A "Canadian Content" Approach to building a North American Electric Vehicle Supply Chain

accelerate

Executive Summary

A North American electric vehicle (EV) supply chain is emerging and Canada needs a national strategy to secure its place in this market. The global rise of industrial policy creates both opportunities and challenges for our country to secure long-term prosperity in net zero mobility. Canada needs to respond with its own strategy to navigate this competitive landscape in a way that advances its economic and geopolitical interests, as well as its emissions reduction goals. To inform this, Accelerate undertook a policy consultation with Canada's broad EV industry ecosystem to identify core initiatives that could inform such a strategy. This report summarizes what we heard from stakeholders and identifies four main categories of recommendations.

1. A MORE ACTIVE AND COORDINATED EV INDUSTRIAL APPROACH

Despite massive investment in the EV and battery sectors, the current approach:

- disperses investment across sectors
- rolls-out public policies and regulations through departmental silos
- uses targets that provide little information on the structural changes needed to achieve climate goals

What we heard from the policy consultations is that Canada's new approach needs to:

- prioritize top economic opportunities where Canada has comparative advantages and can produce high value-added goods on a large scale
- coordinate its climate, economic and trade policies more systematically to build specific sectors in the EV industry
- introduce production targets for low-carbon goods to activate the private sector in prioritized economic areas

Key items to consider to advance a more active Canadian EV strategy include:

- prioritizing the development of a robust midstream in the EV supply chain, while stimulating EV deployment and supporting small-medium enterprises integration
- using a combination of tariffs, content requirements and procurement tools to build domestic capabilities in strategic EV segments
- introducing production targets for refined critical minerals and battery materials enough to supply 2 million EVs by 2030, albeit it could be more in some instances

2. ACTIVE INVESTMENT STRATEGIES INTO EV SUPPLY CHAINS

Seizing economic opportunities will require addressing key barriers to private investment, which include:

- volatile prices for critical minerals
- lack of financial incentives to transform Canadian critical minerals into battery materials
- gaps in the EV supply chain and lack of funds to scale-up homegrown innovations

To address these challenges, this report recommends that government:

- deploy mechanisms (such as price floors and strategic reserves of critical minerals) to provide stable and adequately priced critical minerals to Canadian producers
- introduce financial incentives for battery materials, with content requirements for critical minerals manufactured in Canada
- create net zero mobility hubs to coordinate public and private investments in a way that responds to business needs and harnesses local strengths

3. BUILDING THE GREEN ECONOMY FASTER AND SMARTER

Canada faces a number of barriers that slow down the growth of a Canadian EV supply chain, including:

- lengthy approval processes for major projects, in particular in the mining sector
- regulatorily uncertainty regarding permitting processes
- lack of a clear vision on how Canada intends to reduce permitting process in the coming decades

- uncertain social acceptability around industrial and mining projects

To address these challenges, this report recommends:

- governments introduce a fast-track permitting process for priority projects that advance Canada's net-zero economic interests and national security
- maximum permitting delays with leverage mechanisms be developed to provide greater predictability to private investors
- a roadmap be developed outlining how the federal government plans to achieve its objective of reducing the time it takes to open a new mine
- the private sector work from start to finish with local communities to create conditions conducive to social acceptability around their projects

4. LEVERAGING ESG AS AN ECONOMIC DEVELOPMENT TOOL

- Canadian companies must compete in a global economy where many foreign competitors:
    - face lower environmental standards than in Canada
    - benefit economically from weak labour and social regulations
    - don't pay for human right violations

To address these challenges, this report recommends:

- using trade policies as a leverage to drive ESG practices in EV and battery markets
- developing traceability mechanisms throughout the entire EV and battery value chain to demonstrate the ESG performance of Canadian products
- creating public-private partnerships with the mission of advancing a mandatory EV battery passport

1. Introduction

Canada has begun to position itself into the global electric vehicle (EV) supply chain. In the last four years alone, the country has invested over C$50 billion to build domestic industries in the EV sector. This progress contrasts with recent past trends in the country's automotive sector. At a time when vehicle production in Canada has fallen by roughly half since the 2000s[1], these new investments signal a more promising outlook for the sector. Canada's recent top ranking for its EV battery supply chain confirms this potential.[2] With the global EV market projected to reach $57 trillion by 2050[3], the shift towards EVs offers the country an economic opportunity to revitalize its automotive sector as well as to build a more integrated value chain, from extracting and transforming critical minerals to EV battery manufacturing and recycling components.

Yet achieving this objective will involve overcoming a number of challenges. At present, the world's EV and battery manufacturing capacity remains geographically concentrated in Asia and is at least a decade ahead of the Canadian industry. Breaking into this supply chain will not be easy. To start with, capital costs in Asian markets are up to two to three times lower than in North America.[4] Several factors are at play here: the industry can rely on lower environmental and labour standards, dumping strategies, and massive public investments — up to US $230 billion in the past 15 years.[5] The volatility of the world market for many critical minerals and global demand for EVs only add to the difficulty of directing sufficient levels of investment into the Canadian domestic industry to catch up with international competitors.

The stakes of manufacturing EVs and their components are not limited to economic considerations. Indeed, the concentration of several key segments of the supply chain in authoritarian countries that are increasingly hostile to liberalism poses significant geopolitical risks. Just as Russia weaponized its natural gas to destabilize Europe[6] or China its rare earth minerals against Japan[7], relying on imports from authoritarian regimes to build a green economy carries risks of price instability and supply shortages. This makes the geopolitical implications of the rise of

1 https://www.theglobeandmail.com/business/commentary/article-canada-auto-industry-investments/

2 https://about.bnef.com/blog/china-drops-to-second-in-bloombergnefs-global-lithium-ion-battery-supply-chain-ranking-as-canada-comes-out-on-top/

3 https://assets.bbhub.io/professional/sites/24/2431510_BNEFElectricVehicleOutlook2023_ExecSummary.pdf

4 https://www.cerclecanadien-montreal.ca/fr/tous-les-evenements-1/detail/panel-sur-la-filiere-batterie/39340

5 https://www.csis.org/blogs/trustee-china-hand/chinese-ev-dilemma-subsidized-yet-striking

6 https://www.npr.org/2022/11/02/1133667483/russia-is-using-energy-as-a-weapon-could-this-spread-to-the-rest-of-the-world

7 https://www.nytimes.com/2010/09/23/business/global/23rare.html

China's carmakers today markedly different from the growth of Asian liberalism-friendly companies (such as Toyota and Honda) in the 1980s. Forging a national EV industry will therefore require a careful alignment between a range of economic, climate, and geopolitical objectives to navigate this uncertain and insecure landscape.

In this context, Canada needs a national strategy to build a globally competitive domestic EV and battery supply chain that reflects its values and aspirations. Here the objective should not be to close the door to international competition or punish those who are doing well. Rather, it is an opportunity to define what success looks like for Canadians and to create the conditions to make it happen. Through our consultations, we heard from a wide range of stakeholders – business leaders, labor organizations, environmental groups and government representatives – about their commitment to building thriving EV and battery supply chains that minimize pressures on the environment, take care of workers and empower marginalized communities. Bringing this vision to life will require an active strategy on the part of governments, businesses and civil society leaders to create an industry in which environmental, social and governance (ESG) aspects are harnessed into economic assets. Imposing strict standards (e.g. environmental and labour norms, community engagement, inclusive governance) on companies at home while importing goods produced under conditions contrary to those same standards isn't a blueprint for success. Canada needs a coherent strategy that responds to the climate emergency, while also promoting a green economy that is prosperous and geopolitically resilient.

The country is not alone on this path. In recent years, a number of allied countries have developed national strategies to shape their EV and battery supply chains in a way that aligns with their economic, climate, and geopolitical objectives. In the United States, the Inflation Reduction Act (IRA) is a key piece of legislation that promotes the development of EV and battery supply chains while also ensuring that its growth supports national security, benefits their national economy and empowers marginalized communities. Europe is also active on this question, the European Battery Alliance being a prime example.[8] It aims to drive decarbonization in a way that promotes prosperous, sustainable, and geopolitically resilient EV battery supply chains. For Canada, this convergence with the objectives of allied countries is an opportunity for closer cooperation in building a safe and thriving EV and battery sector.

8 https://transitionaccelerator.ca/reports/canadas-future-in-a-net-zero-world/

Building the North American EV supply chain

While the Canadian strategy should be informed by a deep understanding of the global economy, it is clear that the North American context also has a strategic dimension for the country. Like many sectors, the deep links between the Canadian and American automotive industries make the objective of building a thriving North American EV supply chain politically and economically appealing. Recent policy initiatives in the U.S. have only reinforced the economic attractiveness of the U.S. market for Canadian producers in at least two ways.

The first is the introduction of content requirements on critical minerals and battery components to qualify for the US$7,500 IRA tax credit for EV purchases. Under the IRA, 60 percent of battery components must be assembled in North America and 50 percent of critical minerals in EV batteries sold in the U.S. must be from North America or a country with a free trade agreement with the US. These figures will rise to 100 percent and 80 percent respectively by 2029.[9]

The second is the introduction of several restrictions on imports from countries considered to be "*geopolitically risky*". Measures include tariffs on a range of products manufactured in China[10] as well as the exclusion from IRA subsidies of critical minerals and battery components produced by companies with 25 percent ownership[11] by a *"foreign entity of concern"* (FEOC) – that is, China, Russia, North Korea, and Iran. A significant proportion of existing mineral and battery production capacity on the global stage will therefore face a number of obstacles in entering the U.S. market.[12]

Taken together, these measures create both promising and challenging dynamics for the Canadian EV sector. On the upside, it creates demand for alternative production to China, which will help to build new capacity and thus geographically diversify the critical mineral supply chains. Additionally, it incentivizes original equipment manufacturers (OEMs) to speed up the development of projects through strategic partnerships to meet U.S. requirements. Graphite is a prime example.

To qualify for the IRA tax credits, OEMs must demonstrate their capacity

9 https://home.treasury.gov/news/press-releases/jy1379

10 https://www.whitehouse.gov/briefing-room/statements-releases/2024/05/14/fact-sheet-president-biden-takes-action-to-protect-american-workers-and-businesses-from-chinas-unfair-trade-practices/

11 That includes the number of board seats, voting rights or equity interest.

12 https://foreignpolicy.com/2023/12/06/china-electric-vehicle-restrictions-biden-us-green-transition/

by 2027 to manufacture EVs using graphite that is not sourced from FEOCs.[13] [14] In practice, this means entering into agreements with 'friendly' companies to secure supplies of graphite, thereby creating demand for new production capacity. Recent agreements between Quebec firm Nouveau Monde Graphite and OEMs (such as GM and Panasonic) to supply refined graphite illustrate this dynamic.[15]

Still, the U.S. policy orientation creates a number of challenges. First, production capacity will have to be increased and brought on stream on a very tight schedule. This creates risks of bottlenecks in the EV and battery supply chain as well as potential investment gaps (notably in production capacity and needed infrastructure). All of which could hamper the pace of electrification in North America and thus slow down efforts to mitigate climate change. Second, the U.S. approach raises competitiveness concerns for the Canadian industry. American industrial policy measures (such as the IRA and the Buy American Act) mean that – all other things being equal – companies around the world will have a strong incentive to supply the U.S. before their home market. Canada is no exception.[16] The pull of the U.S. market could therefore hamper the development of integrated Canadian EVs and battery supply chain.

In this context, a key objective facing our policymakers is to accelerate the decarbonization of transport while ensuring that Canadian-made content is present in the North American EV supply chain to secure the country's prosperity. For Canada, this means structuring a productive relationship with the United States, marked by a mix of cooperation and competition to build a thriving, geopolitically resilient and socially inclusive North American EV supply chain.

To support this endeavor, Accelerate has conducted a consultation with the EV ecosystem. The objectives were twofold: (i) to gather insights on how to improve Canada's value chains to ensure long-term economic growth and job creation across the country, and (ii) to identify points of convergence that can be leveraged to unite the sector around a common vision.

To this end, an online consultation was held between May 29 and September 1, 2024. It involved more than 60 respondents from different backgrounds. They included business leaders, Indigenous leaders, union representatives, researchers, lawyers, investors, politicians, policymakers and others wishing to share their views. Respondents were asked to complete a questionnaire covering a range of key areas, including:

- sustainable development of critical minerals

13 https://www.northerngraphite.com/northern-graphite-comments-on-new-us-graphite-procurement-regulations/

14 https://www.fastmarkets.com/insights/us-delays-ban-on-chinese-graphite-in-batteries/

15 https://netzeroindustrialpolicy.ca/reports/getting-prices-right

16 https://financialpost.com/commodities/us-tariffs-ev-supply-chain-pose-dilemma-canada

- growth of components and parts manufacturing sectors
- commercialization of innovative Canadian technologies
- strengthening of Canada's value proposition in North America
- greater integration and coordination within the EV supply chain

Data collected was then analyzed to identify patterns in respondents' answers on the questions asked. The report also draws on secondary data to support and deepen the analysis of certain themes. That includes Accelerate's previous consultations, work by organizations exploring Canada's opportunities in a net zero future, government and international organization reports, and scientific articles.

Based on the data collected, the report identifies four main categories of recommendations:

- (i) strategic orientations
- (ii) investments
- (iii) permitting process
- (iv) ESG standards

REPORT STRUCTURE

The report is organized as follows. Section 2 explores strategic orientations that should guide Canada's strategy to build champions in global EV supply chains. That includes prioritizing Canadian economic opportunities, aligning climate policy with economic policy, and setting production targets to help coordinate public and private stakeholders along the supply chain. Section 3 examines initiatives to stimulate investment to seize economic opportunities in the EV sector. This includes addressing the price volatility of critical minerals, encouraging the transformation of these minerals into battery materials, and developing net zero mobility hubs to align investments in technology development, infrastructures and innovation. Section 4 explores the importance of permitting reforms to build the green economy faster. Finally, section 5 stresses the importance of leveraging ESG to build a robust Canadian EV supply-chains and outlines three key recommendations towards this objective.

2. Strategic orientations: towards a more focused and coordinated Canadian EV strategy

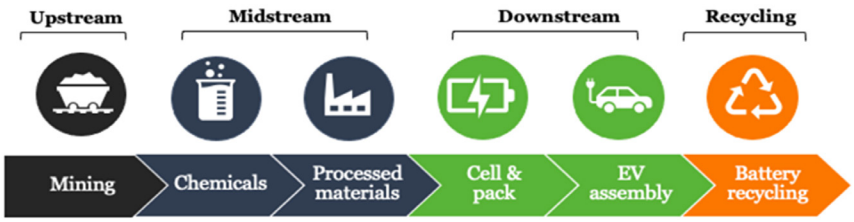
> “ Canada risks losing out to other jurisdictions by not participating in EV industrial policy at least proportionately to other countries ”

2.1. PRIORITIZING CANADIAN ECONOMIC OPPORTUNITIES IN THE EV SECTOR

In Canada, economic policy has long been marked by horizontal instruments spreading public funds thinly across sectors and provinces.[17] At the center of this approach is the conventional wisdom that ‘governments can’t pick winners’: that is, the incapacity to correctly identify promising technologies or sectors to grow the economy. Despite the recent rise of industrial policy in Canada’s climate debate, this idea continues to constrain public investment in green technologies.[18]

There was broad agreement among respondents that Canada needs to shift away from the traditional *“everyone gets a little”* mindset. Like its major trading partners[19], Canada needs a more focused and deliberate economic strategy for building specific industries in the EV and battery sector. As one respondent put it, *“Canada risks losing out to other jurisdictions by not participating in EV industrial policy at least proportionately to other countries”*. A key element of good industrial strategy is to prioritize technological sectors where the country has national advantages, can produce high value-added products, and has strong market potential for exports. A common message emerging from the policy consultation is the importance for Canada to target the midstream segment of the EV battery supply chain: that is, refining critical minerals and producing battery materials and precursors (see Figure 1). This economic priority has also been highlighted by a number of reports assessing promising Canadian opportunities in the global net zero economy.[20]

Figure 1. Simplified EV battery value chain



17 https://www.proquest.com/openview/d89b161fdae3bd1fcd1297ce0a11a0fe/1?pq-origsite=gscholar&cbl=18750&diss=y

18 https://www.budget.canada.ca/2023/pdf/budget-2023-en.pdf

19https://transitionaccelerator.ca/wp-content/uploads/2023/05/White-Paper_Net-Zero-Industrial-Summit-Transition-Accelerator.pdf

20 Examples include:
https://www.nzab2050.ca/publications/compete-and-succeed-in-a-net-zero-future
https://institute.smartprosperity.ca/sites/default/files/CanadasFutureinNetZeroWorld_Report_final.pdf
https://thebusinesscouncil.ca/app/uploads/2021/04/Clean-Growth-3.0.pdf

In the policy consultation, participants highlighted economic, political, and social reasons for targeting the midstream segment of the EV battery supply chain.

Economically, the production of battery materials and components is a high value-added activity in which Canada has several competitive advantages. They include access to natural resources (critical minerals), expertise in chemical processing, proximity and access to the U.S. market, and clean and low-cost electricity to power energy-intensive processes.[21] This combination of competitive advantages puts Canada in a strategic position to leverage its critical mineral resources to produce high-value products on a large scale. As one respondent put it, *"Canada has an opportunity to participate in the mid-stream to truly define our production ingenuity rather than being viewed simply as a domestic supplier of raw materials".*

Politically, Canada could leverage its refining capacity for EV battery metals in the USMCA renegotiation. Currently, the United States faces refining capacity gaps for a number of critical minerals (such as graphite, cobalt, and nickel) to meet its projected 2030 demand in a way that is IRA-compliant[22]. In this context, building integrated Canadian supply chains for critical minerals (from mining to refining) would strategically position our country in trade negotiations with the US. Indeed, it would help make the country pivotal to the U.S. goal of reducing its dependence on China and offer a friendly, stable and geographically close supply of refined metals/minerals for EV battery manufacturing. In this sense, the construction of a Canadian midstream industry should be viewed as a way to *"reflect[ing] and leverag[ing] each jurisdiction's abilities to contribute to geopolitical security as well as industrial efficiencies".*

Socially, building a robust Canadian midstream segment of the EV battery supply chain is central to advancing a net zero economy that benefits Indigenous Canadians. Many mines are located on Indigenous territories, and their development will require fair agreements to build a green economy that promotes economic reconciliation. Securing a 'fair' price for critical mineral extraction will be important in realizing this vision. Transforming Canada's natural resources into high-value-added products therefore appears critical to funding the construction of a thriving and equitable economy for all Canadians – and notably for historically marginalized communities.

Of course, this is not to say that Canada shouldn't place greater emphasis on other segments of the supply chain. On the contrary, a number of opportunities exist to leverage Canada's strength and build integrated supply chains. For instance, many respondents underscored the strategic

" Canada has an opportunity to participate in the mid-stream to truly define our production ingenuity rather than being viewed simply as a domestic supplier of raw materials ".

21 https://transitionaccelerator.ca/reports/canadas-future-in-a-net-zero-world/

22 https://fas.org/publication/critical-thinking-on-critical-minerals/

value of battery recycling, as well as the battery management system (BMS) spaces. Canada also has companies active in commercial EV manufacturing (such as New Flyer Industries, Lion Electric, and Nova Bus), although the export potential of this sector seems more complicated (see Box 1).

Box 1. Exporting Canadian-made commercial EVs

The economic opportunity for Canada to produce zero-emission medium- and heavy-duty vehicles is open to debate. On the one hand, the country has several firms active in the production of electric buses and trucks, and this opens up opportunities for SMEs to produce components for these vehicles. On the other hand, some point to the sector's limited export potential. In particular, the US Buy America legislation require 70 percent American-made components for transit projects receiving more than US$150,000 in federal funding.[23] Content requirements also apply to charging stations. Many Canadian companies have responded in recent years by opening plants in the US (such as Lion Electric and FlO) as well as delocalizing parts of their production and innovation value chains (such as NFI).[24]

Policy targeting should not be limited to specific sectors or segments of sectors. For one thing, many respondents called for support tailored to the needs of small and medium-sized enterprises (SMEs) to penetrate the transport supply chains. As one respondent put it, *"Canada needs to ensure it creates and fosters a start-up environment"*. That includes concierge services to SMEs to help them identify opportunities and navigate regulatory frameworks, creating network opportunities to connect OEMs with Canadian entrepreneurs and SMEs, and provide financial support to companies to integrate the emerging Canadian EV and battery supply chain. Moreover, additional policies facilitating EV deployment are also needed to create market demand for Canadian industries and reduce GHG emissions: for example, additional tax credits for EV purchases [25] and investments in charging stations to address consumer concerns about EV autonomy.

All of this is true, yet the international economic competition is fierce and a small open economy like Canada needs to harness its strengths to secure its place in the global green economy. The transformation

23 https://www.transit.dot.gov/buyamerica

24 https://thenarwhal.ca/electric-bus-jobs-new-flyer/
https://thelionelectric.com/documents/en/PressRelease_JolietGrandOpening_July212023.pdf
https://www.flo.com/en-ca/news/flo-announces-u-s-ev-charger-facility-jobs-coming-to-michigan/

25 https://cleanenergycanada.org/canadas-approach-to-ev-tariffs-undermines-affordability-and-our-climate/#:~:text=%E2%80%9CInstead%2C%20Canada%20is%20applying%20a,solar%20products%2C%20and%20critical%20minerals.

of Canadian resources into high-value-added products represents a generational opportunity for our country to secure net zero prosperity. As one respondent pointed out, *"the energy transition is about the re-industrialization of the West which is a huge opportunity for Canada to add value to our own raw materials"*. However, seizing this economic opportunity while advancing deep decarbonization will require closely aligning Canada's climate and economic objectives, which we will explore further below .

KEY ITEMS TO CONSIDER

- need to shift from "everyone gets a little" mindset to prioritization of economic opportunities where Canada has competitive advantages
- the midstream segment of the battery value chains represents a generational opportunity for Canada to build a prosperous, resilient, and socially-inclusive net zero economy
- promoting the deployment of EVs to create demand for Canadian industries in the North American market
- initiatives targeting small-and-medium enterprises (SMEs) are needed to build thriving ecosystems in the battery and EV sectors

QUESTIONS TO STAKEHOLDERS

- How confident are you that Canada should prioritize the midstream segment of the EV battery supply chain to secure net zero prosperity?
- What institutional safeguards should the government introduce to minimize the risk of targeting the wrong economic opportunities?
- Are there any examples worldwide that Canada could leverage to effectively prioritize economic activities?

2.2. COORDINATING CLIMATE, ECONOMIC, AND GEOPOLITICAL OBJECTIVES

In recent years, the federal government has introduced a range of measures to stimulate the production and deployment of EV-related products. These include a range of measures to support EV consumption (such as incentives for zero-emission vehicles (ZEV) and medium- and heavy-duty zero-emission vehicles (MHZEV)), as well as incentives to build domestic industries (such as investment in EV battery manufacturing). However, more coordination between demand-side and supply-side measures is needed to align Canada's climate and economic objectives. For example, the federal — along with many provincial and municipal governments — have started the process of converting their fleets to EVs,

> " the energy transition is about the re-industrialization of the West which is a huge opportunity for Canada to add value to our own raw materials ".

but there is currently no guidance on whether these fleets should include Canadian-made content.

This disconnection between economic and environmental goals contrasts with the approach taken by other countries. Consider the United States. As previously mentioned, to qualify for the IRA EV tax credit of US $7,500, OEMs must meet escalating content requirements focused on critical minerals and battery assembly and components sourced within North America or other regions with which the U.S. has a free trade agreement. The Biden Administration has also deployed other policy measures to incentivize EV production and supply chain friend-shoring and its recent introduction of higher tariffs on Chinese critical minerals, battery components, and EVs should spur more domestic investment and production

Against this backdrop, there is general agreement among respondents that Canada should better align its climate and economic policy. At least three measures proved highly favorable to respondents in the survey.

First, to make consumer subsidies for EVs conditional on a certain level of domestic production. The government recently announced its plans to restrict eligibility for the iZEV and iMHZEV programs to goods made in countries that have a free trade agreement with Canada. This measure is welcome, but more is needed to bolster Canada's economic objectives. In general, respondents agreed on two key measures: content requirements at the North American level, and mandating levels of critical minerals and battery materials consistent with the U.S. IRA. Economically, this would promote the development of Canada's midstream segment of the EV battery supply chains and advance the creation of a common market for North American producers. Greater integration between Canadian and U.S. companies would yield political benefits too: it would encourage OEMs to lobby U.S. policymakers to keep trade with Canada open during the renegotiation of the USMCA. Overall, the central message is that "*content requirements are essential to growing local supply*" in Canada and, more broadly, in North America.

Second, to use public procurement as a lever for economic development. Since 2018, the federal government has had a public goal of having 100 percent of all new purchases of light-duty administrative vehicles be ZEVs or hybrids by 2030. However, there are no conditions to encourage the purchase of Canadian-made vehicles or components in this regulation. The government should revamp its current 'lowest bidder' approach and shift towards one that embodies green innovation and economic development values. As one respondent put it, *"[p]rocurement should favour local production and content when all things are equal".* This reform should also extend to all government levels (federal, provincial, municipal). Public procurement, with a total annual value of around $200 billion, could therefore play a major role in building a thriving Canadian EV supply chain. Third, to align Canada's trade policy with its climate policy. The federal

government recently took some steps in this direction, notably with the announcement of 100 percent tariffs on Chinese EVs. Several respondents, while supportive of such a measure[26], argued for additional initiatives for two main reasons: (i) to level the playing field and (ii) counteract China's state-directed overcapacity strategy.[27] Two recommendations stand out. First, some respondents suggested introducing Canadian tariffs on Chinese lithium-ion EV batteries and critical minerals. As one respondent put it, *"[s]imilar to what is done in the US, tariffs on components and subcomponents that go into EVs ma[k]e the most sense"*.

Importantly, tariff rates should be tailored to specific critical minerals and battery materials. One reason is that tariffs are not only a defensive measure (e.g. protecting industries against unfair competition). When strategically aligned with the policy mix, they can act as a demand pull stimulating the growth of domestic production capacity. A second recommendation is to reform the Investment Canada Act to make Chinese foreign direct investments (FDI) in Canadian EV supply chains conditional on government review and clearance for compliance with its national interest. The rationale for this measure is essentially twofold: (i) to prevent Canada from becoming the *"backdoor"* of Chinese EVs in North America, and (ii) to reinforce North America's common position in the face of growing pressure from authoritarian regimes.

While initiatives that stimulate Canadian-made content in EV-based products were widely supported, three main concerns were also expressed. One is their compliance with WTO rules. In particular, the use of content requirements tied to EV consumer tax credits, as well as tariffs on Chinese EVs. Clearly, these are sensitive policy initiatives that require a thoughtful strategic response to ensure their political durability. At least three strategies, far from mutually exclusive, should be explored to this end. The first starts by documenting the preferential practices China has employed to build up its EV supply chain (see Box 2 for an example). Then, to emulate some of these strategies and defend them in the WTO as *"fair retaliation"*. Another approach is to frame the content requirement as a necessary step in aligning Canada's trade policy with that of the United States and to defend it as a measure promoting trade within North America under the USMCA (GATT Article XXIV).[28] Lastly, a third approach is to use Article XXI of the GATT to legitimize these measures on the grounds of national security concerns: for example, as Chinese EV computers could transmit sensitive data back to Beijing. [29]

26 While the measure has not been announced at the time of the survey, many respondents have expressed a wish for it or support for it.

27 https://www.reuters.com/markets/yellen-says-us-europe-must-respond-jointly-chinas-industrial-overcapacity-2024-05-21/

28 https://www.csis.org/analysis/electric-debate-local-content-requirements-and-trade-considerations

29https://www.csis.org/analysis/electrihttps://theweek.com/business/chinese-electric-cars-national-security-threatc-debate-local-content-requirements-and-trade-considerations

Box 2. An example of "Buy China" initiative in the EV sector

In China, governments have used a combination of subsidies and "Buy China" policy measures to build their domestic EV supply chains.[30] One mechanism was an approved list of Chinese suppliers of lithium-ion batteries that automakers had to use to qualify for consumer subsidies.[31] In practice, no major foreign company has ever made it onto this list. This measure, introduced in 2015 and relaxed in 2019, helped use the Chinese domestic market to enable its companies – across the value chain – to scale up production and become globally competitive.

Overall, the message of the government needs to be clear:

"The objective of such measures is not to rule out foreign competition but to give time for domestic industries to catch up and compete on a fair basis in the global economy."

A second concern is the lack of North American supply – notably around refined critical minerals and battery materials – to meet potential content requirements. Again, this is a serious challenge that needs to be tackled proactively to avoid gaps and bottlenecks across our supply chain. One approach would be to extend compliance deadlines but require OEMs to demonstrate their ability to meet future North American content requirements to qualify for EV consumer tax credits. This would encourage companies to sign supply agreements with producers of critical minerals (extraction and refining) and battery materials, thereby stimulating demand for North American supply.

The third concern is that preferential measures (such as tariffs and content requirements) could reduce competition and thus firms' incentives to innovate. The government needs to take steps to mitigate these potential risks. A key element is to underscore the fact that tariffs on Chinese EVs and batteries are temporary steps.[32] One way to do this is to include a sunset clause, with clear timetables and ongoing reviews along the way. This would stimulate Canadian companies to build domestic capacity quickly and minimize the risk of business complacency. Overall, the message of the government needs to be clear: the objective of such measures is not to rule out foreign competition but to give time for domestic industries to catch up and compete on a fair basis in the global economy.

Together, these recommendations would help align and balance trade-offs between economic, environmental, and trade policies. At the same time, these represent only a first step towards better aligned policy mixes. Ultimately, Canada needs a more systematic and institutionalized process to coordinate its policy mix on an ongoing basis. In line with the recommendations of many reports,[33] Canada should create a central

30 https://www.cfr.org/blog/how-us-and-eu-could-harmonize-their-approaches-trade-evs-and-steel

31 https://issues.org/wp-content/uploads/2021/01/72%E2%80%9379-Graham-et-al.-How-China-Beat-the-US-in-EV-Manufacturing-Winter-2021.pdf

32 https://netzeroindustrialpolicy.ca/reports/ev-tariffs-alone-will-not-secure-canadian-competitiveness

33 Examples include: https://bir.acceleratezev.ca/
https://transitionaccelerator.ca/reports/canadas-future-in-a-net-zero-world/

agency that would operate in between traditional ministries and would be responsible for coordinating Canada's EV policy mix. Clearly, such organizations can take a number of forms and their (eventual) creation is likely to take some time in order to build the in-house capabilities and expertise within government to be effective. Still, the government can take some steps in the short term to better coordinate and align public and private initiatives towards Canadian net zero priorities. A key idea is to introduce targets connecting upstream and downstream sectors, as presented below.

KEY ITEMS TO CONSIDER

- to make consumer subsidies for EVs conditional on a certain level of domestic production
- including economic and innovation criteria in public procurement to stimulate national economic development
- introducing tariffs with sunset clauses on critical minerals and battery components to create demand for domestic producers
- to institutionalize the policy coordination process with the creation of a central agency operating outside traditional ministries to coordinate Canada's EV policy mix

QUESTIONS TO STAKEHOLDERS

- How should Canada navigate WTO constraints to create a North American market and stimulate Canadian content?
- How can Canada ensure that content requirements for EV consumer tax credits (critical minerals, battery materials) will be met by North American supply?

2.3. POLICY TARGETS TO STIMULATE COORDINATION ACROSS THE EV SUPPLY CHAIN

Canada has introduced a number of climate targets, including the goal of reducing emissions by 40 percent by 2030 and achieving net zero emissions by 2050. These targets are important in advancing climate initiatives. However, many stakeholders pointed out that Canada also needs to deploy more focused targets to activate and coordinate the private sector towards Canadian top economic opportunities. A key idea is to introduce targets that convey information about the structural transformation needed to build a green economy. Production targets for specific low-carbon products is a prime example. Consider a target of a certain number of EV batteries: by linking mining activity (upstream) to the materials needed to produce batteries (midstream) for a certain number of EVs (downstream), it helps private actors across different

sectors coordinate their initiatives to achieve a certain direction and pace of economic development.

In the policy consultation, many respondents underscored the importance of setting targets for critical minerals processing. As one respondent put it, *"[i]t is key that Canada develop a critical minerals industrial policy to support ZEV in Canada. We do not have this. The targets should be to convert critical minerals from resources to reserves in 5 years with key minerals where we have a clear global competitive advantage"*. In addition to tapping into promising economic opportunities, targets for building refining capacity for specific critical minerals can also catalyze investment along the entire value chain.[34] Indeed, boosting the processing capacity of our primary resources creates demand for both upstream activities (such as mineral exploration and extraction) as well as downstream activities (such as cell manufacturing and battery recycling).

So, what targets should Canada pursue for processing critical minerals? There is wide consensus that Canada should seek at minimum to refine enough critical minerals and battery metals to supply the four EV battery plants that have already been announced: Volkswagen, Northvolt, Stellantis, and Honda. This represents a battery manufacturing capacity of roughly 205 GW to supply an equivalent of 2.1 million EVs annually by 2030, as shown in Table 1.

Table 1. Planned EV battery production in Canada by 2030

Firm	Timeline	Capacity (GWh)	EV equivalent*
Volkswagen	2027	90	1,000,000
Northvolt (phase 1)	2026	30	500,000
Stellantis	2025	49.5	400,000
Honda	2028	36	240,000
Total		205.5	2,140,000

Yet most participants agree that Canada should ultimately seek to produce more than its domestic demand, and export to the U.S. market in particular. Similarly, some comment letters suggested that Canada could realistically produce up to 30 percent of North American demands for battery materials by 2030.[35] Given that the Canadian automotive industry accounts for around 10 percent of North American markets, the production of refined critical minerals represents an opportunity for the

34 https://transitionaccelerator.ca/wp-content/uploads/2023/05/A-Roadmap-for-Canadas-Battery-Value-Chain_Executive-Summary_VF.pdf

35 https://www.nzab2050.ca/publications/compete-and-succeed-in-a-net-zero-future

country to *"punch above its weight"*.

Table 2 presents potential targets for 2030 for processed battery metals as outlined by the Net-zero Advisory Board (NZAB).[36] This group of experts convened by the federal government defined these targets based on four key elements: (i) current mining projects in development, (ii) known reserves, (iii) assessment of global competition, and (iv) potential market share.

Table 2. 2030 battery material targets

Battery active materials	2030 (ktpa)	% of North American market
Lithium	11	10
Graphite	350	35
Manganese	9	20
Iron	113	30
Nickel	130	35
Cobalt	32	35

Of course, Canada could potentially produce more than these figures. Especially as new policy initiatives are implemented. After all, effective policy targets that activate business need to be aligned across the policy spectrum on an ongoing, proactive basis. Thus, while the targets in Table 2 may warrant adjustment, the government should adopt a systematic methodology in carrying out this exercise. [37]

A similar undertaking should be done for battery materials. This is particularly true of cathode production, which accounts for almost 40 percent of the value of battery cells.[38] As shown in Table 3, Canada has currently five cathode active material plants in development that could supply the production of more than 1,625,000 EVs equivalent. Moreover, the United States has a domestic production gap of around 60 percent of its projected 1.3 Mtpa demand for CAM by 2030.[39] Like refined critical minerals, the country could aim to capture at least 35 percent of the CAM production gap forecast by the United States. For Canada, this would

36 https://www.nzab2050.ca/publications/compete-and-succeed-in-a-net-zero-future

37 For an example, see: https://institute.smartprosperity.ca/sites/default/files/CanadasFutureinNetZeroWorld_Report_final.pdf

38 https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/the-battery-cell-component-opportunity-in-europe-and-north-america

39 https://www.csis.org/analysis/friendshoring-lithium-ion-battery-supply-chain-battery-cell-manufacturing

involve the construction of four additional CAM plants with a capacity of 45,000 tpa each.

Table 3. Snapshot of CAM plants in Canada

Firm	Location	Production capacity (tpa)	Timeline	EVs equivalent
Umicore	Ontario	NA	2026	800,000
Honda	Ontario	NA	2028	240,000
Ultium Cam	Quebec	30,000	2025	360,000
Ford & SK	Quebec	45,000	2026	225,000
Nano One	Quebec	15,000	2030	N/A

A number of participants also underscored the necessity of complementing production targets with objectives targeting home-grown innovations. This element is central to boosting Canada's productivity and capturing greater market share through the development of superior products and production processes. Recently, Accelerate released a Canadian Battery Innovation Roadmap[40] that proposes a number of targets that should be considered to this end:

- $3 billion (public and private) investment in battery innovation
- $500 million for advanced manufacturing
- $1 billion for emerging technologies
- $1.5 billion for demonstration and pre-commercialization projects
- Secure 1,000 patents in battery technology by 2035
- Multiply the number of Canadian-owned companies by a factor of 10 by 2035

KEY ITEMS TO CONSIDER

* set 2030 targets for the production of refined critical minerals and battery components
* Canada should at minimum produce enough critical minerals and battery materials to supply its EV battery plants
* set investment and patent targets to stimulate innovation activities in the EV and battery sector

40 https://www.acceleratezev.ca/reports/agKEN3q7BV

QUESTIONS FOR STAKEHOLDERS

- Beyond 2030, at what time horizon should Canada set additional production targets (2035; 2040; 2050)?
- Should Canada develop targets for both extraction and transformation of critical minerals to support an integrated EV battery value chains?
- Should Canada introduce specific production targets for domestic and foreign markets to secure supply for its domestic EV industry?

IN SUM, THIS SECTION MADE THREE KEY POINTS:

1. It stressed the need for Canada to prioritize the development of robust midstream EV supply chains while stimulating EV deployment and supporting the integration of SMEs.
2. It highlighted the need for greater alignment between Canada's climate, economic, and geopolitical objectives to increase Canadian-made content in the North American EV value chains.
3. Third, it recommended the adoption of production targets, in particular for refined critical minerals and battery materials, to help coordinate public and private actor initiatives across value chains.

All these elements are important steps towards a more focused and coordinated approach. However, respondents were clear that bringing these targets to fruition will require robust financial mechanisms to ensure that sufficient investment flows into the Canadian EV supply chains. This is further explored below.

3. Active investment strategies into the EV supply chain

Achieving the targets described in the previous section will require significant capital investment. Yet consultant participants and a number of studies stressed at least three key barriers hindering private investment in the Canadian EV and battery sector, namely:

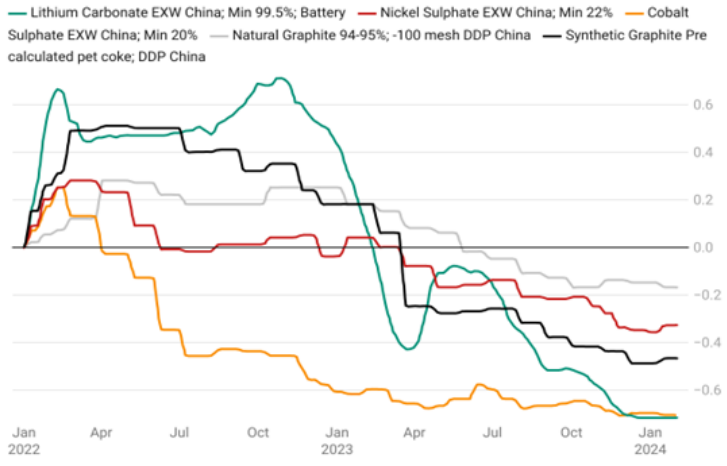
1. price instability in critical minerals
2. lack of financial incentives targeting the transformation of Canadian critical minerals into battery materials
3. lack of coordination mechanisms to steer public and private investment to fill gaps in the supply chain and grow Canadian homegrown innovations

From the policy consultation, we have identified three key recommendations to address each problem: (i) mechanisms to provide price stability in the critical minerals market, (ii) conditional mechanisms to incentivize investment in the domestic processing of Canadian resources, and (iii) creating net zero mobility hubs to coordinate investment strategically.

3.1. MECHANISMS TO DEAL WITH MARKET VOLATILITY

In recent months, price volatility in critical minerals has become a major obstacle to private investment in EV battery supply chains. Between 2022 and 2023, price falls have ranged from 30 percent to 45 percent for nickel, cobalt and graphite, and as much as 75 percent for lithium (see Figure 2). This market volatility is all the more problematic given the high geographical concentration of processing capacity (particularly in China), which increases the risk of market manipulation and dumping strategies.[41]

Figure 2. Trends in the price of critical minerals between 2022 and 2024[42]



41 https://netzeroindustrialpolicy.ca/reports/getting-prices-right

42 https://fas.org/publication/critical-thinking-on-critical-minerals/

In this context, Canada needs to create a business environment conducive to investment in the extraction and transformation of its critical minerals. At least two strategies, without being mutually exclusive, should be explored to reduce price volatility. One is establishing floor prices for targeted critical minerals. This could take many forms, but the basic logic would be to operate similarly to a Contract for Difference (CFD) mechanism. Much like in the renewable energy sector, the government would compensate companies if market prices fell below an agreed-upon threshold. As one respondent put it:

"A mechanism to establish a guaranteed floor price for Canadian Critical Minerals would be advantageous to assist with putting together the debt portion of the financing package, as banks traditionally would use long term metal forecasts that are under pressure due to expansion in Asia. This method generally would reduce a project's debt carrying capacity and increase the equity requirement".

The government could work with the private sector alongside an independent third party (such as academia experts and public-private organizations) to set appropriate price floors. Collaboration with the U.S. to establish a common mechanism appears equally important to facilitate the emergence of North American EV battery supply chains.

Another strategy would be to commission a government entity or Crown Corporation to sign off-take agreements with domestic suppliers.[43] The Crown Corporation could then sell on markets (domestic or foreign) depending on demand and prices or build up reserves in case of adverse conditions. As suggested by the Bipartisan Policy Center, critical minerals could be stored either in warehouses set up by the Crown Corporation or through *"virtual warehouses"* – that is to say, compensating firms to store the product.[44] This strategy would have at least two advantages. First, it would help bridge the gap between short-term market turbulence and the long-term supply that is needed to put the global economy on a net-zero path.[45] Second, it would give the government some leverage to bring critical minerals to markets while balancing supply between domestic and North American demand.

Together, these two approaches (floor prices/off-take agreements) could help increase the size of markets for a number of critical minerals and reduce price volatility. Still, these options represent only a starting point. Ultimately, Canada will need to work with its allies to create new market frameworks. Currently, there is a disconnect between market prices and the economic environment in which North American companies operate. Graphite is a prime example. The recent fall in graphite prices reflects predominantly the oversupply of Chinese graphite, exacerbated by the

43 https://netzeroindustrialpolicy.ca/reports/getting-prices-right

44 https://bipartisanpolicy.org/report/critical-minerals-reserve/

45 https://www.iea.org/reports/net-zero-by-2050

country's export controls.[46] In North America, there is a strong need for graphite due to almost non-existent production capacity and the fact that imports from China will be restricted in the U.S. by 2027. Yet Canadian graphite producers are raising capital based on Chinese market pricing – as they control almost 100 percent of the CSPG market[47] – that in no way reflects their economic environment (on both the supply and demand sides). Similar discrepancies exist between global critical mineral prices (such as cobalt and nickel) and the market conditions in which North American companies operate. For Canada, this means working in the coming years with its close allies (e.g. USA, EU) to set up transparent and standardized markets reflecting North American and European conditions.

KEY ITEMS TO CONSIDER

- mechanisms to reduce price volatility of critical minerals such as contracts-for-difference (CfD) and strategic reserves of critical minerals
- creating transparent frameworks that reflect the market conditions of North American industries
- cooperation with Canada's allies to introduce common standards in critical minerals pricing to facilitate international trade

QUESTIONS FOR STAKEHOLDERS

- How should the Canadian government approach the process of setting 'appropriate' prices for critical minerals?
- What are the main pitfalls that the government should avoid in providing price stability for Canadian critical mineral producers?
- Could Canada learn from other countries to stabilize the price of critical minerals?

Overall, stabilizing the price of critical minerals will be key to increase the proportion of Canadian-made battery materials in the North American market. Yet this strategy should also be coupled with more targeted financial support for the midstream industry in a way that promotes the use of Canadian mineral resources, as explored below.

3.2. PROMOTING TRANSFORMATION OF CANADIAN MINERAL RESOURCES

There is wide agreement that the extraction and processing of critical minerals are key activities in building a thriving Canadian battery industry. In line with Canada's Critical Minerals Strategy, a number of economic

46 https://www.fastmarkets.com/insights/chinas-jan-feb-graphite-exports-plunge-amid-export-controls/

47 https://www.mining.com/graphite-one-could-take-a-leading-role-in-loosening-chinas-grip-on-us-graphite-market/

incentives have been introduced to achieve this objective: including the Clean Manufacturing Tax Credit (including for the extraction, processing or recycling of critical minerals), the Critical Minerals Exploration Tax Credit, and $1.5 billion in the federal Strategic Innovation Fund (SIF) for critical minerals projects.

These initiatives represent an important source of capital for financing of critical mineral projects in Canada. However, these programs contain no provisions concerning the origin of critical minerals used to produce battery materials. By introducing a requirement to use a certain portion of Canadian minerals to access public subsidies for battery midstream production, government would advance three key objectives: (i) favor the transformation of Canadian resources into high value-added products, (ii) facilitate coordination between upstream and midstream activities, and (iii) contribute to the development of geopolitically resilient supply chains. As one respondent summarized it: *"[t]he mid-stream, or conversion of [Canadian] critical minerals into critical materials, such as NMC cathode, can have huge impact on the economy. […] With technology advancements in the mid-stream, it's possible for companies to retain more margin for these higher-value materials […]"*.

A key recommendation to this end is the introduction of a financial incentive targeting the production of battery materials (such as cathodes) or precursors linked to domestic content requirements. Like the Investment Tax Credit for Clean Technology Manufacturing, Finance Canada could introduce a 'Tax Credit for Battery Manufacturing' that would include a certain percentage of Canadian-made content of critical minerals. Ultimately, these content requirements should be aligned with government targets (as explored in section 2.3).

As the political sustainability of content requirements remains uncertain, an alternative approach is to introduce a similar policy to the 2024 Electric Vehicle Supply Chain ITC for battery materials. This new policy, which could be called 'Battery Materials Supply Chain ITC', could offer a 10 percent ITC capital cost that would be conditional on companies claiming the Clean Manufacturing ITC for critical minerals (extraction and processing) and battery components manufacturing (such as cathode active materials).

Together, these measures would help steer investment towards the transformation of Canadian minerals into battery materials. However, achieving the scale of production required to meet North American demand will also require massive investment in infrastructure. Addressing these needs requires a more holistic strategy than focusing on individual projects, as discussed below.

KEY ITEMS TO CONSIDER

* greater integration between midstream and upstream activities to build integrated EV battery supply chains
* to introduce a financial incentive targeting the production of battery materials (such as cathodes) or precursors linked to domestic content requirements

QUESTIONS FOR STAKEHOLDERS

- How should Canada fix content requirements for minerals in its battery materials incentive programs?
- Should the government set requirements at the national level or rather at the North American level?
- What are the main obstacles preventing the use of Canadian critical mineral resources in battery manufacturing in Canada?

3.3. NET ZERO MOBILITY HUBS

Canada's recent investments in battery manufacturing are a stepping stone in building our domestic EV supply chain. However, the focus on large foreign companies and ad hoc project financing can only take us so far. We also need to develop home-grown companies and innovations that can produce value-added products and synergies across the different segments of the value chains.[48] Fortunately, the country is home to a number of promising domestic companies with patented technologies in priority cleantech sectors.[49] However, transforming these opportunities into thriving businesses will require massive investments to scale them up. This is an area in which the Canadian economy has struggled in recent decades.[50] The transport sector is no exception. [51]

Identifying priority sectors and technologies is an important step in meeting this challenge, but this alone is not enough. Equally important is the creation of dynamic ecosystems that meet the needs of companies to grow and compete on a global scale. This includes access to innovation infrastructure to develop and test novel technologies, the presence of public infrastructure that enables the development of industrial projects (roads, wastewater systems; education and health facilities for workers), access to skilled workforce, and a critical mass of firms that can benefit from synergistic collaborations (e.g. information exchange, sourcing contracts).

48 https://www.thebusinesscouncil.ca/report/engines-of-growth/

49 https://www.acceleratezev.ca/reports/agKEN3q7BV

50 https://global.oup.com/academic/product/innovation-in-real-places-9780197508114
https://ppforum.ca/wp-content/uploads/2021/12/NNS3-CanadaAdvancedResearchProjectsAgency-PPF-Dec2021-EN.pdf

51 https://bir.acceleratezev.ca/

Addressing these needs effectively and coherently requires a holistic approach. For Canada, this means moving from a *"project-by-project"* focus to an *"ecosystem-building"* one in its investment strategies. A key idea to this end is to create *"geographic clusters"* that target specific *"regions with multiple projects"*. The creation of net zero mobility hubs would have at least three key advantages:

1. promote collaboration between firms across the value chains (funding, innovation, suppliers) that can increase productivity
2. facilitate coordination of investment in infrastructures needed to build the electric transport industry (e.g. wastewater systems and roads) and host workers in the sector (e.g. schools and day-care centers)
3. offer opportunities to leverage existing expertise (research centers, R&D) and infrastructure that minimize the cost of capital investment

Clearly, hubs can take many forms and have different scopes. A detailed analysis should be conducted to inform such policy strategy. Here, we outline three broad principles that follow from the policy consultation to guide the process of identifying potential net zero mobility hubs.

First, we need clear, transparent and systematic criteria to identify potential locations for establishing hubs. Previous experiences suggests that such frameworks should be sensitive to a range of economic, political, and institutional factors. In Québec, Bécancour offers an example to guide this process. The municipality has a number of assets which make it a prime location for an EV battery hub: a municipality with plenty of free industrial space, a long history of industrial projects and a motivation to promote economic development to remedy recent poor economic performance, a regional agency dedicated to promoting local economic development, and proximity to markets (e.g. Ontario and Detroit). Table 4 lists five potential criteria to guide the hub selection process.

Table 4. Five potential criteria for hub selection

Potential criteria	Description
Motivation and culture	The presence of certain economic activities or economic conditions ("weak growth") that foster a strong culture of economic development
Geographic advantage	Geographic proximity to market, resources, or suppliers that can deliver economic benefits
Labour force	Availability of labor: for example, high unemployment due to declining industries that will need to change or nearby academic training institutions.
Infrastructure	Local access to infrastructure for industrial projects (energy and water access; sewage and industrial wastewater) or innovation activities (research centers, university)
Institutions and organizations	The presence of a Crown corporation or regional economic development organization responsible for mobilizing the ecosystem around common projects

While this list may not be the right one, what is important is to develop a systematic and transparent approach to selecting hubs that respond to economic rather than political considerations.

Second, hubs should be sensitive to regional characteristics to leverage local advantages. Canada is a vast territory, with diverse economies and communities across provinces and territories. One way of capitalizing on this characteristic is to develop specialized hubs. This specialization could be in certain sub-sectors (such as EV battery materials or battery recycling), or in certain types of economic activity (such as innovation and industrial production). The central idea is to use hubs to tailor investment strategies to region- and sector-specific obstacles and opportunities across entire value chains. Table 5 lists a number of specialized hubs, with examples that illustrate their local strengths.

Table 5. Potential specialized hubs with examples

Specialized hubs	Example	Strengths
EV battery manufacturing hub	Sarnia-Lambton	Geographic proximity to automakers; culture of industrial projects; skilled labor force in industrial chemistry; organisations promoting economic development (Sarnia-Lambton Economic Partnership)
EV battery Innovation hub	Halifax	Specialized research centers (Jeff Dahn); academic institutions (Dalhousie university); promising firms (Novonix; Zen electric)
Critical minerals innovation	Toronto	University of Toronto offers programs for EV battery material processing and recycling; presence of organisations and networks (Canadian Critical Minerals & Materials Alliance); mining research institutes (Lassonde Institute); proximity to financial institutions;
EV battery	Windsor	EV battery plants (Stellantis); research institutes (Waterloo Centre for Automotive Research; Centre for Hybrid Automotive Research and Green Energy; Battery technology centre); network of small manufacturing companies in automotive sector
Smart EV innovation	Montreal	Leader in AI research and education; AI research institutes (Mila) and EV institutes (Institute for Electrification and Intelligent Transportation); organisations and networks (Propulsion Quebec)
EV battery recycling	Kingston	Planned battery recycling plant; availability of labor; proximity to automotive sector and industrial plants; promising firms (Li-Cycle; Cyclic Materials); organizations facilitating scale-up of companies (GreenCentre Canada); academic institutions (Queen University)
Battery materials manufacturing	Bécancour	Manufacturing capacity under development; Crown corporation accelerating infrastructure development; research institutes prioritizing battery sector; proximity to market;

Third, public incentives should incorporate hubs to maximize their role in attracting and steering investment towards Canadian opportunities: for example, by making financial support for certain programs conditional on the project located in a hub identified by government. For public authorities, this would bring a degree of control over how the value chains develop, making it easier to coordinate investments and regulatory changes in a way that responds to business and community needs. To

promote its adoption into the policy mix, the criteria for selecting net zero mobility hubs should be jointly determined by ISED, NRCan, and Finance Canada in collaboration with their provincial and municipal partners.

KEY ITEMS TO CONSIDER

* a shift away from a project-by-project approach to a hub-based approach could be crucial to steering investments in a way that meets companies' needs
* governments need a systematic, regionally-tailored approach to identifying net-zero mobility hubs to maximize the economic benefits of public investment
* net zero mobility hubs should be integrated into Canada's policy mix to help align public investment across sectoral needs (e.g. infrastructure, innovation, labour)

QUESTIONS FOR STAKEHOLDERS

- What criteria should be used to determine regional hubs in the net zero transport sector?
- Should hubs be specific to the transport sector or even to sub-sectors (batteries), or should they seek to integrate several economic sectors (transport, electricity, industry)?
- Are any examples of past or current hubs relevant to inform Canada's EV strategy?

IN SUM, THIS SECTION MAKES THREE KEY POINTS:

- It stresses the need for mechanisms to reduce the price volatility of critical minerals to attract private investment at scale
- It calls for greater integration between midstream and upstream activities in financial programs to stimulate the transformation of critical minerals into battery materials
- It underscores the value of adopting a hub strategy to fund the creation of ecosystems responding to the needs of Canadian companies to grow

All these recommendations could help unlock strategic investment into the Canadian EV supply chains. However, Canada must also tackle regulatory obstacles. A key challenge is the lengthy deadlines required to approve the construction of a project, as discussed in the next section.

4. Building the green economy faster and smarter

Transforming the transport sector to achieve net zero by 2050 means building faster, without neglecting environmental and social impacts. Some progress has been made in this respect. For example, governments have accelerated the development of major new battery and materials plants in Ontario and Quebec, so that OEMs and battery manufacturers can start production as soon as possible. However, the pace of improvement remains uneven across the different segments of the supply chain. This is particularly true in the upstream segment. Speeding up the approval process for new critical mineral mines, in line with Canada's commitment to social inclusion and environmental protection, remains a challenge. The often-quoted 15-18 year lead time for developing a new mine in Canada is a serious drag on the country's ability to compete in the global economy.

From the policy consultation, we heard an overwhelming consensus on the need to review the authorization process in Canada. Four key ideas emerge as guiding principles for Canada's approach to permitting.

First, is to prioritize economic projects that promote Canada's net zero prosperity and national security. As one respondent put it, *"[i]t is critical to fast track permitting for projects which have the potential to ensure Canada's economic well-being"*. For example, projects that involve both extraction and refining of critical minerals, as well as projects with robust financial structures and those working in partnership with Indigenous groups. One way of doing this would be to instruct the Major Projects Management Office (MPMO) to establish a fast-track procedure for these priority projects. This would incentivize firms to locally transform critical minerals and/or to partner with other companies along the supply chain to submit joint permit proposals. Financial support is also needed to speed up the permitting and construction phase: for example, economic incentives for the completion of the engineering studies required to secure permits.

Second, is to introduce mechanisms that minimize the risk of delays. As one respondent put it, "*project[s] developer should be able to petition the federal gov't when unreasonable permitting roadblocks are encountered*". A key idea is to introduce deadlines with levers that project proponents can pull to hold governments accountable. Following the example of the U.S. NEPA reform,[52] Canada should introduce a time limit for permitting review which, if not met, allows the main proponent of a project to pursue legal recourse. In the United States, the deadline is one year for environmental assessment (EA) and two years for complex projects requiring an

52 https://www.nytimes.com/2023/07/07/podcasts/ezra-klein-podcast-transcript-robinson-meyer.html

environmental impact statement (EIS). Of course, consultations between government and industry, experts, and civil society stakeholders would be needed to determine appropriate timelines for Canada. But the bottom line is that this would provide investors with greater predictability as to how long it takes to secure approval for a proposed project.

Third, is to introduce a plan demonstrating how Canada intends to reduce the time it takes to open a new mine. As one respondent put, *"[p]ublic sector commitment to reducing permitting timelines will be critical to our collective success"*. The Minister of Natural Resources recently announced a five-year target. A detailed, publicly accessible roadmap is now needed to communicate the steps and progress towards this goal, so private actors can adjust their practices accordingly. This document should also be produced in partnership with the various levels of government to harmonize regulations and explore international practices to ensure that Canada is competitive with its peers.

Fourth, is to introduce initiatives that promote inclusive governance practices conducive to creating social acceptability. As many respondents pointed out, consultation with civil society cannot be limited to simply obtaining authorization. *"As many of the critical minerals are located on Indigenous territories (either unceded or recognized through a treaty) extra focus must be made in these areas to ensure there is local collaboration, career opportunities and local investments (by project proponents) are made in the surrounding communities"*. To achieve such win-win partnerships based on mutual trust, governments and companies will need to work with local communities from the beginning to the end of industrial projects. At least three recommendations stand out to achieve this. One is to make access to government subsidies conditional on a company's employees taking part in training courses on inclusive practices: for example, firms applying for government subsidies should demonstrate that their employees have taken training on Canadian history and Indigenous reconciliation. Another approach is to create networks where local communities can meet with the industry and share their perspectives (visions, concerns, goals). Such institutional frameworks could create opportunities for collaboration and exchanges of information. Finally, a third suggestion is to add social criteria in how governments select economic projects: for example, to prioritize the development of projects in the EV supply chain with equity stakes from Indigenous partners.

KEY ITEMS TO CONSIDER

* introduce a fast-track approval procedure for priority projects that advance Canada's net-zero prosperity
* set mechanisms designed to reduce the risk of regulatory delays, similar to recent reforms in the U.S.
* develop a roadmap outlining the way government plans to achieve

its objectives in terms of reducing the time it takes to open a new mine
* promote partnerships between companies and local communities, from start to finish, to build social acceptability.

QUESTIONS FOR STAKEHOLDERS

- What criteria should the government use to prioritize projects for the fast-track process?
- How many projects should be prioritized by the government?
- What agency should be mandated to manage the fast-track program?
- Are there examples of best-in-class engagements and partnerships with local communities - particularly Indigenous communities - that can be leveraged and used as baseline approaches?

Speeding up the approvals process is an essential means of unlocking Canadian prosperity while directing investment towards Canadian opportunities. This must be done, however, without compromising Canada's high social and environmental standards and aspirations. Striking the right balance between speed and social acceptability calls for a strategy that harnesses ESG as leverage of economic development.

5. Leveraging ESG as an economic development tool

Canada is committed to building a net-zero economy that delivers national prosperity while taking care of its workers and addressing historical injustices. Aligning social, environmental and economic objectives is, however, fraught with difficulties in the current global economy.

First, Canadian companies are facing foreign competition where environmental standards are often far less stringent.[53] Second, they have to compete with autocratic regimes that cut production costs by resorting to practices that violate human rights. In the field of critical minerals, for example, numerous reports indicate that over a hundred human rights and environmental violations have been committed in more than thirty Chinese mines.[54] Similarly, there is strong evidence that the production of Chinese EV-related materials involve Uyghur forced labour.[55] Third, the lack of transparency about corporate practices means that those who are socially responsible are not economically rewarded. On the contrary, socially desirable practices are likely to entail higher investment costs in some cases. For example, inclusive consultation processes with Indigenous and other local communities are likely to take longer than in an authoritarian regime.[56] Overall, one respondent succinctly summed up the challenge facing Canadian policymakers, businesses and workers: "*maintaining economic competitiveness while creating the level playing field from an ESG standards perspective".*

To meet these challenges, respondents to the policy consultation largely agreed: stringent environmental, social and governance (ESG) standards are crucial to building a Canadian EV sector that reflects our economic and democratic aspirations. At the heart of this approach should be the goal of building a market where ESG products are an economic asset. This would unlock value for products aligned with the aspirations of world democratic nations, and harness many competitive advantages of Canada in ESG-based markets. That includes its low-carbon electricity, stringent environmental and labour policies, transparent and rules-based regulatory frameworks, and domestic companies active in technologies underpinning the development of ESG-based practices (see box 3).

Of course, Canada cannot develop ESG markets on its own. As one

Box 3. Optel Group and traceability mechanisms

The Canadian Optel Group has a longstanding specialization in traceability solutions used notably in the pharmaceutical industry as well as mining and agri-food. In recent years, the company has worked with international organizations and Canadian governments in the EV battery sector, too. Together these national strengths contribute to Canada strategic position in building ESG-compliant products and services.

53 https://2017-2021.state.gov/chinas-environmental-abuses/#:~:text=The%20People's%20Republic%20of%20China,trafficked%20wildlife%20and%20timber%20products.

54 https://www.business-humanrights.org/en/from-us/briefings/unpacking-clean-energy-human-rights-impacts-of-chinese-overseas-investment-in-transition-minerals/

55 https://www.hrw.org/report/2024/02/01/asleep-wheel/car-companies-complicity-forced-labor-china

56 https://transitionaccelerator.ca/wp-content/uploads/2023/05/A-Roadmap-for-Canadas-Battery-Value-Chain_Executive-Summary_VF.pdf

respondent put it, *"all of North America needs to adopt similar metrics for effectiveness and global impact as Canada as a whole is a small market segment"*. Still, participants in the policy consultation broadly agree that Canada should take a number of steps to advance the ESG agenda. Three recommendations stand out.

First, to align the use of tariffs on products from authoritarian regimes with the emergence of ESG practices. Like carbon pricing, the idea is to use tariffs as a means of internalizing the socially negative impacts of foreign production into the price of EV-related products. This policy should then be used as a lever to promote standardized practices around the assessment and demonstration of ESG metrics. This means going beyond merely considering the environmental performance of products – important as that is. As one respondent put it, Canada should leverage other ESG benefits, which are not limited to environmental measures, but also encompass *"safety, social, and security perspectives as well"*. The Mineral Security Partnership (MSP), which aims to foster collaboration between Canada and its democratic allies around the common goal of developing secure and prosperous critical minerals value chains, represents a conducive mechanism for advancing this objective on the global stage.

Second, to develop traceability mechanisms throughout the EV battery value chain to demonstrate the ESG performance of its domestic products. Canada does not have to start from scratch. It should leverage its experience and learning in a number of sectors to advance this goal. Quebec's aluminum industry is a good example.[57] In response to American criticism regarding the lack of transparency concerning the origin of certain inputs for aluminum production, two pilot projects were implemented to explore traceability mechanisms. In partnership with Optel Group, a cloud-based authentication platform was developed to demonstrate the metal's provenance as well as its environmental performance. Building on the success of the initiative, the Aluminium Association of Canada and Quebec government are now aiming to extend this practice to the entire Quebec Aluminium value chain. A similar initiative should be applied to the entire Canadian EV supply chain. To this end, we suggest:

- funding of a study defining a roadmap towards traceability mechanisms in the North American EV supply chain
- funding for pilot projects to introduce traceability mechanisms in different segments of the EV supply chain

Third, to create public-private partnerships with the mission of advancing the establishment of a mandatory EV battery passport. This would involve a number of steps. First, the government should publicly signal

57 https://cdn-contenu.quebec.ca/cdn-contenu/adm/min/economie/publications-adm/politique/PO_strategie_aluminium_2021-2024_MEI.pdf

its commitment to a mandatory EV battery passport. The objective should be twofold: to reward companies for their social responsibility, and (ii) prevent them from being disadvantaged for it. Second, engagement with the United States to develop standardized ESG metrics that can be applied rigorously across EV battery value chains. Third, applying ESG metrics on imports to ensure a level playing field between North American firms and foreign competitors. Overall, government needs to be clear that ESG is not only desirable from a social and environmental standpoint but can also spur economic competitiveness. As one participant put it, *"[i]n addition to applying ESG standards on imports that are punitive in instances of violation, there is value in providing positive reinforcement benefits for Canadian Parts Suppliers and EV Start-ups which are taking over and above positive steps in the ESG area".*

KEY ITEMS TO CONSIDER

- leverage tariffs to drive ESG practices in EV and battery markets
- develop traceability mechanisms throughout the EV battery value chain to demonstrate the ESG performance of its domestic products
- create public-private partnerships with the mission of advancing the establishment of a mandatory EV battery passport

QUESTIONS FOR STAKEHOLDERS

- In your view, what are the main obstacles to overcome to create an EV market that rewards ESG-based products and services?
- What types of pilot projects should be prioritized or implemented to develop traceability mechanisms in the EV battery supply chains?

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