

eMobility Strategy

Supporting New Westminster's Bold Steps for Climate Action

NEW WESTMINSTER

dunsky Energy + Climate

LAND ACKNOWLEDGMENT

We recognize and respect that New Westminster is on the unceded and unsurrendered land of the Halkomelem speaking peoples. We acknowledge that colonialism has made invisible their histories and connections to the land. As a City, we are learning and building relationships with the people whose lands we are on.

Submitted to:

City of New Westminster
Climate Action Division

www.newwestcity.ca

NEW WESTMINSTER

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About Dunsky

Founded in 2004, Dunsky supports leading governments, utilities and others across North America in their efforts to **accelerate the clean energy transition, effectively and responsibly**.

Working across the buildings, renewable energy and clean mobility sectors, we support our clients through three key services: we **quantify** opportunities (technical, economic, market); **design** go-to-market strategies (programs, plans, policies); and **evaluate** performance (with a view to continuous improvement).



EXECUTIVE SUMMARY

In March 2019, the City of New Westminster became the second municipality in Metro Vancouver to declare a climate emergency. To support the climate emergency declaration, the City established a new climate action budgeting framework and Bold Steps with the goal of moving New Westminster towards a zero-carbon future by 2050.

An inventory based on 2016 data found that transportation is responsible for nearly half of New Westminster's community emissions. The City aims to reduce these emissions and improve quality of life with its two transportation-related Bold Steps:

Car Light Community

60% of all trips within the City will be by sustainable modes of transportation by 2030.

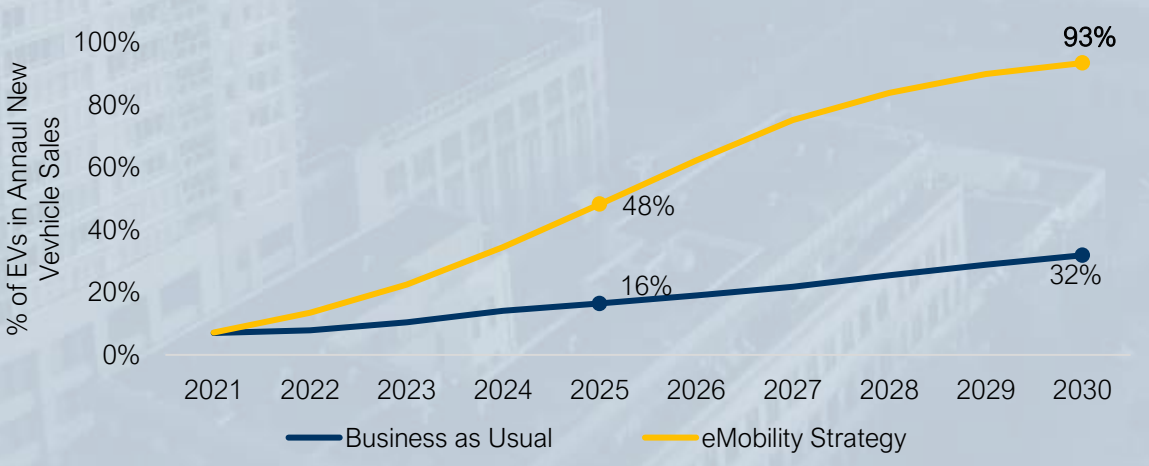
Pollution Free Vehicles

By 2030, 50% of kilometres driven by New Westminster registered vehicles will be by zero emission vehicles.

This Strategy defines a vision for accelerating electric mobility (eMobility) adoption in New Westminster to advance towards these targets.

Electric bikes and other lightweight modes (eMicromobility) allow more people to move further and faster than traditional active transportation options. eMicromobility enables a shift to more sustainable modes of transportation, while also being more affordable than electric vehicles. There is significant local interest in eMicromobility, but more than half of trips are still made by automobiles. This Strategy identifies actions to accelerate eMicromobility adoption.

Electric vehicles (EVs) reduce emissions by powering personal transportation with BC's low-carbon electricity. New Westminster residents are adopting EVs at a rate similar to the rest of the province, but adoption is too low to reach the City's Pollution Free Vehicles target. This Strategy sets New Westminster on a path to significantly increase the number of pollution-free EVs on the road, **reaching 93% of new light-duty vehicles sold by 2030.**



To reach the level of EV adoption outlined above, Dunsky completed analysis and modelling to determine the level of charging infrastructure needed for residents in public, at home, and at work, and what is needed to prepare for potential impacts to New Westminster's electricity grid:



52 Level 2 and 5 DCFC **publicly accessible charging stations**



95% of parking stalls in existing multi-unit residential buildings are retrofitted to **enable home charging**



The electricity grid is **future-proofed** to manage impacts and capitalize on electrification benefits

The Strategy includes the following ten objectives and tangible actions to help transform the way we move in New Westminster, reducing emissions and continuing City efforts towards a healthy, inclusive, and thriving community.

Strategy Objectives			
eMicromobility		1.	Incorporate eMicromobility into City planning and outreach
		2.	Advance supportive eMicromobility policies
		3.	Enhance e-bike accessibility
		4.	Improve access to secure public and private e-bike parking
Electric Vehicles		5.	Improve access to EV charging in public spaces
		6.	Improve access to EV charging at home
		7.	Improve access to EV charging at work
		8.	Support affordability of electric vehicles
Utility		9.	Proactively manage electricity grid impacts of EV charging
Implementation		10.	Successfully implement the eMobility Strategy

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Glossary of Terms

This Strategy uses the following definitions:

1. **Electric micromobility (eMicromobility):** lightweight transportation option that is partly or fully powered by electricity (e.g., e-bike, e-scooter, e-skateboard, etc.).

2. **Electric vehicles (EVs):** includes light-duty Battery Electric Vehicles and Plug-in Hybrid Electric Vehicles

    - **Battery Electric Vehicles (BEVs):** EVs that operate solely on electricity. These vehicles need to be charged in order to refuel (e.g., Chevy Bolt, Nissan Leaf).
    - **Plug-in Hybrid Electric Vehicles (PHEVs):** hybrid vehicles that can plug in to charge and operate in electric mode for short distances (e.g., 30 km to 85 km), but that also include a combustion powertrain for longer trips (e.g., Chevy Volt, Toyota Prius Prime). To drive in electric mode, PHEVs need to charge more frequently than BEVs because they have a smaller battery, and therefore a shorter electric range.

3. **EV-Ready:** refers to parking stalls that have an electrical circuit terminating in an energized outlet for the purpose of EV charging. Does not need to include the charger itself.

4. **EV Charging Station**: refers to infrastructure that provides an EV charging service and can provide charging to one or more EVs at a time depending on the number of ports it includes.

    - **Level 2 (L2) charger:** most commonly provides a charging power of 7.2 kW and can charge an EV at a rate of approximately 40 km of range per hour.
    - **Direct Current Fast Charging (DCFC):** often referred to as Level 3 charging, they provide a charging power of 25 kW – 350 kW and can charge an EV with 300 km in between approximately 15 and 60 minutes.
    - **EV Charging Port:** reflects an individual connector that can charge one vehicle at a time.

Introduction

The 2019 *Global Warming of 1.5 ºC* report by the world's leading climate scientists, the International Panel on Climate Change (IPCC), warned that limiting global warming to 1.5°C requires rapid, far-reaching and unprecedented changes in all aspects of society. The report, which was led by ninety-one authors and review editors from forty countries from around the world, stresses that we are already seeing the consequences of 1°C of global warming through more extreme weather, rising sea levels and diminishing Arctic Sea ice. However, it highlights that the worst impacts of climate change can be avoided by limiting global warming to 1.5°C. With clear benefits to people and natural ecosystems, limiting global warming to 1.5°C can go hand in hand in ensuring a more sustainable and equitable society.

The IPCC report finds that limiting global warming to 1.5°C requires "rapid and far-reaching" transitions in land use, energy, industry, buildings, transportation, and cities. Simply put, society must act quickly to reduce greenhouse gas (GHG) emissions which drive global warming. For any chance of meeting this goal, human caused GHG emissions need would need to reduce by 45% from 2010 levels by 2030, reaching net zero by 2050.

Recognizing this report, in 2019, cities around the world started to declare a 'Climate Emergency'. In declaring a climate emergency, a government acknowledges that human-induced climate change has far-reaching consequences, and the measures taken up until this point are not enough to prevent climate catastrophe. The declaration typically comes with plans to take more aggressive measures to reach our global climate targets.

In March 2019, the City of New Westminster became the second municipality in Metro Vancouver to declare a climate emergency. To support the climate emergency declaration, the City established a new climate action budgeting framework and identified seven bold steps to move New Westminster toward a zero-carbon future by 2050.

With almost half of New Westminster emissions coming from transportation, the electrification of transportation offers a significant opportunity to curb emissions and advance community climate action goals.

Current State of eMobility in New Westminster

An inventory based on 2016 data found that on-road transportation is responsible for 47% of New Westminster's community GHG emissions. Transforming the way we move is a key pathway to meeting climate targets and presents an important opportunity to support other City goals to become a healthy, inclusive, and thriving community.

Electrifying how we move is an important pathway in this transformation. In British Columbia, nearly all electricity is generated by harnessing the power of flowing water, a clean and renewable source. Therefore, electrifying transportation can reduce GHG emissions by replacing fossil fuels with clean electricity. For the purposes of this Strategy, eMobility is grouped into two categories: electric micromobility (eMicromobility) and electric vehicles (EVs).

eMicromobility

eMicromobility refers to any lightweight transportation option that is powered by electricity, or a combination of human and electric power. These modes include e-bikes, e-skateboards, e-scooters and more. eMicromobility allows more people to move further and faster than traditional active transportation modes.



e-bike | **e-skateboard** | **e-balancing board** | **e-scooter** | **e-wheelchair**

Many residents are already using eMicromobility. In a 2020 survey on eMobility, 22% of respondents stated that they owned or regularly used an eMicromobility device. Nearly half of respondents were considering an e-bike as their next bicycle, and nearly a quarter of respondents were considering other eMicromobility options.

However, most trips are still made by personal vehicles. TransLink's *2017 Trip Diary* data showed the majority of trips in New Westminster were made by automobile, followed by transit, and walking (Figure 1). Biking and other modes made up only 1% of trips, respectively.

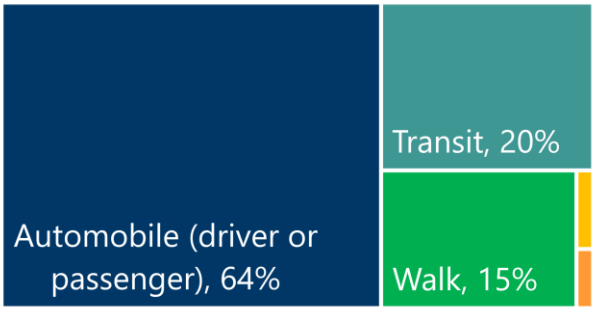


Figure 1: Percent of trips by mode in New Westminster in 2017

Safe operation

Today, there are limited safe routes for eMicromobility because these novel, higher-speed transportation modes do not yet have a clear place in the roads and routes of New Westminster. While the safety of eMicromobility users and non-users is critical, current regulations provide little or no guidance on how and where to operate eMicromobility devices.

Secure e-Bike parking

eMicromobility users often store their device in secure parking areas to ensure it is safe whether at home or on the go. Parking areas can sometimes include access to electrical plugs for charging. Various types of secure e-bike parking are currently available as outlined in Table 1. The City's Zoning Bylaw requires bike parking for long-term storage in new multi-unit residential buildings (MURBs). TransLink offers modular storage lockers at 22nd Street Skytrain Station. Caged storage is commonly used to add secure storage in existing buildings. Public and private bike racks are available for short-term storage, though current conventional bike racks are not necessarily sized to accommodate e-bikes.

Table 1 Typical e-bike storage types and their locations, capacity and cost

	 **Bike storage room**	 **Modular storage lockers**	 **Caged storage**	 **Publicly accessible bike racks**
Typical use locations	MURBs, workplaces, transit	Workplaces, transit	MURBs, workplaces	Community spaces, transit
Bike Storage Capacity	20 - 100	1 - 2	10 - 100	3 - 6
Est. cost per unit	Included in overall construction cost	$3,000 - $5,000[1]	$5,000 - $20,000[2]	$700 - $1,000[3]
Stay length	Long-term	Long-term	Long-term	Short-term

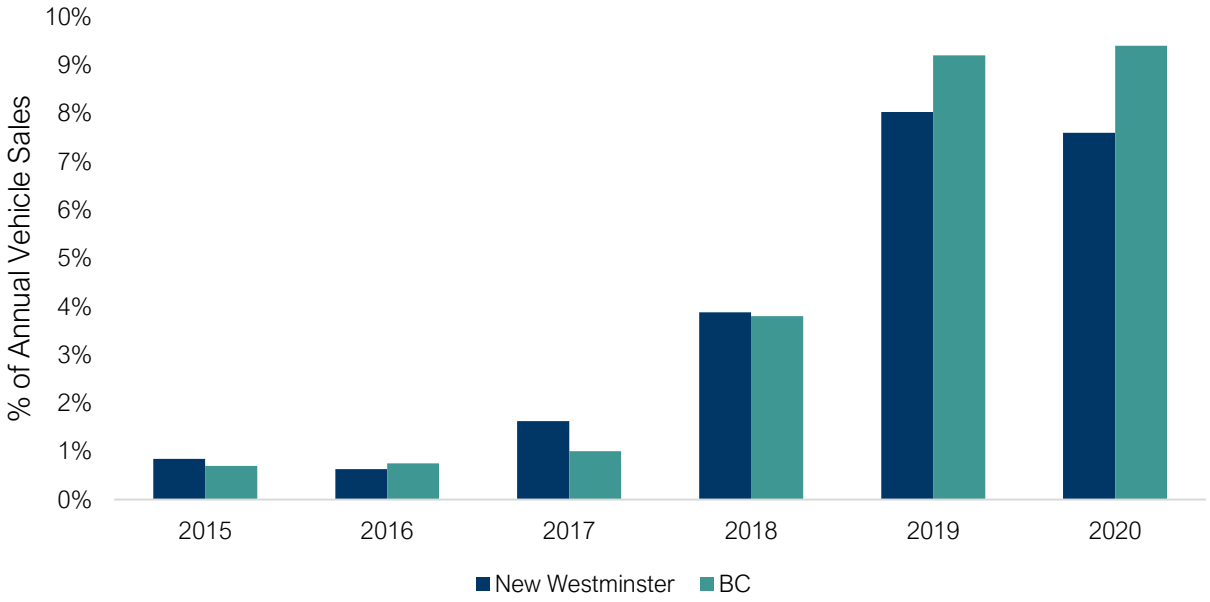
[1] Clean Air Partnership (2019). *Costing of Bicycle Infrastructure and Programs in Canada.* Accessed online: https://www.tcat.ca/wp-content/uploads/2016/08/Costing-of-Bicycle-Infrastructure-and-Programs-in-Canada.pdf
[2] Master's Research Project, Trent University (2015). *Secure Bicycle Parking: Downtown Toronto Office Buildings.* Accessed online: https://rshare.library.ryerson.ca/articles/thesis/Secure_bicycle_parking_downtown_Toronto_office_buildings/14668410/files/28155387.pdf
[3] Clean Air Partnership (2019). *Costing of Bicycle Infrastructure and Programs in Canada.* Accessed online: https://www.tcat.ca/wp-content/uploads/2016/08/Costing-of-Bicycle-Infrastructure-and-Programs-in-Canada.pdf

Electric Vehicles

EVs use an electric motor to drive for some of their propulsion, such as plug-in hybrid EVs, (PHEV) or all of their propulsion, such as battery EVs (BEVs). In this Strategy, EVs refer to light-duty battery EVs and plug-in hybrid EVs.

In 2020, 7.6% of new light-duty vehicle sales in New Westminster were electric. This is closely aligned with trends at the provincial level (Figure 2). Sales have increased rapidly over the past five years as costs have come down and more EV models have become available. EV sales slowed in 2020 due to the COVID-19 pandemic[4] but are expected to start rising again.

Figure 2: Annual EV sales by percent in New Westminster and British Columbia[5]



[4] Statistic Canada (2021). *Zero-emission vehicle registrations down slightly in 2020*. Accessed online: https://www150.statcan.gc.ca/n1/daily-quotidien/210422/dq210422e-eng.htm

[5] Dunsky internal historic EV resources and ICBC Open Data Licence (2020). *Vehicle Population Data*. Accessed online: https://public.tableau.com/app/profile/icbc/viz/VehiclePopulationIntroPage/VehiclePopulationData

EV Charging

Charging infrastructure is an important part of the transition to EVs. EV charging infrastructure technologies are explained in more detail in Table 2.

Table 2 EV Charging Infrastructure Technologies

	Level 1 (AC)	Level 2 (AC)	DCFC
Typical output	1.5 kW (120 Volts)	7.2 kW (240 Volts)	25 kW – 350 kW
Approx. range added per hour of charging	8 km	40 km	300+ km
Equipment and installation costs6	$150 - $1,500	$2,000 - $10,000	$50,000 - $200,000
Typical use locations	Homes, workplaces, public spaces	Homes, workplaces, public spaces	Major corridors, public spaces
Used by	BEV and PHEV	BEV and PHEV	Primarily BEVs

Home charging

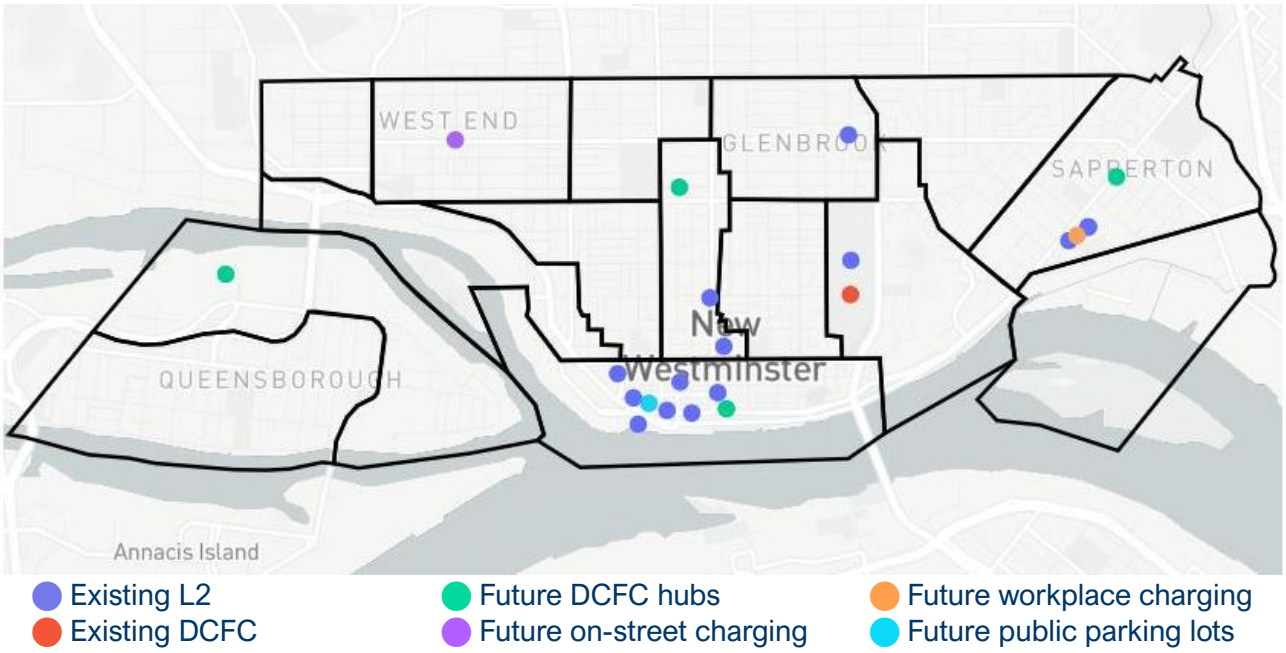
New Westminster is one of several leading communities in British Columbia making it easier for EV drivers to plug in at home. In 2019, the City introduced requirements for all new residential buildings to be 'EV Ready'. An EV Ready building includes an energized outlet at each parking stall that can support a Level 2 EV charger. The EV charger can then be installed at a future time based on resident needs, supporting broader EV uptake by residents. Even without new energized outlets for Level 2 chargers, most single detached owners can also charge at home using a standard outlet and a Level 1 charger.

Public charging

The City was one of the first municipalities in BC to pilot public curbside charging in early 2018. The local infrastructure has expanded to include a combination of Level 2 (L2) stations and direct-current fast charging (DCFC) stations, as outlined in Figure 3.

[6] Costs are approximate ranges based on Dunsky's extensive EV-project experience, inclusive of conduit and other equipment.

Figure 3: Public EV Charging Stations in New Westminster[7]



Workplace charging

Workplace charging is currently promoted through the City's development permit area guidelines by encouraging new non-residential buildings to be EV-Ready. Workplace charging is also supported by private installations in publicly accessible locations.

[7] Natural Resources Canada (2021). *Electric Charging and Alternative Fuelling Stations Locator*. Accessed online: https://www.nrcan.gc.ca/energy-efficiency/transportation-alternative-fuels/electric-charging-alternative-fuelling-stationslocator-map/20487#/find/nearest and City data

A summary of the three general categories of EV charging is described in Table 3.

Table 3 EV Charging Location Categories

	Home	Public	Workplace
Description	A station at the home of the EV driver.	A station that is publicly accessible. It can be offered by the City or the private sector.	A station located in parking that serves workplaces, including public and semi-public charging.
Use	The most preferable charging location, as indicated by New Westminster eMobility survey respondents.	Key support for EV drivers who do not have access to charging at home or at work, and for drivers feeling range anxiety.	Useful replacement or addition to home charging when employees park their vehicle for extended periods at their workplace.
Typical locations	Often found in driveways or garages at multi-unit residential buildings or single-detached homes.	Often found on the street (curbside), in parkades or parking lots, at community centres or in similar spaces.	Often found at parkades, parking lots, or other workplace parking areas at institutional, commercial, or industrial buildings.

Policy Context

eMobility in New Westminster is also supported by a range of actions by regional, provincial, and federal governments, industry, and non-government organizations.

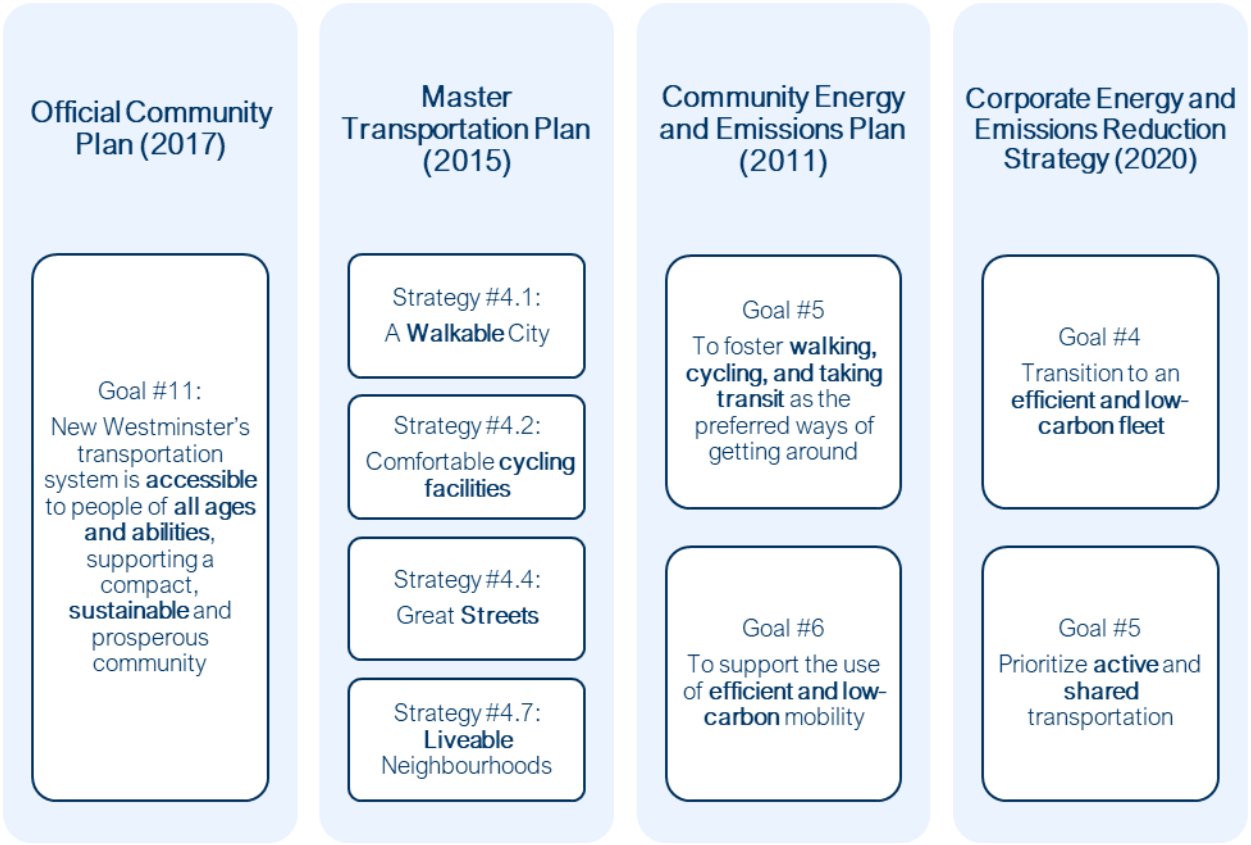
Key policies include the provincial government's mandate for 30% of light-duty vehicle sales to be zero-emission by 2030. The Province committed to updating this mandate to 90% in the *CleanBC Roadmap to 2030* released in October 2021.[8] In addition, in 2021, the federal government committed to introducing a requirement that 100% of car and passenger truck sales are zero-emission by 2035. These ambitious targets from all levels of government support and reinforce efforts for electrifying transportation.

[8] Dunsky's modelling and analysis was completed under the target as it is currently legislated (30% by 2030), though it is expected that the legislation will be updated. This accelerated timeline will support the City's Pollution Free Vehicle Bold Step.

Supporting Policy in New Westminster

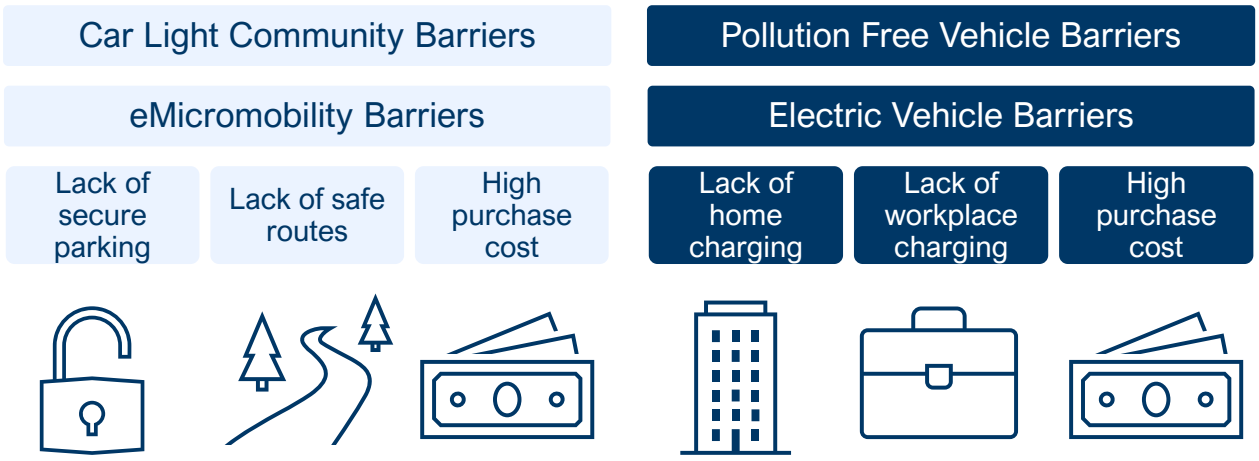
The eMobility Strategy complements and bolsters the efforts of a number of existing policies in the City. A selection of the plans, strategies, and goals that align with, or support eMobility is outlined in Figure 4.

Figure 4: Selection of City Plans and Strategies that align with the eMobility Strategy



Barriers to eMobility Adoption

Several barriers are standing in the way of accelerating eMobility adoption in New Westminster, as identified through engagement with community and industry representatives and the public. Key barriers include access to charging infrastructure, affordability, and safety. The eMobility Strategy aims to reduce these barriers to eMobility adoption, however, progress will also depend on coordinated action and investment by the City across several departments and plans, as well as other levels of government. Tackling these barriers is a critical step towards reaching the Car Light Community and Pollution Free Vehicles Bold Steps.



eMicromobility Barriers

Lack of Secure Parking

eMicromobility (e.g., an e-bike) typically has a higher value than its non-electrified equivalent (a bike). This additional value can place these devices at higher risk of theft or damage. Secure parking that is suitable to the size and/or charging needs of an eMicromobility device can be limited both at home and on the go. The lack of a trusted parking location remains a barrier to adoption.

What we heard:

"I take my car more often than e-bike or electric micromobility device because there are ***so few secure places to lock up"***

Lack of Safe Routes

eMicromobility modes can operate at higher speeds than non-electrified modes. Users do not necessarily know how or where to safely ride and non-users can be concerned about how to safely interact with these higher-speed devices. This lack of certainty of safe routes reduces the appeal of adoption.

High Purchase Cost

eMicromobility typically has a higher upfront cost in comparison to similar non-electric devices due to the battery and charging equipment. This high cost can deter adoption.

EV Barriers

Lack of Home Charging

EV charging at home is critical for adoption because it is the preferred place for most EV drivers to charge.[9] For existing single-detached homes with access to a garage or driveway, installing an EV charger is not usually a barrier – a standard outlet can be used for a Level 1 charger, or a 240 Volt circuit can be installed for a Level 2 charger. Depending on whether the electrical capacity to the property is sufficient, charging can be installed at a reasonable cost ($500 - $2,000).[10] Funding is also available to cover the cost of the EV charger. For new residential buildings, EV charging is not expected to be a barrier, given the City's requirement that all new residential buildings are 'EV Ready.'

However, the 2016 Census found 68% of residents in New Westminster lived in multi-unit residential buildings (MURBs), where installing charging is much more challenging due to the required electrical upgrades and building/strata approval processes. In many existing MURBs, there are few EV charging stations, which remains a barrier to EV adoption.

What we heard:

*"It is difficult to be an EV owner in an **older, multi-housing complex**. We have no chargers, and the strata will not approve the cost to install any for the complex. This forces me to constantly seek out public charging options, which are **often in use** when I need them."*

Lack of Workplace Charging

Charging at work can be a useful replacement for home charging because personal vehicles are typically parked at or near the workplace for extended periods of time. However, few work-related parking areas offer EV charging, reducing the convenience or viability of EV ownership.

High Purchase Cost

EVs currently have a higher upfront cost than similar internal-combustion engine vehicles. This upfront cost remains a barrier to residents who would like to purchase an EV, and benefit from the lower operational and lifetime costs[11], but cannot afford the higher price tag.

[9] Preference for at-home charging was confirmed in the public engagement process. In addition, a 2021 Canadian survey by NRCan confirmed that access to a charging station at home was a leading factor for Canadians considering EVs. The survey can be accessed online: https://www.nrcan.gc.ca/sites/nrcan/files/057-21-NRCan_ZEVs_Final_Report_EN_accessible.pdf

[10] Plug in BC (2018). *Residential Electric Vehicle Charging*. Accessed online: https://pluginbc.ca/wp/wp-content/uploads/2018/10/Residential-EV-Charging-A-Guide-for-Local-Governments.pdf

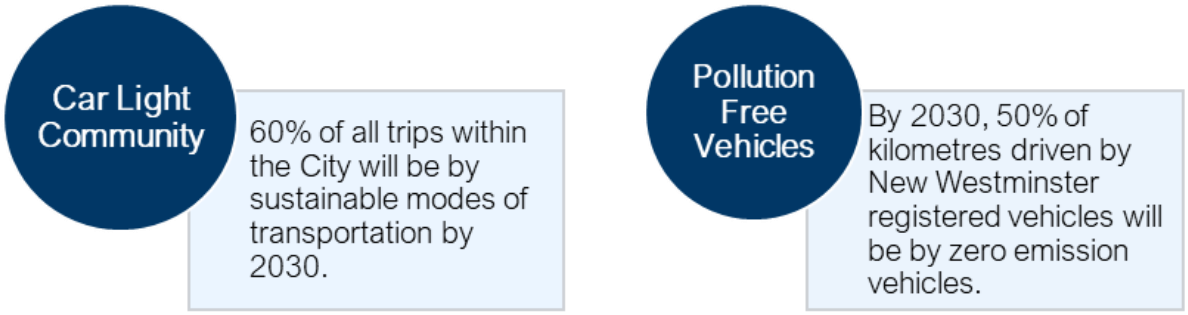
[11] Clean Energy Canada (2022). *The True Cost*. Accessed online: https://cleanenergycanada.org/report/the-true-cost/

Vision for eMobility in New Westminster

Strategy Purpose

The purpose of the eMobility Strategy is to provide a strategic and actionable plan to support community adoption of eMobility in New Westminster. It identifies concrete actions the City will take to help achieve some of its Bold Steps for Climate Action and related 2030 GHG emissions reduction targets. The Bold Steps include two transportation-focused goals outlined in Figure 5.

Figure 5: Transportation-Related Bold Steps for Climate Action



Strategy Approach and Methodology

This Strategy was developed through research on best practices, interviews with industry experts, community and stakeholder engagement and modelling of EV adoption and electricity grid impacts using Dunsky's EV Adoption model (EVA™). Potential eMobility actions were assessed based on their impact on the two Bold Steps, ease of implementation, stakeholder support, authority, complexity, and cost.

Integrating Equity

The transition to electrified transportation offers important opportunities to improve equitable access to transportation in New Westminster. eMobility can also improve street-level air quality and reduce traffic, which benefits all residents.

For sustainability, health, and equity reasons, the City's top priority, as reflected in the Master Transportation Plan hierarchy of transportation modes, is supporting active transportation. eMicromobility devices reduce the physical effort required to travel using traditional active transportation modes - a key advantage in a city like New Westminster where the urban landscape includes significant hills. In addition, eMicromobility offers a more cost-effective electric option than EVs for short and medium distances.

While this Strategy emphasizes mode-shifting and getting people out of single-occupancy vehicles, personal vehicles remain a necessity for many households for longer distance travel, work or other obligations. For households that require a vehicle, an EV can help reduce the operational costs of vehicle ownership, and therefore, the transportation cost burden. This Strategy aims to ensure that households of all types can reasonably choose to go electric.

Equity was integrated throughout the Strategy's development, including the analysis, engagement processes and initial implementation considerations for further consultation. An equity lens will be applied to implementation of the Strategy along with further engagement with equity-denied groups.

Advancing the Car Light Community Bold Step

The Car Light Community Bold Step requires a major shift in how residents choose to move around New Westminster.

eMicromobility supports mode shift to more sustainable modes of transportation by making e-bikes, e-scooters and other micromobility options more accessible. In comparison, eMicromobility requires less effort to operate than traditional active transportation options and is also more affordable than EVs.

Meeting the Car Light Community Bold Step requires a comprehensive approach that addresses more than eMicromobility, including all forms of active and public transportation. Efforts are needed to shift people from personal vehicles to more active modes at the top of the transportation pyramid, as outlined in the *Master Transportation Plan's* Transportation Hierarchy (Figure 6). Parallel efforts in City policies will support the overall Car Light Community Bold Step target. In addition, the Quality People-Centred Public Realm Bold Step aims to transform 10% of street space from moving vehicles to moving people. Under this Bold Step, street space transformation can further promote safe and enjoyable eMicromobility use.

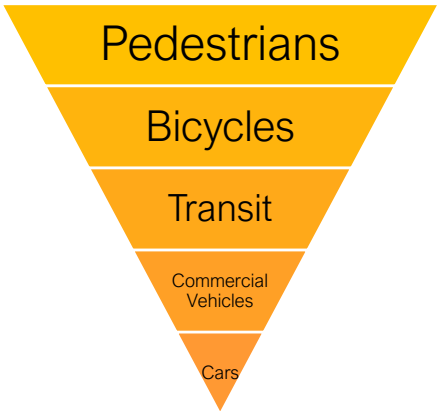


Figure 6: Transportation Hierarchy from the City's Master Transportation Plan

eMicromobility is a key component in the Car Light Community landscape to support mode shift directly and indirectly. This Strategy refers only to the barriers and solutions from the perspective of making eMicromobility and, therefore, car-free transportation, more accessible.

Broad eMicromobility adoption requires prioritizing the safety of users and non-users such as pedestrians, increased affordability of owning or sharing an eMicromobility device, and better availability of secure storage options (see Table 4).

Table 4 eMicromobility Adoption Priorities

Safety	Affordability	Parking
Users should have clear and regionally consistent guidance on how to safely engage with other users and non-users. Users should understand where to ride, knowing that infrastructure can accommodate eMicromobility.	The high upfront cost of eMicromobility devices should be reduced through shared transportation options and broader incentive programs.	Secure storage for eMicromobility devices should be available where residents live, work, and play.

Advancing the Pollution Free Vehicles Bold Step

The Pollution Free Vehicles Bold Step targets 50% of all kilometres travelled by New Westminster vehicles to be by zero-emission vehicles by 2030. If all vehicles travelled the same distance, this target would translate to 50% of all vehicles on the roads. However, distance travelled varies substantially depending on the vehicle type (e.g., bus vs passenger vehicle), owner's lifestyle, location of workplace, and other factors. Therefore, modelling the pathway to this Bold Step is challenging because of the diversity in travel patterns and the lack of data on annual kilometres travelled by individual New Westminster vehicles, today and in the future.

Rather than kilometres travelled, the Strategy focuses on how to accelerate new sales of EVs (as a percent of total vehicle sales). The percent of EVs in new vehicle sales is a common and trackable metric in the eMobility sector: the provincial and federal governments have set targets to reach 100% of light-duty EV sales by 2035. Over time, as vehicles turnover, new EV sales will translate to more EVs on the road and more pollution-free kilometres travelled. Other actions can also contribute to meeting the Bold Step, such as accelerating electrification of vehicles that have high kilometres travelled, such as taxis, buses and shared fleets. Vehicle scrappage programs can also help increase the share of EVs on the road by encouraging the early retirement of polluting vehicles.

Key Findings

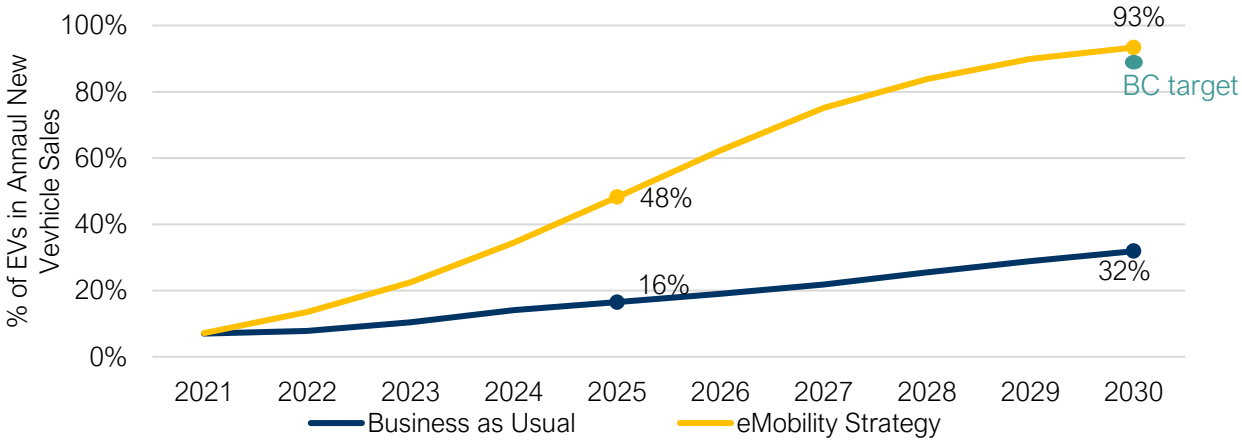
Dunsky completed detailed EV adoption forecasts for new light-duty vehicles using its EV Adoption™ model. The results of Dunsky's modelling show that if the City takes no additional action (Business as Usual), New Westminster will not meet the Bold Step targets or support the provincial and federal EV sales goals. Under this scenario, only 32% of all new light-duty vehicle sales in New Westminster will be EVs by 2030.

Business as Usual (BAU) Scenario

The BAU scenario represents minimal policy action supporting EV adoption. There is limited expansion of public charging networks (L2 and DCFC port numbers are in line with historical growth), current federal and provincial incentives are ramped down and phased out by 2025, and Multi-Unit Residential Building (MURB) home charging access is limited due to no municipal funding for retrofits (though the BAU scenario does include the current EV-readiness requirements for new construction).

The interventions outlined in this Strategy are expected to increase the share of EVs in new light-duty vehicle sales to 93% by 2030 (Figure 7), which is in alignment with federal and provincial targets. This represents significant progress towards meeting the Pollution Free Vehicles Bold Step.[12]

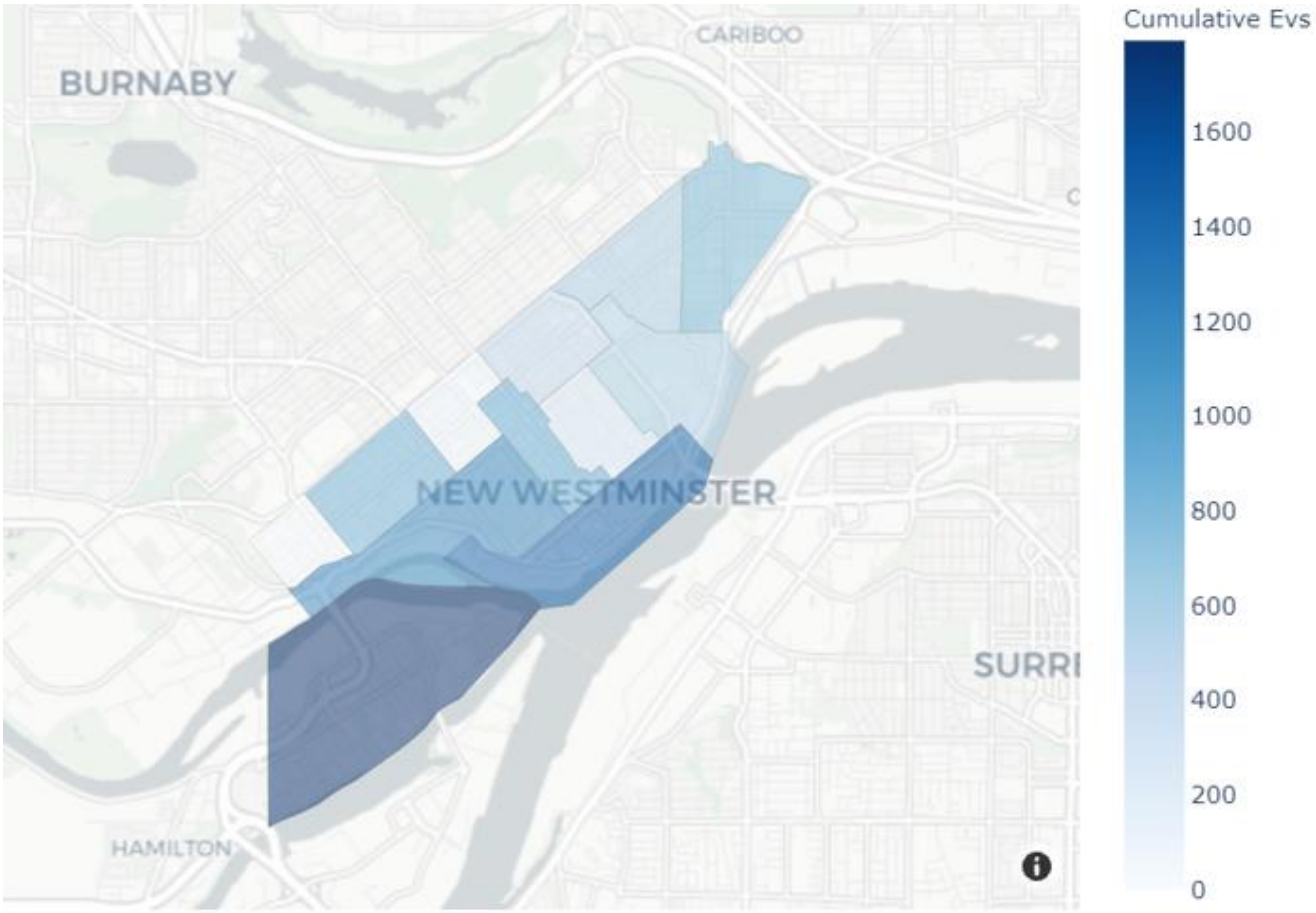
Figure 7: Forecast of EV adoption in New Westminster under Business as Usual and the eMobility Strategy



Reaching 93% EV sales by 2030 would translate to having 11,500 EVs registered in New Westminster, representing approximately 26% of the community's vehicle stock. The level of uptake of EVs varies across neighbourhoods in New Westminster, and is projected to continue to vary, due to differences in the size of the vehicle population, historical EV sales, housing types (and ability to charge at home), income levels and average daily driving distance, as seen in Figure 8.

[12] This trend is dependent on positive global market factors such as ongoing trends towards lower battery costs and increasing availability of electric vehicle models.

Figure 8 Map of projected EV adoption in 2030 by neighbourhood in New Westminster



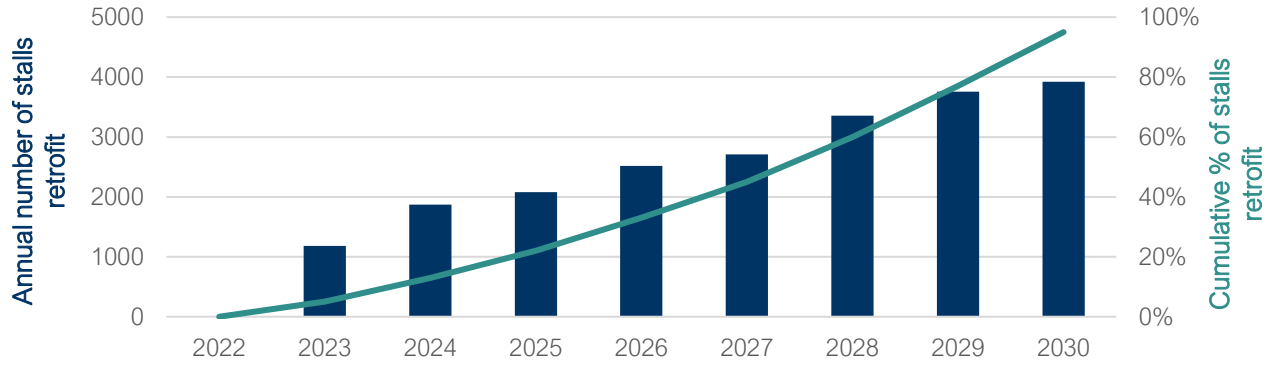
To reach the level of EV adoption outlined in Figure 8, Dunsky completed analysis and modelling to determine the level of charging needed for residents at home, in public and at work, and the potential impact on New Westminster's electric grid. To reduce the kilometres driven by existing vehicles powered by fossil fuels, the actions outlined in this Strategy also include programs, policies and advocacy that can encourage residents to drive less or not at all when they are able.

Home Charging

The modelling assumes that all new residential homes are EV Ready, as required by the City's Zoning Bylaw.[13] For existing single detached homes, Dunsky's modelling and analysis assumed that most existing single detached homes have the potential to install a Level 2 EV charger.

However, to achieve the Bold Step target a significant number of existing multi-unit residential buildings (MURBs) will require retrofitting for EV charging. Modelling and analysis conducted by Dunsky estimates that 95% of MURBs parking stalls will need to be EV-Ready by 2030. An EV-Ready retrofit includes the necessary upgrades to install an energized outlet at most or all of the parking stalls. These retrofits also include an assessment of the building's electricity capacity and energy management solutions to mitigate upgrade costs. These retrofits are future-proofing upgrades that are more cost-effective than installing EV charging at one or a few stalls at a time.[14] Figure 9 outlines a trajectory to achieving these retrofits based on the number of stalls retrofitted annually.

Figure 9 Trajectory to reach EV Ready in 95% of stalls in MURBs with annual number of stalls retrofit



Public charging

To achieve 93% of new light-duty EV sales, residents in New Westminster will need access to a total of 52 Level 2 stations (208 ports) and 5 DCFC stations (15 ports) by 2030[15] as summarized in Table 5.[16] This level of infrastructure is needed to support the number of EVs anticipated to be on the road by 2030, as determined through Dunsky's EV Adoption™ model.

[13] An EV Ready building includes an energized outlet at each parking stall that can support an EV charger. The EV charger can then be installed at a future time based on resident needs, supporting broader EV uptake by residents.
[14] City of Richmond (2019). *Residential Electric Vehicle Charging: A Guide for Local Governments*. Accessed online: https://www.richmond.ca/__shared/assets/Residential_EV_Charging_Local_Government_Guide51732.pdf
[15] The number of ports per station can vary for L2 and DCFC stations depending on location and utilization. DCFC sites may vary between one to three ports and L2 sites may vary between one to six ports. Note that one DCFC port can often have a dual-connector that includes one CCS connector and 1 CHAdeMO connector, but this should be considered one port as only one vehicle can charge at a time.
[16] This includes a portion of EV charging at workplaces, which may be semi-public/only accessible to employees.

Table 5 Public charging needed in New Westminster by 2030

Public Charging Type	Stations	Ports
Level 2	52	208
DCFC	5	15

These stations could be privately funded or supported by City investment and can be located on publicly accessible private land such as a grocery store parking lot, or on publicly owned land such as roads, parks or facilities. City investment could be provided as direct investment in City-owned and/or -operated charging stations and as financial incentives for private actors to invest in privately-owned charging stations. Placement of charging infrastructure on City-owned lands will need careful consideration, given the range of priority uses, and how the charging network may build out over time.

The cumulative number of new and existing public Level 2 and DCFC charging stations required on an annual basis, according to Dunsky modelling and analysis, is outlined in Figure 10 and Figure 11.

Figure 10: Public Level 2 charging stations needed by 2030

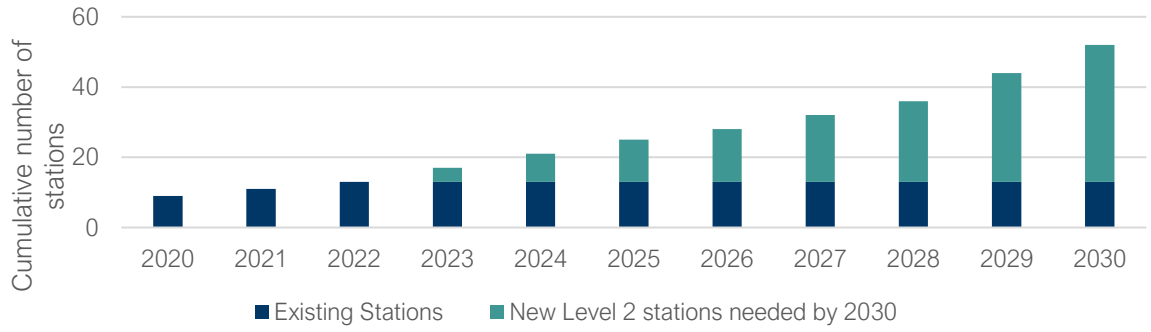
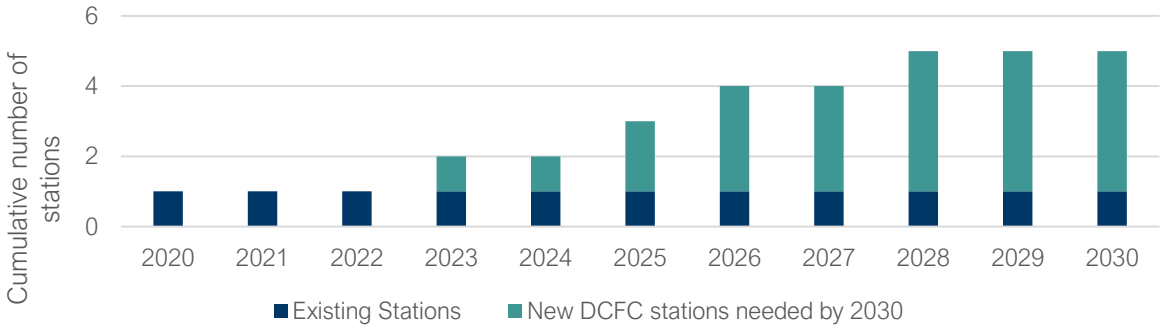


Figure 11: Public DCFC charging stations needed by 2030



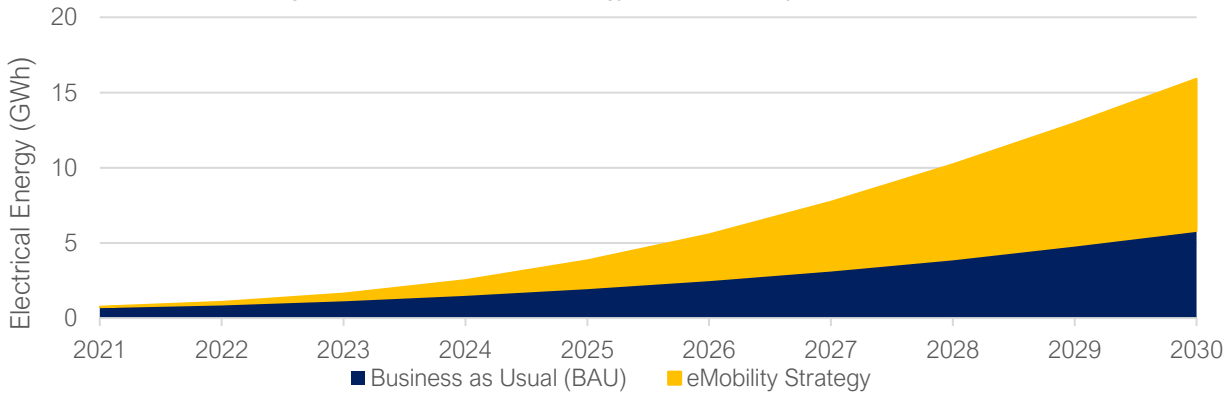
Workplace charging

The level of workplace charging required to meet this scale of EV adoption is included in forecasted public Level 2 charging that will be built in new or existing workplace parking areas.

New Westminster Utility Impacts

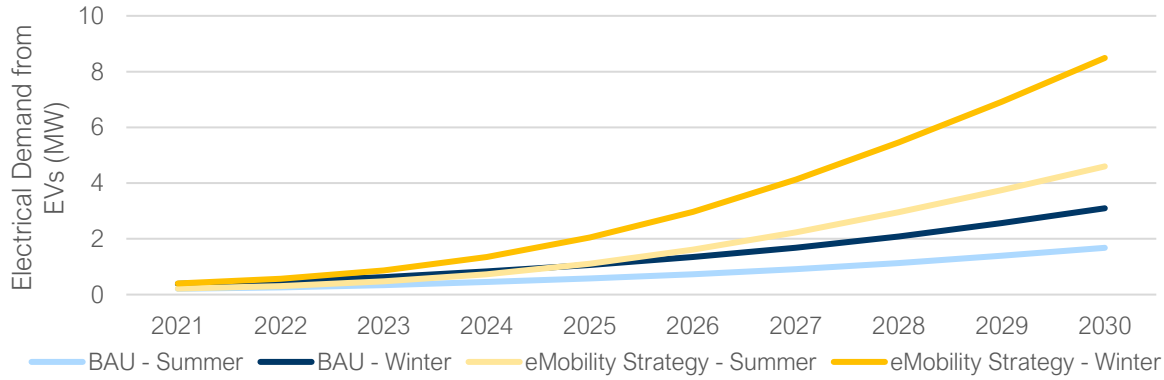
The additional EV adoption and EV charging by residents will increase the amount of electricity demand on the grid, which is operated by the New Westminster Electric Utility. Figure 12 outlines EV energy consumption under the business as usual and under the eMobility Strategy scenarios, as modelled by Dunsky. By 2030, it is estimated that EVs in New Westminster will consume 16 GWh of electricity annually under the accelerated EV adoption supported by this Strategy. The increase in EV charging translates to revenue for the Utility.

Figure 12: Annual electrical energy consumption by EVs over time



The increase in EV charging will also increase the demand for electricity at any given time. As more EVs are adopted, the demand for electricity as EV drivers arrive home in the evening will increase. This need for electricity will peak in winter evenings, due to EVs requiring more energy per kilometre in the winter than in the summer.[17] Increased peak electrical demand can strain or exceed the capacity of local substations, accelerating the need for electrical distribution infrastructure upgrades. As seen in Figure 13, this winter peak demand reaches an additional 8.5 MW by 2030 based on accelerated EV adoption.

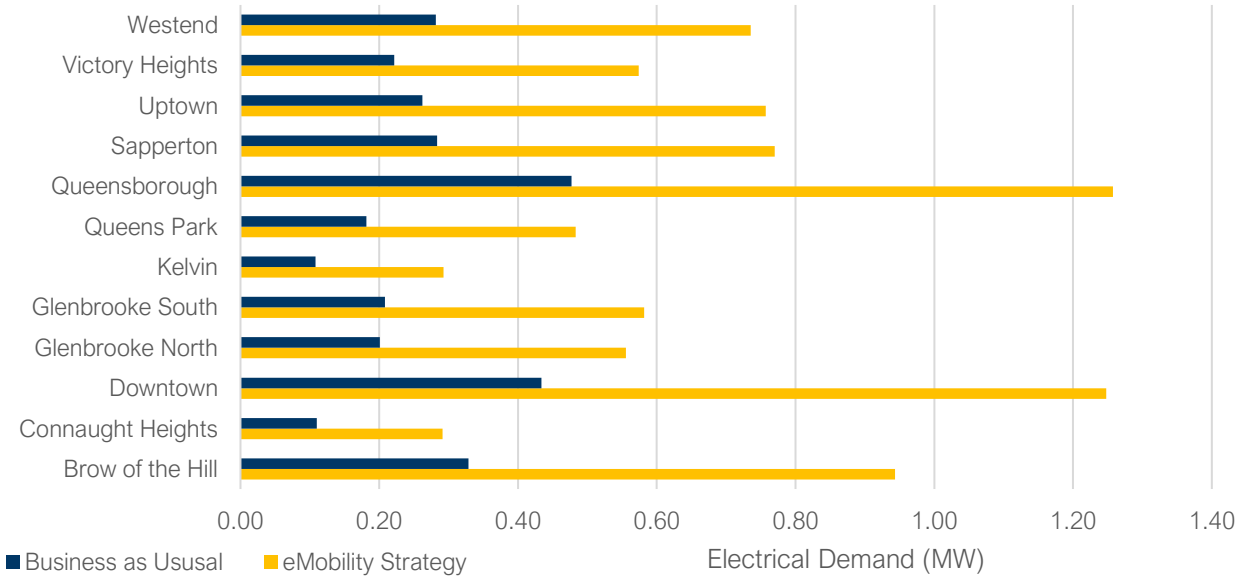
Figure 13: Peak 2030 electricity demand (MW) from EVs in winter evenings



[17] Peak demand is higher in the winter for the grid overall due to heating loads. In addition, EV charging demand is higher in winter due to lower battery and charging efficiency.

This demand will not be the same across the City. The pattern of EV adoption will drive differences in the added electricity demanded in each neighbourhood, as outlined in Figure 14.

Figure 14: Peak electricity demand (MW) in 2030 from EVs in winter evenings by neighbourhood



EVs are anticipated to represent a small portion of expected peak demand in 2030: up to 6% with the implementation of the eMobility Strategy, according to modelling and analysis completed by Dunsky. This means that EV charging loads are not a cause for concern in the short term. However, EV charging loads are anticipated to continue growing beyond 2030, and without proactive interventions, the City risks losing the ability to actively manage EV charging loads when they do become a significant strain on the grid. Recognizing this risk, other utilities have implemented strategies to shift the peak demand of EV charging, thereby extending the lifetime of their assets and limiting the need for infrastructure upgrades.

Peak demand can be mitigated by shifting the time that EVs charge. This is typically achieved by developing a city-wide load management strategy, and there are a growing number of utilities across North America who are leveraging the capabilities of networked, or 'smart', EV chargers in their load management strategies. With the right customer incentives in place, utilities can directly monitor and control the electrical impacts of EV charging through networked communications. For example, networked chargers can delay the time that a charging session is initiated to when it is best for the grid, based on available capacity at that time. Nova Scotia Power is piloting their Smart Grid program in which participants allow the utility to control charging cycles of their EV smart charging system. The Smart Grid Nova Scotia program helps the utility determine their ability to lower power usage by EV chargers during peak times.[18]

[18] Nova Scotia Power. *Investing In Our Future: Electric Vehicle Smart Charging Program*. Accessed online: https://www.nspower.ca/cleanandgreen/innovation/smart-grid-nova-scotia/chargepoint-home-flex-ev-charging-system

As new EV owners install chargers, utilities can incentivize residents to choose networked, or 'smart' chargers, which can be used to manage the charging time. For example, rather than hundreds of people arriving home after work, plugging in and charging at the same time, networked chargers can delay charging to when it is best for the grid capacity. Utilities can also encourage residents to allow their charger to share its usage data to provide real-time data on usage needs.

This networked capacity is not needed immediately by the Utility but encouraging residents to select networked chargers when they are making their purchase decision will help future-proof the City's infrastructure. There may also be opportunities in the future to leverage plugged-in vehicles as energy storage that increases the resilience of the grid.

Objectives and Actions

This section outlines ten objectives with supporting actions to accelerate eMobility adoption over the next five years (Table 6). Aligning with the urgency of the climate emergency, these actions were designed to be started quickly with opportunities to accelerate over time. Each objective, developed in consultation with the community and informed by Dunsky's modelling and analysis, includes key considerations to ensure equitable access to the benefits provided by electrifying transportation.

Encouraging the shift to more sustainable transportation modes through electrification is the core goal of the Strategy. However, meeting the transportation-related Bold Steps will also depend on the implementation of other complementary City initiatives and goals, contained in the Official Community Plan, the Master Transportation Plan, the Community Energy and Emissions Plan, among others. Similarly, this Strategy will complement the implementation of these plans.

Table 6 Strategy Objectives

Strategy Objectives			
eMicromobility		1.	Incorporate eMicromobility into City planning and outreach
		2.	Advance supportive eMicromobility policies
		3.	Enhance e-bike accessibility
		4.	Improve access to secure public and private e-bike parking
Electric Vehicles		5.	Improve access to EV charging in public spaces
		6.	Improve access to EV charging at home
		7.	Improve access to EV charging at work
		8.	Support affordability of electric vehicles
Utility		9.	Proactively manage electricity grid impacts of EV charging
Implementation		10.	Successfully implement the eMobility Strategy

Objective #1: Incorporate eMicromobility into City planning and outreach

Barriers tackled:



eMicromobility devices are relatively recent additions to New Westminster roads, sidewalks, and multi-use pathways. Integrating and accommodating eMicromobility in City plans and infrastructure requires new user experience considerations. For example, wider and protected bike lanes can accommodate more users at varying speeds. Uneven road surfacing can present safety hazards to eMicromobility with a low wheelbase such as e-scooters and e-skateboards.[19]

In addition, many residents are looking for guidance on the benefits and supports for eMicromobility devices, along with where and how to safely use them. Educational efforts that clarify these benefits and their place in the broader transportation landscape can support eMicromobility adoption.

Actions

1. Apply an eMicromobility lens to the Master Transportation Plan and in other transportation-related City projects

The City's plans and projects (e.g., infrastructure upgrades, capital projects) should consider accommodating future eMicromobility users. Future updates to the Master Transportation Plan will integrate an eMicromobility lens, identifying ways to support the uptake of these modes as an important piece of the sustainable transportation puzzle. The City will also develop eMicromobility design considerations for other transportation-related plans and projects. Building an eMicromobility lens into City plans and projects needs to include careful consideration of accessibility. Mobility scooters, for example, whether electric or not, must be considered, along with other mobility aids.

2. Develop an education campaign for safe use and benefits of eMicromobility

The City will develop educational resources on the benefits and correct use of eMicromobility modes. Resources should be consistent with guidelines and messaging used by neighbouring municipalities, TransLink, and Metro Vancouver.

Initial equity considerations for further consultation

Building an eMicrobility lens into City plans and projects needs to include careful consideration of accessibility. Mobility scooters, for example, whether electric or not, must be considered, along with other mobility aids.

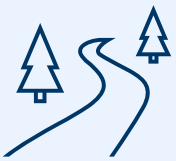
[19] International Transport Forum (2020). *Safe Micromobility*. Accessed online: https://www.itf-oecd.org/sites/default/files/docs/safe-micromobility_1.pdf

Objective #2: Advance supportive eMicromobility policies

The safety of eMicromobility users and non-users needs to be prioritized to ensure a positive, equitable transportation experience in New Westminster. Users need clear and consistent guidance on where it is and is not appropriate to ride and how to interact with other users.

The City will work with local municipalities, Metro Vancouver, and industry partners, and advocate to the Province to develop policies and regulations to complement and magnify the impact of the actions in this Strategy.

Barriers tackled:



Actions

1. Advocate for changes to the *Motor Vehicle Act* to provide clear guidance on eMicromobility

BC's *Motor Vehicle Act* (MVA) provides limited guidance on eMicromobility use. Some eMicromobility devices, such as e-scooters, are currently illegal to operate in the province, except where there is an e-scooter pilot project underway (Part 13 under the MVA). Therefore, the MVA should be updated to provide clear guidance to support and regulate safe eMicromobility use. The City will advocate, with regional partners, to the Provincial Government to update the MVA accordingly.

2. Collaborate to develop clear regionally consistent safety guidelines and requirements for eMicromobility

The City will collaborate with neighbouring municipalities, TransLink, Metro Vancouver, and Province to develop consistent guidance on where eMicromobility devices are permitted, and to develop regulations such as establishing maximum speeds to support safe use. The International Transport Forum recommends regulating modes by their maximum speed and weight (for example, regulating low-speed e-scooters and e-bikes as bicycles, and higher-speed micro-vehicles as mopeds).[20] The City will engage with equity-denied populations during development, to ensure these guidelines and requirements advance equity and avoid negative impacts (e.g. further marginalizing people with mobility impairments).

3. Monitor e-scooter pilot programs and assess opportunities for New Westminster

The City will explore ways it can proactively prepare to integrate e-scooter use into its existing transportation corridors when provincial guidance comes into place. The City will monitor provincial regulations, outcomes and lessons learned from the e-scooter pilot in the province and other jurisdictions.[21] The City will also assess and respond to the opportunities in New Westminster. The City can leverage these learnings to develop educational materials and guidelines to ensure e-scooters can be used safely.

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[20] OECD International Transportation Forum (2020). *Safe Micromobility.* Accessed online: https://www.itf-oecd.org/sites/default/files/docs/safe-micromobility_1.pdf

[21] Government of British Columbia (2021). *Electric Kick Scooter Pilot Project Regulation*. Accessed online: https://www2.gov.bc.ca/gov/content/transportation/transportation-environment/active-transportation/policy-legislation/motor-vehicle-act-pilot-projects/scooter

4. Advocate for a region-wide approach to road usage charging

The City will work with TransLink and regional partners to establish a regional approach for decongestion or road usage charging, as proposed by TransLink's Transport 2050 strategy and the 2018 Mobility Pricing Independent Commission report. Road usage charging is a mobility pricing tool that manages demand for road space by charging more to drive at busy times of the day or in heavily congested areas. Road usage charges motivate people to change their travel habits, such as by using sustainable transportation modes (including eMicromobility, transit and active transportation), carpooling, avoiding travel during peak periods or using another route if they are able. [22]

Initial equity considerations for further consultation

All advocacy efforts should highlight the potential impacts, positive or negative, on vulnerable populations. Accommodations in policy recommendations should be included to ensure equitable access and benefits of the transition to eMicromobility.

[22] Mobility Pricing Independent Commission (2019). *Metro Vancouver Mobility Pricing Study.* Accessed online: https://www.translink.ca/-/media/translink/documents/plans-and-projects/managing-the-transit-network/mobility-pricing/mpic_commission_report_-_final_-_digital_version.pdf

Objective #3: Enhance e-bike accessibility

E-bikes typically have a higher purchase price than conventional bikes. To increase the accessibility of this mode, the City will advocate for additional incentive programs. Shared e-bikes can also reduce the barrier of high upfront costs by switching the higher cost of an e-bike purchase to a smaller subscription fee. In addition, the shared nature of the system transfers much of the security risk associated with e-bike ownership and parking to the e-bike program provider. To support e-bike adoption and improve the accessibility of e-bikes, the City will explore a shared e-bike pilot.

Barriers tackled:



Actions

1. Advocate for e-bike incentive program(s) and promote current e-bike incentives

E-bikes are a popular eMicromobility mode, but the high upfront cost limits adoption and the current incentives are limited. The current incentives include a PST exemption (which has less impact on the high upfront cost than a purchase incentive) and SCRAP-IT ® program purchase incentive (which requires a household to own and scrap a vehicle). The City will work with TransLink and regional partners in support of provincial programs that provide e-bike purchase incentives.

2. Explore a shared e-bike pilot program

The City will explore designing an e-bike pilot program, integrating the key findings from the current e-bike pilot programs offered in other jurisdictions. The City could also consider the shared micromobility guidelines developed by TransLink.[23]

The **City of North Vancouver and other neighbouring municipalities** have launched shared e-bike pilot programs. The City of North Vancouver opted to reduce municipal costs by having the service provider cover all program administration and by choosing a dock-less system. The City required costing systems and an equity plan as part of the program operator permit application and used these items as selection criteria.

An important aspect of this pilot will be the system in which the e-bikes are stored and secured when not in use. E-bike programs use either docked or dock-less systems. Docked systems ensure e-bike storage is orderly and controlled, but require additional infrastructure and may limit system accessibility. Docked systems also require location planning with transportation partners, such as TransLink. Dock-less systems significantly reduce operating costs and increase user parking flexibility, which can support the business case and reduce user costs. In designing a program, a comprehensive review of the benefits and challenges of each system should be undertaken.

[23] TransLink (2019). *Shared Micromobility Guidelines*. https://www.translink.ca/-/media/translink/documents/plans-and-projects/programs-and-studies/translink-tomorrow/shared_micromobility_guidelines.pdf

Initial equity considerations for further consultation

A shared e-bike system helps make e-bikes more accessible, especially for those who cannot afford the high upfront costs. The design of a potential pilot should ensure access for underserved communities and neighborhoods, and equity-denied groups. The City can define equity areas, as the City of Seattle did with its eMobility system by identifying locations and e-bike use in neighbourhoods based on the City's equity analysis (e.g., areas with a high risk of displacement for marginalized populations and low access to economic opportunities).[24] In addition, access to the shared system could be available for people without smartphones or credit records (e.g., offer a cash payment option at private operators or municipal buildings). Many cities have enabled users to pay for trips with cash to reduce barriers.[25] The City must engage with equity-denied groups to inform these and other aspects in a design of a pilot.

[24] City of Seattle (2021). *Bike Share Data Dashboard.* Accessed online: https://www.seattle.gov/transportation/projects-and-programs/programs/bike-program/bike-share

[25] Institute for Transportation and Development Policy (ITDP) (2019). *The Electric Assist: Leveraging E-Bikes And E-Scooters for More Livable Cities.* Accessed online: https://www.itdp.org/wp-content/uploads/2019/12/ITDP-The-Electric-Assist-Leveraging-E-bikes-and-E-scooters-for-More-Livable-Cities-Executive-Summary.pdf

Objective #4: Improve access to public and private secure e-bike parking

Due to their value, e-bikes are at high risk of theft. E-bike users require secure, trusted parking to feel comfortable leaving their device, at home, at work, and on-the-go. The weight of e-bikes makes them difficult to bring them up and down stairs in multi-unit residential buildings (MURBs). E-bikes are often larger than regular bikes and can be challenging to store in small living spaces and may not fit in traditional bike racks.

Barrier tackled:



Secure e-bike parking promotes e-bike adoption and must be available across all neighbourhoods. Secure parking at transit enables users to leave their e-bikes at a station and continue their journey. Secure short-term e-bike storage could also support the shared e-bike pilot if a dock-less system is selected. It also allows e-bikes to be used more often and for more diverse activities beyond recreation.

Actions

1. Map existing public e-bike parking and infrastructure gaps

The City will map out the locations of existing public short- and long-term e-bike parking currently available and planned by the City, TransLink, and others, and identify infrastructure gaps for secure e-bike storage.

2. Invest in secure public e-bike parking at City facilities

The City will invest in e-bike parking for public use. Installing a variety of parking systems can enable more options for users and broader geographic coverage for secure parking. These installations should focus on secure e-bike parking, though these structures typically also enable parking of conventional bikes. Parking can include low-cost traditional bike racks sized for e-bikes with or without a shelter (short-term parking), or long-term secure parking options such as modular bike lockers, and caged storage rooms implemented in existing parking garages (see Table 1).

3. Advocate for expanding secure e-bike parking and storage at transit locations

The City will advocate to TransLink to add secure bike rooms and additional bike lockers and additional bike parking at SkyTrain Stations in New Westminster.[26]

4. Explore developing a program for existing buildings to provide secure e-bike storage

The City will explore the development of a program to support retrofits to offer long-term secure e-bike storage in existing buildings. This retrofit program could include educational and/or financial incentives to support the construction of secure indoor and separated (e.g., caged) storage for e-bikes, which could include charging capacity (e.g., plugs). This program could support e-bike storage in residential (e.g.,

[26] TransLink provides a map of its current and planned bike lockers and bike rooms: https://www.translink.ca/rider-guide/bike-and-ride-on-transit/bike-parking

rental and strata buildings), commercial (e.g., workplaces), and institutional (e.g., educational facilities) buildings.

5. **Support e-bike security education programs**

The City will support programs that educate users on e-bike security best practices and to increase awareness of the secure e-bike parking available in New Westminster. This effort will leverage and support existing efforts by community groups (such as HUB Cycling) who currently offer bike security education programs.

Initial equity considerations for further consultation

Secure public and private storage should be available across all neighbourhoods. Neighbourhoods with a higher proportion of older buildings without storage or without electrified storage, and areas with higher history of bicycle theft and vandalism may have a greater need for improved secure storage options. All storage should be accessible for multiple user types, those with an electric or conventional bike.

A retrofit program could include an incentive targeted towards rental buildings, or non-residential buildings that serve low-income communities. Again, engagement with equity-denied populations will be critical to successful implementation.

Objective #5: Improve access to EV charging in public spaces

Public charging stations are an important option for EV drivers who cannot plug in at home or at work, and for drivers who need additional charging while on the go. The geographic distribution and design of public charging stations should ensure that residents have equitable access to EV charging, regardless of their housing type. To advance towards the City's Pollution Free Vehicles Bold Step, residents in New Westminster will need access to a total of 52 Level 2 stations (208 ports) and 5 DCFC stations (15 ports) by 2030.

Barriers tackled:



Actions

1. Complete detailed street-level mapping of EV infrastructure gaps

A more detailed street-level mapping should be completed, taking into account existing and planned public and private sector installations and equity considerations.

2. Develop siting guidelines for public infrastructure with a focus on user experience

Level 2 sites should consider the proximity of available electrical power, proximity to activities (e.g., parks, commercial/ retail, schools, community centres, medical centres), proximity to multi-unit residential buildings, visibility, ease of access, and safety.

DCFC stations should be located at sites that are regularly visited but with short visiting times, such as privately owned charging sites, like grocery stores, or City-owned charging sites such as community centres. DCFC siting should also consider proximity to available electrical power.

Siting should include consideration to geographic and equitable distribution. Further considerations include universally accessible parking, well-lit and safe siting, ease of maintenance, cord storage, and ease of payment.

3. Coordinate public charging deployment with shared fleet operators

Shared fleets, such as carshare services, ride-hail services and taxi fleets, can play an important role in reducing reliance on personal vehicles and supporting the City's transportation Bold Steps. While shared fleets typically require dedicated charging infrastructure to ensure access for these heavily used vehicles, the City may be able to facilitate electrification of these shared fleets through coordinated infrastructure deployment. This could include co-located charging sites with shared infrastructure supporting both public charging ports and dedicated charging ports reserved for fleets.

4. Install public charging where network gaps remain

Given the challenging business case for private sector investment in public charging, the City has a critical role to play in investing, owning and deploying stations. The City will monitor the gaps that remain in the publicly accessible charging network where public needs are unfilled by the private sector. The City will

install public charging that it owns and/or operates to fill network gaps. To build internal capacity, the City can continue to engage with municipal, regional, and provincial governments to learn and share best practices for EV charging infrastructure networks.

There is a strong business case for the City to invest in public EV charging infrastructure. In addition to revenues received through providing the EV charging service, the City can receive Low Carbon Fuel Standard (LCFS) credits as the supplier of electricity through its chargers, both of which have the potential to shorten the asset's payback period.

5. **Continue to set City charging user fees to support cost recovery and turnover**

User fees for the City's EV charging network should be lower than the equivalent cost of fossil fuel transportation. The fee should be high enough to reflect the value of the service, supporting the operator's business case, and ensuring rotation of vehicles (i.e., the fee is not so affordable that customers leave their vehicles for extended periods compared to typical use).

Initial equity considerations for further consultation

All residents should have access to DCFC and Level 2 charging regardless of where they live in New Westminster. Ensuring equitable access across the city could mean that proportionally more ports or stations are installed in neighbourhoods with a higher proportion of renters, low-income households, higher density, older buildings, or other qualities that could challenge access.

Objective #6: Improve access to EV charging at home

As previously described, to progress towards the City's Bold Steps, 95% of parking spaces in multi-unit residential buildings (MURBs) will need to be EV-Ready by 2030. Therefore, preparing these MURBs to enable residents to charge at home is critical to enabling residents to choose electric over fossil fuel-powered vehicles. EV charging in existing single-detached homes was not identified as a significant barrier.

Barrier tackled:



EV Ready upgrades provide the ability to add a charging station to most or all of the parking stalls in a MURB. This significantly reduces the cost per stall and future-proofs the building by accommodating future EV drivers.[27]

Actions

1. Explore developing a financial incentive program for MURB EV-Ready retrofits

The City could provide a top-up financial incentive, in addition to the provincial[28] and federal[29] supports, for MURBs to undertake EV-Ready retrofits. Some retrofits with poor business cases or important equity considerations may require a higher level of support from the City, while some may require less support. In addition, higher levels of support (from the City and senior governments) may be required in the earlier years of the Strategy while EV demand grows but remains relatively low and, therefore, the private investment business case is less attractive.

2. Promote existing educational and financial supports for EV-Ready Retrofits

Education and capacity-building initiatives are needed to help building owners and residents navigate the process of EV Ready upgrades. The City will support local education by promoting existing resources. The BC Government, Plug In BC, BC Hydro and FortisBC have a range of educational materials and guidance that the City will leverage to support building owners and residents in New Westminster.

3. Advocate for EV-Ready retrofit requirements

The City will advocate to the provincial government for EV-Ready retrofit requirements. The Province is responsible for regulating building and construction and, therefore, could introduce requirements for EV-Ready retrofits in existing buildings. The City will also advocate to the federal government for EV-Ready requirements to be included in the upcoming federal Alterations to Existing Buildings retrofit code, aimed to reduce emissions and improve performance in the existing building stock.

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[27] City of Richmond (2019). *Residential Electric Vehicle Charging: A Guide for Local Governments*. Accessed online: https://www.richmond.ca/__shared/assets/Residential_EV_Charging_Local_Government_Guide51732.pdf

[28] Provincial financial and technical supports are available for MURBs through the *CleanBC Go Electric* program: https://goelectricbc.gov.bc.ca/

[29] Federal financial support is available for MURBs through the *Zero Emission Vehicle Infrastructure Program*, administered by Natural Resources Canada: https://www.nrcan.gc.ca/energy-efficiency/transportation-alternative-fuels/zero-emission-vehicle-infrastructure-program/21876

4. Advocate to include EV-Ready retrofits in financing programs

The City will advocate with regional partners for EV-Ready retrofits to be allowable under financing programs for all building types. Financing for building retrofits can be enabled through provincial legislation (e.g., Property Assessed Clean Energy, or PACE, financing or on-bill repayment). The City will advocate to the provincial government that this legislation should allow EV-Ready retrofits to be an eligible cost for financing. The City will also advocate for EV-Ready retrofits to be allowable under financing programs offered by the regional or provincial governments and associations (e.g., the Federation of Canadian Municipalities).

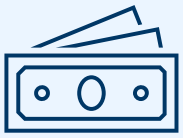
Initial equity considerations for further consultation

As the City explores a top-up EV- Ready retrofit incentive, the program could be designed to provide financial support based on local needs. For example, additional support could be provided to rental and non-market buildings or older buildings with more complex electrical requirements. While some low-income residents may be less likely to drive, many need a vehicle for their work or other obligations. In addition, there are many moderate-income households who live in rental MURBs and have little say on building upgrades. Targeting incentives can ensure that the transportation cost benefits and emission reductions of EVs are available to low- and moderate-income households at home, where most drivers prefer to charge.

Objective #7: Improve access to EV charging at work

Charging at work is a convenient option for drivers who cannot do so at home. Given the long durations people often park at workplaces, they are ideal for Level 2 charging stations. EV-Ready construction future-proofs parking lots by installing electrical infrastructure at the most cost-effective point in a building's life cycle, avoiding expensive retrofits in the future, and allowing employers and building managers to install EV chargers as demand from workers grows.

Barrier tackled:



Actions

1. Establish EV-Ready requirements for new non-residential buildings

The City will undertake a review to determine appropriate Zoning Bylaw requirements for a proportion of vehicle parking spaces in new non-residential buildings to be EV-Ready. To support alignment in the region, New Westminster could adopt similar requirements for the proportion of stalls in new non-residential buildings as other Metro Vancouver municipalities (see *City of Vancouver Non-Residential Standards* text box). To prepare for the adoption of these requirements, the City will work with the business and development community to review the proposed requirements, address questions and build capacity, following a similar process as the residential EV Ready requirements, which included information sessions to disseminate information.

Initial equity considerations for further consultation

New requirements for EV Ready spaces should also apply to accessible parking spaces for new non-residential buildings

City of Vancouver Non-Residential Standards

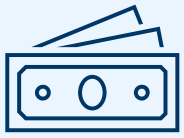
The City enacted the following requirements table in its Parking Bylaw (Section 4) on July 20, 2021.

Non-residential segment	Minimum percent of stalls required to be EV-Ready	Technology type
All non-residential buildings (except Hotel and Bed and Breakfast)	45%	L2, with option to substitute DCFC capacity for equivalent L2 capacity
Hotel and Bed and Breakfast Accommodation	100%	L2, with option to substitute DCFC capacity for equivalent L2 capacity
Shared vehicle (car-share) stalls	100%	L2, including charging station
Accessible parking stalls Hotels and bed and breakfasts All other uses	 100% 45%	L2

Objective #8: Support affordability of electric vehicles

Affordability is a key barrier to choosing an EV for many drivers due to the higher up-front cost and lack of awareness about the lower operational costs of EVs. Ensuring continued financial and educational support for EVs is critical for adoption.

Barrier tackled:



Actions

1. Advocate for the current level of EV purchase incentives be maintained to 2030

The City will work with regional partners to advocate to the provincial and federal governments to maintain the current levels of incentives. The current EV purchase incentives of up to $8,000 offered by senior governments are critical to making EVs more affordable and achieving the Pollution Free Vehicles Bold Step, according to modelling and analysis completed by Dunsky.

2. Promote existing EV purchase incentives and educational resources

The City will promote existing incentives and provide education on the benefits and logistics of EV ownership through its website and other outreach. These supports can be made by expanding the information presently available on the City website, or by providing links to leading provincial resources (e.g. Emotive and Plug-in BC).

3. Advocate to expand efforts to 'scrap' internal combustion engine vehicles

The City will work with regional partners to advocate to the provincial government for additional efforts to reduce the number of internal combustion engine vehicles on the road. Even with high numbers of new EV sales, the long life of vehicles keeps fossil fuel emitting vehicles on the road. Removal and/or replacement of these vehicles through incentive programs, such as BC's SCRAP-IT® Program, can support the affordability of EVs. These programs should be designed with a careful assessment of operational emission reduction while accounting for life-cycle vehicle emissions.

4. Explore creating low- or zero-emission zones in New Westminster

The City will explore creating low- or zero-emission zones. These zones are areas where cities designate that, by some point in the future, only people walking, rolling, biking or driving EVs and other zero-emission vehicles may access the area. These zones provide additional incentive for EV ownership, while also reducing congestion and improving air quality.

Initial equity considerations for further consultation

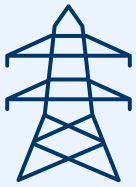
Even with financial incentives, new personal vehicles, including EVs, remain out of reach for many households and the current low availability of used EVs further limits access. Based on these challenges, agencies serving equity-denied populations may be better placed to take advantage of incentives to electrify fleets. Consultation with equity-denied groups could assess if or how EVs could support their transportation needs. Supporting the uptake of EVs will need to be balanced with the implementation of

other objectives such as supporting eMicromobility and carsharing and collaborating with TransLink to expand the convenience and accessibility of transit.

Objective #9: Proactively manage electricity grid impacts of EV charging

The City is in a unique position because it owns and operates its own electric utility. Together, the City and the Utility can prepare for increased EV charging demand to achieve the anticipated benefits and mitigate the expected peak impacts. The City can take near-term actions to future-proof the grid for EV charging demand by encouraging the adoption of networked 'smart' chargers, which can communicate with the Utility.

Barrier tackled: (infrastructure)



As the adoption rates of EVs continue to increase, so will their demand for electricity. The City and the Utility can prepare for these future demands by monitoring EV adoption and planning for EV load management.

Actions

1. Explore the development of a networked or 'smart' charging incentive pilot

The City will explore the development of a smart charger incentive pilot. While exploring the development of this pilot, the City will look to the key findings of other Utilities that have implemented similar pilots (e.g., Nova Scotia Power).

The pilot could be completed in multiple phases. For example, a first stage could require data sharing on usage to examine EV charging patterns and mitigation strategies. Building on the usage patterns of the first phase, the program could expand to include controlling charge times for customers who opt-in.

2. Develop educational materials on the benefits of networked or 'smart' charging

The City will develop educational materials on the benefits of networked charging for residents to encourage the adoption of networked chargers over non-networked chargers. These efforts should be integrated with the City's broader EV education efforts.

3. Continue to monitor EV uptake and forecast the anticipated impacts of adoption

The City will direct the Utility to plan for additional load impacts of EVs on the Utility – in line with the EV adoption forecasts set out in this Strategy – and provide regular reports on how they are updating their operations to prepare for increased EV adoption. These impacts should be considered along with current forecasts and the other disruptive trends such as building heating electrification.

4. Plan for the future development of an EV load management program

The City and Utility will begin planning for the development of a future EV load management program. This plan should integrate EV adoption and charging demand forecasts. The plan should also include proactive interventions to manage these impacts, such as strategies to shift the timing of EV charging demand.

Initial equity considerations for further consultation

In a potential smart charger incentive program, the City could explore higher levels of incentives or offering incentives only to households that are typically underserved (e.g., lower-income households).

The long-term electricity benefits and costs of EV electricity use and peak demand should be monitored to ensure there are no repercussions to ratepayers. Electric vehicles have the potential to provide overall benefits to all electricity ratepayers, including non-EV owners, by better distributing energy production costs and potentially avoiding increases to electricity rates. By encouraging EV owners to charge overnight when there is excess capacity on the grid, smart charging can ensure that the increased revenue from electricity sales to EV owners outweighs any additional cost required for capacity upgrades to serve those EVs. This concept is referred to as "beneficial load growth" and can lead to lower electricity rates for all ratepayers. However, if peak demand is not managed and more infrastructure is required, all ratepayers could have to fund these upgrades, increasing rates and making energy less affordable.

Objective #10: Successfully implement the eMobility Strategy

This Strategy, including its goals, objectives, and actions, is intended to be a living document that will evolve with changes in policies, legislation, and technologies over time. While key staff in specific departments, such as Climate Action, Planning and Development, Engineering, and the Electrical Utility, will take a lead role in implementing a number of this Strategy's projects, all City staff play a role in advancing the collective goals. There is a lot of work ahead, but through thoughtful implementation, these actions can build a more accessible, more connected, safer, and resilient city. Successful implementation of the Strategy requires funding, including for a new staff position, monitoring and reporting, and project prioritization.

Actions

1. **Create and hire an eMobility Specialist staff position to lead and support the eMobility Strategy**

   To support the implementation of the eMobility Strategy, one full-time employee will need to be assigned to progress the actions and oversee the objectives.

2. **Leverage external funding opportunities.**

To fund the implementation of the eMobility Strategy, it will be important to continue looking for and leveraging external and emerging funding sources, such as from senior governments, particularly for the expansion of the City's public charging network. Natural Resources Canada offers programs to help deploy zero-emission vehicle charging in public places, on-street charging, workplaces, and multi-unit residential buildings.

The City could also consider using revenue from City-owned EV charging stations to fund the Strategy. This revenue could come from user fees and BC's Low Carbon Fuel Standard (LCFS) credits. The LCFS allows participants who own EV charging stations to generate credits in proportion to the amount of electricity dispensed to fuel EVs.

Other sources of potential funding streams include the Federation of Canadian Municipalities programs and the Investing in Canada Infrastructure Program. The BC government also offers several incentive programs to support public and private charging infrastructure.

3. **Apply an equity lens to implementation and engage with equity-denied groups**

   Equity will be a key consideration in determining how actions are implemented. Each action recommended in this Strategy must be implemented with nuance, whether it is ensuring equitable access to EV charging across neighbourhoods and for renters, crafting eMicromobility regulations and guidelines that do not further marginalize people with mobility impairments, or developing an e-bike share system that allows payment without a credit card. To get it right, it will be critical to engage with representatives of diverse equity-denied groups as programs, policies and regulations are developed.

Applying an equity lens will also mean considering the bigger picture of how resources are allocated. During consultation for another climate plan, representatives of equity-denied groups flagged that low-income people often struggle to afford a bus pass or a second-hand bike, and that eMobility is quite out of reach. In this context, climate action on eMobility needs to be considered with other more equity-enhancing action. The action prioritization tool described below will help with this decision-making process.

4. Create an action prioritization tool

The City will develop a tool to prioritize the actions outlined in this Strategy and other climate plans, to support implementation scheduling. This matrix could include financial considerations, GHG emission reductions and internal carbon pricing, current and future capital and infrastructure planning processes, project lead times, and other analytical tools. An equity lens will also be needed. Using a prioritization tool for implementation of all climate actions will help ensure the City takes the most strategic action possible.

5. Monitor and report on the Strategy under the Climate Action and Environment Key Performance Indicators

Regular monitoring and reporting are an integral part of this Strategy's impact on the eMobility landscape. Through the City's Climate Action and Environment Key Performance Indicators (KPI) Report, the City is actively monitoring and reporting metrics that directly and indirectly align with the eMobility Strategy's objectives. The alignment of these initiatives means that the success of the Bold Steps measured in the Climate Action and Environment KPI report will reflect the success of the eMobility Strategy.

Data collection should be integrated into each action as it is implemented to ensure that the data is available for each action for monitoring and reporting. For example, key metrics can be incorporated into rebate or program designs, or existing annual reporting mechanisms to streamline reporting. Further, the proportion of any funding allocated for equity-denied groups should be assessed as a proportion of the annual spending as a consideration for the focus on ensuring equitable access to eMobility. To assess impact, an analysis of the trends in the metrics collected should be completed.

During the Climate Action and Environment KPI reporting process, a comprehensive review of the eMobility Strategy's implementation will also be conducted to ensure the City is on track to meet its objectives and targets. The review may include changing and adding actions as necessary to ensure the resources needed to reach the eMobility Strategy's goals and the larger Bold Steps for Climate Action are included in the five-year capital planning process. As the Climate Action KPIs evolve over time to reflect emerging priorities, this Strategy will also be reviewed to ensure any new and applicable quantitative and qualitative performance indicators are considered.

eMobility Roadmap

The following table summarizes the Objectives and Actions of this Strategy, along with the lead departments, estimated cost, and timeline.

	Objectives	Barrier Tackled		Actions	Lead Department	Estimated Cost	Recommended Launch	Timeline
eMicromobility	**1. Incorporate eMicromobility into City planning and outreach**		1.1	Apply an eMicromobility lens to the updated Master Transportation Plan and in other transportation-related City projects	Engineering	$	Short Term	Ongoing
			1.2	Develop an education campaign for safe use and benefits of eMicromobility	Climate Action	$	Short Term	Short Term
	2. Advance supportive eMicromobility policies		2.1	Advocate for changes to the *Motor Vehicle Act* to provide clear guidance on eMicromobility	Engineering	N/A	Short term	Ongoing
			2.2	Collaborate to develop clear regionally consistent safety guidelines and requirements for eMicromobility	Engineering	N/A	Short Term	Ongoing
			2.3	Monitor e-scooter pilot programs and assess opportunities for New Westminster	Climate Action	N/A	Medium Term	Ongoing
			2.4	Advocate for a region-wide approach to road usage charging	Engineering	N/A	Long Term	Ongoing
	3. Enhance e-bike accessibility		3.1	Advocate for e-bike incentive program(s) and promote current e-bike incentives	Climate Action	N/A	Short Term	Ongoing
			3.2	Explore a shared e-bike pilot program	Engineering	$$	Short Term	Medium term
	4. Improve access to public and private secure e-bike parking		4.1	Map existing secure public e-bike parking and infrastructure gaps	Climate Action, Engineering	$$	Short Term	Short Term
			4.2	Invest in secure public e-bike parking City facilities	Engineering	$$ - $$$	Short Term	Long Term
			4.3	Advocate for expanding secure e-bike parking and storage at transit locations	Engineering	N/A	Ongoing	Ongoing
			4.4	Explore developing a program for existing buildings to provide secure e-bike storage	Climate Action, Engineering	$ - $$$	Medium Term	Long Term
			4.5	Support e-bike security education programs	Climate Action	$	Short Term	Short Term

	Objectives	Barrier Tackled		Actions	Lead Department	Estimated Cost	Recommended Launch	Timeline
Electric Vehicles	**5. Improve access to EV charging in public spaces**		5.1	Complete detailed street-level mapping of EV infrastructure gaps	Climate Action	$	Short Term	Short Term
			5.2	Develop siting guidelines for public infrastructure with a focus on user experience	Climate Action, Engineering	$	Short Term	Short Term
			5.3	Coordinate public charging deployment with shared fleet operators	Climate Action, Engineering	N/A	Short Term	Ongoing
			5.4	Install public charging where network gaps remain	Climate Action, Engineering	$$$	Short Term	Long Term
			5.5	Continue to set City charging user fees to support cost-recovery and turnover	Climate Action, Electric Utility	N/A	Ongoing	Ongoing
	6. Improve access to EV charging at home		6.1	Explore developing a program to provide financial incentives for MURB EV-Ready retrofits	Climate Action, Engineering	$$$	Short Term	Long Term
			6.2	Promote existing educational and financial supports for EV-Ready Retrofits	Climate Action	N/A	Short Term	Ongoing
			6.3	Advocate for EV-Ready retrofit requirements	Climate Action	N/A	Short Term	Ongoing
			6.4	Advocate to include EV-Ready retrofits in financing programs	Climate Action	N/A	Short Term	Ongoing
	7. Improve access to EV charging at work		7.1	Establish EV Ready requirements for new non-residential buildings	Climate Action, Planning & Development	$	Short term	Medium Term
	8. Support affordability of electric vehicles		8.1	Advocate to ensure current EV purchase incentive level is maintained to 2030	Climate Action	N/A	Ongoing	Ongoing
			8.2	Promote existing EV purchase incentives and educational resources	Climate Action	N/A	Ongoing	Ongoing
			8.3	Advocate to expand efforts to 'scrap' internal combustion engine vehicles	Climate Action	N/A	Ongoing	Ongoing
			8.4	Explore creating low- or zero emission zones in New Westminster	Climate Action	N/A	Long Term	Long Term

	Objectives	Barrier Tackled		Actions	Lead Department	Estimated Cost	Recommended Launch	Timeline
Utility	**9. Proactively manage electricity grid impacts of EV charging**		9.1	Explore the development of a networked or 'smart' charging incentive pilot	Electric Utility	$$$	Short Term	Long Term
			9.2	Develop educational materials on the benefits of networked or 'smart' charging	Climate Action	$	Short Term	Short Term
			9.3	Continue to monitor EV uptake and forecast the anticipated impacts of adoption	Climate Action	N/A	Short Term	Ongoing
			9.4	Plan for the future development of an EV load management program	Electric Utility	$$	Medium Term	Long Term
Implementation	**10. Successfully implement the eMobility Strategy**		10.1	Create and hire an eMobility Specialist staff position to lead and support the eMobility Strategy	Climate Action, Engineering	$$$	Short Term	Ongoing
			10.2	Leverage external funding opportunities	Climate Action	$	Short Term	Ongoing
			10.3	Apply an equity lens to implementation and engage with equity-denied groups	Climate Action	$	Short Term	Ongoing
			10.4	Create an action prioritization tool	Climate Action	$	Short Term	Short Term
			10.5	Monitor and report on the Strategy under the Climate Action and Environment Key Performance Indicators	Climate Action	N/A	Ongoing	Ongoing

Access to charging at home	**High upfront cost**	**Access to charging at work**	**Lack of secure parking**	**Lack of safe routes**	**Infrastructure**

Estimated costs

$	<$100,000	**$$**	$100,000-$500,000	**$$$**	>$500,000

Outlook to 2050

The transportation landscape will continue to evolve, driven by climate action, public policy, technology availability and personal preferences. To best support transportation decarbonization, the City should track Strategy metrics and emerging trends in the sector.

Looking to 2050, the transportation landscape is expected to evolve dramatically. The current and growing policy landscape in New Westminster and other levels of government to shift towards clean transportation options will encourage innovative solutions and new choices for travel. The rapid growth of the car-share industry suggests that shared vehicles for personal transportation will become commonplace.[30] These vehicles will also become further integrated into new building developments and transit systems as private organizations and governments look to improve regional and local connectivity. Autonomous vehicle operation will be increasingly integrated into the vehicle options, which will generate new policy and safety requirements.[31]

It is anticipated that the vast majority of motorized passenger vehicles will be zero-emission after 2035, in line with the forthcoming federal ZEV mandate. By 2050, vehicle turnover is expected to result in most of the internal combustion engine vehicles off the road in Canada.[32] Metro Vancouver may have taken further steps to discourage internal combustion engine vehicles by introducing regional mobility pricing to accelerate the shift to low-carbon transportation, manage congestion, and improve local air quality. Medium- and heavy-duty vehicle traffic will shift to low-carbon, which may be accelerated by the establishment of low- or zero-emission zones. These zones may change the way goods are delivered in urban areas, creating an opportunity to complete local delivery with smaller, low-carbon last-mile delivery modes.

The City should monitor the rise of innovative technologies by tracking the results of provincial or federal pilot programs and exploring how the City's policies and programs can proactively support new technologies in alignment with the City's Bold Steps and other policies.

Transportation offers an important opportunity today and into the future to transform daily life in New Westminster and significantly reduce emissions. The City has taken an early and important leadership role in innovating urban transportation through eMobility. Looking ahead, the City of New Westminster can continue to leverage innovative transportation technologies and approaches to achieve its significant climate and community goals.

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[30] VanCity (2018). *Changing Gears: Exploring the car-sharing culture shift in Metro Vancouver*. Accessed online: http://danskedelebiler.dk/wp-content/uploads/2018/04/Vancouver-unders%C3%B8gelse.pdf
[31] BLG (2021). *Autonomous vehicles: Canada's readiness for the future* Accessed online: https://www.blg.com/en/insights/2021/12/autonomous-vehicles-canadas-readiness-for-the-future
[32] ICF (2021). *Grid Readiness Report prepared for Natural Resources Canada*. Accessed online: https://www.nrcan.gc.ca/sites/nrcan/files/Executive%20Summary%20ICF_English.pdf



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