Surrey Electric Vehicle Strategy

FEBRUARY 2021

CITY OF SURREY

ACKNOWLEDGMENTS

The development of the Surrey Electric Vehicle Strategy was led by the Engineering Department, Transportation Division in close collaboration with Sustainability and Energy Services Division and an interdepartmental working group.

FINANCIAL SUPPORT

The City of Surrey received generous financial support to develop the Strategy from the BC Hydro Sustainable Communities Program.

BC Hydro
Power smart

PUBLIC & STAKEHOLDER ENGAGEMENT

Input from stakeholders as well as many local citizens and businesses contributed greatly to this Strategy. We look forward to continued collaboration as we work in partnership to implement the actions in the Strategy.

Table of Contents

Strategy Vision:

Surrey is a leader and innovator in accelerating the use of electric vehicles by residents and businesses, helping to achieve the City's emissions reduction targets and sustainable transportation goals.

By 2050 …

Supporting home and workplace charging

All Surrey residents will have access to home, near-home, or workplace charging, enabling the transition to 100% electric vehicles on Surrey roads.

Expanding access to public charging

Surrey will operate the largest public EV charging network in the province, ensuring equitable access for all residents.

Accelerating individual EV adoption

100% of personal and shared vehicles in Surrey will be zero-emission, helping the City meet its net-zero community GHG reduction target.

Accelerating fleet EV adoption

Surrey businesses will be leaders in fleet EV adoption, supported by the City's robust public charging network.

Leading by example

100% of the City's fleet will be zero-emission vehicles, helping the City achieve its absolute zero corporate GHG emissions target.

Introduction

The Surrey EV Strategy identifies actions to accelerate electric vehicle (EV) adoption in the city and supports a long-term vision for Surrey where all vehicles are zero-emission. These actions will contribute significantly to reducing greenhouse gas (GHG) emissions and achieving the City's emission reduction targets.

Surrey is one of the fastest growing cities in Canada and the fastest growing in Metro Vancouver, welcoming over 10,000 new residents each year. The City is committed to providing the infrastructure and services necessary to serve the growing population and to demonstrating leadership on climate action. This growth can be harnessed to build an EV-ready city and accelerate the transition to electric mobility.

Recognizing the need for urgent action in response to the global climate crisis, in November 2019 Surrey Council declared a Climate Emergency, and in March 2020 introduced new targets to reduce community GHG emissions to net zero, and reduce corporate GHG emission to absolute zero, before 2050.

Surrey's community GHG emissions inventory includes emissions associated with buildings, on-road transportation, municipal solid waste, and land-use change. Meeting the community and corporate GHG reduction targets requires a credible path to zero emissions in each of these areas. Achieving the City's GHG reduction targets before 2050 will necessitate partnerships and collaboration with utilities, senior and municipal governments, local businesses, and Surrey residents. The City is developing a Climate Change Action Strategy to define an equitable path for reaching these targets.

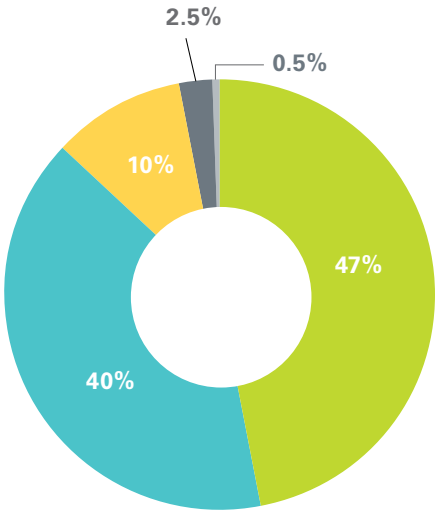
SURREY'S GHG EMISSIONS TARGETS

Community
Reduce Surrey's GHG emissions (from non-agricultural and non-industrial uses) to **net zero by 2050.**

Corporate
Reduce City of Surrey corporate GHG emissions to **absolute zero before 2050.**

Climate Change Action Strategy

The City's Climate Change Action Strategy (CCAS) is currently being updated to outline a roadmap to reach Council's recently adopted targets of net zero community GHG emissions, and absolute zero corporate GHG emissions, before 2050. In addition to prioritizing sustainable transportation (walking, cycling, and transit), the CCAS will focus on supporting a rapid shift to EVs in order to reach these targets.



- On-Road Transportation
- Buildings
- Non-Road Transportation
- Waste
- Industry

The transportation sector is the largest contributor to Surrey's community GHG emissions, representing 47% of community-wide emissions, and therefore offers the single largest opportunity to reduce emissions and meet the City's GHG reduction targets.

47%	of total GHG emissions come from transportation sector
79%	of daily trips are by car (driver or passenger) [compared to 72% Metro Vancouver avg.] [1]
81%	of residents drive to work [compared to 69% Metro Vancouver Avg.] [2]
39%	of total emissions come from passenger vehicles

Cars and trucks are the largest and fastest growing source of GHG emissions in Surrey and, absent planning and technology interventions, will continue to increase.

Surrey's new Transportation Plan will establish a long-range vision and identify transportation priorities for the next 10 years.

A New Surrey Transportation Plan

The City's new Transportation Plan will establish a long-range vision, articulate a decision-making framework, and identify transportation priorities for the next 10 years. The new Plan will chart a path forward to provide an efficient and equitable transportation system and support a thriving, green, and inclusive city. The Plan will also set the foundation for transitioning Surrey's transportation system towards meeting the target of net-zero community GHG emissions before 2050. To achieve this, five foundational pillars will guide the Plan and respond to Surrey's unique context:

Surrey Transportation Plan Pillars

Grow the Transportation Network:
Surrey will become a vibrant urban centre of 1 million people.

Prioritize Vision Zero Surrey:
Human life is valued above all else in the City's transportation network.

Tackle the Climate Crisis:
Tackling the climate crisis requires decisive action on how we get around.

Innovate through Technology and New Mobility:
Connected, autonomous, shared, and electric mobility options are available.

Balance Equity:
All members of the community should benefit from and have equitable access to the transportation network.

Electric vehicles are only one of the pieces that will contribute to the successful transition to sustainable transportation. The Surrey Transportation Plan will help foster a safe, clean, and connected city where walking, cycling, and transit are prioritized according to the sustainable transportation hierarchy (figure 1). Passenger vehicles will continue to be an integral part of the City's transportation network for the foreseeable future, and this strategy focuses on electrifying these remaining passenger vehicles trips.

Sustainable Transportation Hierarchy

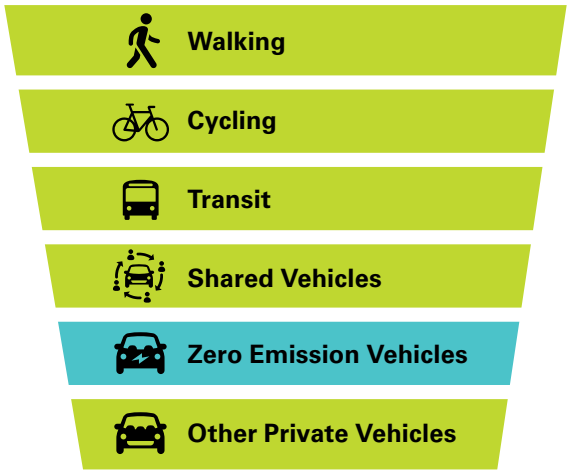


Figure 1

The EV Strategy is one of the action plans that will support the implementation of the Surrey Transportation Plan and it will play a critical role in achieving community GHG reduction targets by identifying actions to accelerate EV adoption for residents and businesses. The Strategy will also help to set direction for the City to demonstrate leadership in the use of EVs in its corporate fleet, which will be explored in more detail in a future corporate climate and energy strategy. This Strategy identifies actions the City can take over the next 5 years towards achieving a long-term vision where all vehicles in Surrey are zero-emission. The actions are organized into 5 areas of focus, and are based on extensive research, internal and external stakeholder engagement, and public consultation.

EV Strategy Actions – 5 Areas of Focus

- **Supporting home and workplace charging**
- **Expanding access to public charging**
- **Accelerating individual EV adoption**
- **Accelerating fleet EV adoption**
- **Leading by example**

Strategy Scope

The City can play a key role in enabling and accelerating the transition to electric vehicles. The Surrey EV Strategy focuses primarily on actions that will accelerate adoption of light-duty passenger plug-in EVs, including personal and shared vehicles, with a secondary focus on commercial fleets. The Strategy outlines the City's role in supporting Surrey residents and businesses in the shift to EVs, and includes actions within the local government sphere of influence:

- providing EV education and advocacy
- expanding access to charging infrastructure
- developing partnerships with private sector, utilities, and senior governments
- leading by example

The table on the right outlines what is in-scope and out-of-scope for the Strategy.

Electric vehicles and charging technology are evolving rapidly, and this strategy will be renewed annually within the 5-year timeframe to reflect the latest technological advancements, market developments, and best practices. Topics currently deemed out of scope may be incorporated into the strategy in the future.

Additionally, through the development of the Surrey Transportation Plan and the Climate Change Action Strategy, the City will identify opportunities to support other zero-emission mobility options and technologies that foster sustainable transportation and reduce personal vehicle use.

IN SCOPE – PRIMARY FOCUS
Plug-in electric vehicles
Charging infrastructure (home, work, & public)
Passenger vehicles (e.g. residents)
City fleet vehicles
IN SCOPE – SECONDARY FOCUS
Light-duty fleet vehicles (e.g. local businesses)
Medium & heavy-duty vehicles (e.g. vans & trucks)
OUT OF SCOPE
Hybrid vehicles (non-plug-in)
Hydrogen fuel cell vehicles
Non-road vehicles (e.g. golf carts)
E-bikes and micro-mobility options
Automated vehicles
Public transit vehicles
Vehicle-to-grid (V2G) technology
Emerging charging technologies
Battery recycling

Balance Equity

The importance of equity is inherent in the City's vision of "a thriving, green and inclusive city". Equity is a key pillar in the Surrey Transportation Plan, while both the Poverty Reduction Strategy and Age Friendly Strategy for Seniors identify affordable transportation and increased transportation options as key factors in reducing poverty and financial burden. To ensure a transportation system that is accessible to all, equity must be addressed as new policies are developed.

In 2019 the City launched a Public Engagement Taskforce with the purpose of enhancing how the City engages with the public and to develop a consistent, city-wide approach to public engagement, with a focus on reaching more diverse voices in the community. This commitment to enhanced engagement and equity is central to the development of the Surrey Transportation Plan, and this plan will shape how equity is defined and addressed in the context of transportation going forward.

SURREY TRANSPORTATION PLAN: EQUITY PILLAR

The City's vision of becoming a thriving, green and inclusive city requires equity to be considered as a key pillar in the Transportation Plan. All members of the community should benefit from and have equitable access to the transportation network.

The importance of equity is inherent in the City's vision of "a thriving, green and inclusive city".

The City plays an important role in promoting equitable access and affordability for electric mobility and recognizes that there are equity issues associated with electric vehicles and the policies and programs designed to support EV adoption. Some examples of the equity issues identified include:

- New EVs are currently too expensive for many individuals and households
- EV incentives tend to target homeowners and those in the market for new vehicles (not used vehicles)
- Public EV charging infrastructure is not distributed equitably throughout the city
- Many public charging stations are not designed to accommodate the needs of persons with disabilities
- EV education and outreach programs are typically provided in English only
- Renters face greater barriers to accessing home charging (e.g. rental apartment buildings & secondary suites)
- Many low- and moderate-income households may be better served by prioritizing investments in other sustainable transportation options (e.g. walking, cycling, transit, e-bikes, and shared vehicles)
- Some equity-seeking groups are disproportionately affected by climate and air pollution from vehicle emissions

Input received through this Strategy's public and stakeholder engagement process raised additional equity concerns, and this input helped to refine the proposed actions and will shape the implementation of the Strategy going forward.

EQUITY: IDEAS FOR ACTION FROM STAKEHOLDER ENGAGEMENT

- Support the development of an equally distributed EV charging network throughout the city.
- Provide educational and promotional EV-related materials in multiple languages.
- Consult with equity-seeking organizations working in Surrey.
- Ensure all public chargers meet the accessibility needs of people with disabilities.
- Strategically locate public EV chargers to provide access to low-income families.
- Encourage more EV car sharing operations.
- Assist low-income rental buildings in planning for EV charging installations.
- Offer financial incentives to low-income families to buy used EVs.

EV 101

What are EVs?

This EV Strategy focuses on supporting the accelerated and widespread adoption of plug-in electric vehicles. Plug-in electric vehicles include battery electric vehicles and plug-in hybrid vehicles. Other zero-emission vehicles (ZEVs) and technologies may also be options for some fleets and the medium- and heavy-duty vehicle segment in the future.

Electric Vehicle Types		
	Battery Electric Vehicles	A battery electric vehicle is powered exclusively by electricity and must be plugged in to charge.
	Plug-in Hybrid Vehicles	Plug-in hybrid electric vehicles can be fuelled with both gasoline and electricity and can be plugged in to charge.

EV Charging Explained

There are three common types of EV charging, and the charging times for each depend on the size of the battery.

Charging Types		
Level 1		• Uses 120V system to fully charge in 8-20 hours (or between 8-10 km of range per hour). • Often referred to as "trickle charge", but still adequate for most daily commuters.
Level 2		• Uses a 240V system to fully charge in 4-6 hours (or between 20-40 km of range per hour). • Can be installed at home in garages or parkades and are commonly found at community centres, parks, and private commercial locations.
Level 3		• Also known as DC fast charging. Uses a 400V-800V system to charge to 80% in under an hour (or 300+ km of range per hour). • Networks of fast charging stations are being built all across Canada and the United States, making road trips faster and easier.

Market Trends

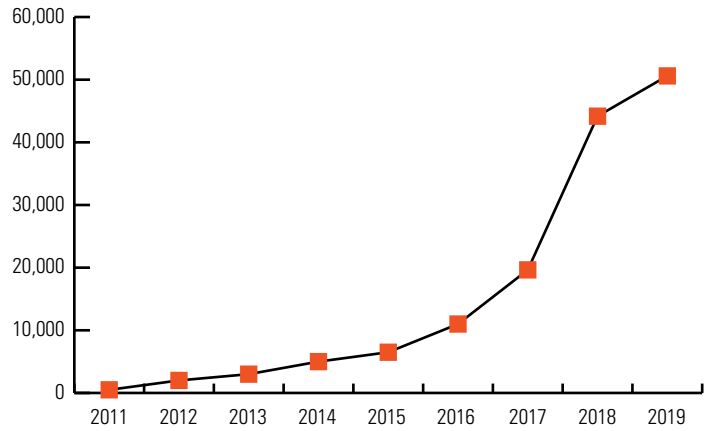
In Canada, the market for electric vehicles has been growing significantly since 2011 with sales increasing year-over-year (figure 2). From 2011 to 2019, over 140,000 EVs were sold in Canada[3] with EV market share in 2019 reaching 2.6% of total passenger vehicles sales.[4] BC has been leading EV adoption in Canada, and in 2019 EV sales in BC made up 9% of light-duty vehicle sales.[5]

Surrey EV Market Share

EV ownership in Surrey has been growing exponentially, roughly doubling each year since 2016.

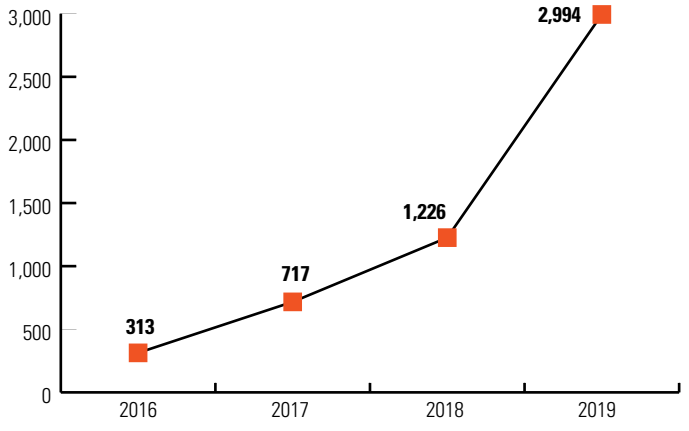
EV Sales in Canada (2011-2019)[6]

Figure 2



EV Ownership in Surrey (2016-2019)[7]

Figure 3



Surrey Plug-in EV Stats [8]

2,994 (1% of passenger vehicles) Battery Electric Vehicles (2019)

804 (0.3% of total passenger vehicles) Plug-in Hybrid Electric Vehicles (2019)

2.4x (144%) Growth in Battery Electric Vehicles, 2018-2019

2x (104%) Growth in Plug-in Hybrid Ownership, 2018-2019

Factors Driving EV Adoption

Growth in EV ownership is being driven by numerous factors, including increasing vehicle affordability, greater efficiency and lower cost to operate vs. gasoline or diesel vehicles, supportive government policies and incentives, and increased consumer familiarity. Many drivers enjoy the performance and driving experience of EVs, and consumers and society at large benefit from the reduced environmental impact and noise pollution associated with EVs. In fact, an electric vehicle is better for the environment over its entire life cycle than a gas-powered vehicle. This is true for most places in the world, but especially in BC, where 97% of electricity is from clean hydro power.[9]

Factors Driving EV Adoption	
Increasing affordability	The initial cost of EVs is decreasing as battery costs decline and more EV models come to market.
Greater efficiency & lower operating costs	Electric vehicles are several times more energy efficient and cost less to fuel compared to gasoline and diesel vehicles
Lower maintenance costs	Electric motors have few moving parts and therefore require significantly less maintenance than gas-powered vehicles. (e.g. no oil changes).
Supportive government policies and incentives	There are numerous federal and provincial government programs and incentives in place to help reduce the initial costs of EVs and expand access to charging.
Environmental impact	Electric vehicles powered by clean hydro electricity do not produce GHGs or particulate matter, which helps to reduce emissions and improve local air quality. EVs are also quiet, helping to reduce noise pollution from traffic.

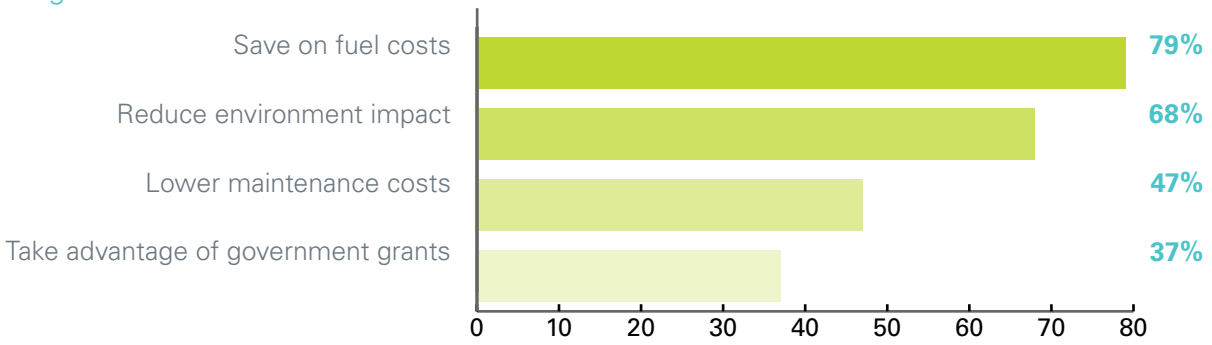
Did you know?

Electric vehicle batteries are projected to reach price parity with gasoline engines by 2023[10]**.**

Public Survey Responses

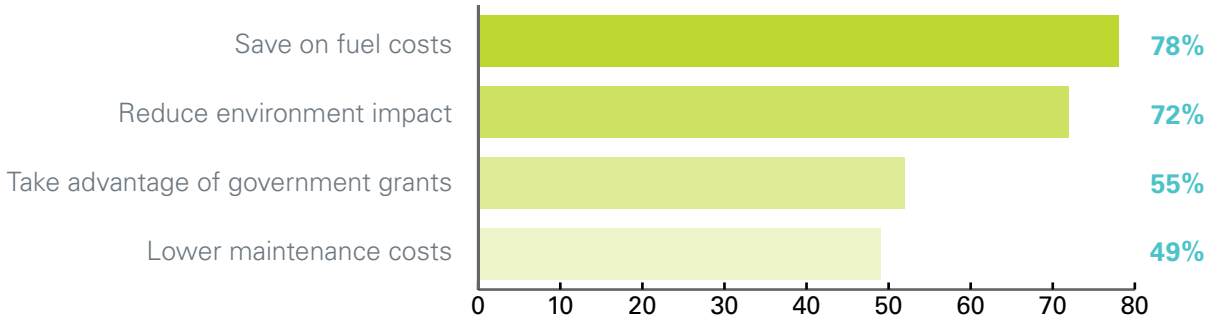
For both EV-owners and non-EV owners, the top reasons for purchasing an EV (or to consider purchasing an EV) were to save on fuel costs, reduce environmental impact, lower maintenance costs, and to take advantage of government grants.

Top Reasons for purchasing an EV



Question: What initially motivated you to purchase an EV? Rank the three most important motivators (238 responses).

Top reasons to purchase an EV (Non EV owners)



Question: What would be your main reason to buy an EV? Select all that apply. (1,493 responses).

Supportive government policies are a key driver of EV uptake.

Background & Context

Why Plan for EVs?

This Strategy recognizes the immediate and urgent need to reduce greenhouse gas (GHG) emissions to help mitigate the effects of climate change. Surrey has declared a Climate Emergency, formally acknowledging the need to act urgently in response to the climate crisis and has adopted targets to reduce community GHG emissions to net zero, and corporate emissions to absolute zero, both before 2050.

Did you know?

The City installed its first electric vehicle charging stations in 2013 at 3 City facilities in Fleetwood, Newton and Guildford with funding assistance from the Fraser Basin Council.

Electric vehicles have a critical role to play in achieving these targets. Surrey community GHG emissions from transportation represent 47% of city-wide emissions, while passenger vehicles account for 83% of the vehicle emissions (excluding off-road and construction vehicles).

Widespread adoption of electric vehicles will be crucial to meeting the City's climate targets, alongside efforts to shift to sustainable modes of travel. All levels of government have an important role to play in accelerating the transition to electric vehicles and sustainable transportation.

The City's Role

Supporting low and zero-emission transportation has been a feature of City plans and policies for over a decade. The Official Community Plan, Sustainability Charter, and Climate Change Action Strategy each include strategic directions that are supportive of electric vehicles. Going forward, electric vehicles will also feature prominently in the Surrey Transportation Plan currently being developed, supporting both the Climate Crisis and Technology & New Mobility pillars of the plan. The EV Strategy supports the implementation of these plans by providing a comprehensive list of actions within the local government sphere of influence that will help accelerate EV adoption in Surrey.

Hierarchy of City plans and strategies related to electric vehicles

Sustainability Charter 2.0

Desired outcomes & strategic objectives:

- Air quality meets or exceeds established standards.
- Emissions are low, and align with global, national, and provincial GHG reduction targets.
- Low emission vehicles predominate and are supported by the necessary fueling infrastructure.

Official Community Plan

Policies

- Promote sustainable transportation.
- Reduce GHG emissions by supporting the expanded use of alternative fuel vehicles.

Targets

- Net zero community emmisions by 2050.
- Absolute corporate emissions by 2050.

Long-range Transportation Vision

Low-Carbon, Resilient Neighbourhoods

Community Climate Action Strategy*

Policies & Actions

- Integrated climate action plan to achieve the City's GHG reduction targets.
- Anticipated to include zero-emisson vehicle targets and actions supporting EV uptake.

Safe, Zero-Carbon Transportation

Surrey Transportation Plan*

- A long-range transportation vision and decision-making framework.
- Action plans with key objectives and initiatives for the next 10 years.
- 5 pillars: Growth, Visions Zero, Climate Crisis, Technology & New Mobility, Equity

Action Plan

Mode Shift

Zero-Emission Vehicles

Electric Vehicle Strategy

- Supports the Climate Crisis and Technology & New Mobility pillars of the Transportation Plan.

* The Surrey Transportation Plan and Climate Change Action Strategy are currently under development

Senior Government Action on EVs

Cities and countries that have achieved a high percentage of EV ownership have policies that increase both the supply of EVs available (e.g. EV sales mandates), and demand for EVs (e.g. purchase incentives), in addition to investments in charging infrastructure. Supportive government policies are expected to continue to drive significant growth in EV uptake in BC and Canada for the foreseeable future. The federal and BC provincial governments each have numerous EV focused initiatives that support EV Strategy objectives and the acceleration of EV adoption in Surrey.

Summary of Federal EV Programs and Incentives	
Zero Emission Vehicle Infrastructure Program	$130 million over five years (2019-2024) to deploy a network of zero-emission vehicle charging (level 2 and higher) and refuelling stations.[13]
The iZEV program	The iZEV program offers up to $5,000 off the purchase price of a qualifying new battery electric vehicle, $2,500-$5,000 on a plug-in hybrid, and up to $5,000 for a hydrogen fuel cell vehicle.[14]
Tax write-offs for businesses	100% write-off for zero-emission vehicles to support business adoption.[15]

Federal Support for EVs

The Government of Canada, under the Paris Agreement, committed to reducing GHG emissions by 30% below 2005 emissions by 2030.[11] The Pan-Canadian Framework on Clean Growth and Climate Change was established to reduce emissions and highlighted the importance of increasing the number of zero-emission vehicles (ZEVs) on the road and shifting to lower-emitting modes of transportation. Additionally, the Net-Zero Emissions Accountability Act was tabled in Parliament in November 2020 and, if passed, would formalize the federal government's announced target of net-zero GHG emissions by 2050.

To help achieve these targets, the federal government has set an ambitious zero-emission vehicle supply target of 10% of light-duty vehicle (LDV) sales per year by 2025, 30% by 2030 and 100% by 2040.[12] Additionally, the government has created several demand-focused programs to stimulate the shift to zero emission vehicles (summarized in table).

Provincial Support for EVs

In 2018 the Government of BC introduced the CleanBC strategy, which is a pathway for a cleaner future for BC and guided by three goals:

1. protect the environment
2. leverage actions to build a more diverse and sustainable economy
3. provide support to ensure everyone benefits

The CleanBC strategy focuses on cleaner transportation and better air quality, healthier and more energy efficient buildings, and cleaner industry that cuts pollution. The strategy also renewed the Province's commitment to emissions reductions by 40% by 2030, 60% by 2040, and 80% by 2050 (relative to 2007 levels).[16] With respect to transportation, the strategy prioritizes reducing the price of clean vehicles and accelerating the switch to cleaner fuels.

In July 2020, the Government of BC adopted new regulations under the Zero-Emission Vehicles Act that require sales and leases of light-duty vehicles to meet an escalating annual percentage of zero-emission vehicles: 10% by 2025, 30% by 2030 and 100% by 2040.[17] The provincial government has also introduced several programs to incentivize the shift to zero emission vehicles (summarized below).

Summary of EV Programs and Incentives in British Columbia	
Clean Energy Vehicles for British Columbia (CEVforBC) Program	$71 million for vehicle point-of-sale incentives and charging infrastructure.[18] Rebate of $3,000 on the purchase of new battery electric vehicles, and $1,500 for plug-in hybrid vehicles.[19]
BC SCRAP-IT Program	Rebate of up to $5,000 for early retirement of old vehicles that are replaced with EVs.[20]
Specialty Use Vehicle Incentive (SUVI) Program	Offers between $2,000 and $100,000 for other vehicle types such as e-cargo bikes, e-motorbikes, forklifts, trucks and buses.[21]
Charging Incentives and Solutions Program	$350 rebate for Level 2 charging stations for single-family homes. $2,000 rebate for stations designed for multiple users in condos, apartments, and workplaces. EV Advisor services for stratas and workplaces.[22]

City Actions To-Date

Surrey is already a regional leader in supporting EV adoption. For nearly a decade, the City has encouraged EV ownership by deploying public charging, introducing EV charging infrastructure requirements in new buildings, and electrifying fleet vehicles.

Public and Workplace Charging

Since 2013, the City has encouraged EV ownership by installing charging stations for public use at City facilities. Usage of these stations has increased exponentially each year as EV ownership in the city has grown. In addition, the City has supported workplace charging for employees by installing employee charging at City Hall and the Operations Centre.

35	Public Level 2 Charging Ports at 16 separate City facilities
2	DCFC locations (site host for BC Hydro)
+10,000%	Growth in public charging sessions (2013-2020)
14	Level 2 employee charging ports 8 City Hall | 6 Operations Centre
10	Level 1 smart charging ports at City Hall
$867,947	Federal and Provincial Government grants secured for EV charging infrastructure (2016-2021)

City Fleet

The City has shown leadership by introducing EVs into the City's fleet and by installing fleet charging infrastructure at City Hall and Operations Centre. The City also has 3 hybrid vehicles, and 153 dual fuel vehicles (gasoline and compressed natural gas). The duel fuel vehicles are capable of using renewable natural gas (RNG) produced at the Surrey Biofuel Facility that processes the city's organic waste into 100% RNG.

19	Fleet EV charging ports • 9 City Hall • 8 Operations Centre (Fleet Yard) • 2 South Surrey Operations Centre (Fleet Lot)
11	Fleet EVs

EV Charging Infrastructure in New Developments

In 2019, the City adopted EV charging infrastructure requirements for all new residential and commercial developments. Additionally, the City is participating in a regional working group to develop EV-ready requirements for non-residential buildings which will inform future updates to the City's EV infrastructure requirements for all commercial, industrial, and institutional buildings.

Residential
100% of residential parking spaces must have an energized electrical outlet capable of providing Level 2 EV charging.

Commercial
20% of residential parking spaces must have an energized electrical outlet capable of providing Level 2 EV charging.

Shared EV Incentive

In 2019, the City updated the Zoning Bylaw to include a new car share incentive. Multiple unit residential developments in City Centre are permitted to reduce their minimum parking requirements by 5 spaces for each car share vehicle that is provided on-site. An additional 1 space reduction is permitted if the shared vehicle is a plug-in EV and the shared vehicle parking space is made EV-ready.

Public EV Charging in New Land Use Plans

Beginning in 2020, all new and updated Neighbourhood Concept Plans (NCPs) and Town Centre Plans (TCPs) will include on-street EV charging infrastructure requirements at select mixed-use locations and adjacent to parks.

**Map from Newton TCP highlighting locations of on-street EV charging infrastructure.*

Did you know?

For the past 10 years, the city has added on average more than 4,300 new residential dwelling units each year. As of June 2019, 100% these new homes will be EV-ready.

Developing the Strategy

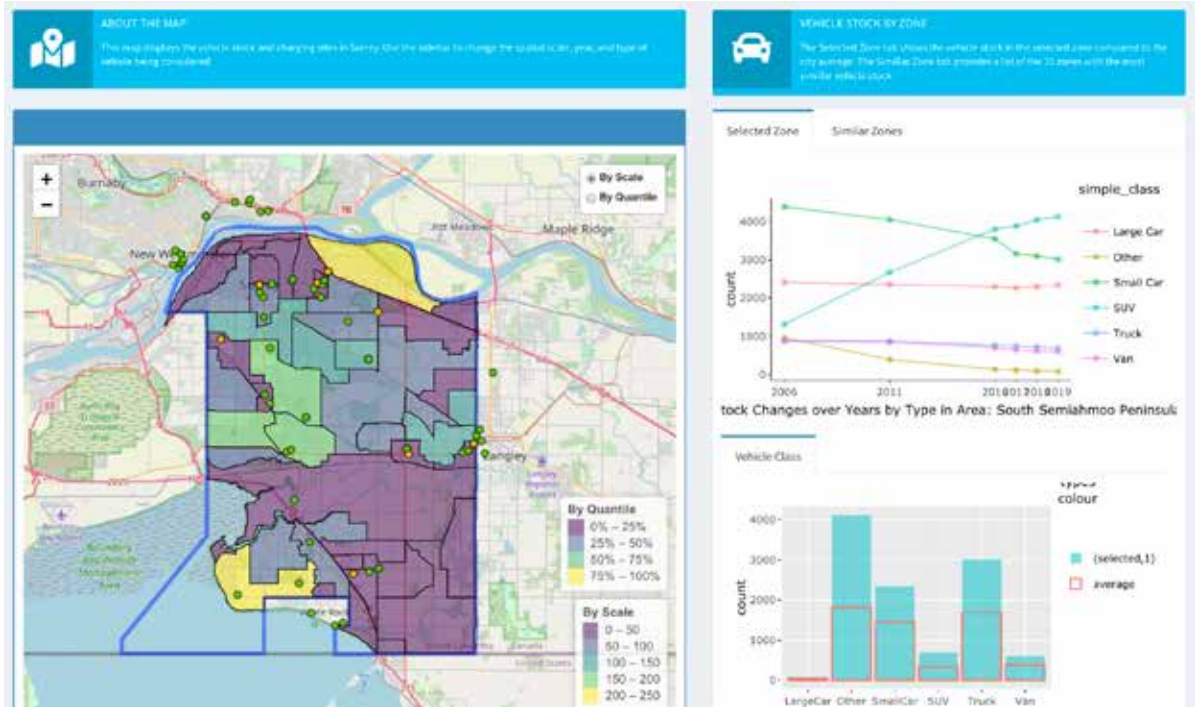
The EV Strategy combines industry-leading knowledge with input from local stakeholders and Surrey residents to provide a strong foundation for the city's transition to electric mobility. The actions were developed through extensive research, external stakeholder and public engagement, and collaboration with internal stakeholders across various City departments.

Best practice & expert research

The Strategy's actions are informed by best practices from municipalities across Metro Vancouver, BC, Canada, and North America, including the review of peer-city EV Strategies. The City of Surrey is a member of the BC Electric Vehicle Peer Network, a working group and forum for sharing information and best practices, and developing consistent and effective approaches to encouraging EV adoption. Additionally, Navius Research was engaged to summarize current and future trends in EV adoption, identify consumer barriers to EV adoption, explore policies to support EV adoption, and provide examples from EV-leading cities.

Collaboration with UBC Data Science

In 2019 the City partnered with the Data Science for Social Good (DSSG) Program at the University of British Columbia to develop a functional, data-based tool to enable policy analysis and forecasting of transportation energy demand and GHG emissions.[23] The tool incorporates census demographic and income data, city land use data, transportation demand projections, and ICBC vehicle registration data. The City can use this tool to develop and target EV programs and infrastructure investments, and track trends in EV adoption across the city.



UBC's Data Science for Social Good program developed a data-based app that will help the City develop and target EV programs and investments.

Engagement Summary

The best practice and expert research directly informed the design of the engagement phase of the Strategy development, which involved engagement with City staff, key stakeholders and experts, and the public. The input from the public and stakeholder engagement process is reflected in the action plan, and key findings are presented throughout the Strategy.

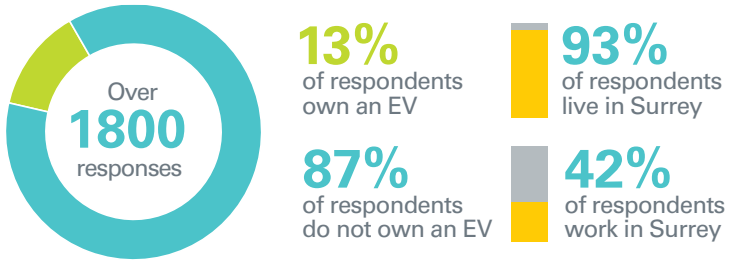
Internal Engagement

Key personnel across numerous City divisions were engaged to identify opportunities for collaboration, ideas for action, and to develop the internal relationships and networks necessary to implement the Strategy.

- Transportation Planning
- Sustainability & Energy Services
- Community Planning
- Area Planning
- Parks, Recreation & Culture
- Engineering Operations (Fleet)
- Land Development Engineering
- Facilities
- Finance

Public Engagement

An online public survey launched in November 2019 elicited over 1,800 responses and sought to understand the perspectives of both EV-owners and non-EV owners.



The survey focused on understanding barriers to EV adoption while also exploring opportunities to accelerate EV uptake in the city. The survey covered the following key topics:

- Familiarity with EVs
- Considerations around purchasing EVs
- Ongoing benefits and challenges to EV ownership
- Charging behaviour at home and in public
- Preferred types and locations of public chargers
- Proposed EV Strategy actions

Stakeholder Engagement

In addition to the public survey, representatives from industry, academia, utility companies, advocacy groups, local businesses, and community-based organizations were invited to participate in a series of focus groups held in November 2019 to help shape the Strategy. These sessions focused on the following topics:

- **Determining the Best Approaches to Private and Public Infrastructure**
- **Accelerating Individual EV Adoption**
- **Accelerating Fleet Adoption**

The primary objective of the focus groups was to examine potential obstacles to EV adoption, areas of opportunity, and key considerations for action implementation. Participants were first asked to identify potential barriers related to each topic and then were tasked with generating ideas for action and possible solutions for overcoming those barriers. The key themes and areas of interest that emerged informed the development of draft actions.

Focus group participants were re-engaged in June 2020 through a survey to get feedback on draft actions and to help refine and prioritize the draft action plan. This survey was organized into **6 topics:**

1	Supporting home and workplace charging
2	Expanding access to public charging
3	Accelerating individual EV adoption
4	Accelerating fleet EV adoption
5	Leading by example
6	Integrating equity into the EV Strategy

Stakeholder Engagement Summary

4	focus groups sessions
43	focus group participants
43	stakeholder survey participants
256	verbatim survey responses

The input received through the public and stakeholder engagement process helped to identify and confirm barriers to EV adoption in the city and directly informed the actions the City can take to overcome these barriers and accelerate the transition to EVs. The engagement process also helped ensure the strategy reflects community priorities and began the process of securing the buy-in necessary for success. Going forward, as the strategy is implemented, the City will continue to engage with community stakeholders to ensure the policies, activities, and investments that flow from the Strategy meet the needs of the community and are delivered in an equitable manner.

The results of the stakeholder survey identified the following high-priority actions to be included in the action plan.

Stakeholder Survey Priority Actions

1. Supporting home & workplace charging

- Ensure EV-readiness in new non-residential developments
- Advocate for and support provincial policy

2. Expanding access to public charging

- Expand the City-owned public charging network
- Encourage or require new developments to provide public charging

3. Accelerating individual EV adoption

- Engage in long-term planning initiatives to ensure the public charging network is prepared for increased EV adoption
- Explore non-financial incentives to encourage EV-adoption

4. Accelerating fleet EV adoption

- Support and accelerate the electrification of taxis and ride-hailing vehicles
- Advocate for provincial policy to accelerate EV adoption in fleets

5. Leading by example

- Design City-owned charging infrastructure to be fully accessible for persons with disabilities
- Factor in the social cost of carbon as part of an 'Electric First' fleet procurement policy

6. Integrating equity into the EV Strategy

- Ensure equitable access to publicly accessible charging
- Consult with equity-seeking organizations and provide educational EV materials in multiple languages

70% of survey respondents indicated that requiring all new non-residential developments to be EV-ready should be a high priority.

High initial purchase costs remain a significant barrier to EV adoption.

Barriers to EV Adoption

Despite the growth in EV adoption in BC, EV ownership remains low in Surrey and there are significant barriers to widespread EV adoption in the city. In order to develop strategic actions to support the transition to electric vehicles, it is important to first understand these barriers.

There are a number of common factors that influence rates of EV adoption, including initial costs, government incentives, availability of charging infrastructure, vehicle availability and model choice, and consumer awareness.

Vehicle Costs

- High initial purchase costs vs. comparable fossil-fueled powered vehicles.
- Availability of purchase incentives or rebates significantly influences purchase decisions.

Availability of Charging Infrastructure

- Home – no access to designated parking, and the challenge of retrofits in multiple-unit residential buildings.
- Work – no designated parking and the challenge of building retrofits
- Public – insufficient public charging infrastructure
- Private - Poor business case for private EV charging infrastructure: high electricity demand costs, low utilization, high equipment costs.

Vehicle Availability and Selection

- Limited vehicle availability across vehicle classes
- Limited inventories of EVs at dealerships
- Used EV market is immature in most regions.

Consumer EV Awareness

- Low consumer awareness of EVs including charging options and availability, vehicle range, and model availability.
- Low awareness contributes to resistance to change.

These common barriers to EV adoption were confirmed as part of the public engagement process. Survey respondents cited high vehicle costs, concerns about vehicle range, and access to charging as the top barriers to EV ownership.

Non-EV-Owners barriers to EV adoption & motivators to purchase

The survey results (to the right) highlight the concept of latent demand – what EV sales would be if they were fully available in a variety of makes and models, if consumers were fully aware of their existence, and if ownership was not constrained by access to charging.

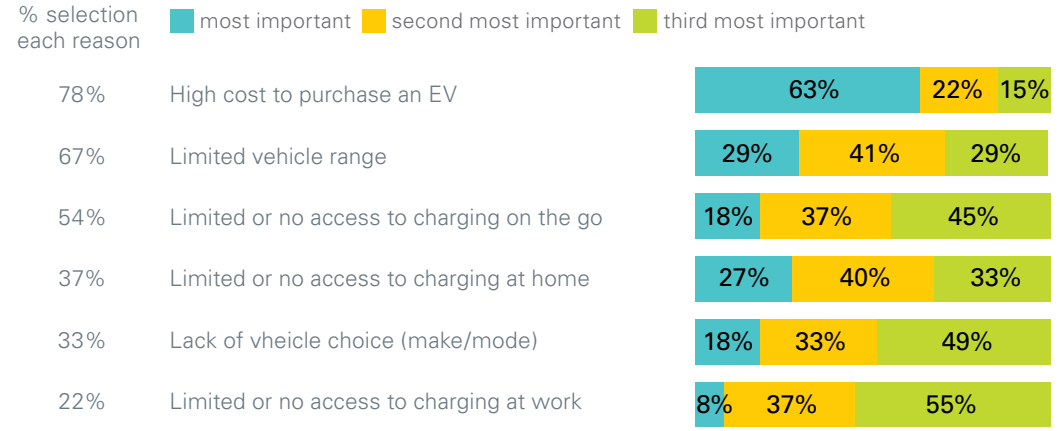
- in 2015 latent demand for EVs in Canada was estimated at 12% of new vehicle market share[24]
- in 2017 latent demand for EVs in Metro Vancouver was estimated at 18-23% of new car buyers[25]

Understanding the real and perceived barriers to EV adoption in Surrey alongside the latent demand for EVs reveals the areas the City can target to accelerate EV adoption. Key actions targeting each of these areas are explored in the next section.

Survey Results

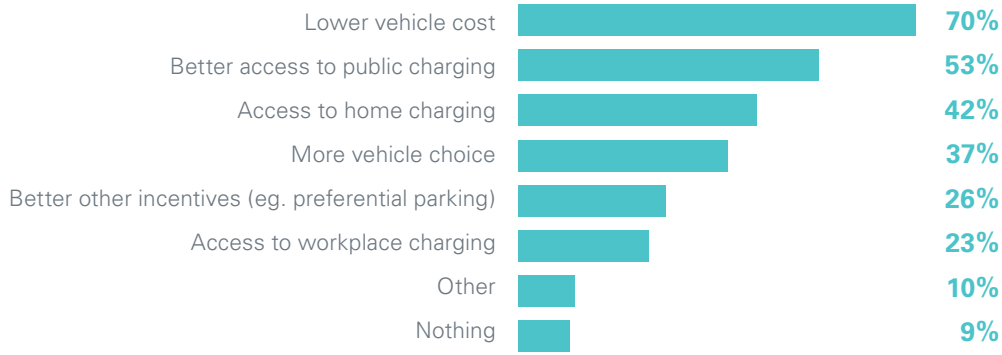
Barriers to owning an EV (Non-EV Owners)

Question: What are the top three barriers that would prevent you from owning an EV? Rank the three most important barriers (1494 responses)



Motivators to Purchase a fully electric vehicle

Question: What would convince you to buy a fully electric vehicle? Select all that apply. (383 responses)



Key City Actions

To successfully support residents and businesses in the transition to electric vehicles, the City must deploy a comprehensive suite of actions. The following sections of the Strategy outline the most impactful actions the City can take to address barriers to EV ownership and accelerate EV adoption in the city. This action plan was developed through extensive best practice research, consultation with expert stakeholders, public engagement, and internal stakeholder review.

Areas of Focus

The action plan is organized into 5 areas of focus, which emerged from best practice research and review of peer city plans. These areas of focus also provided the framework for the public and stakeholder engagement.

Action Plan Areas of Focus

1. **Supporting Home & Workplace Charging**
2. **Expanding Access to Public Charging**
3. **Accelerating Individual Adoption**
4. **Accelerating Fleet Adoption**
5. **Leading by Example**

Action Plan Timeframe

Each strategic action includes an indication of the implementation timeframe within the five-year scope of the Strategy. These timeframes take into account available resources, level of effort, and level of impact.

Timeframe	Description
Complete	Action already completed
In-progress	Work has been initiated and/or is ongoing
Short-term	1-2 years
Medium-term	2-4 years
Long-term	5+ years

The City must deploy a comprehensive suite of actions to support the transition to EVs.

1. Supporting Home & Workplace Charging

Home Charging

Access to EV charging at home is one of the most important factors influencing electric vehicle uptake, but many residents do not currently have access. Owners of single-family homes may find it relatively easy to install EV charging in their garages or driveways. However, residents of multi-unit residential buildings (apartments and condos), secondary suites, those who utilize on-street parking, and those who rent can face significant barriers to accessing at-home charging.

Common barriers to installing charging at home include high building retrofit costs, insufficient electrical capacity, complicated processes, and lack of access to dedicated parking.

Work Place Charging

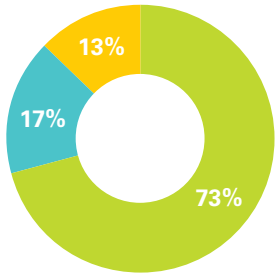
Workplace charging can both complement home charging (e.g. for those with longer commutes) and provide an alternative for those who do not have access to EV charging at home. The barriers to installation are similar to those faced by multi-unit residential buildings, but are further complicated by a mixture of tenure and ownership models that mean businesses may not have direct control over their parking spaces.

City actions to support access to home and workplace charging focus on charging requirements in new developments and supporting the retrofit of existing buildings for EV charging.

Charging Behaviour

EV OWNERS

Average amount of time spent charging at different locations



73% of charging time spent **at home**

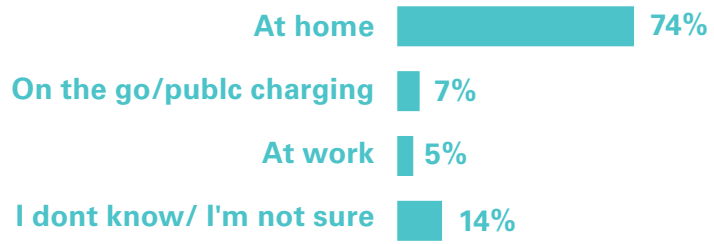
13% of charging time spent at work

17% of charging time spent at public chargers/on the go

Question: What percentage of the time do you charge your EV at the following locations? (233 responses)

NON-EV OWNERS

Most likely place to charge an electric vehicle



Question: If you owned an electric vehicle, where do you think you would charge it most? (1475 responses)

1.0 Supporting Home & Workplace Charging – Actions

	Action	Timeframe
1.1	**Implement EV-ready requirements in residential buildings** • Require 100% of parking spaces in new residential buildings, including 100% of accessible parking spaces, to be capable of providing Level 2 EV charging.	**Complete**
1.2	**Implement EV-ready requirements in non-residential buildings** • Require 20% of parking spaces in new commercial buildings to be capable of providing Level 2 EV charging. • Introduce EV charging infrastructure requirements for all new industrial and institutional buildings.	**Complete** Short Term
1.3	**Streamline permits & inspections for EV charging** • Develop information bulletins and process checklists to support the EV charging infrastructure installation application process. • Streamline internal application review and inspections processes.	Short-term
1.4	**Educate residents and businesses about EV charging infrastructure** • Coordinate with BC Hydro, the Province of BC, Metro Vancouver, and EV industry experts to provide information and outreach to residents, businesses, employers, and property managers on strategies to install EV charging.	Short-term
1.5	**Advocate for "right-to-charge" legislation** • Advocate to the Province for policy that makes installing EV charging in existing multi-unit buildings easier and more cost-effective.	Short-term
1.6	**Support home and workplace EV charging retrofits** • Educate residents and businesses on EV charging options and available financial incentives. • Explore non-permanent City-grants to support EV charging retrofits of multi-family buildings.	Medium-Term
1.7	**Ensure access to EV charging for renters** • Develop policies and requirements for EV charging in rental buildings and secondary suites to support renters, particularly low-income residents and newcomers.	Medium-Term
1.8	**Map all public and private EV charging infrastructure in the City** • Develop a comprehensive map and data sources for all public and private EV charging infrastructure, including stations and EV-ready buildings, to guide future infrastructure investments.	Medium-Term

2. Expanding Access to Public Charging

Convenient public charging is essential to accelerating the transition to EVs because it provides access to charging for residents who do not have reliable access to charging at home or at work. Public charging stations can also complement home and workplace charging for drivers taking longer trips.

Did you know?

In Metro Vancouver, an estimated 42% of residents do not have access to "at-home" charging, defined as access to having a reliable parking space located within 25 ft. of either an electric vehicle charger, 110V outlet, 220V outlet, or electric panel.[26]

Surrey At-Home Charging Gap

200,000+	existing housing units in Surrey are not EV-ready
40%	of housing units are multi-family units
16%	of housing units are secondary suites or coach houses
56%	of housing units will be slow and/or expensive to retrofit

Access to public EV charging supports EV adoption in the following ways:

- Provides access to those without access to home or workplace charging.
- Gives drivers confidence they can access convenient charging when 'on the go'.
- Helps to alleviate fears that EVs have insufficient power reach their destination (range anxiety)
- Provides options for drivers on longer trips or visitors to the city.
- Provides charging options for shared mobility fleets, such as taxis, ride-hailing (e.g. Uber, Lyft), and car share (e.g. Modo, Evo).
- Increases EV awareness and helps promote EVs as a viable option for the mainstream market.

Public charging stations can be either publicly or privately owned and operated. Currently, the business case is not strong for the private sector to own and operate public charging stations for a variety of reasons, including low EV market share, high equipment costs, high electricity costs (demand charges), high land costs, and competition with free and low cost charging options.

The City can support public charging by continuing to expand the City-owned public charging network and by facilitating public charging on private property. The City currently operates 35 Level 2 charging ports at 16 different City facilities and hosts 2 BC Hydro fast-chargers on City property. Three additional City-owned fast chargers are scheduled to be added in 2021 under a Natural Resources Canada grant. The City has also received a CleanBC grant for 40 new Level 2 stations (80 ports) to be installed in phases at 10 City locations (2021-2025).

As the public charging network is expanded in the future, the City will prioritize public charging stations near existing multi-unit residential buildings without charging, near existing amenities (e.g. retail locations, civic facilities), and on-street locations. Future infrastructure investments will be guided by data (EV data tool) and community engagement to ensure an equitable distribution of locations that are best positioned to accelerate EV adoption.

Sustainable Funding for Expansion & Operations

Sustainable funding is essential to allow for the strategic planning and installation of public EV charging over the long-term. The City will develop sustainable funding sources to finance the expansion of public charging, while also continuing to partner with federal and provincial governments, BC Hydro, and the private sector.

To support the sustainable operation and maintenance of the City-owned network, the introduction of user fees is necessary. User fees have the added benefit of increasing station turnover by encouraging drivers to only charge when necessary, thus ensuring efficient use of the infrastructure and availability for those who need it most. Introducing fees for charging will bring the City in-line with most other Metro Vancouver municipalities that offer public charging.

Over time, the City's rate of investment in the public charging network will be adjusted to reflect changes in levels of EV adoption, increased access to home and workplace charging, and private sector investment in public charging.

65% of survey respondents were supportive or very supportive of the City introducing a fee for charging at City-owned facilities.

20% opposed, 16% neutral/don't know

2.0 Expanding Access to Public Charging – Actions

	Action	Timeframe
2.1	**Implement user fees for the City-owned EV charging network**	
	• Introduce user fees for the City-owned charging network to increase station turnover and support cost recovery.	Short-term
	• Explore feasibility and investigate funding sources for subsidizing the costs of accessing the public charging network for low-income residents.	Medium-term
2.2	**Expand the City's publicly accessible Level 2 charging network**	
	• Expand the publicly accessible Level 2 charging network at City facilities (community centres, recreation centres, libraries, fire and police department locations, and parks).	In-progress
	• Include EV charging at all new City facilities, renovations of existing facilities, and upgrades to existing parking lots (including parks).	
2.3	**Expand the City's publicly accessible DC fast charging network**	
	• Develop a network of DCFC charging stations and hubs in partnership with senior governments, BC Hydro, and private site hosts.	In-progress
	• Design the public charging network so all residents either have home charging access or are eventually located within a 10-minute drive of a DCFC location.	Long-term
2.4	**Expand the City's publicly accessible charging network to include on-street locations**	
	• Install on-street charging stations in areas adjacent to existing multi-family dwellings, employment centres, and retail amenities.	
	• Screen major road and utility capital projects (including streetlight retrofits) to identify, prioritize, and pursue opportunities to simultaneously install on-street EV chargers and/or electrical infrastructure.	Short-term
	• Explore opportunities to secure on-street EV charging as voluntary community amenity contributions associated with new developments.	
2.5	**Require on-street EV charging infrastructure in all new land use plans**	
	• Require all new Neighbourhood Concept Plans and Town Centre Plans to include EV charging infrastructure at select mixed-use locations and adjacent to select parks.	In-progress

2.0 Expanding Access to Public Charging – Actions *(continued)*

	Action	Timeframe
2.6	**Identify funding sources for expanding the public charging network** • Identify sustainable, long-term funding mechanisms for the expansion of the City-owned public charging network.	Short-term
2.7	**Develop design standards for publicly accessible charging stations** • Develop design standards for all publicly accessible charging stations, adhering to universal design best practices and ensuring stations are accessible to all users. • Develop a design standard for on-street EV charging stations to be incorporated into the City's Supplementary Master Municipal Construction Documents.	Short-term
2.8	**Expand public charging on private property** • Explore policies and processes that encourage businesses to install publicly accessible charging on private property, such as major retail locations. • Require new conventional gas stations to provide EV charging infrastructure.	Medium-term
2.9	**Develop charging hubs with multiple charging stations and types** • Develop charging hubs with multiple charging stations that incorporate both Level 2 and DCFC chargers to support residents and commercial fleet operators, including taxis, ride-hailing, and car sharing fleets. • Develop multi-modal electric mobility hubs in connection with Skytrain stations.	Long-term

3. Accelerating Individual Adoption

While there has been an increase in EV ownership in recent years, low consumer EV awareness remains a significant barrier to EV adoption. Many residents and businesses are not familiar with the benefits of EV ownership, available EV models, charging types, or the host of federal and provincial incentives available to support EV purchases. Increasing EV awareness is an important first step in the market transformation necessary for widespread EV adoption to occur, and governments can help accelerate this transformation through targeted education and outreach.

73% of survey respondents felt it is important or very important that the City play a role in increasing awareness and educating the public about EVs.

14% opposed, 15% neutral/don't know

Where possible, EV education and outreach should be targeted to specific audiences, including multi-unit residential building residents and building managers, local business owners and employers, newcomer communities, and low-income residents.

There are a variety of EV education options available including online resources, information sessions, "ride and drive" events, and promotion of the public charging network, all of which can help grow consumer confidence in EVs.

The Electric Vehicle Experience

Emotive is a B.C. wide outreach and awareness campaign that encourages the accelerated adoption of EVs in B.C. The goal of the Emotive campaign is to inform the public about how FUN it is to drive an EV, without promoting one brand over another. Emotive holds electric test drives and demonstrations, makes educational presentations, and shares the latest EV news in BC.

3.0 Accelerating Individual Adoption – Actions

	Action	Timeframe
3.1	**Increase EV awareness of residents and businesses** • Coordinate with EV ambassador programs such as Emotive and Plug'N Drive to develop programming and host 'ride and drive' events. • Target EV education and outreach efforts at specific audiences, including multi-unit residential building residents and building managers, local business owners and employers, newcomer communities, renters, and low-income residents. • Develop the City's EV webpage into an EV information and resource hub, including information on EV incentives and rebates.	Short-term
3.2	**Educate residents and businesses on EV charging** • Develop partnerships with EV industry leaders to provide information to homeowners, renters, landlords, property managers, business owners, and commercial buildings owners on strategies to implement EV charging. • Develop brochures and other resources on the installation of home and workplace EV charging for distribution at City permitting counters and hosted on the City EV webpage.	Short-term
3.3	**Launch a shared EV demonstration project for low-income residents** • Support expanded and more equitable access to electric vehicles by launching a shared EV demonstration project targeted at low- and moderate- income households and employees of non-profit organizations.	In-progess
3.4	**Support provincial and federal ZEV mandates** • Continue to support the provincial and federal governments in establishing and refining zero-emissions vehicle (ZEV) supply mandates. • Provide input and propose changes to the Province's ZEV Act and associated regulations to ensure they are effective and suitable for Surrey.	In-progress
3.5	**Explore a bulk EV purchase program** • Investigate opportunities for a bulk purchase program where local dealerships provide discounts on EVs, potentially targeted at specific groups such a low-income households or small commercial fleets.	Medium-term
3.6	**Explore non-financial incentives for EV drivers** • Explore providing one-time or ongoing non-financial incentives to EV drivers, such as preferred parking, free parking, and low- or zero-emission vehicle only zones.	Medium-term

4.0 Accelerating Fleet and Medium & Heavy-Duty Vehicle Adoption

The primary focus of this Strategy is the electrification of personal passenger vehicles; however, the City must also identify actions that support zero-emission fleet vehicles and medium- and heavy-duty vehicles (MHDVs). The composition of local fleets varies and can include light-duty cars, SUVs, and trucks as well as medium- and heavy-duty trucks, vans, and equipment. Electrification for some types of MHDVs is advancing rapidly, but is still at an earlier stage of commercial deployment compared to passenger vehicles. Hydrogen fuel cell technology and/or renewable natural gas may also be an option for certain types of MHDVs.

Fleets and MHDVs in Surrey represent a significant opportunity for electrification and zero-emission technologies. There are more than 29,000 commercial vehicles registered in Surrey, over 5,000 of which are light-duty passenger fleet vehicles. Additionally, commercial trucks and buses account for approximately 16% of "on-road" transportation emissions in Surrey. The electrification of this segment therefore has an important role to play in meeting the City's emission reduction targets.

Fleet operators transitioning to EVs face many of the same barriers to EV adoption as individuals, including access to charging and EV awareness. However, some challenges unique to this segment include matching charging infrastructure to fleet operational needs and lack of vehicle choice (e.g. light-trucks and vans), which currently lags passenger vehicles.

The medium- and heavy-duty segment trails the light-duty passenger vehicle segment in terms of technology, vehicle availability, and market development. However, this is beginning to change with numerous manufacturers having announced EV options across a wide range of MHDV vehicle types.

Compared to passenger vehicles, there is greater uncertainty on the fuels and technologies that will enable a shift to zero-emission (ZEV) medium- and heavy-duty vehicles, and it is less clear how the City can best encourage ZEV adoption for these vehicle classes. The City is collaborating with other municipalities in BC to clarify municipal roles and prioritize short-term actions. The results of this work will be incorporated into the relevant sections of the Strategy. Numerous actions proposed to support workplace charging, public charging, and individual adoption will also support fleet and MHDVs adoption. For example, expanded workplace and non-residential charging requirements and a growing public charging network can facilitate the electrification of smaller fleets.

City-Wide Commercial Vehicle Inventory[27]		
57,615	Commercial class vehicles (including pick-up trucks)	17% of all registered vehicles
29,501	Vehicles registered for commercial use • 23,327 Commercial vehicles • 5,787 Passenger vehicles	9% of all registered vehicles

4.0 Accelerating Fleet and Medium & Heavy-Duty Vehicle Adoption – Actions:

	Action	Timeframe
4.1	**Increase EV awareness of businesses and fleet managers** • Coordinate with EV fleet experts to deliver fleet-specific EV education and host 'ride and drive' events. • Engage with School District No. 36 to encourage policies to convert to an electric school bus fleet.	Short-term
4.2	**Develop EV charging requirements for truck parking and loading areas** • Investigate feasibility of EV charging requirements for truck parking and loading areas in new commercial and industrial buildings.	Short-term
4.3	**Support and accelerate the electrification of taxis and ride-hailing vehicles** • Incentivize zero emission taxis and ride-hailing vehicles through reduced licensing fees. • Coordinate with other municipalities, the Passenger Transportation Board, and the Ministry of Transportation to develop regulations and programs to accelerate the shift to zero-emission vehicles for taxi and ride-hailing fleets.	**Complete** In-progress
4.4	**Support and accelerate the electrification of car share vehicles** • Use minimum parking alternatives policy to incentivize electrified car share and EV-ready car share parking spaces in new buildings. • Partner with car share operators to provide access to dedicated on- and off-street public charging stations.	**Complete** Medium-term
4.5	**Advocate for high-impact senior government policies, programs, and regulations aimed at medium- and heavy-duty ZEVs** • Emphasize the importance of regulation designed to stimulate and accelerate vehicle supply and industry action and investment.	Short-term
4.6	**Advocate for the creation of a provincial medium- and heavy-duty ZEV transition strategy and advisory panel** • Seek a multi-stakeholder collaboration led by the Province and involving representatives from local governments, senior government agencies, large fleet owners, industry, and labour. • Identify the necessary policies and infrastructure investments to achieve fleet adoption rates in line with targeted GHG reductions.	Medium-term
4.7	**Investigate non-financial incentives for medium- and heavy-duty ZEV drivers** • Investigate providing medium- and heavy-duty ZEVs with extended roadway operating hours and access to municipal HOV lanes.	Medium-term

5.0 Leading by Example

The City must be a leader in EV adoption and a catalyst for change in the transition to electric vehicles. As a large organization and employer, the City can show the way for businesses in the city. The City can demonstrate leadership in four key areas – fleet electrification, workplace charging, advocacy, and EV education and awareness.

Electrifying City fleet vehicles is a key opportunity to show leadership in the transition to electric mobility, reduce corporate GHG emissions, and increase EV visibility. As the variety of EVs suitable for municipal fleets increases and vehicle costs decline, electric vehicles will increasingly offer a pragmatic way to reduce life-cycle costs for fleet vehicles. Additionally, the City adopted a corporate GHG reduction target of absolute zero by 2050, and shifting to a zero-emission fleet will be critical to meeting this target.

Comments received as part of the stakeholder engagement process underscored the importance of continuing to add EVs to the City's fleet. Adding EVs to the fleet will require adequate fleet charging infrastructure at City facilities. As more vehicles are electrified, electrical upgrades may be required at facilities, which will necessitate careful planning and a strategic, phased approach.

The City is a large employer, employing more than 4,000 full-time and part-time staff. At-work charging for employees is important to encourage the shift to EVs as it supports those without reliable access to home charging and those with longer commutes. Developing an employee charging policy both supports employees' choices to drive EVs and provides a strong example to other local employers and businesses.

City EV Fleet

11	fleet EVs
19	dedicated fleet EV chargers
66%	of survey respondents were supportive or very supportive of the City beginning to convert all its medium and heavy-duty vehicles to EVs

The City also has an important advocacy role to play. The transition to electric mobility requires policy changes at all levels of government and from electric utilities. The federal and provincial governments are encouraging EV uptake through incentive programs and regulation. BC Hydro can significantly impact the viability of EVs through rate structures and electrical grid service connections and extension policies. The City must advocate for the continued development and strengthening of policies and programs that support the transition to EVs and ensure they account for Surrey's needs.

Finally, the City can support EV adoption by being an information hub – sharing information and links to key EV resources and promoting incentives.

Support for Converting City's Fleet to EVS

14	employee charging ports
62%	% of survey respondents were supportive or very supportive of the City developing a workplace charging policy for employees if chargers are publicly available outside of regular business hours.

5.0 Leading by Example – Actions

	Action	Timeframe
5.1	**Enact a "ZEV First" policy for City fleet vehicles** • Establish a "ZEV First" policy that prioritizes EVs and other zero emission vehicles in the City fleet. • Encourage ZEV-use in procurement of services.	Short-term
5.2	**Conduct charging infrastructure feasibility studies at City facilities** • Undertake feasibility studies at City facilities to determine capacity to install charging infrastructure and identify necessary electrical infrastructure upgrades.	Short-term
	• Develop a phased plan for infrastructure investments and upgrades.	Medium-term
5.3	**Develop an enhanced City EV webpage** • Develop the City's EV webpage into an information and resource hub with links to external resources and experts to promote EV education and support residents and businesses in the transition to electric vehicles.	Short-term
5.4	**Advocate for the expansion of TransLink's electric bus fleet** • Advocate through the Mayor's Council for the expansion of TransLink's electric bus fleet into Surrey.	Short-term
5.5	**Advocate for policies and programs that support EV adoption** • Advocate to senior governments for policies, programs, and regulations that increase EV supply and support EV adoption.	In-progress
5.6	**Develop a zero-emissions fleet strategy** • Undertake a comprehensive fleet inventory and analysis to identify vehicles best suited for replacement by EVs or other zero-emission vehicles. • Develop a vehicle replacement schedule to plan for upcoming zero-emission vehicle purchases.	Medium-term

5.0 Leading by Example – Actions *(continued)*

	Action	Timeframe
5.7	**Develop a workplace EV charging policy for City employees** • Assess the current and future demand for employee EV charging and develop a plan to expand EV charging infrastructure. • Require EV charging infrastructure in all new City facilities and install charging at existing facilities. • Ensure employee charging is available to the public after hours wherever possible.	Medium-term
5.8	**Implement employee EV awareness and maintenance training** • Educate employees on the operation and charging of EVs to ensure optimal operation and acceptance of fleet EVs.	Medium-term
	• Support EV maintenance training for fleet mechanics.	Long-term
5.9	**Develop a corporate carbon price policy** • Develop an internal corporate carbon price policy to inform City decision-making, including life cycle cost analysis for new fleet vehicle procurement.	Medium-term

The City must be the ultimate model and must aggressively publicize its move to EVs.

– Quote from stakeholder survey

Moving Forward

The Surrey EV Strategy is an action plan to accelerate EV adoption in the city, which is essential to meet the City's GHG emissions reduction targets and sustainable transportation goals. The Strategy positions the City to be a regional leader in EV adoption at both the community and corporate level.

Implementation

While the EV Strategy development was led by the City's Engineering Department, key personnel from numerous City divisions and departments were engaged to identify challenges and generate ideas for action. Internal working groups will be formed to maintain the internal stakeholder relationships and co-operation required to effectively implement the actions. Additionally, collaboration with the public, community stakeholders, utilities, senior governments, and other partners will be essential to the success of the strategy.

Measuring success

It is important to monitor progress towards the overall objectives of the Strategy. The implementation of the EV Strategy will be aligned with the framework for action plans to be established under the Surrey Transportation Plan when it is completed. The Surrey Transportation Plan will set baseline metrics, establish targets, and track key performance indicators. Some examples of key performance indicators that may be included are:

- Number of registered EVs in Surrey
- Number and utilization of City-owned EV charging stations
- Public EV charging density (per capita or per hectare)
- Number of City fleet vehicles

The Climate Change Action Strategy will also include specific policy directions, targets, and measures to support the shift to EVs.

Annual Strategy Reporting and Updates

Electric vehicles and charging technology are rapidly evolving. The action plan will be reviewed annually within the 5-year outlook of the strategy to ensure the actions reflect the latest technological advancements, trends, market developments, and best practices. Over time, topics currently deemed out of scope may be incorporated into the Strategy. Annual reports on key performance indicators will be provided through the Surrey Transportation Plan framework.

Appendix 1: Consolidated Action Plan

	Action	Timeframe	Lead Department – Supporting Partners	Action Category
Supporting Home & Workplace Charging				
1.1	Implement EV-ready requirements in residential buildings.	**Complete**	Eng – P&D	Policy - Implementation
1.2	Implement EV-ready requirements in non-residential buildings.	Short-term	Eng – P&D	Policy - Development & Implementation
1.3	Streamline permits & inspections for EV charging.	Short-term	P&D – Eng	Policy - Process Review
1.4	Educate residents and businesses about EV charging infrastructure.	Short-term	Eng – PRC, Libraries, Emotive, Plug' N Drive, Industry	Education & Outreach
1.5	Advocate for "right-to-charge" legislation.	Short-term	Eng – Other Municipalities	Advocacy
1.6	Support home and workplace EV charging retrofits.	Medium-term	Eng – Provincial Government	Policy - Development
1.7	Ensure access to EV charging for renters.	Medium-term	Eng – P&D	Policy - Research
1.8	Map all public and private EV charging infrastructure in the City.	Medium-term	Eng – P&D, GIS	Policy - Data & Tools
Expanding Access to Public Charging				
2.1	Implement user fees for the City-owned EV charging network.	Short-term	Eng – Finance	Policy - Development & Implementation
2.2	Expand the City's publicly accessible Level 2 charging network.	**In-progress**	Eng	Infrastructure
2.3	Expand the City's publicly accessible DC fast charging network.	**In-progress**	Eng – BC Hydro, Federal & Provincial Governments	Infrastructure
2.4	Expand the City's publicly accessible charging network to include on-street locations.	Short-term	Eng	Infrastructure
2.5	Require on-street EV charging infrastructure in all new land use plans.	**In-progress**	P&D – PRC, Eng	Policy - Implementation
2.6	Identify funding sources for expanding the public charging network.	Short-term	Eng	Policy - Development & Implementation
2.7	Develop design standards for publicly accessible charging stations.	Short-term	Eng – P&D	Infrastructure
2.8	Expand public charging on private property.	Medium-term	Eng – Private Sector	Policy - Development
2.9	Develop charging hubs with multiple charging stations and types.	Long-term	Eng – BC Hydro, Federal & Provincial Governments	Infrastructure

Appendix 1: Consolidated Action Plan (continued)

	Action	Timeframe	Lead Department – Supporting Partners	Action Category
Accelerating Individual Adoption				
3.1	Increase EV awareness of residents and businesses.	Short-term	Eng – Emotive, Plug' N Drive, Auto-dealers	Education & Outreach
3.2	Educate residents and businesses on EV charging.	Short-term	Eng – PRC, Libraries, Emotive, Plug' N Drive, Industry	Education & Outreach
3.3	Launch a shared EV demonstration project for low-income residents.	**In-progress**	Eng – P&D, Car Share Operator, Community Partners	Education & Outreach
3.4	Support provincial and federal ZEV mandates.	**In-progress**	Eng – Other Municipalities	Advocacy
3.5	Explore a bulk EV purchase program.	Medium-term	Eng – Finance, Other Municipalities, Industry Partners	Policy - Research
3.6	Explore non-financial incentives for EV drivers.	Medium-term	Eng – P&D	Policy - Research
Accelerating Fleet & MHDV Adoption				
4.1	Increase EV awareness of businesses and fleet managers.	Short-term	Eng – Emotive, Plug' N Drive, BC Hydro	Education & Awareness
4.2	Develop EV charging requirements for truck parking and loading areas.	Short-term	Eng – P&D	Policy – Development & Implementation
4.3	Support and accelerate the electrification of taxis and ride-hailing vehicles.	**In-progress**	Eng – Provincial Government, Industry Partners	Policy – Development & Implementation
4.4	Support and accelerate the electrification of car share vehicles.	Medium-term	Eng – Provincial Government, Car Share Operators	Policy –Development
4.5	Advocate for high-impact senior government policies, programs, and regulations aimed at medium- and heavy-duty ZEVs.	Short-term	Eng – Other Municipalities	Advocacy
4.6	Advocate for the creation of a Provincial medium- and heavy-duty ZEV transition strategy and advisory panel.	Medium-term	Eng – Other Municipalities	Advocacy
4.7	Investigate non-financial incentives for medium- and heavy-duty ZEV drivers.	Medium-term	Eng	Policy - Research

Appendix 1: Consolidated Action Plan (continued)

	Action	Timeframe	Lead Department – Supporting Partners	Action Category
Leading by Example				
5.1	Enact an "ZEV First" policy for City fleet vehicles.	Short-term	Eng	Education & Awareness
5.2	Conduct charging infrastructure feasibility studies at City facilities.	Short-term	Eng – P&D	Policy – Development & Implementation
5.3	Develop an enhanced City EV webpage.	Short-term	Eng – PRC	Education & Awareness
5.4	Advocate for the expansion of TransLink's electric bus fleet.	Short-term	Eng – Provincial Government, Car Share Operators	Policy –Development
5.5	Advocate for policies and programs that support EV adoption.	**In-progress**	Eng – Other Municipalities	Advocacy
5.6	Develop a zero-emissions fleet strategy.	Medium-term	Eng	Policy –Development
5.7	Develop a workplace EV charging policy for City employees.	Medium-term	Eng – All City departments	Policy –Development
5.8	Implement employee EV awareness and maintenance training.	Medium-term	Eng	Education & Awareness
5.9	Develop a corporate carbon price policy.	Medium-term	Eng – Finance	Policy - Development

Appendix 2: References

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