

more difficult to obtain for lower income households without investment in public and private EV charging infrastructure.

To help reduce this barrier to achieving Victoria's target, it is estimated that a potential total investment of up to \$60 M in charging infrastructure is needed between 2021 and 2030, with the City's potential contribution being up to \$15 M. The City's investment would be divided between public and private infrastructure with approximately \$5.25 M allocated to public charging infrastructure in earlier years and up to \$9.75 M expended on complementary incentives with other levels of government to retrofit existing buildings to support at-home EV charging in later years. The approach would target concentrated investment on expanding public infrastructure in the near term with a transition towards building retrofit incentives ramping up from 2025 onwards. With these investments and incentives, EV adoption is projected to increase from approximately 2% today to between 17% and 31% by 2030, depending on market conditions.

This phased approach reflects evidence on where the shorter-term infrastructure needs and user demands are, thereby sustaining EV adoption rates. It also builds in flexibility for the longer-term investment profile by allowing review and adjustment to happen as further data is collected and help ensure "right sizing" of future potential investments in what is a rapidly changing EV environment. Although the focus of the EV Strategy is on infrastructure, beyond investments and incentives, the strategy identifies complementary advocacy and regulatory options to further support reaching the CLP target. Given the critical leadership, funding and legislative roles of both the federal and provincial governments in the accelerated adoption of EVs, City advocacy will continue to push for the expansion of incentives and regulatory measures supporting adoption of EVs.

Go Victoria, the City's Sustainable Mobility Plan, supports advancing low carbon mobility choices through curb management and prioritization, using tools such as providing priority access to EVs, adjusting parking fee structures or introducing permit programs. These types of future zero emissions mobility incentive policies were also identified as part of the Climate Emergency High Impact Initiative to support the transition to zero emissions vehicles.

In bringing forward this Strategy, staff recognize that it is a first step in initiating a considerable expansion of the City's public EV charging network at a time of rapid change in the transportation industry. To maximize the effectiveness of investments, staff will track metrics such as use of EV charging infrastructure, sales of EVs in the community and region, and growth in access to charging for households, such as rental apartment dwellers and condominium owners as well as other mobility trends including car ownership, walking, cycling and transit modal share and estimated vehicle kilometres travelled. The City will also monitor broader trends of electric vehicle adoption within public fleets and car share services operating within the City. Metrics will be collected to help inform any recommended future Strategy and investment adjustments to support the CLP target seeking a transition to 30% renewable energy powered passenger vehicles by 2030.

PURPOSE

The purpose of this report is to share the directions contained within the draft City of Victoria Electric Vehicle Strategy.

BACKGROUND

The City of Victoria adopted the Climate Leadership Plan (CLP) in July 2018 which recognizes that on-road transportation accounts for 40% of community greenhouse gas emissions and identifies the transition to renewably-powered vehicles, along with increasing active transportation as key strategies to reduce the City's emissions. The CLP establishes a target to have renewable energy powering 30% of passenger vehicles by 2030. Passenger vehicles comprise over 80% of the vehicles registered in Victoria.¹

Council declared a Climate Emergency in March 2019, and in November 2019 adopted 3 High Impact Initiatives (HII's) within the "Low Carbon Mobility" Sector of the Climate Action Plan:

- Expand walking, rolling and cycling infrastructure
- Advance bus rapid transit
- *Expand EV infrastructure, policies and incentives*

Over the past eight years the City has initiated and been expanding its public EV charging network with the installation of EV charging stations in City parking lots, as well as on the street. The City currently owns and operates 19 Level 2 public charging stations and hosts two DC fast charging (DCFC) stations which are owned and operated by BC Hydro. The City is planning to install additional Level 2 charging stations and an additional two DCFC charging stations in 2021/22. The City's charging network is growing, but an enhanced level of investment is necessary to achieve the CLP renewably-powered vehicle target.

In July 2020, the City of Victoria amended the Zoning Bylaw and Zoning Regulation Bylaw to require EV charging infrastructure in all new residential developments and commercial developments with provision for more than 5 parking spaces, with changes that came into effect on October 1, 2020. While this sets the city up for success longer-term there remains an existing EV charging infrastructure gap for which the strategy identifies specific investment priorities.

In August 2020, the City hired Dunskey Energy Consulting to support the City of Victoria Electric Vehicle Strategy and help guide how the City could best reach its CLP renewably-powered passenger vehicle target. The Strategy examines the current rates of EV adoption in Victoria, forecasts its alignment with the 2030 CLP renewably-powered vehicle target, and assesses the barriers and potential approaches to address the shortfall identified.

ISSUES & ANALYSIS

Electric vehicles have become the pre-eminent force in the renewably-powered vehicles sector in Victoria. The modest driving distances, EVs added benefits of low noise, good performance in our mild climate, and low carbon and zero air pollution emissions, have made them a preferred choice over competing renewably-powered vehicle technologies. While through other strategic plans the City will continue to encourage mode shift, reduced vehicle kilometres travelled and reduced vehicle ownership rates through land use planning and mobility infrastructure investments, the goal of the CLP is to increase the low-carbon / renewably-powered proportion of vehicles that are operating on city streets.

¹ In this context a passenger vehicle is a motor vehicle that is used primarily to carry people on highways and streets. Most cars, station wagons, minivans, SUVs, and some pick-up trucks are passenger vehicles.

In Victoria, 13% of new vehicle sales in 2020 were EVs, according to the most recent data available. With the highest percentage of EV sales in Canada, Victoria and the Capital Region are leading the province in renewable-powered vehicle adoption and progress towards the City's 2030 CLP target is trending in the right direction. However, forecasting and analysis completed by the City's consultant team, which is described in the Technical Report (Appendix C), finds that over 80% of new vehicle sales in the City will need to be EV by 2030 in order to reach the City's target, which relates to total passenger vehicles, as opposed to new vehicle sales. The forecasting and analysis also finds that the initial pace of EV adoption will likely not be maintained due to barriers that are specific to Victoria, in particular, access to home charging. More than three-quarters (78%) of residents currently have limited access to charging at home, mainly those who live in multi-unit residential buildings.

Reliable, convenient, and cost-effective access to EV charging is a critical component to enabling Victorians who need a vehicle, for example, to access employment or education, especially where other mobility options are limited, to choose, buy, and operate EVs. Unlike the traditional model of gas stations, EVs can 'fuel up' anywhere with the proper electrical access and charging infrastructure. The most convenient location for EV drivers to charge their car is generally at home, where vehicles are frequently parked for long periods of time. The majority of today's EV owners in Victoria live in single-family homes where adding EV charging is relatively easy. In contrast, multifamily housing types like apartments have a number of potential constraints in providing access to home charging including the requirement for more substantial and challenging upgrades and not all residents who own a vehicle have the space to park it at their home with some multi-residential buildings, both traditional multi-storey buildings and house conversions, having limited on-site parking areas.

If provision is not made for Victoria multifamily and apartment dwelling residents to have convenient access to EV charging, growth in EV adoption will not be sufficient for the Climate Leadership Plan's target to be met. The figure below shows that based on the business-as-usual scenario, with no additional investment in charging and other policies and incentives, Victoria is on track for approximately 10% of passenger vehicles to be electric by 2030, 20% shy of the CLP target.

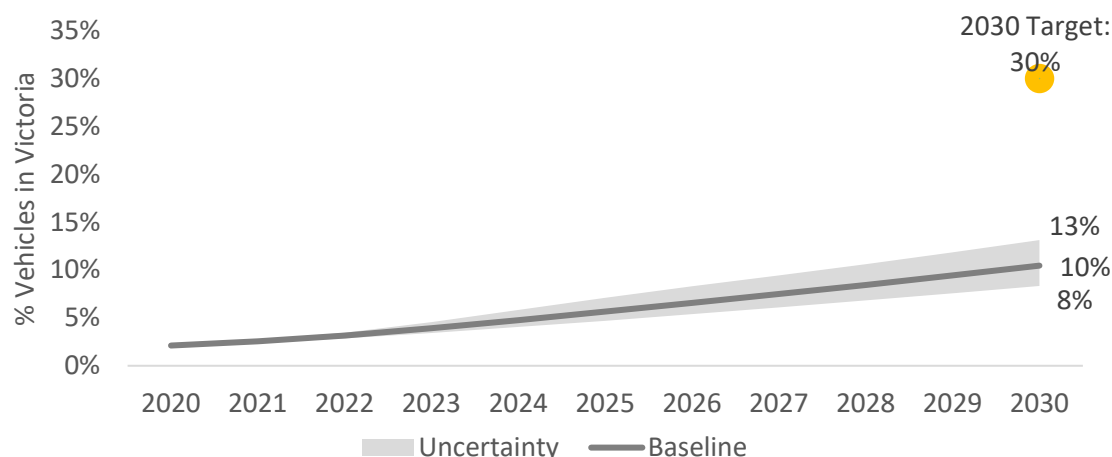


Figure 1: Business-as-usual (BAU) Forecast from the EV Strategy Technical Report by Dunsky

The draft City of Victoria EV Strategy has been developed to inform what actions are needed to reach the City's ambitious targets. The primary focus of the Strategy is improving access to EV charging for Victoria residents, and thus eliminating one of the key barriers to EV adoption.




Investment in EV Charging infrastructure is therefore central to the Strategy which includes a recommended 10-year capital investment profile.

OPTIONS & IMPACTS

Supporting access to EV charging is the single most impactful measure for the City to support EV adoption. A suite of investments and actions to bridge the gap between the projected business-as-usual rate of EV adoption and the desired rate targeted by the Climate Leadership Plan is recommended, and is a large focus of the City's draft EV Strategy.

To achieve Victoria's target, it is estimated that a total "global" investment of approximately \$60 M in charging infrastructure is required between 2021 and 2030, with the City's contribution totaling up to \$15 M. The table below summarizes the three main areas for City investment, public DC Fast Charging (DCFC), public Level 2 charging and EV-ready retrofits (see Appendix A for description of EV charging types).

Table 1: Total investment in charging infrastructure required between 2021 - 2030

Public Charging Network		Incentives
 Level 2 Charging (650 charging ports)	 DC Fast Charging (34 charging ports)	 EV Ready Retrofits (40,000 parking stalls)
Global Investment \$4.5 M	Global Investment \$6 M	Global Investment \$49.5 M
City Investment \$2.25 M	City Investment \$3 M	City Investment \$9.75 M

The optimal investment in charging infrastructure would include an estimated \$10.5 M into expansion of the City's public charging network through the installation of over 650 level 2 stations and 34 DC fast charging stations. This would provide convenient on-the-go and workplace charging options, as an alternative to home charging, which will help enable increased EV adoption. Based on the current grant opportunities available, it is anticipated 50% of this investment could be funded through the provincial and federal governments and other stakeholders such as the private sector, thus the City's contribution would be up to \$5.25 M over the next seven years. The City would continue to advocate for an expanded regulatory and financial role from both the federal and provincial governments to reduce the City's investments.

Public Charging - Expand Access to Level 2 Charging

Level 2 public and workplace charging infrastructure can enable EV adoption for those with limited or no home charging, if the access is convenient and reliable. There is a portion of Victorians who have no access or shared access to home charging, but who would consider public or workplace charging an acceptable substitute by plugging in to charge all-day at work or on the street overnight.

Level 2 charging, while slower, is more affordable for both the installer and user and can be deployed quickly and with more flexibility than DCFC.

Public Charging - DC Fast Charging Hubs

DCFC public charging infrastructure provides rapid, on-the-go charging for residents without at-home charging. These rapid charging stalls can be centred within higher density residential areas or destination-based activity centres such as downtown or village centres. By creating a hub where people naturally gather can enhance EV adoption. Modelling revealed that expanded delivery of DCFC charging infrastructure continues to have a significant influence on EV adoption to a greater degree beyond the levels of Level 2 chargers.

Incentives - EV Ready Retrofits

Current market research suggests that to achieve mainstream adoption of electric vehicles, improving access to charging at home will ultimately be necessary. The City's recent bylaw amendments require new residential developments to install the electrical infrastructure to enable EV Charging. However, in order to reduce the current infrastructure gap of EV charging, a significant portion of Victoria's existing residential buildings will require retrofits to be EV Ready by 2030. The most cost-effective way to accomplish these updates for individual buildings is to perform a comprehensive retrofit where energized circuits are provided to every parking stall during a single renovation. Modeling suggests that this approach is scalable to enable EV adoption among most multi-unit building residents with access to parking.

There are an estimated 40,000 residential parking stalls associated with the city's multi-family housing stock. Were all of these parking stalls to be made EV charging ready, a total investment of some \$49.5 M is estimated and would make home charging accessible to most Victoria residents. It is anticipated that government incentives and/or regulations will be necessary to achieve this level of investment by 2030. Currently, Provincial and Federal grant programs do not yet exist for these whole building retrofits which enable EV charging for all parking stalls. However, it is anticipated that such grants will likely become available in the future as whole building retrofits are much more cost effective per stall. Based on anticipated funding programs from other levels of government and expected demand from building owners, it is estimated that a City-funded top-up of 20% of retrofit costs would generate strong retrofit uptake. Thus, the City's contribution could be up to \$9.75 M over the next 10 years.

EV's within the context of Victoria's future Mobility Profile

Looking past 2030, by 2050 all passenger vehicles in the City are targeted to be renewably powered. Given the long life of vehicles in Victoria, the next 10 years will be key for the City to lay the groundwork for a successful complete transition. The 40,000 residential parking stalls and associated retrofit costs represents a "snapshot" of the current supply of parking. Other City strategies envision lower car ownership, reduced parking supply, much expanded custom and shared mobility services as well as more walking, cycling and transit use. Within this context, along with the potential for future mobility policy changes it will be necessary and appropriate to continue to review and assess to allow for more detailed, refined and context specific recommendations within the residential retrofit investments. This, combined with the fact that electric vehicle technology and policy/regulatory environment are rapidly changing, is why it is recommended that the City update it's EV strategy and investment profile in 2025, ahead of any significant investment commitments for 2026-2030.

As Victoria is the central hub of the Capital Region, access to public charging will also benefit other municipalities beyond City borders. Coordination and collaboration with neighbouring municipalities and the CRD will be important to providing a cohesive and connected charging network across the entire region. Both the CRD and neighbouring municipalities are developing their own EV strategies and investment plans to expand the regional EV charging infrastructure.

EV Infrastructure Investment Profile

The recommended amount and timing of the public EV charging and incentives-based investments, including operations and maintenance (O&M), needed to support EV adoption and reach the City's 2030 target is shown in Figure 2.

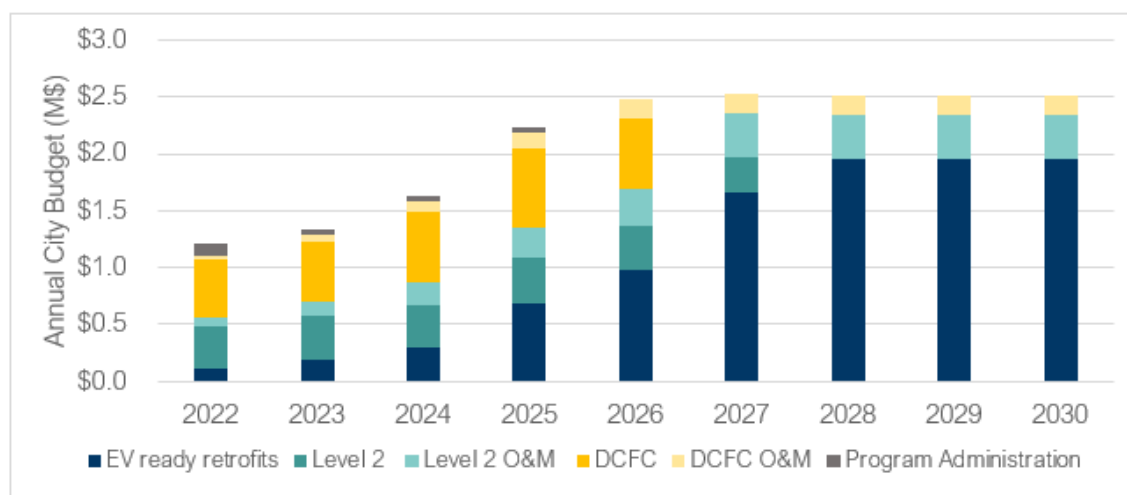


Figure 2: EV infrastructure investment profile identified in the City of Victoria EV Strategy

The initial expansion of infrastructure focuses on public charging infrastructure to serve Victorians without at-home charging access, with the majority of Level 2 and DCFC charger installations occurring in the first half of the decade. This reflects the known demand for this infrastructure in the shorter term, the immediate benefits public chargers bring in sustaining EV adoption rates and will generate additional investment income through the accumulation of low carbon fuel credits.

EV Ready retrofit incentives are more modest in the early years as the program ramps up, representing the time needed to attract participants and build the capacity of the local retrofit industry. The residential retrofit incentives are also the most sensitive to changing grant opportunities, future full redevelopment of buildings and the anticipated further reductions in the level of car ownership being achieved already due to other investments and policy directions being pursued in areas of transit, land use planning, active transportation, parking supply and the emergence of new mobility services such as car share. It is recommended that the EV strategy and investment profile be updated in 2025 to improve assumptions and incorporate learnings from the early deployment of incentives for EV ready retrofits prior to committing to larger investments in these incentives for 2026-2030.

The investment of City resources in a rapidly changing transportation environment comes with some uncertainty. To address this, an adaptive management process will be adopted including on-going review and metrics to support the effectiveness of investments and annual budgeting through the financial planning process. Staff will track metrics such as use of EV charging infrastructure, sales of EVs in the community and region, and growth in access to charging for households, such as

rental apartment dwellers and condominium owners. The City will also monitor broader trends of electric vehicle adoption within public fleets and car share services operating within the City.

It is projected that through combining the above three infrastructure investments, i.e. DCFC, Level 2 and residential EV Ready retrofits, supported by on-going advocacy and education and local, provincial and federal regulations, the City will be able to help address the barrier of access to charging. This, combined with financial incentives from other levels of government and organizations is anticipated to result in an EV adoption rate between 17% to 31%, depending on market conditions (see figure below). This reflects the magnitude of the challenge of transitioning a significant portion of the community's passenger vehicles in just 10 years and also highlights the fact that there many other market, economic and regulatory factors influencing the outcome that are beyond the City's control.

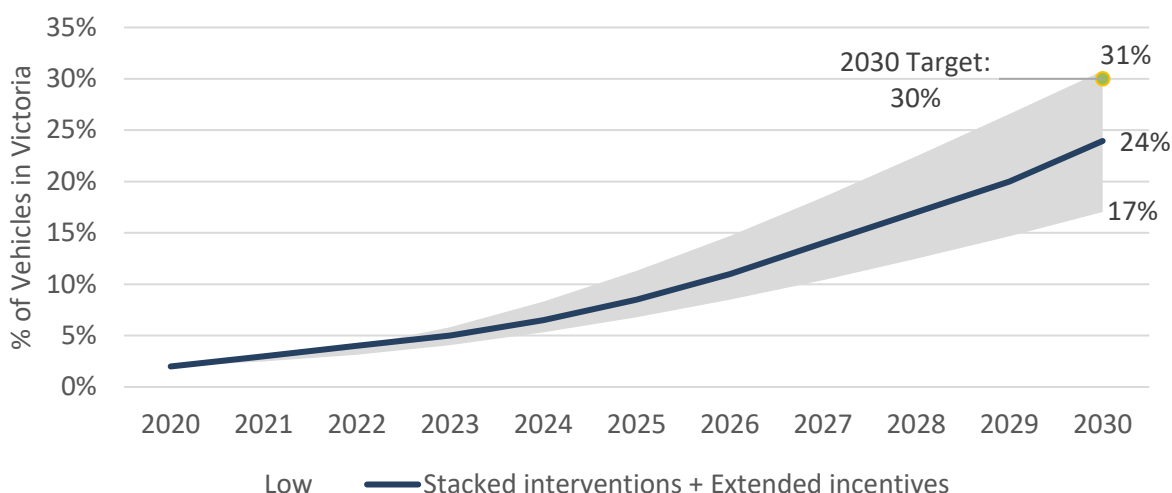


Figure 3: Electric vehicles as a percentage of vehicles in Victoria following infrastructure investments and extended incentives

While the federal and provincial governments have strong EV programs and targets in place, more of this positive progress will be needed to achieve the City's EV adoption targets. Advocacy to other levels of government is a key action in support of this draft EV strategy. Requirements and incentives provided by the Provincial and Federal governments should be expected to play a large and increasing role in advancing the EV market in the City. The City will advocate for Provincial and Federal policies to encourage the transition to EVs, such as rebates for new and used vehicles, incentives for comprehensive EV Ready retrofits and strengthening the provincial Zero Emission Vehicle Act.

At the regional level, the City will advocate for EV supportive policies, as well as play a role in supporting the coordination and alignment of regional efforts to invest in infrastructure.

City Staff will continue to track EV adoption rates in relation to the CLP target and provide Council with recommendations on adoption of measures based on overall progress towards the target. As the longer-term strategy focus shifts towards EV Ready retrofit incentives, the City may consider other regulatory tools to support EV adoption such as Zero Emissions Zones (ZEZs) or on street parking regulations.

Integration of Policy Objectives

Below is a summary of main policies and initiatives identified in the draft EV Strategy and how they integrate with some of the City's other key policy objectives.

Potential Policy or Initiative	Objectives
Invest in public Level 2 EV infrastructure and DC Fast Charging	Environment: Through supporting adoption of EVs this investment also supports clean transportation goals of OCP, Climate Leadership Plan and GoVictoria. Equity: Provides convenient, fast charging to users without access to charging at home. Locating multiple chargers in a single hub can support a larger volume of EV drivers as adoption increases. Economic Development: On-street Level 2 and DCFC can support opportunity charging. Access to such charging may be particularly important for ride-hailing, taxis, and other high-mileage vehicles. Affordability: Supports access to transportation with low operating and maintenance costs to all city residents.
Invest in EV Ready Infrastructure	Environment: Supports clean transportation goals of OCP, Climate Leadership Plan and GoVictoria. Equity: Provides an opportunity to access home EV charging to all City residents rather than just those in single family homes or new multi-family buildings. Economic Development: Retrofitting will support growth in clean tech businesses and regional electrical contractors.
Advocacy to other levels of Government	Environment: The City of Victoria's targets are aligned to support the Paris Agreement and deliver on the commitments made to address the Climate Emergency. Affordability: In some areas City targets are more ambitious than those of other levels of government. Advocating for stronger Provincial and Federal emission reduction targets may result in additional government regulations and investments by others reducing the need for municipal investment.

Accessibility Statement

In supporting a public EV charging network the City can ensure charging infrastructure is spread across all neighbourhoods and planned using appropriate design standards for accessibility.

2019-2022 Strategic Plan

Aligns with Strategic Objective Six: Climate Leadership and Environmental Stewardship

Impacts to Financial Plan

No impacts to the 2021 Financial Plan. Staff will bring forward as part of the 2022 budget process a recommended 5 year EV infrastructure investment and associated staffing resources.

Official Community Plan Consistency Statement

Supports Chapter 12, Climate Change, Goal 12(C) "Transportation options reduce fossil fuel dependence, help conserve energy and produce low greenhouse gas emissions and other air contaminants."

CONCLUSIONS

The requirements to meet a key target in the Climate Leadership Plan's transportation chapter and a component of Victoria's 2050 vision have been identified through the development of a draft EV Strategy and accompanying report. The draft EV Strategy identifies a pathway to achieving the City's ambitious targets that focuses on reducing one of the key barriers to EV adoption that the majority of Victorians are currently facing. By investing \$15M over the next 10 years in public charging infrastructure and incentives that enable EV ready retrofits in existing buildings, the City can improve charging access for Victorians. This investment combined with continued incentives and programs from other levels of government can increase Victoria's EV adoption rates from 2% to 30% by 2030. Without this investment from the City, the majority of Victoria residents will not have timely access to EV charging infrastructure. This exclusion will disproportionately impact residents in lower cost housing and limit their access to the benefits of lower maintenance and fuel costs associated with electric vehicles.

Respectfully submitted,

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Report accepted and recommended by the City Manager.

List of Attachments

Appendix A: EV Charger Types

Appendix B: Draft City of Victoria Electric Vehicle Strategy

Appendix C: Draft Electric Vehicle Strategy Technical Report