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Extended Producer Responsibility regulation proposal by the government of Québec

7 Electric Mobility Canada Battery working group recommendations



To the attention of Benoit Charrette,

Minister of the Environment and the Fight against Climate Change

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

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

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



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### About Electric Mobility Canada

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

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

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

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

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

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

**The main problem with Quebec's proposed regulations:**

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

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

Manufacturers do not control these variables.

That's why we propose the following recommendations.

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

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

EMC members consider the following statement:

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

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

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

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

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

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

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

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



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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

#### **a) Environmental considerations**

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

#### **b) Strategic and technological considerations**

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

#### **c) Economic considerations**

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

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

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

3 : [https://electricautonomy.ca/2021/10/29/jeff-dahn-quebec-ev-battery-recycling/?fbclid=IwAR2hqqo0Gblj\\_nl-9xRI8sPCC-c\\_6xtb\\_qUsnDfmqNghNPhRE7nFXxQ8WC4](https://electricautonomy.ca/2021/10/29/jeff-dahn-quebec-ev-battery-recycling/?fbclid=IwAR2hqqo0Gblj_nl-9xRI8sPCC-c_6xtb_qUsnDfmqNghNPhRE7nFXxQ8WC4)

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

## References to European experience:

Auto Recycling Nederland (ARN): independent organization in the Netherlands for end-of-life management of vehicles

All details and results here: <https://arn.nl/en/drive-batteries/>

Founded and organized jointly by :

BOVAG (trade association of more than 8,000 contractors involved in mobility)

FOCWA (Federation of Contractors in the Body and Vehicle Building Industry and related companies)

RAI Vereniging (The RAI Association represents the interests of more than 700 manufacturers and importers of passenger cars and trucks, trailers and semi-trailers, bodywork and special vehicles, motorcycles and scooters, mopeds and bicycles)

STIBA (Trade association and advocate for certified car, motorcycle, truck and related vehicle dismantling companies)

Results:

The majority of automakers are joining the program

In 2020, over 121 tons of traction batteries were dismantled and processed. 20% have entered the reuse pathway for a second life, mainly for stationary energy storage. The rest ended up in the recycling channel.

The "eco-fee" for each rechargeable vehicle battery is decreasing year by year. It is currently set at between 95 and 135 euros. The fee is paid by the member companies.

Since 2017, traceability is provided in a centralized database independently managed by STIBA (with a fee for each entry, 0.057 euros per entry).

Batteriretur Høyenergi AS: independent organization in Norway for end-of-life management of all types of batteries

All details and results here: <https://batteriretur.no/en/hva-vi-gjor/>

Founded and organized by the recycling and circular economy industry, and 25% owned by car importing companies:

RENAS (Norway's leading recycling company for electrical and electronic waste)

Grønt Punkt Norge (finances return programs for plastic, metal and glass packaging, container board, beverage board and corrugated cardboard)

Reneos (Tailor-made solutions for end-of-life Li-ion batteries in Europe)

NSSØ (Norwegian Centre for Circular Economy)

EUCOBAT (Eucobat is the European association of national battery collection schemes)

Results:

More than 25 car manufacturers and importers are joining the program.

The batteries will be recycled "across the street" by the new Norwegian recycling plant HydroVolt (8000 tons capacity) founded by Norwegian giants Hydro and NorthVolt.