ELECTRIC MOBILITY CANADA
ACCELERATING ELECTRIC TRANSPORTATION

MOBILITÉ ÉLECTRIQUE CANADA
ACCÉLÉRER L'ÉLECTRIFICATION DES TRANSPORTS

ELECTRIC MOBILITY CANADA

ONTARIO 2023 BUDGET RECOMMENDATIONS

Submitted to:
The Honourable Peter Bethlenfalvy
Minister of Finance
c/o Budget Secretariat
Frost Building North, 3rd Floor
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About Electric Mobility Canada

Founded in 2006, Electric Mobility Canada is a national membership-based industry association dedicated exclusively to the advancement of electric mobility as an opportunity to fight climate change and air pollution while supporting the energy transition of the Canadian economy. EMC has more than 175 member organizations including light-, medium-, heavy-duty and off-road vehicle manufacturers, infrastructure providers, utilities, technology companies, mining companies, research centers, governmental departments and agencies, cities, universities, fleet managers, unions, environmental NGOs and EV owners' groups.

The EMC team works on electric mobility from bikes to cars, from buses to boats, from trucks to trains and from BC to Atlantic Canada. Electric Mobility Canada supports the activities of its members by:

- Communicating to our membership the legislative, policy, technical and operational matters of key interest pertaining to electric mobility. This includes identifying the actions required to meet the needs of the members and proactively communicating these needs to policy makers and other stakeholders.

- Establishing partnerships to accelerate the adoption of electric mobility through research, demonstration projects, policies, programs and strategies to increase market penetration.

- Acting as a resource centre for relevant and contemporary information on electric mobility from across Canada and around the globe.

Electric Mobility Canada is the national voice dedicated to electric mobility in Canada with the most experience and expertise to help advance forward-thinking projects and policies.

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Foreword

There are 3 main reasons to support electric mobility:

1. Air pollution & health

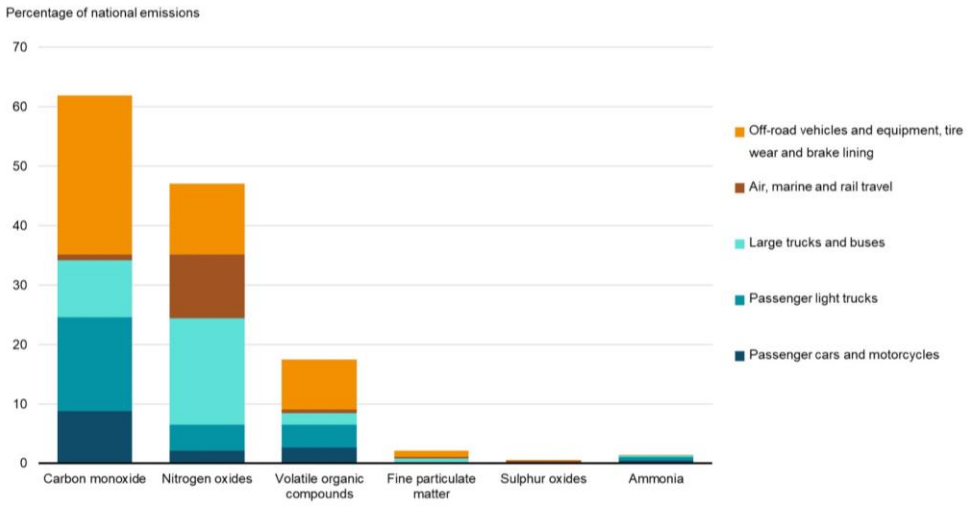
a) According to a 2021 Health Canada report[1]:

- 15,300 deaths per year can be attributed to air pollution in Canada, including from chronic exposure to particulate matter, acute exposure to nitrogen dioxide, and chronic and acute exposure to ground-level ozone.
- $120 billion a year is the total annual economic cost of health outcomes associated with air pollution, equivalent to roughly 6% of the national Gross Domestic Product.
- Combustion emissions from transportation and mobile equipment are the largest source of nitrogen oxide (NOx) emissions, accounting for 51% of total NOx emissions on average; another 28% of NOx emitted in Canada derives from the upstream production of oil and gas.

b) According to a 2022 Environment Canada report[2], transportation (road, air, rail, marine) accounted for:

- 62% of total national emissions of carbon monoxide (CO),
- 47% of nitrogen oxides (NOX)
- 17% of total emissions of volatile organic compounds (VOCs)

Figure. Contribution of transportation, off-road vehicles and mobile equipment to total air pollutant emissions by transportation mode, Canada, 2020.



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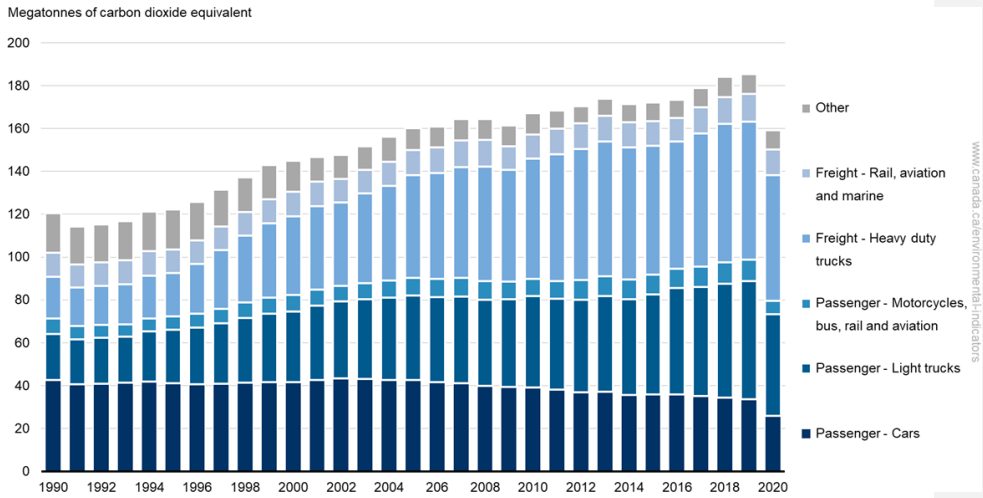
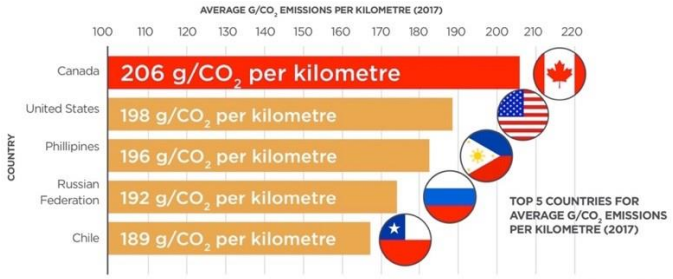
2. Climate change

- Since April 2021, Canada has a new, more ambitious GHG emission reduction target for 2030: 40% to 45% below 2005 levels. According to Canada's 2022 National Inventory Report[3], in the 14 years between 2005 and 2019, GHG emissions in Canada decreased by only 1%. In 2020, the transport sector was the second largest source of GHG emissions, accounting for 24% of total national emissions with 159 megatonnes of carbon dioxide equivalent (Mt CO_2 eq).
- In 2020, due to COVID, national sector GHG emissions were 14% lower than in 2019, the largest decrease since 1990.
- Between 1990 and 2020, national GHG emissions from the transport sector grew by 32%. The growth in emissions was mostly driven by increases from freight trucks and passenger light trucks.
- In Ontario, which in 2020 was responsible for 22% (149.6 Mt) of national GHG emissions, transportation-related emissions were the leading source of GHGs, responsible for 32% (47.8 Mt) of the total provincial emission inventory and 30% of national transportation emissions.[4]



According to 2019 report from the International Energy Agency[5], Canada's Light Duty passenger fleet is the worst performer in the world in terms of average fuel consumption and GHG emissions per kilometer driven. It is also the largest and second heaviest in the world.



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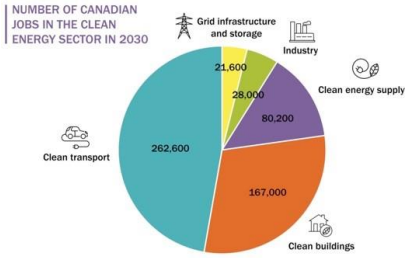
3. The economy

According to 2019 report from Clean Energy Canada[6], there will be approximately 560,000 jobs in the clean energy sector by 2030, with almost 50% in clean transport.



According to a 2020 report by Electric Mobility Canada[7], if Canada adopts a strong electric mobility strategy inspired by those of California, BC or Québec, we can anticipate at least $200 billion in sales revenue between now and 2030 in the EV sector.

Canada's great potential in transportation electrification

Since 2019, the Canadian government has accelerated investment in the EV industry in order to create high paying sustainable jobs for Canadians while decarbonizing its economy. Just in the past 6 months, federal and provincial governments have secured more than $16 billion in investment and tens of thousands of jobs. These actions will most probably end up saving the automotive sector in Canada, but more work needs to be done. According to an Ernst and Young report published earlier this year, while Canada has been increasing its support for the transition to EVs, other countries have been moving even faster: Canada dropped from 8th place last year to 13th place in this year's EY index of EV leadership.[8]

According to an RBC report[9] published on September 28, 2022, "in Canada, we've lagged since 2014, when spending on clean technologies fell sharply. Though we've made up some ground in the last few years, ***the pace of spending is still about half that of other major economies.*** China leads the pack, spending about 1.5% of GDP on green investment each year. In some key industries, it's the undisputed global leader, dominating solar panel and battery manufacturing, accounting for 40% of the world's nuclear reactors under construction, and recently overtaking Europe in the share of electric vehicles sold. Historically a leader, Europe spends around 1% of GDP on green investment. The U.S., Australia and Japan are further behind. But a major shift is coming south of the border. The recently passed U.S. Inflation Reduction Act will pump US$370 billion into clean investment, and leverage additional money from the private sector."

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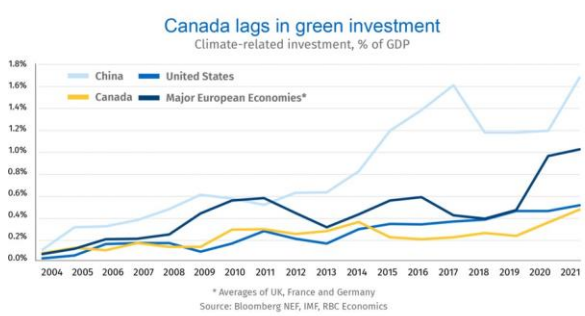
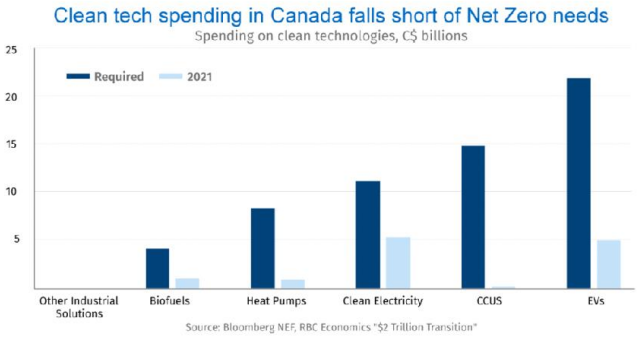


Canada could be left behind

RBC's analysis continues: "Canada will need to adjust its policies, or risk falling even further behind major economies. After a decade of investment, we're still not spending enough on clean electricity, which needs $200 billion in investment by 2035 to meet current green grid goals, and more thereafter to accommodate rapid growth in electricity demand. That said, we're much closer to spending enough on green electricity than in any other sector: investment there needs to *merely* double. ***Spending on electric vehicles (EVs) will need to grow from about $4 billion to nearly $22 billion annually*** while spending on heat pumps to decarbonize buildings will need to grow more than 8 times over current levels."



Canada's modelling towards 2030 reduction targets will be more robust if undertaken using actual deployment and operational data, rather than hypothetical or projected adoption rates. Further, Canada's ability to move policy and programs into finalized regulation, or into a phase of delivery and implementation, will depend on the electric mobility sector's collective capacity to point to on-the- ground projects. This dialectic of deploying, learning, and scaling must have all of our attention if we are to retain a realistic hope of achieving Canada's 2030 GHG reduction targets, while still enjoying economic growth.

Canada has the natural resources, the qualified workforce, the universities, the research, and now the will. That's why we at Electric Mobility Canada support accelerated investments in the EV industry to help Canada fulfill its highest potential as a global leader in this growing sector.

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Electric Mobility Canada recognizes the significant efforts that the Ontario government has recently undertaken to make the province and, by extension, Canada, a global player in the electrification of transport, with many new programs and projects announced to support the acceleration of the EV industry in our country. To help Ontario rise to the top with other leaders, EMC proposes the following recommendations ahead of the 2023 Ontario Budget:

2023 Ontario Budget Recommendations

Light-Duty ZEV Consumer Adoption

1. Establish a light duty EV sales target of 100% by 2030. Follow up the target with a regulated provincial ZEV Standard to ensure that Ontarians get access to their fair share of EVs.
An Ontario ZEV sales standard (referred to as a "mandate" in some jurisdictions) will increase consumer choice, provide earlier access in Ontario to new products launched by manufacturers, reduce wait times for vehicles, and potentially even reduce vehicle costs. Today, most ZEV supply goes to the two provinces that already have ZEV Standards in place: British Columbia and Quebec. As a result, Ontarians have limited access to EVs. A strong target and regulated ZEV standard in Ontario will overcome this problem and ensure Ontarians have access to the EVs that Ontario workers are increasingly going to be making. In addition to Canada's two leading provinces, 15 US states accounting for more than a third of new US car sales have adopted a ZEV standard modelled after California's. In other words, these standards are increasingly the norm, not the exception. For details regarding how to adopt a federal ZEV mandate, see EMC's 2022 report (co-authored with Clean Energy Canada) titled *How Canada can develop a truly effective Zero Emission Sales Mandate*.[10]

2. Establish a modest provincial purchase incentive for new passenger EVs focused on *value for electric-only range.* Doing so will make incentivize the efficient use of battery resources and ensure Ontarians can access the types of electric cars, SUVs and pickups they are seeking.
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 preferred by Canadian consumers. Until EVs reach price parity in up-front sticker price, 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. Any incentive created in Ontario should base eligibility on a straightforward evaluation of *price* relative to *electric range*—not MSRP. The incentive amount issued could be based on achieving revenue neutrality relative to revenues generated though a feebate program (see below).

3. Fund incentives through a revenue-neutral system by having the most polluting vehicles fund EV incentives for new vehicles.
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 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 choose a higher polluting vehicle and help support other Ontarians in going electric. Until all categories of vehicles are available in an electric version, exemptions could be proposed for big families and people who need bigger vehicles for work.

4. Offer incentives for used EVs.
Establish a used EV incentive to encourage used-vehicle buyers to consider an electric vehicle when making their next purchase. This program is complemented by the new vehicle incentive which contributes to ensuring sufficient long-term supply of used vehicles to the market.

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5. Low-and-modest income household purchase incentive "top-up"
To further support low- and modest-income households in going electric, it is recommended that Ontario establish a meaningful income-based incentive "top-up" for new or used EVs, and further offer grants to support the installation of home charging infrastructure.

6. Support the establishment of a shared-EV program for lower-income communities.
Recognizing the shortage in supply of used EVs in Ontario (driven by a lack of new EV supply in the province), and the lack of charging infrastructure in rental buildings, consider establishing a program to deploy shared EVs and charging to social housing properties and other buildings in lower-income communities for use by residents.

7. Support more consumer education
While many Ontarians want to go electric, for others low levels of consumer awareness continue to be a barrier. Work with leading and trusted organizations like Plug n' Drive, EV Society, Tesla Owners Club of Ontario and others to establish a suite of programs to educate and support consumers in making the transition to electric vehicles.

8. Maintain the existing Green Plate program
Access to HOV and HOT lanes has been a motivator for many Ontarians to go electric. Maintain the green plate program given its successful track record and historic all-party support. Continue to provide the same benefits as currently offered on existing highways when new HOV/HOT lanes are constructed in the province until 50% of new vehicle sales are EV.

Commented [BP1]: may wish to adjust threshold

Medium, Heavy and Off-road ZEV Fleet Electrification

9. Establish a medium/heavy-duty EV sales target of at least 100% by 2040, at the latest.
Make Ontario a leader in electric medium- and heavy-duty vehicle use. Electrifying transit and freight will deliver significant economic benefits to transit operators, freight carriers and others, strengthening the Ontario economy. Consider establishing a medium/heavy duty truck ZEV Standard or fleet rule to achieve the target, similar to US-based programs.

10. Work with regulators and utilities to ensure transmission and grid capacity exists to serve return-to-base operations that will be common in freight and transit use.
Electric heavy-duty vehicles are expected to see a rapid growth in demand as more products come to market given the significant economic savings associated with operating electrified fleets. Work with IESO to ensure transmission and grid capacity is available in Ontario's large freight / logistics districts and near transit facilities. Work with the OEB to ensure distributors are well equipped to provide connections to new heavy-duty freight and transit customers swiftly so as not to bottleneck commercial adoption.

11. Establish tax credits or rebates for the purchase of medium/heavy duty charging infrastructure or vehicles for freight use.
Facilitate EV adoption in transit and freight sectors by incentivizing fleet transitions to electric for companies that have publicly committed to eliminate all combustion trucks/vehicles from their fleets by no later than 2040. Establish new rebates or refundable tax credits for the purchase of electric vehicles for transit and freight fleets.

12. Support public transit and school bus electrification and work with the federal government to secure federal-provincial funding programs.
Working with the federal government, provide predictable and long-term funding to municipalities, transit agencies and service providers, public bodies and school bus operators that plan to convert their entire fleet to electric vehicles. This includes helping entities procure electric buses and build out infrastructure, including charging infrastructure and facility upgrades, as well mid-term operational funding support associated with the purchase of electric transit vehicles due to lost revenue associated with a recent

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decrease in ridership due to COVID-19. More should be done to support operators, distributors and transmission companies for electrical upgrade costs associated with charging large batteries for transit and school bus electrification.

EV Infrastructure Deployment Plan

13. Set provincial targets for EV charging deployment for all vehicle classes
Set ambitious two-, five-, and ten-year targets for AC and DC charging connector deployments in each of the following sectors: multi-unit residential buildings, at workplaces, at town/city destinations, for long distance travel, for remote travel corridors, and for fleet depots.

14. Allocate $300 million over four years to make 300,000 existing condominium and apartment parking stalls in Ontario EV-ready.
Multi-unit residential buildings represent the largest infrastructure barrier to EV adoption, as highway-side and public charging is increasingly competitively developed or is supported by the federal government. As such, the province can alleviate this important barrier to EV adoption by allocating $75M/year for four years specifically for the purpose of funding 50% of electrical power upgrades and make-ready infrastructure costs in Ontario's existing multi-unit residential building stock through building owners (for rental apartments) and condominium corporations. The goal should be to bring electrical capacity to 300,000 parking spaces, eliminating a major barrier to EV adoption.

15. Establish EV ready requirements for multi-unit buildings and workplaces in the Provincial building code and Provincial Policy Statement.
Establish requirements in the provincial building code to mandate the installation of EV-ready power infrastructure in new construction. Require 100% of multi-unit residential parking to be EV-ready, and 20%-40% of workplace parking to include the basic electrical infrastructure needed for EV charging, at the time of construction. Such requirements should be included in the Ontario Building Code and will save EV drivers and businesses money by avoiding expensive and complex retrofits. While building codes are the best tool to implement these requirements, alternatively, the province could update the Provincial Policy Statement to direct municipalities to have regard for EV charging infrastructure in municipal planning frameworks. Make clear that requirements should meet both the needs of current and future EV charging based on local, provincial and national targets, where they exist.

16. Put underutilized government lands to work solving the urban charging challenge by establishing "charging hubs."
To support access to charging in urban areas for those without reliable home charging access, and to put underutilized and high-cost provincial/agency real-estate to work supporting EV adoption, Ontario could take the lead in identifying parcels of public land in its high-cost real estate markets to establish as "Charging Hubs." Charging hubs would help charging network providers to defray or avoid the high capital cost of land acquisition in major markets and centres. Such hubs should be large, available to any and all charging operators without exclusivity and should not cost EV drivers a fee to enter. In addition to its own lands, Ontario should also work through multi-party agencies (e.g. Waterfront Toronto) in which Ontario is a member, to achieve this goal. Charging hubs will provide scale in urban settings, enabling the market to meet growing demand for charging services until multi-unit residential building retrofits in cities can be completed. Approach provincially controlled highway rest stops in the same manner: without exclusivity to any and open to all operators to ensure a sufficient level of service is provided to Ontario's EV drivers over the long-term.

17. Implement a time-limited utility connection rebate, provincially funded, to support deployment of large-scale EV charging installations for all vehicle types
Moving freight and large volumes of passenger vehicles with electricity will require electrical service upgrades to accommodate the power needs of large-scale charging deployments. The federal government should provide funds to rebate a portion of the cost of electrical service upgrades and connections for these large, high power, charging deployments in the near-term to afford provincial

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regulators, working with utilities and charging operators, time to address these costs permanently through provincial measures. Examples of eligible costs could include line-extension costs and private substation costs, where required.

Provincial Leadership

18. Direct the Ontario Motor Vehicle Industry Council to require the estimated cost of fuel (whether gasoline, diesel or electric) be advertised over a 6-year ownership period with every vehicle advertisement made in Ontario.
To better inform and protect consumers, require retailers and manufacturers to advertise the estimated cost of fuel over a six-year ownership period next to the purchase price of every advertised vehicle (whether gasoline, diesel, hydrogen or electric), including on website advertising and in-store, as part of OMVIC's obligations to protect fair advertising practices. This will help consumers better understand the total cost of ownership of any vehicle – ICE vehicle or ZEV – at point of purchase and better inform consumers who are making a major purchase decision about the costs they will face.

19. Establish a "Cabinet Office Secretariate for Electric Transport"
Create a dedicated secretariate within the Cabinet Office to coordinate and advise the Premier on progress being made by government departments towards Premier-level oversight will ensure EV issues receive sufficient attention and priority. Such an office is justified given the public health benefits, climate change imperatives and the number of different government departments responsible for different aspects of electrification.

20. Make government & MPP EV awareness and education a priority
Unless both consumers and policy makers understand all the benefits and savings associated with electric vehicles, along with the challenges to adoption, the transition to an electric future will take longer than necessary. As such, the government should make EV education a priority, working with leading educational and independent consumer organizations like Plug n' Drive, EV Society, and Tesla Owners Club of Ontario.

21. Provincial fleet rule: 100% EV unless otherwise justified.
Government can lead by example and foster demand and investment in the EV ecosystem through its own purchasing power. No internal combustion engine vehicles -- whether heavy duty, medium duty, light duty or off-road -- should be purchased by the government unless an electric option does not yet exist to meet a specific need. In other words, every vehicle purchased by the government should be electric from this point forward, unless a compelling reason exists to purchase a combustion vehicle. This rule should extend to crown agencies and delegated administrative authorities in Ontario. Ontario should also start installing charging infrastructure in its owned and leased parking lots immediately to ensure that charging does not act as a barrier to EV adoption for government fleets or employees.

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Notes from Tesla conversation
Iain / Daniel / Bora
Feb. 6, 2023

1. Attracting high-growth, advanced manufacturing invsetment to Ontario
    a. Review economic development programs to ensure they align with the needs of high growth, advanced manufacturing, companies
        i. Land costs vs growth capital
        ii. Rapid growth companies need to prioritize use of capital more than established industries
        iii. Quick access to land at a competitive prive relative to other NAM options
        iv. Existing programs (mostly) prioritize retooling in existing plants vs attracting new → Stifles ability for parts, tooling, new OEMs to invest in the province

2. Reducing fuel costs - Accelerating tht eroad to lower fuel costs for Ontarians and their businesses
    a. Reduce fuel costs for freight haulers and help Ontarians avoid ever-inflating "fuel surcharges" on their goods and services by:
        i. Providing tax credits for
        ii. Expedite utility planning and servicing in logistics districts
    b. Charging hubs - put underutilized public lands to work and generate long-term ROI
        i. No exclusivity - everybody can be there
        ii. Free access for the charging operator
        iii. Free access for the public
    c. Fix charging at ONRoute: unreliable and malfunctioning public charging undermines productivity
        i. Gvmt of ON wants exclusivity for Ivy (HydroOne x OPG) - we need to get rid of this - create a competitive market, open it up.
    d. Address lin extension inconsistencies which are delaying business and stalling investment

3. Increasing efficiency of civil service - approval timelines - set service standards for EV-charging related approvals
    a. Reduce admin costs to gvmt by increasing civil service efficiency while reducing red tape:
        i. **Set a 2-week service standard** to respond with approvals or rejections of requests for EV charging projects when a project is being privately developed but may encroach into an MTO right-of-way
        ii. These projects are almost always approved but only after extensive delays
        iii. Looking for a yes/no commmitment based on willingness to move if right-of-way is claimed

4. Activating Ontario's mineral resources
    a. Identify solutiosn to the financing challenges that junior mining companies face in Canada
        i. Tesla is a sustainable energy company, not a mining company. Tesla prefers to be a customer (an offtake partner) to mining ompanies
        ii. Resources Quebec, for example, invests in projects to help de-risk. Consider building and Ontario
    b. Mining juniors, industry, offtake partners, gvmt - what do we need to make the project go (road? Financing? Feasibility) - need to convene with the intent to resolve

Commented [BP2]: Any recommendations here that I've missed that we want to pull in from our conversation with Iain M?

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FROM EMC'S 2023 FEDERAL PRE-BUDGET SUBMISSION

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Policy & Regulation for Light Duty Zero Emission Vehicles

1- **Federal rebate for electric cars and light trucks:**
Until EVs reach price parity in sticker price, incentives will be needed to level the playing field for consumers faced by a choice 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. Going forward, Canada should base eligibility on a straightforward evaluation of price relative to electric range, rather than sticker price alone. Canada may also wish to consider a means-tested approach toward EV incentives, to ensure that more public investment is directed households that would not otherwise have been able to afford the electric option when making a vehicle purchase decision.

2- **Used EV rebate:** Despite the frothy secondary market in EVs, the government should not lose sight of its directive (issued via the 2021 mandate letter to the Minister of Transport) to follow leading jurisdictions, like California, to make purchase incentives available for used / pre-owned EVs. This will further enhance the accessibility of EVs to low- and middle-income households. The federal government should follow provincial examples, such as the Electrify Nova Scotia Provincial Rebate Program, which offers up to $2000 for consumers looking to access (battery) EVs through the used vehicle market. The introduction of such an incentive federally would also help to substantiate a second-hand market, which in turn will reinforce market confidence in the residual values for EVs and incent vehicle financing partners to underwrite more EV purchases and fleet electrification projects.

3- **Federal ZEV sales mandate:** Adopt clear targets so 20% of LDV sales be ZEVs by 2026; 60% by 2030 and 100% by 2035. For details regarding how to adopt a federal ZEV mandate, see EMC & CEC 2022 document titled *How Canada can develop a truly effective Zero Emission Sales Mandate*.[11] A federal ZEV mandate will not only help bring much needed supply of electric vehicles to Canada, but it will also bring market certainty to private investors and financial institutions who want to support the transition to EVs in our country.

4- **Federal GHG emission standards:** 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.

5- **Feebate:** Establish a financially neutral *feebate* system to make polluting passenger vehicles pay for ZEV rebates, so the rebate programs can finance themselves. For vehicle categories that do not yet have a ZEV option, feebate exemptions should be considered until ZEV models come to market.

6- **PHEVs:** Progressively remove the federal rebate for PHEVs with less than 50 km of electric range *or* make the rebates proportional to their official range: $2,000 from 40 to 59km, $3,000 from 60 to 79km, $4,000 from 80km or more.

7- **Low-income rebate:** We recommend an incentive for lower- and modest- income Canadian individuals and families to transition to ZEVs by offering a dedicated $2000 rebate for a new or used ZEV via a program like the California Income Eligibility program. This program should be stackable with the original incentive program.

8- **Green cash for clunkers**: To get more polluting ICE vehicles off the road (12 years and older), develop

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a program focused on Canada's long-term climate objectives, meaning funds should be only available for the purchase of new or used ZEVs, transit passes or active transportation tools (e.g., bikes or e-bikes). This program should be stackable with other incentive programs.

9- **Electric taxis, car sharing and carpooling incentive:** Offer a $2000 rebate for taxis, car sharing and carpooling businesses and individuals who want to transition to electric vehicles ***and remove the 10-vehicle cap on fleet rebates as it keeps such fleets to become electric at a fast enough pace***. This program should be stackable with the regular EV incentive program to help reduce GHG emission, air pollution ***and*** traffic congestion.

10- **G/HST exemption**: for both new and used light duty ZEVs to support equitable access to the benefits of driving electric. Where vehicles are not eligible for other federal vehicle incentives or tax deductions, then a full GST exemption for medium- and heavy-duty ZEV purchase is recommended to apply.

11- **Four-year federal guarantee** on ZEV financing contracts for ZEV loans via the Canada Infrastructure Bank to ensure that all Canadians have access to ZEV financing since their initial purchase price is higher than that of comparable gas vehicles.

12- **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 BC, Association des Véhicules Électriques du Québec (AVEQ), Electric Vehicle Association of Atlantic Canada (EVAAC), Electric Autonomy Canada, 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 information.

Charging Infrastructure Measures for Light-Duty Vehicles

In order for Canada to be able to support the growth in EV ownership, we recommend the following actions:

13- **Infrastructure Targets:** Set up ***clear charging infrastructure targets*** for LDVs in accordance with the 2022 NRCan report[12]:

Table ES- 2: Estimated total charging infrastructure needs and EV-to-charger ratios for Canada.

		2025	2030	2035	2040	2045	2050
Scenario 1: High access to home charging	Public DCFC	4,300	13,800	32,000	50,200	62,700	69,000
	Public L2	48,000	181,000	410,000	593,000	673,000	658,000
	Total Public Ports	52,000	195,000	442,000	643,000	736,000	727,000
	Total MURB Ports	515,000	1,302,000	2,189,000	3,191,000	4,326,000	5,610,000
	EVs/Level 2	21	26	30	35	40	47
	BEVs/DCFC	180	250	300	330	350	380
	EVs/Public Port	20	24	28	32	37	43
	EVs/Total Ports	2	3	5	5	5	5
Scenario 2: Low access to home charging	Total DCFC	4,300	14,100	33,700	55,100	72,500	84,900
	Total L2	49,000	186,000	436,000	659,000	791,000	830,000
	Total Ports	53,000	201,000	469,000	714,000	864,000	914,000
	Total MURB Ports	46,000	152,000	499,000	886,000	1,318,000	1,799,000
	EVs/Level 2	21	25	28	31	34	37
	BEVs/DCFC	170	240	280	300	300	310
	EVs/Public Port	20	23	26	29	31	34
	EVs/Total Ports	11	14	13	13	13	12

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14- **Public Infrastructure Funding:** Provide sufficient funding so Canada reaches the following targets:

Budget for 53,000 public ports by 2025:
5,000 DCFC / 48,000 L2

Budget for 200,000 public ports by 2030:
15,000 DCFC / 185,000 L2

15- **Condo and multi-unit residential building infrastructure targets**: Set a goal to make 1 million existing apartment and condominium/strata parking stalls EV-ready by 2030 and establish new funding programs to achieve this:

Budget for 100,000 chargers in 2023-2024

16- **Focus on dedicated charging investments:** (i) on cities' downtown areas where millions of Canadians cannot charge their ZEVs at home, (ii) rural, remote and Northern communities where charging deployment is less developed.

17- **Focus on highway side charging investments**: to close the gaps in Canada's charging infrastructure along long-distance travel corridors, and on increasing density of charging in high-travel areas where charging demand is growing fastest.

18- **Incorporate EV-ready requirements** into the Model National Building Code and Energy Code for Buildings and/or support EV- ready municipal zoning bylaws.

19- Put underutilized government lands to work by facilitating multi-service provider "charging hubs," particularly in high density and high-cost real estate markets.

20- Include EV charger installation or EV-readiness as part of energy efficiency programs to help Canadians who live in older houses (40 years and older) retrofit to the electric infrastructure requirements for EV charging.

Budget for 20,000 home retrofits in 2023-2024

Electric cars during a winter test - February 2022

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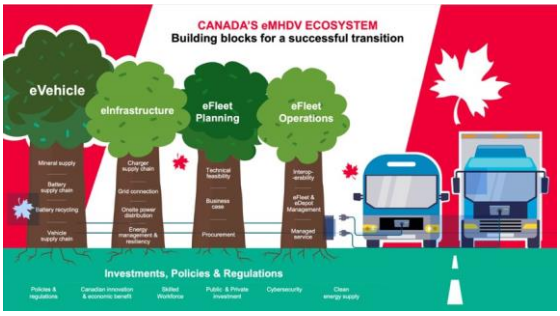
Policy & Regulation for Medium & Heavy-Duty Zero Emission Vehicles

The Medium and Heavy Duty Zero Emission Vehicle segment is developing at a fast-growing pace, thanks to support from the federal government, the private sector and R&D development. Yet, we are still in the early stages of the decarbonization of this segment.

In September of 2022, the Electric Medium and Heavy-Duty Vehicle (eMHDV) working group from Electric Mobility Canada published a document addressing the gaps in the eMHDV ecosystem[13].

While some gaps can be handled swiftly with government support, some others will take more time and will need dedication in the medium to long term.



21- **MHDV Charging Infrastructure Funding**: We recommend that the federal government establish a dedicated five-year grant- based incentive program to support the deployment of large-scale EV charging installations in the medium and heavy-duty segments, particularly in the truck sub-sector that is not considered under the current CIB program for electric buses and school buses. This program should support charging infrastructure deployment for MHD commercial and public fleets, including highway and en route fast chargers, and chargers in public and private depots. While the federal government recently launched the new Incentives for Medium and Heavy Duty Zero-Emission Vehicles (iMHZEV) Program to support the purchase of zero-emission medium- and heavy-duty vehicles, there is no complementary program specifically dedicated to supporting zero-emission MHDV charging infrastructure. This gap could be remedied by creating a funding program that would, at minimum, match the budgetary lifetime of the iMHZEV program, but on the infrastructure side of the deployment segment. We recommend a total funding envelope that is scaled to what the California Energy Commission has invested in MHDV charging (approximately USD $390m) through its Clean Transportation Program for 2021–2023. Considering the 2019 Memorandum of Understanding between the California Air Resources Board and Environment and Climate Change Canada on cooperating for clean vehicles/engines/fuels, and the fact that clean transport is the first "area of cooperation" in the more recent June 2022 Canada-California MoU on Climate Action and Nature Protection, there is a clear foreign policy and international-cooperation rationale for matching program amounts and incentive levels with our partner in EV leadership.

Budget for MHDV charging infrastructure in 2023-2024: In line with California Energy Commission

22- **MHDV Charging Infrastructure Targets**: As with Recommendation 13, EMC believes the Government of Canada should establish clear targets for charging infrastructure installations devoted specifically to MHD EVs, alongside targets for vehicle adoption. To advance transportation electrification, electric infrastructure must be a forethought, not an afterthought. In addition, there is significant job creation potential linked to the charging infrastructure, including not only manufacturing of chargers, but also the design, installation and service of infrastructure (both hardware and software).

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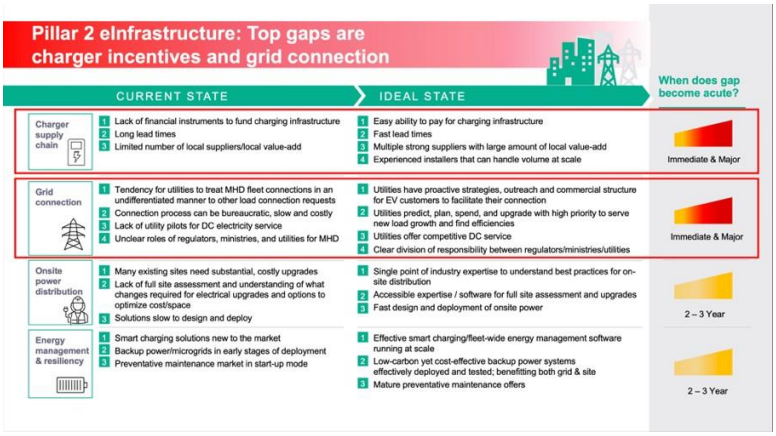
23- ***Funding and low-cost capital for electrical utility infrastructure upgrades needed to support multi-MW charging:***
Medium and Heavy-Duty vehicles are critical to the Canadian economy; however, they are responsible for over 40% of national transportation emissions. The electrical infrastructure necessary for fast-charging MHD EVs is typically in the multi- megawatt range, which often requires costly electrical infrastructure upgrades which will slow MHD EV uptake, particularly in provinces with capital constrained electric utilities. EMC's Utility Working Group, comprised of utilities across Canada, is eager to support transportation electrification. Access to funding and ***capital specific*** to electrical infrastructure upgrades necessary for transportation electrification would further enable utilities to assist in accelerating this energy transition.



24- **We support the federal government in its will to develop Zero Emission Vehicle adoption targets backed by regulation as mentioned in Canada's Emission Reduction Plan:** "Launch an integrated strategy to reduce emissions from medium-and heavy-duty vehicles (MHDVs) with the aim of reaching 35% of total MHDV sales being ZEVs by 2030. In addition, the Government will develop a MHDV ZEV regulation to require 100% MHDV sales to be ZEVs by 2040 for a subset of vehicle types based on feasibility, with interim 2030 regulated sales requirements that would vary for different vehicle categories based on feasibility, and explore interim targets for the mid-2020s."[14]

25- **MHDV Scrap-it program:** We recommend a MHDV scrappage program for fossil fuel-powered vehicles in exchange for a ZEV (ideally one that is stackable with other financial incentives) and rebates (that have a clear pre-approval process).

26- **Electric Transit buses**
We recommend that the federal government:

- Subsidizes 85% of the price differential between an electric transit bus and a fossil fuel transit bus *instead of loans* to accelerate the transition towards electric transit buses.
- Subsidizes 50% of the cost of new electric transit infrastructure that needs to be installed for electric buses
- Make the proposed program admissible with other federal and provincial programs
- Offer financial support for three to five years for the operating costs of the transit systems to compensate for the significant drop in revenue due to COVID-19 since the current emergency fund will end soon.

For Quebec & Ontario, EMC supports the provincial requirement for 25% of Canadian content for

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transit buses. EMC understands that these supports would enable EMC's bus OEM members to:

- Maintain or grow the number of high-tech jobs (R&D, engineering, etc.) in Canada
- Ensure 5% of these funds is reinvested into Canadian operations/infrastructure

27- **Electric school buses**

We recommend that the federal government:

- Subsidize 85% of the price differential between an electric school bus and a fossil fuel school bus *instead of loans*
- Subsidize 50% of electric school bus infrastructure
- Make such an incentive program stackable with other federal and provincial programs to support cleaner commutes for students and Canada's school bus manufacturing industry.

28- **Electric Vehicles fleets in ports, airports and other 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. Support the purchase of zero emission trucks, snowblowers, and other clean vehicles and mobile equipment.

Policy & regulation for off-road vehicles and marine transportation

A growing number of companies offer a diversity of off-road vehicles ranging from electric snowmobiles to electric watercrafts and electric side by side that are either used for work or pleasure, and that can help significantly reduce GHG emissions, not to mention air and water pollution. It is important to note that:

- a modern gas snowmobile emits as much air pollutants as 40 modern cars.
- noise pollution is also a nuisance to wildlife.
- In remote regions of the country, snowmobiles can often be one of the first means of transportation.
- Because of our winters, snowmobiles are relied upon by law enforcement units (for search and rescue work and emergency missions), they are used by surveyors, ranchers, public utility employees, environmental and wildlife scientists, ski centres, recreational park agencies, and countless other organizations. The same is true for other off-road vehicles.

Today, a growing number of cities, states, countries and automakers are moving towards 100% ZEV sales by 2035 of both road and off-road vehicle and Canada could do the same. The jurisdictions that are including targets for the electrification of off-road vehicles include New Jersey (Bill S 432), California (Sept. 23, 2020 Executive Order) and New York (Bill S 2758). If the government is serious about achieving zero emissions in the transport industry, and if it is committed to an equitable clean energy transition in which zero-emissions options are made available to rural and remote Canadians, it must also extend these policies to the off-road sector.

In addition, some of the leaders in the electric off-road and marine industry are based here in Canada, which means that supporting the transition to zero emission will help create high paying sustainable jobs in the country.

That's why we recommend:

29- A federal rebate for the purchase of electric snowmobile, personal watercraft or RV in line with the Yukon electric snowmobile rebate of $2500.[15]

30- A ZEV mandate for small off-road vehicles in line with the most ambitious jurisdictions in North America, whether at the federal or state level.

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31- A luxury tax exemption for zero-emission vessels since they cost more than gas or diesel powered vessels and their purchase should be supported, rather than discouraged.[16]

32- **Electric ferries:** According to the Canadian Ferry Association[17] **"**Canada is home to over 180 different ferry routes with a route presently operating in each province and the majority of the territories. These ferries represent a mix of private and publicly operated routes and well as a mix of passenger, freight, and mixed-use ferries… Transportation through waterways has always been a crucial part of Canada's history." With ferry routes in every region across Canada, the ferry sector continues to play an integral role in Canada's economic and social development.

In June 2022, a large EMC delegation went to Norway for the EVS35 International conference. That is when the EMC delegation discovered that out of 825 ferries in their country, 47% of them were already electric. The largest ferry in Norway, the Bastø Electric[18] is 139.2-metre-long and 21-metre-wide has room for 600 passengers and 200 cars or 24 trucks. The battery and fast-charging systems for all three ferries are supplied by Siemens Energy from the battery factory in Trondheim. Bastø Electric uses batteries with a capacity of 4.3 MWh. The fast-charging system has a capacity of 9 MW, according to the shipping company. When docking, the ferry is always "charged at lightning speed. The approximately ten-kilometre-long ferry route between Moss and Horten is Norway's busiest ferry connection, according to Bastø Fosen. Annually, 3.8 million passengers and 1.8 million vehicles are transported on this route. "During 2022, emissions on this ferry route will be reduced by 75 per cent," according to the company, and each ferry docks and departs 20 to 24 times a day. The crossing takes around 30 minutes.

In view of the clear potential for progress in electric ferry deployment, we recommend that the federal government work with regional or provincial transit agencies, as well as Crown corporations like BC Ferries, to launch a program to support the electrification of ferry services across Canada. This action will help to lower GHG emissions, air and water pollution, and stimulate the Canadian zero emission marine industry to become a North American leader.

(June 2022 - Electric ferry in Oslo)

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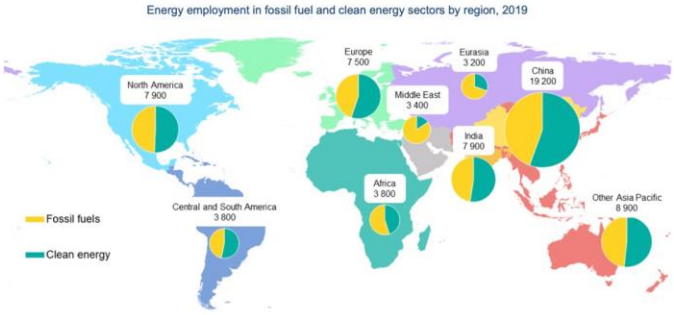
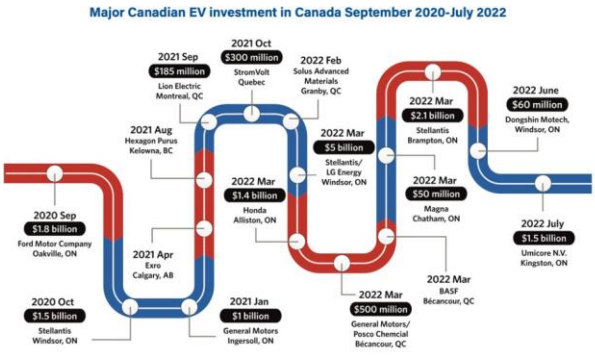
Policy & Regulation for EV Industry jobs

On the most important reasons why Canada needs to accelerate electric mobility policies is **jobs**. While we must reduce our GHG emissions and air pollution, we all agree that we also must be doing that ***while supporting the transition to sustainable jobs in the clean energy and transportation sectors.***

According to a 2022 World Energy Employment report for the International Energy Agency[19], "Energy employment is set to shift rapidly as countries and companies accelerate efforts to decarbonize and meet net zero emissions pledges… Clean energy employs over 50% of total energy workers, owing to the substantial growth of new projects coming online. **There is tremendous growth for energy employment on the horizon, driven primarily by new investments to decarbonize.** In all IEA scenarios, energy employment is set to grow, outweighing declines in fossil fuel jobs. In the IEA's Net Zero Emissions by 2050 Scenario, we estimate that 14 million new clean energy jobs are created by 2030, while another 16 million workers shift to new roles related to clean energy. Around 60% of these new jobs require some degree of post-secondary training."



Since 2020, the federal government has announced many inspiring projects in the electric mobility industry, ranging from vehicle assembly to battery manufacturing, to cathode plants and anode plants, etc. In the last six months alone, the federal government has secured $15 Billion of investment and tens of thousands of jobs



(EV Investment in Canada - Credit: Unifor[20])

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The Canadian Battery industry: a once in a generation opportunity

According to the 2022 Clean Energy Canada & Trillium Network for Advanced Manufacturing Report titled "Canada's Economic Engine"[21] in which EMC participated,

- By 2030, Canada's EV battery supply chain could support nearly 250,000 direct and indirect jobs and add $48.2 billion to its economy. When induced jobs are considered (for example, employees at a restaurant popular with supply chain workers), a total of nearly 323,000 jobs could be created across Canada and $59 billion added to the Canadian economy.
- Between 2020 and when the analysis underlying this report was finalized in June 2022, Canada attracted at least $1 billion related to EV battery mineral extraction and materials manufacturing, $5.2 billion related to EV battery cell and module manufacturing, $6.6 billion related to EV assembly, and $1 billion related to EV battery components and recycling.
- Since June 2022, Canada has seen additional major battery announcements, such Umicore's $1.5 billion plan to construct a cathode active battery materials facility in Kingston, Ontario, and recent deals with Volkswagen and Mercedes-Benz to secure Canadian EV battery raw materials while cooperating in other areas such as battery manufacturing.
- Canada ranks among the world's top five countries when it comes to battery supply chain potential, largely due to its access to key metals and minerals.
- The global market for batteries will be worth at least US$360 billion by 2030. By 2040, the International Energy Agency projects demand for critical minerals to grow by at least 30 times to meet rising demand for batteries used in EVs and storage.

Here are the 6 key recommendations from this report

- **Develop a strategy:** Canada needs a public-facing, national battery strategy that pulls existing efforts together, connects dots across the battery supply chain, and guides industrial development.
- **Build the workforce:** Canada is home to one of the world's top talent pools but is faced with worker shortages and challenges ensuring the right talent is in the right place. Canada must develop new strategies to engage and mobilize big populations of skilled workers.
- **Accelerate project development:** Canada faces significant competition in securing additional battery supply chain investments. Canada should focus on lining up project land and infrastructure needs while creating predictable and efficient review processes for projects across the supply chain.
- **Grow the North American market:** Canada must support and expand policies to increase domestic EV demand and uptake.
- **Promote Canada's clean battery brand:** Canada should continue promoting its many clean battery advantages— including low-carbon critical minerals, proximity to the U.S., a cutting-edge battery research and recycling leadership, and abundant clean electricity—to attract investment into its battery supply chain and increase export opportunities.
- **Scale up homegrown clean battery leaders:** Canada is home to a host of innovative battery technology companies. The next step is to leverage existing investments from multinational battery cell manufacturing companies to also support domestic companies.

(Battery assembly plant – 2022)

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On the steps on these recent successes, we recommend that the federal government keeps working to attract foreign investments while helping Canadian workers transition as smoothly as possible in this new industry.

Here are our key recommendations:

33- **Develop an integrated electric mobility strategy to achieve Canada's climate and electrification targets in coordination with Canada's First Nations, Inuit and Métis:** We recommend the launch of a pan-Canadian EV Strategy that includes an EV Action Plan[22] 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. Accountability measures, such as periodic audits, should be established. Considering that transportation electrification projects might impact First Nation's, Inuit and Métis, we highly recommend collaboration as soon as possible in order to make this collaboration fruitful for all parties involved from environmental, social and economic points of views. As the national voice of electric mobility in the country, EMC can play a central role in the development of this strategy through a fund specifically dedicated to its development, writing and deployment in collaboration with all federal departments involved.

Budget to develop an integrated electric mobility strategy in 2023-2024: $20 million

34- **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.

35- **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. Simultaneously, interoperability standards for charging vehicles must be formalized. Regional Canadian interoperability test centers can be used as a forum to help ensure that these standards are met and there is compatibility between different vehicle and charging infrastructure types.

36- **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.

37- **Support workforce training program for EV sales, repair and maintenance:** As more Canadians are interested in buying EVs, the lack of experience and knowledge displayed in many stores and dealers selling EVs in 2022 remains a significant roadblock to EV adoption. We recommend the creation of dedicated EV training programs to help workers working in this industry take advantage of the growing opportunities ahead.

38- **Support training and retraining programs to help workers make the transition to a decarbonized economy:** 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.

39- **Champion Canada's mining advantage:** by supporting electrification at mining locations across the country and promoting sustainable mining development and operations, particularly in connection with

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those metals and minerals necessary for the ZEV supply chain in Canada and in other jurisdictions.

40- **EV battery circular economy:** In collaboration with industry stakeholders, adopting and implementing a framework based on the highest international standards of circular economy will optimize EV battery lifecycles and ensure that EV batteries are managed efficiently at the end of their useful life.

Federal leadership

One of the best ways for any policy to be embraced by its citizens is through example. If people see their leaders adopt responsible and even exemplary behavior, they will be more inclined to adopt the same habits. This is why we recommend that the federal government adopt the following policies:

41- **Establish a Privy council office for electric mobility:** 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.

42- **Make government and parliamentarians EV 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 BC, EVAAC, and others to establish experiential learning opportunities for elected officials and civil servants.

43- **Convene electricity stakeholders to develop EV solutions for the future of Canada's electric grid:** EMC convenes an expert Utility Working Group that is committed to developing Canadian solutions for the future of EV deployment, but the federal government must play a leading role in this transition. That's why we recommend the establishment of 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 may also be needed to establish pan-Canadian guidance for electricity regulators to expedite deployment of charging infrastructure. Guidance could address: 1) electrical service size challenges for EV charging; 2) demand charges and opt-in electricity rates for public charging; 3) the need for EV charging station connection prioritization to keep infrastructure expanding in step with EV demand, especially for MHD EVs which imply high load growth; 4) utility-supported fleet facility assessments and infrastructure upgrade planning; 5) needs assessment of public or shared infrastructure for key corridors and vocations, informed by commercial vehicle usage data, to supplement charging needs outside of fleet-owned facilities; 6) the use and pricing of electricity to support grid-beneficial applications such as vehicle- to-grid and demand response. Finally, we need a clear role for utilities and regulatory flexibilities to enable utility investments in transportation electrification; utilities need to be empowered to own and rate-base charging infrastructure. EMC assessed major gaps regarding grid connections in our eMHDV Ecosystem Analysis; these must be addressed to ease the transition to electrification in the freight and goods movement segment of the transport sector.

44- **Ensure federal fleets and buildings are 100% electric and EV ready by 2030:** 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.

45- **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

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(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.

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