PLUG-IN ELECTRIC VEHICLE AVAILABILITY

ESTIMATING PEV SALES INVENTORIES IN CANADA: Q1 2020 UPDATE

Prepared for:
TRANSPORT CANADA

dunsky ENERGY CONSULTING

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About Dunsky

Dunsky provides strategic analysis and counsel in the areas of energy efficiency, renewable energy and clean mobility. We support our clients – governments, utilities and others – through three key services: we **assess** opportunities (technical, economic, market); **design** strategies (programs, plans, policies); and **evaluate** performance (with a view to continuous improvement).

Dunsky's 30+ experts are wholly dedicated to helping our clients accelerate the clean energy transition, effectively and responsibly.

CLIENTS

1 EXECUTIVE SUMMARY

Across Canada, supportive provincial and federal programs, decreasing plug-in electric vehicle (PEV) prices, and a growing variety of electric vehicle models have led to steady year-over-year increases in consumer demand for PEVs. Although the sales of PEV models nation-wide are the highest we have ever seen, there is concern that limited supply – both in terms of the number of vehicles and the diversity of models available on dealership lots – may be acting as a barrier to adoption in growing markets across Canada. This report presents the results of a comprehensive data collection effort completed by Dunsky on behalf of Transport Canada to assess the availability of PEVs in dealerships across Canada.

As was seen in previous reports assessing PEV availability in 2018 and 2019, dealership inventory levels across Canada remain below optimal levels to meet consumer demand. While our previous report suggested that limited inventory in 2019 may have been a result of a sudden increase in demand due to the introduction of the federal purchase incentive program in May 2019, dealership inventory levels in February 2020 assessed in this report suggest that the supply of vehicles is still not keeping up with demand. Nation-wide inventory levels in February 2020 are 3% above those observed in November 2019, but still 21% below those observed in December 2018. Meanwhile, PEV sales have increased roughly 25% over that time, meaning that the PEVs that are available are selling faster, and consumers are likely having a harder time finding a vehicle available for purchase in inventory that meets their needs.

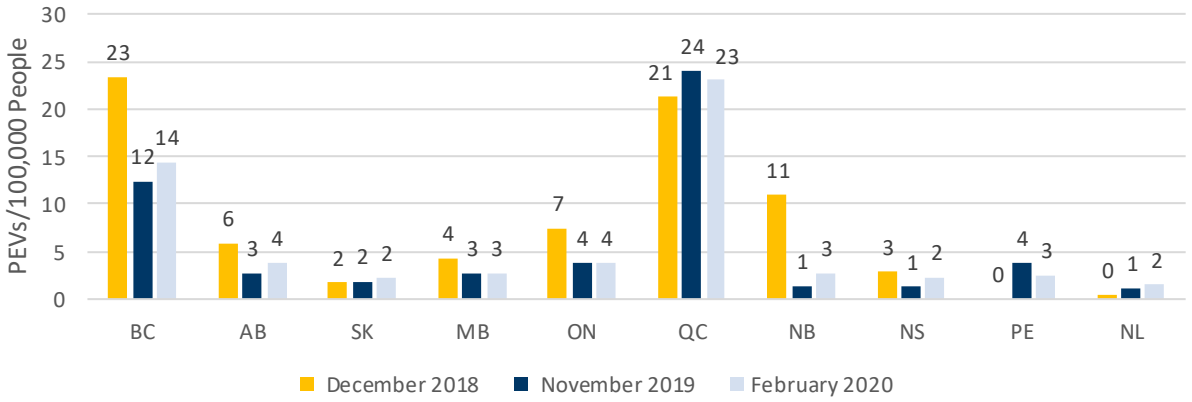
The inventory that is available in Canada is not evenly distributed across the country. While many automakers are naturally concentrating their inventory in provinces with supportive policies for PEV adoption and strong momentum in terms of sales, the limited number of PEVs available for purchase in some provinces is likely impeding the market and making it hard for these provinces to build their own momentum. Table ES1 below shows the number of PEVs available in inventory for each province across all three comprehensive inventory assessments conducted by Dunsky so far.

Table ES1. Comparison of 2018 and 2019 Inventory Levels by Province

	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	Total
Total – Feb 2020	692	164	26	36	536	1,944	21	22	4	8	**3,453**
Total – Nov 2019	595	115	22	37	543	2,010	10	12	6	6	**3,356**
Total – Dec 2018	1,118	253	19	57	1,043	1,789	81	29	-	2	**4,391**

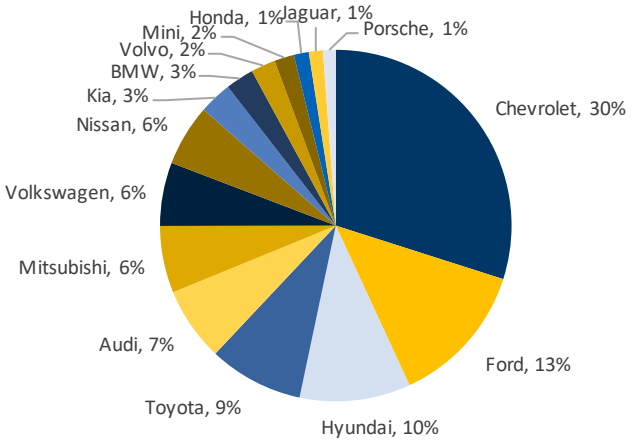
Figure ES1 below shows that when normalized by population, inventory levels are clearly heavily concentrated in Quebec and BC, with very limited availability in Atlantic Canada. This figure also makes it clear that inventory levels are not increasing over time.

Figure ES1. PEVs Available for Purchase per 100,000 People, by Province



The data collected in November 2019 showed little diversity in vehicles from an automaker perspective, with Chevrolet making up 56% of nationwide inventory. This round of data collection shows available vehicles being more evenly distributed among automakers, indicative of increased consumer choice. That being said, just three automakers (Chevrolet, Ford, and Hyundai) currently make up more than half of the nationwide inventory, suggesting consumer choice remains limited.

Figure ES2. National PEV Inventory by Automaker as a Percentage of Total



Days of supply – a metric used by dealerships to assess whether inventory levels are expected to be adequate according to historic sales – remains low across the country. Data collected in 2018 and 2019 fell below the target range of 50-100 days of supply with 36 and 19 days of supply, respectively, across all provinces and automakers. With 26 days of supply, this round of data collection showed a slight increase from 2019, while staying below 2018 levels.

Table ES2. Comparison of 2018 and 2019 Inventory Levels by Province

	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	Total
Total – Feb 2020	19	47	53	50	22	29	47	43	28	67	**26**
Total – Nov 2019	12	24	39	35	16	24	16	20	20	31	**19**
Total – Dec 2018	49	100	87	128	23	37	501	115	0	56	**36**

LEGEND	
	Over-supply (>100 days of supply)
	Target level of supply (50-100 days of supply)
	Under-supply (<50 days of supply)
	No sales in Q3 2019 (but at least one vehicle available in inventory)

These observations point to several overall conclusions from this analysis, and are consistent with the findings from the previous report:

- There needs to be a significant increase in PEV inventory levels in order to keep pace with growing sales in Canada.
- Despite a national ZEV purchase incentive in place, it can still be very challenging to find a PEV as only 33% of dealers in Canada have at least one PEV in stock. Outside of Quebec, BC and Ontario, fewer than 20% of dealerships have at least one PEV.
- Harmonization of policies and practices across the country could help to ensure that all Canadians have greater access to PEVs, not just those in Quebec and BC.

Given the federal ZEV sales targets for 2025 and 2030, it will be important for the federal government to continue to monitor the availability of PEVs across Canada and explore opportunities to address supply issues to ensure that a lack of PEV availability does not create an additional barrier to adoption of PEVs.

2 TABLE OF CONTENTS

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3 INTRODUCTION

Across Canada, supportive provincial and federal programs, decreasing plug-in electric vehicle (PEV) prices, and a growing variety of electrified vehicle models have led to steady year-over-year increases in consumer demand for PEVs. Although the sales of PEV models nation-wide are the highest we have ever seen, there is concern that limited supply – both in terms of the number of vehicles and the diversity of models available on dealership lots – may be acting as a barrier to adoption in growing markets across Canada.

Dunsky has been retained by Transport Canada to assess PEV availability in dealerships across the country and to report on the findings a number of times, as outlined below:

- December 2018: Comprehensive data collection effort (web and phone surveys)
- March 2019: Data collected for a subset of manufacturers (web-only)
- November 2019: Comprehensive data collection effort (web and phone surveys)

This latest report reflects a comprehensive data collection effort conducted in **February 2020**.

3.1 METHODOLOGY

The data presented in this report was collected through two primary means.

1. **Automaker inventory databases**. Where available, inventory data was collected directly through automaker websites. This was the case for 10 of the 22 automakers[1] included in this study.
2. **Dealership phone surveys**. For the remaining 12 automakers that do not currently provide a public-facing inventory database on their website, individual dealerships were contacted by phone by researchers posing as interested buyers and asked how many of each PEV model were available to purchase at the dealership.

Between these two methods, data on PEV inventory levels was collected for 3,079 dealerships across Canada. This is an increase of 378 dealerships compared to the last report, due primarily to the addition of new automakers that have entered the PEV market (e.g. Mini, Subaru), although other automakers have taken PEV models off the market (Cadillac, Smart). In all cases, both plug-in hybrid electric vehicles (PHEVs) and battery electric vehicles (BEVs) were counted (collectively referred to as PEVs). All data was collected during the first half of February 2020.

Table 1. Data Collection Methodology and Number of Dealerships by Automaker

	Data Collection Methodology	Number of Dealerships Across Canada
Audi	Web	51
BMW	Phone Survey	51
Cadillac	Web	138
Chevrolet	Web	448
Chrysler	Web	477

[1] For simplicity's sake, the term "automaker" is used in this report to refer to automotive brands. Brands that are part of the same automotive company (e.g. Cadillac and Chevrolet as two brands under General Motors) are referred to as individual "automakers".

Ford	Web	468
Honda	Phone Survey	175
Hyundai	Phone Survey	224
Jaguar	Phone Survey	27
Karma	Web	3
Kia	Web	168
Mercedes-Benz	Web	57
Mini	Web	31
Mitsubishi	Phone Survey	100
Nissan	Phone Survey	157
Porsche	Phone Survey	20
Smart	Web	35
Subaru	Phone Survey	94
Tesla	Phone Survey	10
Toyota	Phone Survey	241
Volkswagen	Phone Survey	67
Volvo	Phone Survey	37

While the web-based data collection process allows a large amount of data to be collected quickly and consistently, it may be somewhat removed from the experience of an actual customer shopping for a PEV depending on the accuracy of the automaker's inventory database. For example, while an automaker may list a certain number of PEVs as available in a given dealership, a customer visiting the dealership may not be guaranteed to find that exact number of PEVs on the dealership lot.

On the other hand, while the phone survey process more closely approximates an actual EV shopping experience, the shear number of dealerships to be contacted required a streamlined survey process that is less thorough than would be possible through an actual in-person secret shopper approach. The phone survey process also introduces an increased opportunity for errors in data collection. For example, there are cases where automakers offer several versions of the same vehicle with different powertrains (e.g. plug-in hybrid and conventional hybrid versions of the Hyundai Ioniq and Toyota Prius). Phone survey staff were given clear descriptions of each powertrain configuration and warned of specific cases where there might be possible confusion between available vehicle models. An example of the script used for phone surveys is included in the Appendix.

3.2 STRUCTURE OF REPORT

This report is structured as follows:

CONTEXT: ELECTRIC MOBILITY IN CANADA
An overview of the PEV market and supportive policies and programs across Canada.

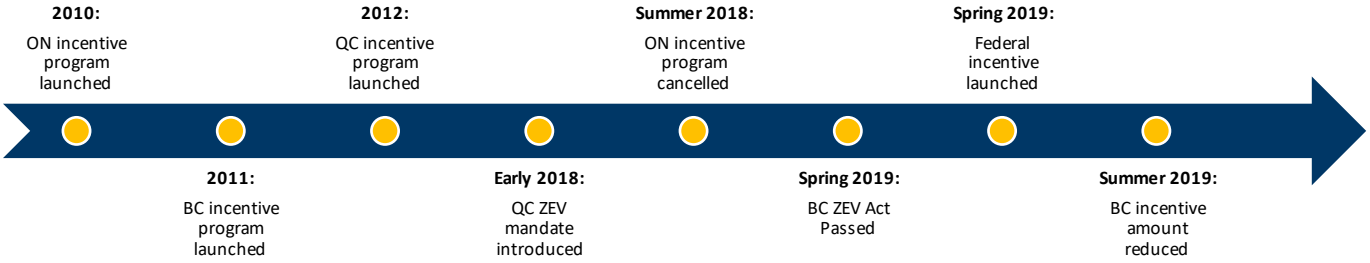
PEV INVENTORY: DATA AND OBSERVATIONS
A description and analysis of PEV inventories by province and manufacturer, including absolute inventory levels, inventory relative to sales, split of battery electric vehicles (BEV) and plug-in hybrid electric vehicles (PHEV), and selection of makes and models.

CONCLUSION
A summary of the key takeaways from this study.

4 CONTEXT: ELECTRIC MOBILITY IN CANADA

Below, a timeline is presented that highlights key provincial and federal policies related to PEVs (Figure 1). In Canada, British Columbia, Quebec, and Ontario have historically taken the lead on PEVs, offering sustained policy support through incentives and other initiatives. In summer of 2018, however, this support was reversed in Ontario when the provincial vehicle and charging infrastructure incentive program was cancelled. Elsewhere in Canada, support for PEVs from provincial governments has remained limited.

Figure 1. Timeline of Key Provincial and Federal PEV policies



A federal electric vehicle purchase incentive was introduced to the market in spring of 2019. This purchase incentive can be stacked with existing provincial incentives, offering consumers in provinces with existing rebates significant reductions on the incremental upfront purchase cost of a PEV. The federal incentive is the first exposure that markets outside of Quebec, Ontario, and British Columbia have had to a PEV rebate, and it is expected to boost adoption in those provinces.

The introduction of a Canada-wide incentive by the federal government represents a significant policy change that is likely accelerating PEV sales across Canada

As was noted in the last report, a lack of public charging infrastructure is considered to be a key barrier to adoption of PEVs. Figure 2 and Figure 3 below highlight public charging infrastructure installed in each province as of December 2019.

Figure 2. Number of Level 2 and DCFC Ports by Province: BC, Ontario, and Quebec[2]

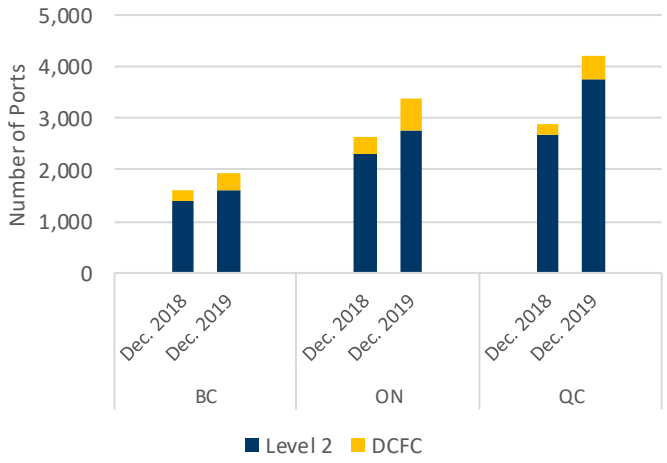
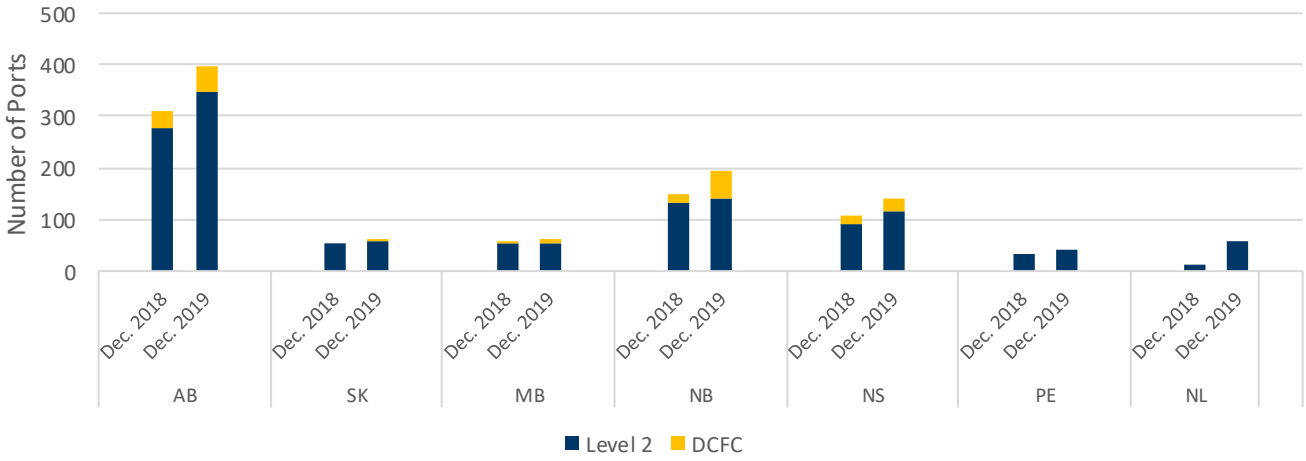


Figure 3. Number of Level 2 and DCFC Ports by Province: Rest of Canada



Since the 2018 report, growth in the overall number of charging stations has been observed in all provinces. Across Canada, there has been a 28% increase in level 2 charging stations along with 81% increase in DCFC charging stations. It should be noted that DCFC charging infrastructure has been concentrated in Quebec, Ontario, and British Columbia, with 90% of the growth in DCFC installations occurring in these provinces.

Canada's charging infrastructure network is growing rapidly, but remains concentrated in Quebec, Ontario, and British Columbia

DCFC deployments have begun to establish geographic connectivity in other parts of the country as well, however, thanks in large part to Natural Resources Canada's Electric Vehicle and Alternative Fuel Infrastructure Deployment Initiative. New Brunswick and Nova Scotia, for example, have both succeeded

[2] Data from Natural Resources Canada Electric Charging and Alternative Fuelling Stations Locator. Available online at: https://www.nrcan.gc.ca/energy/transportation/personal/20487#/analyze?country=CA

in establishing strong geographic coverage of DCFC stations with a relatively small number of installations, and a number of other provinces are seeing their first DCFC installations along major highway corridors.

4.1 PEV REGISTRATIONS

In order to assess how sales have evolved over the time since the last study was completed while accounting for seasonal fluctuations of the auto market, we can compare the fourth quarter (Q4)[3] 2019 PEV registrations to those from the fourth quarter of 2018. Focusing on Q4 registrations rather than monthly registration data helps to smooth out fluctuations from month to month, providing the latest data available while also capturing the impacts of the introduction of the federal incentive in May of 2019 without being influenced by the sudden increase in registrations observed in Q2 immediately after the incentive was introduced.

Over 12,000 PEVs were registered in the fourth quarter of 2019, representing a 25% increase compared to 2018. It's likely that the volumes were boosted in large part by the introduction of a federal vehicle purchase incentive in spring 2019, partially offsetting the impact of the cancelation of Ontario's incentive program in 2018[4].

Much of this nation-wide increase in PEV registrations is attributable to significant growth in Canada's strongest PEV markets, British Columbia and Quebec, which have reached 10% and 7% market share, respectively, compared to a 3.5% market share nation-wide[5]. That being said, the largest relative increases occurred in provinces with very few registrations to begin with. For example, Q4 sales in Newfoundland and Labrador increased from 6 to 11 from 2018 to 2019, while Prince Edward Island increased from 1 to 13. While these increases do not contribute significantly to overall PEV registrations across Canada, the sudden change represents a significant disruption to the PEV market in these jurisdictions. The highest volume battery electric vehicles across Canada registered in the fourth quarter of 2019 are included in Table 2 below.

Table 2. Top Registered Electric Vehicles in Canada, Q4 2019

Model	Powertrain	Q4 2019 Registrations
Tesla Model 3	BEV	3,420
Toyota Prius Prime	PHEV	2,078
Chevrolet Bolt	BEV	1,291
Mitsubishi Outlander PHEV	PHEV	953
Hyundai Kona	BEV	876
Nissan Leaf	BEV	619

Source: IHS Markit New Light Vehicle Registrations, Data as of December 31, 2019

As can been seen above, the Tesla Model 3 represents the top selling car across the country, representing roughly a third of Q4 PEV sales in Canada. The Model 3 has introduced a significant step-change in PEV sales volumes in North America. First arriving in 2017 with a significant backlog of reservations, a rapid ramp up of production through 2018 led to the Model 3 becoming the top selling PEV in Canada by a wide margin by Q2 of 2019. The other top-selling PEVs in Canada are showing a more gradual growth compared to the Model 3.

[3] This refers to the fourth quarter of the calendar year, including the months of October, November, and December.

[4] While the cancellation of Ontario's incentive program was announced in the spring of 2018, existing dealer inventory vehicles were eligible for incentives until September 10, 2018.

[5] https://emc-mec.ca/new/electric-vehicle-sales-in-canada-q3-2019/

5 PEV INVENTORY: DATA AND OBSERVATIONS

This section presents the PEV inventory data that was collected under this study and highlights observations from the data. The data is presented in four main subsections:

1. **PEV Inventory Levels**, where the absolute inventory numbers are presented by province and by automaker.
2. **Inventory Relative to Sales,** where the data is presented in terms of "days of supply" based on the sales rate of each model.
3. **Availability of Distinct PEV Models**, where the number of distinct PEV model options are presented by province and by automaker.
4. **Availability by Dealership,** with a focus on the number of PEVs available in each dealership.

5.1 PEV INVENTORY LEVELS

Table 3 below summarizes the inventory across Canada, presented by province and by automaker.

Table 3. Vehicle Inventory by Province and Automaker

	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	Total
Audi	50	9	3	2	88	75	1	3	0	1	232
BMW	16	3	9	0	33	27	1	0	0	0	89
Chevrolet	281	42	3	12	7	676	0	0	0	0	1021
Chrysler	0	2	0	1	3	1	0	0	0	0	7
Ford	26	2	0	1	13	407	1	0	0	0	450
Honda	8	1	0	0	6	31	0	1	0	0	47
Hyundai	56	26	6	5	73	168	3	8	0	3	348
Jaguar	6	9	1	1	16	8	0	3	0	0	44
Karma	5	0	0	0	4	5	0	0	0	0	14
Kia	43	0	0	0	21	38	1	0	0	0	103
Mercedes	2	0	0	0	2	9	1	0	0	0	14
Mini	27	2	1	1	9	20	1	1	0	0	62
Mitsubishi	29	17	0	6	67	80	8	0	0	3	210
Nissan	40	4	1	1	61	85	0	0	1	0	193
Porsche	9	4	2	2	11	11	0	1	0	0	40
Subaru	0	0	0	0	1	8	0	0	0	0	9
Tesla	0	0	0	0	0	0	0	0	0	0	0
Toyota	39	30	0	4	77	134	2	4	3	1	294
Volkswagen	34	0	0	0	20	145	0	0	0	0	199
Volvo	21	13	0	0	24	16	2	1	0	0	77
Total – Feb 2020	692	164	26	36	536	1,944	21	22	4	8	**3,453**

Total – Nov 2019	595	115	22	37	543	2,010	10	12	6	6	**3,356**
Total – Dec 2018	1,118	253	19	57	1,043	1,789	81	29	-	2	**4,391**

LEGEND: 1 100 200 300 400 500 600 700

A total of 3,453 PEVs were found to be available for purchase across the country. This represents a 3% increase in inventory from the last comprehensive data collection effort in November 2019. Compared to December 2018, however, inventory levels have decreased by 21% across the country. Canada-wide EV sales have grown by 25% between Q4 2018 and Q4 2019, as highlighted in the PEV section[6]. This mismatch between supply and demand points to the potential for supply to become a key barrier to adoption, as further explored in Section 5.2: Inventory Relative to Sales. Inventory relative to sales

Inventory has increased slightly compared to December 2019, but is still 21% lower than in 2018 despite increasing PEV sales, indicating that supply is not keeping pace with demand

5.1.1 AVAILABILITY BY PROVINCE

As might be expected from the historic supportive policies in these provinces and the fact that these provinces represent the largest automotive markets in Canada, and mirroring the findings from 2018 and 2019, Quebec, Ontario, and British Columbia show the highest absolute inventory values. These provinces also show the greatest diversity of automakers. Quebec was found to have the greatest overall inventory numbers with 57% of the nation-wide stock, potentially a result of the zero-emission vehicle (ZEV) mandate that has been in place since early 2018.

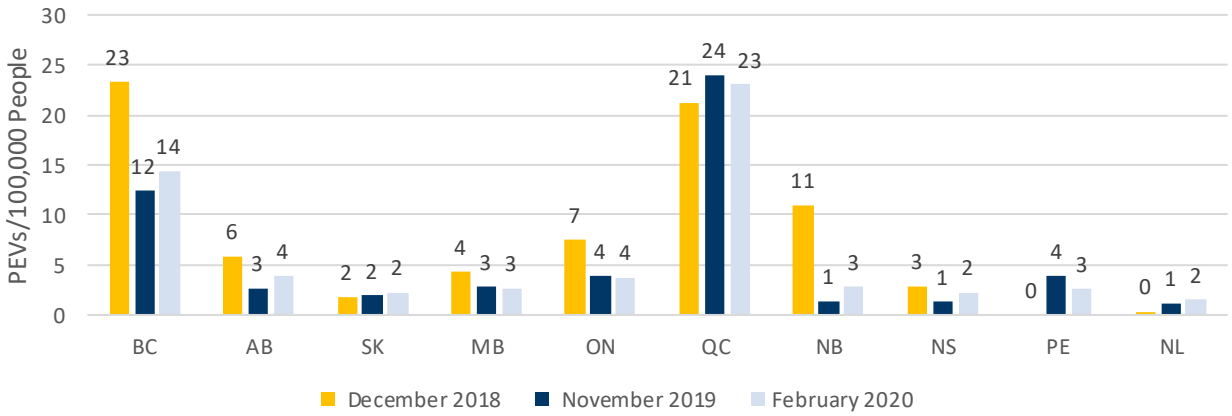
Although British Columbia and Ontario remain in the top three provinces in terms of absolute inventory values, both show decreases when compared to the data collected in 2018 (-38% and -49%, respectively). Compared to the data collected in November 2019, inventory levels have increased in BC (by 16%), perhaps indicating that manufacturers are adjusting to the high levels of demand in the province and responding to the province's forthcoming ZEV mandate. Again, comparing to data collected in November 2019, inventory levels decreased (although only slightly, by 1%) in Ontario. This is expected to indicate reduced focus on the Ontario market by automakers in the continued absence of province-specific policy support.

In the previous report, very low stocks were noted in Atlantic Canada, and both the number of vehicles and the selection of makes and models remain limited in this round of data collection. Stocks have increased in New Brunswick, Nova Scotia, and Newfoundland, but have dropped in PEI since data was collected in November 2019. Meanwhile, ZEV sales have grown rapidly across Atlantic Canada. Q4 2019 sales have increased over Q4 2018 sales in all Atlantic provinces, from 78% growth in New Brunswick at the low end (23 vehicles in 2018 to 41 vehicles in 2019) to 1200% growth in PEI at the high end (1 vehicle in 2018 to 13 vehicles in 2019). The federal vehicle purchase incentive is the first incentive that has been introduced to these markets and is thought to have contributed strongly to this growth in sales.

Normalizing the inventory data by population allows for comparison between provinces. Below, Figure 4 includes the number of PEVs available per 100,000 people in each province.

[6] Source: IHS Markit New Light Vehicle Registrations, Data as of December 31, 2019

Figure 4. PEVs Available for Purchase per 100,000 People, by Province



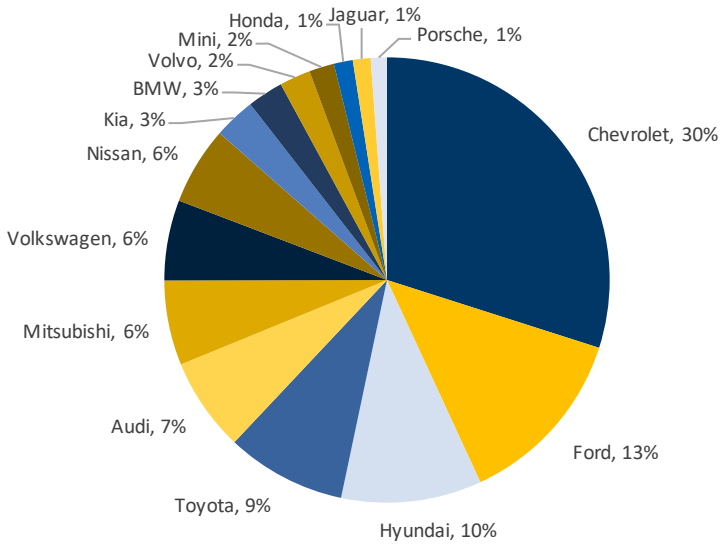
Even when normalized by population, Quebec continues to show significantly higher inventory levels than the rest of Canada. When compared to the previous comprehensive data collection effort in 2018, the majority of provinces show decreases in per capita inventory levels. The largest decrease can be noted in New Brunswick.

Even normalized by population, Quebec shows significantly higher inventory levels that the rest of Canada

5.1.2 AVAILABILITY BY AUTOMAKER

Below, Figure 5 provides a summary of the inventory by automaker as a percent of Canada-wide inventory.

Figure 5. National PEV Inventory by Automaker as a Percentage of Total



In December 2018, three automakers (Chevrolet, Mitsubishi, and Hyundai) accounted for approximately half of the nation-wide inventory, while in November 2019 a single automaker (Chevrolet) represented 56% of inventory. In this round of data collection, Chevrolet, Ford, and Hyundai account for more than 50% of Canada-wide stocks. This is attributable both to a significant drop in inventory at Chevrolet (1854 down to 1021, mostly due to drops in Quebec and Ontario), a near doubling of inventory for Ford (from 230 up to 450, with Ford's inventory becoming even more concentrated in Quebec) and a near quintupling of inventory for Hyundai (from 71 to 348, with increases observed in Quebec, Ontario, BC and Alberta). This suggests that Hyundai has been able to respond at least partially to the strong demand for the Hyundai Kona.

Three automakers account for more than half of Canada's total inventory: Chevrolet, Ford, and Hyundai

As was seen in the PEV section, Tesla has the highest selling model by a large margin. This is not reflected in inventory levels, however, with Tesla not having a single vehicle available for purchase in stock. Tesla uses a unique sales strategy compared with other automakers, relying less heavily on "brick and mortar" dealerships, offering customers the option to customize and order vehicles online and order directly from the factory. Tesla does operate ten showrooms in Canada where customers can test drive vehicles, but this is significantly fewer than other automakers (see Table 1 in the Methodology section) and maintains little to no on-site inventory.

High sales do not translate to high inventory level for all automakers (notably Tesla), potentially due to sales outpacing supply or variation in stocking practices between automakers

5.2 INVENTORY RELATIVE TO SALES

In addition to assessing inventory levels on an absolute basis as in the previous section, it can be helpful to consider inventory levels of vehicle models relative to the sales rates of those models. The text box below offers additional context on this metric, while Equation 1 and Equation 2 outline how it is calculated.

DAYS OF SUPPLY: A METRIC FOR DEALERSHIP INVENTORY

Car dealerships use inventory management practices to balance the selection of vehicles available to customers with the demand for those vehicles. Days of supply is a common metric used to manage inventory, developed using historical sales data and used when determining which and how many models should be ordered (see equations below). Using sales data, dealerships are able to calculate the number of a particular model of vehicle that are sold per day. These values are then used to fill orders for new vehicles that ensure enough vehicles will be available to meet expected demand. Dealerships will typically have guidelines for the minimum and maximum number of days they aim to stock vehicles for. Previous work in this area (Ease of Purchasing EVs in Canada, FleetCarma, 2015) has used the thresholds of **between 50 and 100 days of supply as the optimal inventory range**, and these values will be used here to assess the adequacy of PEV inventories by province, and vehicle make.

Equation 1. Step 1: Calculation of Sales per Day

$$Number\ Vehicles\ Sold\ in\ Q3 \div Days\ in\ Q3\ = Q3\ Sales\ per\ Day$$

Equation 2. Step 2: Calculation of Days of Supply

$$Current\ Inventory \div Q3\ Sales\ per\ Day\ = Days\ of\ Supply$$

Table 4 below presents PEV days of supply by province and vehicle make, calculated based on inventory data presented in Table 3 and on the average sales rate of each vehicle model in each province in the fourth quarter of 2019. Orange boxes indicate under-supply of a given make (<50 days of supply), green boxes indicate adequate supply (50-100 days of supply) and blue boxes indicate over supply (>100 days of supply).

Table 4. Days of Supply by Province and Manufacturer

	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	Total
Audi	70	138	276	61	145	130			0	92	115
BMW	53	39	828	0	127	52		0	0	0	76
Chevrolet	152	203	69	1,104	9	59	0	0	0	0	71
Chrysler	0	61	0	46	31	18	0	0	0	0	24
Ford	54	61	0	31	50	139	92	0	0	0	118
Honda	245		0	0	61	357	0		0	0	216
Hyundai	17	104	69	66	91	24	39	82	0		30
Jaguar	46	276			77	57	0		0	0	86
Karma		0	0	0			0	0	0	0	
Kia	20	0	0	0	23	8	15	0	0	0	13
Mercedes	184	0	0	0	20	46		0	0	0	44
Mini	497				276	184			0	0	317
Mitsubishi	10	33	0	110	45	15	147	0	0	276	20
Nissan	15	53	92	15	131	25	0	0		0	29
Porsche	30	37	184		19	30	0		0	0	29
Subaru	0	0	0	0	23		0	0	0	0	207
Tesla	0	0	0	0	0	0	0	0	0	0	0
Toyota	9	77	0	23	22	10	26	61	55	31	13
Volkswagen	45	0	0	0	153	41	0	0	0	0	45
Volvo	51	199	0	0	57	64	184	31	0	0	64
Total – Feb 2020	19	47	53	50	22	29	47	43	28	67	**26**

Total – Nov 2019	12	24	39	35	16	24	16	20	20	31	**19**
Total – Dec 2018	49	100	87	128	23	37	501	115	0	56	**36**

LEGEND	
	Over-supply (>100 days of supply)
	Target level of supply (50-100 days of supply)
	Under-supply (<50 days of supply)
	No sales in Q4 2019 (but at least one vehicle available in inventory)

In this table, there are a number of instances where a vehicle had zero sales throughout 2019, making it impossible to calculate the days of supply. In cases where there was also zero inventory of these vehicles, these are treated as "0 days of supply" and coloured yellow in this table. In cases where there were zero sales in 2019 in a given province but at least one vehicle was found in inventory, the cell was left blank and coloured in gray.

When data was collected in 2019, 19 days of supply were found at a nation-wide level. In this round of data collection, the 3,453 vehicles found to be in inventory represent 26 days of supply. In order to meet 50 days of supply, 6,627 vehicles would need to be in current inventory across the country. To meet 100 days of supply, 13,254 vehicles would be needed in inventory.

Nation-wide, inventory levels would need to almost double to meet the minimum target for days of supply

5.2.1 RESULTS BY PROVINCE

Although supply meets or exceeds targets for some automakers in some provinces, total supply (when considering all automakers, as shown in the total row in Table 4 above) is below target levels in the majority of provinces (only Saskatchewan, Manitoba, and Newfoundland meet target levels). The days of supply metric helps to contextualize the absolute inventory values presented in Table 3, and the two metrics should be considered in tandem to give a fulsome picture of inventory. British Columbia, Quebec, and Ontario appear to have high inventories of vehicles when only considering absolute values. Once sales values are factored in to generate the days of supply metric, however, it becomes clear that current inventory levels are much lower than the levels expected to support demand from consumers. Conversely, the days of supply metric has limited use when looking at emerging EV markets. In one such case, Saskatchewan appears to be oversupplied by three automakers and across all automakers is at target levels. When we look at the absolute inventory numbers, however, we can see that the numbers of vehicles in each of these cases remain quite low. As an example, Audi is shown as being oversupplied with only three vehicles in inventory. In this case, and in the case of all provinces in the early stages of adoption with limited sales to date, the favourable days of supply metrics are more a result of low historical sales in the province rather than high inventory levels and should be interpreted as such.

5.2.2 RESULTS BY AUTOMAKER

Results are mixed when looking at specific automakers. While a number of automakers have inventory levels that are below target, including Kia, Hyundai, Nissan and Toyota, there are several with inventory levels that are either within the optimal range or even oversupplied. That said, inventory levels for these automakers are not consistent across the country, with Atlantic Canada seeing low inventory levels from almost all automakers. For example, while Chevrolet's nation-wide inventory level is within the optimal range at 71 days of supply, Chevrolet has zero inventory in all four Atlantic provinces, and only 9 days of supply in Ontario. Chevrolet has clearly prioritized Canada's leading PEV markets, with an optimal 59 days of supply in Quebec, and an oversupply of 152 days of supply in BC. Likewise, Ford's inventory, which is oversupplied at the national level, is heavily concentrated in BC and Quebec, with only 17 vehicles in inventory in the remaining 8 provinces. As mentioned above, the days of supply metric is most useful when assessing inventory levels in more mature markets with a significant sales track record to compare to. When focusing on BC and Quebec, it becomes apparent that a number of automakers are successfully keeping pace with demand, including Chevrolet, Ford, Audi, BMW and Volvo.

Below, Table 5 outlines the inventory levels and sales strategies for each of the automakers with the top selling vehicles in Q4 2019.

Table 5. Inventory and Sales Strategy for Automakers with the Top Selling Models

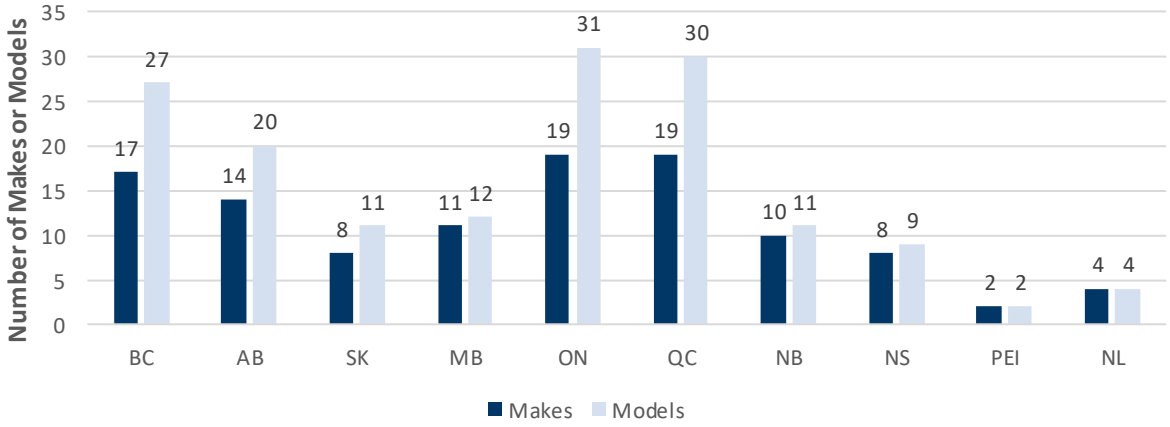
Automaker	Q4 2019 Sales	Inventory Level	Sales Strategy
Tesla Model 3	3,420	0	Factory order
Toyota Prius Prime	2,078	297	Inventory order
Chevrolet Bolt	1,291	1,013	Inventory order
Mitsubishi Outlander PHEV	953	210	Inventory order
Hyundai Kona	876	29	Inventory order
Nissan Leaf	619	193	Inventory order

As noted previously, Tesla uses a factory order model (most commonly seen in the luxury vehicle market), which explains the low inventory levels noted here, and may point to the days of supply metric not being an instructive indicator for automakers using this strategy. Other top-selling automakers use an inventory order sales model, where franchised dealerships typically stock a variety of vehicle models for consumers to choose from and purchase from the lot. Of these automakers, Chevrolet stands out as having provided a significant amount of inventory nationwide, although as stated above, this appears to be concentrated primarily in BC and Quebec.

5.3 VEHICLE CHOICE: AVAILABILITY OF DISTINCT PEV MODELS

The number of unique makes and models available in each province are shown in Figure 6 below, providing a measure of the selection available to consumers shopping for a PEV. As was found in the December 2018 data collection, consumers in Quebec, Ontario, and British Columbia continue to have the greatest selection of both makes and models. For the sake of comparison, there were over 250 light-duty vehicle models available for purchase in Canada in 2019[7], so while the diversity of PEV models has increased significantly over recent years, consumer choice is still limited, even in these leading provinces.

Figure 6. Number of makes/models available by Province



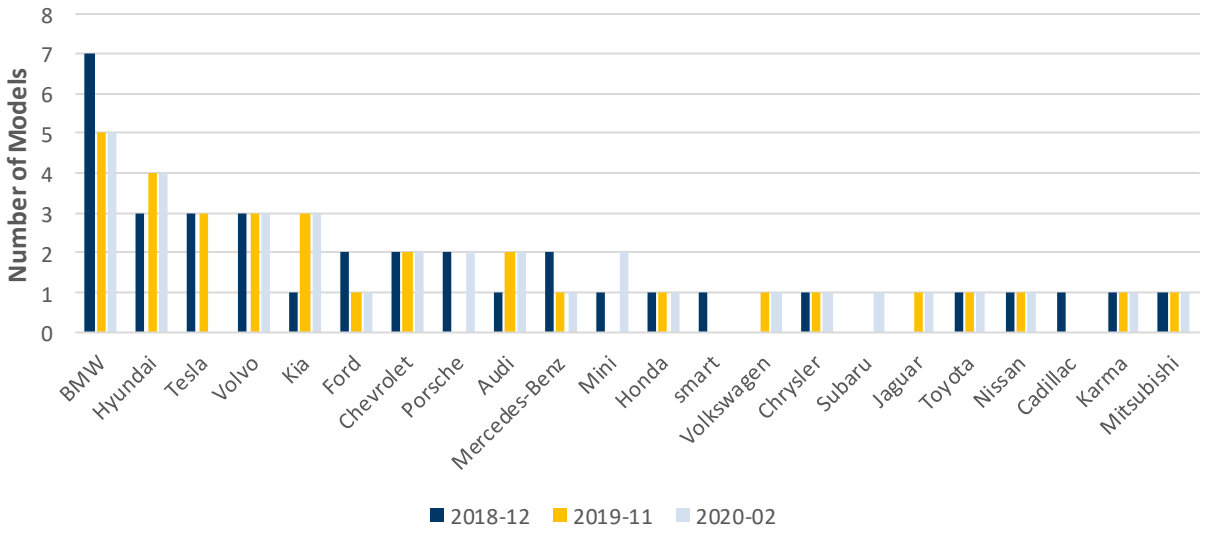
[7] 2019 Canada Vehicle Sales Figures by Model. https://www.goodcarbadcar.net/2019-canada-vehicle-sales-figures-by-model/

Of the top provinces, Ontario has the greatest selection of PEV vehicle models available. This is likely explained in part by Ontario having the largest auto market in the country, and the greatest number of dealerships. In addition, the province had a PEV vehicle purchase incentive from 2010 to 2018, which may have encouraged dealerships to invest in PEV stocking and sales, including investment in PEV-specific repair and servicing equipment, staff training, installation of charging infrastructure, and more, potentially motivating continued stocking of these vehicles. Outside of Quebec, Ontario, and British Columbia, the diversity of PEV models available to buyers is much more limited.

Consumer selection of PEV makes and models remains highest in QC, ON, and BC, with limited model selection in the rest of Canada.

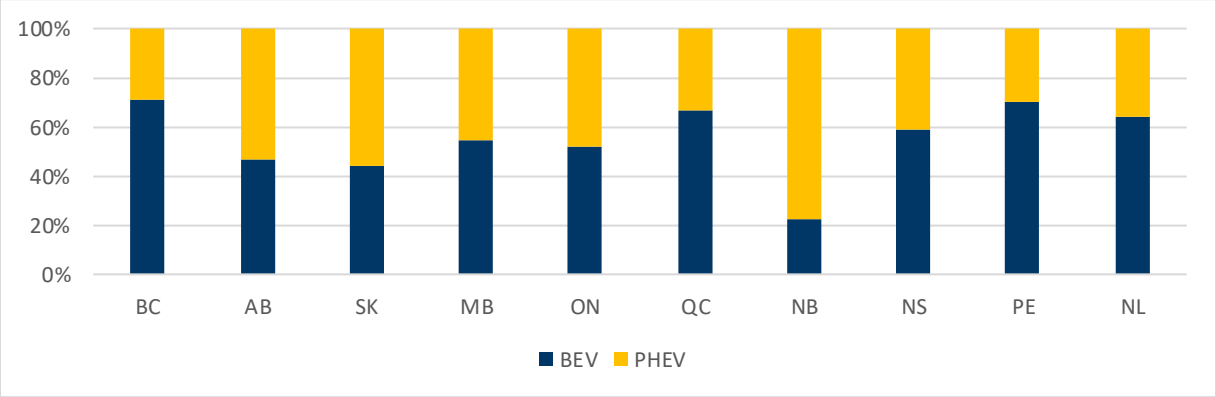
The number of models available by automaker varies, as shown in the figure below. More than half of the automakers only had a single model in stock across the country at the time of data collection, similar to what was found in 2018 and 2019. As part of a general trend towards a larger number of PEV models on the market, several automakers have added PEV models compared to 2018, including Hyundai, Kia, Audi, and Jaguar, with further additions to the market in early 2020 from Porsche, Mini and Subaru. In a few cases (e.g. BMW, Ford, Mercedes) the number of PEV models offered by certain automakers actually decreased from 2018 to 2019. This has occurred in a few cases where early PEV models have been discontinued, such as the Ford Focus Electric, partially offsetting the growth in diversity of available PEV models.

Figure 7. Number of PEV Models Available by Automaker across Canada



Powertrain type is also an important consideration for PEV shoppers, with the two primary categories being battery electric vehicles (BEVs) which run only on electricity and plug-in hybrid electric vehicles (PHEVs) which offer sufficient electric-only range for typical daily driving distances while relying on an internal combustion engine for longer trips. Figure 8 shows the number of vehicles available in inventory in each province according to powertrain type.

Figure 8. Split of BEV vs PHEV Available for Purchase by Province



Overall, BEVs represent 56% of the inventory across the country, down from 72% in the data collected in November 2019, but still up considerably from the 37% share of BEVs that was found when data was collected in 2018. This surge in BEVs from 2018 is primarily due to increased stocks from Chevrolet, which is responsible for a large share of overall inventory and announced in 2019 that it would no longer produce plug-in hybrid vehicles. This has been offset to some degree by the Ford Fusion Plug-In Hybrid, which was found to make up 13% of nationwide stocks in this round of data collection. We would not be surprised to see continued growth in the BEV market in the future – we expect consumer range anxiety concerns to reduce over time as the PEV market matures and consumers increasingly recognize that BEVs can meet most of their driving needs. As noted in the context section, there has also been a 28% country-wide increase in level 2 charging stations from the last report, and an 81% increase in DCFC charging stations. Improved coverage of the public charging infrastructure system may also be contributing to increased consumer willingness in BEVs, which may have led to higher stocking of these vehicles.

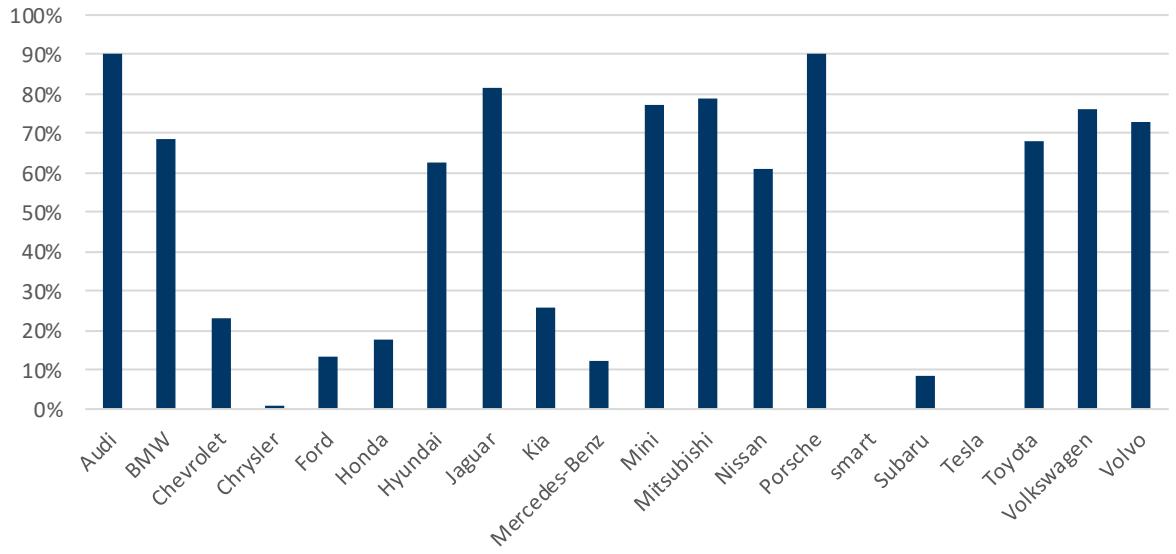
The share of BEVs in inventory has risen significantly across the country since 2018, but PHEVs have resurged slightly in early 2020.

5.4 AVAILABILITY BY DEALERSHIP

While the discussion so far has focused on results aggregated by province or by automaker, looking at PEV availability on an individual dealership basis can help to shed light on the PEV shopping experience, such as the likelihood of PEVs being available at any given dealership, and the number of PEVs in stock at a dealership that a shopper would be able to choose from.

Figure 9 below shows the percentage of dealerships for each automaker with at least one PEV available in inventory.

Figure 9. Percentage of dealerships with at least one PEV available



Overall, 67% of dealerships in Canada have no PEVs available in inventory, down slightly from 69% in November 2019, although there is significant variation between automakers. Interestingly, while the Chevrolet Bolt is by far the most heavily stocked PEV in Canada, 77% of Chevrolet dealerships do not have any Bolts in stock at all. A similar trend was observed with a handful of other automakers, including Ford and Kia, seemingly as a result of these automakers sending very little inventory to dealerships outside of BC and Quebec. Audi and Porsche on the other hand, stand out as having at least one PEV available in 90% of their dealerships across Canada. Another significant change since November 2019 is a significant increase in the percentage of Hyundai dealerships with available PEVs, from 24% to 63%, likely reflecting the roll-out of Hyundai's 2020 models in late December and early January.

Looking more closely at the number of PEVs per dealership, Figure 10 shows again that a large majority (67%) of dealerships do not have any PEVs available at all, with a further 24% of dealerships with three or fewer PEVs available. Only 9% of dealerships have four or more PEVs.

Figure 10: Number of PEVs available per dealership

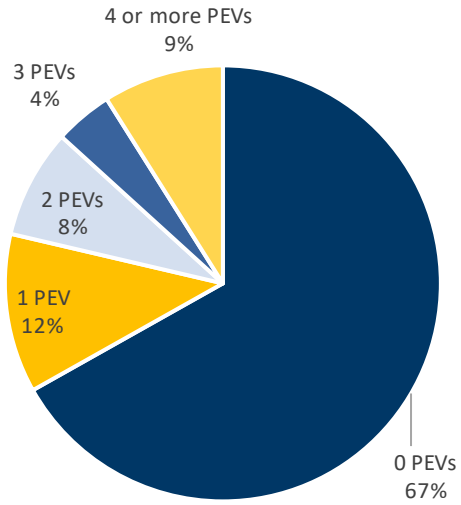
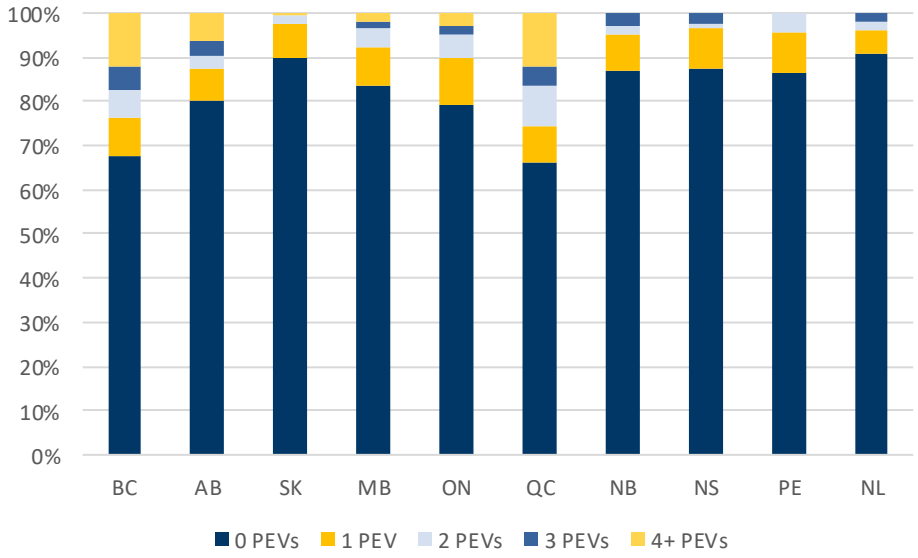


Figure 11 below shows this same data broken down by province. This highlights that outside of Quebec, BC and Ontario, over 80% of dealerships in every province have no PEVs available at all, and fewer than 2% of dealerships have 4 or more PEVs available.

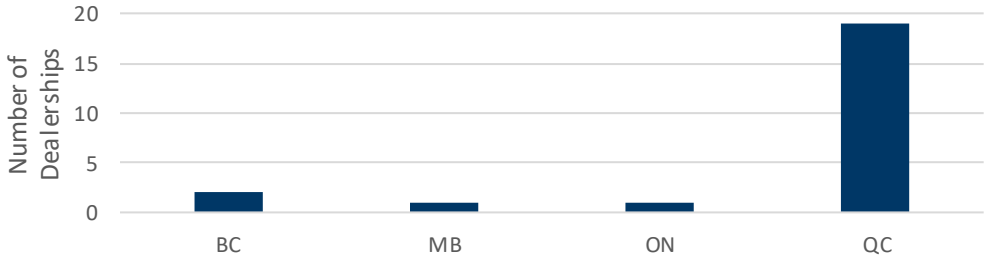
Figure 11: Number of PEVs available per dealership by province



Similar to the last data collection, there were 24 dealerships with 20 or more PEVs in inventory. In November 2019, however, these were all Chevrolet dealerships located in either BC or Quebec. In this data collection round, we see a large number of these being Ford dealerships selling the Fusion Plug-In Hybrid. With 99% of stock in British Columbia, Ontario, and Quebec, Ford is seemingly using the same strategy as has been seen from Chevrolet - concentrating inventory in specific markets, while leaving very little inventory for the rest of Canada.

Dealerships were further classified as in either an urban or rural location based on the dealership's postal code. Of the dealerships with at least one PEV, only 2.4% of them (23 dealerships) were located in rural areas. Figure 12 below shows the number of rural dealerships with at least one PEV in each province.

Figure 12: Number of dealerships in rural locations with at least one PEV

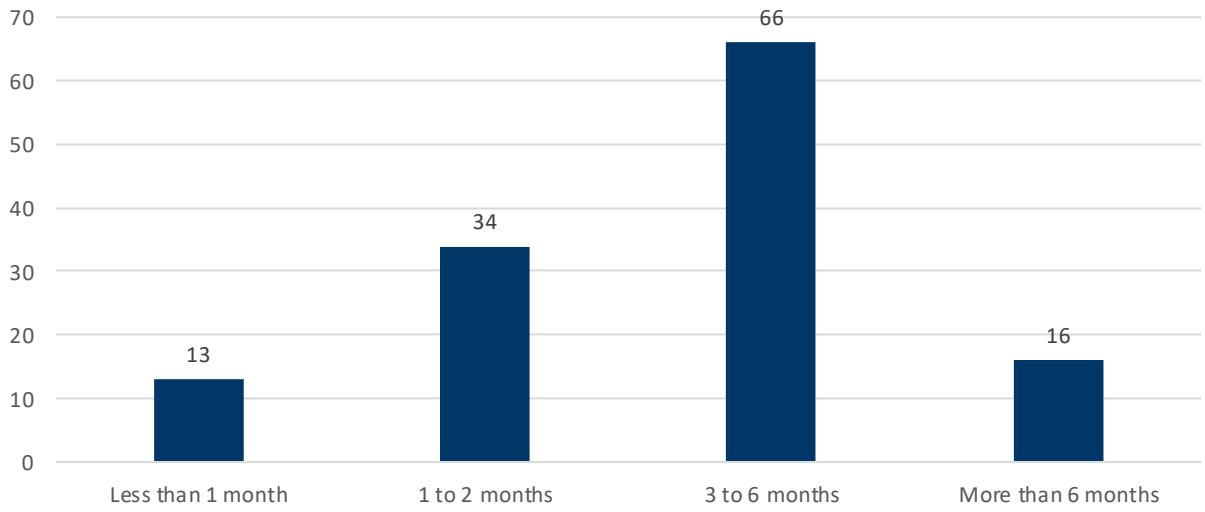


Quebec was the only province with significant availability of PEVs in rural dealerships, with 90 PEVs available across 19 dealerships, including 58 Chevrolet Bolts at seven Chevrolet dealerships. This suggests that it may be hard to find a PEV at a local dealership in rural regions outside of Quebec. That said, Canada Post's classification of rural and urban postal codes is not well defined and evolves over time. A more detailed analysis in the future could classify postal codes into a larger number of categories to build a more complete picture of the distribution of PEV availability within provinces.

WAIT TIMES

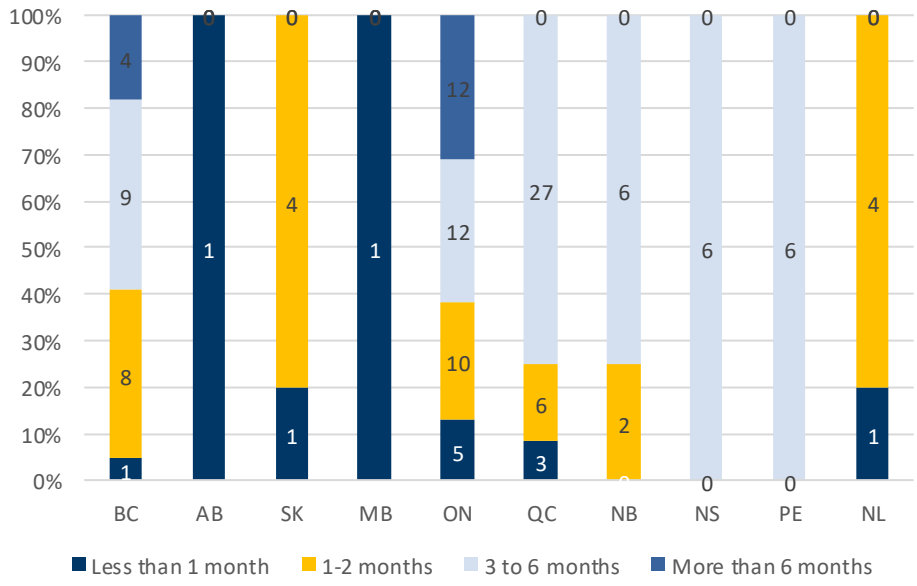
Of the 1,203 dealerships that were contacted by phone, 535 reported at least one PEV available. Of the remaining 556 dealerships that reported 0 PEVs available, 129 suggested getting onto a waiting list for the PEV of interest. The following figure highlights the wait times suggested by these dealerships.

Figure 13: Expected wait time for the dealerships that suggested getting onto a wait list



The majority of responses suggested a 3 to 6 month wait time for the requested PEV, making it clear that, for those who do not find the PEV they're looking for in inventory, acquiring a new PEV requires customers to plan ahead. As seen in Figure 14, breaking these responses down by province shows that "3 to 6" months was the most common response in all provinces, except in Nova Scotia and Saskatchewan where there were very few responses overall.

Figure 14: Expected wait times by province



6 CONCLUSION

This report shows relatively constant inventory levels when compared to the last comprehensive data collection effort in November 2019, with nationwide stock levels increasing by 3%, but still 21% lower than was seen in December 2018. Meanwhile, sales across Canada rose by 25% between Q4 2018 and Q4 2019, thanks in part to the introduction of a Federal vehicle purchase incentive. The increase in sales may be partly responsible for the drop in inventory from 2018 levels, as automakers struggle to meet demand. Conversely, inventory levels should typically be managed as a function of vehicle sales rates, and one might have expected inventory levels to increase at the same rate as the increase in sales. In the previous report, it was suggested that automakers may not have had advance notice of the federal incentive program before planning vehicle orders for 2019. With a new calendar year well under way, we expected that we may have seen increased inventory in a response to the federal incentive in this round of data collection, but that has not been the case.

Meanwhile, inventory levels as measured in terms of the "days of supply" metric have improved from the last data collection effort (noting that this round of data collection uses 2019 fourth quarter sales to calculate days of supply), with 26 days of PEV supply nationwide, compared to 19 days in 2019 and 36 days in 2018. Days of supply are narrowly within target levels in Saskatchewan, Manitoba, and Newfoundland, and nearing target levels in Alberta and New Brunswick. The vast majority of the country remains below target levels, however, and this continued disconnect between supply and demand suggests that vehicle availability may be acting as a barrier to PEV adoption.

The inventory that *is* available is not distributed uniformly throughout the country, and instead is primarily concentrated in those provinces with supportive PEV policies – British Columbia and Quebec. The portion of inventory supplied by each automaker has become more evenly distributed since 2019, however just three automakers (Chevrolet, Ford and Hyundai) make up more than half of the nationwide inventory, pointing to limited consumer selection. A significant majority of dealerships in Canada (67%) did not have any PEVs in inventory at all.

These observations point to several overall conclusions from this analysis:

- There needs to be a significant increase in PEV inventory levels in order to keep pace with growing sales in Canada.
- Despite a national ZEV sales incentive in place, it can still be very challenging to find a PEV as only 33% of dealers in Canada have at least one PEV in stock. Outside of Quebec, BC and Ontario, fewer than 20% of dealerships have at least one PEV.
- Harmonization of policies and practices across the country could help to ensure that all Canadians have greater access to PEVs, not just those in Quebec and BC.

Given the federal ZEV sales targets for 2025 and 2030, it will be important for the federal government to continue to monitor the availability of PEVs across Canada and explore opportunities to address supply issues to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