentives such as EV purchase rebates or tax credits, fund research and development for EV technologies, and promote the development of a national EV charging infrastructure. The federal government's influence can extend to creating regulations that encourage automakers to produce more EVs, thereby expanding vehicle choices for consumers. Advocating for higher levels of government to maintain and expand supportive incentives and policies will ensure that this does not fall completely on the shoulders of municipalities and the private sector which can slow adoption.

C-4: Advocate that higher levels of government work to reduce barriers to EV adoption, which could include advancing Provincial "right to charge" legislation alongside incentivization, and vehicle purchase rebates to reduce purchase cost disparity with ICE vehicles.

"Right to charge" legislation, refers to laws or regulations that grant individuals living in multi-unit residential buildings (MURBs) or rental properties the legal right to install and use electric vehicle charging infrastructure in their parking spaces. "Right to charge" laws often prohibit property management, landlords, or homeowner associations from unreasonably denying or restricting a resident's request to install charging infrastructure. The legislation ensures that residents have the legal entitlement to install EV charging stations in their designated parking spaces, even if they do not own the property. This gives EV owners living in MURBs or rental units the ability to charge their vehicles conveniently at home, similar to homeowners with private garages.

Continuing to advocate to the Province through the UBCM and through official letters of support will demonstrate to the province that cities are passionate about advancing this legislation.

C-5: Advocate to higher levels of government to attract EV and EV battery manufacturing to strengthen and support the local EV industry as part of a broader economic development strategy.

Advocating for higher levels of government to attract EV and EV battery manufacturing presents a strategic opportunity for cities to drive economic development and environmental sustainability. By partnering with industry stakeholders and collaborating with regional authorities, the Tri-Cities can encourage the establishment of manufacturing facilities that create jobs, stimulate local economies, and nurture innovation.

7.4 D – Support and Promote the Transition of E-Micromobility

Supporting and promoting the transition to e-micromobility presents a holistic approach to addressing multiple urban challenges. These compact electric mobility solutions, encompassing electric scooters, bicycles, and small electric vehicles, offer benefits that align with sustainable urban development. By integrating e-micromobility options, cities can provide residents and visitors with alternative personal mobility options, potentially alleviating traffic congestion and reducing air pollution.

E-micromobility serves as a solution to the "first-and-last-mile" problem in public transit, providing convenient connections between homes and SkyTrain stations. This not only enhances overall mobility but also reduces the reliance on personal cars for short trips.

7.4.1 OBJECTIVES

1. Build a vibrant e-micromobility ecosystem.

7.4.2 ACTIONS

D-1: Consider rebranding cycling facilities as 'micromobility facilities' to communicate to all road users the preferred travel location for this expanded user group within the road Right-of-Way. Expedite the completion of the Tri-Cities' All Ages and Abilities (AAA) micromobility network as laid out in the municipalities' respective Transportation Master Plans in recognition that the transition to e-mobility will generate an additional user-base for cycling facilities.

The rise of e-micromobility has expanded the userbase for traditional cycling facilities. Alongside cyclists, bike facilities now need to accommodate the mobility needs of e-bikes, e-scooters, and other electric small mobility devices, increasing overall demand on these facilities. The broadened userbase underscores the need to develop and maintain a safe and robust network of All-Ages-and-Abilities (AAA) facilities. To this end, the Tri-Cities should strongly consider expediting the completion of these facilities, leveraging external funding partnerships (i.e. TransLink funding along the MRN), where applicable. Strong consideration should be given to rebranding traditional bike facilities as slow, small vehicle (micromobility) facilities to align with their functional shift in purpose and clearly communicate where micromobility devices belong in the right-of-way.

D-2: Identify and plan for infrastructure to ensure the safety and security of e-micromobility device users, cyclists, and others.

The growth in micromobility has resulted in increased demand for traditional cycling facilities through the addition of new user groups. As costs for personal micromobility devices continue to decrease, these pressures will likely only grow. Alongside expediting network expansion, the following context sensitive improvements could be considered in higher usage areas:

- Widening multi-use trails;
- Creating pull-outs and designated parking locations for cargo bikes;
- Providing separated rolling/cycling designated facilities
- Providing secure bike parking (with standard electric outlets for charging e-micromobility devices) in commercial areas;
- Posting speed limits on congested trails.

D-3: Increase awareness of e-bikes and other e-mobility devices through a comprehensive communications campaign.

The City of Coquitlam's E-Scooter Pilot Project (operating through December 2024) is actively raising public awareness of e-micromobility in the Tri-Cities. *Lime* and *Neuron Mobility* are operating, maintaining, and managing a publicly-accessible dockless e-scooter and e-bike sharing system in Coquitlam's City Centre. Shared bikes and e-scooter services use downloadable apps to allow clients to find, unlock, and pay for point-to-point micromobility services. In-person workshops conducted by City of Coquitlam staff in collaboration with HUB Cycling are occurring to educate the community on micromobility and provide demonstration e-scooters and e-bikes for trial by the public.

In addition to the conspicuous presence of shared micromobility services, the Tri-Cities could consider incorporating messaging around the evolving mobility landscape into planned pop-up events, open houses, or online. Communications campaigns could focus on safe operations and awareness of e-micromobility vehicles, emphasizing where vehicles should preferably be operated within the right-of-way and encouraging appropriate rider etiquette. Campaigns can also raise awareness about safe and secure public bike or e-micromobility parking and available public outlets for charging.

In addition, on-road signage encouraging riders to travel in designated cycling facilities could be mounted in prominent and high traffic locations to regularize both e-micromobility users, cyclists, and the general public to expectations around operating behaviour.

D-4: Initiate an update of Zoning Bylaws and Off-Street Parking Regulations to enhance storage options for e-bikes and other micromobility devices in new multi-unit buildings to support their secure storage and charging.

While bicycle rooms have become increasingly common in newer multi-unit buildings, it is increasingly important that these and other residential end-point facilities provide for flexibility and electrification needed to accommodate an expanding array of e-micromobility devices.

Municipal bylaws and parking regulations should be updated to reflect a changing reality with emphasis placed on ensuring new builds contain end-point facilities that are at the same time secure, flexible to allow for the stowage of larger devices, and provide charging access.

D-5: Explore the feasibility of micromobility hub creation alongside e-micromobility device public charging (outdoor outlets) at strategic locations, with the co-benefit and consideration of accessibility standards for mobility scooters.

The Tri-Cities can conduct a comprehensive site assessment to identify suitable locations for micromobility hubs, considering factors such as foot traffic, connectivity, and nearby amenities. Collaborating with local e-micromobility providers, they can install outdoor charging outlets and establish a seamless charging infrastructure. Concurrently, involving accessibility experts and engaging with the mobility scooter community will enable the integration of universal design principles, ensuring that the hubs are easily accessible and usable by everyone. This can include features like ramps, designated parking spaces, and proper pathway widths.

D-6: Refine bylaws and/or permit programs to regulate businesses renting shared e-mobility devices, pending a review of Coquitlam's e-scooter share pilot program. Aim to expand permanent e-micromobility sharing to include all the Tri-Cities by 2026, pending updates to the BC MVA.

Coquitlam’s e-scooter share pilot program is currently operating through December 2024. The pilot program will provide the City with significant data around the demand for e-micromobility share services (along with typical daily and weekday/weekend variations), usage and travel patterns, as well as demographic information around who uses to the system. Alongside system data, the broader community will be consulted on the benefits and drawbacks of e-micromobility share operations in Coquitlam City Centre.

Incorporating key lessons learned from Coquitlam’s e-scooter pilot program is imperative for the continued operation of the mobility share system in its current service area – and its potential expansion to all Tri-Cities by 2026, pending updates to the BC Motor Vehicle Act (MVA). The ongoing success of this burgeoning travel mode will be reliant on bylaw or permit program refinements that ensure services can be delivered in the best way possible, while mitigating negative externalities.

D-7: Advocate to the Provincial and Federal governments to expand the current BC e-bike rebate program to include other forms of e-micromobility beyond e-bikes.

As of June, 2023, the Provincial government is offering significant rebates that reduce the purchase price of e-bikes. Income-indexed rebates range from $350 to a maximum of $1,400 and is anticipated to allow as many as 9,000 people to lower the cost of their e-bike purchase.

In recognition that the evolving e-micromobility landscape involves other devices that can be of equal use and benefit to the travelling public, it is recommended that the Tri-Cities advocate to the Province to allow the current grant to apply to the purchase of other e-micromobility devices, alongside e-bikes.

D-8: Incorporating lessons learned from e-micromobility pilot programs taking place across BC, including in Coquitlam, advocate to the Province for permanent updates to the BC MVA to allow for the continued operation of e-scooters and other e-micromobility devices on public roadways.

Ordinarily, the operation of e-scooters is illegal on public roadways in the Province of BC. In light of new circumstances, the Province has initiated an *electric kick-scooter pilot project,* which allows for e-scooter operation on roads and highways in participating pilot communities. Within Metro Vancouver, these communities include the City of Coquitlam, City of North Vancouver, City of Richmond, City of Vancouver, District of North Vancouver, District of West Vancouver, and Township of Langley.

Under the pilot program, electric scooters are encouraged to travel in designated cycling facilities or as near as possible to the right of the street, sidewalk use is prohibited, and riders are prohibited from using crosswalks unless specifically allowed by signage.

Incorporating key lessons learned through the pilot project, including in Coquitlam, and barring significant and insurmountable issues arising from the pilot, it is recommended that the Tri-Cities advocate for permanent changes to the Motor Vehicle Act to permit legal and safe e-scooter operations across the Province, including throughout the Tri-Cities.

D-9: Advocate to TransLink to update their infrastructure design guidelines to support e-micromobility devices.

TransLink's Bus Infrastructure Design Guidelines identify elements and design standards for bus stops and transit facilities. These include considerations for the design of cycling amenities in transit stations.

As e-micromobility can function as an important "first and last mile" component for transit trips, the Tri-Cities should advocate for minor updates to existing design standards to incorporate provisions for charging as well as greater flexibility to accommodate variations in e-micromobility device sizes, especially at bike parkades.

7.5 E – Lead by Example

Leading by example signifies the Tri-Cities' commitment to serve as role models and catalysts for EV adoption. This goal entails the Tri-Cities taking proactive steps to demonstrate their dedication to sustainable transportation solutions and to encourage both public and private entities to follow suit.

7.5.1 OBJECTIVES

1. Achieve 100% zero emissions fleet vehicles by 2040 or sooner.

2. Guide investment decisions toward zero-emissions options.

3. Visibly demonstrate the Tri-Cities commitment to sustainable transportation.

7.5.2 ACTIONS

E-1: Develop a corporate carbon price policy to help guide investment decisions toward zero emission options.

By establishing corporate carbon price policies in each respective City, the Tri-Cities can integrate environmental considerations into their financial decisions. This policy would serve as a guiding framework that encourages investments in zero-emission options by factoring in the costs associated with carbon emissions. This proactive approach not only aligns financial choices with sustainability goals but also signals the respective municipality's commitment to reducing its carbon footprint and advancing the transition to cleaner alternatives for transportation and beyond.

E-2: Prioritize the installation of chargers in municipal lots.

The prioritization of electric vehicle chargers within municipal lots reflects a strategic commitment to fostering EV adoption. By focusing on locations with high public visibility and frequent usage, such as municipal parking lots, the Tri-Cities would not only facilitate convenient and accessible charging options for residents but also demonstrate their dedication to supporting sustainable transportation practices and leading by example.

E-3: Conduct charging infrastructure feasibility studies at all municipal facilities as an input to determining charger siting priorities. Consider oversizing electrical conduits to prepare for future expansion.

Undertaking charging infrastructure feasibility studies across all municipal facilities is a proactive step to ensure effective planning and deployment. By assessing the viability and optimal locations for charging stations, the Tri-Cities would gain valuable insights for how to prioritize charger installation. Additionally, the consideration of oversizing electrical conduits to accommodate future expansion reflects a forward-thinking approach, anticipating the growth of electric mobility and preparing the infrastructure for scalability.

E-4: Complete a Municipal Zero-Emission Fleet and Infrastructure Plan.[9]

Developing a comprehensive plan for a zero-emission fleet and associated infrastructure signifies a proactive approach to leading by example. A plan would outline a strategic roadmap for transitioning municipal-owned vehicles to zero-emission options, backed by the necessary charging infrastructure.

[9] Creating a ZEV-first purchasing policy for fleet may be included as an intermediary step prior to a more comprehensive fleet and infrastructure plan.

E-5: Hire a dedicated, shared, Tri-Cities full-time staff member responsible for Zero Emission Mobility.

This staff member would play a pivotal role in advancing decarbonization and micromobility efforts, developing and implementing policies, and engaging in community outreach. It would be intended for this staff member to receive funding from each of the Tri-Cities.

7.6 F – Generate Revenue from the Sale of Low Carbon Fuels

BC's Low Carbon Fuel Credits (LCFCs) program is a valuable incentive provided by the Province to encourage the adoption of low carbon fuels. The Tri-Cities should aim to proactively leverage the financial opportunities presented by the sale of low carbon fuels within its jurisdiction to generate revenue that can be channeled into various sustainable transportation projects.

7.6.1 OBJECTIVES

1. Monetize the sale of Low Carbon Fuels from municipally-owned public EV chargers to charger costs and advance sustainable mobility projects.

7.6.2 ACTIONS

F-1: Review bylaws and transition to user-fees at all new municipally-owned public chargers based on kWh. Review bylaws for the transition to a kWh-based fee for all new chargers Ensure that all new public-facing chargers have the ability to measure kWh directly from the charger.

Ensure that all new public-facing chargers can measure kWh directly from the charger, in accordance with Provincial LCFC program guidelines. By implementing user fees based on kWh consumption at municipally-owned public chargers, the Tri-Cities can generate revenue while simultaneously increasing vehicle turnover and encouraging the use of electric vehicles. This also ensures compliance with Measurement Canada legislation and associated requirements for collecting Low Carbon Fuels credits. Charging users for the actual energy consumed promotes efficient usage of charging stations, reduces congestion, and ensures a fair and transparent billing process.

F-2: Conduct a business case for assessing estimated revenues from Low Carbon Fuels Credit (LCFC) compared to infrastructure cost over time. Capitalize on LCFCs as a revenue generating opportunity through municipal investment in public charging infrastructure.

This analysis should focus on estimating the projected revenues generated from LCFCs in relation to the ongoing costs of developing and maintaining public charging infrastructure over a specified period. By evaluating the long-term financial implications, the Tri-Cities can strategically align the collection of LCFCs with revenue generation through the investment in EV charging infrastructure. This approach ensures that the benefits of the LCFC program are leveraged to not only support the adoption of low carbon fuels but also to fund the expansion and sustainability of the Tri-Cities' EV charging network.

F-3: Implement a climate reserve or alternative funding pool and enact a policy to dictate how LCFC funds will be reinvested in sustainable mobility projects.

To ensure responsible and effective utilization of funds generated from the Low Carbon Fuels Credit (LCFC) program, each of the Tri-Cities should establish a dedicated climate reserve or an alternative funding pool. This reserve will serve as a financial mechanism designed to specifically support sustainable mobility initiatives. In tandem with this, the Tri-Cities should enact a comprehensive policy framework that outlines clear guidelines for the allocation and reinvestment of LCFC funds into various sustainable mobility projects, both as a collective group and individually.

Creating this climate reserve or funding pool *prior* to the sale of the credits provides clarity and assurance that the funds generated will go where they are intended to.

F-4: Explore alternative fee structures for existing time-based charging and consider retrofitting existing chargers that do not have the ability to charge based on kWh; at the same time, consolidate / remove paid parking at EV chargers (if applicable) to reduce redundancy in payment.

Retrofitting existing chargers that do not have the ability to charge based on kWh is a strategic investment for compliance with Measurement Canada and Low Carbon Fuels reporting.

7.7 G – Monitor and Evaluate Progress

This goal aims to ensure a dynamic and data-driven approach to advancing sustainable transportation. By continually tracking EV adoption rates, charging patterns, and infrastructure distribution, the Tri-Cities can gain insights into the effectiveness of incentives, campaigns, and infrastructure expansion efforts. This goal emphasizes adapting strategies to evolving trends, enabling evidence-based decision-making, and ensuring that the Tri-Cities remain responsive to emerging challenges and opportunities in its pursuit of a sustainable and carbon-neutral transportation network.

7.7.1 OBJECTIVES

1. Monitor adoption rates and charging infrastructure utilization across the Tri-Cities.

2. Monitor and evaluate grid integration and load management.

3. Evaluate cost savings and revenues.

4. Monitor and Evaluate equitable access.

7.7.2 ACTIONS

G-1: Develop a Tri-Cities data sharing agreement on charger utilization data and establish a central repository for EV-related data.

Data sharing should occur regularly to further inform EVSE investment. One such method may be through the development of a map of all publicly owned charging infrastructure to track investment, usage, and KPIs that will help guide future infrastructure investments. As part of this, the Tri-Cities should:

- Ensure continual tracking of data by requiring data sharing agreements in instances where private industry or utilities install chargers on public property.
- Analyze usage and utilization patterns to identify peak hours, popular locations, and areas with underutilized infrastructure.
- Use the data to inform the expansion and placement of new charging stations.
- Share EV-related data, including charging patterns, energy consumption, and emissions reductions.

G-2: Work with TransLink to ensure that the regional Trip Diary specifically includes and tracks Electric Vehicle and e-micromobility device uptake and usage patterns.

By integrating EV and e-micromobility usage patterns, this initiative aims to capture a more accurate representation of the evolving transportation landscape. This collaborative effort will provide valuable insights into the adoption rates, usage trends, and travel behaviors associated with EVs and e-micromobility devices across the region. The data gathered through this partnership will serve as a crucial foundation for informed decision-making, enabling the Tri-Cities and TransLink to refine transportation infrastructure and address emerging mobility needs.

G3: Monitor costs and revenues related to installing and maintaining public charging infrastructure.

As the Tri-Cities expand public charging infrastructure, they should work together to monitor and evaluate the total cost of ownership for charging infrastructure as well as any revenues made from the sale of Low Carbon Fuels Credits. This will help the Tri-Cities understand the true costs of EV Infrastructure expansion over time.

G4: Examine public charger usage and utilization trends. Analyze charging station utilization data across different neighbourhoods to identify areas with lower access to charging and advance social equity.

Expansion of the public charging network should be driven by data considerations and should align with usage and utilization patterns. Charger network expansion should consider critical actions noted in under Goal A, including the overall assessment of priority charger locations identified in **Figure 7-1.**

In addition, expansion of the public charger network should be guided by equity considerations, prioritizing charger placement in areas with large concentrations of underserved and marginalized communities.

G5: Monitor load management and grid integration.

To effectively monitor and evaluate progress for grid integration, the Tri-Cities should strategically implement smart charging systems that facilitate real-time communication between EVs and the grid, optimizing charging schedules based on grid conditions and cost fluctuations. Simultaneously, continuous monitoring of grid load during peak usage times should be established to quantify the precise impact of EV charging on grid stability. To enhance responsiveness, the Tri-Cities should initiate demand response programs that allow for flexible adjustment of charging times during periods of heightened grid demand. These combined actions enable comprehensive data collection, facilitating ongoing assessment of the strategy's effectiveness in achieving seamless grid integration

and load management for electric vehicles. By doing so, the Tri-Cities would become a testbed and lead by example to ensure that impacts to the grid are minimized through the expansion of charging infrastructure, while reducing electricity costs.

G6: Periodically review the Zero Emissions Mobility Plan and update as needed

Long-term planning involves regular reviews of the community's EV adoption goals, adapting the strategy in response to evolving technologies, policy landscapes, and community priorities, as well as engaging stakeholders through strategic planning sessions to maintain alignment with overarching objectives.

7.8 Zero Emissions Mobility Roadmap

The Tri-Cities Zero Emissions Mobility Roadmap, which summarizes the goals and actions discussed above, is presented in **Table 7-3.** Action type, who is responsible for implementation, and relative cost is additionally noted for each action, with relative cost symbolized as $ (low cost), $$ (medium cost), $$$ (high cost), - (no cost), + (revenue generating). Costs are discussed in further detail in **Section 8 – Implementation.**

Table 7-3: Tri-Cities Zero Emissions Mobility Roadmap

	Actions	Action Type	Responsibility	Relative Cost ($ to $$$)
GOAL A: Expand Public EV Charging				
Objectives: 1. Significantly expand public charging infrastructure to 864 Level 2 and 75 DC Fast chargers by 2030 support a medium adoption scenario where approximately 23,000 EVs are registered in the Tri-Cities by 2030, representing approximately 16% of the total light duty vehicle fleet. 2. Distribute public charging infrastructure in line with population density, housing type as well as key locations and trip generators; with consideration given to equity of access.				
A-1	Coordinate and facilitate the expansion of the public charger network to 864 Level 2 and 75 DC Fast Charger public charger ports across the Tri-Cities by 2030.	Investment	Municipality, Business Owners, Utilities, TransLink, EVSE companies	$$$
A-2	Expand the publicly accessible charging network in higher density and mixed-use locations such as designated urban centres, mobility hubs and frequent transit development areas as well as locations with greater proportions of multi-unit residential buildings (MURBs). Strong consideration should be given to on-street charger placement.	Policy	Municipality, TransLink	-*
A-3	Work with private and public agency property owners at destinations such as workplaces, office parks, malls, parkades, and park and ride lots to enhance destination-based charging opportunities.	Partnerships	Business owners, Utilities, EVSE Companies, Municipality, TransLink	-*

Actions		Action Type	Responsibility	Relative Cost ($ to $$$)
A-4	Develop charging hubs with multiple charging stations and types to ensure charger availability.	Policy	Municipality or Private Sector	-*
A-5	Ensure a fair and inclusive distribution of charging infrastructure across the community through an equity lens.	Policy	Municipality	-*
A-6	Continue to engage with Metro Vancouver and TransLink to support regional charging coverage in alignment with the results of the Regional EV Infrastructure Study.	Partnerships	Municipality, Metro Vancouver, TransLink	-*
A-7	Formalize responsibility for the public EV charger network (management of costs, management of data, and assessment of options for operations and maintenance).	Policy	Municipality	-
A-8	Embed public EV charging considerations in all new developments and planning processes; consider eligible developer contributions for funding new public charger infrastructure generated by new developments.	Policy	Municipality	+
A-9	Consider imposing business license fees or discounts to require EV charging at select business types (i.e. license fees to encourage or mandate the installation of EV chargers at gas stations).	Policy	Municipality	-

Actions		Action Type	Responsibility	Relative Cost ($ to $$$)
A-10	Develop design standards for all publicly accessible charging stations, including on-street charging, adhering to universal design best practices and ensuring stations are accessible to all users. Ensure that public chargers in municipal lots are clearly marked with attractive and informative signage through the development of EV signage standards.	Study	Municipality, Utilities	$
A-11	Where possible, use EV energy management systems (EVEMS) to reduce costs for municipal infrastructure and in policy development	Policy	Municipality, Utilities	-
GOAL B: Expand Home and Workplace Charging				
Objectives: 1. Improve access to EV charging at home and at work. 2. Ensure new residential builds are 100% EV Ready.[10]				

[10] *EV Ready* refers to parking spaces that feature a complete electrical circuit terminating in an electrical outlet for the purpose of EV charging. Implementation of the Electric Vehicle Supply Equipment (EVSE) is not required.

Actions		Action Type	Responsibility	Relative Cost ($ to $$$)
B-1	Encourage MURB owners, management companies, or condo boards to assess the feasibility of upgrading electrical infrastructure to support EV charging in their complexes through educational support or by directing City web traffic to BC Hydro resources and incentives.	Outreach/ Advocacy	Municipality	$
B-2	Promote existing federal and provincial incentives for EV charging retrofits in existing single-detached homes and multi-unit residential buildings and consider providing short-term municipal 'top-ups' to augment federal and provincial funding.	Investment & Outreach/ Advocacy	Municipality	$$
B-3	Amend by-laws to require EV-ready parking stalls in all new residential, commercial and institutional construction (i.e. through zoning and parking bylaws).	Policy	Municipality	-
B-4	Create a centralized webpage to educate residents and businesses on EV charging options, multifamily unit retrofits, and available financial incentives for home charging with links to broader Provincial and regional resources such as Emotive and Plug-In BC.	Education	Municipality	$
B-5	Continue to advocate to the Province for “Right to Charge” legislation to make installing EV charging in existing multi-unit buildings easier and more cost-effective.	Advocacy	Municipality, BC Hydro, Metro Vancouver, Province of BC	-

Actions		Action Type	Responsibility	Relative Cost ($ to $$$)
GOAL C: Accelerate Light-Duty EV Adoption				
Objective: 1. Support a target for 20% of light-duty vehicles registered in the Tri-Cities to be Zero Emission Vehicles by 2030.				
C-1	Develop standards and policies to facilitate 100% EV Car Share in the Tri-Cities.	Policy & Partnerships	Municipality	-
C-2	Continue to share knowledge and experience with federal and provincial EV working groups to guide policy direction.	Outreach/ Advocacy	Municipality, Metro Vancouver	-
C-3	Advocate that utilities, regional, provincial and federal governments maintain and expand supportive incentives and policies.	Outreach/ Advocacy	Municipality, Metro Vancouver	-
C-4	Advocate that higher levels of government work to reduce barriers to EV adoption, which could include advancing Provincial "right to charge" legislation alongside incentivization, and vehicle purchase rebates to reduce purchase cost disparity with ICE vehicles.	Outreach/ Advocacy	Municipality. Metro Vancouver	-
C-5	Advocate to higher levels of government to attract EV and EV battery manufacturing to strengthen and support the local EV industry as part of a broader economic development strategy.	Outreach/ Advocacy	Municipality	-
GOAL D: Support and Promote the Transition to E-Micromobility				

Actions		Action Type	Responsibility	Relative Cost ($ to $$$)
Objective: 1. Build a vibrant e-micromobility ecosystem.				
D-1	Consider rebranding cycling facilities as 'micromobility facilities' to communicate to all road users the preferred travel location for this expanded user group within the road Right-of-Way. Expedite the completion of the Tri-Cities' All Ages and Abilities (AAA) micromobility network as laid out in the municipalities' respective Transportation Master Plans in recognition that the transition to e-mobility will generate an additional user-base for cycling facilities.	Investment	Municipality	$$$[#]
D-2	Identify and plan for infrastructure to ensure the safety and security of e-micromobility device users, cyclists, and others.	Study	Municipality	$
D-3	Increase awareness of e-bikes and other e-mobility devices through a comprehensive communications campaign.	Policy	Municipality, TransLink	-
D-4	Initiate an update of Zoning Bylaws and Off-Street Parking Regulations to enhance storage options for e-bikes and other micromobility devices in new multi-unit buildings to support their secure storage and charging.	Outreach/ Advocacy	Municipality	$
D-5	Explore the feasibility of micromobility hub creation alongside e-micromobility device public charging (outdoor outlets) at strategic locations, with the co-benefit and consideration of accessibility standards for mobility scooters.	Policy	Municipality, TransLink	-

Actions		Action Type	Responsibility	Relative Cost ($ to $$$)
D-6	Refine bylaws and/or permit programs to regulate businesses renting shared e-mobility devices, pending a review of Coquitlam's e-scooter share pilot program. Aim to expand permanent e-micromobility sharing to include all the Tri-Cities by 2026, through regional partnership and pending updates to the BC MVA.	Study	Municipalities, Metro Vancouver, TransLink	$
D-7	Advocate to the Provincial and Federal governments to expand the current BC e-bike rebate program to include other forms of e-micromobility beyond e-bikes.	Policy	Municipality	-
D-8	Incorporating lessons learned from e-micromobility pilot programs taking place across BC, including in Coquitlam, advocate to the Province for permanent updates to the BC MVA to allow for the continued operation of e-scooters and other e-micromobility devices on public roadways.	Partnerships	Municipality, Private Sector, TransLink	-
D-9	Advocate to TransLink to update their infrastructure design guidelines and policies to support e-micromobility devices.	Outreach/ Advocacy	Municipality	-
GOAL E: Lead by Example				
Objectives: 1. Achieve 100% zero emissions fleet vehicles by 2040 or sooner. 2. Guide investment decisions toward zero-emissions options. 3. Visibly demonstrate the Tri-Cities commitment to sustainable transportation.				

Actions		Action Type	Responsibility	Relative Cost ($ to $$$)
E-1	Develop a corporate carbon price policy to help guide investment decisions toward zero emission options.	Policy	Municipality	-
E-2	Prioritize the installation of chargers in municipal lots.	Policy	Municipality	-
E-3	Conduct charging infrastructure feasibility studies at all municipal facilities as an input to determining charger siting priorities. Consider oversizing electrical conduits to prepare for future expansion.	Study	Municipality	$
E-4	Complete a Municipal Zero-Emission Fleet and Infrastructure Plan.[40]	Policy	Municipality	$$$
E-5	Hire a dedicated, shared, Tri-Cities full-time staff member responsible for Zero Emission Mobility.	Investment	Municipality	$
GOAL F: Generate Revenue Generation from sale of Low Carbon Fuels Credits				
Objective: 1. Monetize the sale of Low Carbon Fuels from municipally-owned public EV chargers to charger costs and advance sustainable mobility projects.				

Actions		Action Type	Responsibility	Relative Cost ($ to $$$)
F-1	Review bylaws and transition to user-fees at all new municipally-owned public chargers based on kWh. Review bylaws for the transition to a kWh-based fee for all new chargers. Ensure that all new public-facing chargers have the ability to measure kWh directly from the charger.	Policy	Municipality	+
F-2	Conduct a business case for assessing estimated revenues from Low Carbon Fuels Credit (LCFC) compared to infrastructure cost over time. Capitalize on LCFCs as a revenue generating opportunity through municipal investment in public charging infrastructure.	Study	Municipality	$
F-3	Implement a climate reserve or alternative funding pool and enact a policy to dictate how LCFC funds will be reinvested in sustainable mobility projects.	Policy	Municipality	-
F-4	Explore alternative fee structures for existing time-based charging and consider retrofitting existing chargers that do not have the ability to charge based on kWh; at the same time, consolidate / remove paid parking at EV chargers (if applicable) to reduce redundancy in payment.	Policy	Municipality	-
GOAL G: Monitor and Evaluate Progress				
Objectives: **1**. Monitor adoption rates and charging infrastructure utilization across the Tri-Cities.				

Actions		Action Type	Responsibility	Relative Cost ($ to $$$)
2. Monitor and evaluate grid integration and load management. 3. Evaluate cost savings and revenues. 4. Monitor and Evaluate equitable access.				
G-1	Develop a Tri-Cities data sharing agreement on charger utilization data and establish a central repository for EV-related data.	Investment/ In-kind	Municipality	-
G-2	Work with TransLink to ensure that the regional Trip Diary specifically includes and tracks Electric Vehicle and e-micromobility device uptake and usage patterns.	Partnerships	Municipality & TransLink	-
G-3	Monitor costs and revenues related to installing and maintaining public charging infrastructure.	Routine monitoring	Municipality	-
G-4	Examine public charger usage and utilization trends. Analyze charging station utilization data across different neighbourhoods to identify areas with lower access to charging and advance social equity.	Routine monitoring	Municipality	-
G-5	Monitor load management and grid integration.	Routine monitoring	Municipality, Utilities	-
G-6	Periodically review the Zero Emissions Mobility Plan and update as needed	Study	Municipality	$

*No incremental costs. Relates to the distribution of chargers accounted for in Action A-1.

#Costs already accounted for in other planning processes including municipal TMPs and ATMPs.

7.9 Summary by Goal

Relative impacts, relative costs, and potential cost mitigation are summarised for the seven goals in **Table 7-4.** Actions that support Goal A - Expand Public EV Charging and Goal B - Expand Home and Workplace Charging are likely to generate the greatest impacts on emission reduction, relative to other goals, by accelerating the provision of essential infrastructure which, in turn, allows EVs to become a realistic choice for a broader number of consumers.

Table 7-4: Relative Impacts and Costs of Roadmap Goals

Goal		Relative Impact on Emissions Reduction	Relative Cost ($ to $$$$$)	Cost Mitigation
A	Expand Public EV Charging	●	$$$	• Install fewer public chargers • Explore shared or private charger ownership models • Pursue partnerships with private property owners and developers
B	Expand Home and Workplace Charging	●	$$	• Abandon or reduce municipal 'top-up'; promote federal and provincial grants only
C	Accelerate Light-Duty EV Adoption	○	-	
D	Support and Promote the Transition to E-Micromobility	◑	$	• Order of magnitude cost EXCLUDES cost of expanding the active transportation network, already accounted for in other planning documents • Leverage third party operators to expand e-micromobility share services to Port Moody and Port Coquitlam
E	Lead by Example	◑	$$	• Moderate parameters for municipal fleet conversion to ZEVs or slow conversion timelines
F	Monetize the Sale of Low Carbon Fuels for Revenue Generation	-	+	
G	Monitor and Evaluate Progress	-	-	

Table Legend			
-	No Impact	-	No cost
○	Low Impact	+	Revenue generating
◑	Moderate Impact	$	Low cost (scale)
●	High Impact	$$$	High Cost (scale)

8 Implementation and Funding

8.1 Cost of Charging Infrastructure

8.1.1 LEVEL 2 CHARGING

Level 2 charging can be ‘smart’ or ‘dumb’, depending on its level of functionality and control. While basic or ‘dumb’ chargers only have the capacity to deliver an electric charge to an electric vehicle, a smart charger possesses the capability to offer added features like energy load coordination, access limitations, remote initiation and cessation, as well as monitoring of status and charging sessions, among other functionalities.

It is recommended that the Tri-Cities install smart chargers not only for the ability to charge user fees to enhance revenue generation potential, but to also comply with Measurement Canada standards for charging user fees and subsequently fulfilling the Province’s requirements to enable collection of Low Carbon Fuels Credits.

Smart chargers also excel in energy distribution and load management, optimizing power consumption while averting strain on the grid. Their ability to harness off-peak rates and mitigate peak demand charges translates to significant cost savings. These chargers also gather invaluable data on charging behaviors, empowering informed decisions regarding infrastructure planning and upkeep. Additionally, smart chargers ensure secure user access and streamline remote monitoring and maintenance.

While smart chargers have greater capabilities, they are also typically higher in costs. The costs may vary based on several factors, including the brand, features, and specifications of the chargers. For the purposes of estimating the cost of charging infrastructure, the cost of a **dual port smart charger** was assumed, which was based on estimates provided by OEMs. An average cost of $9,000 was assumed for high-level costing purposes. Estimates are current to 2023.

8.1.2 DCFC CHARGING

DC fast charging (DCFC) infrastructure comes in several configurations to cater to different needs. Standalone DCFC stations are single units that can be placed at diverse locations, like highways or urban centers.

Retail and parking lot charging stations, aimed at attracting customers, typically come with price tags of $30,000 to over $250,000 (2023 $). They usually have 1-2 ports and outputs varying between 50 kW to 250 kW. Prices and specifications can differ due to factors like location and equipment choices. For the purposes of calculating high-level cost estimates, a DCFC with two charging ports and approximately 150kW power output was assumed.

8.1.3 NUMBER OF CHARGERS REQUIRED

Assuming a medium EV adoption scenario, the Tri-Cities will be home to approximately 23,000 electric vehicles by 2030, representing approximately 16% of total light duty vehicles registered.

Altogether 864 Level 2 and 75 DC Fast EV charging stations will need to be provided across the Tri-Cities within the next seven years to support this transformation. In 2022, the Tri-Cities had 78 Level 2 and 23 DC Fast Chargers.

To achieve the identified public charger targets, an additional 786 Level 2 and 52 DC Fast Chargers will need to be provisioned.

8.1.4 COSTS TO INSTALL CHARGING INFRASTRUCTURE

Table 8-1 and Table 8-2 show the costs to install Level 2 and DCFC public charging infrastructure respectively.

Table 8-1: High-level costs to install public level 2 charging infrastructure

Cost to Install Dual Port Level 2 Chargers[11]	**Cost Estimate** (Installation only/ Fixed costs)
Level 2 Charger	$9,000
Electrical labour + Installation	$6,750
Networking/ Activation Fee	$400
Cellular Connection	$300
Signage/ Pavement Paint	$500
Charging Ports per charger	2
Charging Ports required	786
Chargers Required	393
Costs per dual port charger	**$25,950**
Costs for full installation	**$6.7M**

[11] The cost estimates provided herein for charging infrastructure are intended for informational purposes only and should be treated as estimates. WSP assumes no liability for any discrepancies or variations between the estimates provided and the actual costs incurred during the implementation of charging infrastructure projects.

Table 8-2: High-level costs to install public DCFC charging infrastructure

Cost to Install DCFC Chargers[41]	**Cost Estimate** (Installation only/ Fixed costs)
DCFC Charger (~150kW)	$150,000
Electrical labour + Installation	$15,000
Networking/ Activation Fee	$750
Signage/ Pavement Paint	$750
Charging Ports per charger	2
Charging Ports required	52
Chargers Required	26
Costs per dual port charger	**$171,500**
Costs for full installation	**$4.5 M**

In addition to the costs to install EV infrastructure, there may be a requirement to upgrade the transformer, electrical panel, electrical pole, among other electrical costs to ensure adequate capacity on site. In this case, it can be assumed that an additional $50,000 may be required per site.

8.2 Cost Estimates for additional measures

8.2.1 COST TO RETROFIT MURBS

Retrofitting existing electrical systems to accommodate EV charging demand can be complex with costs varying significantly depending on context. Components typically include an electrical engineering feasibility assessment, detailed electrical design, materials and labour to enable EV readiness, then ultimately materials and labour to install the Electric Vehicle Supply Equipment. Altogether, costs to retrofit a parking stall range between $4,000 and $15,000.

According to the 2021 Census, there are 91,940 total residential units in the Tri-Cities. 31,815 (35% of total residential units) are located in multi-unit residential buildings. Assuming 25% of these units are retrofitted for EV chargers at 1 parking stall per unit by 2030, total costs could range between $30M and $114M. While the majority of these costs will be borne by building owners and occupants, with potential support from Provincial incentives, some municipalities have introduced modest per stall top-ups (approximately $100 / stall) to reduce the overall capital cost burden.

8.2.2 MUNICIPAL ZEV REPLACEMENT

While acknowledging the upfront costs associated with implementing a municipal zero-emissions vehicle strategy, it's essential to recognize the profound long-term benefits that far outweigh these

initial expenses. Although the purchase price of new electric vehicles tends to be higher compared to their internal combustion counterparts (with an approximate difference of $10,000), and the investment in charging infrastructure may pose an additional financial challenge, these considerations become inconsequential when viewed through the lens of the broader picture. Numerous municipalities that have diligently assessed the potential of transitioning to a zero-emissions fleet have made a remarkable revelation – the total cost of ownership spanning the next two decades often aligns with, or even falls below, the expenses incurred under the conventional business-as-usual approach. This not only demonstrates the financial prudence of adopting such a strategy but also highlights the underlying environmental and sustainability advantages of such a strategy in meeting their climate goals.

8.2.3 COST OF IMPLEMENTING 'BIKE' TRANSPORTATION ELEMENTS OF TRI-CITIES' TMP'S

Costs related to multi-modal network expansion and public end-of-trip facilities are assumed to already be accounted for by other planning processes including municipal transportation plans

8.2.4 OTHER COSTS

Beyond the items identified above, municipalities should be cognizant of the cost of studies, promotional materials, awareness campaigns, and new staffing positions identified in the Action Plan and budget accordingly. The following costs can be assumed for high level budgeting purposes:

- Studies: $80-100,000 per study
- LCFC Business Case: $30,000
- Develop promotional materials: $30,000
- Develop materials and run promotional and awareness campaigns: $50,000
- Dedicated full-time staff position: $100,000 / year

Cost expenditures can be mitigated by approaching these items together as the Tri-Cities, in lieu of each municipality tackling them on their own.

9 Funding & Incentives

This section identifies funding and incentives made available by higher levels of government and municipal associations to support the transition to sustainable mobility. Incentives and funding identified are current as of Fall 2023.

The following tables summarize the various incentives available to municipalities, individuals, building owners, organizations, and businesses for enhancing many of the priority actions identified within this ZEMP.

9.1 Vehicle Incentives & Funding

Funding Level	Federal
Org. Name	Government of Canada
Program Name	**Incentive for Medium to Heavy duty Zero-Emission Vehicle (iMHZEV)**
Eligible Recipients	Canadian Businesses / Organizations with an office registered in Canada.
Description	The iMHZEV Program provides point-of-sale incentives for Canadian organizations and businesses interested in purchasing or leasing a battery electric vehicle (minimum lease duration: 12 months). Vehicles dealerships will be required to apply for these incentives to get their vehicles listed on the approved vehicle list.
Vehicle / Fleet Eligibility Requirements	Eligible vehicles include medium or heavy-duty vehicles with a gross vehicle weight rating (GVWR) of greater than 8,500 lbs. This includes class 2B to class 8 vehicles. Vehicles are listed on Transport Canada's website. Eligible vehicles must: • meet all of Canada's Motor Vehicle Safety Standards • be meant for use on public streets, roads, and highways • be plated and registered in Canada in the eligible recipient's name • be new (in other words must not have been plated before) Lease must be at least greater or equal to 12 months. For lease durations over 48 months, vehicles are eligible for full incentives while the incentive amount will be pro-rated for vehicles with leases between 12 - 48 months.

Funding Support	Up to $200,000 per vehicle, based on the type of vehicle. Funding for relevant vehicle types is presented below. • Class 4 - Large walk-in, conventional vans, city delivery – Max $75,000 • Class 5 – Large walk-in, city delivery, bucket – Max $75,000 • Class 6 – Beverage, single axle vans, rack – Max $100,000 • Class 7 – furniture, medium conventional – Max $100,000 • Class 8 (under 350kW) – Dump, cement – Max $100,000 • Class 8 (350kW and up) – Dump, cement – Max $150,000
Stacking	The federal incentive will be applied to eligible vehicles in addition to any provincial/territorial incentive offered up to 75% of the Manufacturer's Suggested Retail Price (MSRP) of the vehicle. It cannot be stacked with any other federal program towards the same vehicle.
Limitations	• Total annual incentive for a municipality restricted to 10 incentives or $1 million per calendar. • Conversions (i.e., converting an existing internal combustion engine (ICE) vehicle to ZEV) are not eligible. • Cannot be stacked with other federal programs towards the same vehicle.

Funding Level	**Provincial**
Org. Name	CleanBC
Program Name	**Go Electric: Speciality Use Vehicle Incentive (SUVI) Program**
Eligible Recipients	The SUVI program states that the purchaser / lessee of a vehicle must be an individual, business, non-profit, or public sector organization that is based in British Columbia (B.C.) or has a B.C.-based affiliate. They must also comply or provide the following: • All businesses must be licensed to operate in B.C.; • A copy of a valid B.C. business license must be provided if applicable; • A WorkSafeBC number; • Valid government-issued dentification of the applicant • and one or more recent utility bills.
Vehicle / Fleet Eligibility Requirements	Medium Duty (MD) and/or Heavy Duty (HD) on-road vehicles must: • Be new

	• Be covered by EPA certificate or deemed to be covered by EPA certificate in accordance with CEPA • Meet Transport Canada's Motor Vehicle Safety Act requirements • Be Class 3 or higher • Be Battery Electric, Plug-in Hybrid or Hydrogen Fuel Cell • Remain plated, registered, and insured in British Columbia in the applicant's name for at least 36 months from date of sale • Purchased or Leased in Canada
Funding Support	$100,000 or 33% purchase price for MD or HD vehicle, whichever is lower. Other rebates available for other vehicle types Leased vehicles are eligible for a rebate depending on the term of the lease and whether the vehicle is used for personal or fleet purposes. Fleet vehicles will receive a 33% of the maximum rebate amount for a 12-month lease. For lease durations equal to or greater than 24 months, 100% of the maximum rebate amount is allowed.
Stacking	Stacking of provincial funding from SUVI with other CleanBC programs (such as Clean BC Go Electric Commercial Vehicle Program and CleanBC Industry Fund) is not permitted. Stacking of CleanBC funding with other government funding programs is limited to 75% of a vehicle's MSRP. Reporting of application for other government funding for the use toward a project funded under the SUVI Program is mandatory.
Limitations	• Stacking of provincial funding from SUVI with other CleanBC programs (such as Clean BC Go Electric Commercial Vehicle Program and CleanBC Industry Fund) is not permitted. • Stacking of CleanBC SUVI funding with other government funding is limited to 75% of a vehicle's MSRP.

Funding Level	**Provincial**
Org. Name	CleanBC
Program Name	**Commercial Vehicle Pilots Program (CVP)**

Eligible Recipients	The CVP Program is for B.C.-based businesses, non-profits, local governments, Indigenous communities, and eligible public entities looking to deploy ZEV technology in commercial applications along with supporting infrastructure. The Program is for proponents such as local governments who are looking to deploy ZEVs of class 3 and above. For class 3 and 4, must deploy a minimum of 6 ZEVs, class 5 and 6, 3 ZEVs, class 7 and 8, no minimum.
Vehicle / Fleet Eligibility Requirements	Eligible vehicles must: • Be ZEVs • On-road vehicles must demonstrate a 56km all-electric range, or if fast-charge compatible, demonstrate a 32km all-electric range. • Be new • Be covered by EPA certification or deemed covered by EPA cert in accordance with CEPA • Remain plated, registered, insured in B.C. in applicant's name for >=12 months • Be purchased or leased within Canada Vehicle fleets in B.C.: • Fleets of Class 3 & 4 must comprise >=6 ZEVs • Fleets of Class 5 & 6 must comprise >=3 ZEVs • Fleets of Class 7 & 8 no minimum Eligible infrastructure must: • New installation or expansion of existing infrastructure • If hydrogen, dispense H2 compliant with SAE J2719, & operate in BC >=12 months • If electric, be Level 2+, be permanent installation, and have cUL, cETL, or CSA cert
Funding Support	Covers up to 1/3 cost (up to $100,000) of vehicles as well as supporting infrastructure. Funding delivered to successful applicants cannot exceed one third of total eligible project costs. There is a total of $11 million in funding available through the CVP Program. Successful applicants are eligible to receive funding support of up to one-third of total costs of their ZEV deployments and/or infrastructure projects. The funding call is expected to support several on-road medium and heavy-duty applications, as well as one or two in the marine, rail, air or off-road categories. The final number and types of applications supported will be at the discretion of the Program Advisory Committee.

	Program will also fund charging (Level 2 and up) or hydrogen fueling infrastructure.
Stacking	Stacking with ZEVIP, EVAFIDI, or other CleanBC programs (like Clean BC SUVI) is not permitted. Stacking of funding from other government funding programs with the CleanBC Go Electric Commercial Vehicle Pilots Program will be limited to 75% of eligible project costs, except in the case where the applicant is a local or Indigenous government or their department or agency in which case the stacking limit for government funding is 100% of the total project costs. Funding from other sources will be allowed as long as funding amounts do not exceed total project costs.
Limitations	• Application period is set to close on November 30, 2022. • If funds remain beyond the application periods, further dates will be added as needed.

Funding Level	**Municipal Association**
Org. Name	Federation of Canadian Municipalities
Program Name	**Pilot project: Reduce fossil fuel use in fleets**
Description	This program has been created for pilot projects that reduce pollution by improving transport systems/encouraging switch to less polluting transport. Projects should reduce GHG emissions by 20% compared to an existing or modeled baseline measurement and assess technology or other solutions in real-life conditions. They evaluate either a small-scale version of a project or a full-scale, replicable version. The pilot may compare several options or assess the capacity of one option to reduce or avoid using fossil fuel in any vehicle that delivers municipal services. The pilot should assess whether the project meets the necessary requirements (e.g., financial, technical), has a solid business case and the ability to deliver strong environmental, financial and social benefits directly to your community. Possible subjects include: • Purchasing properly sized municipal vehicles for various uses (e.g., fleet optimization) • Alternative fueling infrastructure for vehicles providing municipal services (e.g., fast charging stations)

	• Zero Emission Vehicle (ZEV) and alternative fuel fleet conversion (e.g., electric/hydrogen, biogas), especially medium and heavy-duty vehicles
Eligible Recipients	Canadian municipal governments or partners thereof are eligible.
Vehicle / Fleet Eligibility Requirements	All classes of vehicle are eligible for this funding. It applies to fleets (i.e, all municipally owned vehicles such as police cruisers and fire trucks) and private vehicles that deliver municipal services.
Funding Support	Up to $500,000 to cover up to 50% of eligible costs.
Stacking	Stacking is permitted.
Limitations	• The lead municipality must contribute at least 10% of project costs.

9.2 EV Infrastructure Incentives & Funding

Funding Level	**Provincial**
Org. Name	CleanBC
Program Name	**Go Electric – EV Charger Rebate for MURBs**
Description	The program is funded by the Government of B.C.'s Ministry of Energy, Mines and Low Carbon Innovation, with financial support from the Government of Canada, and is administered by BC Hydro and FortisBC. The program provides rebates for the electric vehicle chargers.
Eligible Recipients	Stratas, building owners or individual residents living in MURBs
Funding Support	Rebate up to 50% of the cost to purchase and install eligible EV chargers, to a maximum of $5,000 (regularly $2,000) per charger and $25,000 (regularly $14,000) per apartment/condo complex. Dual-port stations count as two chargers. On a first-come, first-served basis.
Stacking	If these rebates are combined with any other incentive, they'll be capped so that the total incentives don't exceed the total cost of the equipment and installation.
Limitations	Pre-approval is required.

Funding Level	**Federal**

Org. Name	Natural Resources Canada
Program Name	**Zero Emission Vehicle Infrastructure Program (ZEVIP)**
Description	This funding program provides funding towards the deployment of electric vehicle (EV) chargers and hydrogen refuelling stations across Canada. The $680M initiative is administered through three key funding streams: • For owners/operators of ZEV infrastructure • For delivery organizations • For indigenous organizations
Eligible Recipients	Province, municipalities, non-profits, Indigenous, institutions, companies
Vehicle / Fleet Eligibility Requirements	For EV charging infrastructure projects, your proposal must include: • A minimum of one (1) charger of 200 kW and above; or • A minimum of two (2) fast chargers of 50 kW and above; or • A minimum of twenty (20) chargers of all charging levels. For Level 2 chargers, each connector can count as a unit towards the minimum of 20 chargers if each connector can charge a vehicle at the same time.
Funding Support	ZEVIP will pay up to 50% of Total Project Costs, up to maximum of: Type of Infrastructure — Output Power — Maximum Funding • Level 2 charger — 3.3 kW to 19.2 kW — $5,000 per port • DC fast charger — 20 kW to 49 kW — $15,000 per fast-charger • DC fast charger — 50 kW to 99 kW — $50,000 per fast-charger • DC fast charger — 100 kW to 199 kW — $75,000 per fast-charger • DC fast charger — 200 kW and above — $100,000 per fast-charger
Stacking	Not with other federal incentives.
Limitations	• Funding for smaller EV charging projects with under 20 level 2 connectors or 2 fast-chargers can be found through organizations authorized to redistribute a component of the ZEVIP funding. • Larger EV charging or hydrogen refuelling projects above $20 million and carried out by the private sector will be redirected to the Canada Infrastructure Bank's Charging and Hydrogen Refuelling Infrastructure Initiative for funding consideration.

9.3 General Sustainability Incentives & Funding

Funding Level	Municipal Association
Org. Name	Federation of Canadian Municipalities
Program Name	**Study: Signature Initiative**
Description	This funding is designed to accommodate transformative, best-in-class municipal projects, meaning they're highly innovative and impactful. The project you study must have the potential to address environmental challenges and change the way other municipalities operate and deliver municipal services. It must also have a solid business case and the ability to deliver strong environmental, financial and social benefits directly to your community or through replication in other municipalities. Possible studies include: • Advanced, emerging and adaptive technologies • Innovative financing mechanisms and business models (e.g., property assessed clean energy programs, innovative utility charges) • Projects and programs that generate environmental, economic and other benefits for the broader community • Making it easier to implement environmental initiatives (e.g., clarifying policy change requirements; developing municipal bylaws such as a green procurement policy or private sector sustainability incentives) • Enabling greater adoption of sustainable infrastructure (e.g., demonstrating new products such as shared electric autonomous vehicles, creating smart grid projects that enable more integration of renewable generation within the community)
Eligible Recipients	All Canadian municipal governments; Municipal partners applying in partnership with a municipal government.
Vehicle / Fleet Eligibility Requirements	This incentive is related to energy but can involve fleets. Signature Incentives projects are unique and evaluated on a case-by-case basis and are less stringent on requirements, however FCM prefers projects that have built-in mechanisms to encourage replication and widespread adoption to achieve environmental targets/thresholds.
Funding Support	Up to 50% of eligible costs to a maximum of $175,000.
Stacking	Stacking is permitted.
Limitations	• The lead municipality must contribute at least 10% of project costs.

10 Moving Forward

The Tri-Cities' Zero Emissions Mobility Plan serves as a pragmatic roadmap towards a sustainable and forward-looking future, emphasizing the collective need for collaborative action. The ever-evolving nature of technology underscores the necessity for adaptation and receptiveness to innovation. While the present plan lays the foundation for a zero-emissions transportation landscape, the Tri-Cities should remain open to emerging technologies that may impact this plan.

A significant driver for the electric vehicle infrastructure needs identified within this study is the Federal Zero Emissions Vehicle Sales mandate, which sets to reshape the automotive industry toward a zero-emissions future from 2035 onward. This mandate presents both challenges and opportunities that will require the Tri-Cities to work together and collaborate with other levels of government, private industry, institutions, and other non-profit organizations. The actions within this plan are designed to prepare the Tri-Cities for this new future and support zero-emissions vehicle growth.

It will be important for the Tri-Cities to integrate this strategy with broader urban planning endeavours, public transit enhancements, and infrastructure projects to achieve the best results. As well, maintaining knowledge of higher-level plans to enhance zero-emissions vehicles will be essential. For example, if the Federal government implements a zero-emissions mandate for heavy-duty vehicles or if Metro Vancouver implements mobility pricing, the Tri-Cities should remain adaptable and responsive to these initiatives.

As the Tri-Cities set out on the path outlined in this Zero Emissions Mobility Plan, building partnerships both within the community and beyond will be crucial. Cooperative initiatives spanning government bodies, private sector stakeholders, academic institutions, and non-profit organizations will play a key role in driving the plan's goals.

While this Zero Emissions Mobility Plan specifically focuses on light-duty passenger travel as well as e-micromobility, a deeper study on the medium- and heavy-duty passenger and freight is recommended as a next step toward achieving significant GHG emissions savings and zero-emissions transportation within the Tri-Cities.

Endnotes

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APPENDIX

A EMISSIONS MODEL DESCRIPTION

Tri-Cities, Transportation GHG emissions model

November, 2022

Model Purpose

The emission model provides a **tool** to:

- Quantify the current GHG impacts of mobility in the Tri-Cities
- Project future condition GHG impacts based on Business-as-Usual trends and a range of alternative electric vehicle (EV) adoption scenarios
- Quantify the impact of potential actions developed through this process

Modeling Objectives

To provide a projection on the greenhouse gas (GHG) emissions expected from the Tri-cities transportation segment given several scenarios:

1. Low EV adoption scenario
2. Medium EV adoption scenario
3. High EV adoption scenario

Scenarios Description

Scenarios

- The scenarios are based on the projection of new vehicle sales ratio (Adoption)
- Three main scenarios: low, medium and high adoption scenarios
- Metro Vancouver Baseline added for comparison

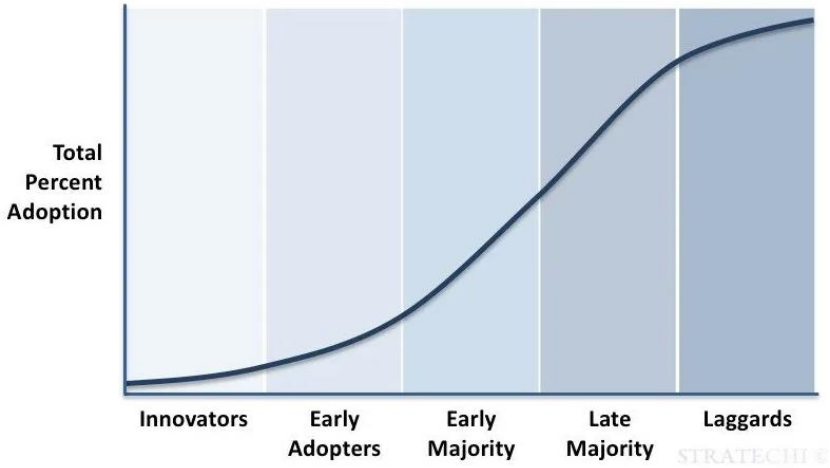
Adoption Model

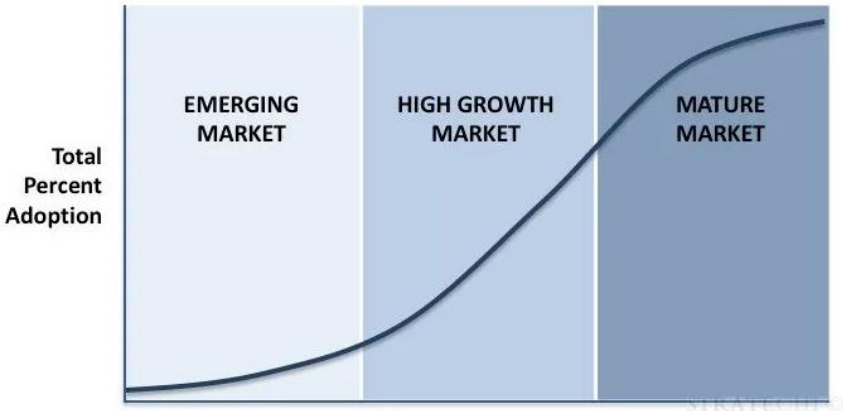
- Simplified Bass Technology Diffusion Model: logistic Model

Scenarios Description – Adoption Model

Simplified Bass Technology Diffusion Model: logistic Model

- A logistic function is utilized to model Market adoption from innovators to laggards, from an emerging market to a mature market
- Adoption model reflects what the share of new sales would be of the emergent technology
- The model fits the year-by-year adoption ratio to the adoption targets given as input





Source: Stratechi

Primary Data Sources

Passenger and Commercial Fleet: *ICBC Vehicle Population*	**Population Projections:** *BC Stats*	**Fuel Economy Projections:** *U.S. EIA*
Aggregate VKT Projections: *Metro Vancouver 2015 EI MOVES model*	**Mode Share and Trip Length by Mode:** *2017 TransLink Trip Diary**	**GHG Conversion Factors:** *2017 BC Best Practices Guide*

- * To be revised with **Existing travel survey data being prepared by Coquitlam** for their STP update and **2041 (future condition) mode share and trip length information gathered from the RTM**
- Existing mode share, VKT, and transportation sector GHG emissions will shift with inclusion of new data
- Missing data will not meaningfully change the trajectory or scale of the results

Scenarios Descriptions

Aggressiveness

Scenario 3	High EV Adoption Scenario	• Port Moody expedited target
		  ○ 40% of total light-duty vehicles on the road to be ZEV by 2030; 100% by 2040
		  ○ 25% of total high-duty vehicles on the road to be ZEV by 2030

Scenario 2	Medium EV Adoption Scenario	• Full achievement of BC ZEV Act ○ 30% of new sales ZEV by 2030; 100% by 2040 • Clean Fuel Standards
Scenario 1 (BAU)	Low EV Adoption Scenario	• Partial achievement of BC ZEV Act ○ 30% of new sales ZEV by 2030
Scenario 0	Metro Vancouver Adoption Baseline	

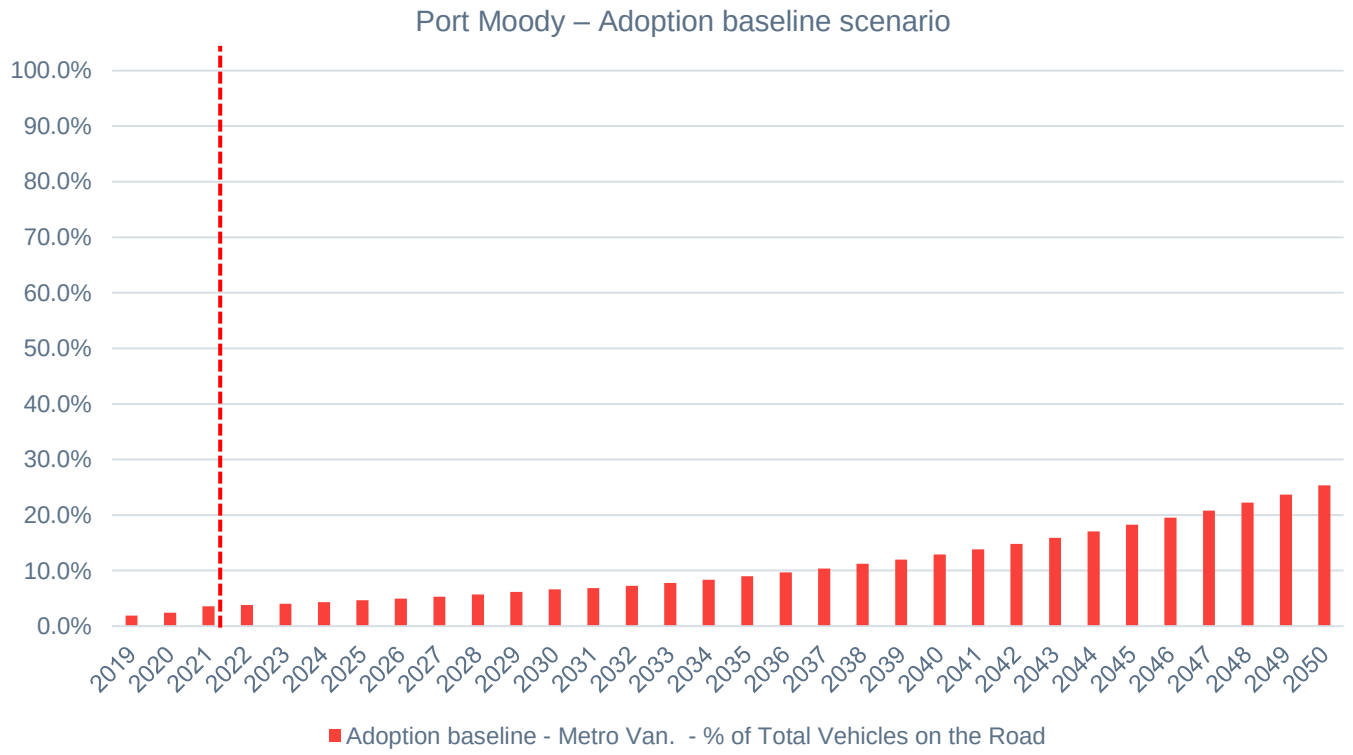
LDV = Light Duty Vehicle
HDV = Heavy Duty Vehicle
ZEV = Zero Emissions Vehicles

Scenarios Description

- The New Vehicle Sales and fleet Total Vehicles on the Road projections for the city of Port Moody are used as example to explain the adoption scenarios
- Similar projections have been performed for the cities of Coquitlam and Port Coquitlam

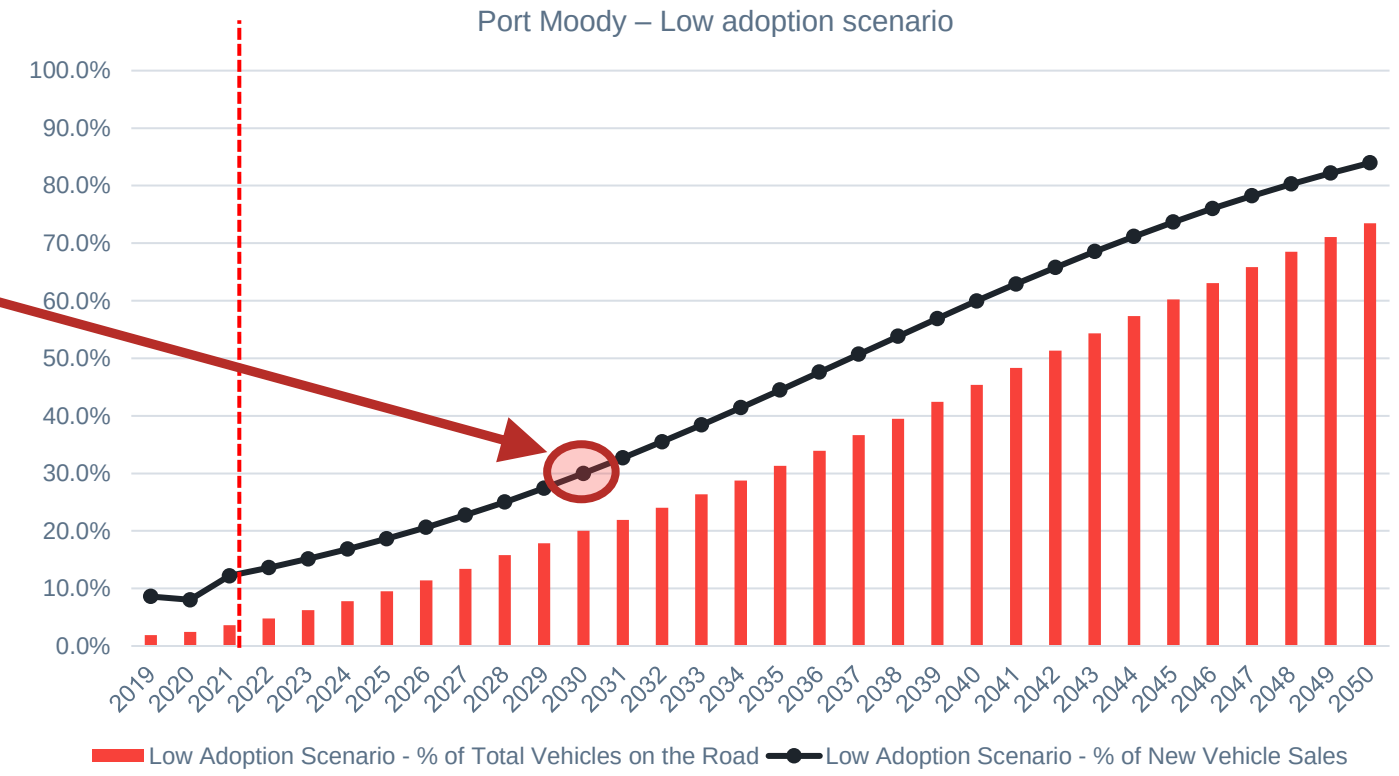
Scenarios Description - Metro Vancouver Adoption Baseline

- Metro Vancouver Baseline added for comparison
  - Projection based on the baseline in the model "2015 EI MOVES Metro Vancouver Models"
  - City EV adoption rates are based on the adoption rate for the Metro Vancouver Model
  - At the time of the Model there were no legislated targets



Scenarios Description – Business as Usual (Low EV Adoption Scenario)

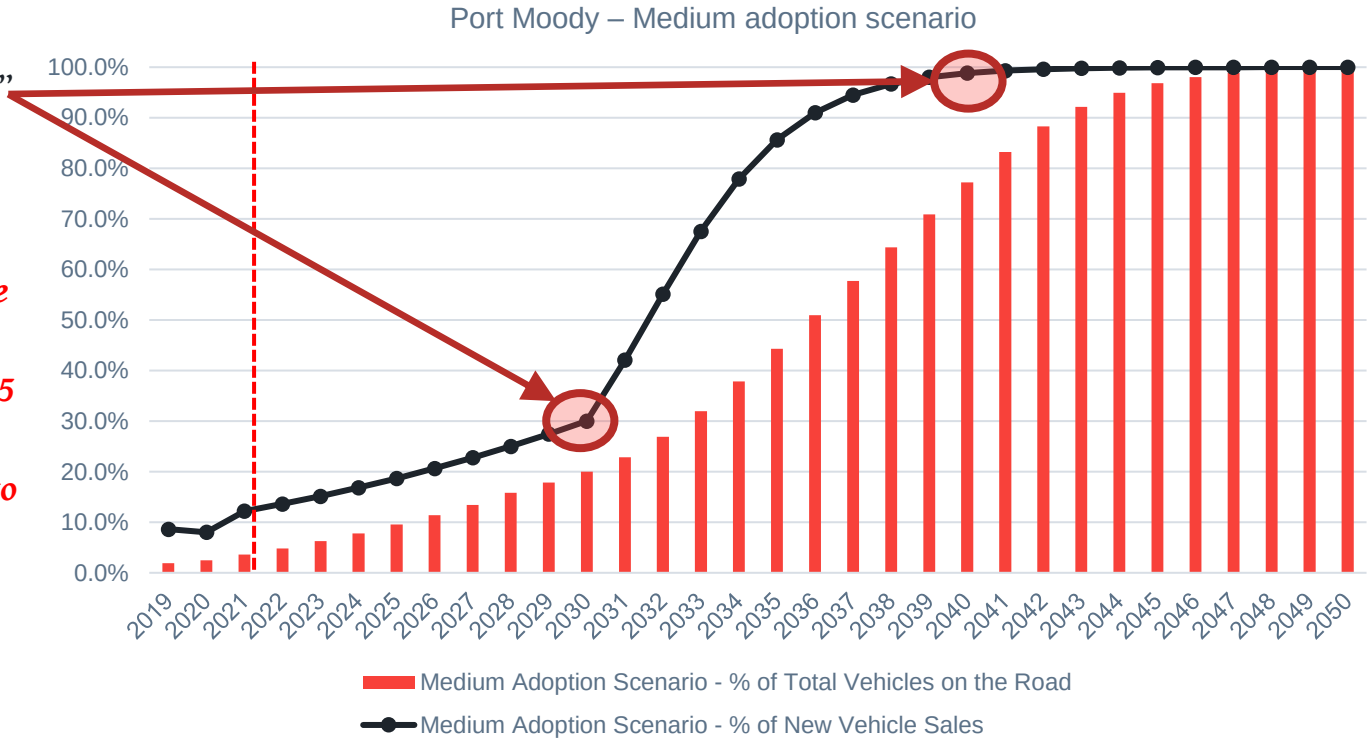
- Assumption: partial achievement of the BC Zero-Emission Vehicle Act:
  - "*...new light-duty ZEV sales and leases, reaching 30% of light-duty vehicle sales by 2030*"
- The new vehicle sales projection follows the trend of the historic data (example Port-Moody)



Scenarios Description – Medium EV Adoption Scenario

Assumptions:

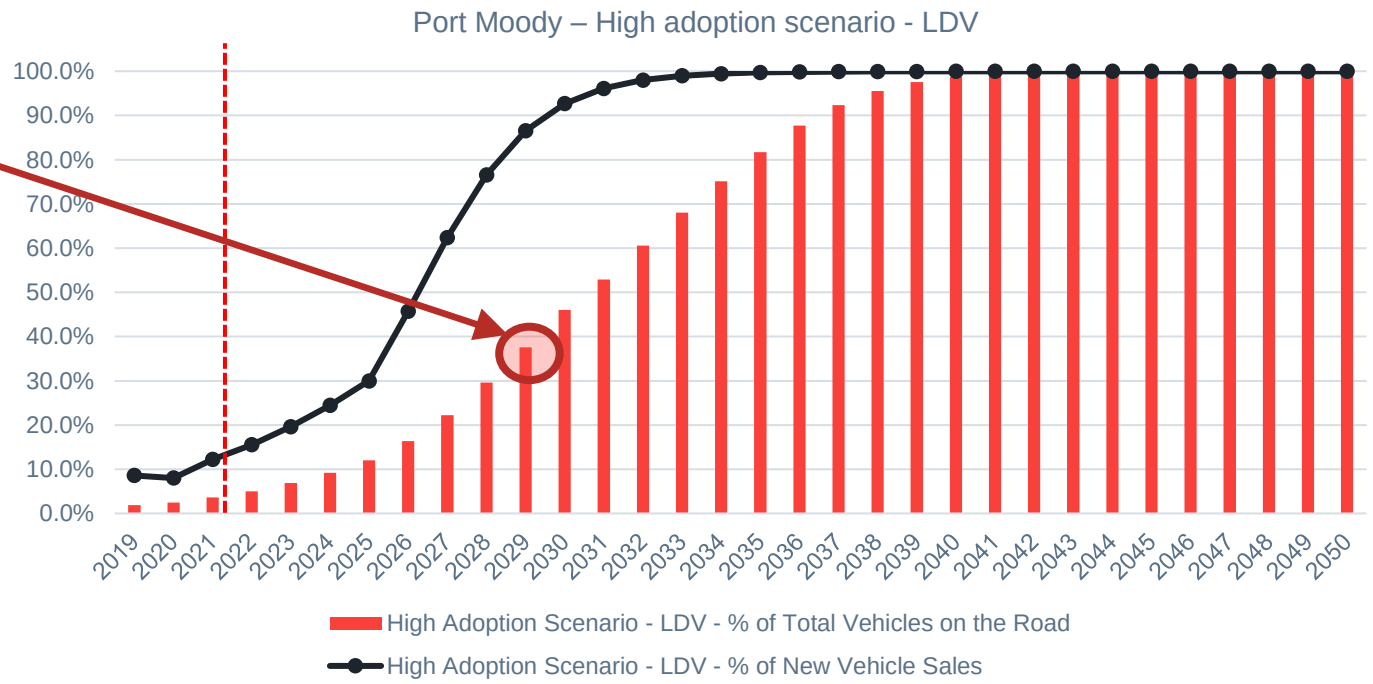
- Full achievement of the BC Zero-Emission Vehicle Act:
  - *"... new light-duty ZEV sales and leases, reaching... **30% by 2030 and 100% by 2040.**"*
- Full achievement of the Clean Fuel Standards
  - *"**to reduce the carbon intensity (CI) of the gasoline and diesel** they produce in, and import into, Canada from 2016 CI levels **by 3.5 grams of carbon dioxide equivalent** per megajoule (gCO2e/MJ) **in 2023**, **increasing to 14 gCO2e/MJ in 2030**"*



Scenarios Description – High EV Adoption Scenario, LDV segment

Port Moody's Target for Light-Duty Vehicles (LDV)

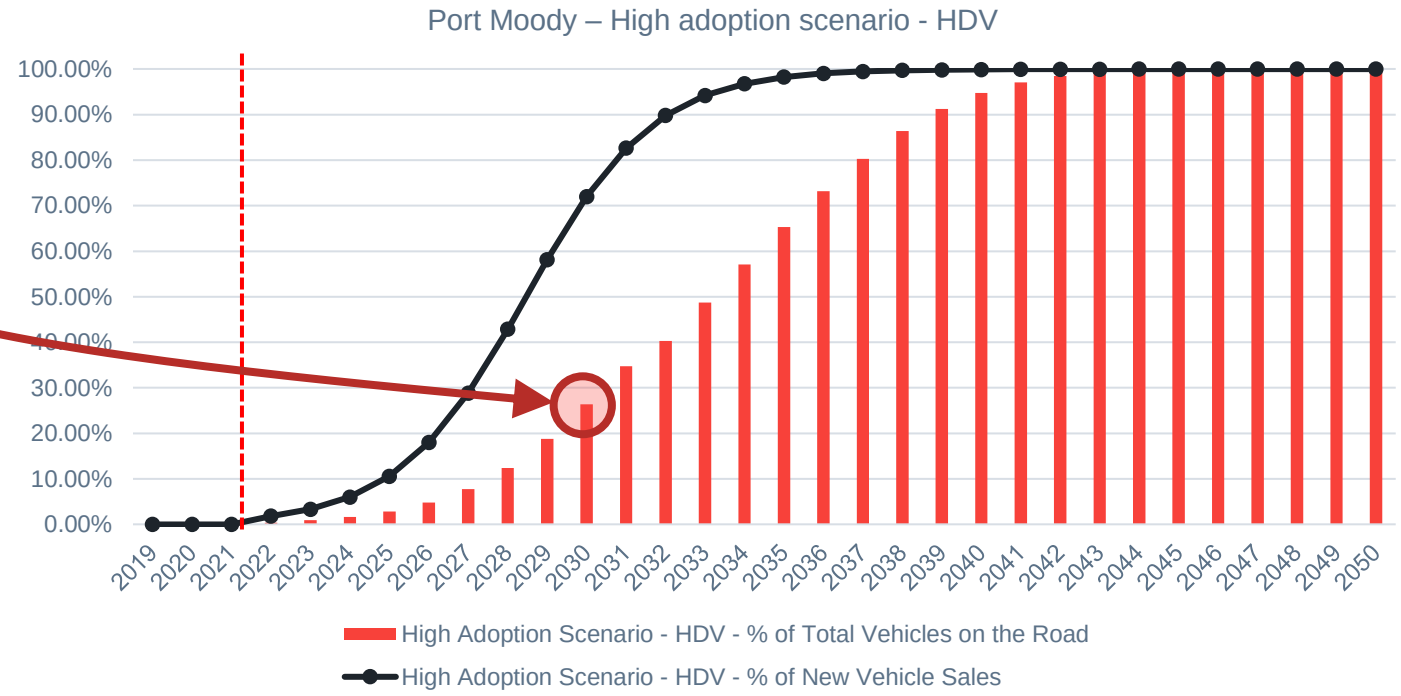
- To achieve a ZEV share of 40% of the total LDV on the road by 2030



Scenarios Description – High Adoption Scenario, HDV segment

Port-Moody's Target for Heavy-Duty Vehicles (HDV)

- To achieve a ZEV share of 25% of the total HDVon the road by 2030



Observations

- The Metro Vancouver baseline does not follow the trend from historical data: at the time of the study the BC and federal targets were not legislated yet
- Adoption rate of change for Light Duty Vehicles (LDVs) (increase in new sales per year):
  - Medium Adoption Scenario: on average 10% increase in new-sales per year between 2022 and 2030
  - High Adoption Scenario (**e.g. Port Moody**): on average 26% increase in new-sales per year between 2022 and 2030
- Adoption rate for Heavy Duty Vehicles (HDVs):
  - Medium Adoption Scenario: No legislated targets for HDVs
  - High Adoption Scenario (**e.g. Port Moody**):
    - 5 Electric HDVs by 2023
    - 16 Electric HDVs by 2025
    - To consider: a pilot project may take 1 to 3 years to implement

Study Cases

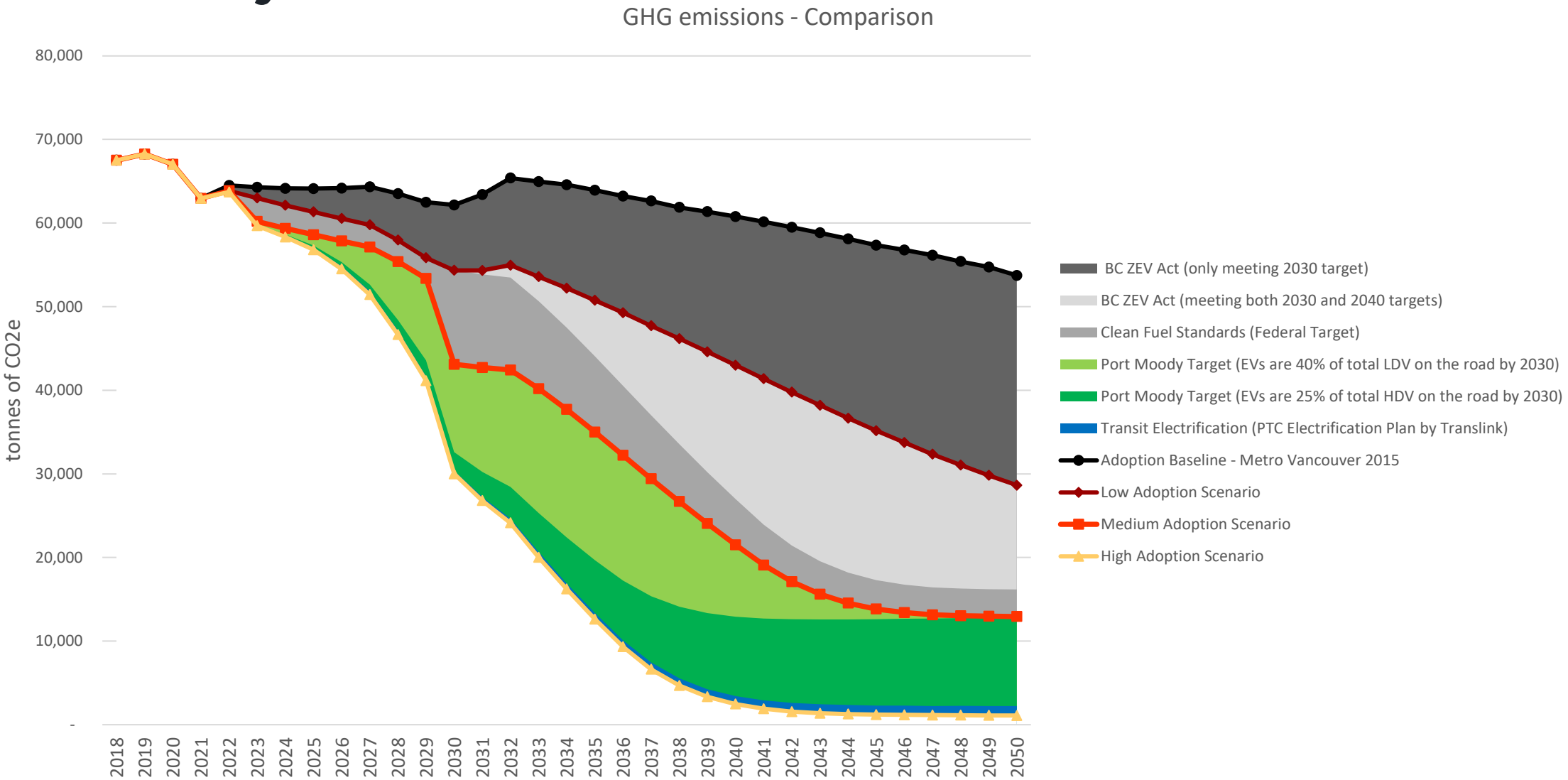
Preliminary Results

Study Cases

Assumptions

- Population growth for each city: follows the population growth of the Metro Vancouver region
- Vehicle population from ICBC:
  - ICE fleet size projection is based on the average new vehicle sales from 2017 to 2019 (years prior to the pandemic)
  - Electric fleet projection are based on the adoption models described in the slides above
  - The effects of COVID19 on the VKTs have not been taken into account
- VKT: the projection is based on the projection from the Metro Vancouver 2015 MOVEs model
- Fossil fuel economy projections are based on the from EIA (Energy Information Administration)– Annual Energy Outlook
- Battery-Electric energy consumption (kWh/km) projections :
  - E-LDVs projection is based on the NRCAN data on battery electric vehicles
  - E-HDVs projection is based on the rate of improvement from the E-LDV segment

Port Moody


GHG emissions - Comparison
tonnes of CO2e
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
-
2018
2019
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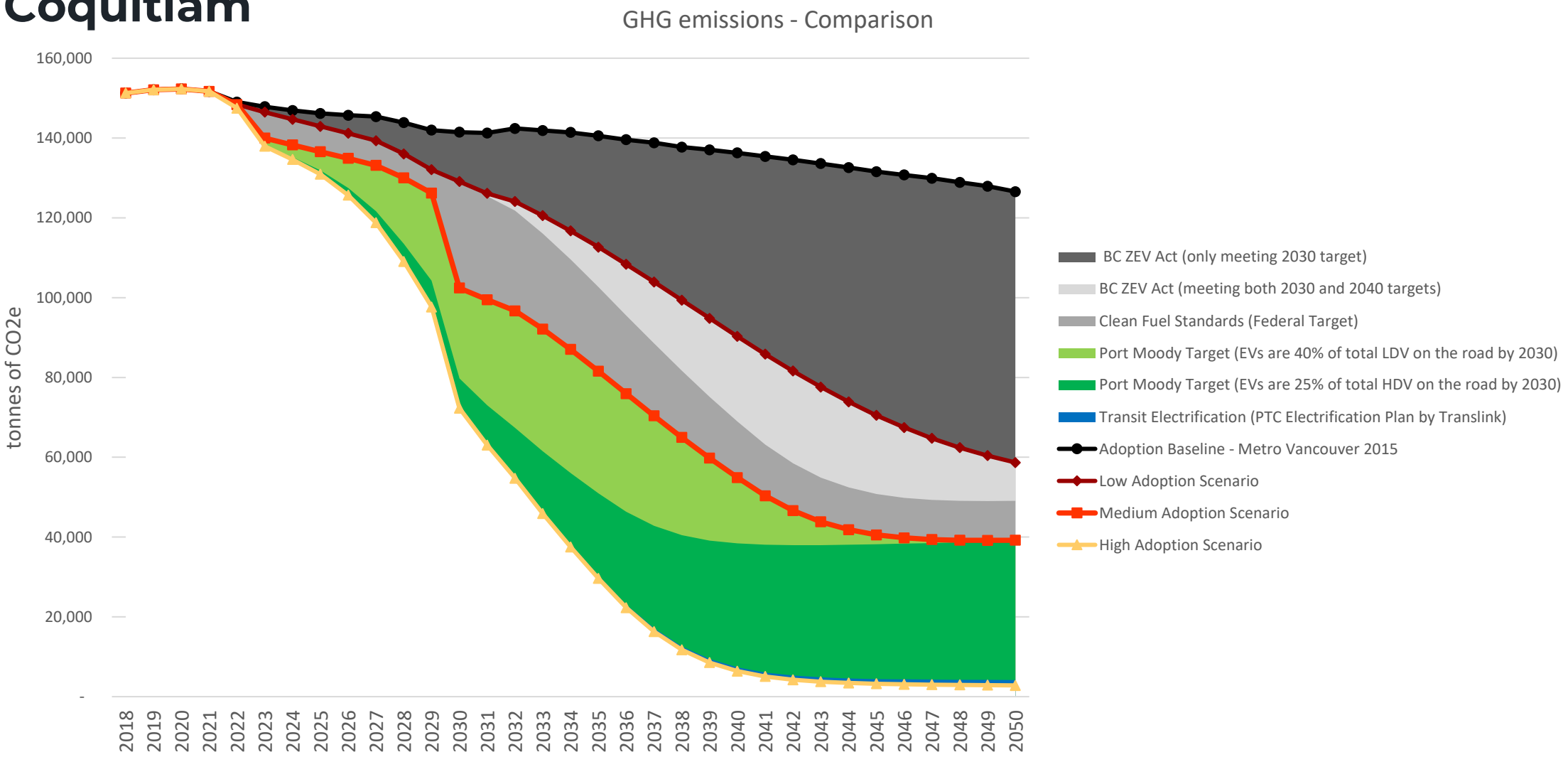
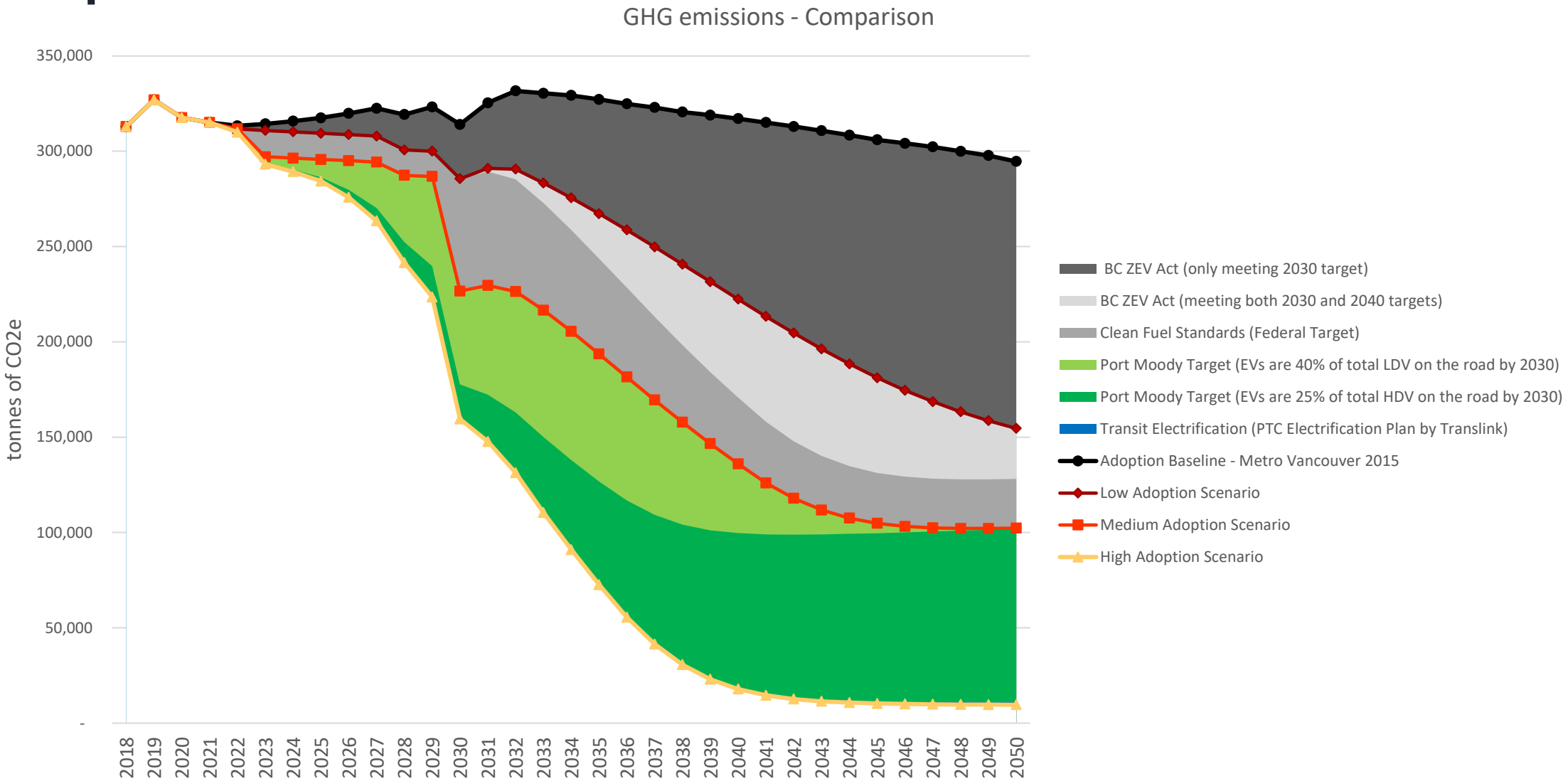
BC ZEV Act (only meeting 2030 target)
BC ZEV Act (meeting both 2030 and 2040 targets)
Clean Fuel Standards (Federal Target)
Port Moody Target (EVs are 40% of total LDV on the road by 2030)
Port Moody Target (EVs are 25% of total HDV on the road by 2030)
Transit Electrification (PTC Electrification Plan by Translink)
Adoption Baseline - Metro Vancouver 2015
Low Adoption Scenario
Medium Adoption Scenario
High Adoption Scenario

Port Coquitlam



Coquitlam


GHG emissions - Comparison
tonnes of CO2e
350,000
300,000
250,000
200,000
150,000
100,000
50,000
-
2018
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Transit Electrification (PTC Electrification Plan by Translink)
Adoption Baseline - Metro Vancouver 2015
Low Adoption Scenario
Medium Adoption Scenario
High Adoption Scenario

Observations

- Metro Vancouver Baseline Scenario
  - At the time of the projection, no legislated targets were considered and a conservative growth was assumed
  - Port Moody and Coquitlam show a mild increase in the GHG emissions between 2022 and 2033.
    - This increase is due to the overall effect of the population growth, that is overcome in later years by the growing adoption of the battery electric fleet.
- The 'Low Adoption Scenario' adoption
  - Partial achievement of the BC Zero Emissions Vehicle Act will contribute greatly to the emissions reduction, compared to the baseline scenario.
  - Considering the emissions in 2050, the reduction due to this partial achievement is:
    - Approximately 50% of the total emissions in Port Moody and Port Coquitlam
    - Approximately 46% of the total emissions in Coquitlam

Observations

- The medium adoption scenario
  - Fully meeting the BC Zero-Emission Vehicle Act will result less GHG emissions than in 'Low Adoption Scenario', at an earlier year.
  - Clean fuel standard will increase the GHG emissions savings
    - ✓ In Port Coquitlam and Coquitlam, the Clean Fuel Standards has a higher reductions share compared to Port Moody
    - ✓ A possible reason for this is that the HDV fleet share is higher in Coquitlam and Port Coquitlam, and the improvement on the GHG emissions factor for Diesel increases the reduction proportionally in each city.
  - The medium adoption scenario lower emissions in 2050:
    - ✓ By approximately 30% in Port Moody and 20% in both Port Coquitlam and Coquitlam

Observations

- From the High adoption scenario, the Electric-LDV segment
  - Medium and high adoption scenarios end up reaching full electrification before 2050.
  - If the horizon for electrification of this segment is 2050, medium adoption scenario successfully achieves the goal (even before 2050)
- From the High adoption scenario, the Electric-HDV segment
  - The electrification of this segment is key to reduce the emissions from the transportation segment
    - ✓ For Coquitlam, it represents close to 1/3 of the emissions in 2050
    - ✓ For Port Coquitlam, it represents close to 1/4 of the emissions in 2050
    - ✓ For Port Moody it represents close to 1/5 of the emissions in 2050
  - For the three cities, the Electric-HDV segment is the highest and only driver (by 2050) for the reduction in the High adoption scenario

APPENDIX

B PRIORITY CHARGER LOCATION IDENTIFICATION

MEMO

TO: Angela Jarvis (Coquitlam), Scott Walmsley (Port Coquitlam), Melony Burton (Port Coquitlam), Arzan Balsara (Port Moody)

FROM: Jeremy Finkleman (WSP), Micha Gutmanis (WSP)

SUBJECT: **ZEMP Priority Charger Locations**

DATE: **July 14, 2023**

1.0 METHODOLOGY

This memorandum identifies priority locations for public charger placement in the TriCities. The output is the result of spatial analysis conducted at the Traffic Area Zone (TAZ) level.

Charger location scores at the TAZ level are calculated as a function of population and employment density with population given a higher weighting to reflect that residences are primary EV charge locations (as reported in multiple surveys of EV drivers). Population scores are then multiplied by a land-use multiplier, which provides higher weightings to TAZs with larger proportions of mixed-use and high-density dwellings (as provided by municipal zoning).

Charger location scores at each TAZ are calculated as follows:

*Charger location score = 0.7*weighted population density + 0.3*employment density*

Whereas population weighting accounts for percentage of mixed-use and high density residential lands within each TAZ, weighted accordingly:

- <5% = 1
- 5-25% = 1.25
- 26-50% = 1.5
- >50% = 2

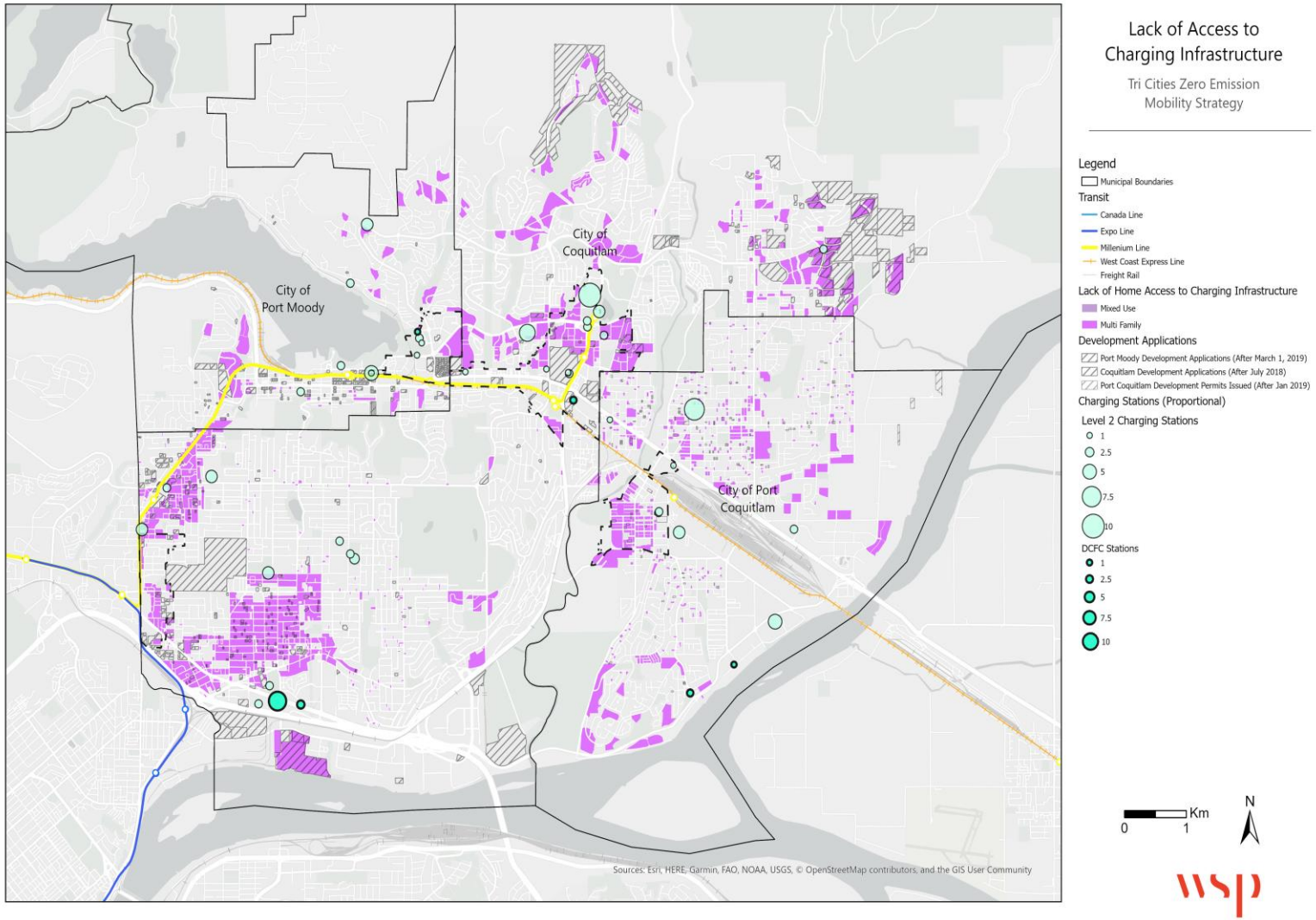
The methodology deployed is a modification of the methodology used to identify priority charger locations in the Capital Region District, with modifications necessary to reflect data availability.

Data sources include:

- Population and employment by TAZ (Metro Vancouver Regional Travel Demand Model)
- Municipal OCP designations

2.0 RESULTS

Figures 1, 2, and 3 display current public charger access in relation multi-family and mixed-use lands, charger access in relation to population and employment density, and priority charger location and charger gaps (the result of the analysis).



Lack of Access to Charging Infrastructure

Tri Cities Zero Emission Mobility Strategy

Legend

- Municipal Boundaries

Transit

- Canada Line
- Expo Line
- Millenium Line
- West Coast Express Line
- Freight Rail

Lack of Home Access to Charging Infrastructure

- Mixed Use
- Multi Family

Development Applications

- Port Moody Development Applications (After March 1, 2019)
- Coquitlam Development Applications (After July 2018)
- Port Coquitlam Development Permits Issued (After Jan 2019)

Charging Stations (Proportional)

Level 2 Charging Stations

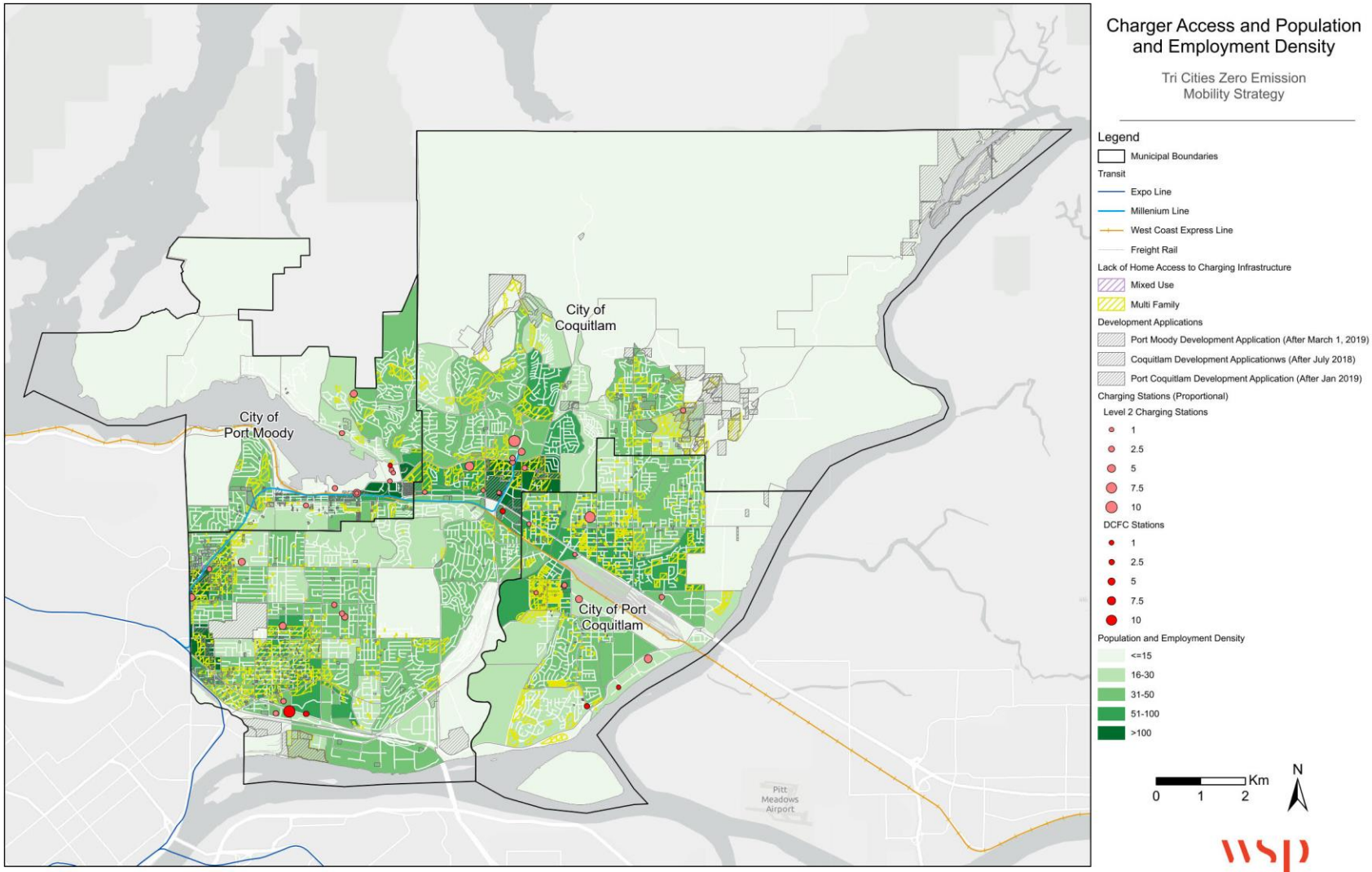
- 1
- 2.5
- 5
- 7.5
- 10

DCFC Stations

- 1
- 2.5
- 5
- 7.5
- 10

0 1 Km

N



Charger Access and Population and Employment Density

Tri Cities Zero Emission Mobility Strategy

Legend

- Municipal Boundaries

Transit

- Expo Line
- Millenium Line
- West Coast Express Line
- Freight Rail

Lack of Home Access to Charging Infrastructure

- Mixed Use
- Multi Family

Development Applications

- Port Moody Development Application (After March 1, 2019)
- Coquitlam Development Applicationws (After July 2018)
- Port Coquitlam Development Application (After Jan 2019)

Charging Stations (Proportional)

Level 2 Charging Stations

- 1
- 2.5
- 5
- 7.5
- 10

DCFC Stations

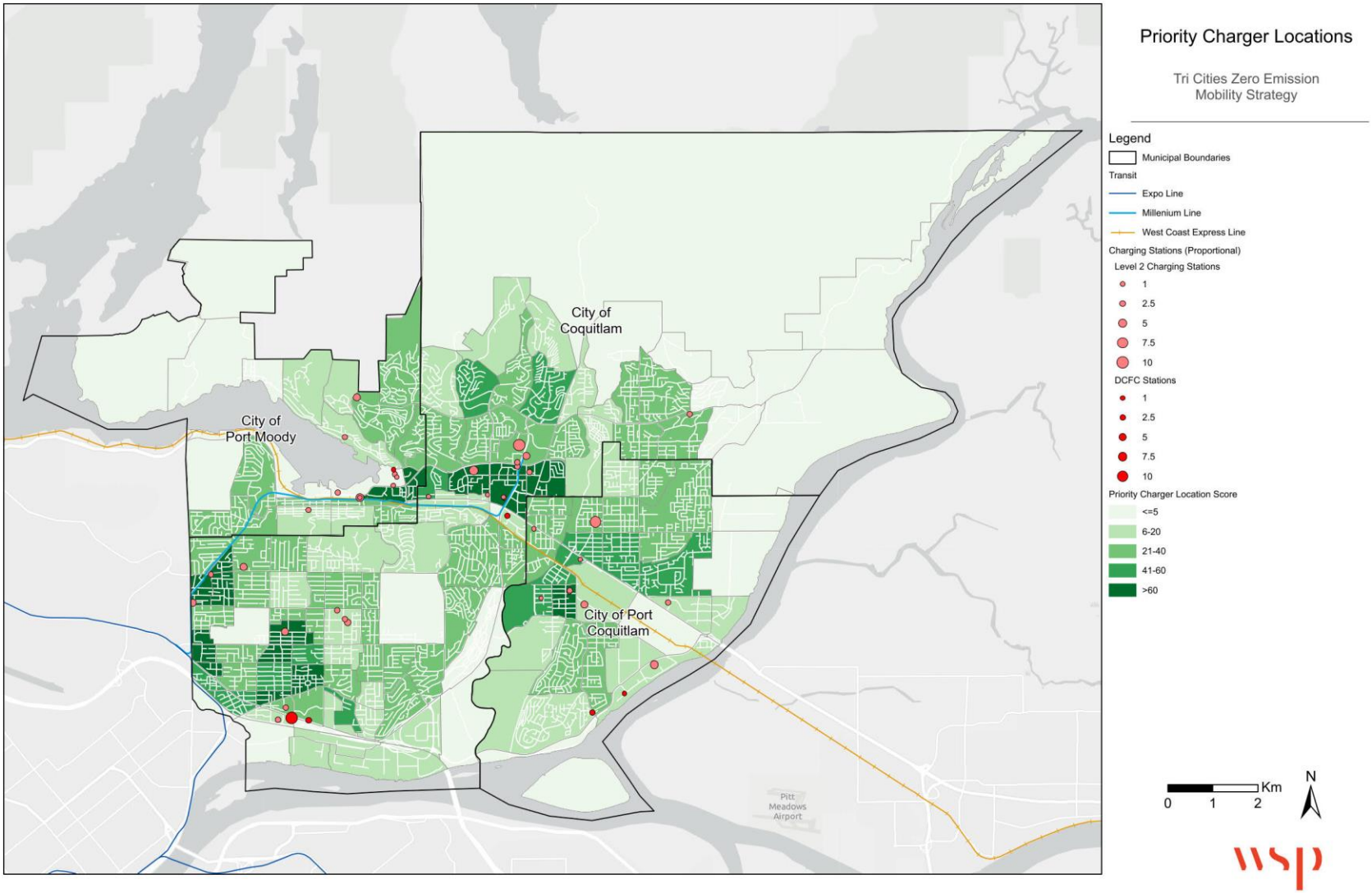
- 1
- 2.5
- 5
- 7.5
- 10

Population and Employment Density

- <=15
- 16-30
- 31-50
- 51-100
- >100

0 1 2 Km

N


Priority Charger Locations
Tri Cities Zero Emission Mobility Strategy
Legend
Municipal Boundaries
Transit
Expo Line
Millenium Line
West Coast Express Line
Charging Stations (Proportional)
Level 2 Charging Stations
1
2.5
5
7.5
10
DCFC Stations
1
2.5
5
7.5
10
Priority Charger Location Score
<=5
6-20
21-40
41-60
>60
City of Coquitlam
City of Port Moody
City of Port Coquitlam
Pitt Meadows Airport
0
1
2
Km
N

wsp.com

3.0 CONCLUSION

We trust the deliverables aligned with your expectations. If you have any questions of comments please do not hesitate to contact the undersigned.

Jeremy Finkleman, MCIP RPP
Senior Transportation Planner