



Montreal, November 2<sup>nd</sup> 2016

Honorable Senator Richard Neufeld  
Chair  
Senate Committee on Energy,  
the Environment, and Natural resources

**Subject: Additional information from Electric Mobility Canada following October 18th session**

Dear Senator Neufeld,

Following my testimonial on October 18th, I agreed to send to the Committee members some precisions and facts, and their sources, on certain topics that were brought up. I would appreciate that you share with all members the following.

**1. The capacity of public utilities to satisfy supply for electric vehicles**

Hydro-Québec states: "A powerful electric grid – Hydro-Québec would already be able to supply power for a million plug-in vehicles, or 25% of the cars now on Québec roads, without having to make a major investment in the grid. A fleet of a million electric cars would consume about 3 TWh per year, roughly the annual output of a mid-sized hydroelectric generating station like Eastmain-1 (507 MW), or less than 2% of electricity sales in Québec in 2008."<sup>1</sup>

To the question: "Can the BC Hydro system handle the increased electricity demand as EVs are adopted in BC?", BC Hydro states: "The rate of electricity load growth from the adoption of electric vehicles will be gradual, and we are already planning to ensure that the supply of electricity is in place to meet future demand. Think of it this way: if all the cars in BC were to become electric overnight, that would represent a 19 per cent increase on our current base

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<sup>1</sup><http://www.hydroquebec.com/about/transportation-electrification/>

load. As it is, since their introduction in the late '90s, EVs represent less than 1% of new vehicle sales”<sup>2</sup>

In Ontario, the situation is similar. The Canadian Electricity Association states: “With tens of thousands of electric vehicles (EVs) expected to plug into Ontario’s power grid over the next few years, some wonder if the electricity system can accommodate them.” Devin McCarthy, Vice-President of public affairs at the Canadian Electricity Association, is not concerned. “I’m confident the electricity companies in Ontario will be able to handle that influx of EVs as this comes to pass.” McCarthy says there is no question that some equipment may need to be upgraded as EVs begin to cluster in certain neighborhoods, but meeting that additional load is something local electric companies have spent the past 10 years planning for as part of grid modernization investments. He adds that there is also a lot of room to accommodate EVs on the grid, which is built to handle peak demand — those times in a day when electricity consumption spikes, such as late afternoon during a heat wave when air conditioners across the province are working overtime. “Time-of-use rates in Ontario are designed to shift the demand curve, to flatten it, so more electricity is used during off-peak hours”, McCarthy explains. “If the cars can be incented or managed in such a way that they are charging during off-peak hours, then I do not anticipate a major issue there.”<sup>3</sup>

## **2. The total cost of EV ownership can be profitable, compared to the cost for an internal combustion engine**

In Appendix 1, you will find an excerpt from the AVEQ website. AVEQ is the most important EV owners’ association in Quebec. They have more than 5,500 active EV drivers as members and volunteers for all of their activity and communications. They have compared the total cost of ownership for similar cars such as the Nissan Leaf, the Kia Soul, and the Honda Civic Sedan X. Even after 2 years, the EVs are less expensive. After 4 years, up to \$5,000 can be saved. Even when applying the same logic with Ontario prices of electricity, the savings are quite similar.

The EMC Roadmap report takes into account the variable electricity prices in Canada. On page 15, the report states:

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<sup>2</sup>[https://www.bchydro.com/about/sustainability/climate\\_action/plugin\\_vehicles/evfaqs.html](https://www.bchydro.com/about/sustainability/climate_action/plugin_vehicles/evfaqs.html)

<sup>3</sup><https://www.plugndrive.ca/are-ontarios-electric-car-ambitions-realistic>

EVs are 4 to 6 times cheaper to run. When comparing the cost of electricity to the cost of fuel for similar car models, the savings are important. The cost of electricity varies from province to province but is usually predictable. For example, a compact car driven 20,000 km per year would cost \$1,906 in a gasoline model while the cost of electricity for a similar size EV would be \$564 in Ontario and \$368 in Quebec, translating into major savings for EV owners over the life of an EV. EVs require less maintenance and will help Canadian families to save money and reduce emissions. On average, a dollar saved at the gas pump and spent on other goods and services can generate a significant multiplier on jobs. Unlike the fossil fuel supply chain, the majority of new demand created by fuel cost savings goes to local services, a source of diverse, bedrock jobs that are less likely to be outsourced. A study by Berkeley University, conducted for the Californian market, states that "Because, on average, household demand is 16 times more job-intensive than the fossil fuel supply chain, every dollar saved at the gas pump and spent on the other goods and services consumers traditionally buy adds stimulus to state incomes, employment, and real wages. Another way of looking at the economic benefits is that to a large extent, dollars spent for fossil fuels leave Canada while dollars spent for electricity stay in the local economy."<sup>4</sup>

### **3. GHG reductions for EVs in different provinces**

EMC Roadmap addresses this question in the figure titled "GHG emission reductions from an ICE vehicle to an EV" on page 17 that is based on Environment Canada and Statistics Canada.<sup>5</sup>

An EV produces no local emissions. However, there are emissions created to generate the electrical energy that is stored in the EV's battery. In Canada, over 65% of our electricity comes from renewables such as hydro, wind, and solar, energy sources with very low GHG emissions. This means that EVs charged from the Canadian grid create very low GHG emissions relative to their fossil fuelled counterparts. Figure 1 below shows the calculated GHG emissions per kilometer of a mid-size Internal Combustion Engine (ICE) car compared to those of an equivalent size EV charged from the grids of each of Canada's ten provinces, using 2011 data which is the most recent data available online. The emissions reductions in hydro-dominated Quebec, Manitoba and BC are largest, while those of the other provinces vary depending on the energy sources of their grids. Overall, with Canada's current energy mix, a typical EV will achieve an 80% reduction in GHG emissions versus its fossil fuel powered counterpart. Even more, emissions from EVs continue to decrease as the carbon intensity of Canada's

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<sup>4</sup> [https://emc-mec.ca/wp-content/uploads/EMC-EV-Roadmap\\_Final-Report.pdf](https://emc-mec.ca/wp-content/uploads/EMC-EV-Roadmap_Final-Report.pdf)

<sup>5</sup> Id.



grid decreases. Therefore, EVs make imminent sense as a GHG reduction measure in most Canadian provinces.

I hope that you will consider this trustworthy information for your final analysis before completing your report.

I remain available for any additional questions.

Best regards,

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## Appendix 1

## Total Cost of EV Ownership<sup>6</sup>

### Is the electric car expensive?

In order to compare the cost difference, we invite you to browse through the table below to see the savings you might do throughout the years. The table compares the total cost of 100% EVs (Nissan Leaf S and Kia Soul EV), versus a popular gasoline car such as the Honda Civic. In the Nissan Leaf example below, more than \$1,000 in savings can be reached after only 2 years. This means that it takes less than two years to offset the cost difference between a Honda Civic and a Nissan Leaf. After this period, driving electric brings major savings year after year. After 7 years, you will have saved more than \$10,000.

We can also see that a Kia Soul EV owner will save about \$1,000 after 4 years. This amount may vary greatly depending on the kilometers driven. For more than 95% of EV owners, the EV is bought as a second car. However, for a majority of them after a few weeks of EV ownership, it is their gasoline car that rapidly becomes their second vehicle. They see that their EV can easily address the majority of their mobility needs. Conclusion: not only an EV means no more gas expenses, it will also reduce significantly the gas expenses of a second car.

Another important financial benefit that is not shown in the table below is the low maintenance needed with an electric car. On the long run, many items of a gasoline car will need to be replaced (spark plugs, alternator, timing belt, transmission liquid, transmission, muffler, radiator, oil filters, gas pump, catalytic converter, fuel injectors, valves, pistons, etc.). All these components, and many others, are not in an electric car.

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<sup>6</sup> Content translated from the AVEQ website: <http://www.aveq.ca/guide-dachat-automobile.html>

### Drive Electric, Save Money!

|   | After 2 years    |                  |                        | After 4 years    |                  |                        | After 7 years    |                  |                        |
|---|------------------|------------------|------------------------|------------------|------------------|------------------------|------------------|------------------|------------------------|
|   | Nissan LEAF S    | Kia Soul EV      | Honda Civic Berline LX | Nissan LEAF S    | Kia Soul EV      | Honda Civic Berline LX | Nissan LEAF S    | Kia Soul EV      | Honda Civic Berline LX |
|   | 0L / 100 km      | 0L / 100 km      | 8L / 100 km            | 0L / 100 km      | 0L / 100 km      | 8L / 100 km            | 0L / 100 km      | 0L / 100 km      | 8L / 100 km            |
| <b>Cost Price</b>                         |                  |                  |                        |                  |                  |                        |                  |                  |                        |
| Base Price                                | 31,788 \$        | 35,195 \$        | 23,000 \$              | 31,788 \$        | 35,195 \$        | 23,000 \$              | 31,788 \$        | 35,195 \$        | 23,000 \$              |
| Taxes, fees (charging station)            | 6,023 \$         | 6,533 \$         | 3,444 \$               | 6,023 \$         | 6,533 \$         | 3,444 \$               | 6,023 \$         | 6,533 \$         | 3,444 \$               |
| Government incentives (vehicle & station) | (8,549) \$       | (8,549) \$       | - \$                   | (8,549) \$       | (8,549) \$       | - \$                   | (8,549) \$       | (8,549) \$       | - \$                   |
| <b>TOTAL - COST PRICE</b>                 | <b>29,262 \$</b> | <b>33,179 \$</b> | <b>26,444 \$</b>       | <b>29,262 \$</b> | <b>33,179 \$</b> | <b>26,444 \$</b>       | <b>29,262 \$</b> | <b>33,179 \$</b> | <b>26,444 \$</b>       |
| <b>Cost-in-Use</b>                        |                  |                  |                        |                  |                  |                        |                  |                  |                        |
| Gaz* (1,20\$/L)                           | - \$             | - \$             | 3,840 \$               | - \$             | - \$             | 7,680 \$               | - \$             | - \$             | 13,440 \$              |
| Electricity*                              | 716 \$           | 716 \$           | - \$                   | 1,432 \$         | 1,432 \$         | - \$                   | 2,506 \$         | 2,506 \$         | - \$                   |
| Insurance Discount                        | (240) \$         | (240) \$         | - \$                   | (480) \$         | (480) \$         | - \$                   | (840) \$         | (840) \$         | - \$                   |
| Oil Changes                               | - \$             | - \$             | 480 \$                 | - \$             | - \$             | 960 \$                 | - \$             | - \$             | 1,680 \$               |
| <b>TOTAL - COST-IN-USE</b>                | <b>476 \$</b>    | <b>476 \$</b>    | <b>4,320 \$</b>        | <b>952 \$</b>    | <b>952 \$</b>    | <b>8,640 \$</b>        | <b>1,666 \$</b>  | <b>1,666 \$</b>  | <b>15,120 \$</b>       |
| <b>TOTAL - COSTS</b>                      | <b>29,738 \$</b> | <b>33,655 \$</b> | <b>30,764 \$</b>       | <b>30,214 \$</b> | <b>34,131 \$</b> | <b>35,084 \$</b>       | <b>30,928 \$</b> | <b>34,845 \$</b> | <b>41,564 \$</b>       |
| <b>COST DIFFERENCE</b>                    | <b>- \$</b>      | <b>- \$</b>      | <b>+ 1,027 \$</b>      | <b>- \$</b>      | <b>- \$</b>      | <b>+ 4,871 \$</b>      | <b>- \$</b>      | <b>- \$</b>      | <b>+ 10,637 \$</b>     |

\*Based on 20,000km/year