

## **Phase 1 Market Research Report - Single-Phase Electric Charger Market, Canada**

### **I. Executive Summary:**

The single-phase electric charger market in Canada is experiencing significant growth driven by the increasing adoption of electric vehicles (EVs) and government incentives. The market size of EV market is estimated to be USD 106.79 million in 2022, and is projected to reach USD 1438.1 million by 2030, at a CAGR of 38.9%. Key trends include rising environmental awareness, technological advancements in EV and charging technology, and expanding charging infrastructure.

Opportunities lie in targeting specific market segments, such as homeowners and businesses, developing innovative products and services like smart chargers, and collaborating with key stakeholders like governments and utilities. Further research and analysis using the collected data in Phase 2 could focus on specific segments like high-density residential areas, customer research to understand charging preferences and behaviors, and future market potential considering factors like government policies and technological advancements.

### **II. Market Overview:**

Single-phase electric chargers are designed for use in homes and businesses with a single-phase electrical connection. They typically deliver 7.2 KW of power, making them suitable for charging most EVs overnight. Different types of single-phase chargers include:

Level 1 chargers: Plug into a standard household outlet and offer slow charging speeds.

Level 2 chargers: Utilize a dedicated outlet and provide faster charging compared to Level 1.

The Canadian single-phase electric charger market is experiencing rapid growth, with increasing sales driven by:

Rising EV adoption: EV sales are increasing significantly, with 233,619 EVs registered in Canada in 2023.

Government incentives: The government offers financial incentives for EV purchases and charger installations, such as the Zero-Emission Vehicle (ZEV) Incentive Program.

### **III. Market Trends:**

Several key trends are impacting the single-phase electric charger market in Canada:

Growing EV adoption: As mentioned earlier, EV adoption is a major driver, creating demand for charging solutions.

Government policies and incentives: Government support through financial incentives and infrastructure development is accelerating market growth.

Technological advancements: Advancements in battery and charging technology are leading to faster charging times and more efficient chargers.

Consumer preferences and buying behavior: Consumers are increasingly looking for sustainable solutions, driving demand for EVs and charging infrastructure.

Infrastructure development and charging network expansion: The expansion of public and private charging infrastructure is essential for wider EV adoption.

#### IV. Market Size

Statistics Canada data shows a rise in vehicle registrations categorized by fuel type (2017-2023)<sup>[1]</sup>:

- **Growth:** Battery, Hybrid, and Plug-in Hybrid segments have seen consistent growth over the past seven years.
- **Decline:** Gasoline and Diesel segments have exhibited fluctuating declines in the past 3-4 years.

The following table shows the number of vehicle registrations:

Year	Quarters	Fuel Type						
		Gasoline	Diesel	Battery Electric	Hybrid Electric	Plug-in Hybrid Electric	Other Fuel Types	All Fuel Types
2017	Q1	403,087	14,283	1,664	4,185	1,824	0	425,043
	Q2	581,151	17,643	2,195	7,199	1,830	0	610,018
	Q3	521,730	18,150	2,400	7,264	2,784	1	552,329
	Q4	423,659	15,711	2,820	5,473	3,179	4	450,846

2018	Q1	380,187	14,642	2,639	4,377	4,205	70	406,120
	Q2	563,103	21,781	7,393	8,034	7,486	79	607,876
	Q3	500,791	19,327	6,506	6,944	6,116	70	539,754
	Q4	390,802	14,850	6,032	6,482	3,906	38	422,110

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	Q1	373,971	13,223	5,273	6,596	3,002	58	402,123
	Q2	527,118	16,058	12,370	13,053	7,076	88	575,763
	Q3	487,211	16,810	10,120	10,349	6,066	51	530,607
2019	Q4	388,271	12,998	7,760	8,392	4,498	33	421,952

	Q1	303,035	13,567	8,386	7,680	3,537	9	336,214
	Q2	277,460	12,867	6,088	6,367	3,115	14	305,911
	Q3	457,057	19,494	12,601	14,782	4,698	10	508,642
2020	Q4	347,376	18,841	11,961	12,624	3,967	25	394,794

	Q1	326,146	18,112	12,693	14,278	4,592	5	375,826
	Q2	416,441	20,057	16,167	26,088	7,839	0	486,592
	Q3	384,338	14,411	15,845	23,909	8,117	0	446,620
2021	Q4	288,436	13,301	14,021	15,055	6,758	0	337,571

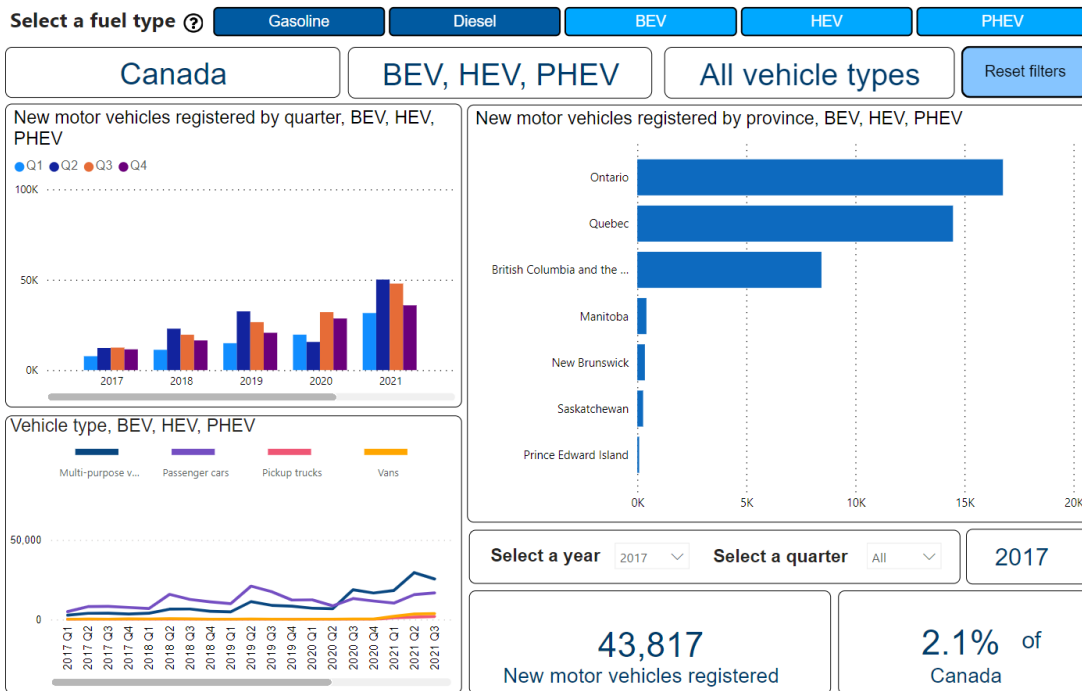
	Q1	282,993	15,982	19,695	14,826	6,323	1	339,820
	Q2	351,524	23,044	21,764	27,449	8,068	12	431,861
	Q3	318,834	19,682	29,376	21,514	4,937	5	394,348
2022	Q4	279,074	16,536	27,754	17,361	5,645	0	346,370

	Q1	285,757	16,562	23,774	22,916	6,759	6	355,774
	Q2	367,971	19,751	34,610	38,987	12,047	5	473,371
2023	Q3	345,491	17,790	42,260	38,933	13,333	29	457,836

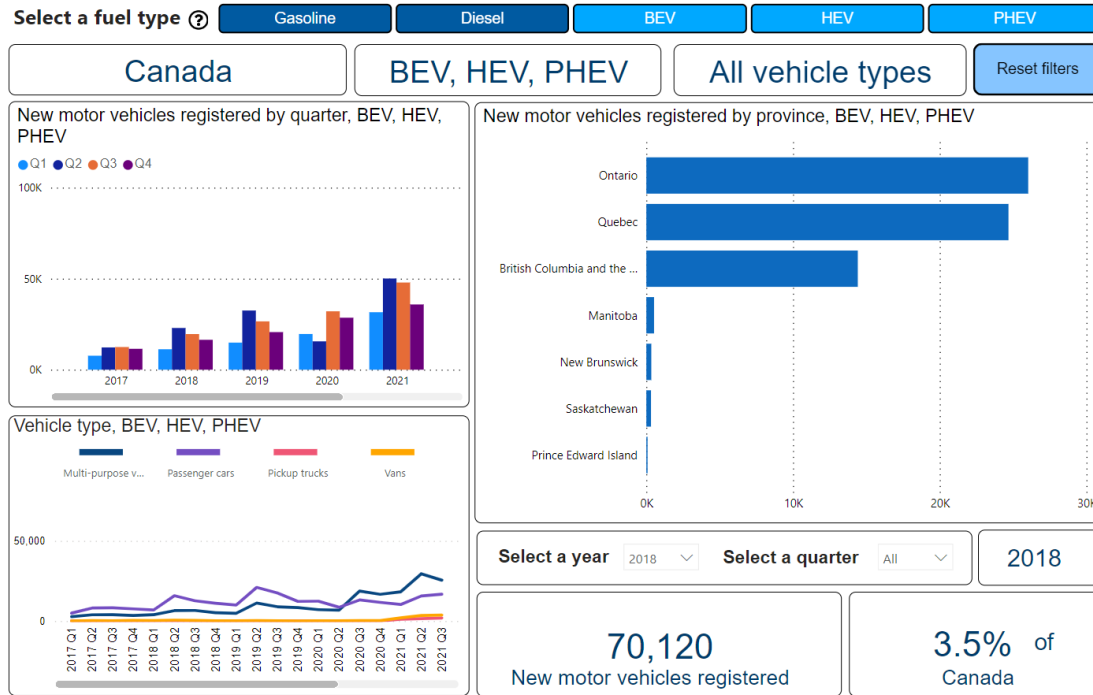
## V. Electric Vehicle Market Size:

The following Dashboards shows the annual increase in electric vehicle registration<sup>[2]</sup>:

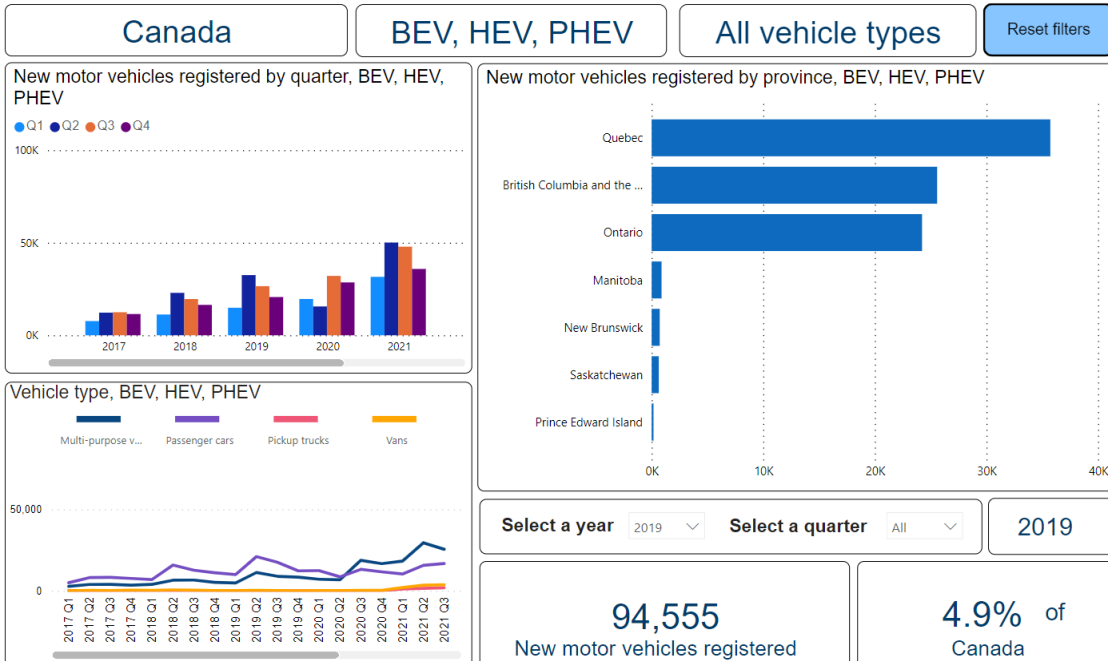
2017:



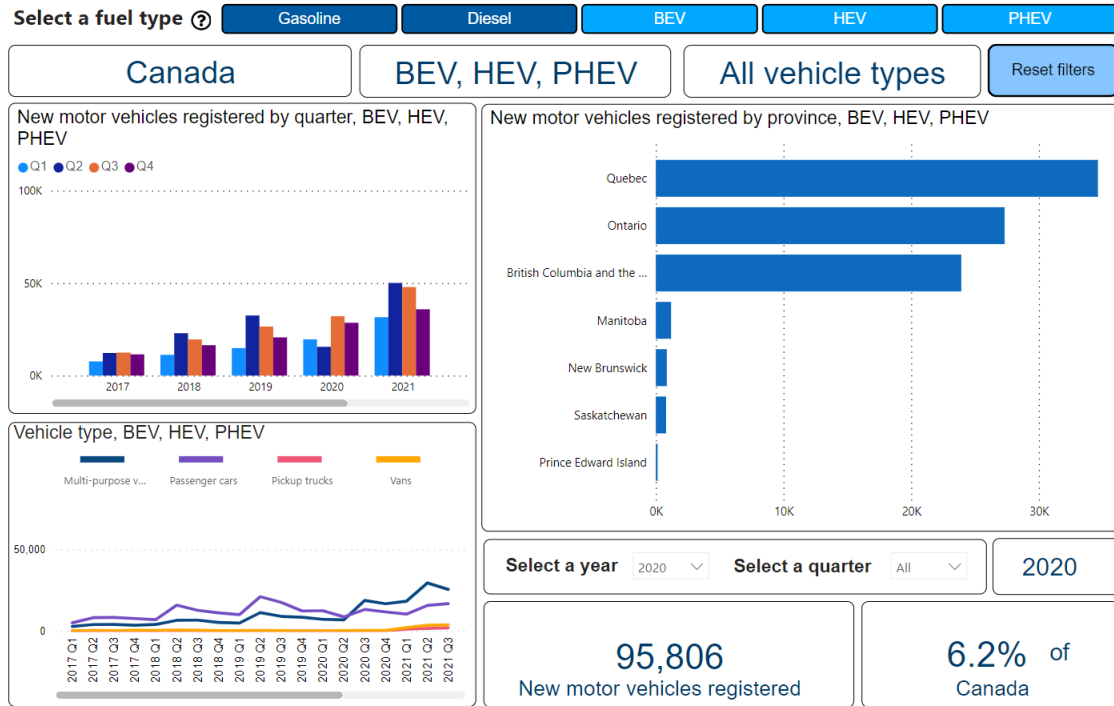
2018:



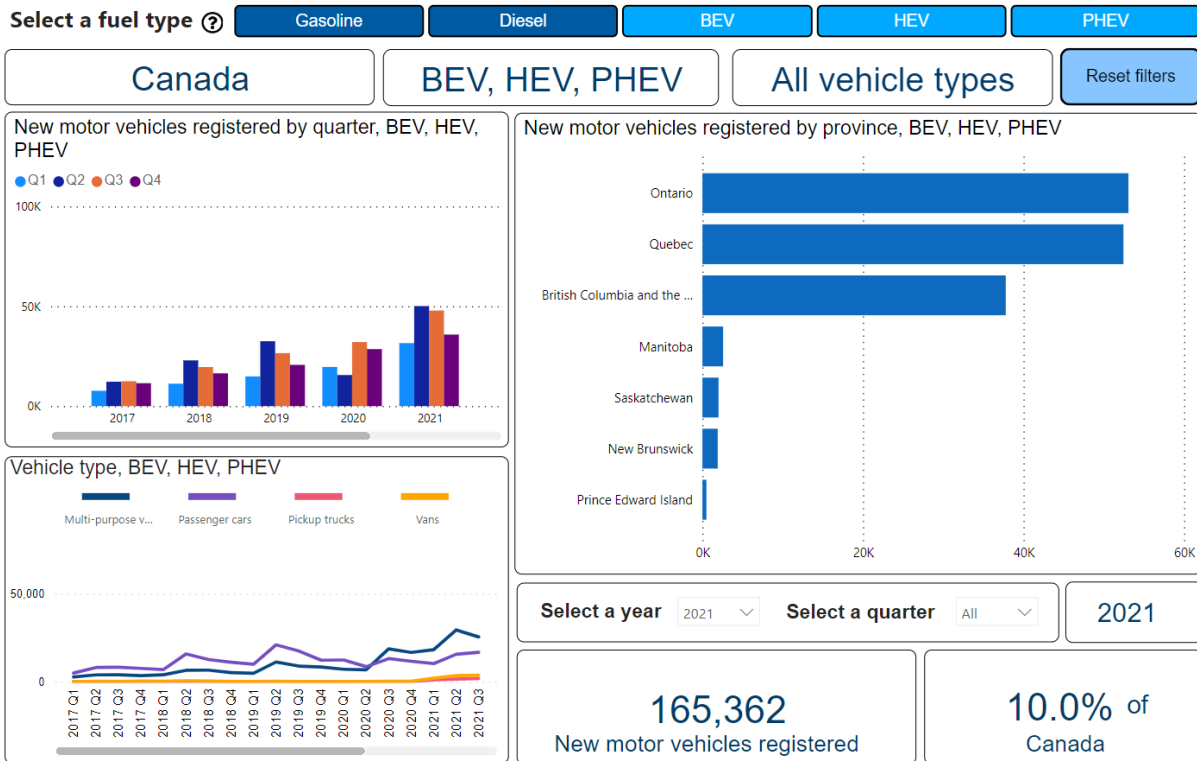
2019:



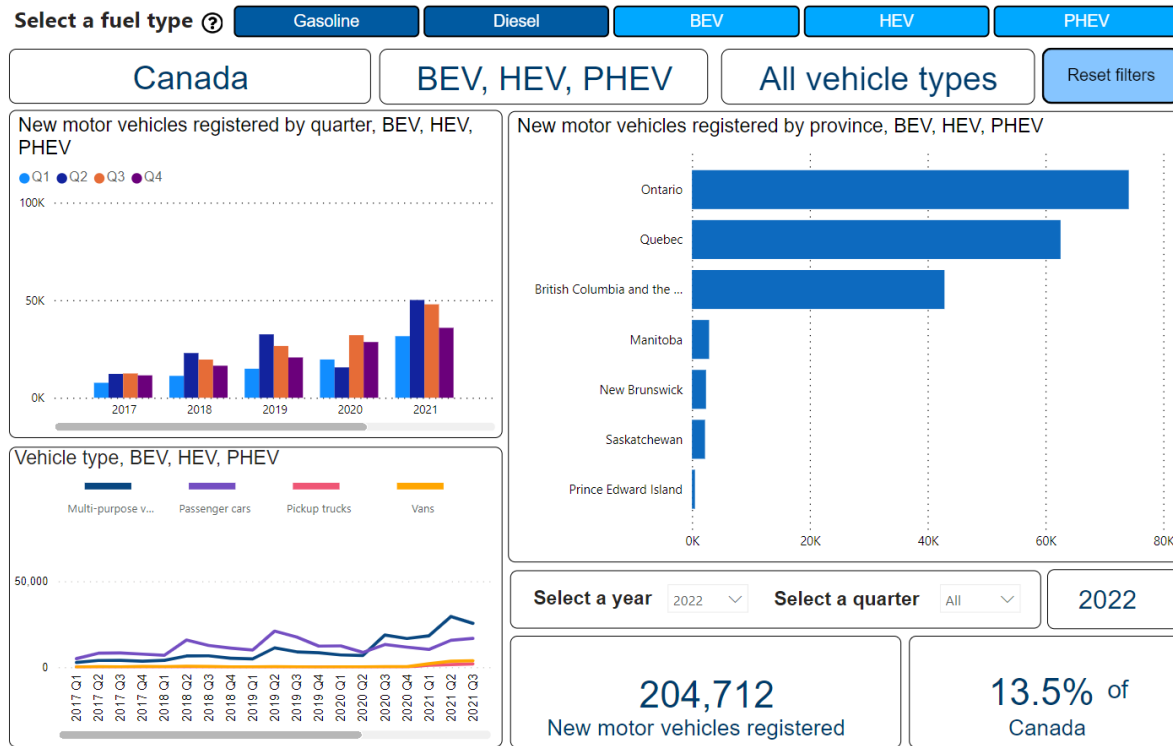
2020:



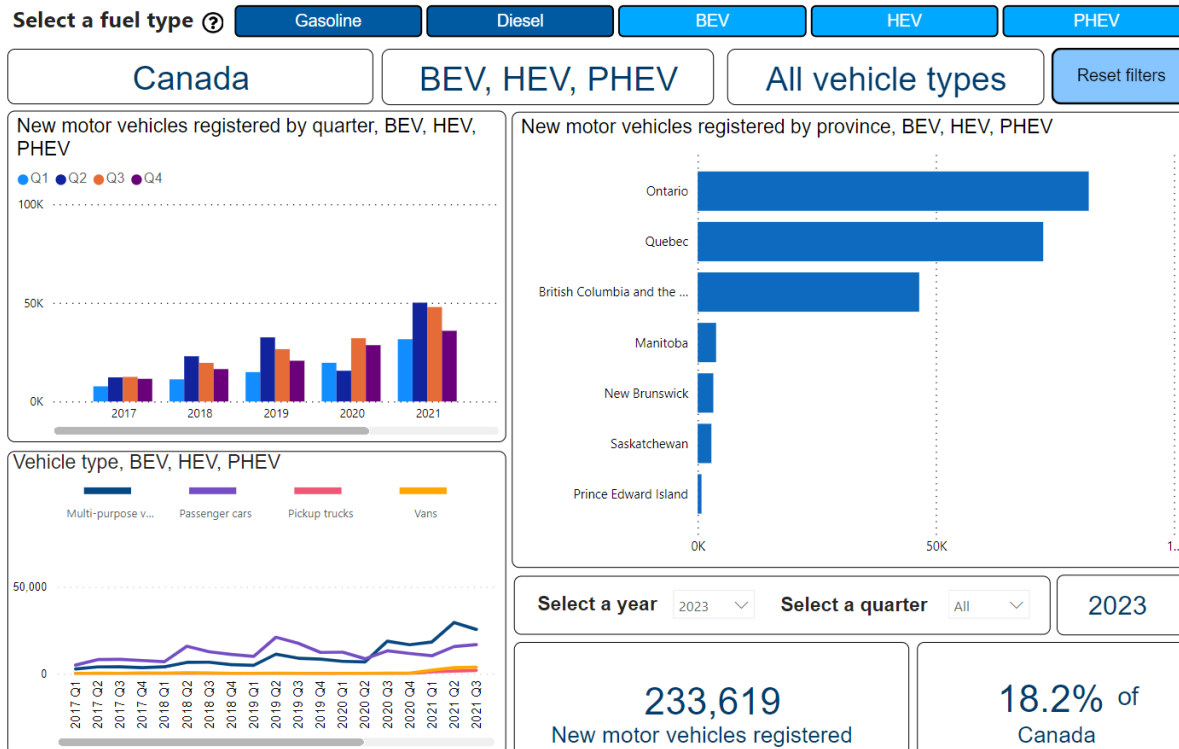
2021:



2022:



2023:



Year	Number of EVs (HEV, BEV, PHEV) Registered	% of total vehicles in Canada
2017	43,817	2.1%
2018	70,120	3.5%
2019	94,555	4.9%
2020	95,806	6.2%
2021	165,362	10.0%
2022	204,712	13.5%
2023	233,619	18.2%

As shown, EV registration in Canada has risen from 2.1% in 2017 to 18.2% in 2023.

#### VI. Provinces with Maximum ZEV Registrations:

	2017	2018	2019	2020	2021	2022	2023
Ontario	16,763	26,030	35,721	34,628	53,069	74,130	82,089
Quebec	14,474	24,685	25,578	27,332	52,443	62,557	72,534
British Columbia & Territories	8,444	14,414	24,226	23,926	37,784	42,856	46,501

#### VII. Government Initiatives:

The 2030 Emission Reduction Plan aims to achieve net-zero emissions by 2050<sup>[3]</sup> and includes:

- **Incentives for Zero-Emission Vehicles (ZEVs):** Consumers can get up to \$5,000 for BEVs, PHEVs, and fuel-cell electric vehicles<sup>[4]</sup>.
- **100% ZEV Sales Target:** The government aims for all new light-duty and passenger vehicles to be zero-emission by 2035<sup>[5]</sup>.

#### VIII. Opportunities:

A [press release by EY](#) indicates rising fuel costs as a primary reason Canadians are switching to EVs. With increasing fuel prices and government incentives, 52% of Canadians are considering purchasing an EV<sup>[6]</sup>.

The data suggests that more individuals are opting for EVs, potentially leading to a rise in demand for:

- Single-phase chargers: Suitable for home charging of EVs.



- Proper charging infrastructure: To support the growing EV population.

### Vehicle Type Definition<sup>[7]</sup>:

EV	Electric Vehicles	Vehicles which have a rechargeable battery and have an Internal combustion engine
BEV	Battery Electric Vehicles	Vehicles which use rechargeable battery
HEV	Hybrid Electric Vehicles	Vehicles have an Internal Combustion Engine and have rechargeable battery
PHEV	Plug-in Hybrid Electric Vehicles	Vehicles have an Internal Combustion Engine and have rechargeable batteries. After the battery is drained it runs on the internal combustion engine
ZEV	Zero-Emission Vehicles	BEV and PHEV falls in ZEV where there is no emission

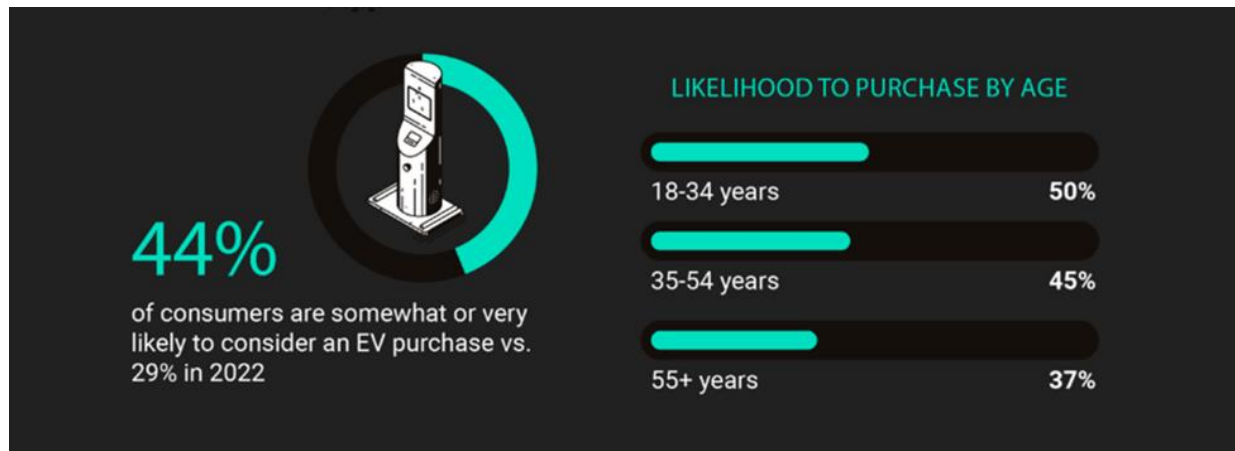
### Target Audience Research:

There is no available information that could be found specifically about EV chargers. Therefore, research was done on the EV market to extrapolate the target audience for EV chargers. However, there is not much information on specific demographics and market segmentation for EVs in Canada.

The following links contain the most relevant information about who either owns an EV or is most likely to own an EV.

Summary	Source
As previously mentioned in our report, most EV registrations are in <b>Quebec</b> (43%), <b>British Columbia</b> (28%), and <b>Ontario</b> (23%) in 2021.	<a href="https://www.cer-rec.gc.ca/en/data-analysis/energy-markets/market-snapshots/2022/market-snapshot-record-high-electric-vehicle-sales-canada.html">https://www.cer-rec.gc.ca/en/data-analysis/energy-markets/market-snapshots/2022/market-snapshot-record-high-electric-vehicle-sales-canada.html</a>
The following infographic below the table summarizes customers' likeliness to purchase an EV by <b>age</b> . This was a survey conducted by Ipsos in 2023.  In addition, people with a <b>higher level of education</b> are more likely to buy EVs.	<a href="https://canadianautodealer.ca/2023/05/more-canadians-would-consider-buying-an-ev-study-shows/#:~:text=In%20terms%20of%20age%2C%20CBB,the%2055%2Dplus%20age%20group.">https://canadianautodealer.ca/2023/05/more-canadians-would-consider-buying-an-ev-study-shows/#:~:text=In%20terms%20of%20age%2C%20CBB,the%2055%2Dplus%20age%20group.</a>
This site reiterates information from the 2 sites above (provinces and age group).	<a href="https://electricautonomy.ca/2021/03/03/canadian-poll-ev-adoption/">https://electricautonomy.ca/2021/03/03/canadian-poll-ev-adoption/</a>
This site has an interactive map that focuses on the <b>British Columbia</b> region. It shows the percentage of registered EVs by postal code along with corresponding median after-tax	<a href="https://vancouversun.com/news/local-news/which-bc-neighbourhood-has-the-most-electric-vehicles">https://vancouversun.com/news/local-news/which-bc-neighbourhood-has-the-most-electric-vehicles</a>

income. The first map is based on data from September 2023.



## IX. Competitive Landscape:

Please refer to the attached Competitor SWOT Analysis PowerPoint for details on key competitors.

As a note, please keep in mind that there is only a limited amount of free information available on distributors, retailers, installation and service providers, and competitor strategies. All the information found has been included in our research.

## X. Testing and Regulations:

Ensuring the compatibility of various charger types and adherence to global standards for new vehicle models necessitates the use of a charging analyzer as a benchmark measuring tool, along with a power source and an electronic load. These tools enable making detailed quantitative assessments of the charging status, moving beyond a simple pass/fail evaluation. The tests include the system-in-the-middle test, the electric vehicle (EV) test, and the EV supply equipment (EVSE) test.

**Safety Testing:** Compliance with IEC 61851 and UL 2202 safety requirements is verified. Insulation resistance testing is performed to assure electrical safety. Grounding resistance testing to verify proper grounding.

**Functionality Testing:** Verification of basic functions like connection, start, and stop. Communication testing to ensure proper interaction with EVs. Testing of user interface elements such as display screens, buttons, and indicators.

**Performance Testing:** Verification of charging speed and efficiency.

Load testing to assess the charger's performance under different load conditions.

Temperature testing to ensure the charger operates within specified temperature ranges.

**Regulatory Compliance Testing:** Confirmation of adherence to local, regional, and international standards; UL certification in the US and CE marking in Europe are two instances of this. Ensure conformity to appropriate authorities' safety and performance regulations.

**Reliability and Durability Testing:** Verifying that the charger can withstand a predetermined number of cycles of charging.

Life cycle testing establishes a component's long-term dependability.

### References:

[1] [statistics\\_canada](#)

[2] [factsheet-06-transportation.pdf \(canada.ca\)](#)

[3] [2030 Emissions Reduction Plan: Clean Air, Strong Economy - Canada.ca](#)

[4] [Zero-emission vehicles \(canada.ca\)](#)

[5] <https://www.canada.ca/content/dam/eccc/documents/pdf/climate-change/erp/factsheet-06-transportation.pdf>

[6] [EY: 52% of Canadians seeking an EV amid rising living costs | EY Canada](#)

[7] [CER – Market Snapshot: Record-high electric vehicle sales in Canada \(cer-rec.gc.ca\)](#)

[8] <https://www.n-ix.com/ev-charging-station-testing/#:~:text=As%20the%20demand%20for%20EVs,compatibility%20with%20different%20EV%20models>.

[9] <https://ised-isde.canada.ca/site/measurement-canada/en/buying-and-selling-measured-goods/electric-vehicle-charging-stations>

[10] <https://webstore.iec.ch/publication/33644>

[11] <https://fastercapital.com/content/Insulation-Resistance--Ensuring-Safety-in-Electrical-Systems.html#:~:text=Insulation%20resistance%20testing%20is%20important,before%20they%20cause%20serious%20damage>

[12] <https://batteryuniversity.com/article/bu-410-charging-at-high-and-low-temperatures>

[13] [https://celectronics.com/learning-center/en-55011-cispr-11#:~:text=EN%2055011%20is%20a%20modified,EDM\)%20and%20arc%20welding%20equipment](https://celectronics.com/learning-center/en-55011-cispr-11#:~:text=EN%2055011%20is%20a%20modified,EDM)%20and%20arc%20welding%20equipment)