

Global Economic Policy Lab

Evaluating Canada's Zero-Emission Vehicle Targets and Policies

Clean Energy Analysts

Philipp Bien
philipp.bien@mail.utoronto.ca

Saad Iqbal
saad.iqbal@mail.utoronto.ca

Amy Li
amyq.li@mail.utoronto.ca

Ian Stecher
ian.stecher@mail.utoronto.ca

Lab Director
Professor Mark Manger
mark.manger@utoronto.ca



munk school
OF GLOBAL AFFAIRS & PUBLIC POLICY



UNIVERSITY OF
TORONTO

- Canada has set a zero-emission vehicle (ZEV) sales target for 2025, 2030, and 2040.
- The Government of Canada is investing CAD\$280M in ZEV infrastructure and offering subsidies of up to CAD\$5000 to incentivize the purchase of ZEVs.
- Weak ZEV sales in Ontario make it unlikely that Canada will achieve its 2025 target, and lagging national performance puts the 2030 and 2040 targets in jeopardy.
- Without broader policy intervention at the provincial level, with a specific focus on Ontario, and the national level, Canada is unlikely to hit any of its ZEV sales targets.

Background

Canada is Falling Short of Its Ambitious EV Targets

The Government of Canada (GoC) is currently focused on reducing carbon emissions across the country by encouraging consumers to transition away from internal combustion engine (ICE) vehicles by incentivizing the purchase of zero-emission vehicles (ZEVs), specifically battery electric and hybrid-plug in vehicles. This ambition is evidenced by the heavy programming and investment the GoC has poured into ZEV infrastructure and ZEV purchasing incentives in recent years.

In an effort to make the country more friendly for ZEVs, the GoC is financing the [Zero Emission Vehicle Infrastructure Program](#), which will invest CAD\$280M across 5 years in the expansion of Canada's ZEV charging and refuelling infrastructure. To complement this, the government has also rolled out a [Zero-Emission Vehicle Awareness Initiative](#), which offers funding to projects aimed at improving ZEV awareness and adoption across Canada. Finally, and potentially most significantly, the GoC is offering a [subsidy ranging from CAD\\$2500 to CAD\\$5000](#) for consumers who buy or lease an eligible ZEV - to incentivize consumers to switch away from ICE vehicles.

All of this investment is being undertaken with the express intent of hitting the [ambitious targets the GoC has set for ZEV sales in the country](#). By 2025, the GoC is aiming to have 10% of all new light-duty vehicles sold in Canada be ZEVs. This sales target rises to 30% by 2030 and culminates in an ambitious 2040 goal, when 100% of vehicles sold in Canada are expected to be ZEVs. If everything goes according to plan, Canada is projected to have 14 million ZEVs on the road by 2040.

Despite these ambitious targets and incentives, [Transport Canada has recently admitted that the country is unlikely to hit its first 2025 ZEVs sales target](#). ZEV uptake is simply not occurring quickly enough. Ultimately, additional measures will be needed to hit these ambitious sales targets.

Breaking Down Vehicle Sales by Province

To understand where Canada is lagging behind in ZEV sales and what policy interventions could be used to get the country back on track, our research team began by identifying where the majority of light-duty vehicles are sold in Canada.

| NL | PEI | NS | NB | QU | ON | MB | SK | AB | BC* | Total |
|----|------|----|--------|---------|---------|--------|--------|----|---------|-----------|
| - | 7140 | - | 40,559 | 458,269 | 769,079 | 51,345 | 49,328 | - | 218,001 | 1,930,445 |

* BC data includes the Territories, but due to the low population in YK, NWT, and NV, our analysis will focus only on BC.
Source: StatsCan, New Motor Vehicle Registrations

From Table 1 it is clear that three provinces, of the provinces that report in Canada, are driving the majority of new vehicles sales in Canada: Ontario, Quebec, and British Columbia (B.C.). Together these three provinces accounted for 75% of all new motor vehicle registrations in 2019. More specifically, Ontario and Quebec alone are responsible for more than 60% of new registrations - which is to be expected due to their large populations.

Increasing ZEV sales in these provinces therefore represents Canada's best chance of reaching its 10% target for 2025. Significantly increasing sales in one or more of these key provinces could be enough to get Canada back on track with its ZEV transition.

ZEV Sales in B.C., Ontario, and Quebec

The total numbers and proportion of ZEV sales in each of the three provinces is summarized in the following tables.

| | 2015 | 2016 | 2017 | 2018 | 2019 |
|----|-------|-------|-------|--------|--------|
| BC | 1,399 | 2,091 | 3,102 | 8,129 | 16,980 |
| ON | 2,073 | 4,012 | 8,426 | 16,365 | 9,762 |
| QC | 3,184 | 5,341 | 8,092 | 17,740 | 27,071 |

*ZEVs are defined as battery electric and plug-in hybrid electric vehicles.
Source: StatsCan, New Motor Vehicle Registrations

| | 2015 | 2016 | 2017 | 2018 | 2019 |
|----|------|------|------|------|------|
| BC | 0.65 | 0.94 | 1.3 | 3.53 | 7.79 |
| ON | 0.29 | 0.53 | 1.05 | 2.05 | 1.23 |
| QC | 0.7 | 1.15 | 1.7 | 3.8 | 5.91 |

Source: StatsCan, New Motor Vehicle Registrations

Tables 2 and 3 reveal some interesting trends in the growth, or in some cases stagnation, of ZEV sales in B.C., Ontario, and Quebec. ZEV sales in B.C. and Quebec have been growing at similar, steady rates since 2015 and both provinces are on track to hit or surpass Canada's

10% target by 2025. Not so in Ontario: Despite achieving similar growth between 2015 and 2017, it began to lag behind B.C. and Quebec in 2018 and 2019. Between 2018 and 2019, ZEV sales even fell - a negative trend which could jeopardize Canada's ability to reach its 2025 targets, especially given that Ontario accounts for nearly 40% of new vehicle sales in Canada. While Quebec and B.C. are driving ZEV sales in Canada, Ontario is falling behind and bringing the country with it.

ZEV Subsidies and Targets in B.C., Ontario, and Quebec

What could be driving these differences? The answer may lie in the significant variation in provincial ZEV rebates and incentives - which may be driving the divergence in growth rates between Ontario and the other two provinces.

B.C. has a ZEV incentive program and a ZEV sales target that complements the federal programs currently in place. The province's [Go Electric Program](#) offers CAD\$3000 to consumers who are purchasing or leasing a new ZEV. As well, the [provincial government has put ZEV sales targets in place](#) which align with the targets set out by the GoC. Combined with federal incentives, these provincial programs help explain the rapid growth of ZEV sales in B.C.

Quebec stands out with even more aggressive ZEV incentives. Since 2012, their provincial government has offered individuals, businesses, and municipalities [rebates of up to CAD\\$8000 for the purchase or lease of new ZEVs](#). As well, they have [recently passed legislation](#) stipulating that 3.5% of the sales of every large automaker in the province must be ZEVs. Again, these two policies help explain the rapid ZEV uptake in Quebec.

Compared to these two provinces, Ontario's current lack of ZEV incentives stands out, and may explain the lagging ZEV sales in the province. Ontario did have an incentive program in the past, implemented in 2016 by the Liberal government, that offered [up to a CAD\\$14,000 rebate](#) for the purchase of new ZEVs. However, this incentive was [cancelled in Q3 of 2018](#) by newly elected Conservative premier Doug Ford. This incentive explains Ontario's ZEV sales growth between 2015 and 2018 and its subsequent decline between 2018 and 2019 following the cancellation of the incentive.

The analysis of ZEV sales and incentives by province highlights the fact that Ontario is lagging behind comparable provinces and, as a result, may prevent Canada from hitting its 2025 sales target. It seems likely that if Ontario had a program similar to what can be seen in Quebec or B.C., the growth of ZEV sales in the province may be able to align much more closely with what we see in those provinces. However, the current provincial government's cancellation of the previous subsidy means future ZEV direct subsidies are an unlikely policy option. As a result, our research team set out to define a more innovative policy approach to bring ZEV sales in Ontario closer to what can be seen in Quebec and B.C. - which we understand to be Canada's best chance to reach its 2025 ZEV sales target.

Designing a New Policy to Incentivize ZEV Sales in Ontario

To accomplish this, we considered a range and mix of policy actions to increase ZEV uptake in Ontario. In an initial scan, our research team [uncovered various policy options](#) including, but not limited to: financing to bridge the cost gap between ZEVs and ICE vehicles, the large-scale construction of ZEV infrastructure, congestion charges, and information campaigns to raise awareness of the viability and benefits of ZEVs. However, responsibility for some of these policies rests with either the federal government, such as when dealing with infrastructure, or municipal governments, such as congestion charges.

As such, we identified [bridging the cost gap between ZEVs and ICE vehicles](#) as the most impactful, realistic policy action Ontario could take in support of Canada's goals. This is an area where Ontario has legislated before, with the aforementioned ZEV subsidy, and is a space where a new, more innovative policy could be introduced.

To do so, we recommend the Province of Ontario introduces a Scrap Premium Policy - similar to what [Germany instituted in 2009](#) after the Global Financial Crisis to incentivize consumption. However, instead of incentivizing the purchase of any new car, like what was done in Germany, our recommended policy would be specifically designed to encourage consumers to replace their older, ICE vehicles for ZEVs. Specifically, Ontario should offer consumers who are willing to trade in their 10 years or older ICE vehicle a CAD\$3000 voucher that can be put towards the purchase of a new ZEV - to close the cost gap which currently exists between these two vehicle classes.

Providing vouchers for the scrapping and replacement of older cars in this manner provides two key benefits. First, it avoids the implementation of a direct subsidy program, which is unpopular with the current government. Second, it maximizes the environmental impact of the policy by removing older cars from the road, which are on average [worse for the environment in terms of fuel efficiency and emissions](#).

By examining the age of Ontario's vehicle fleet, we can arrive at an estimate for how wide reaching this policy would be. As of 2015, there were [10.1 million cars](#) in Canada that were over 10 years old. Given that [35.5% of all road motor vehicles](#) in the country are registered in Ontario, our research team assumed there are roughly 3.6 million cars in Ontario that are older than 10 years and, as a result, eligible to be traded in under our Scrap Premium Policy.

If the policy was then used for every eligible vehicle in Ontario, it would cost the government CAD\$10.8 billion. Clearly, this would not be financially viable for a provincial government. Therefore, we recommend capping the policy at CAD\$500 million and distributing it on a first-come-first-serve basis while funding lasts. This investment would allow for a ZEV sale voucher to be extended to the first 166,000 cars turned in, more than four times as many ZEVs currently registered in Ontario. Depending on the initial uptake speed of the program, further funding could be allocated to the policy to extend the support it provides for ZEV sales in Ontario.

Analysis

How a Scrap Premium Policy in Ontario Can Support Canada's Goals

In this section, our research team compared two scenarios to evaluate how likely Canada is to hit its 2025, 2030, and 2040 ZEV sales targets of 10%, 30% and 100% respectively. In the first, we assume business as usual with no ZEV incentives implemented in Ontario. In the second, we assume our Scrap Premium Policy was implemented in Ontario. In both scenarios, we utilized two key variables: (1) the average increase in ZEV market share per year by province and (2) the average provincial market share of total vehicle purchases between 2015 and 2019 - where data was available.

Scenario Calculations

First, building on the data presented previously, which showed the share of new ZEV registrations as a percentage of total vehicle registrations in Ontario, Quebec, and B.C., we aggregated the available data for every other province into a single data category labelled "Others". We then calculated the average annual increase in ZEV market share for each province over the period 2015 to 2019. This produced figures for the average increase we could expect per year under both scenarios. For the business as usual scenario, we used Ontario's average percentage change in ZEV market share from 2015 to 2019, resulting in just a 0.24% annual increase. For the Scrap Premium Policy scenario, we calculated the average of B.C. and Quebec's ZEV market share growth between 2015 and 2019, which was 1.54% annually, and applied it as Ontario's future growth rate.

To calculate the total impact both scenarios would have on Canada's overall ZEV market share, we used our expected annual market share increases for each province and weighted them based on the [provincial proportion of total new vehicles \(all types\)](#) registered in Canada each year. We used this weighting system to ensure our model accounted for the fact that ZEV market share increases in Ontario are more impactful than ZEV market share increases in other provinces since more vehicles are purchased every year in Ontario.

Business as Usual Scenario

| Table 4. ZEV Sales Market Share (BAU*) | | | | | |
|---|--------------|--------------|--------------|-------------|---------------|
| | CAN | QC | BC | ON | Others |
| 2015 | 0.37 | 0.7 | 0.65 | 0.29 | 0.04 |
| 2016 | 0.63 | 1.15 | 0.94 | 0.53 | 0.08 |
| 2017 | 1 | 1.7 | 1.3 | 1.05 | 0.1 |
| 2018 | 2.21 | 3.8 | 3.53 | 2.05 | 0.22 |
| 2019** | 2.91 | 5.91 | 7.79 | 1.22 | 0.46 |
| 2020 | 3.65 | 7.21 | 9.58 | 1.46 | 0.57 |
| 2021 | 4.39 | 8.52 | 11.36 | 1.69 | 0.68 |
| 2022 | 5.13 | 9.82 | 13.15 | 1.93 | 0.79 |
| 2023 | 5.87 | 11.12 | 14.93 | 2.16 | 0.9 |
| 2024 | 6.61 | 12.42 | 16.72 | 2.4 | 1.01 |
| 2025 | 7.35 | 13.73 | 18.5 | 2.63 | 1.12 |
| 2026 | 8.09 | 15.03 | 20.29 | 2.87 | 1.23 |
| 2027 | 8.83 | 16.33 | 22.07 | 3.1 | 1.34 |
| 2028 | 9.57 | 17.63 | 23.86 | 3.34 | 1.45 |
| 2029 | 10.31 | 18.94 | 25.64 | 3.57 | 1.56 |
| 2030 | 11.05 | 20.24 | 27.43 | 3.81 | 1.67 |
| 2031 | 11.79 | 21.54 | 29.21 | 4.04 | 1.78 |
| 2032 | 12.53 | 22.84 | 31 | 4.28 | 1.89 |
| 2033 | 13.27 | 24.15 | 32.78 | 4.51 | 2 |
| 2034 | 14.01 | 25.45 | 34.57 | 4.75 | 2.11 |
| 2035 | 14.75 | 26.75 | 36.35 | 4.98 | 2.22 |
| 2036 | 15.49 | 28.05 | 38.14 | 5.22 | 2.33 |
| 2037 | 16.23 | 29.36 | 39.92 | 5.45 | 2.44 |
| 2038 | 16.97 | 30.66 | 41.71 | 5.69 | 2.55 |
| 2039 | 17.71 | 31.96 | 43.49 | 5.92 | 2.66 |
| 2040 | 18.45 | 33.26 | 45.28 | 6.16 | 2.77 |

*Business As Usual scenario

** 2019 historical edge

Source: StatsCan, GEPL calculations

If no new incentives are introduced, we forecast the nationwide increase in annual ZEV market share to be just 0.74% per year. This confirmed Transport Canada's concerns that the 2025 target of 10% market share will not be reached. Our analysis suggests that market share by 2025 would be just 7.35%. As well, in the longer term, existing ZEV market share growth rates will be insufficient to achieve the 2030 and 2040 targets as well.

Quebec and B.C., however, will both exceed the 2025 goal with market shares of 13.73% and 18.5%, respectively. Unfortunately, under this scenario, Ontario's ZEV market share would be a mere 2.63%. Given that Ontario accounts for such a large proportion of vehicle sales in Canada, its lagging performance would be the primary factor holding Canada back from reaching its national target.

Scrap Premium Policy Scenario

| | CAN | QC | BC | ON | Others |
|---------------|--------------|--------------|--------------|--------------|---------------|
| 2015 | 0.37 | 0.7 | 0.65 | 0.29 | 0.04 |
| 2016 | 0.63 | 1.15 | 0.94 | 0.53 | 0.08 |
| 2017 | 1 | 1.7 | 1.3 | 1.05 | 0.1 |
| 2018 | 2.21 | 3.8 | 3.53 | 2.05 | 0.22 |
| 2019** | 2.91 | 5.91 | 7.79 | 1.22 | 0.46 |
| 2020 | 4.28 | 7.21 | 9.58 | 2.76 | 0.57 |
| 2021 | 5.65 | 8.52 | 11.36 | 4.31 | 0.68 |
| 2022 | 7.02 | 9.82 | 13.15 | 5.85 | 0.79 |
| 2023 | 8.39 | 11.12 | 14.93 | 7.4 | 0.9 |
| 2024 | 9.76 | 12.42 | 16.72 | 8.94 | 1.01 |
| 2025 | 11.13 | 13.73 | 18.5 | 10.48 | 1.12 |
| 2026 | 12.5 | 15.03 | 20.29 | 12.03 | 1.23 |
| 2027 | 13.87 | 16.33 | 22.07 | 13.57 | 1.34 |
| 2028 | 15.24 | 17.63 | 23.86 | 15.11 | 1.45 |
| 2029 | 16.61 | 18.94 | 25.64 | 16.66 | 1.56 |
| 2030 | 17.98 | 20.24 | 27.43 | 18.2 | 1.67 |
| 2031 | 19.35 | 21.54 | 29.21 | 19.75 | 1.78 |
| 2032 | 20.72 | 22.84 | 31 | 21.29 | 1.89 |
| 2033 | 22.09 | 24.15 | 32.78 | 22.83 | 2 |
| 2034 | 23.46 | 25.45 | 34.57 | 24.38 | 2.11 |
| 2035 | 24.83 | 26.75 | 36.35 | 25.92 | 2.22 |
| 2036 | 26.2 | 28.05 | 38.14 | 27.46 | 2.33 |
| 2037 | 27.57 | 29.36 | 39.92 | 29.01 | 2.44 |
| 2038 | 28.94 | 30.66 | 41.71 | 30.55 | 2.55 |
| 2039 | 30.31 | 31.96 | 43.49 | 32.1 | 2.66 |
| 2040 | 31.68 | 33.26 | 45.28 | 33.64 | 2.77 |

** 2019 historical edge

Source: StatsCan, GEPL calculations

On the other hand, if Ontario implements our suggested Scrap Premium Policy, our analysis suggests a much more optimistic outlook for ZEV market share growth in Canada. Under this scenario, Canada would achieve and even surpass its 2025 target with a ZEV market share of 11.13%. This, of course, is driven by significantly increased uptake in Ontario. Our forecasted market share increase of 1.54% per year would see Ontario's ZEV market share reach 10.48% by 2025. However, it should be noted that, similar to the BAU scenario, Canada and all of its provinces will fail to meet the national 2030 and 2040 targets at this growth trajectory.

Conclusion

Broader ZEV Reforms are Needed

The above data and analysis provides several key implications. First, it is clear that Canada will be unable to meet its ZEV market share targets without the support of Ontario. Given Ontario's size and share of the Canadian vehicle market, it is simply too important of a province to be ignored when it comes to these targets. The implementation of a Scrap Premium Policy, or a policy with a similar outcome, will be crucial to getting Ontario back on track with regard to ZEV sales and represents the best opportunity for Canada to achieve its 2025 target.

However, it is also clear that the current and proposed slate of incentive programs will only support Canada's ZEV sales targets in the short-term. Achieving the longer-term objectives in 2030 and 2045 will require more comprehensive, structural changes to fundamentally transform Canada's vehicle market. These changes will need to translate to a more exponential growth in the ZEV market share, as opposed to the linear growth assumed in our model, if Canada is to hit its ambitious targets. This may only be possible if the GoC and the provinces make large investments in infrastructure and production in order to push down the cost of ZEVs and make them a more attractive alternative for consumers. Unless broader reforms are implemented, Canada is unlikely to achieve its ZEV goals and the resulting emissions reductions.

No forwarding, reprinting, republication or any other redistribution of this content is permissible without expressed consent of the author(s). All rights reserved.

The Global Economic Policy Lab at the Munk School of Global Affairs & Public Policy is not a certified investment advisory service. It aims to create an intellectual framework for informed decisions by its clients. The document is based upon information obtained from sources the author(s) believe(s) to be reliable but which it has not been independently verified. Opinions, data and other information expressed in this document are based upon publicly available information at the moment of publication and/or distribution and may be amended without notice. This content is for informational purposes only and does not constitute, and may not be relied on as, investment advice or a recommendation of any investment or policy strategy. It does not represent a statement on behalf of the Munk School of Global Affairs & Public Policy at the University of Toronto. You may refer to this document in publications by directly linking to it at its source address.