

Calgary



Calgary's Electric and Low-Emissions Vehicles Strategy

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Electric vehicles (EVs) are a rapidly emerging technology that can provide significant benefits to citizens and businesses.

Role of Calgary's Electric Vehicle (EV) Strategy

Although EVs are currently more expensive to purchase than comparable gasoline-powered vehicles, they are more economical to operate and maintain. Battery prices will continue to fall, with multiple analysts projecting that EVs will cost the same or less than the equivalent gas-powered cars by the mid 2020s. This will result in a rapid increase in EV sales, which The City needs to prepare for.

Electric vehicles also provide the single largest opportunity to reduce greenhouse gas (GHG) emissions and local air pollution from the transportation sector in Calgary. Electric and hybrid vehicles are the leading technology for emissions reductions and cost savings for privately-owned vehicles, whereas commercial fleets may shift to renewable diesel, renewable compressed natural gas, electric or hydrogen.

The City of Calgary's Electric Vehicle (EV) Strategy clarifies the role of The City of Calgary relative to citizens, businesses, utilities and other orders of government. The strategy identifies specific actions that should be taken over the coming years to prepare Calgary for this new technology.

The EV Strategy is an extension of actions in the *Climate Resilience Strategy and Actions Plan*, approved by City Council in June 2018. The Climate Resilience Strategy outlines The City's actions to improve energy

management and reduce greenhouse gas emissions, as well as implement risk management measures in preparation for current and future climate impacts.

The EV Strategy provides additional background information, and more detailed implementation actions that build on actions in the Climate Mitigation portion of the Climate Resilience Strategy. It also supports air quality management goals in the Climate Adaptation actions.

The EV Strategy also builds on the Electrification section of *The Future of Transportation in Calgary* report presented to City Council in 2017. That report considered a range of emerging technologies, related societal trends, and what they might mean for the future of transportation in Calgary. The report linked the benefits and implications of EVs with other emerging technologies, particularly autonomous vehicles and rideshare services that may rely heavily on electrification.

Understanding electric vehicles

Electric vehicles provide the single largest opportunity to reduce greenhouse gas (GHG) emissions and local air pollution from the transportation sector in Calgary.



Types of electric vehicles



Tesla

Battery Electric Vehicles (BEV)

Battery Electric Vehicles, or BEVs, are fully electric vehicles that run entirely on electricity without using any gasoline. Examples include the Tesla Model 3, the Chevy Bolt, and Nissan Leaf. BEVs have dozens of moving parts, compared to thousands of moving parts in a gas-powered car, which reduces operating and maintenance costs.

BEVs currently have driving ranges starting at about 150 km (e.g. older Nissan Leafs) up to 500 km for many Tesla models. Future EVs from multiple manufacturers will continue to increase driving ranges.

BEVs can be charged externally at a charging station, including fast charging stations, and through regenerative braking.

The driving range for BEVs can be reduced by 30 to 50 per cent in winter temperatures. Since the average driving distance per day in Calgary is around 50 km, this is not a problem for typical urban trips.



Mercedes-Benz S-Class plug-in hybrid

Plug-In Hybrid Vehicles (PHEV)

Unlike BEVs, Plug-in Hybrid Electric Vehicles (PHEVs) have smaller batteries, and pair an electric motor with a gas-powered engine. Examples include the Toyota Prius Prime and Mitsubishi Outlander.

PHEVs have pure electric ranges between 25 km to 85 km, though the gas-powered engine may provide back-up power to the electric motor at highway speeds to conserve battery power. Once the pure electric range is exceeded, the gas-powered engine and electric motor work in tandem to provide hundreds of kilometers of additional range.

The battery in PHEVs can be charged externally at lower-power charging stations, or internally by the gas-powered engine and use of regenerative brakes.



Hyundai Ioniq

Hybrid Vehicles

Hybrid vehicles are a mature technology, popularized by the Toyota Prius. Numerous manufacturers have begun offering hybrid versions of their vehicles, including the Ford F-150 starting in 2020.

Hybrids have small batteries and electric motors that supplement the power of a gas-powered engine to improve fuel efficiency. Hybrid vehicles cannot be charged externally, instead relying on the gas engine and regenerative braking.



Toyota Mirai

Hydrogen Fuel Cell Vehicles

Hydrogen fuel cell vehicles are also considered an electric vehicle, where hydrogen effectively acts as a liquid battery. A limited number of hydrogen vehicles are available for sale, such as the Honda Clarity and Toyota Mira. Availability of fuel cell passenger vehicles will continue to be limited in Alberta for some time due to a lack of fueling stations.

Hydrogen vehicles offer faster refueling times than BEVs, and currently provide around 500 to 600 km driving ranges, similar to several Tesla BEVs.

Hydrogen sourced from natural gas, which accounts for 95 per cent of all hydrogen today, does not offer a significant lifecycle GHG reduction relative to diesel fuel. Hydrogen sourced from renewable natural gas (e.g. gas captured from landfills) likely would offer GHG reduction benefits however.



Nissan e-NV200 electric van

Medium and Heavy Duty Electric Trucks

Unlike passenger cars and light duty trucks, it is not yet clear what fuel technologies will become most common in the medium and heavy-duty trucking sector. This sector includes delivery trucks, semi-trailers, garbage trucks and other commercial vehicles.


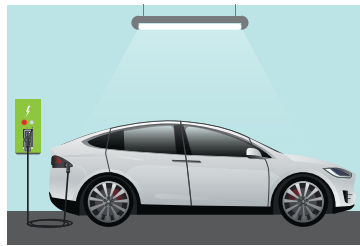
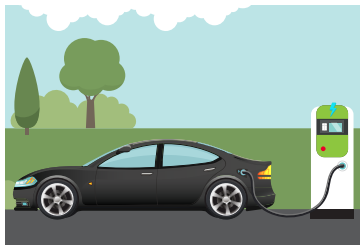
A number of established and startup companies are actively developing electric or fuel-cell medium and heavy-duty trucks, with some already available on the market. McKinsey Energy Insights (MEI) suggests that sales of medium duty electric trucks could accelerate rapidly, as they offer lower lifecycle costs to businesses.

“A number of established and startup companies are actively developing electric or fuel-cell medium and heavy-duty trucks, with some already available on the market.”

Electric Vehicle Charging Infrastructure

There are several types of electric vehicle charging stations for cars, SUVs and light duty trucks, some of which are limited to certain types or models of electric vehicles. Figure 1 below summarizes the three basic types of charging stations, their electricity requirements, purchase/installation costs, and what vehicles can use them.

FIGURE 1

TYPES OF EV CHARGING STATIONS		
AC LEVEL ONE	AC LEVEL TWO	DC FAST CHARGE
		
VOLTAGE 120V 1 - PHASE AC	VOLTAGE 208V or 240V 1 - PHASE AC	VOLTAGE 208V or 480V 3 - PHASE AC
AMPS 12 - 16 Amps	AMPS Typically 32 Amps	AMPS <125 Amps (Typ. 60 Amps)
CHARGING LOADS 1.4 to 1.9 kW	CHARGING LOADS Typically 3.6 kW to 7.2 kW	CHARGING LOADS 50 kW to 350 kW
CHARGE TIME FOR VEHICLE 5 - 8 km of Range per Hour	CHARGE TIME FOR VEHICLE 30 km of Range per Hour	CHARGE TIME FOR VEHICLE 80% Charge in 15 - 60 minutes

It is worth noting that wireless versions of Level 2 are starting to become available, with losses as low as 10 per cent. This provides a strong synergy with future autonomous vehicles, which could charge without needing a human attendant.

Based on research conducted for The City of Calgary in 2015, the number of publicly accessible charging stations that should be in place over the next four years to support electric vehicle growth in Calgary are shown in Table 1.

TABLE 1

CALGARY TARGETS FOR PUBLICLY ACCESSIBLE CHARGING STATIONS		
Charging Station Type	2018 Public Supply	Target Range
Level 2 Charger	Approximately 100	125 to 250
DC Fast Charger	One (plus 3 dealerships)	6 to 12

The approximately 100 Level 2 stations in Calgary are provided mostly by private businesses for customers, along with a few in downtown Calgary Parking Authority parkades. In addition to the three DC Fast Charger stations in Calgary, additional Tesla Supercharger stations are available at CrossIron Mills north of Calgary.

A distinction needs to be made between Tesla and non-Tesla stations. Tesla stations can only be used by Tesla vehicles. All other BEVs and PHEVs can use universal charging stations produced by other manufacturers, though most PHEVs are limited to using Level 2 chargers.

The targets in Table 1 allow for a mix of Tesla and non-Tesla charging stations. Given that Tesla is independently installing Supercharger stations on highways across Canada, The City should prioritize facilitating the installation of non-Tesla DC Fast Charging that enable regional travel for all BEVs.

Hydrogen Fueling Stations

From a user perspective, hydrogen fueling stations are virtually identical to conventional gas stations. There are currently no public hydrogen fueling stations in Calgary, and few across Canada. The cost to install one hydrogen fueling station is also high, running between \$1 million to \$5 million per station.

Hydrogen fueling solutions for some corporate fleets may be more cost effective if hydrogen is produced as a by-product at facility where hydrogen-powered vehicles can make out-and-back trips to refuel at that location.



Emerging Charging Technologies

Two emerging charging technologies The City of Calgary will continue to track are in-road charging and vehicle-to-grid charging.

In-road charging is currently being tested in multiple countries, including Sweden (pictured below). Segments of electrified road would allow vehicles to recharge while driving, increasing driving range while reducing the size of batteries required.

Vehicle-to-grid charging would allow utilities to request electricity back from vehicles, if permitted by the owner, to flatten demand peaks. This would assist the growth in renewable energy as vehicles could provide battery storage. EV owners could potentially also generate revenue if time-of-day pricing were implemented in Alberta in the future. EV owners could buy cheap electricity during low demand periods and sell it back to the grid for a profit during high demand periods.



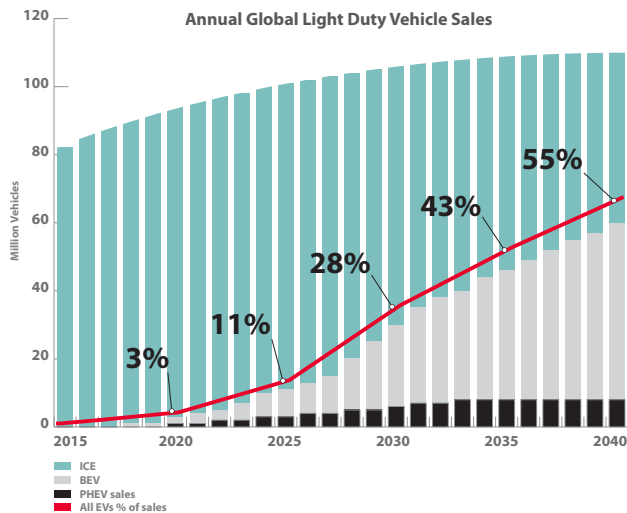
“Two emerging charging technologies The City of Calgary will continue to track are in-road charging and vehicle-to-grid charging.”

Benefits of electric vehicles

Electric vehicles (EVs) are a rapidly emerging technology that can provide significant benefits to citizens and businesses.



Bloomberg New Energy Finance (BNEF) expects “that around 2024, upfront cost parity will kick-start the mass adoption of EVs, which will reach 28 per cent of global vehicle sales in 2030.”¹ This conclusion is based off BNEF research that has shown “batteries are the single most expensive component in an EV and average prices per kWh fell 79 per cent from 2010 to 2017.”² BNEF forecasts are based on economic fundamentals, and do not assume any new government measures or incentives.



Source: Bloomberg New Energy Finance, 2018

BNEF states that much more investment in charging infrastructure is needed globally to support the projected demand for EVs. “The inability to charge at home in many local and regional markets is part of the reason why we forecast EVs making up just over a third of the global car fleet in 2040, and not a much higher figure.”³

McKinsey Energy Insights (MEI) projects a similar, though slightly slower adoption rate than BNEF, and suggests that the adoption rate for light duty electric trucks will occur at roughly half the pace of passenger cars.⁴ Sales for medium and heavy-duty electric trucks may be faster or slower than light-duty trucks. Since 80 per cent of new vehicle sales in Alberta are trucks and SUVs, EV adoption rates in Calgary could therefore be slower than the North American average without other measures or incentives that encourage adoption.

Based on these projections and goals, The City is estimating healthy but not leading-edge growth in EVs in Calgary, with 10 per cent vehicles estimated to be electric in 2030, and 50 per cent in 2050. These rates would need to be revised upwards if new federal or provincial programs designed to increase EV adoption are announced, or if battery prices decline faster than expected. The Government of Canada is expected to release its Zero Emission Vehicle Strategy in early 2019.

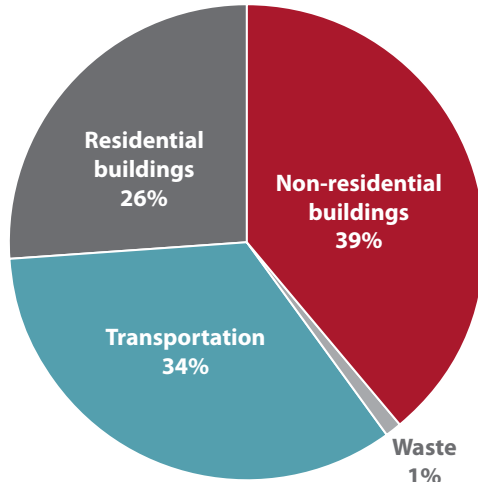
¹ BNEF Theme: Electric Vehicle Cost Competitiveness. Published: 2018-08-15 10:20:00.0 GMT
² BNEF Theme: Long-Term Implications of EV Adoption. Published: 2018-08-06 14:02:18.618 GMT
³ BNEF Electric Vehicle Outlook 2018: <https://bnef.turtl.co/story/evo2018?teaser=true>
⁴ MEI Global Energy Outlook 2019

Emissions Reductions

Transportation accounts for 34 per cent of greenhouse gas (GHG) emissions in Calgary, primarily from personally-owned cars, pickup trucks and SUVs as shown in Figure 3. Electric vehicles offer the single largest opportunity to reduce GHG emissions in Calgary and can also help to reduce local air pollution.

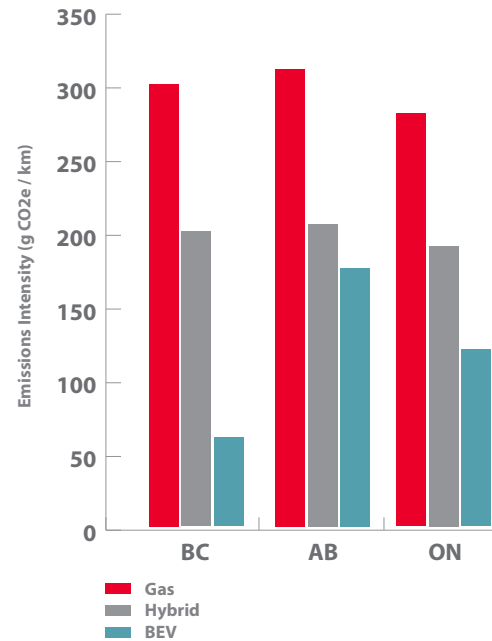
FIGURE 3

Calgary community-wide GHG emissions by sector | 2017



Although the phase-out of coal from Alberta's electricity grid will further improve the environmental benefits, EVs can reduce GHG emissions even using power from Alberta's current grid. A 2015 analysis by Simon Fraser University found that the preference for most EV owners is to plug in their vehicles when they return home from work, during periods of peak electrical demand. During peak times, Alberta increases the use of natural gas and imports hydro power from British Columbia, reducing the carbon-intensity of the electricity. The resulting GHG savings are shown in Figure 4.

FIGURE 4



Source: *Electrifying Vehicles – Insights from the Canadian Plug-in Electric Vehicle Study*, Simon Fraser University, 2015

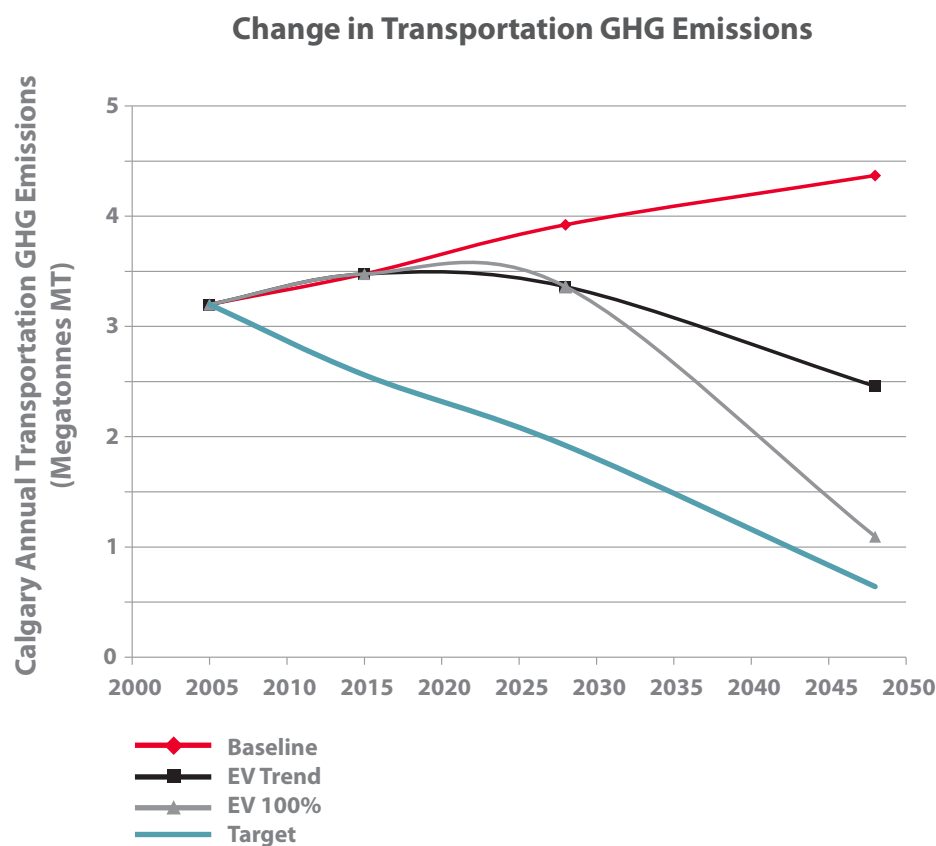
EDC Associates, an independent energy consulting firm, indicates the majority of Alberta's coal power plants will be converted to natural gas by the mid to late 2020s, which will improve GHG reductions from EVs in Alberta.

As part of the Climate Resilience Strategy and Action Plan, The City analyzed the potential GHG reductions from EVs to the year 2050. The red line in Figure 5 shows the baseline transportation emissions, which would continue to grow as Calgary's population grows. The blue line shows the Council approved GHG reduction targets for Calgary (80 per cent reduction from 2005 levels by 2050). The black line indicates the GHG reductions from electric vehicles following the marked-based adoption rates discussed above, while the grey line shows the reduction potential if 100 per cent of vehicles were electric by 2050.

Based on the grey line, the estimated GHG reduction between now and 2050 would be 65 megatonnes. This is approximately four times the GHG reduction potential of the combined transit, walking and cycling projects planned for Calgary over the same timeframe.

The City of Calgary analysis includes an estimated 10 per cent increase in embedded carbon emissions from the manufacture of batteries for the electric vehicles. As shown in Figure 5, the savings from the on-road use of EVs more than compensates for the battery manufacturing process.

FIGURE 5



Local Economic Advantages

In 2018, the University of Leeds and University of Calgary published *The Economics of Low Carbon Development: Calgary, Canada*, which examines the economic case for Calgary switching to a more energy efficient and lower carbon development path. It provides both economic and broader evaluations on the desirability of different options to reduce Calgary’s emissions.

Looking at electric vehicles, the report found that the most cost effective of these actions is shifting private vehicle owners to hybrid cars, which currently have a relatively small price premium, and electric vehicles, which are currently priced higher relative to convention vehicles, but decreasing in price quickly, as discussed above. The report also found that switching to electric and hybrid vehicles would create new economic investment and employment opportunities in Calgary, as shown in table 2.

TABLE 2

ACCELERATE THE SHIFT TO LOW EMISSIONS VEHICLES PROJECTIONS ⁸				
Total potential GHG reductions to 2050 (Mt)	Total Investment (Billion \$)	Annual Energy Savings (Billion \$)	Total Job Creation Potential (Thousand job years)	Payback period on original investment (Years)
60.3	59	3.2	291	18.4

Factors supporting electric vehicle adoption

A recent Environics study found there is growing interest in electric vehicles in Calgary.



Even with growing interest in EVs, research across North America has identified several factors that would support or discourage the purchase of electric or other low emission vehicles. These include:

- availability of home, workplace and public charging stations
- purchase incentives (financial or non-financial),
- having a variety of vehicle models to choose from, and
- programs to increase awareness of low emission vehicles.

These factors are outlined over the next several pages.

More than one-third of people identified as potential early adopters in Calgary will consider purchasing an EV. This number increases to almost 50 per cent for potential early adopters under the age of 45, illustrating that younger, more tech-savvy generations have a strong interest in EVs. Contributing to environmental health is the main appeal; higher prices and access to charging stations are the main concerns.⁹

Availability of Charging Infrastructure

Many studies have shown that the strategic placement of public charging stations can reduce the range anxiety of EV drivers. That is not to say that EV models available today are ill-equipped to provide for the daily driving needs of a large majority of consumers. Roughly 70 per cent of Calgarians drive less than 50 km per day on weekdays, and 61 per cent drive less than 50 km on an average weekend day. Only 9 per cent of Calgarians drive more than 100 km per day on average.¹⁰

EV users do the majority of their charging at home, so it is important to proactively support the deployment of home charging as part of a broader strategy to promote EV use in Calgary. This includes working with developers, utilities, commercial enterprises and citizens to collaborate and explore policy approaches to remove barriers to home charging. Charging in existing multi-family residential buildings and is an issue where municipal government and local utilities can be most actively involved.

A strategic approach to the siting and installation of public charging infrastructure in these early days of EV adoption can achieve several benefits. First, the stations help to increase the driving range and reduce any potential anxiety around being unable to charge their vehicles. Public charging stations can also help meet the needs of EV owners who cannot charge at home, which is particularly an issue for older multi-family dwellings. Finally, and equally important, is the ability of the stations to build awareness amongst the general public that EVs can be a safe and reliable option for their next vehicle purchase. Helping to provide citizens with an effective public EV charging network is a key role cities can play to support EV adoption. Municipal governments can link potential charging station sponsors with organizations and venues that want to install charging infrastructure.

⁹ Pollution Probe. (2015). Electric Mobility Adoption and Prediction (EMAP) – Calgary and Edmonton. Retrieved from: <http://www.pollutionprobe.org/publications/electric-mobility-adoption-and-prediction-emap-calgary-and-edmonton/>

¹⁰ Pollution Probe. (2015). Electric Mobility Adoption and Prediction (EMAP) – Calgary and Edmonton. Retrieved from: <http://www.pollutionprobe.org/publications/electric-mobility-adoption-and-prediction-emap-calgary-and-edmonton/>



Electric vehicle availability is expected to increase significantly over the next five years.

Purchase Incentives

Purchase incentives are designed to bring the purchase price of EVs and PHEVs in line with gasoline-powered vehicles today. Within Canada, British Columbia and Quebec currently offer upfront rebate programs to incentivize the purchase of EVs. For The City of Calgary, this option is not feasible given the constrained local tax resources and a broad array of spending needs. Provincial and federal governments are far more likely to be able to offer these types of purchase subsidies.

Although municipal governments tend to have fewer financial resources to draw from than higher levels of government, they have a comparative advantage in the areas of policy approaches such as reduced parking fees, access to high occupancy vehicle lanes, building codes and permitting. These types of incentives have the advantage of being neither costly nor time-consuming to implement and fall within The City's direct control.

Variety of EVs Available for Purchase

Electric vehicle availability is expected to increase significantly over the next five years. According to BNEF, the number of EV models available is set to jump from 155 at the end of 2017 to 289 by 2022.¹¹

Currently in the Calgary market, there has been a lack of EVs available for sale. Within Canada, most EVs are sold in jurisdictions with purchase incentives right now, making it harder to get EVs in Alberta. This is seen as a short-term issue as more auto manufacturers are introducing new model EVs in greater numbers over the upcoming years.

Increasing the variety of EVs available for purchase in Calgary is primarily the responsibility of automobile manufacturers and dealerships. The ability of municipal governments to directly influence the supply of electric or other low emission vehicles in their communities is limited. Investments in public charging infrastructure and non-financial purchase incentives can have the indirect effect of creating an appealing market for EV sales however. Federal policies or incentives could also help to level the playing field across provinces.

¹¹BNEF Electric Vehicle Outlook 2018: <https://bnf.turl.co/story/evo2018?teaser=true>

Information and Awareness

A major barrier to EV adoption is the lack of consumer education surrounding EVs, especially on issues like performance and total cost of ownership. Consumer hesitation to invest in emerging technologies is a barrier that all businesses and governments grapple with frequently. Providing educational resources to consumers and other stakeholder groups is a common approach used to tackle this challenge.

The City of Calgary can play an active role in promoting EV adoption and raising awareness. These measures include the establishment of information and awareness campaigns, marketing activities, the provision of buyer guides and total cost of ownership tools, education and training activities for vehicle salespeople, engaging public figures in advocacy efforts, and curriculum development.

The City is also uniquely positioned to convene multi-stakeholder groups that include city planners, automakers, utilities, infrastructure suppliers, academic and research institutions, and representatives from higher levels of government.



Our Electric Vehicle Strategy

The City of Calgary developed the Electric Vehicle Strategy based on a combination of consultant research, in-house technical analysis, and a series of stakeholder engagement sessions.

How the Plan Was Developed

Preliminary findings from The City's research and analysis were presented to Council as part of The City's Future of Transportation report. A broad range of stakeholders were engaged throughout the development of the strategy, including electrical utilities, charging providers, developers and homebuilders, the Federation of Calgary Communities, Calgary Economic Development, the Calgary Parking Authority, post-secondary institutions, and electric vehicle owners.

This work was further expanded upon by a 2017 study, The Economics of a Low Carbon City: Calgary, for The City which reviewed and verified the GHG reduction potentials for electric vehicles in Calgary. The study also developed an economic analysis for EVs and all other climate change mitigation actions that Calgary could undertake until 2050. The study was jointly produced by Leeds University in the UK and the University of Calgary.

The City of Calgary also hosted a Natural Resources Canada (NRCAN) zero emission vehicle workshop in January 2018. This provided valuable insights to consider in the development of the EV Strategy and enabled The City of Calgary and many stakeholders from across western Canada to provide input towards NRCAN's and the Federal Government's Zero Emission Vehicle strategies.

Overall, development of the EV Strategy was proactive in meeting the evolving mobility needs of Calgary's citizens, including its commuters and businesses. The EV Strategy situates electric vehicle technology as a component of a broader, multimodal sustainable transportation strategy that contributes to the climate change work undertaken by The City.

Recommended Actions

The EV Strategy is an extension of actions in the Climate Resilience Strategy and Actions Plan that was approved by City Council in June 2018. The Climate Resilience Strategy outlines The City's actions to improve energy management and reduce greenhouse gas emissions, as well as implement risk management measures in preparation for current and future climate impacts.

The EV Strategy was developed as part of the Climate Resilience Program, since it represents one of the greatest opportunities to reduce greenhouse gas emissions from transportation.

The objectives of the EV Strategy are to:

- respond to the growing demand for electric vehicle infrastructure and services,
- encourage/support faster adoption of electric vehicles to aid in reducing greenhouse gas emissions,
- align The City's approach to policies from other levels of government,
- build partnerships across Alberta to provide an electric vehicle charging network within the province that connects to other provinces or states,
- establish what role The City, partner organizations and the private sector should play in providing electric vehicle infrastructure and services, and
- increase awareness and create enthusiasm amongst the public and industry about electric vehicles.

Given those objectives, the following actions have been identified as critical first steps that The City needs to undertake over the next one to two business cycles. It should be noted that the top-level actions have been previously approved by Council through the Climate Mitigation Action Plan in June 2018 (Section 4 of the Climate Mitigation Plan). The additional actions contained below provide additional detail on how and when the top-level actions will be implemented.

The key action areas are:

Topic Area: Support and enable the uptake of electric vehicles

ACTION	LEAD BUSINESS UNIT	TIMEFRAME
Partner with the private sector and other government agencies to implement local and regional electric vehicle charging infrastructure.	Transportation Planning	
•Participate in the planning and development of a privately owned-and-operated Southern Alberta EV Fast Charging Network.		2018 – 2020
•Partner with private sector companies to expand Level 2 and fast charging public charging stations at City or Civic Partner facilities.		2018 – 2020
•Evaluate the need for publicly accessible charging infrastructure that is inclusive of all mobility choices such as electric bikes, and if appropriate, incorporate such charging infrastructure with other charging locations at City facilities.		2019 – 2022
ACTION	LEAD BUSINESS UNIT	TIMEFRAME
Work with the private sector and non-profit organizations to develop an electric vehicle education program for the general public and businesses.	Transportation Planning	
•Develop web-based and in-person educational programs and materials about electric vehicles and charging options for the general public and businesses.		2018 – 2020
•Explore the creation of an Electric Vehicle Showcase Centre, in partnership with the private sector, to provide the public and businesses with a hands-on opportunity to learn about and test drive electric vehicles.		2023 – 2026
ACTION	LEAD BUSINESS UNIT	TIMEFRAME
Collaborate with the City of Edmonton, the Province, local development industry and utility companies to identify and analyze options to improve access to home charging for electric vehicles.	Transportation Planning	
•Create an EV Readiness best practices website/program for new residential buildings and retrofits.		2019 – 2020
•Analyze and implement potential cost-effective EV Ready requirements (e.g. empty conduit, spare electrical capacity) for new single-family homes, multi-family residential and commercial buildings, building on best practices from other jurisdictions.		Analyze 2018 – 2020 Implement 2020 – 2022
•Design and pilot potential options for publicly accessible community charging hubs in locations where home charging is not an option.		Analyze 2018 – 2020 Pilot 2020 – 2022

Topic Area: Support and enable the uptake of electric vehicles

ACTION	LEAD BUSINESS UNIT	TIMEFRAME
Monitor and provide input to new electric vehicle policies and regulations developed by other orders of government.	Transportation Planning	
<ul style="list-style-type: none"> •Participate in Federal and Provincial electric vehicle working groups to guide policy direction. 		2018 – 2026
<ul style="list-style-type: none"> •Advocate to the Province of Alberta to replace declining fuel tax revenue (due to EV adoption) with alternative road pricing mechanisms (e.g. vehicle-km-travelled tax) to contribute to municipal infrastructure funding, and to continue to encourage non-automobile travel choices. 		2023 – 2026
<ul style="list-style-type: none"> •Explore and, if appropriate, advocate for the development of a vehicle scrappage program that encourages decommissioning of older, higher emission vehicles. 		2023 – 2026

ACTION	PARTICIPATING BUSINESS UNITS	TIMEFRAME
Streamline municipal and utility processes to support public and private electric vehicle projects and reduce barriers.	Environmental & Safety Management Planning & Development Corporate Analytics & Innovation	
<ul style="list-style-type: none"> •Amend policies and bylaws to better enable businesses to install and operate Level 2 and fast charging stations, and associated facilities. 		2019-2020
<ul style="list-style-type: none"> •Streamline information sharing between The City and ENMAX Power on electrical permit approvals for new EV chargers to enable ENMAX Power to proactively plan infrastructure upgrades. 		2018-2019
<ul style="list-style-type: none"> •In collaboration with ENMAX, other utilities and stakeholders, advocate to the Province for development of new electricity rate codes designed to support fast charging for passenger and fleet vehicles 		2018-2020
<ul style="list-style-type: none"> •Partner with taxi, car-sharing and ride-sharing companies to increase the percentage of electric vehicles in their fleets 		2019-2026

The key action areas are:

Topic Area: Support and enable the uptake of electric vehicles

ACTION	LEAD BUSINESS UNIT	TIMEFRAME
Partner with post-secondary institutions and the private sector to advance research and field testing of low emission technologies, supporting infrastructure and policy direction.	Transportation Planning	
•Engage in research to understand short and medium-term public charging infrastructure requirements, in response to growing electric vehicle adoption and technology advancements.		2018 – 2026
•Continue to monitor developments in hydrogen fuel cell vehicles and fueling infrastructure to determine if it could become an affordable and consistently low-carbon transportation option in the future.		2018 – 2026

ACTION	PARTICIPATING BUSINESS UNITS	TIMEFRAME
Evaluate and incorporate fully-electric, electric hybrid, and other low carbon vehicle technologies into City fleets and facilities.	Environmental & Safety Management Corporate Analytics & Innovation Calgary Transit Fleet Services Waste & Recycling	2018-2026

Topic Area: Support and enable the uptake of low emissions vehicles in commercial fleets

ACTION	LEAD BUSINESS UNIT	TIMEFRAME
Monitor and provide input to new medium- and heavy-duty low emission vehicle policies and regulations developed by other orders of government.	Transportation Planning	
•Participate in Federal and Provincial goods movement working groups to guide policy direction.		2018 – 2026
•Participate in pilot projects with other orders of government and/or the private sector to test energy efficiency and alternative fuel technologies and/or share data from completed studies.		2023 – 2026

ACTION	LEAD BUSINESS UNIT	TIMEFRAME
Develop a program to support the assessment of alternative fuel technologies for commercial vehicle fleets, and provide education information and emerging regulations from other orders of government.	Environmental & Safety Management	Ongoing

ACTION	LEAD BUSINESS UNIT	TIMEFRAME
Partner with post-secondary institutions to advance Calgary-specific research into goods movement GHG reduction and energy efficiency actions and supportive policies.	Transportation Planning	
•Support studies to identify and prioritize actions municipalities and/or the private sector can take to reduce fuel use and GHG emissions from the trucking sector.		2018 – 2026
•Monitor developments in hydrogen fuel-cell technology and fueling infrastructure to determine if it could become a widespread, affordable and consistently low-carbon fuel source for medium and heavy-duty fleets in the future.		2018-2026

Additionally, The City has also participated in the Government of Canada Transportation 2030: Green and Innovative Transportation. This initiative is the creation of a National Zero-Emissions Vehicle Strategy which is slated to be released by the end of 2018. The City will also review align where possible to the actions associated to this strategy.

Implementation and next steps

The Calgary EV Strategy is a living document where future revisions of the plan will be improved by accounting for new economic realities, new and improved technologies and overall ambition on reducing emissions.



The business units identified as accountable for actions in this document will be leading the action implementation. Details and prioritization of the actions may change to reflect emerging challenges and opportunities, as well as funding made available through different levels of government or partnership with the private sector and institutions.

Building on existing models for climate governance, the EV actions will be part of the overall Climate Resiliency Program governance and engagement model. Within this approach, a climate resiliency working group will be established to bring together key organizations and actors from across The City, the public, private and third-party sectors to implement these actions.

The effectiveness of implementation is dependent on the extent to which actions are incorporated into existing plans, policies, standards and programs at The City. Unplanned or disruptive changes and unforeseen circumstances will also shape The City's approach, including technological advancements, energy price changes, grant funding, which will all be considered in future recommendations and updates.

Monitoring & Reporting Progress

An important part of this strategy is to monitor, measure, report and publicly communicate Calgary's progress on the implementation of actions. As part of the Climate Program, The City will monitor and report the progress of EV actions annually to Council.

Also, The City of Calgary is a member of the Electric Vehicles Initiative (EVI) Global EV Pilot City Programme. The EVI is a voluntary global cooperative initiative composed of 32 cities from 10 different countries. The EVI program will also enable sharing of information, best practices and lessons learned between cities.

As part of The City's membership in the program, Calgary will annually report on the following statistics to contribute to the EVI City Data Report.

- The number of electric and plug-in hybrid vehicles registered in Calgary
- The number of publicly accessible Level 2 and DCFC charging stations
- Charging loads and activity at City-owned public charging stations
- The number of home and workplace charging stations, subject to data availability

The City of Calgary will also provide an annual summary for the EVI Urban EV Policy Support Overview report, outlining projects and supporting measures undertaken to enable EV adoption in Calgary.



