ELECTRIC MOBILITY CANADA
ACCELERATING ELECTRIC TRANSPORTATION

MOBILITÉ ÉLECTRIQUE CANADA
ACCÉLÉRER L'ÉLECTRIFICATION DES TRANSPORTS

Information and Recommendations for ECCC

on its 2022 ZEV Consultation: Achieving a Zero-Emission Future for Light-duty Vehicles

Submitted by

Electric Mobility Canada – Mobilité Électrique Canada

January 21, 2022

To:

The Honorable Steven Guilbeault
Environment and Climate Change Minister
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We thank the Minister for giving Electric Mobility Canada (EMC) the opportunity to participate in this very important consultation on the future of electric mobility in Canada. We applaud the government's will to accelerate the zero-emission vehicle (ZEV) deployment process, because the climate change crisis needs action without delay. We will be there to support the Minister, department staff and civil servants as we all rise to the challenges and opportunities in front of us.

Best regards,

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About Electric Mobility Canada
EMC is a national membership-based not-for-profit organization dedicated exclusively to the advancement of electric mobility as an exciting and promising opportunity to fight climate change and air pollution while stimulating the Canadian economy. EMC's mission is to strategically accelerate the transition to electric mobility across Canada.

Established in 2006, EMC is one of the very first electric mobility associations in the world. It represents organizations working to electrify transportation across Canada. Members representing more than 70 billion dollars a year in revenue include vehicle manufacturers (from light to heavy-duty to off-road), utilities, charging infrastructure manufacturers, charging suppliers and networks, research centres, technology companies, mining companies, fleet managers, unions, cities, universities, dealers associations, environmental NGOs and EV owners associations. They range from SMEs to Multinationals and work from British Columbia to Atlantic Canada.

EMC is the national voice of electric mobility in Canada.

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1 EMC's ZEV Recommendations

In the fall of 2021, Electric Mobility Canada launched the 2030 EV Action Plan[1], an industry-led project intended to ensure Canada succeeds in the transition to electric mobility. The result of months of consultations with Canada's leading experts and stakeholders, the 2030 EV Action Plan contains 32 industry-backed recommendations to help advance Canada's light-, medium-, heavy-duty and off-road electric mobility industry. It is the most recent series of recommendations from the most experienced organization in Canada on the subject of transportation electrification. We start with this because we believe it provides a strong basis for your ministry's consideration of the major questions posed by this consultation, and underscores the recommendations provided by industry to allow Canada to achieve decarbonization of the transportation sector.

The recommendations are divided into 6 pillars:

1. Light-Duty EV Consumer Adoption
2. Medium, Heavy-Duty and Off-Road Fleet Electrification
3. National EV Infrastructure Deployment Plan
4. 2030 Electric Vehicle Strategy and EV Regulation
5. Domestic EV Jobs and Manufacturing Capacity
6. Federal Leadership

EMC 2030 EV Action Plan: 6 pillars to support EV transition in Canada
See Appendix 1 for full details on each recommendation

1.1 Pillar 1: Light-Duty EV Consumer Adoption

- **Recommendation #1 -** Continue purchase incentives for new passenger EVs but focus on value for electric-only range to include long range electric cars, SUVs and pickup trucks.
- **Recommendation #2 -** Have the most polluting vehicles fund EV incentives for new vehicles
- **Recommendation #3 -** Offer incentives for used EVs
- **Recommendation #4 -** Provide a low-and-modest income household purchase incentive "top-up"
- **Recommendation #5 -** Make it easier for taxi, ride-hailing and carshare companies to go electric
- **Recommendation #6 -** Offer low-interest loans to first time EV buyers
- **Recommendation #7 -** Support consumer EV education

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1.2 Pillar 2: Medium, Heavy-Duty and Off-Road Fleet Electrification

- **Recommendation #8 -** Make electric buses, trucks and off-road vehicles more affordable
- **Recommendation #9 -** Work across jurisdictions to accelerate electric transit and school bus adoption
- **Recommendation #10 -** Electrify vehicle fleets in ports, airports and similar federal facilities

1.3 Pillar 3: National EV Infrastructure Deployment Plan

- **Recommendation #11 -** Set targets for EV charging installations, for all types of vehicles
- **Recommendation #12 -** Make one-million condo and apartments EV ready over five years
- **Recommendation #13 -** Add EV charging requirements to national building codes
- **Recommendation #14 -** Put underutilized government lands to work: establish public charging “hubs”
- **Recommendation #15 -** Provide a connection rebate to cover costs levied by utilities when building large-scale charging stations
- **Recommendation #16 -** Include EV charger installation in home energy retrofit programs

1.4 Pillar 4: 2030 Electric Vehicle Strategy and EV Regulation

- **Recommendation #17 -** Immediately Launch a Canadian EV Strategy
- **Recommendation #18 -** Adopt a national ZEV Mandate for passenger vehicles requiring 100% ZEV sales by 2030.
- **Recommendation #19 -** Implement strong tailpipe emission standards for all types of vehicles
- **Recommendation #20 -** Adopt a national ZEV Mandate for trucks and buses requiring 100% ZEV sales by 2040 at the latest.
- **Recommendation #21 -** Develop a plan to help rural, northern, First Nations and Inuit communities go electric
- **Recommendation #22 -** Offer an “green scrap-it program” for all types of vehicles

1.5 Pillar 5: Domestic EV Jobs and Manufacturing Capacity

- **Recommendation #23 -** Support and attract EV-related business and investment in Canada
- **Recommendation #24 -** Focus R&D investment on strategic EV technology

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- **Recommendation #25 -** Work with provinces to fast-track EV-only service technician training
- **Recommendation #26 -** Support retraining programs and help workers make the transition to zero carbon industry
- **Recommendation #27 -** Take a North American approach to EV manufacturing and supply chains

1.6 Pillar 6: Federal Leadership

- **Recommendation #28 -** Establish a “Privy Council Office for Electric Transport”
- **Recommendation #29 -** Make government & parliamentarian EV awareness and education a priority
- **Recommendation #30 -** Convene electricity stakeholders to develop EV solutions for our grid
- **Recommendation #31 -** Ensure federal fleets and buildings are 100% electric and EV-ready
- **Recommendation #32 -** Establish a Zero Emission Zone in the City of Ottawa

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2 Answers to questions from ECCC's discussion document

Note: In our answers to the questions, we sometimes reference recommendations from the 2030 EV Action Plan with the following tag: ***See Recommendation #***

2.1 What should be the approach to achieving 100% in 2035, including ZEV sales of at least 50% in 2030?

The government's approach should be based on our 2030 EV Action Plan (see Appendix 1) that makes all the necessary recommendations to be able to reach and even surpass these targets. We recommend that Canada aims for 100% ZEV sales by 2030 because Canada is lagging in GHG emissions reduction and in ZEV adoption. It is critical to set a bold target and back that target with a strong regulatory regime to assure compliance because of the long lifecycle of internal combustion engine vehicles.

There are six ways to ensure we reach these targets:

a) Purchase incentives: According to the Electric Vehicle Outlook 2021 from Bloomberg New Energy Finance[2], "under the Economic Transition Scenario, passenger EV sales continue rising quickly as battery prices fall. Unsubsidized price parity between EVs and internal combustion vehicles is achieved in most segments and countries by the late 2020s, and some reach this point much sooner". We must financially help fill the initial price difference between a gas and an electric vehicle like we have done in the past for hybrid vehicles (starting in 2006), solar energy and wind power. These technologies are now financially competitive and don't need subsidies like they used to when they first came to market.

b) Consumer education and worker training: Because so many misconceptions are still prevalent in Canadian consumers' perception of EVs, the government needs to support EV education through groups like Plug'n Drive, EV Societies, AVÉQ and others that talk directly to consumers in order to help Canadians understand and appreciate the benefits of EVs. It is also critical to support training and retraining programs to help Canadian workers find quality, sustainable jobs in this new field that is the future of the automotive industry in Canada.

c) Develop and implement a National EV Infrastructure Deployment Plan: To ensure that Canadians can confidently travel in every region of the country, from highways and cities to rural and remote areas, we must have a well-funded plan that will take into consideration all aspects and realities of Canadian geography and demography. Other countries and leading Canadian provinces like British Columbia and Québec are showing that it's feasible and Canada can become a leader.

d) **Regulate the transition to EVs:** A federal ZEV mandate and a strong tailpipe emission standard are critical to ensuring the availability of the makes and models of ZEVs needed to attract consumers to ZEVs and make sure Canada reaches and even surpasses its ZEV adoption and GHG emission reduction targets. Not only will regulation help Canada reach its targets, but it will also provide market certainty that will be helpful to develop a thriving Canadian EV industry.

e) **Help develop a Canadian EV supply chain:** To help accelerate the development of a Canadian EV industry, we must support a Canadian EV supply chain. Canada has the qualified workforce, the research and development network, the critical minerals and the clean grid that makes it a potential future global EV industry leader, but time is of the essence since many other regions of the world are moving quickly to develop their own EV industries. That's why EMC and other organizations recently launched *Accelerate: Canada's ZEV Supply Chain Alliance*[3] in 2021. Its mission is "to bring together key players across Canada, from mining to mobility, R&D to commercialization, vehicle assembly to infrastructure. Accelerate is a national alliance with a mandate to organize and align Canada's ZEV supply chain to ensure its growth and success."

f) **Show federal leadership: Canadians want to see the government practice what it preaches.** Through a series of policies and practices, the government can become a global governmental leader by helping its elected officials, employees, and contractors have access to EVs and EV infrastructure. ***(See Recommendations #28-32)***

2.2 In addition to ZEV sales targets of at least 50% by 2030 and 100% by 2035, are additional interim targets needed to allow Canada to succeed? What should those targets be?

A 2025 interim target with annual reviews is not only needed but necessary for Canada to be sure to reach its ZEV adoption targets. Representatives from the automotive industry have recently argued that a 2025 interim target is not possible because regulation takes a lot of time. Back in 2016, the OEMs presented the exact same argument during the Québec consultation on its ZEV mandate.

In the development of its ZEV mandate, the Government of Québec,

- Launched a series of consultations on a ZEV mandate in the summer of 2016[4]
- Adopted a ZEV mandate on October 26, 2016[5]
- Implemented a ZEV mandate on January 11, 2018[6]

Over a period of 18 months, the Government of Québec was able to consult all key stakeholders, adopt and implement a ZEV mandate. After implementation of the ZEV mandate, **all OEMs have been able to comply, as indicated in the Government of Québec 2018-2020 implementation report published in January 2021**[6]**,** demonstrating that a 2025 interim target is not only

necessary but that it can be developed and, can be reviewed on a yearly basis. A 2025 target is particularly achievable and fair given that Canada has already messaged its ZEV sales targets and it is joining other sub-national jurisdictions in setting achievable interim ZEV sales targets.

2.3 The Government of Canada will be mandating the sale of ZEVs. How should this be designed, and what should be considered to ensure its success? What are the mechanisms in other jurisdictions' mandatory ZEV regulations that should be used or avoided?

If the government of Canada really wants to be a global ZEV leader, it should build on the experience of leading jurisdiction regulations in North America, from California to British Columbia to Quebec. Consistent policy built on existing best practices will be more efficient to implement and better understood by industry players, with certain amendments as outlined below to support more effective program design. EMC believes that adopting these positions will support Canada's leadership on a national ZEV mandate

a) **ZEV credits:** EMC supports the proposal for a credit system where:
   - a ZEV will be worth 1 credit
   - a PHEV, with a range of 80 kilometres or more, is entitled to 0.5 credit.

b) **80 km minimum electric range:** We support the 80 km minimum range requirement to access credits considering that PHEVs have less environmental benefits than ZEVs, particularly in Canada where, during winter conditions, the internal combustion engine of PHEVs operate more frequently. In addition, it has been shown that some PHEV users often do not plug in their vehicles.

For the post Internal Combustion Engine (ICE) sales period:

To ensure that no new ICE vehicles can be sold beyond the ICE sales period, we recommend that:

a) Once we reach 100% ZEV sales, all credit banks must be voided;
b) Canada legislates a ban on the sale of gasoline and non-plug-in hybrid vehicles from 2030-onwards.

Issues for the Federal Government to Avoid

Although current ZEV mandates have had successes as we can see in ZEV sales statistics, present programs have had some issues that the government of Canada can learn from:

- **Giving away too many upfront credits**: This has hampered the acceleration of ZEV sales and is presently slowing down ZEV supply and sales in California and Québec;

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- **Allowing the exchange of credits between states and California:** It has created an imbalance in ZEV sales in certain states. If Canada wants to make sure that ZEVs are available and sold in *every* province in a proportional fashion, it must develop a system that gives a certain number of credits by province and does not allow sales to be concentrated in only select provinces;
- **Keeping the real credit value secret** during exchanges between OEMs has been an issue, since it depreciates the true value of ZEV credits.

2.4 What issues impede adoption of ZEVs in northern and remote communities and by low-income households?

Northern, rural and remote communities
Access to a sufficient supply of ZEVs and charging infrastructure are two common issues for northern and remote communities, but ZEVs can still be successful in those communities, if they are provided with sufficient supply of the correct type of make and model, which currently they are not. The lack of electric Light Duty Trucks and SUVs has been a particular challenge for these communities, but that will soon change with the arrival of more electric SUVs and of electric pickup trucks. Electricity supply can also be a challenge for some communities where the grid is not sufficiently developed or supplied at all in the case of non-grid connected communities.

Low-income individuals and households:
Low-income Canadians often face an initial purchase price for both new electric AND gas vehicles, and face a particular lack of more affordable used EVs. Access to convenient and affordable charging infrastructure can also be an issue if they live in multi-unit dwellings.

2.5 How can the Government address these issues?

- **For northern, remote and rural communities:**

Many rural, northern, and indigenous communities in Canada have not yet had equal opportunity to participate in the benefits of the EV transition due to a lack of charging options and vehicle availability, among other things. It is critical that these barriers be addressed to allow all Canadians a meaningful opportunity to drive electric. ***(See Recommendation #21)***

The government can address these equity issues by ensuring that they have sufficient access to ZEVs. For certain communities where people need to travel long distances away from any charging infrastructure (i.e., in the tundra, the forest, etc.), PHEVs can play a role while EV technologies and infrastructure are being developed and deployed. It is also critical to support

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the development of off-road electric vehicles and charging infrastructure to support rural lifestyles.

- **For low-income individuals and households,**

- Many Canadians, including low-income consumers (about 60% of car purchases) choose the second-hand market. To expand the availability of used EVs first, a national ZEV mandate ensuring more supply of new vehicles is critical and, second, we recommend making EV incentives available to used car buyers to increase EV adoption. ***(See Recommendation #3.)***

- Low- and modest-income Canadians can benefit from the fuel and maintenance savings an electric car provides, but are less likely able to afford a new vehicle. Canada should establish an additional income-tested incentive for new or used EVs, and offer support for the installation of home charging infrastructure. ***(See Recommendation #4.)***

- Since not all Canadians want or need a personal vehicle for their daily commutes, we recommend supporting the electrification of taxi, ride-hailing and carshare companies who are currently facing a cap on how many EV incentives they're able to take advantage of. The government should remove this cap for taxi, ride-hailing, carshare and other companies providing transportation to the public to help them go fully electric by 2030. ***(See Recommendation #5.*** *This is in addition to the important recommendations regarding electrification of transportation contained in other recommendations discussed in this document.)*

- Often, lower-income Canadians have trouble accessing financial support to help cover the initial purchasing cost of an EV. The Canada Infrastructure Bank, or another government agency, should step in to fill this gap and provide low-interest EV loans to consumers who need it most. ***(See Recommendation #6.)***

2.6 What role should PHEVs play in achieving the 100% ZEV sales target?

Canada's ZEV standard should grant a certain percentage of ZEV credits to PHEVs proportional to their electric range, so long as they meet a minimum all-electric range requirement of 80 km. It is important to note that while range for the average EV has increased by approximately 275% in the last 10 years, PHEV electric range has not improved during the same period, remaining predominantly below 50 kilometers for the majority of PHEVs.

This "range stagnation" from PHEVs has recently made them less and less popular with Canadian consumers. While in 2017, PHEVs represented 54% of ZEVs in Québec, in June 2021, they only represented 43%, a drop of 11% in 4 years.

What is even more striking is the fact that during Q2 of 2021:

- **65%** of ZEVs sold in Québec were 100% electric vehicles
- **74%** of ZEVs sold in Ontario were 100% electric vehicles
- **76%** of ZEVs sold in British Columbia were 100% electric vehicles

As EV technology improves, PHEVs are bound to become even less popular and relevant except for specific use cases.

In addition, the International Council on Clean Transportation (ICCT) recently found that PHEV fuel consumption and tail-pipe CO_2 emissions in real-world driving are about ***two to four times higher than advertised.*** [7]

That's why, as stated above, we recommend that PHEVs (with an 80-kilometre range or more) get 50% of the credits allowed for EVs.

2.7 In addition to the measures already implemented by the Government, are there other actions the Government should explore to complement the regulated sales mandate?

- An ambitious Clean Fuel Standard inspired by the California LCFS[8] could help reduce GHG emissions and air pollution. The main advantage of LCFS is its quick impact on reducing these emissions and strong signal for the deployment of charging station investments.
- A financially neutral "feebate" system can help lower GHG emissions and air pollution by discouraging Canadian consumers to buy gas guzzlers. Being financially neutral, such a system can help make the transition to EVs more advantageous both for consumers and governments. There can be some exceptions included in a feebate system for large families or people who need bigger vehicles for their work until larger EVs offers come to market. [9]

2.8 What is the role of other actors, including the private sector, to help complement the regulated sales mandate?

The private sector, from vehicle manufactures to charging station manufactures and networks all have a critical role to play in deploying the supply needed to allow Canadians to choose electric. In addition, fleet managers, rideshare companies and drivers and others making vehicle and parking decisions have a critical role to play. Our 2030 EV Action Plan provides numerous recommendations that can support the unlocking of private capital needed to accelerate EV adoption in Canada.

2.9 Should the Government scale up its existing efforts on incentives, infrastructure, and awareness, and what are the priorities?

Absolutely. Apart from other 2030 EV Action Plan policy recommendations mentioned earlier, we also recommend the following:

- **Incentives**

Until EVs reach price parity in sticker price, incentives are needed to "level the playing field" between electric and gas cars. New vehicle incentives also help grow the supply of used EVs in the market, bringing down the price of used electric cars over time. The federal EV rebate program needs to be updated to support the types of vehicles Canadians want to buy to include larger personal vehicles, long-range electric cars, SUVs and pickup trucks. Going forward, Canada should base eligibility on a straightforward **evaluation of price relative to electric range**, rather than sticker price alone.

Put simply, if a given trim of a zero-emission car, crossover or SUV costs less than $145 (MSRP) per kilometer of range (EPA/NRCan) offered, it should be eligible. If a trim of a ZEV pickup truck costs less than $180 per kilometer of range, it too should be eligible. All zero emission vehicles under $45,000 in price should remain eligible, regardless of their price-to-range value. This incentive could also be extended to plug-in hybrids (PHEVs) at this price point. ***(See Recommendation #1)***

The purchase incentive program in Canada continues to be successful in accelerating the transition to electric mobility, but more should be done to include long range zero emission vehicles, including SUVs and pickup trucks, which are so often the focus of Canadian consumers.

- **Infrastructure**

Set ambitious targets linked to ZEV adoption for putting EV charging connectors in key areas such as apartment buildings, workplaces, downtown cores, along highways and remote travel corridors, and at fleet depots. Expand current funding programs to achieve those targets. Ensure charging access for all Canadians by setting targets specific to northern, rural, and indigenous communities. ***(See Recommendation #11)***

Nearly 30% of Canadians live in apartments or condos. A lack of EV charging access in multi unit buildings creates a major barrier to EV uptake. Government should take immediate steps to make one-million parking spaces in these buildings EV ready. Complete this goal by allocating $1-billion over five years to make one-million existing condominium and apartment parking stalls

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ZEV-ready. Allocate $200M/year for five years specifically for the purpose of funding 50% of electrical power upgrade and make-ready infrastructure costs in existing multi-unit residential buildings. The goal should be to bring electrical capacity to 1-million parking spaces, eliminating a major barrier to EV adoption in apartments and condos, which in 2016 made up almost 30% of Canada's dwellings. ***(See Recommendation #12)***

Establish provisions in the National Model Building and Electrical Codes to have all new residential parking spots be "EV-ready" and 20%-40% of new non-residential parking spots to include the basic electrical infrastructure needed for EV charging. Cities should also be encouraged to play a leadership role by developing their own EV-ready requirements. ***(See Recommendation #13)***

To support access to charging in urban areas for those without reliable home charging access, establish charging hubs on underused government lands, particularly in high-density urban areas. Charging hubs should be large, open to all charging operators without exclusivity, and accessible to the public without the need to pay a parking fee while charging. ***(See Recommendation #14)***

Moving freight and large volumes of passenger vehicles with electricity will require electrical service upgrades to accommodate the power needs of large-scale charging infrastructure. These installations are costly today. Federal and provincial governments, electric utilities, provincial regulators and charging operators must work together to better allocate these costs while recognizing the economic opportunities. In the near-term, Canada can support charging investments by providing time-limited rebates for large-scale charging investments. ***(See Recommendation #15)***

Hundreds of thousands of older Canadian homes have outdated electrical panels, making it difficult and sometimes impossible to install an EV charger. EVs being three-times more energy efficient than gas cars, they contribute in reducing GHG emissions, so existing home energy retrofit programs should support the installation of newer, more efficient electrical panels and EV charging infrastructure. ***(See Recommendation #16)***

- **EV awareness:**

Many Canadians want to go electric, but have unanswered questions or don't know where to start. Work with leading and trusted organizations like Plug'n Drive, EV Society, Plug in British Columbia, AVÉQ and others to establish a suite of programs to educate and support consumers in making the transition to electric vehicles. Many Canadians want to transition to electric, but low levels of consumer awareness continue to be a barrier. Work with leading and trusted organizations like Plug n' Drive, EV Society, Plug in British Columbia, AVÉQ and others to

establish a suite of programs to educate and support consumers in making the transition to electric vehicles like those offered by Plug'n Drive.[10] ***(see Recommendation #7)***

EVs are far less complicated machines than gas vehicles. Work with provinces to revamp the vehicle mechanic curriculum to prioritize EVs by fast-tracking training for EV mechanics, and provide them with more apprenticeship opportunities. ***(See Recommendation #25)***

Building a labour force with the right skills – from engineering and research, electrical and mechanical, charging infrastructure installation, maintenance, and fleet management – will be critical to the success of Canada's transition to a zero-carbon economy. Explore opportunities for the government to support employers, whether traditional industry or all-EV, to train new employees who have not previously worked in the EV industry. Maintain existing funding commitments for training and re-training. ***(See Recommendation #26)***

2.10 Should Canada explore other options to close the price gap between ZEVs and ICE vehicles, including feebates or measures that prevent higher leasing and lending rates for ZEVs?

We recommend imposing a fee on the most polluting new vehicles and using the revenues generated to fund EV purchase incentives (sometimes called a feebate). This approach would offer consumers a choice: they can purchase a cleaner car and get an EV incentive, or choose a more polluting car and help support other Canadians in going electric. Establishing a feebate system where purchases of the most polluting new vehicles would be subject to polluter-pay fees that would fund ZEV purchase incentives. Average and less-than-average polluting vehicles would face no fee. This approach would offer consumers a choice: they can purchase a low-polluting vehicle and avoid the fee or they can pick a higher polluting vehicle and help support other Canadians in going electric. Until all categories of vehicles are available in an electric version, exemptions can be proposed for big families and people who need bigger vehicles for work. ***(See Recommendation #2)***

As mentioned above, we also recommend providing low-interest EV loans to lower-income Canadians, who may have trouble accessing financial support to help cover the initial purchasing cost of an EV. The Canada Infrastructure Bank, or another government agency, should step in to fill this gap and provide low-interest EV loans to consumers who need it most.

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2.11 Should Canada's Excise tax on fuel - Inefficient Vehicles (Green Levy) be modernized to better align with climate objectives (e.g., include a wider range of vehicles?)

For the moment, EMC has no official position on this particular subject.

2.12 What are the R&D gaps to support the uptake of ZEV technologies and charging/refuelling solutions (e.g., higher-power charging solutions, V2G, energy storage, etc.)?

R&D gaps in the EV industry include:

a) **An up-to-date Canadian Vehicle Survey**: The most recent report on the subject was published in 2011[11] as the 2009 Canadian Vehicle Survey. Industry and policymakers require more recent data in order to be able to better plan future ZEV and infrastructure deployment.
b) **Solid state battery technology:** Canadian research centers and universities are presently working on future EV battery chemistry. The "race to the moon" on the development of future EV batteries will change the EV, energy and storage world. Canada needs to fully support R&D in the field.
c) **V2G and V2H:** As new EVs offering V2H come to market, Canada must start developing working models to take full advantage of the technological possibilities. A report published by Plug 'n Drive in July 2020, titled "*EV Batteries Value Proposition for Ontario's Electricity Grid and EV Owners*" [12], concludes that the lifetime benefit of using EV batteries in the electrical system could create up to $38,000 of value, per EV.

2.13 What challenges and opportunities do you anticipate for the electricity grid as a result of accelerating our EV sales targets?

While utilities anticipate many opportunities from the EV uptake across the country, some challenges are expected. That's why the EMC's Utility Working Group is presently working on a white paper that will address the challenges and opportunities ahead of us. We will get back to the government with more details later this year.

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2.14 What role does Canada's critical minerals and battery supply chain have in helping Canada achieve its ZEV targets?

Canada's unique position in the world for its critical mineral supply potential can make it a key player in the global EV industry. In February 2021, Electric Mobility Canada fully supported the Canadian and US governments agreement on the importance of the development of a zero-emission vehicle future and a battery strategy at the first bilateral meeting held virtually with Canadian Prime Minister Justin Trudeau and US President Joe Biden and their senior teams.

As noted in their official statement:

- "The leaders agreed to work together to build the necessary supply chains to make Canada and the United States global leaders in all aspects of battery development and production. To that end, the leaders agreed to strengthen the Canada-U.S. Critical Minerals Action Plan to target a net-zero industrial transformation, batteries for zero-emissions vehicles, and renewable energy storage."
- Recalling the Agreement's call to pursue efforts to limit global temperature increase to 1.5 degrees C., they will work in tandem, and encourage others to achieve net-zero emissions no later than 2050.
- Given the integrated nature of the road transport, maritime, and aviation sectors, the President and Prime Minister agreed to take aligned and accelerated policy actions, including efforts to achieve a zero-emissions vehicle future.

The leaders committed to working with Canadian and American public and private financial institutions to advance the adoption of climate-related financial risk disclosure and align financial flows with climate goals, including the achievement of a prosperous net-zero emissions economy.

For economic, environmental and geopolitical reasons, developing a Canada-US EV strategy and a critical mineral strategy make perfect sense and have the potential to make these two countries world leaders as a joint electric mobility powerhouse.

2.15 What end of life EV battery strategies need to be in place to support our environmental goals while achieving the 100% ZEV target?

EMC is presently working with the government of Québec to develop a dedicated Extended Producer Responsibility (EPR) regulation framework for EV battery producers. **A document presented by EMC to the government of Québec in November 2021, is attached in Appendix 2.**

3 ZEV mandate

3.1 What is a ZEV mandate?

First adopted in 1990 in California as part of the Low Emission Vehicle regulation[13] a ZEV mandate is a regulatory credit program that requires a growing percentage of a manufacturer's sold vehicles in a market to be electric. There are currently 15 states in the USA who have adopted ZEV mandates: California, Colorado, Connecticut, Maine, Maryland, Massachusetts, Minnesota, Nevada, New Jersey, New York, Oregon, Rhode Island, Vermont and Washington. Together, they represent 36% of the US market.

- These 15 states represent more than 3 times the Canadian market.
- In Canada, 2 provinces have adopted ZEV mandates: Québec and British-Columbia.
- Together, they also represent approximately 36% of the Canadian market.

3.2 How a ZEV mandate works

Auto manufacturers are required to produce and sell a number of ZEVs and plug-in hybrids each year, based on the total number of cars sold in a particular jurisdiction by the manufacturer. Manufacturers with higher overall sales of all vehicles are required to make more ZEVs. Auto manufacturers are to produce ZEVs and each vehicle receives credits based on its electric driving range. The more range a vehicle has, the more credit it receives. Credits not needed for compliance in any given year can be banked for future use, traded, or sold to other manufacturers.

3.3 Why does Canada need a federal ZEV mandate?

Market alone won't work because of fossil fuel subsidies: "Market forces" alone have shown to be insufficient to increase the number of ZEV sales in the country at the level needed to meet Canada's GHG and ZEV adoption targets, especially since those market forces are imbalanced by fossil fuel subsidies making the fossil fuels less expensive than they should be.[14] According to a 2021 report from the International Monetary Fund Globally, "fossil fuel subsidies were $5.9 trillion in 2020 or about 6.8 percent of GDP, and are expected to rise to 7.4 percent of GDP in 2025."

While Canada's original ZEV adoption target was 30% by 2030 and 100% by 2040, without a regulatory framework Canada won't be able to meet either target as indicated in the 2020 Transport Canada report.

Now that the government of Canada has signaled that it wants to accelerate ZEV adoption with new ZEV adoption targets of 50% by 2030 and 100% by 2035, the need for a stringent ZEV mandate is even more urgent.

Countries and jurisdictions with ZEV regulations have priority: More and more countries, states and provinces have adopted and implemented ZEV regulations to ensure ZEV supply and predictability. One such example is Québec, who adopted a ZEV mandate in 2018. Noted in its January 2021 report: "As previously mentioned, one of the targets of the ZEV standard is to ensure broader model availability and a greater number of vehicles at car dealerships to meet the needs of consumers and shorten waiting lists. When the ZEV Act was adopted in 2016 only 66% of models available in California were also marketed in Quebec. Today, that figure is close to 85%. ***Some motor vehicle manufacturers have clearly stated that they are prioritizing Quebec within the Canadian market due to the ZEV standard.*** Not only does Quebec have regulatory requirements, but the ability to alienate surplus credits provides manufacturers with business opportunities to incentivize making more vehicles and models available." [15]

The Canadian market demonstrates that provinces with ZEV mandates see more ZEV sales than provinces without mandates, even if they offer provincial ZEV rebates. The official data from StatsCan are eloquent. [16]

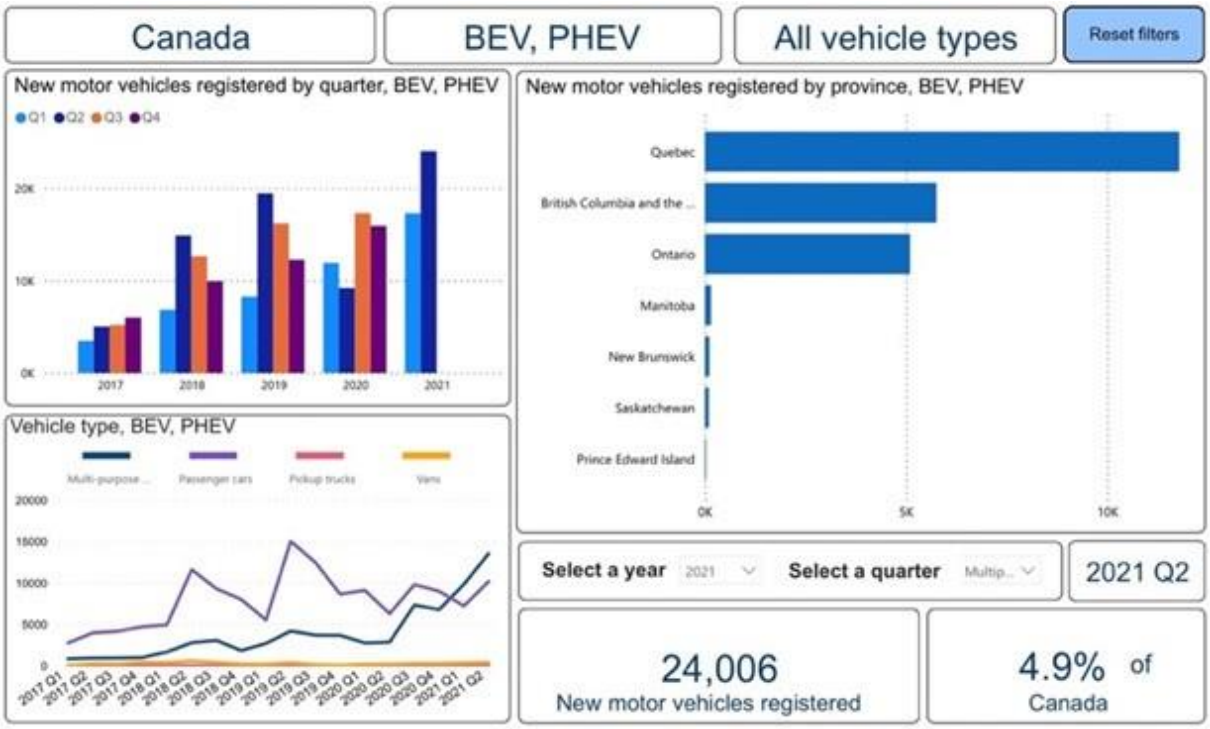

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TABLE: ZEV % of total sales in different jurisdictions with and without a ZEV rebate or mandate.

State, Province or Country	ZEV rebate	ZEV mandate	ZEV % of total sales Q2-2021
California[17]	Yes	Yes	11.0%
British-Columbia	Yes	Yes	9.8 %
Québec	Yes	Yes	9.0 %
Canada	Yes	No	4.9 %
Prince-Edward-Island	Yes	No	4.8 %
Ontario	No	No	2.8 %
Manitoba	No	No	1.2 %
New Brunswick *	No	No	1.0 %
Saskatchewan	No	No	0.8 %

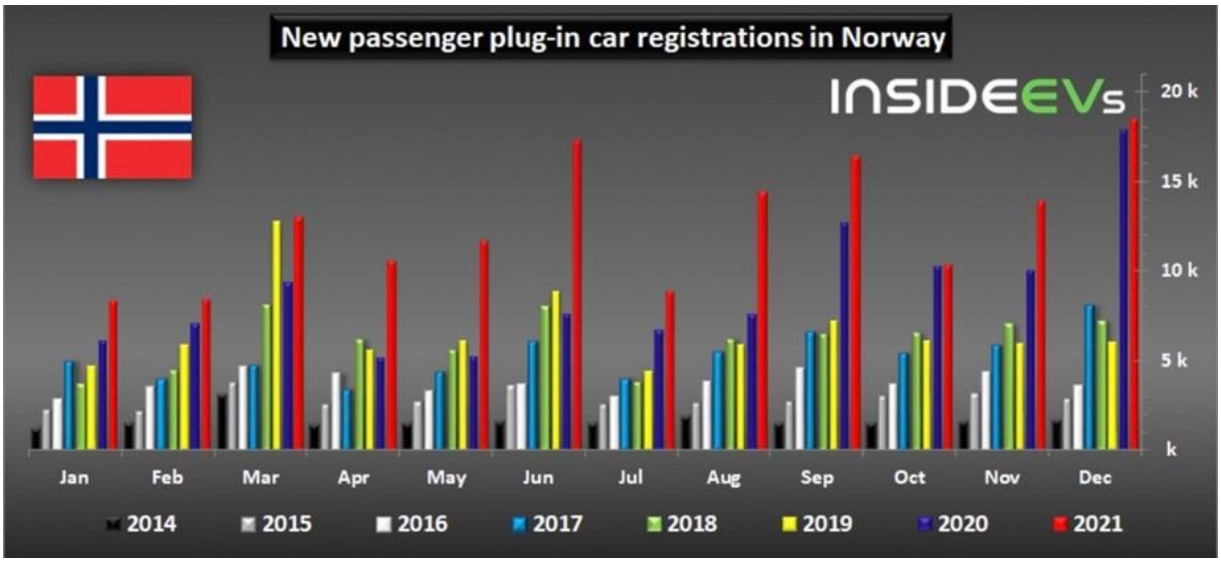
** Now that N.B. has a ZEV rebate program, we will soon see an impact on ZEV sales in that province.*

While many countries and jurisdictions around the world have seen the level of ZEV sales accelerate at a very fast pace because of regulatory frameworks coupled with different incentives, the lack of regulation on ZEV adoption clearly demonstrates that Canada is very far from being amongst the world leaders in ZEV sales.

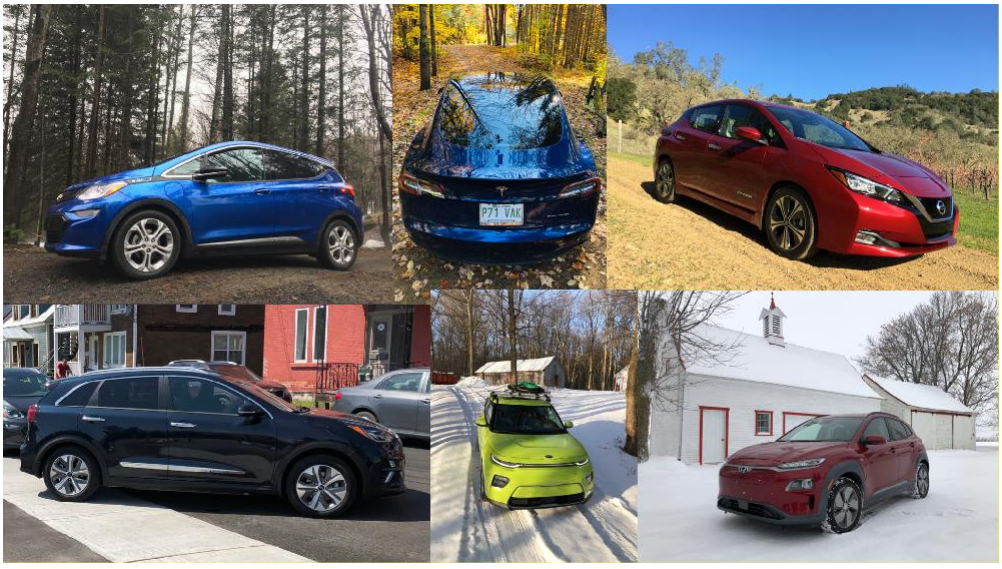
ZEV sales in leading jurisdictions and countries

In 2021, other countries around the world have had much higher ZEV sales:

- China: 19% of ZEV sales in November 2021[18]
- France: 23.4% of ZEV sales in November 2021[19]
- United Kingdom: 28% of ZEV sales in November 2021[20]
- Germany: 34% of ZEV sales in November 2021[21]
- Sweden: 54% of ZEV sales in November 2021[22]
- Denmark: 58% of ZEV sales in December 2021[23]. *In 2016, ZEV sales in Denmark were at a mere 1%, showing what regulation and incentives have done to accelerate ZEV sales exponentially in just 5 years.*
- Norway: 90% of ZEV sales in December of 2021[24]



The 2 main factors explaining the enormous difference in ZEV sales between Canada and the world leaders are the lack of a **ZEV adoption regulation** and the lack of **stringent GHG regulation**.



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4 Debunking myths about ZEV mandates

4.1 On *voluntary* ZEV and GHG targets, as means for reaching GHG emission reductions and ZEV adoption targets

Scientists from Canada and the world have been talking about climate change for over 3 decades now. In spite of that, GHG emissions increased between 1990 and 2019 in Canada, stayed the same between 2005 and 2019. GHG emissions from the transport sector increased by 54% between 1990 and 2019 and by 16% between 2005 and 2019.

- **On GHG emission reduction**

Over the past decades, many have pleaded for *voluntary* targets regarding GHG emissions and fuel consumption. In 2005, the federal government signed a voluntary agreement with car manufacturers to lower the Light Duty Vehicle Fleet GHG emissions by 5,3 Mt CO_2 eq. in 2010 compared to the 2005 level. [25]

According to the 2021 GHG report from ECCC[26]:

- In 2005, LDV GHG emissions were at 81,93 Mt CO_2 eq.
- Five years later, in 2010, LDV GHG emissions were at 81,65 Mt CO_2 eq.

GHG emissions reduction from LDVs was a mere 0.28 Mt instead of the targeted 5.3 Mt, meaning that Canada only reached 5% of its LDV GHG emissions reduction target.

In the 14 years between this voluntary agreement signed in 2005 and 2019, GHG emissions from the Light Duty Vehicle fleet actually **increased** by 7.5%, with a 40% increase in GHG emissions from Passenger Light Trucks. So, no… voluntary targets won't do.

- **On Clean Fuel Regulation**

The forthcoming federal Clean Fuel Regulations (CFR)—which ECCC expects to finalize in 2022—will significantly alter the policy landscape affecting electric vehicles in Canada. By establishing a regulatory requirement on fossil fuel suppliers to reduce the carbon intensity of the transportation energy they bring to market, and by measuring the lifecycle carbon intensity (CI) of different fuels, the policy establishes a long-term signal to increase domestic supplies of low-carbon fuel, including "electric fuel" (kilowatt-hours) metered as residential, public, or workplace charging activity. Under the CFR, Charging Network Operators (CNOs) are a broadly defined category of electric fleet and charging infrastructure owners (including utilities and original equipment manufacturers) capable of generating CFR credits from Compliance Category

3 (CC3), or "end-use fuel switching in transportation." Site hosts are another type of eligible credit creator from the use of private or commercial charging infrastructure.

Actions credited under CC3 do not directly reduce the carbon intensity of fossil fuel, but instead reduce GHG emissions by displacing the fossil fuel with a fuel (like electricity) or energy carrier (like hydrogen) that has a lower carbon intensity. The CFR's overarching requirement to reduce the average CI of retailed transportation energy creates a source of demand for compliance credits—each representing one tonne of carbon-dioxide-equivalent reduced—including credits generated from EV charging activity under CC3. Under the proposed regulation, CNOs would be the default credit creators for both residential charging (at homes with networked/metred charging stations) and public charging.

Modelling by Environment and Climate Change Canada (ECCC) in the Regulatory Impact Analysis Statement accompanying the draft Clean Fuel Regulations (published December 2020) forecasts EV energy demand will nearly double over the first phase of the program (from 6 PJ in 2022 to 11 PJ in 2030) [27]. However, the modelling also suggests that associated EV credit estimates may represent an underestimate relative to credit generation levels now likely under the revised regulatory design of the draft regulations, which replace a linear phase-out of residential EV credits (from 2027–2030) with a binary cut-off of credit generation from residential chargers installed after Dec. 31, 2030. In the reference case projection, about 4.2 million EV credits are created in 2030; this increases to 6.2 million in the high-EV-deployment sensitivity scenario. Other industry modelling suggests there could be even higher credits levels (ranging between 10 megatons (Mt) and 18 Mt) from EV charging, depending on EV deployment over the next decade. [28]

Deployment rates will in turn depend on the implementation of zero-emission vehicle mandates at the federal and provincial level. It is important to note that the complementary and reinforcing effect of these two policies—sales mandates and fuel standards—cannot be taken for granted, but must be adjusted for in policy design. Stronger mandatory targets under a ZEV sales requirement will tend to increase the supply of "baseline" CFR credits (which derive from actions that would have occurred in the absence of the policy). This will hold true so long as EV charging in different contexts remains eligible for CFR credit creation. All else being equal, increased credit supply will then tend to depress the price of credits, lowering the attractiveness of the CFR as means of financing fleet transformations or charger installations. Thus, the two policies must be attuned to the particularities of the other, and situated with the broader strategic objective of reducing overall emissions from transportation. At the federal level, because the CFR is likely to be finalized well before any formal regulatory proposal is published by ECCC, it will be important to ensure that the initial market signal sent by this policy is strong enough to support increased EV charging activity—if not also vehicle deployment. Eventually, there may be a need to re-calibrate the CFR once a federal ZEV mandate is in effect.

Further, as discussed, the benefit of the CFR for EV deployment lies in the strength of the price incentive provided by the market for credits. Obligated parties under the CFR (primarily refiners) would be able to acquire credits by transacting with CNOs and site hosts that generate them. Trade in credits acts as a cross-subsidy from high-carbon to low-carbon fuel producers, thus enabling new ways of financing the deployment EV charging infrastructure without reliance on time-limited and revocable public subsidies. While ECCC argues such cross-subsidization would not be likely to support sufficient investment to attribute measurable, incremental EV uptake under the CFR, it would nevertheless provide another incentive—via a new class of tradeable environmental commodity, the CFR credit—that could work together with other federal and provincial EV policies, including carbon pricing, to boost market signals for increasing EV uptake.

While the price of CFR credits is not likely to be the same as the net cost per tonne of avoided emissions ($/tCO2e) over the life of the policy, it is reasonable to suppose—given experience in comparable low-carbon fuel standards operating in British Columbia and California[29] —that credit values will eventually reach (and perhaps surpass) the net cost per tonne estimate in ECCC's central cost-effectiveness analysis, i.e., $94/t. Combining this value with ECCC's reference and high-end estimates of EV credit supply suggests that, by 2030, the CFR could inject between $395 million and $583 million into Canada's EV ecosystem. By comparison, in California's Low Carbon Fuel Standard program, electricity supplied 2.9 million or nearly 20% of all credits in compliance year 2020. Given the average 2020 credit price of $199 (USD), this amounts to $585 million (USD) in programmatic finance to EV charging.

EMC supports a stringent Clean Fuel Regulation and advocates for a strengthened policy, relative to the draft proposal, when the regulation is finalized in Spring 2022. Current fossil fuel crediting opportunities proposed under the CFR far exceed those available in any other low carbon fuel standard in the world. Unless this situation is resolved, the current regulatory design risks locking in dependency on fossil fuels, missing the most important near-term opportunity to close the gap to Canada's 2030 climate target, and needlessly send Canada off-course from its aspiration to achieve net-zero emissions by 2050.

- **On ZEV adoption requirements**

According to a 2021 report from the CD Howe Institute[30], "a complete transformation of Canada's passenger vehicle market – with ***70 - 75 percent of sales being of Zero-Emission Vehicles (ZEVs) by 2030 – is required in order to hit Ottawa's emissions targets***. This compares to the current 3.5 percent of sales being zero-emission vehicles in 2020. In "Driving Ambitions: The Implications of Decarbonizing the Transportation Sector by 2030," authors Joel Balyk, Brian Livingston, Sara Hastings-Simon and Grant Bishop examine the federal government's December 2020 climate plan, and calculate to achieve the projected reduction in greenhouse gas emissions (GHGs) from Canada's transportation sector, approximately 7.7 million zero-emission passenger vehicles would need to be on the road in 2030 – equivalent to a 30 percent share of the total vehicle stock.

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- **On ZEV supply**

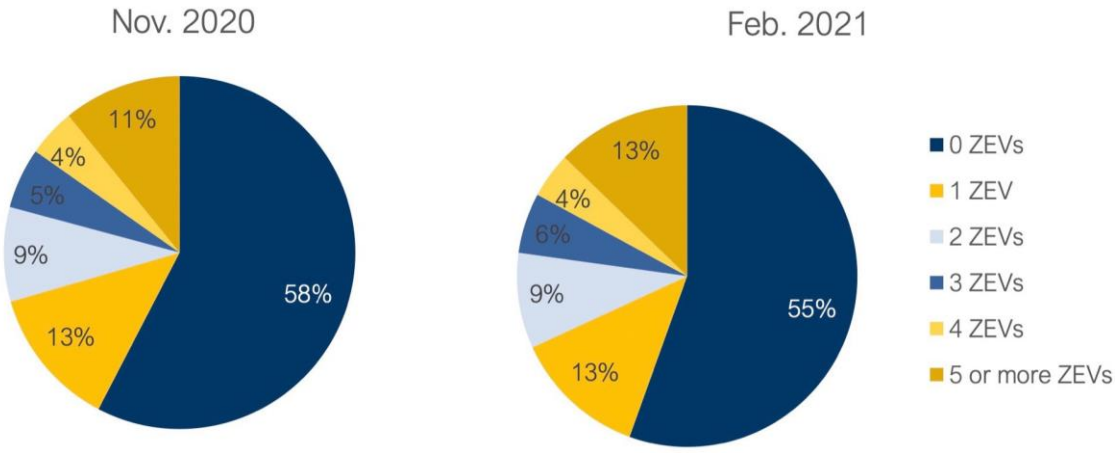
While in different jurisdictions and countries, ZEV sales are accelerating at a very fast pace, supply issues caused by lack of regulation and incentives has led to below-target ZEV sales for Canada.

- In 2011, the governments of Canada and Ontario invested $70,8 millions each to assemble the Toyota RAV4 EV in Woodstock, Ontario[31]. But since there was no ZEV mandate in Canada but there was one in California, all the RAV 4 EVs were sent south of the border so Canadian customers who wanted to buy that vehicle couldn't.

  As the Canadian and Ontario governments are now reinvesting in EV assembly plants in Canada, ***a ZEV mandate in Canada will make sure that Canadian built EVs supported by Canadian funds are available to Canadian customers.***

- According to the March 2021 report from Dunsky Energy and Climate on ZEV availability[32] "While the overall availability of ZEVs has improved compared to previous reports, the majority of dealerships in Canada have zero ZEVs in inventory (see figure below). Less than a quarter of dealerships nation-wide have three or more ZEVs in stock. Outside of Quebec, BC and Ontario, only 18% of dealerships have any ZEVs available at all, and only 4% have 5 or more."

Figure ES-1. Number of ZEVs available per dealership



4.2 On the argument of the microchip shortage

While some may claim that the microchip shortage has made it difficult to deliver enough ZEVs in Canada to meet demand, much higher ZEV sales in other countries clearly demonstrate that when the regulation is stringent enough, consumers manage to have access to ZEVs. In Canada, there clearly is a supply issue… even in Québec, where there is a ZEV mandate.

4.3 On ZEV Standards vs GHG Standards

GHG standards reduce overall average fleet emissions. They do not specify technology or address consumer choice and availability. ZEV standards provide **consumer choice** and **access** to EVs; **mitigate price pressures** associated with supply constraints. Both regulations are made to work together in lowering GHG emissions.

4.4 On the argument that ZEV Standards "impose a burden" on dealers

Only manufacturers are regulated. Informed dealers will know that ZEV Standards empower them to negotiate with manufacturers for tooling, training and more. Uninformed dealers may fall prey to hardliner positions of manufacturers who oppose ZEV mandates. Between now and the end of ICE vehicle sales, car dealers in Canada who do not want to sell EVs won't have to. They can let other dealers take the lead… and therefore lose sales with interested customers. We are already seeing that happening, and more reluctant car dealers are starting to see that they are losing business to the leaders in the industry.

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4.5 On the argument that a single National Program is Better than Layered Provincial and Federal Programs.

Like carbon pricing, a federal ZEV program will fill in the gaps where provinces are not taking action and ensure all Canadians have reasonable access to EVs – not just Quebec and British Columbia. We also have to make sure that credits cannot be exchanged from one province to the other, like we have seen in the USA in the past years between different ZEV states and California. We need to make sure that ZEVs are available in *every province* of Canada.

4.6 On the argument that ZEV Standards create administrative burden and red tape

This is not the case. Automakers participate in credit programs around the world and have trained professionals and credit trading desks to manage compliance with such programs. An additional Canadian program will have no impact on total administrative burden for OEMs. In addition, considering that OEMs have not been able to provide enough GHG emission reduction with voluntary targets for any country in the world to meet its targets, it is simply a normal corporate responsibility.

4.7 On the argument that ZEV Standards increase car prices

On the contrary, ZEV standards help decrease ZEV prices. Governments have heard the exact same argument in the past decades regarding **antipollution systems, seatbelts** and **airbags**, and it has been proven false every time. The opposite is actually true. By mandating that supply grow alongside demand, clearing price increases are mitigated. Incentives (demand measures) alone without supply measures can have the opposite effect: drive up prices.

4.8 On the argument that compliance costs are unreasonable

Not true. Any manufacturer who allocates sufficient electric vehicle products to Canada avoids compliance costs altogether. In addition, the leaders can sell their credits to the laggards, therefore making a profit from ZEV sales ***and*** ZEV credits sales.

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4.9 On the argument that a ZEV mandate is not needed thanks to significant investment by OEMs

It's actually the opposite. ***It is because of ZEV regulation that most OEMs have started to invest in Zero Emission Vehicles***. If this argument were true, OEMs would likely not oppose a Mandate. For the foreseeable future, EV supply will lag behind consumer demand globally. Automakers are therefore allocating products to ZEV mandate and ZEV stringent jurisdictions first. Given the size and demand for EVs in many of these markets, those parts of Canada without provincial mandates will be left waiting for deliveries… as we can already see in ZEV regulated markets who get and sell a lot more EVs than Canada.

4.10 On the argument that Canada should follow Norway's path to accelerate ZEV adoption

Some have argued that in order to accelerate ZEV adoption, Canada should follow Norway's path instead of implementing a ZEV mandate, since Norway has the highest ZEV adoption rate in the world without a ZEV mandate.

While we agree that **purchase incentives, infrastructure deployment acceleration, education and training** are indeed key elements to ensure accelerated ZEV adoption in Canada, it is important to inform the public that Norway policies go way beyond incentive programs.

In fact, Norway ZEV regulations go further than those of any other country in the world. For example, vehicles in Norway are taxed according to the vehicle's tax group, its curb weight, CO2 emissions, NOx emissions and cylinder capacity [33]. For some vehicles, engine power is also included in the calculation. Plus, the Value Added Tax (VAT) represents 25% of the purchase price.

If some want Canada to adopt Norway-style incentive and taxation system to help accelerate ZEV adoption, our calculations, presented further below, will shed a new light on what applying Norway gas and diesel taxation in Canada might look like.

Parking and reserved lane incentives

Norway introduced a special E-Number plate for Electric Vehicles which gives authorities the possibility to choose local incentives such as free parking, using bus lanes based on these number plates. It also helps increase awareness of clean vehicles on the roads. Since 2016, Norwegian municipalities have the authority to determine fees and exemption categories. This

led to different local regulatory frameworks: electric cars pay the same parking fee as ICEs in Trondheim; half the price of ICEs in the city center of Bergen; and they are subject to strongly differentiated parking fees in Oslo, where 1,300 of the 6,500 parking places in municipal parking lots are dedicated to electric car charging and equipped with slow chargers (3.6 kW). These parking spots and charging were free until 2019.

In Norway, electric cars are granted free access to bus lanes, but several bus corridors are experiencing regular congestion during rush hour. The municipality of Oslo tackled this issue in 2017 by granting access to the bus lane on two specific corridors during rush hours only to electric cars with two or more persons on board. In Norway, electric cars are exempt from paying for the use of regional toll roads. This measure added up to NOK 7 500 (EUR 790) in 2016. Since 2019, electric cars have had to pay the tolls, but at a lower fee. Since 2009, electric cars have been granted free access on most ferries that connect parts of the national road network. On ferry crossings that are not part of the national road network, local governments decide the fees.

Norway offers local incentives such as:

- Urban toll exemption
- Highway toll exemption
- Free Parking
- Bus lane use
- Funding in some cities for normal charging stations in shared apartment buildings, shopping centers, parking garages etc.

Infrastructure incentives:
Regulation on the requirements for EVSE in new buildings and parking lots (Norwegian Ministry of Transport, 2016). For parking lots and parking areas of new buildings, a minimum of 6% of the spaces must be allocated to electric cars. Oslo: expanded budget for EVSE deployment. The 2018 budget allocated to housing associations for installing chargers doubles the 2017 budget to NOK 20 million (EUR 2.1 million).

Norway gas and diesel taxation system for passenger cars and light trucks
Contrary to popular belief, Norway doesn't offer purchase rebates for electric cars. Instead, it has different levels of taxation for electric cars or gas and diesel cars. As mentioned earlier, gas and diesel vehicles in Norway are taxed according to the vehicle's tax group, its curb weight, CO2 emissions, NOx emissions and cylinder capacity[34]. For some vehicles, engine power is also included in the calculation. On top of that, people have to pay a 25% Value Added Tax (VAT) on gas and diesel cars. Because of its very ambitious EV adoption system, Norway may reach 100% ZEV adoption as early as March or April of 2022, 3 years ahead of their 100% ZEV adoption target of 2025. [35]

Norway's gas and diesel taxation system applied in Canada:
The table below details five examples of purchase price for cars and light trucks in Norway when adding the one-off registration tax and the VAT. We then transposed the Norwegian taxation system to the same vehicles (or closest equivalent) in Canada to demonstrate the impact this taxation system would have on purchase prices in Canada. The numbers clearly show why the system is so efficient.

Comparing	Norway vehicle taxation	Applying Norwegian vehicle taxation in Canada
Vehicle 1	**Honda Civic**	**Honda Civic**
Selling price	348,700 NOK	26,280 CAD
Vehicle group tax (44%)	153,554 NOK	11,563 CAD
VAT (25%)	87,175 NOK	6,570 CAD
Total price after taxes	**589,429 NOK**	**44,413 CAD**
Vehicle 2	**Toyota RAV4 Hybrid**	**Toyota RAV4 Hybrid**
Selling price	443,200 NOK	33,190 CAD
Vehicle group tax (35%)	153,740 NOK	11,616 CAD
VAT (25%)	110,800 NOK	8,298 CAD
Total price after taxes	**707,740 NOK**	**53,104 CAD**

Vehicle 3	**Ford Mustang Mach-1**	**Ford Mustang Mach-1**
Selling price	1,098,600 NOK	67,055 CAD
Vehicle group tax (58%)	640,079 NOK	38,892 CAD
VAT (25%)	274,650 NOK	16,764 CAD
Total price after taxes	**2,013,329 NOK**	**122,711 CAD**
Vehicle 4	**Toyota Hilux**	**Toyota Tacoma**
Selling price	502,100 NOK	42,739 CAD
Vehicle group tax (71%)	356,960 NOK	30,345 CAD
VAT (25%)	125,252 NOK	10,685 CAD
Total price after taxes	**984,585 NOK**	**83,768 CAD**
Vehicle 5	**Ford Mustang Mach-E**	**Ford Mustang Mach-E**
Selling price	427,500 NOK	50,495 CAD
Scrap deposit	2,400 NOK	344 CAD
VAT (0%)	0 NOK	0 CAD
Total price after taxes	**429,900 NOK**	**50,839 CAD**

4.11 On the argument that a ZEV mandate is too big a burden on small volume motor vehicle manufacturers

Canada could adopt the Californian or the Québec system to give small volume manufacturers a bit of time to adapt. But wherever they are, small volume vehicle manufacturers will indeed have to adapt… or disappear, since all the most important jurisdictions in the world are headed in the ZEV direction.

In California[36], the following manufacturers are subject to the ZEV Requirements:

- BMW, Fiat Chrysler, Ford, General Motors, Honda, Hyundai, Kia, Mercedes, Nissan, Toyota, and Volkswagen must comply with the new requirements.
- Five smaller manufacturers (Jaguar Land Rover, Mitsubishi, Mazda, Subaru and Volvo) are also required to comply with the ZEV requirements, but may meet their obligation with plug-in hybrids.

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In Québec[37]**:** “Small volume motor vehicle manufacturers (fewer than 4,500 vehicles sold annually on average) are not subject to the ZEV standard but can voluntarily participate in the scheme, and declare the number of their eligible vehicles and exchange or sell earned credits.”

- Intermediate motor vehicle manufacturers (4,500 to 19,999 vehicles) are subject to the ZEV standard.
- Large motor vehicle manufacturers (20,000 and more vehicles) are subject to the ZEV standard and have additional requirements starting with model year 2020.

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Sources

[1] 2030 EV Action Plan: https://2030evactionplan.ca

[2] 2021 Electric Vehicle Outlook: https://about.bnef.com/electric-vehicle-outlook/

[3] Accelerate Alliance: https://acceleratezev.ca

[4] Québec ZEV mandate consultation: participation of Daniel Breton https://www.youtube.com/watch?v=GGoXhyUQtCA

[5] Québec ZEV mandate: https://www.environnement.gouv.qc.ca/changementsclimatiques/vze/index.htm

[6] Québec ZEV mandate: https://www.environnement.gouv.qc.ca/changementsclimatiques/vze/index.htm

[7] ICCT on PHEVs: https://theicct.org/analysis-of-plug-in-hybrid-electric-passenger-car-data-confirms-real-world-co2-emissions-are-two-to-four-times-higher-than-official-values/

[8] California LCFS: https://ww2.arb.ca.gov/our-work/programs/low-carbon-fuel-standard/about

[9] Fee-bate (Bonus-malus): https://www.economie.gouv.fr/cedef/bonus-automobile

[10] Plug'n Drive: https://ev.plugndrive.ca

[11] https://oee.nrcan.gc.ca/publications/statistics/cvs/2009/pdf/cvs09.pdf

[12] https://www.plugndrive.ca/wp-content/uploads/2020/07/EV-Batteries-and-Ontario's-Electricity-System-Final-Report-July-2020-v2.pdf

[13] https://ww2.arb.ca.gov/our-work/programs/low-emission-vehicle-program

[14] https://www.imf.org/en/Publications/WP/Issues/2021/09/23/Still-Not-Getting-Energy-Prices-Right-A-Global-and-Country-Update-of-Fossil-Fuel-Subsidies-466004

[15] 2021 ZEV mandate report from the government of Québec: https://www.environnement.gouv.qc.ca/changementsclimatiques/vze/rapport-mise-oeuvre-2018-2020-en.pdf

[16] StatCan ZEV sales data: https://www150.statcan.gc.ca/n1/pub/71-607-x/71-607-x2021019-eng.htm

[17] California Q2 ZEV sales: https://www.autosinnovate.org/posts/papers-reports/Get%20Connected%20Electric%20Vehicle%20Quarterly%20Report%20Q2%202021.pdf

[18] https://insideevs.com/news/557284/china-plugin-car-sales-november2021/

[19] https://insideevs.com/news/554719/france-plugin-car-sales-november2021/

[20] https://insideevs.com/news/552681/uk-plugin-car-sales-november2021/

[21] https://insideevs.com/news/554849/germany-plugin-car-sales-november2021/

[22] https://cleantechnica.com/2021/12/02/most-autos-sold-in-sweden-are-now-plugin-evs-over-54-in-november/

[23] https://cleantechnica.com/2022/01/12/denmark-crushes-50-ev-sales-barrier-now-what/

[24] https://insideevs.com/news/558447/norway-plugin-car-sales-december2021/

[25] https://phys.org/news/2005-04-canadian-automobile-industry-climate-action.html

[26] https://www.canada.ca/content/dam/eccc/documents/pdf/cesindicators/ghg-emissions/2021/greenhouse-gas-emissions-en.pdf

[27] Environment and Climate Change Canada, Clean Fuel Regulations: Regulatory Impact Analysis Statement, Canada Gazette, Part I, Vol. 154, No. 51 (Dec. 19, 2020). https://gazette.gc.ca/rp-pr/p1/2020/2020-12-19/html/reg2-eng.html

[28] John Kruse, "Analysis of the Implications of Canada's Proposed Clean Fuel Standard for Canadian Biofuels and Biofuel Feedstocks," World Agricultural Economic and Environmental Services (Dec. 30, 2021). https://advancedbiofuels.ca/wp-content/uploads/The-Implications-of-Canadas-Proposed-CFS-Program-for-Canadian-Biofuels-and-Biofuel-Feedstocks-2021.pdf#page=21

[29] California Air Resources Board, LCFS Quarterly Summary (Oct. 31, 2021) and Monthly LCFS Credit Transfer Activity Report (Dec. 2021). https://ww2.arb.ca.gov/resources/documents/lcfs-data-dashboard

[30] CD Howe 2021 report: https://www.cdhowe.org/sites/default/files/attachments/research_papers/mixed/Commentary_604.pdf

[31] Toyota RAV4 EV built in Ontario in 2011: https://news.ontario.ca/en/release/19194/ontario-puts-a-charge-into-electric-vehicle-production

[32] 2020-2021 Zero Emission Vehicle Availability report from Dunsky Energy and Climate: https://www.dunsky.com/wp-content/uploads/2021/12/DunskyZEVAvailabilityReport_2021-04-1.pdf

[33] Norway car taxation system: https://www.regjeringen.no/no/tema/okonomi-og-budsjett/skatter-og-avgifter/avgiftssatser-2019/id2614443/

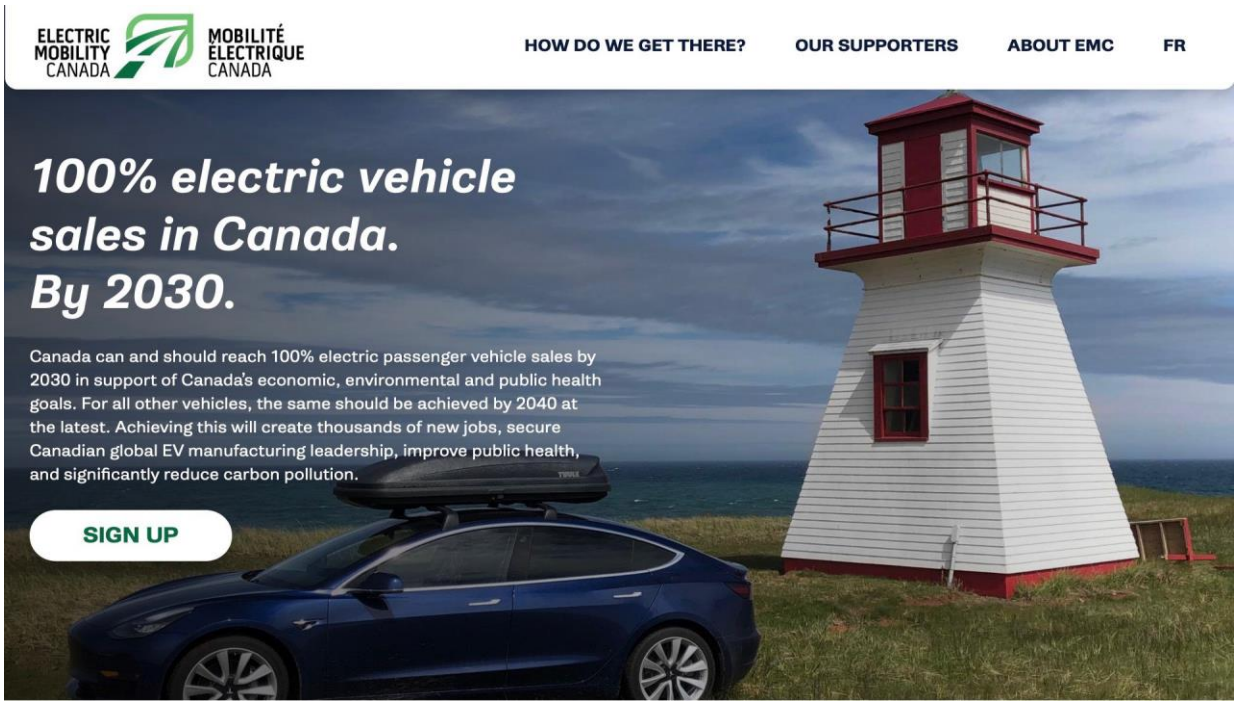
[34] Norway tax calculator: https://www.skatteetaten.no/en/person/duties/cars-and-other-vehicles/importing/calculate/

[35] 100% ZEV sales by March-April 2022 in Norway: https://electrek.co/2021/09/23/norway-bans-gas-cars-in-2025-but-trends-point-toward-100-ev-sales-as-early-as-april/

[36] Car manufacturers subject to ZEV requirements in California: https://ww2.arb.ca.gov/our-work/programs/zero-emission-vehicle-program/about

[37] Car manufacturers subject to ZEV requirements in Québec: https://www.environnement.gouv.qc.ca/changementsclimatiques/vze/rapport-mise-oeuvre-2018-2020-en.pdf

Appendix 1: EMC 2030 EV Action Plan: 6 pillars to support EV transition in Canada



>> Link to the 2030 EV Action Plan website: https://2030evactionplan.ca/

Pillar 1: Light-Duty EV consumer adoption

Policy solutions that overcome barriers to consumer EV adoption focus on affordability and value, education and awareness, as well as new polluter-pay funding mechanisms to support their implementation.

Recommendation #1 - Continue purchase incentives for new passenger EVs but focus on value for electric-only range to include long range electric cars, SUVs and pickup trucks. Until EVs reach price parity in sticker price, incentives are needed to "level the playing field" between electric and gas cars. New vehicle incentives also help grow the supply of used EVs in the market, bringing down the price of used electric cars over time. The federal EV rebate program needs to be updated to support the types of vehicles Canadians want to buy: long-range electric cars, SUVs and pickup trucks. Going forward, Canada should base eligibility on a straightforward evaluation of price relative to electric range, rather than sticker price alone.

The purchase incentive program in Canada continues to be successful in accelerating the transition to electric mobility, but more should be done to accommodate long range zero emission vehicles, including SUVs and pickup trucks, which are so often the focus of Canadian consumers. Until EVs reach price parity in sticker price, then, point-of-sale purchase incentives are needed to "level the playing field" between electric and combustion cars for consumers. New vehicle incentives also help grow the supply of used EVs in the market, bringing down vehicle costs in that segment over time. However, moving forward, Canada should base eligibility on a straightforward evaluation of price relative to electric range, not sticker price. Put simply, if a given trim of a zero-emission car, crossover or SUV costs less than $145 (MSRP) per kilometer of range (EPA/NRCan) offered it should be eligible. If a trim of a ZEV pickup truck costs less than $180 per kilometer of range, it too should be eligible. All zero emission vehicles under $45,000 in price should remain eligible, regardless of their price-to-range value. This incentive could also be extended to plugin hybrids (PHEVs) at this price point.

Recommendation #2 - Have the most polluting vehicles fund EV incentives for new vehicles

Impose a fee on the most polluting new vehicles and use the revenues generated to fund EV purchase incentives. This approach would offer consumers a choice: they can purchase a cleaner car and get an EV incentive, or choose a more polluting car and help support other Canadians in going electric.

Establish a feebate system where purchases of the most polluting new vehicles would be subject to polluter-pay fees that would fund ZEV purchase incentives (see #1 above). Average and less-than-average polluting vehicles would face no fee. This approach would offer consumers a choice: they can purchase a low-polluting vehicle and avoid the fee, or they can pick a higher polluting vehicle and help support other Canadians in going electric. Until all categories of vehicles are available in an electric version, exemptions can be proposed for big families and people who need bigger vehicles for work.

Recommendation #3 - Offer incentives for used EVs

About 60% of car purchases in Canada occur in the second-hand market. Make EV incentives available to used car buyers to increase EV adoption.

Recommendation #4 - Provide a low-and-modest income household purchase incentive "top-up"

Low- and modest-income Canadians also benefit from the fuel and maintenance savings an electric car provides, but are less likely able to afford a new vehicle. Canada should establish an additional income-tested incentive for new or used EVs, and offer support for the installation of home charging infrastructure.

Recommendation #5 - Make it easier for taxi, ride-hailing and carshare companies to go electric

Taxi, ride-hailing and carshare companies currently face a cap on how many EV incentives they're able to take advantage of. Remove this cap for taxi, ride-hailing, carshare and other companies providing transportation to the public to help them go fully electric by 2030.

Recommendation #6 - Offer low-interest loans to first time EV buyers

Often, lower-income Canadians have trouble accessing financial support to help cover the initial purchasing cost of an EV. The Canada Infrastructure Bank, or other government agency, should step in to fill this gap and provide low-interest EV loans to consumers who need it most.

Recommendation #7 - Support consumer EV education

Many Canadians want to go electric, but have unanswered questions or don't know where to start. Work with leading and trusted organizations like Plug'n Drive, EV Society, Plug in British Columbia, AVÉQ and others to establish a suite of programs to educate and support consumers in making the transition to electric vehicles.

Many Canadians want to go electric, but low levels of consumer awareness continue to be a barrier. Work with leading and trusted organizations like Plug n' Drive, EV Society, Plug in British Columbia, AVÉQ and others to establish a suite of programs to educate and support consumers in making the transition to electric vehicles. Efforts could include creating a Canadianized version of MIT's CarbonCounter.com and better communicating the availability and ease of charging.

Pillar 2: Medium, Heavy-Duty and Off-Road Fleet Electrification

Ideas and solutions to overcome and address the barriers in the fleet and non-passenger segment, including for affordability, the transition of electric public transit and school bus fleets, and actions that government can take at federally-regulated facilities.

Recommendation #8 - Make electric buses, trucks and off-road vehicles more affordable

Tax credits and rebates are needed to lower the upfront cost of zero-emission buses, trucks and off-road vehicles. In addition, more should be done to offset the costs of electrical upgrades associated with the specific charging infrastructure these types of vehicles require.

Recommendation #9 - Work across jurisdictions to accelerate electric transit and school bus adoption

Continue to provide predictable and long-term funding to municipalities, transit agencies and school bus operators that plan to convert their entire fleet to electric vehicles. Funding should

help cover the cost of the electric buses themselves, their charging infrastructure, and any grid upgrades needed to support them.

Recommendation #10 - Electrify vehicle fleets in ports, airports and similar federal facilities

Phase out fossil-fuel vehicles at federally regulated properties, such as ports and airports, through a combination of tolls on polluting vehicles, restrictions on access for polluting trucks, and through support for charging infrastructure.

Pillar 3: National EV Infrastructure Deployment Plan

Transitioning to electric mobility requires a new way of thinking about the fuelling infrastructure of the future: electric vehicle charging. We propose solutions to overcome the challenges of charging in multi-unit buildings, in remote areas, highway-side, and on public lands.

Recommendation #11 - Set targets for EV charging installations, for all types of vehicles

Set ambitious targets for putting EV charging connectors in key areas such as apartment buildings, workplaces, downtown cores, along highways and remote travel corridors, and at fleet depots. Expand current funding programs to achieve those targets. Ensure charging access for all Canadians by setting targets specific to northern, rural, and indigenous communities.

Recommendation #12 - Make one-million condo and apartments EV ready over five years

Nearly 30% of Canadians live in apartments or condos. A lack of EV charging access in these buildings creates a major barrier to EV uptake. Government should take immediate steps to make one-million parking spaces in these buildings, EV ready. Complete this goal by allocating $1-billion over five years to make one-million existing condominium and apartment parking stalls ZEV-ready.

Allocate $1-billion over five years to make one-million existing condominium and apartment parking stalls EV-ready. Allocate $200M/year for five years specifically for the purpose of funding 50% of electrical power upgrade and make-ready infrastructure costs in existing multi-unit residential buildings. The goal should be to bring electrical capacity to 1-million parking spaces, eliminating a major barrier to EV adoption in apartments and condos, which in 2016 made up almost 30% of Canada's dwellings.

Recommendation #13 - Add EV charging requirements to national building codes

Establish provisions in the National Model Building and Electrical Codes to have all new residential parking spots be "EV-ready" and 20%-40% of new non-residential parking spots to include the basic electrical infrastructure needed for EV charging. Cities should also be encouraged to play a leadership role by developing their own EV-ready requirements.

Recommendation #14 - Put underutilized government lands to work: establish public charging "hubs"

To support access to charging in urban areas for those without reliable home charging access, establish charging hubs on underused government lands, particularly in high-density urban areas. Charging hubs should be large, open to all charging operators without exclusivity, and accessible to the public without the need to pay a parking fee while charging.

Recommendation #15 - Provide a connection rebate to cover costs levied by utilities when building large-scale charging stations

Moving freight and large volumes of passenger vehicles with electricity will require electrical service upgrades to accommodate the power needs of large-scale charging infrastructure. These installations are costly today. Federal and provincial governments, electric utilities, provincial regulators and charging operators must work together to better allocate these costs while recognizing the economic opportunities. In the near-term, Canada can support charging investments by providing time-limited rebates for large-scale charging investments.

Recommendation #16 - Include EV charger installation in home energy retrofit programs

Hundreds of thousands of older Canadian homes have outdated electrical panels, making it difficult and sometimes impossible to install an EV charger. EVs being three-times more energy efficient than gas cars and contributing to reducing GHG emissions, existing home energy retrofit programs should support the installation of newer, more efficient electrical panels and EV charging infrastructure.

Pillar 4: 2030 Electric Vehicle Strategy and EV Regulation

Achieving results will require coordination and strategy – including a focus on overcoming the challenges of vehicle availability and supply. We also need to ensure no Canadians are left behind, whether they live in rural or indigenous communities.

Recommendation #17 - Immediately Launch a Canadian EV Strategy

Enact legislation requiring the federal government to establish a Canadian EV strategy and a regularly updated EV action plan through 2035. Legislation should require the government to implement actions sufficient to achieve 100% passenger vehicle sales by 2030 and by 100% zero-emission bus and truck sales by 2040 at the latest.

Launch a pan-Canadian EV Strategy that includes an EV Action Plan to accelerate EV adoption. Enact legislation requiring the federal government to (1) establish an EV strategy, and, (2) maintain and regularly update an EV action plan through 2035. Legislation should require the government to implement actions sufficient to achieve 100% passenger vehicle sales by 2030, and by 2040 at the latest for MHDVs. Accountability measures, such as audit, should be

established. The initial strategy and plan should adopt the actions contained in this Platform document**.**

Recommendation #18 - Adopt a national ZEV Mandate for passenger vehicles, requiring 100% ZEV sales by 2030.

A national ZEV mandate will push automakers to introduce more EV makes and models, increasing consumer choice, reducing long wait times for EVs, and improving battery technology to help meet the ever-growing demand for EVs in Canada. It will also help supply EVs across Canada, where currently most EVs available for sale are distributed to the two provinces that already have ZEV Mandates in place: British Columbia and Quebec. Apply the national standard only where provincial standards are weak or do not exist.

A national ZEV standard will increase consumer choice, reduce wait times for vehicles, reduce vehicle costs, deliver better value for infrastructure programs, attract industrial production, and drive innovation (through longer-range battery technology) to supply ever-growing domestic ZEV demand and achieve ZEV goals. It will also help to level the playing field across Canada. Today, most EV supply goes to the two provinces that already have ZEV standards in place: British Columbia and Quebec. So, Canada should treat a federal ZEV standard as a means of filling in the gaps in ZEV policy across Canada and to ensure that EV supply is available in provinces which have not yet established their own ZEV standards of equal or greater stringency, relative to the federal program.

Recommendation #19 - Implement strong tailpipe emission standards for all types of vehicles

Canada must align its auto tailpipe emission standards with the toughest standards in North America, in addition to establishing a national ZEV mandate. Cleaner cars not only cut carbon emissions, they also improve air quality in our communities and save consumers money at the pump. The existing standards have too many “compliance flexibilities” (loopholes) which should be eliminated going forward. Canada must also strengthen emission standards for larger vehicles like buses and trucks, as these are big contributors to tailpipe pollution too.

Recommendation #20 - Adopt a national ZEV Mandate for trucks and buses requiring 100% ZEV sales by 2040 at the latest.

Set a target to achieve 100% zero-emission bus and truck sales by 2040, at the latest, with interim milestones along the way. Increase ambition as technology and product offerings improve. Align Canada’s requirements with the most ambitious targets in North America.

Recommendation #21 - Develop a plan to help rural, northern, First Nations and Inuit communities go electric

Many rural, northern, and indigenous communities in Canada have not yet had equal opportunity to participate in the benefits of the EV transition due to a lack of charging options and vehicle availability, among other things. It is critical that these barriers be addressed to allow all Canadians a meaningful opportunity to drive electric.

Recommendation #22 - Offer an "green scrap-it program" for all types of vehicles

Establish a program that gets gasoline vehicles off the road and replaces them with zero emission vehicles. Allow all polluting vehicles–from cars to buses to snowmobiles–to be scrapped and recycled as part of the program. Government could also offer other clean transportation options such as public transit passes, vouchers for bicycles, vouchers for EV-only car/rideshare services etc., for those Canadians who are not looking to purchase a new vehicle.

Pillar 5: Domestic EV Jobs and Manufacturing Capacity

A Canadian EV Economic Development and Investment Attraction Strategy, focused R&D efforts, and action to protect Canadian industry and workers from foreign buy-domestic rules will help ensure a prosperous transition to an electric mobility economy in Canada.

Recommendation #23 - Support and attract EV-related business and investment in Canada

Focus on attracting more investment to accelerate EV manufacturing and related industries in Canada, including assembly, parts, machinery, charging equipment, and battery materials extraction/processing with a "Canadian EV Economic Development and Investment Attraction Strategy." Building these industries will create good sustainable jobs and raise the profile of EVs to further support their adoption in Canada.

Recommendation #24 - Focus R&D investment on strategic EV technology

Canada should focus its efforts on accelerating technologies, research, development and manufacturing associated with reducing the costs of vehicle batteries and thus vehicle costs per unit of range. Achieving economies of scale in vehicle, battery and charging infrastructure production will also help to reduce costs for consumers and fleets.

Recommendation #25 - Work with provinces to fast-track EV-only service technician training

EVs are far less complicated machines than gas vehicles. Work with provinces to revamp the vehicle mechanic curriculum to prioritize EVs by fast-tracking training for EV mechanics, and provide them with more apprenticeship opportunities.

Recommendation #26 - Support retraining programs and help workers make the transition to zero carbon industry.

Building a labor force with the right skills– from engineering and research, electrical and mechanical, charging infrastructure installation, maintenance, and fleet management–will be critical to the success of Canada's transition to a zero-carbon economy. Explore opportunities for the government to support employers, whether traditional industry or all-EV, to train new employees who have not previously worked in the EV industry. Maintain existing funding commitments for training and re-training.

Recommendation #27 - Take a North American approach to EV manufacturing and supply chains

Work with the US Administration to ensure that any "Buy America" policies reflect the North American auto market and do not negatively impact Canadian EV businesses or suppliers. Collaborate with the U.S. to build a North American EV industry and supply chain.

Pillar 6: Federal Leadership

Government can lead by example and make use of its own facilities, convening ability and internal process to help accelerate the transition to electric mobility.

Recommendation #28 - Establish a "Privy Council Office for Electric Transport"

Create a dedicated Privy Council Office to coordinate EV responsibilities across departments and advise the Prime Minister on progress being made towards achieving the government's electrification goals. Centralized coordination and Prime Ministerial oversight will elevate the importance of this issue and ensure it receives the attention it deserves.

Recommendation #29 - Make government & parliamentarian EV awareness and education a priority

Unless both consumers and policy makers understand all the benefits, needs and savings associated with electric vehicles, the transition to an electric future will take longer than necessary. The government should make education a priority, working with leading organizations like Plug'n Drive, EV Society, AVÉQ, Plug in British Columbia and others to establish experiential learning opportunities for elected officials and civil servants.

Recommendation #30 - Convene electricity stakeholders to develop EV solutions for our grid

Establish cross-Canadian guidance for electricity regulators to speed up deployment of charging infrastructure.

Establish an intergovernmental table to examine electrical system regulatory matters to expedite EV charging infrastructure installation and to support utilities Work through the Council of Canadian Energy Ministers to establish pan-Canadian guidance for electricity regulators to expedite deployment of charging infrastructure. Guidance could address: electrical service size challenges for EV charging; demand charges and opt-in electricity rates for public charging; the need for EV charging station connection prioritization to keep infrastructure expanding in step with EV demand.

Recommendation #31 - Ensure federal fleets and buildings are 100% electric and EV-ready

Government can lead by example and further increase domestic EV demand and investment by using its own purchasing power. Starting now, every vehicle purchased by the government should be electric, unless an electric option does not yet exist to meet a specific need. Canada should also start electrifying its owned and leased parking lots immediately to offer charging options to its fleets and employees. Set a hard target of at least 10% of all owned and occupied parking spaces being electrified by no later than 2025.

Recommendation #32 - Establish a Zero Emission Zone in the City of Ottawa

The Government of Canada should work with the National Capital Commission and the City of Ottawa to establish a Zero Emission Zone (ZEZ) in downtown Ottawa. ZEZs are areas in which polluting vehicles are required to pay a fee to enter, acting as a disincentive for gas-vehicle use within the zone, and encouraging forms of zero emission travel such as EVs, bicycles or electric public transit. Other cities and national capitals (e.g., London, UK) are implementing zero-emission zones too.

Electric Mobility Canada /Mobilité électrique Canada – www.emc-mec.ca – info@emc-mec.ca
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Appendix 2: EMC Battery Working Group Recommendations on the Extended Producer Responsibility Regulation Proposal by the Governement of Quebec

See following pages.

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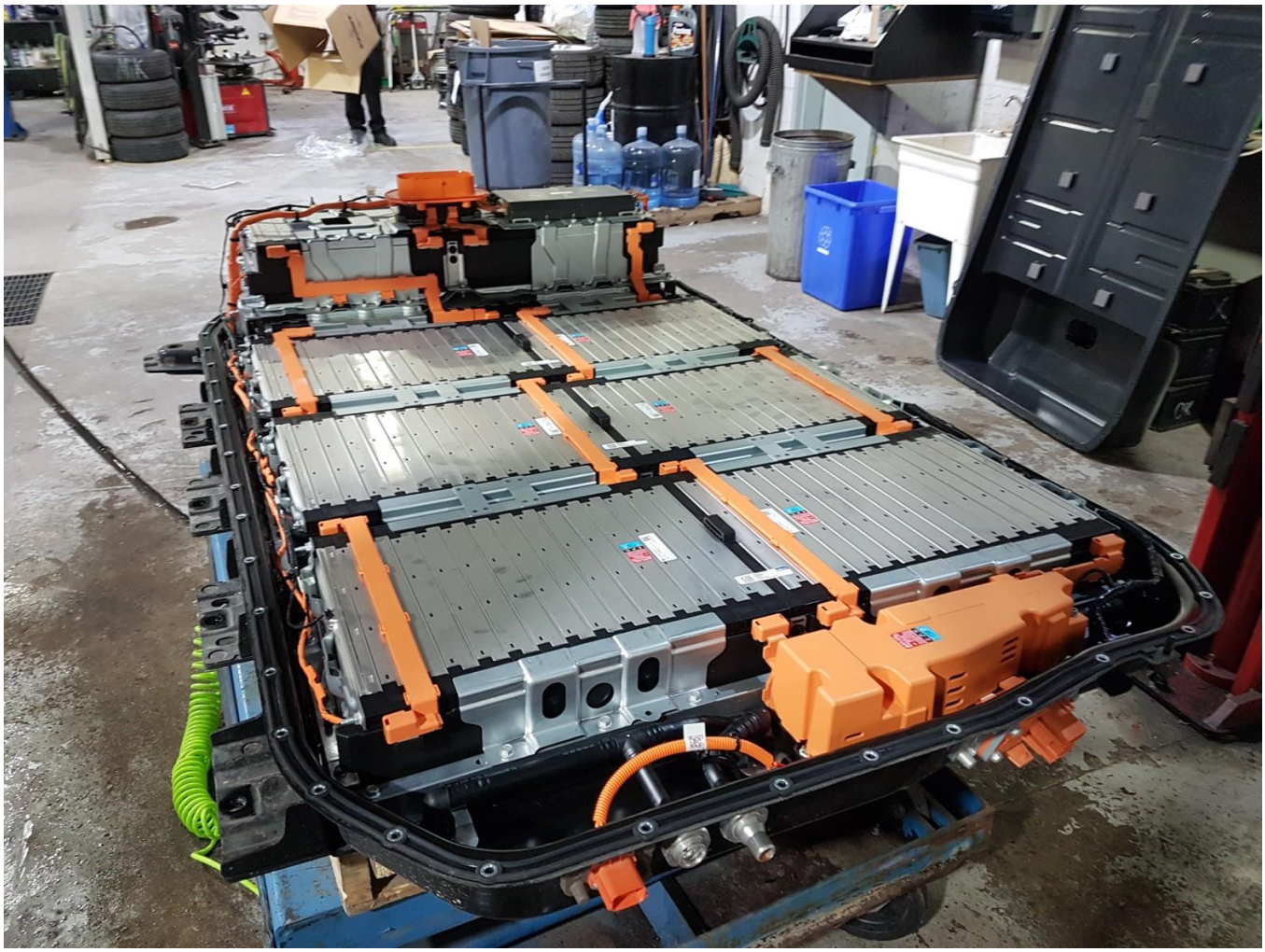
November 2nd, 2021

Extended Producer Responsibility regulation proposal by the government of Québec

7 Electric Mobility Canada Battery working group recommendations



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To the attention of Benoit Charrette,

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Electric Mobility Canada would like to acknowledge the leadership shown by the Quebec government in working towards the creation of regulations for the management of electric vehicle batteries and are willing to work together to ensure that the regulations are as environmentally, economically and logistically efficient as possible.

This document contains our recommendations regarding the management of electric vehicle batteries after the end of their useful life.

If you have any questions or comments regarding this document, please do not hesitate to contact us.

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About Electric Mobility Canada

EMC is a national membership-based not-for-profit organization dedicated exclusively to the advancement of electric mobility as an exciting and promising opportunity to fight climate change and air pollution while stimulating the Canadian economy. EMC's mission is to strategically accelerate the transition to electric mobility across Canada.

Established in 2006, EMC is one the very first electric mobility associations in the world. It represents organizations working to electrify transportation across Canada. Members representing more than 70 billion dollars a year in revenue include vehicle manufacturers, utilities, charging infrastructure manufacturers, charging suppliers and networks, technology companies, mining companies, fleet managers, unions, cities, universities, dealers associations, NGOs and EV owners associations. The following recommendations were developed following months of discussion and exchange with our members who specialize in one or many aspects of the sector.

Electric Mobility Canada shares the Quebec government's objectives of:

- Ensuring that electric vehicle batteries are managed in an environmentally sustainable manner
- Supporting the development of a circular economy for batteries

EMC also believes that a well-designed EPR framework must respect:

- The rights of consumers;
- The unique characteristics of EV batteries, such as their size, weight, market value, diverse chemical composition, and lifespan;
- The innovation curve of the battery manufacturing industry, which means that batteries are and will be increasingly durable;
- Solutions that extend battery life through reuse to meet the 3RV-E hierarchy (source reduction, reuse, recycling, recovery and disposal), as reuse can be a superior option to battery recycling from an environmental and vehicle ownership cost perspective;
- The imperatives related to the fight against climate change by favoring sustainable and exemplary solutions;
- The basic principles of the circular economy to limit the need for mineral extraction in tomorrow's electric vehicle batteries;
- The economic interest of Quebec, which is investing significant sums in the light and heavy transportation electrification sector;

The main problem with Quebec's proposed regulations:

Any regulation on the recycling of electric vehicle batteries that assesses recovery performance based on the volume of batteries put on the market 10 years ago and assumes that batteries will be available for recovery by producers based on time-based assumptions does not work because it does not take into account :

- Of what remains in use on the road or is reused (in primary or alternative applications),
- Whether or not a battery is of interest to the market, depending on its structure, chemistry, state of health, or even its history in a crashed vehicle.
- What could be captured directly by battery recyclers;
- What is exported by third parties: sale of vehicles/batteries to other jurisdictions by end users, dismantlers, etc;
- The fact that rapid growth in electric vehicle sales makes it inappropriate to set recovery targets for a given year based on sales figures from the previous decade;
- Because the expected life of batteries when used in cars and light trucks versus medium-, heavy-duty vehicles and off-road vehicles can vary greatly depending on use cases and vehicle types

Manufacturers do not control these variables.

That’s why we propose the following recommendations.

Recommendation #1: Electric Mobility Canada proposes a producer take-back requirement rather than an expiry date and recovery rate based on assumptions that are not verified and do not directly correlate with "salvageability".

Thus, every battery that a producer puts on the market in Quebec should be recovered by that producer, when the market does not result in a third party acquiring the battery to manage it in an environmentally and logistically responsible manner. In other words, producers are responsible for the ultimate recovery of their own batteries.

EMC members consider the following statement:

"These batteries typically have a 10-year life span, after which they must be replaced. Thus, the first wave of end-of-life electric vehicle (EV) batteries is beginning to accumulate in Quebec"[1], which is the starting premise of the Regulatory Impact Analysis of the draft regulation amending the Regulation respecting the recovery and reclamation of products by enterprises1 of the Government of Quebec, is based on an assumption that has not been quantitatively verified.

In fact, the use cycles and various experiences of electric vehicle owners over the last 20 years have clearly demonstrated that electric vehicle batteries can easily exceed 10 years of service in a vehicle. Several cases of owners of partially and fully electric vehicles can be identified in Quebec whose vehicles have lasted 10 years or more with batteries that are still perfectly functional.

On the other hand, some manufacturers of heavy-duty vehicles consider that the batteries of their vehicles are more likely to last less than 10 years, but not only do these heavy-duty vehicles represent only a fraction of the electric vehicles on the road, but some manufacturers of heavy-duty vehicles in Quebec are currently working with the Innovative Vehicle Institute on the possibility of remanufacturing the batteries of buses.

It is also important to note that vehicle and battery manufacturers such as Tesla and CATL are working to extend the life of electric vehicle batteries to 1,600,000 km (1 million miles), which opens the door to large-scale reuse of batteries when the vehicle is at the end of its life, but the battery is still good.[2] 1,600,000 km represents, at 20,000 km per year, a lifespan of 80 years.

According to Dr. Karim Zaghib and Dr. Jeff Dahn, lithium-ion batteries with NMC technology can go 1.6 million kilometers. As for LFP batteries, we are talking about 15,000 cycles equivalent to 5 million kilometers. (See attached articles)

As recently as October 29, 2021, Dr. Jeff Dahn published the following text in Electric Autonomy Canada magazine[3] on the Quebec government's draft regulation, in which he clearly indicated that it should be reviewed:

"*For several years now, Quebec has been one of Canada's leaders on environmental and climate policy. The electrification of transportation is perhaps the area where Quebec has played the strongest leadership role. But suddenly, Quebec is about to take a sizable step in the wrong direction with its planned electric vehicle (EV) battery recycling regulation. The proposed regulation will put Quebec on the wrong path – one of poor environmental stewardship, inefficient use of resources and greater costs to EV buyers. For those who have not been following the intricacies of Quebec's proposed recycling regulations, the main problem with the proposal is that government deems that batteries have a 10-year life span and obligates manufacturers to reclaim a very large portion of their batteries — ultimately reaching 90 per cent — when they reach that age, even if they are healthy and still working fine.*

An EV owner cannot be forced to recycle their battery after 10 years and if their vehicle is working fine, why would they? But then how does the manufacturer meet the recycling rate requirements after 10 years? The short answer is that this

policy will encourage manufacturers to install inferior batteries with a limited 10-year life span in order to meet the requirements of this proposed regulation. Quebec's assumption that EV batteries have an average life span of 10 years is simply inconsistent with reality and the trajectory of the industry.

I have spent a good portion of my career working to extend the lifespan of lithium-ion batteries. The batteries in today's vehicles cannot and should not be managed as if they are oil filters, televisions, consumer batteries or lightbulbs. Producers should be responsible for the batteries they produce and they should have to collect their batteries, upon request, at end of life. Such a requirement would encourage automakers to focus on battery longevity. But this is not what Quebec is planning.

The most valuable part of an electric car is the battery. Many of today's leading EV batteries are expected to outlast the vehicles they power. EV batteries are not like smartphone batteries as their value necessitates sophisticated charging and temperature control. Advanced EV batteries are designed and operated to ensure long lifetime. In my opinion, Quebec needs to go back to the drawing board and consult with battery experts on battery life span.

One of my main objectives as a researcher is to understand what leads to lithium-ion cell failures and how to get those cells to last longer. So, I am disappointed to see Quebec develop rules that would discourage innovation, that will reward shorter lifespan batteries and penalize those companies manufacturing long-life batteries. If it adopts its planned regulations, Quebec will set a terrible precedent for itself, Canada and the world. Before finalizing its regulation, Quebec needs to step back, look at its objectives and design a new recycling plan: producers should be responsible for the batteries they produce and encouraged to design and implement the longest lifespan possible. Obligating manufacturers to recover batteries when they are still healthy and fulfilling their owner's transportation needs would be entirely counter-productive to the government's transport electrification plan and general environmental goals.

The right way to maximize the environmental and consumer benefits would be to obligate vehicle manufacturers to recover and recycle all of their own batteries when the vehicle owner – the consumer – doesn't want that battery and when that owner doesn't want to sell that battery to a recycler themselves for the valuable materials it contains."

Therefore, it seems illogical to consider a recovery rate associated with an average life of 10 years since:

a) 10 year old light vehicle batteries are very often still usable
b) Electric vehicle batteries are already guaranteed for 8 to 10 years
c) Requiring a recovery rate linked to this average anticipated life of 10 years is tantamount to admitting that we are not aware of the extremely important work of innovation that is currently being carried out throughout the world, including in Quebec and elsewhere in Canada, in terms of research on next generation batteries in order to make them more durable, efficient and safe.

Recommendation #2: Electric Mobility Canada recommends that the government create a specific proposed regulation for electric vehicle batteries

Members consulted by Electric Mobility Canada agree that electric vehicle batteries should be a product category in their own right rather than part of the same proposed regulation that includes other consumer products to be recycled such as

paint, latex, toy batteries and portable electronics. While the other products have little residual value and thus represent little economic interest, the battery of an electric vehicle not only retains significant value, but its safe management requires a supply chain that is of a different order since it is a product to be handled with great care.

Recommendation #3: Electric Mobility Canada supports the government's proposal to allow producers who do not have their own system for managing batteries at the end of their useful life to create a non-profit organization to manage their batteries in a responsible and transparent manner

In this way, producers who do not have their own system for managing batteries at the end of their useful life will be able to rely on the strength of numbers to better manage the costs associated with their recycling.

Recommendation #4: Electric Mobility Canada proposes that EPR require the average cost of managing batteries per kWh for reuse or recycling to be displayed for transparency to government and consumers.

EPR fees should be transparent. If these fees were internalized by the manufacturers, there would be no transparency for the consumer. This "eco-fee" could be revised from time to time to reflect changes in technology and recycling costs.

Recommendation #5: Electric Mobility Canada proposes to better address the possibility of battery reuse and remanufacturing in the EPR program

The vast majority of current batteries that end up outside of vehicles do not end up in recycling centers. Instead, they are resold as spare parts, both in Quebec and abroad, as they have great value for reuse, whether for extending the life of electric vehicles or for stationary energy storage. In fact, one of the most sought-after car parts due to their high commercial value is the battery. The circular economy activities that are naturally set up to reuse batteries contribute to the reduction of greenhouse gases. These activities should be framed and supported, rather than eliminated.

The Innovative Vehicle Institute is currently evaluating the possibility of remanufacturing hybrid bus batteries. If so, the Quebec government could offer support to producers or third parties who contribute to extending the useful life of electric vehicle batteries.

Recommendation #6: Electric Mobility Canada proposes to integrate the concept of a "battery passport" into the EPR

As proposed in the European Union's draft regulation[4], the Quebec regulation should be aligned with the European regulation in order to collect information on batteries through a passport for electric vehicle batteries. This "battery passport" will allow economic operators to gather and reuse more efficiently information and data related to the different batteries on the market and to make better informed choices in their planning activities.

Recommendation #7: Electric Mobility Canada proposes to integrate environmental, policy, technological and economic considerations into the EPR program

The electric vehicle battery plays a central role in the electrification of transportation. The EPR strategy must be designed to align with the challenges and objectives of this strategic sector for Quebec, especially since Quebec wishes to become a serious player in the electric vehicle battery manufacturing industry.

a) Environmental considerations

Unlike "consumable" batteries used in everyday objects that must be replaced regularly, EV batteries have very little chance of contaminating our landfills and our environment, given their value, their size and the existing landfill ban. However, managing the end-of-life of batteries has a significant footprint in itself. Encouraging a second life is very important to maximize the environmental benefits of transportation electrification. It is essential to promote the environmentally responsible management of EV batteries, especially since Canada is one of the most exemplary recycling jurisdictions in the world.

b) Strategic and technological considerations

The battery reuse industry is already helping to accelerate the electrification of transportation in Quebec by encouraging the development of new vehicles at lower costs (by eliminating the need for new batteries). An EPR that allows and encourages the development of a local market could help protect local industries and the local automotive market from potential parts shortages or even material shortages for a battery industry that is subject to the dictates of geo-strategic considerations (e.g., China currently dominating the battery materials market).

c) Economic considerations

Government investments in transport electrification are part of a broader strategy of energy independence from fossil fuels. An EPR project, to be aligned with government objectives, must necessarily include provisions to facilitate positive local economic benefits. Electric vehicle batteries should not be viewed as a cumbersome and dangerous "consumable" waste. Rather, they are a valuable and desired resource, even a potential urban mine. EPR must reflect this shift in thinking.

1 : https://environnement.gouv.qc.ca/matieres/reglement/recup-valor-entrepr/air-rep-202110.pdf

2 : https://www.latimes.com/business/story/2020-09-21/the-million-mile-car-battery-what-is-known

3 : https://electricautonomy.ca/2021/10/29/jeff-dahn-quebec-ev-battery-recycling/?fbclid=IwAR2hqgo0GbIj_nl-9xRI8sPCC-c_6xtb_qUsnDfmqNghNPhRE7nFXxQ8WC4

4 : https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020PC0798

References to European experience:

Auto Recycling Nederland (ARN): independent organization in the Netherlands for end-of-life management of vehicles
All details and results here: https://arn.nl/en/drive-batteries/
Founded and organized jointly by :
BOVAG (trade association of more than 8,000 contractors involved in mobility)
FOCWA (Federation of Contractors in the Body and Vehicle Building Industry and related companies)
RAI Vereniging (The RAI Association represents the interests of more than 700 manufacturers and importers of passenger cars and trucks, trailers and semi-trailers, bodywork and special vehicles, motorcycles and scooters, mopeds and bicycles)
STIBA (Trade association and advocate for certified car, motorcycle, truck and related vehicle dismantling companies)
Results:
The majority of automakers are joining the program
In 2020, over 121 tons of traction batteries were dismantled and processed. 20% have entered the reuse pathway for a second life, mainly for stationary energy storage. The rest ended up in the recycling channel.
The "eco-fee" for each rechargeable vehicle battery is decreasing year by year. It is currently set at between 95 and 135 euros. The fee is paid by the member companies.
Since 2017, traceability is provided in a centralized database independently managed by STIBA (with a fee for each entry, 0.057 euros per entry).

Batteriretur Høyenergi AS: independent organization in Norway for end-of-life management of all types of batteries
All details and results here: https://batteriretur.no/en/hva-vi-gjor/
Founded and organized by the recycling and circular economy industry, and 25% owned by car importing companies:
RENAS (Norway's leading recycling company for electrical and electronic waste)
Grønt Punkt Norge (finances return programs for plastic, metal and glass packaging, container board, beverage board and corrugated cardboard)
Reneos (Tailor-made solutions for end-of-life Li-ion batteries in Europe)
NSSØ (Norwegian Centre for Circular Economy)
EUCOBAT (Eucobat is the European association of national battery collection schemes)
Results:
More than 25 car manufacturers and importers are joining the program.
The batteries will be recycled "across the street" by the new Norwegian recycling plant HydroVolt (8000 tons capacity) founded by Norwegian giants Hydro and NorthVolt.