Clean Transportation Market Forecast

Initiation Project
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VANCOUVER ECONOMIC COMMISSION

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Introduction

British Columbia (BC) is committed to an 80 percent reduction in greenhouse gas (GHG) emissions by the year 2050 in comparison to 2007 levels.[1] Transportation accounts for 39 percent of the total provincial GHG emissions at 25.2 Mt of CO_2e.[2] In alignment with these GHG reduction goals, BC is transitioning to a fossil-fuel-free transportation system, with the 2019 CleanBC plan at the forefront dovetailing with several other plans at the regional and city levels.

This shift brings with it a comprehensive transformation of the transportation market that comprises vehicles and vehicle components as well as an array of vehicle-related products, services, technologies, systems, skills, and expertise. The multitude of government policies guiding transportation in the region has facilitated and defined a path for the residential, commercial, and governmental adoption of clean energy vehicles and related technologies. The Vancouver Economic Commission (VEC) aims to quantify and forecast the market demand generated across Metro Vancouver as a result of these clean transportation policies, and intends to assess the local supply chain to identify existing capacity, gaps, and near-to-long-term potential for economic growth. This project lays the foundation for such forecasting and assessments.

This project is modelled on the Green Building Market Forecast (GBMF) completed by VEC in 2018–19. Based on the BC Energy Step Code and new construction growth projections for Lower Mainland municipalities, the model developed for the GBMF is now an interactive web application for use by stakeholders fulfilling the requirements set out by progressive building policies. According to the GBMF findings, the Vancouver and British Columbia's zero emission and net-zero energy ready building policies are stimulating a $3.3 billion market for high-performance building products and technologies in Metro Vancouver. A similar approach is now being applied to transportation and the large-scale shift to electric and alternative fuels propelled by progressive policy. The results of such a forecast could be used to improve economic development outcomes in the region, helping manufacturers and suppliers time their investments and hiring decisions, and help increase local cluster development opportunities.

Project Scope

This project focusses on analyzing the suite of policies guiding a clean transportation transition at the city, regional and provincial levels with a view to quantifying changes in demand for clean transportation products and technologies, and thus lay the foundation for a clean transportation market forecast. This section delineates the definitional, geographical, and jurisdictional scope of this project.

Definitions

The clean transportation sector consists of:

- clean transportation vehicles (personal, commercial, public or transit);
- clean fuels and clean fuel delivery systems; and
- the technological systems and services that enable clean transportation.

The above categories include public transit, clean marine and rail transport, non-motorized transport, and improvements to transportation systems through new processes and technologies such as intelligent transportation systems.

Domestic aviation, railways, pipeline transport and off-road vehicles were not considered within the scope of policies reviewed in this project, given the project duration. However, it would be worthwhile to revisit these categories in the subsequent project phases.

This project seeks to identify the critical products, technologies, services and systems within the sector that could be reasonably measured and modelled in order to assess the economic opportunity in the transition to clean transportation. The project phase recorded in this report does not include an assessment of which products, technology and services categories should be included in the next phase of quantification and modelling.

Geographical and Jurisdictional Scope

In the transition to cleaner transportation in BC, Vancouver leads the way for the province with the City's **Renewable City Strategy**, **Transportation 2040 Plan** and **Electric Vehicles (EVs) Ecosystem Strategy**. The current project focuses on the City of Vancouver and the Metro Vancouver region, within the larger provincial context.

Plans and policies pertaining to the local level within BC are restricted to those pertaining to Vancouver, Surrey, and Richmond at the city level. Other Metro Vancouver municipal governments were excluded due to time constraints of this study; however, they could be included at a later date to create a complete picture and model for the region.

Project Objectives

The project's specific objectives are to:

- Identify, collect and synthesize relevant plans governing transportation in Vancouver and BC;
- Develop a list of products, services and technologies that would be impacted by the clean transportation transition;
- Identify the stakeholders for engagement in future project phases; and
- Develop a list of data sources that could potentially be used in the clean transportation market forecast by VEC during the plan's identification and review stages.

This project serves as a first-level scoping exercise to collate the sources required for developing a clean transportation market forecast, though the forecast itself will be an undertaking distinct from this project. This groundwork is critical to lay the foundation of a data and stakeholder repository that may be accessed for future phases of the Clean Transportation Market Forecast.

Policies guiding the Clean Transportation Transition

Policy Identification

The first stage of the project identified the key plans, policy documents and reports that govern the transportation landscape in the region. In terms of geographical scope, the primary focus was limited to the City of Vancouver; extended to include a few more jurisdictions within Metro Vancouver. Provincial and federal plans were also reviewed, as they fundamentally shape the regional and municipal contexts. These plans were identified through research and stakeholder engagement with members from these government organizations. Figure 1 lists the policies and planning documents considered for this project.

Figure 1: Policy and plan documents analysed in this project (table)

Province

CleanBC

BC's Clean Transportation Policies & Programs

BC LCFS

B.C. Zero-Emission Vehicles Act: Regulations Intentions Paper

Clean Energy Vehicle Economic Opportunities Assessment

CleanBC | BC's Active Transportation Strategy | Move Commute Connect

City of Vancouver

Renewable City Strategy

Renewable City Action Plan

Transportation 2040

Vancouver's EV Ecosystem Strategy | Nov 2016

Green Fleets

Climate Emergency Response

City of Surrey

Transportation Strategic Plan

EV Strategy

New EV Charging Requirements in New Developments

City of Richmond

Green Fleet Action Plan

Community Energy and Emissions Plan 2020–2050 Directions

Metro Vancouver

Transportation | Discussion Paper to Support Climate 2050 and Clean Air Plan

Metro Vancouver | Regional Growth Strategy

Climate 2050 | Strategic Framework | Sep 2018 & Jul 2019

Short Sea Shipping in Metro Vancouver

TransLink

Transport 2040

Low Carbon Fleet Transition Plan

AES Engineering for Charging Infrastructure Report

BC Ferries

Sustainable Operations | Green Marine

Clean Futures Plan

BC Trucking

CleanBC Heavy-duty Vehicle Efficiency Program | Program Guide | Jan 2020

BC Transit

Low Carbon Fleet Program

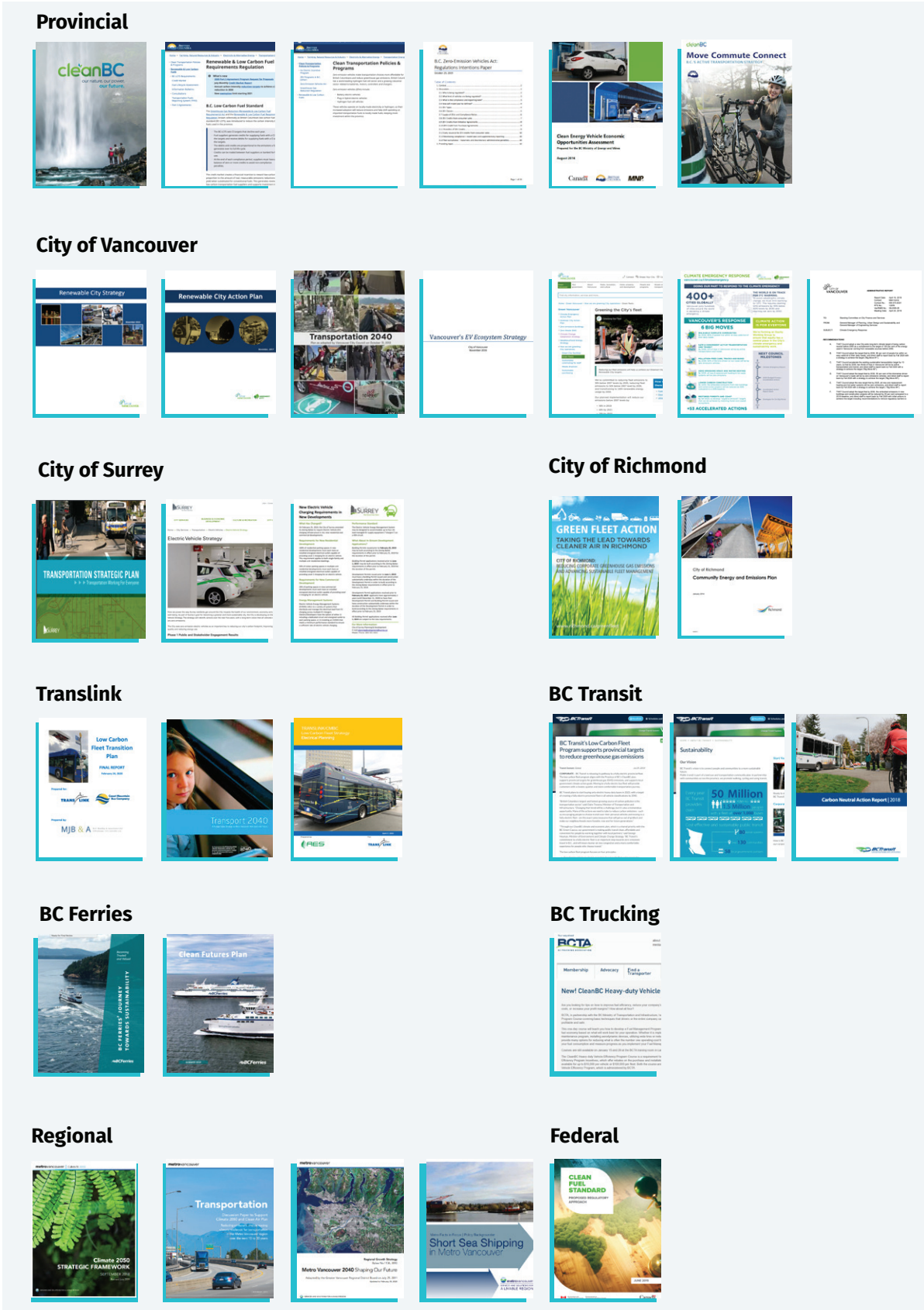
2018 Carbon z Action Plan

BC Transit | Sustainability

Federal

Clean Fuel Standard | Proposed regulatory Approach

Figure 2: Policy and plan documents analysed in this project (image)



Policy Drivers

The four dominant categories that emerged from the review of policies centre on cleaner vehicles and related charging infrastructure; cleaner fuels; and more supportive measures focusing on public and active transportation to incentivize their use among regional residents and public. Figure 3 illustrates the key themes impacting the transition to clean transportation. These emerged largely from the provincial CleanBC plan, and align with the different regional, city and organisational policy plans. The primary focus of the project was to synthesise the plans into a database for VEC to access in the next phase of the forecasting project. Appendix A provides summarizes the identification of the policies and plans, and documents their chronological clean transportation targets, data sources and key recommendations. At the provincial, regional, municipal and organisational levels, there are a range of programs and incentives to advance the transition to clean transportation. Figure 4 provides the list of provincial programs, along with a description and the name of the program's administering entity.

Source: Translink

Figure 3: Key drivers of the transition to a clean transportation sector

Clean Vehicles

1. Mandating ZEVs
2. Incentives for purchase of cleaner vehicles:
   - Rebates for light-duty vehicles
   - Expanded incentives for heavy-duty & commercial vehicles

Charging / Fueling Infrastructure

1. Improve EV charging networks
   - Home, work & public charging stations – through regulations
2. Additional hydrogen fueling infrastructure
3. Enable public investments

Cleaner Fuels

1. Phase in more renewables
   - Low-carbon fuel standard
2. Ramp up cleaner fuel production in BC
3. Raise tailpipe emissions standards for vehicles sold

Active Transportation and Public Transit

1. Use land-use & zoning policies to develop complete compact communities & complete streets
2. Invest in expanding public transit
3. Transit-oriented development

Source: Schema developed based on the policy directives in CleanBC plan's 'Initiatives by Sector' [1]

In the supporting documents appended alongside the report for VEC, a distinction is made between mandatory policies and regulations and voluntary procurement plans and corporate goals. For instance, the provincial targets laid out in CleanBC are mandatory and must be adhered to by local governments and organisations operating in the province. However, the procurement plans of transit authorities may be revised based on financial or other organisational constraints that can change over time. This distinction will be significant when demarcating forecasting scenarios in subsequent project phases. For instance, regulatory drivers would form the baseline scenario, while a moderate growth scenario could incorporate well-documented procurement plans (e.g. TransLink); and an ambitious growth scenario could incorporate more high-level electrification aspirations (e.g. Lyft).

Figure 4: Clean transportation policies and incentives in BC

Program Name	Program Description	Delivered by
Go Electric Incentive Program: Passenger	Program to encourage and accelerate the adoption of ZEVs in BC for their environmental and economic benefits by point-of-sale incentives on eligible vehicles of up to: • $3,000 for purchase or lease of a new battery EV, hydrogen fuel cell electric, or longer-range plug-in hybrid EV • $1,500 for the purchase or lease of a shorter-range plug-in hybrid EV	Administered through the **New Car Dealers Association of BC**
Go Electric Incentive Program: Commercial	Supports the adoption of electric and hydrogen vehicles and zero-emission specialty-use vehicles, such as electric or hydrogen fuel cell motorcycles; low-speed utility trucks; heavy-duty transport trucks; passenger buses and airport and port services vehicles	Administered through the F**raser Basin Council Society**
Go Electric Incentive Program: Fleet Support	Assists private and public fleets in adopting ZEVs in fleet operations in the province by providing: • A central resource of information for any fleet in BC • Training sessions for fleet managers and staff within the FCP customers group • Business case development support for fleets including vehicle assessments • Technical and financial assistance for FCP customers for electric vehicle charging	Administered through the **Fraser Basin Council**
Go Electric Charging Infrastructure Program: Homes & Workplaces	The Province, in partnership with BC Hydro and FortisBC, is providing rebates for the purchase and installation of EV chargers at homes and workplaces: • 50% rebate up to $350 to install a Level 2 charging station in a single-family home • Condominiums, apartments and workplaces can access rebates of 50% off, up to $2,000, as well as five hours of free support services from an EV Charging Station Advisor. • Advisor and consultation services for the installation of EV charging in MURBs and workplaces	**Fraser Basin Council's Plug-In BC**
Public Fast Charger Network	Support the adoption of EVs by providing increased charging options within regions with high EV adoption while also providing mobility across the province	Partnerships between the **Province**, **BC Hydro**, **FortisBC**, **local governments**, **industry** and **academic institutions**

Hydrogen Fueling Infrastructure Program	To expand the hydrogen fueling network in BC, further reducing one of the key barriers to market adoption of hydrogen vehicles: fueling infrastructure. Funding is being provided towards the construction or upgrade of hydrogen fueling stations	Managed by the **Canadian Hydrogen & Fuel Cell Association**
Go Electric Education & Outreach	Support communities and related organizations in delivering public education and awareness campaigns related to electric vehicles under a common brand: Emotive, a public outreach campaign that raises awareness of electric vehicles in BC	Administered by **Fraser Basin Council**, and partners include **communities**, **businesses**, **EV interest groups & owners**
ZEV Economic Development	Go Electric Advanced Research and Commercialization (ARC) Program to support the development of companies operating in the ZEV sector, and to encourage international investment in the ZEV sector in British Columbia. Will provide support to BC companies to invest in product development and commercialization activities through to long-term demonstration projects.	Administered by **MNP LLP**
SCRAP-IT Program	SCRAP-IT Program is working to reduce greenhouse gas emissions and improve air quality by getting older vehicles off the road	**SCRAP-IT Program**
Zero-Emission Vehicles Act	ZEV Act requires automakers to meet an escalating annual percentage of new light-duty ZEV sales and leases, reaching: • 10% of light-duty vehicle sales by 2025 • 30% by 2030 • 100% by 2040	**Fraser Basin Council's Plug-In BC**
Renewable & Low Carbon Fuel Requirements Regulation	British Columbia's low carbon fuel standard (BC-LCFS), was introduced to reduce the carbon intensity (CI) of fuels used in the province: • BC-LCFS sets CI targets that decline each year. • Fuel suppliers generate credits for supplying fuels with a CI below the targets and receive debits for supplying fuels with a CI above the targets	**Fraser Basin Council's Plug-In BC**

Source: Policies and programs referenced from "clean transportation policies and programs" as listed on the provincial government's website[3]

Other Drivers

While policy drivers and regulations set the baseline for quantification and forecasting of the regional clean transportation market, there are other drivers and additional databases that need to be accessed for the modelling phase of the project.

One such source of data is from the transit agencies operating in the region, such as TransLink and BC Transit. Transit agencies routinely make large procurements of vehicles to replace aging fleets or to meet goals for regional transit expansion. Relevant data sources – and whether VEC has access to these databases on transit fleet procurement – have been detailed in the appended documents.

New mobility providers in the region are another source of large fleet procurement. Carsharing operators in Metro Vancouver such as Modo and Evo, or ride-hailing operators such as Lyft and Uber would comprise this category. There has been a push by the Mayor's Council on Regional Transportation to establish GHG emission reduction for the ride-hailing vehicles in the region.[4] Lyft recently announced a 100 percent shift to EVs by the year 2030, as laid out in its "path to zero emissions plan."[5]

In addition, datasets that formed the basis of provincial and City of Vancouver planning targets for EVs will be a vital source to leverage for quantifying and forecasting the demand for private EVs. This data can be modelled to create additional scenarios for demand trajectories for private and commercial vehicles and related technologies. In addition, accessing the databases and models at the root of the City's Climate Emergency Response, the mobility pricing study for Metro Vancouver region, and the database supporting Natural Resources Canada's report on the medium and heavy-duty EV potential for adoption in Canada would aid the subsequent modelling phases of this project. A detailed list of the data sources identified during this phase of the project are briefly mentioned in a later section of the report and supplied as supplementary output to VEC along with this report.

Timelines

Governments and organisations at the different jurisdictional levels have set targets for GHG reductions over the next few decades. These are broadly summarised in Figure 5.

Figure 5: Clean Transportation Targets by Timeframe at the city, regional, provincial and federal levels

Federal

- Commitment to achieving net zero carbon emissions by 2050
- In the process of developing pathways to meet this goal

Provincial

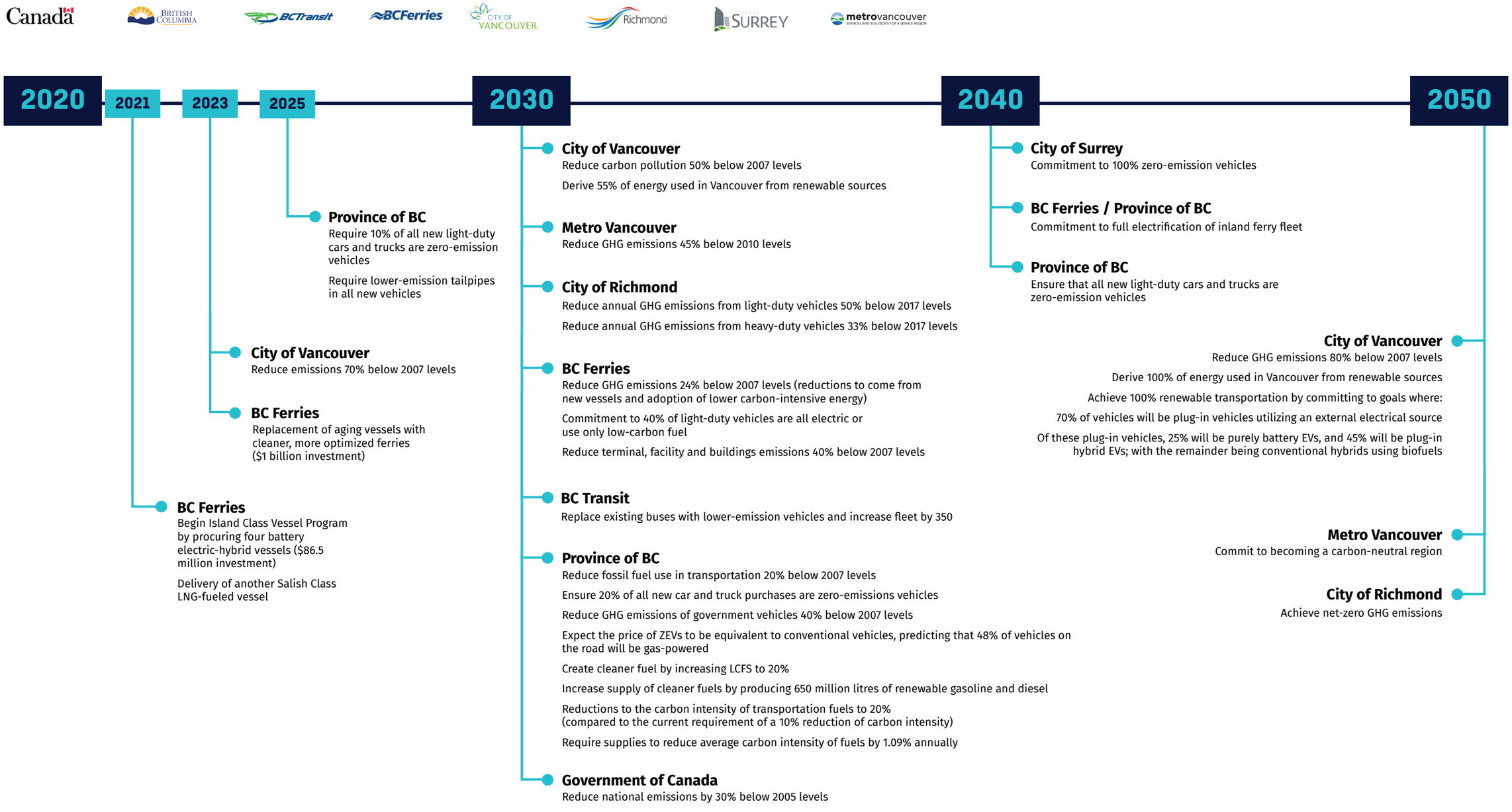
- Economy-wide GHG emissions reductions (as against 207 levels) of:
  - 40% by 2030
  - 60% by 2040, and
  - 80% by 2050
- CleanBC plan calls for 100% of new car and light-truck sales in the province to be electric vehicles by 2040

Regional/City/Organizational

- **Metro Vancouver:** Carbon neutral goals by 2050 and 45% GHG reduction by 2030
- **City of Vancouver:** Targets to derive 100% of the energy used in Vancouver from renewable sources before 2050 and reduce GHG emissions by at least 80% below 2007 levels before 2050
- **TransLink:** Achieve an 80% reduction in GHG emissions from operations by 2050, and utilize 100% renewable energy in all operations by 2050

Figure 6 maps the detailed timeline for the transition.

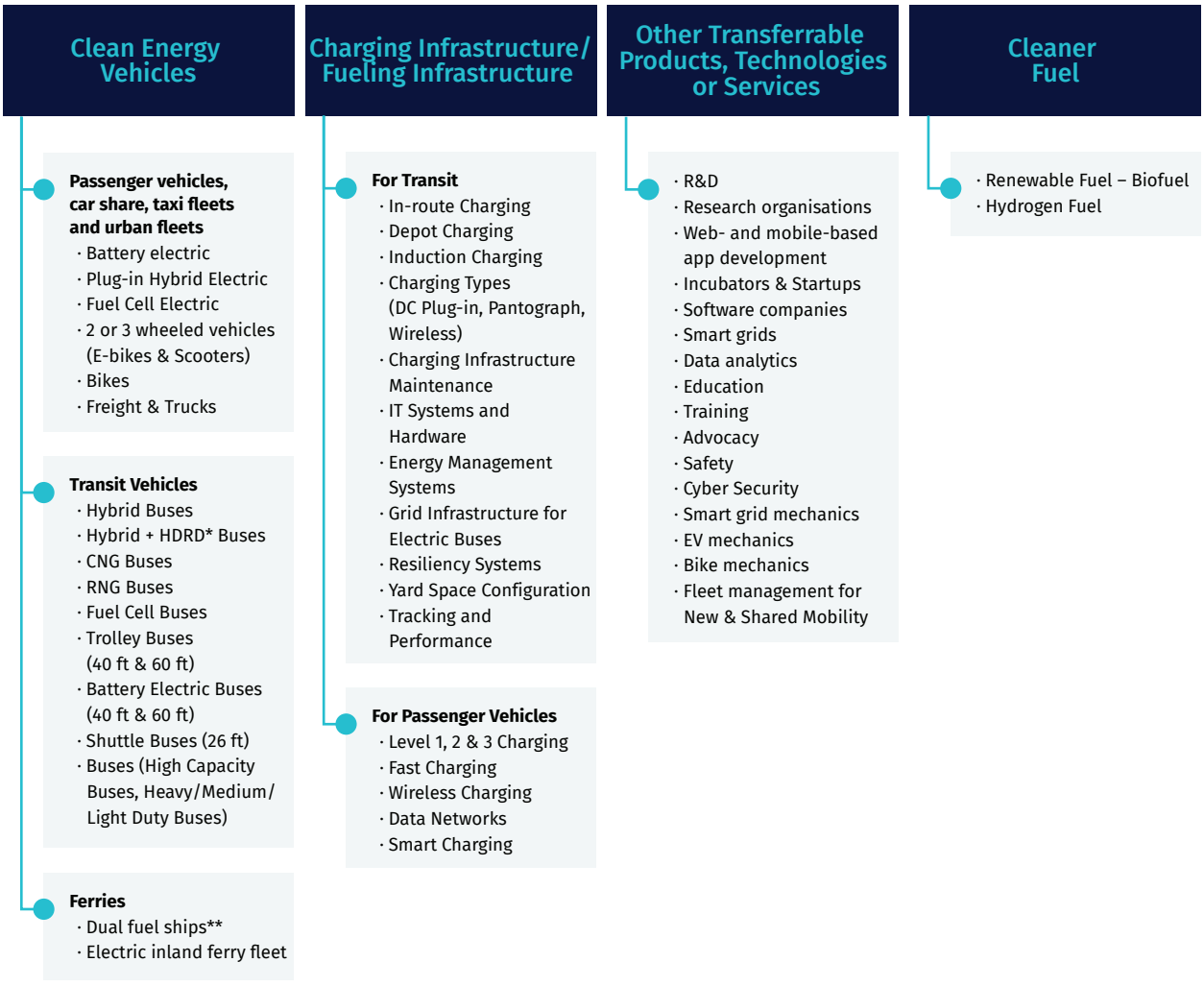
Figure 6: Timeline of policies that would impact the clean transportation sector at the city, regional, organisational, provincial and federal levels



Mapping the market

Figure 7 represents the products, technologies and services that form the economic opportunity in the transition to clean transportation. It details the products that would see a direct demand surge, and those that would likely see a multiplier effect and derive their economic opportunities from implied – rather than direct – demand. Appendix B presents the detailed list of the products, technologies and services influenced by clean transportation policies, and the multiplier demand that these would spur.

Figure 7: Products, Technologies and Services that form the economic opportunity in the transition to Clean Transportation



Source: City of Vancouver

Key Stakeholders & Data Sources

Stakeholders determining the clean transportation market include various governmental, research and transportation organisations, trade associations and industrial players; a cross-section from these groups should form the stakeholders' group and/or advisory committee for a clean transportation market forecast study. For the purpose of this report, we have examined the policies and engaged a stakeholder group represented in Figure 8. Trade associations and industrial players should also be engaged throughout the next stages of the project.

Figure 8: Stakeholders engaged for this project

Province	British Columbia	BCTransit	BCTA BC Trucking Association	BCFerries
Region	metrovancouver Services and solutions for a livable region	TransLink		
City	City of Vancouver	Richmond	City of Surrey	

During this project, stakeholders from the City of Vancouver, TransLink and BC Transit were interviewed. Supplementary materials submitted to VEC alongside this report include a summary of these stakeholder meetings, additional recommended contacts, and other relevant details required to engage them in future project stages.

Figure 9: List of data sources that could be utilised for the forecast modelling

Document	Data Description	Organization	Prepared by
Low Carbon Fleet Transtition Plan for TransLink	Contains the detailed procurement plan for TransLink low carbon fleet	TransLink	MJ Bradley & Associates
AES Engineering Data & Modelling	Contains the design and modelling plans for Charging Infrastructure for TransLink fleet	TransLink	AES Engineering
Data & Modelling for Renewable City Action Plan Creation	Economic modelling to inform the RCAP–CIMS model	City of Vancouver	Navius Research
Climate Emergency Modelling	Modelling to inform the City's Climate Emergency Response	City of Vancouver	
Application to CleanBC Community Grant City of Surrey	Modelling data for Surrey's EV Charging Network Expansion & EV New Vehicle Market Share (Fig. 2 & 3 in the document)	City of Surrey	AES Engineering
Roadmap for Transition to electric Vehicles for BC Transit	Deployment / procurement plans for the transition (purchases, replacements and new expansions planned)	BC Transit	BC Transit
Fuel Lifecycle Assessment Modelling Tool	Modelling tool to calculate carbon intensities of fuels used in Canada.	Province of BC	EarthShift Global
CleanBC	Report includes a methodology for the calculation of reduction requirements and to determine the fuel carbon intensity	Province of BC	Province of BC
CleanBC	Economic modelling to inform the RCAP–CIMS model	Province of BC	Navius Research
Clean Energy Vehicle Economic Opportunities Assessment Prepared for the BC Ministry of Energy and Mines	Modelling data for BC's economic opportunity for CEV sector	BC Ministry of Energy and Mines	MNP
Metro Vancouver Mobility Pricing Study	Findings and recommendations for a fair and effective mobility pricing policy	TransLink	Mobility Pricing Independent Commission
RNG Demand Planning	Document supporting the 30by30 target of FortisBC	FortisBC	FortisBC
Feasibility of a Pan-Canadian Network of DC Fast Charging Stations for EVs	Financial forecast for one Fast Charging Station to 2021	Academic Paper	Ducharme, P; Marcon

Key Companies in BC's Clean Transportation Sector

This is a non-exhaustive list of companies that operate in the Metro Vancouver region's clean transportation space.

- **Canadian Electric Vehicles**, Vancouver Island
  Designer and manufacturer of EVs and EV components; specializes in off-road, low speed work vehicles for use at campuses, malls, resorts, parks, airports and other industries
- **Westport Innovations**, Vancouver
  Manufactures fuel and charging infrastructure
- **Electra Meccanica**, Vancouver
  Developer and manufacturer of EVs: all-electric, single passenger, three-wheeled vehicles
- **Delta-Q Technologies**, Burnaby
  Power management and power conversion in the form of battery chargers and converters
- **E-One Moli Energy**, Maple Ridge
  Lithium-ion battery R&D
- **Hydra Energy**, Vancouver
  Provides hydrogen-as-a-service by converting fleets to a dual-fuel internal combustion engine system (hydrogen and diesel or gasoline)
- **Hydrogen Technology and Energy Corporation (HTEC)**, North Vancouver
  Fueling station development
- **Hydrogen in Motion (H2M)**, Vancouver
  Logistical applications of hydrogen fuel technologies
- **Powertech Labs**, Surrey
  Fueling station development
- **IRDI System**, Richmond
  Products dedicated to hydrogen fueling stations
- **Powertech Labs**, Surrey
  Compressed hydrogen and CNG testing facility
- **CSA Group**, Langley
  High pressure test facility that tests hydrogen industry products from suppliers

- **HTEC (Hydrogen Technology and Energy Corp)**, North Vancouver
  Production and distribution of hydrogen, delivery of hydrogen to fueling stations and building of fueling stations
- **GreenPower Motor Company**, Vancouver
  All-electric buses for transit operators, shuttle operators, schools, universities and governments
- **Greenwit Technologies**, Vancouver
  Design, engineering and manufacturing of light EVs, including electric two-wheeled scooters, electric power-assisted bicycles and motorbikes
- **Grin Technologies,** Vancouver
  Design and manufacture of electric bicycle hardware and conversion kits
- **Velometro Mobility**, Vancouver
  Developing an electric-assist, enclosed, smartphone-connected pedalled vehicle intended to replace automobiles in urban and sub-urban areas.
- **Loop Energy**, Burnaby
  Developing solutions for long-haul hybrid-configured trucks with fuel cell technology
- **Corvus Energy**, Richmond
  Energy storage systems, and batteries for marine vessels; refining renewable fuels
- **Parkland Refining**, Burnaby
  Commercial-scale co-processing tests by mixing various bio-crude oils with petroleum crude in the manufacturing process
- **Husky Energy**, Prince George
  Co-processing and developing bio-crude, which could be converted into renewable gasoline and diesel at Husky's refinery.
- **Ballard Power Systems**, Burnaby
  Fuel cell technology products
- **SandVault**, Richmond
  Bike sharing from battery and solar powered recharge/cycle stations
- **Corinex Communications**, Vancouver
  Develops and manufactures solutions for smart metering and smart grid infrastructure projects
- **Neurio**, Vancouver
  Intelligent home energy management hardware, software and analytics

Source: Unsplash

Summary

This report identified various policies impacting the clean transportation sector in Metro Vancouver. Federal, provincial, regional, and city-level policies were analysed in conjunction with policies from the large public-sector transit and transportation organisations in the regions, such as TransLink, BC Transit, BC Trucking Association, and BC Ferries. During the policy identification and review process, a comprehensive timeline of GHG and clean transportation goals and targets was developed. Stakeholders were approached for engagement with the clean transportation forecast project with VEC. Detailed policy targets and notes, and the stakeholders' meeting summary notes and details have been provided in the database accompanying the report. Research and stakeholder engagement contributed to the list of data sources that may be deployed during the forecasting phase of the project. The bulk of the project results are supplied as supplementary databases to VEC along with this report.

Appendices

Appendix A:
Database of Policies Reviewed and Timelines

Provided to VEC. Available upon request, contact info@vancouvereconomic.com.

Appendix B:
Mapping of the Products, Technologies and Services that would be impacted by the Clean Transportation Policies

Product / Technology / Service Demand	Referenced in a Plan	Mandated or Planned	Implied Demand
Clean Energy Vehicles			
Passenger vehicles, car share, taxi fleets and urban fleet			
Battery Electric	Broadly referenced in **ZEVA** and **RCAP** plans. Data sourced from Navius Research, academic and CleanEnergy papers	Provincial targets on GHG reduction and low-carbon fuel standards apply and could potentially be used in numerical forecasts	**Primary Inputs for Vehicle Manufacturing** R&D & design Engineering services **Components Manufacturing** Batteries, fuel cells, etc **Vehicle Manufacturing** Manufacturing passenger and transit vehicles **Retail & Wholesale** Wholesalers and Dealers of vehicles and components **Fleet Management** **Repair & Maintenance** Vehicle repair and maintenance **Recycling** Vehicles and components (especially batteries)
Plug-in Hybrid Electric			
Fuel Cell Electric			
2- or 3-Wheeled Vehicles (E-bikes & Scooters)			
Bikes (based on the Active Transportation goals) – also has a knock-on effect on bikeshare proliferation (incl. cycle manufacturing, operators, app development)	**Move Commute Connect – BC's Active Transportation Strategy**	Planned	
Transit Vehicles			
Hybrid Buses	Yes, **Low Carbon Fleet Transition Plan** for TransLink	Planned (with 3 scenarios - Cautious, Progressive, Aggressive)	
Hybrid + HDRD* Buses			
CNG Buses			
RNG Buses			
Fuel Cell Buses			
Trolley Buses (40 ft & 60 ft)			
Battery Electric Buses (40 ft & 60 ft)			
Shuttle Buses (26 ft)			
Buses (High Capacity Buses, Heavy/Medium/Light Duty Buses)	Yes, BC Transit's Procurement Plan	Have plans for replacement (already planned) and expansion (may be considered tentative)	
Dual Fuel Ships**	Planned at a high level for 2040	Planned	
Electric Island Ferry Fleet			
Charging Infrastructure / Fuelling Infrastructure			
For Transit			
In-route Charging	Yes, **Low Carbon Fleet Transition Plan** for TransLink	Planned	**Fuel Production** Electricity or Hydrogen or bio-fuels *(cell continues on next page)*
Depot Charging			
Induction Charging			
Charging Types (DC Plug-in, Pantograph, Wireless)	Yes, BC Transit's Procurement Plan	Planned	

Charging Infrastructure Maintenance	Yes, AES Engineering database and modelling for TransLink should provide the basis. BC Transit is just beginning the consultation with MJ Bradley to create such a database	No – planning in progress	**Strorage and Distribution** **Development of Infrastructure** Equipment, technology design & manufacturing **Retail & Wholesale** for the charging infrastructure **Installation & Maintenance**
IT Systems and Hardware			
Energy Management Systems			
Grid Infrastructure for Electric Buses			
Resiliency Systems			
Yard Space Configuration			
Tracking and Performance Management			
For Passenger Vehicles			
Level 1, 2 & 3 Charging	Yes, in CoV's EV Ecosystem Strategy	For Level 1 & 2 – clear guidelines. Vague on the remaining options	
Fast Charging			
Wireless Charging			
Data Networks			
Smart Charging			
Freight & Trucks			
Air Mobility			
Freight & Logistics			
Cleaner Fuel			
Renewable Fuel – Biofuel	Yes, Low Carbon Fuel Standard	Planned	
Hydrogen Fuel			
Other transferrable Products, Technologies or Services			
R&D			
Research Organisations			
Web- & Mobile-based App Development			
Incubators & Startups			
Software Companies			
Smart Grids			
Data Analytics			
Education			
Training			
Advocacy			
Safety			
Cyber Security			
Smart Grid mechanics			
EV Mechanics			
Bike Mechanics			
Fleet Management for New & Shared Mobility			

*HDRD=hydrogenation-derived renewable diesel
**Capable of operating on liquified natural gas (LNG) or marine diesel

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2 2017 GHG emissions [from "2019 Climate Change Accountability Report." Government of British Columbia. 2020. Accessed June 30, 2020.]

3 Link to provincial clean transportation policies and programs https://www2.gov.bc.ca/gov/content/industry/electricity-alternative-energy/transportation-energies/clean-transportation-policies-programs

4 Link to the Public Meeting at Mayor's Council on Regional Transportation https://www.translink.ca/-/media/Documents/about_translink/governance_and_board/council_minutes_and_reports/2020/June/agenda_mayors_council-_public_mtg_2020_06_25.pdf

5 Lyft announcement for shift to 100% EVs by 2030 https://www.lyft.com/blog/posts/leading-the-transition-to-zero-emissions