Impact of Electric Vehicles on Canada

BABI 9020

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Executive Summary

This report examines the impact of electric vehicles on Canada, focusing on two key questions: the monthly average greenhouse gas emissions in the transportation industry and the adoption rates of zero-emission vehicles (ZEVs).

The Government of Canada is working to build a green economy to fight climate change and reduce pollution on all sectors, particularly in the transportation sector, which accounts for 25% of greenhouse gas emissions (Transport Canada, 2021). In 2021, Canada announced a roadmap to transition from gas-powered vehicles to hybrid and electric vehicles. The *Electric Vehicle Availability Standard* and related policies aim to increase the adoption of zero-emission vehicles (ZEVs) through incentives, infrastructure investment, and regulatory targets.

Six datasets were used to build the data model within PowerBI and SQL. The team has linked vehicle registrations, GHG emissions, and Canadian regions to assess relevant trends across Canada.

Key findings include:

- A downward trend in GHG emissions in the transportation sector since 2020.
- Increased adoption of electric vehicles, with British Columbia and Quebec leading the market share in Canada.
- Reduction in emissions from passenger cars, with monthly emissions decreasing from 3.7 megatonnes in 2000 and 2.2 in 2021.

Electric vehicles adoption is influencing GHG emission reductions which help contribute to achieving Canada’s 2050 net zero target. The government should continue to encourage citizens in purchasing electric vehicles by developing more infrastructure and incentivizing car manufacturers and importers.

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Background Information

The Government of Canada is working to build a green economy to fight climate change and reduce pollution on all sectors; particularly in the transportation sector, which accounts for 25% of greenhouse gas emissions (Transport Canada, 2021). In 2021, Canada announced a roadmap to transition from gas-powered vehicles to hybrid and electric vehicles. In the same year, the government introduced the *Canadian Net-Zero Emissions Accountability Act*, aimed to achieving net-zero emissions by 2050, alongside the *2030 Emissions Reduction Plan* to reduce greenhouse gas emissions by 40% by 2030 (Government of Canada, 2024).

In 2022, the *Electric Vehicle Availability Standard* was introduced, requiring vehicle manufacturers and importers to meet annual zero-emission vehicle (ZEV) sales targets (Environment and Climate Change Canada, 2023). To support ZEV adoption, the government implemented incentives to reduce manufacturing costs, invested in infrastructure, and partnered with automakers to provide facilities for ZEV production (Environment and Climate Change Canada, 2023).

With the Canadian Net-Zero Emissions Accountability Act and the Electric Vehicle Availability Standard enacted, the team will examine its outcome by answering the questions:

1. What are the average monthly GHG emissions from gasoline-powered vehicles before and after 2021?
2. What is the ratio of electric vehicles (EVs) to non-EVs by Canadian provinces and territories over the past five years?

Methodology

Data Sources

A total of six datasets were used to build the data model on PowerBI and SQL. The team mostly obtained data sources from Statistics Canada and other government sources like the ‘Environment and Climate Change Canada’ and ‘Natural Resources Canada’. The sources listed provides information for helping to analyze the trends and the growth of zero-emission vehicles (ZEVs) in Canada:

1. Statistics Canada: Vehicle Registrations by Type and Fuel Type:

This dataset provides annual vehicle registration figures categorized by fuel type. By analyzing these trends over time, we can gain insights into evolving fuel preferences. To facilitate data analysis, we imported the data into Power BI, cleaned the titles and removed extraneous rows. We then segmented the data into smaller tables, focusing on individual fuel types and their corresponding yearly registrations. Using functions like

transpose, we restructured these tables to prioritize the year column as the primary key and organized the vehicle registration counts for each fuel type accordingly. From this datasheet, we were able to create the datasheet for gasoline and EVs registration vehicles.

2. Statistics Canada: New Zero-Emission Vehicle Registrations

This dataset presents quarterly data on new ZEV registrations which would be The ZEV entity displays the number of new zero emission vehicle registrations by quarter and geography from 2019 to 2023. This is useful for calculating growth rates and adoption trends of ZEVs.

In this dataset, ‘British Columbia’ was its own province along with the individual territories in the original Excel file. In the Excel file, a new row was made with combined values for BC and the territories. This was done to be able to link it to the other document which also used geographical data within Canada.

British Columbia	1,366	2,458	2,450	2,039	2,784	6,481	4,500
Yukon	0	0	1	1	1	4	4
Northwest Territories	0	0	2	1	0	0	0
Nunavut	..	..	..	..	..	..	..
British Columbia and the Territories	1,366	2,458	2,453	2,041	2,785	6,485	4,504

Figure 1. Excel document for ZEV registrations

In Power BI rows without crucial information such as the titles of the dataset, metadata and footnotes were eliminated. The rows consisting of data from Newfoundland, Nova Scotia, and Alberta were filtered as there was no data from those areas. The quarter labels for the ‘Year’. For example, ‘Q1 2019’ was changed to ‘2019’. Finally, the columns were unpivoted to have each year as its own column and a separate column for the number of ZEV registrations.

Geography	Year	Number of registrations
Canada	2018	6,844
Canada	2018	14,879
Canada	2018	12,622
Canada	2018	9,938
Canada	2019	8,275
Canada	2019	19,446
Canada	2019	16,186
Canada	2019	12,258
Canada	2020	11,923
Canada	2020	9,203
Canada	2020	17,299
Canada	2020	15,928
Canada	2021	17,285

Figure 2. Power BI Transformations

This data was moved to SQL using DAX Studio to export the transformed data as a CSV file into a new database in SQL. A query was used to make a new table with geography, year, and the sum of vehicle registrations grouped per year. This was done to obtain the total ZEV vehicles grouped by year.

Here is the query:

```
SELECT Year, -- Year
Geography, -- Geography
SUM([Zero-emission vehicles]) AS 'Total Zero-emission Vehicles' -- Total ZEVs
FROM [Vehicles].[dbo].[New_ZEV_registrations] -- New ZEV registrations data entity
WHERE Geography!='Canada' -- Filter out Canadian ZEV registrations
AND Year BETWEEN 2019 AND 2023  -- Data from 2019-2023
GROUP BY Year, Geography --- Group Total registrations by Year and Geography
ORDER BY Year, Geography; --- Order Data by Year and Geography
```

This table was then imported to PowerBI. Finally, the territories were filtered out from the dataset.

Year	Geography	Total Zero-emission Vehicles
2019	British Columbia and the Territories	16980
2019	Manitoba	289
2019	New Brunswick	166
2019	Ontario	9762
2019	Prince Edward Island	44
2019	Quebec	27071
2019	Saskatchewan	185
2020	British Columbia and the Territories	15211

Figure 3. Power BI transformations

3. Natural Resources Canada: Transportation Sector – GHG Emissions

Shows the yearly GHG emissions data from the transportation sector dating back to 1990. The data was pretty clean at first, so we didn't change anything but loaded it to PowerBI. The changes we made to the sheet were removing the first couple of title rows and promoting headers for each year and each industry sector.

4. Canada Energy Regulator: EV Sales Snapshot

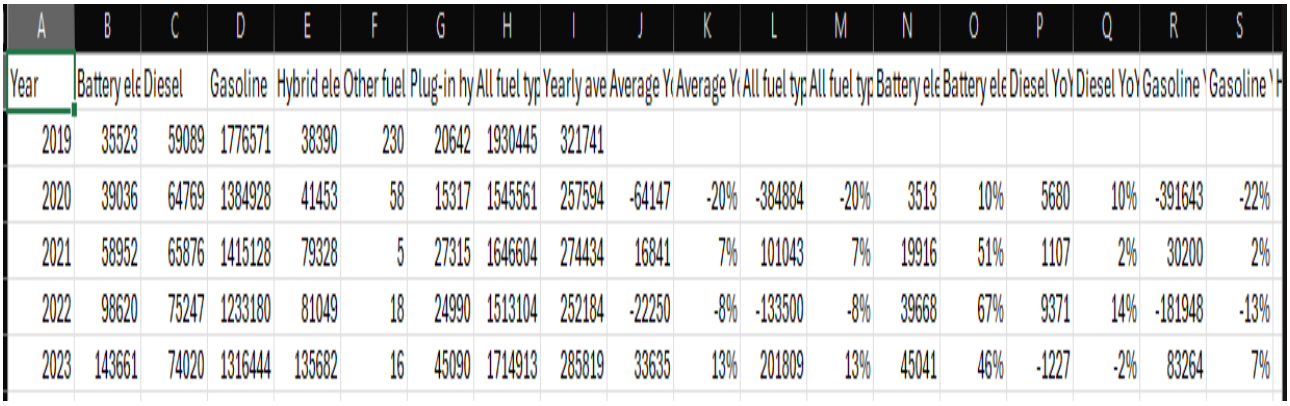
Shows the key trends in EV sales, including record highs before 2023.

5. National Inventory Report: Greenhouse Gas Emission Sources and Sinks

Shows a detailed GHG emissions summary, including breakdowns of the transportation sector by each vehicle type including passenger, light trucks, heavy trucks, motorcycles, bus, rail, aviation, and others. The data again was pretty clean except for a few extra title and description rows.

6. Statistics Canada: New Motor Vehicle Registrations, Annual sum

Includes annual data on all vehicle registrations which can be used to compare ZEV growth rates. There were two datasets: one with the aggregated data in Canada and another one with the data by geography within Canada. These datasets were separated as the aggregated one also includes more statistics such as the year-on-year change and percentage year on year change in new vehicle registrations by fuel type and the average number of new vehicle registrations over the years.



A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
Year	Battery ele	Diesel	Gasoline	Hybrid ele	Other fuel	Plug-in hy	All fuel typ	Yearly ave	Average Y	Average Y	All fuel typ	All fuel typ	Battery ele	Battery ele	Diesel YoY	Diesel YoY	Gasoline Y	Gasoline Y
2019	35523	59089	1776571	38390	230	20642	1930445	321741										
2020	39036	64769	1384928	41453	58	15317	1545561	257594	-64147	-20%	-384884	-20%	3513	10%	5680	10%	-391643	-22%
2021	58952	65876	1415128	79328	5	27315	1646604	274434	16841	7%	101043	7%	19916	51%	1107	2%	30200	2%
2022	98620	75247	1233180	81049	18	24990	1513104	252184	-22250	-8%	-133500	-8%	39668	67%	9371	14%	-181948	-13%
2023	143661	74020	1316444	135682	16	45090	1714913	285819	33635	13%	201809	13%	45041	46%	-1227	-2%	83264	7%

Figure 4. Excel document modifications

For the aggregated dataset, we first loaded the data to PowerBI for basic modifications, transposing to have the year column followed by each fuel type. Then we decided to show the year-to-year change for each individual fuel type by going back to the original file and create a different spreadsheet with year-to-year change by amount and percentage.

For the geographical dataset, in the original Excel document, the geographies were copied and pasted in order for each fuel type to have a geographical value.

Geography	Vehicle type	Statistics	Fuel type	2018	2019	2020	2021	2022	2023	2024
Canada	Total, vehicle type 1			Units						
Canada		Number of	All fuel typ	1,975,860	1,930,445	1,545,561	1,646,604	1,513,104	1,714,913	
Canada			Gasoline	1,834,883	1,776,571	1,384,928	1,415,128	1,233,180	1,316,444	
Canada			Diesel	70,600	59,089	64,769	65,876	75,247	74,020	
Canada			Battery ele	22,570	35,523	39,036	58,952	98,620	143,661	
Canada			Hybrid elec	25,837	38,390	41,453	79,328	81,049	135,682	
Canada			Plug-in hyb	21,713	20,642	15,317	27,315	24,990	45,090	
Canada			Other fuel	257	230	58	5	18	16	
Newfoundland and Labrador 3			All fuel types							
Newfoundland and Labrador 4			Gasoline							
Newfoundland and Labrador 5			Diesel							
Newfoundland and Labrador 6			Battery electric							
Newfoundland and Labrador 7			Hybrid electric							
Newfoundland and Labrador 8			Plug-in hybrid electric							
Newfoundland and Labrador 9			Other fuel types 2							

Figure 5. Excel modifications

This data was moved to PowerBI where the rows with non-essential information were removed along with certain columns. As the ZEV dataset, the rows with certain provinces that didn't offer information were removed which were also Alberta, Nova Scotia, Newfoundland and Labrador. The rows showing the total number of vehicle registrations were removed. Now there was one column with geography, another with fuel type, and multiple columns with individual years. The columns with the individual years were unpivoted to make two separate columns: one for the year and another for the units.

Geography	Fuel type	Year	Units
Prince Edward Island	Gasoline	2019	6832
Prince Edward Island	Gasoline	2020	5182
Prince Edward Island	Gasoline	2021	7434
Prince Edward Island	Gasoline	2022	4706
Prince Edward Island	Gasoline	2023	5151
Prince Edward Island	Diesel	2019	142
Prince Edward Island	Diesel	2020	192
Prince Edward Island	Diesel	2021	308
Prince Edward Island	Diesel	2022	265
Prince Edward Island	Diesel	2023	279

Figure 6. Power BI transformations

The table was then sorted by geography first, then the fuel type. The fuel type and unit columns were pivoted so each individual year had the columns as fuel type values. This data was sorted by year and geography yet again.

7. Statistics Canada: Statistics on the Incentives for Medium and heavy-duty ZEV Program

This dataset shows details of every single ZEV bought with information about the area where each vehicle was bought. In PowerBI the data was quite structured, so I managed to

clean the data eliminating non-essential rows such as metadata on the table and non-essential columns such as the vehicle make and model. Then I filtered the data to only show the vehicles that were bought for 2022. The table consisted of the Year, Geography, ZEV type, and incentive amount for each vehicle.

Year	Geography	Battery-Electric Vehicle (BEV), Plug-...	Eligible Incentive Amount (in dollars)
2022	Ontario	BEV	10000
2022	Ontario	BEV	10000
2022	Ontario	BEV	10000
2022	Quebec	BEV	10000
2022	British Columbia	BEV	10000
2022	Ontario	BEV	10000
2022	Quebec	BEV	100000
2022	Quebec	BEV	10000
2022	Prince Edward Island	BEV	10000
2022	British Columbia	BEV	10000
2022	British Columbia	BEV	10000
2022	Quebec	BEV	10000
2022	Quebec	BEV	100000
2022	Quebec	BEV	100000

This table in its structured form was then imported into SQL and then I joined this table with the ZEV registrations table to make one structured table with the Year, Geography, total number of ZEVs and the maximum incentive amount.

```
SELECT zev.Year, -- Year
       zev.Geography, -- Geography
       zev.[Total Zero-emission Vehicles], -- Total ZEVs
       inc.[Maximum Eligible Incentive Amount] -- Max Eligible Incentive Amount
  FROM [VehicleTypes].[dbo].[Max incentive amount ZEVs] inc -- Max Incentive Amount Data Entity
  RIGHT JOIN [VehicleTypes].[dbo].[Total ZEVs] zev -- Join new ZEV registrations data entity
  ON inc.Geography=zev.Geography
  WHERE zev.Year=2022  -- Only include data from 2022
  AND zev.Geography!='British Columbia and the Territories' -- Filter out British Columbia and the Territories

  SELECT DISTINCT [Geography]
```

Then I moved this data to PowerBI to produce the final diagram showing this relationship. Provinces without a ZEV incentive program were given a maximum eligible incentive amount of ‘0’. Here is the table:

Year	Geography	Total Zero-emission Vehicles	Maximum Eligible Incentive Amount
2022	British Columbia	29587	150000
2022	Manitoba	1046	10000
2022	New Brunswick	861	0
2022	Northwest Territories	27	0
2022	Ontario	38662	100000
2022	Prince Edward Island	220	10000
2022	Quebec	45881	150000
2022	Saskatchewan	705	10000
2022	Yukon	83	0

Data Model

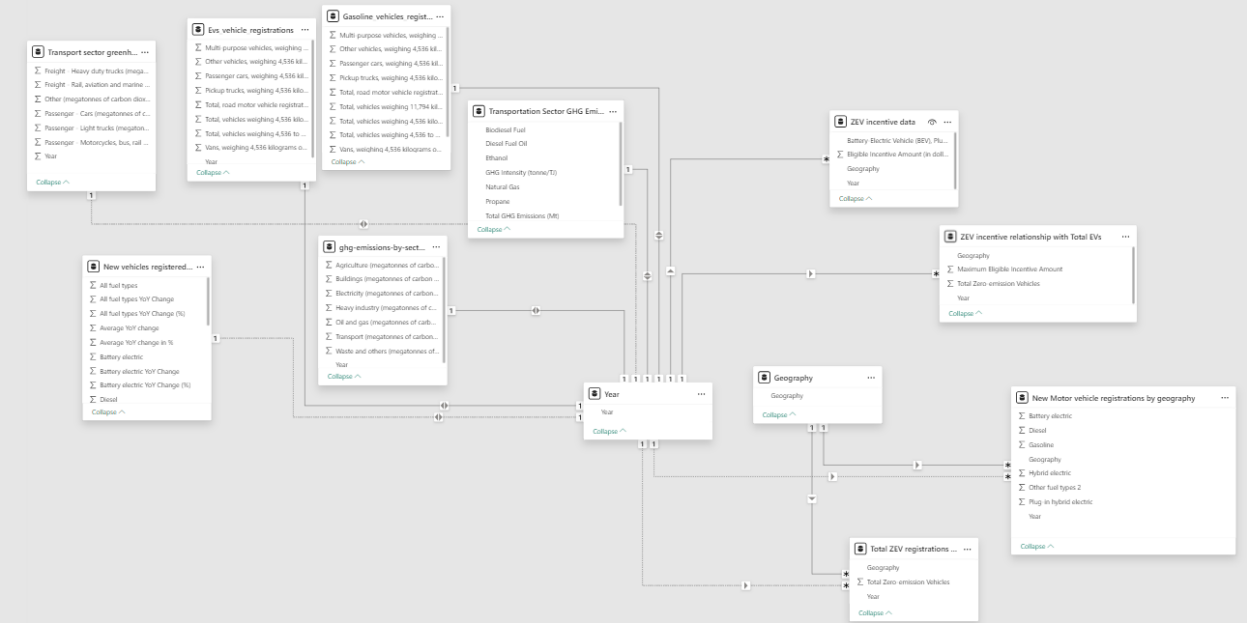


Figure 7. Data Model

We used an OLTP model with all the data sources being linked together through separate entities that were created named ‘Year’ and ‘Geography’. The dataset showing the GHG emissions by sector contained data from 1990 to 2022, so those years were used. For the ‘Geography’ entity, the dataset with the proportion of car type by province was used as it contained all the relevant provinces as well as data on ‘British Columbia and the Territories’. This was done to ensure the data could be linked effectively to the zero-emission vehicle (ZEV) entity. The ‘Year’ entity had one to one relationships with all the data entities except those that included the provincial data. For those relationships, the ‘Geography’ entity was the active relationship with one-to-many relationships which occurred due to the multiple entries for each geography over the years.

One dataset portrays the number of new car registrations by fuel type and geography from 2019 to 2023. In the original Excel document, the geographies were copied and pasted in order for each year to have a geographical value. This data was moved to PowerBI where the rows with non-essential information were removed along with certain columns. As the ZEV dataset, the rows with certain provinces that didn’t offer information were removed which were also Alberta, Nova Scotia, Newfoundland and Labrador. The rows showing the total number of vehicle registrations were removed. Now there was one column with geography, another with fuel type, and multiple columns with individual years. The columns with the individual years were unpivoted to make two separate columns: one for the year and another for the units. The table was then sorted by geography first, then the fuel type. The fuel type and unit columns were pivoted so each individual year had the columns as fuel type values. This data was sorted by year and geography yet again.

Other datasets contain the greenhouse gas emissions by industry sectors in general which we used to compare the transportation sector to other sectors, and the new motor vehicle registration which recorded the total numbers of vehicles by each fuel type in Canada. This is like the other data set described earlier but it excludes geographical data. This dataset also includes more statistics such as the year-on-year change and percentage year on year change in new vehicle registrations by fuel type and the average number of new vehicle registrations over the years.

These datasets were already formatted well with the year as its own column and the type having individual columns. There were no subtypes either. To wrangle the data, non-essential data was removed, and the first row was modified to be the headers in PowerBI.

For the dataset showing the GHG emissions in the transportation sector by car type, the table was transposed so each type had an individual column, and the year had its own columns in PowerBI. Then non-essential data was removed through eliminating rows and columns.

The final two entities contain the number of electric vehicle car registrations by vehicle type and the number of gasoline vehicles by vehicle type. For both datasets, unnecessary rows were removed, and columns were removed to only include gasoline data and battery electric data in PowerBI. The table was transposed to make the year represent the rows and the vehicle type the columns. Finally, the first row was modified for it to be the header and data types were changed to ensure consistency.

Questions and Analysis

Monthly GHG Emissions

Our first question looks at the monthly average amount of gas emitted by the transportation sector and cars before and after 2021. The question has been structured into four components:

1. ***Aggregate: Monthly Average***
2. ***Metrics: Amounts of gas emission (in GHG)***
3. ***Categories: Cars***
4. ***Filters: end of 2021***

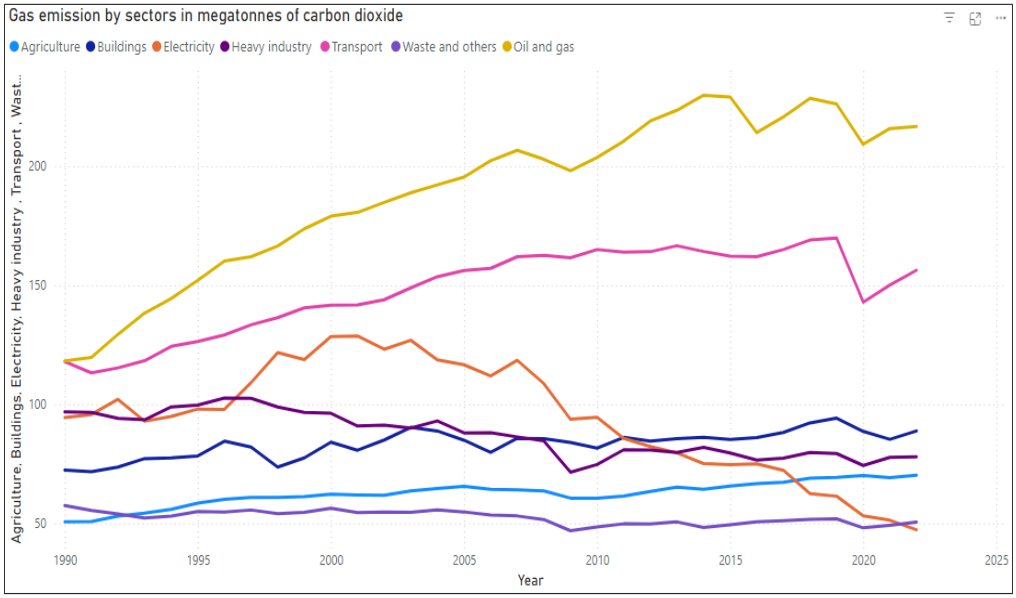


Figure 8. GHG Emissions by Industry

Figure 8 shows which industry uses the most gas emissions from the years 1990 to 2022 (Government of Canada, 2024). The pink trend line represents the Transportation industry which contributes at least 25% of gas emissions (Environment and Climate Change Canada, 2023). In 2022, the transportation sector was the second largest source of GHG emissions, accounting for 22% of total national emissions (Government of Canada, 2024).

Figure 9 presents the trends between vehicle types and its greenhouse gas (GHG) emissions. The data highlights that light trucks, represented by the dark blue trend line, are the largest contributors to GHG emissions which is evidenced to be on an increasing trend from 2021. This growth could be attributed to the rising popularity of SUVs and pickup trucks, which generally consume more fuel. Emissions from passenger and freight transport are influenced by factors such as population and economic growth, vehicle type, fuel efficiency and fuel type (Government of Canada, 2024).

Meanwhile, passenger cars, represented by the light blue trend line, have been steadily decreasing in emissions since 2019. This decline may reflect a shift in consumer preferences such as increased adoption of electric vehicles. These contrasting trends emphasize the need for targeted policies to address the environmental impact of light trucks and heavy-duty freight trucks to transition towards more environmentally friendly and sustainable transportation options.

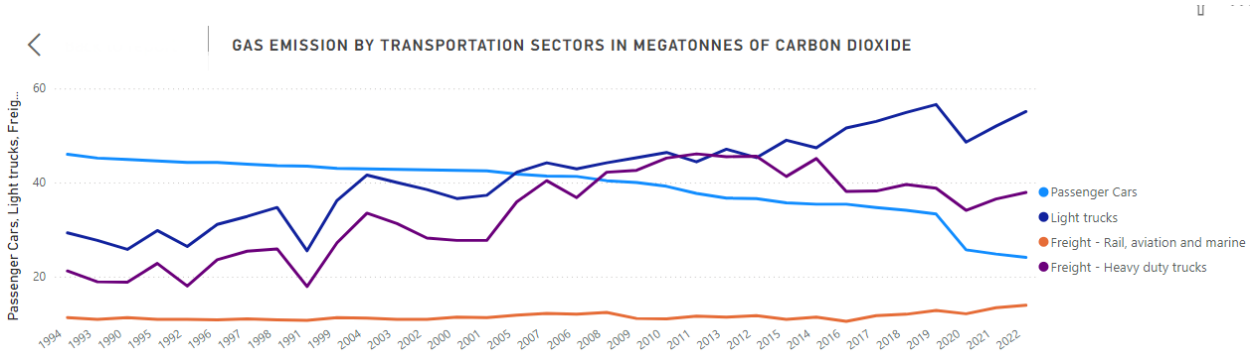


Figure 9. Vehicle Type Emissions (2017-2023)

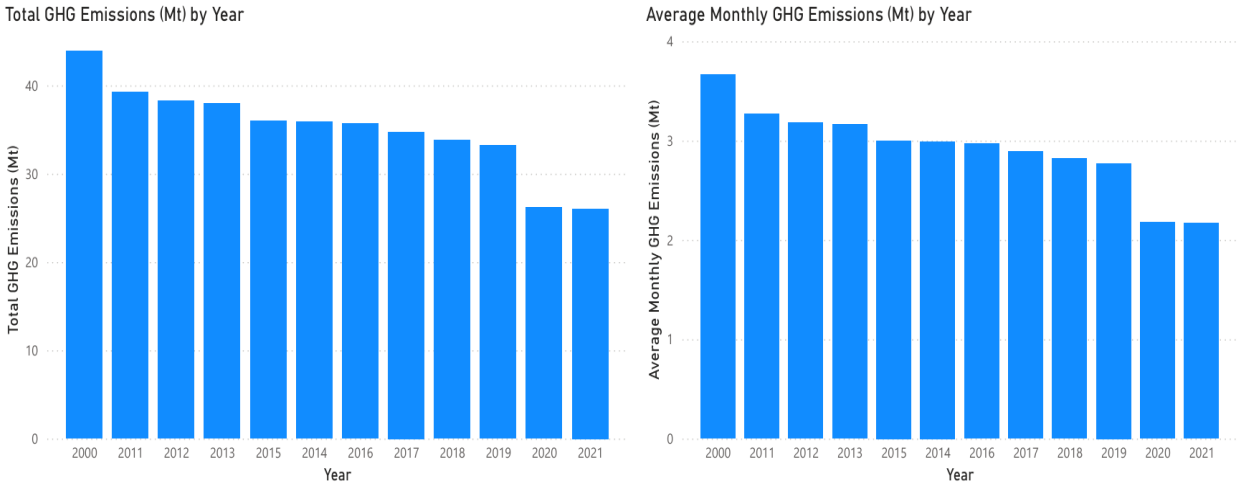


Figure 10. Total and Monthly Average GHG Emissions

Figure 10 illustrates the Greenhouse Gas (GHG) emissions from passenger cars between 2000 and 2021, using data sourced from Natural Resources Canada. The total GHG emissions were divided by 12 to calculate monthly averages, and percentage changes by year were calculated to track yearly trends. Over the period, total emissions dropped significantly from 44 megatonnes in 2000 to 26 megatonnes in 2021, with annual reductions varying from minor changes (e.g., -0.7% in 2012) to significant decreases, such as -21.1% in 2020. Monthly emissions showed a similar downward trend, falling from 3.66 megatonnes/month in 2000 to 2.17 megatonnes/month in 2021. The sharpest monthly reduction occurred in 2020, with a 59% change, likely due to the COVID-19 restrictions.

Non-Zero EV vs. Zero-Emission Vehicles (ZEVs)

Second question looks at the ratio between Non-Zero EV vs. Zero-Emission Vehicles (ZEVs) by Canadian Region in the past 5 years. The question has been structured into four components:

1. Aggregate: Total
2. Metrics: Numbers of ZEVs
3. Categories: Canadian region
4. Filters: past 5 years

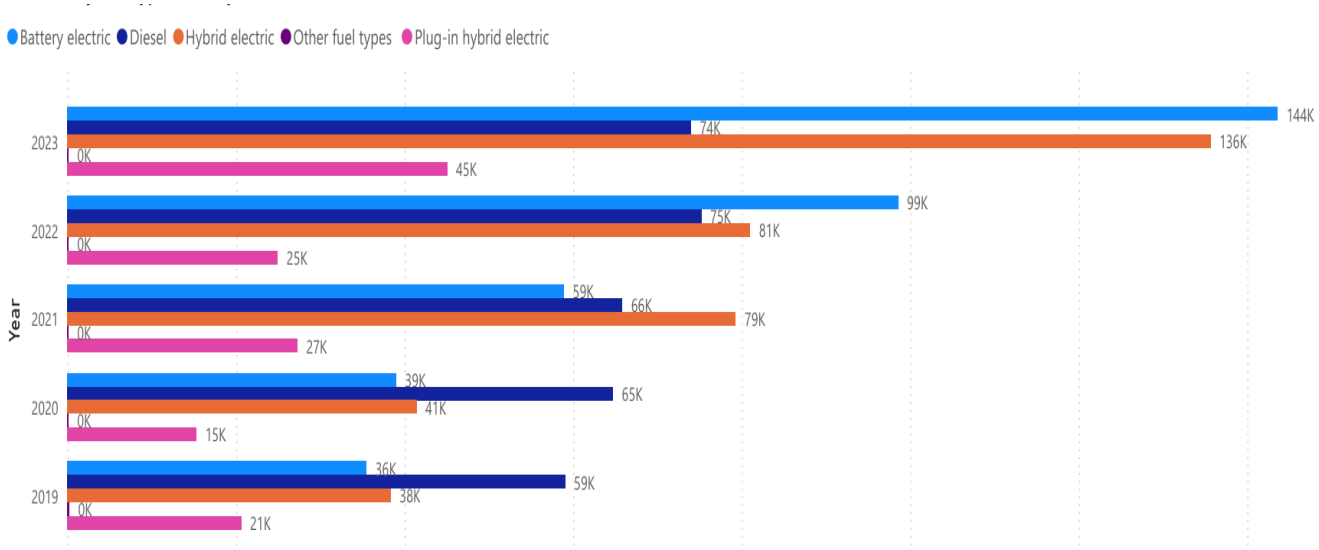


Figure 11. Vehicle Registrations

As illustrated in Figure 11, there has been a substantial increase in the production of electric vehicles over the past five years. Battery Electric and Hybrid vehicles have been the primary drivers of this growth. Data sourced from the Canada National Inventory reveals a significant surge in registrations, with Battery Electric vehicles increasing from 36,000 in 2019 to approximately 144,000 in 2023, and Hybrid vehicles rising from 38,000 to 136,000 over the same period. This trend is indicative of a growing market for Zero-Emission Vehicles (ZEVs) relative to conventional fuel types.

However, we haven't taken gasoline vehicles into consideration since we found a huge amount of data on gasoline cars, which will be illustrated in Figure 12. But first, we want to know the year-to-year percentage change for these vehicle types.

Figure 12. Vehicle Registrations (Table)

Year	Battery electric YoY Change (%)	Diesel YoY Change(%)	Gasoline YoY Change (%)	Hybrid electric YoY Change (%)	Other fuel types YoY Change(%)
2020	10%	10%	-22%	8%	-75%
2021	51%	2%	2%	91%	-91%
2022	67%	14%	-13%	2%	260%
2023	46%	-2%	7%	67%	-11%

To gain deeper insights into this trend, we calculated the year-over-year percentage change in vehicle registrations for each fuel type within the original data file. We found this is the best solution to calculate this specific attribute due to its complexity in the calculation. Battery electric vehicles consistently showed significant growth, with rates ranging from 10% in 2020 to 67% in 2022, before moderating to 46% in 2023. Hybrid electric vehicles, while experiencing substantial growth in 2021 and 2023, showed relatively slower growth in other years. This disparity may be attributed to various factors, including potential production constraints and market demand.

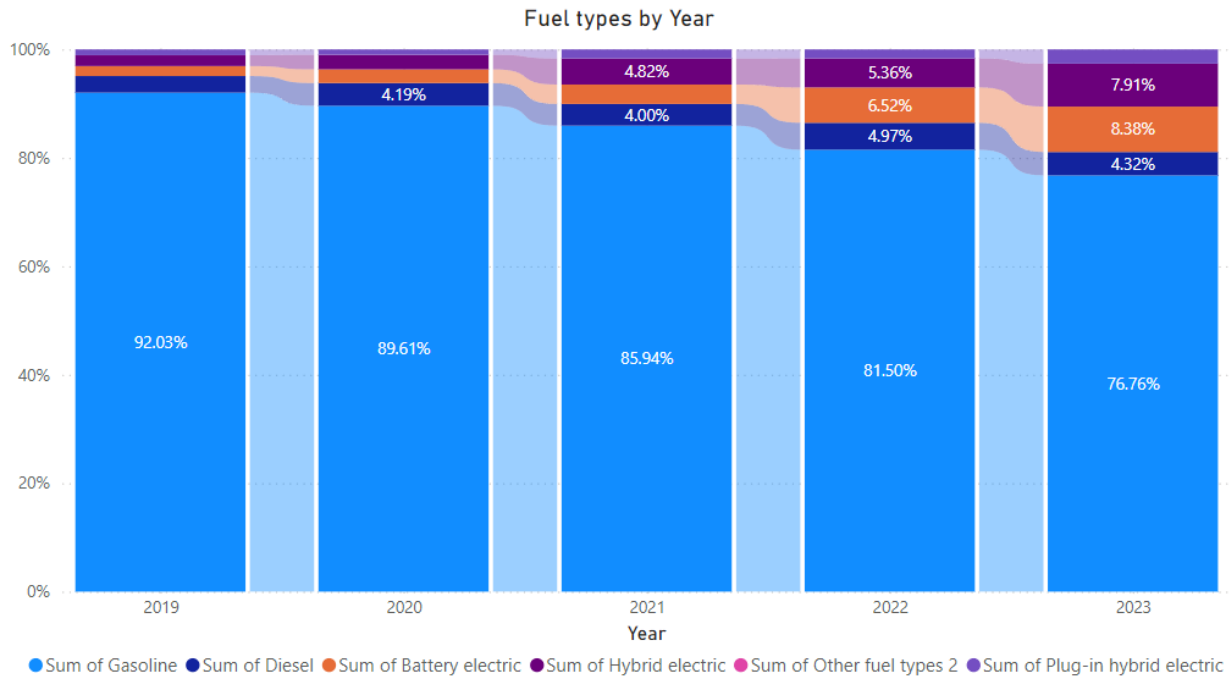


Figure 83. Gasoline and Diesel vs. Electric Vehicles

In Figure 13, we compare gasoline cars with other fuel types from 2019 to 2023. We excluded gasoline from Figure 11 because its overwhelming dominance would skew the graph, making other fuel types nearly invisible. This chart shows the proportion of each fuel type by year. Gasoline consistently dominates, accounting for over 92% of

registrations in 2019, decreasing to 89% in 2020, 85% in 2021, 81% in 2022, and 76% in 2023. While this proportion is declining, gasoline still holds a significant market share. This suggests that a primary focus on non-emission vehicles could significantly reduce transportation emissions, as illustrated in Figure 8.

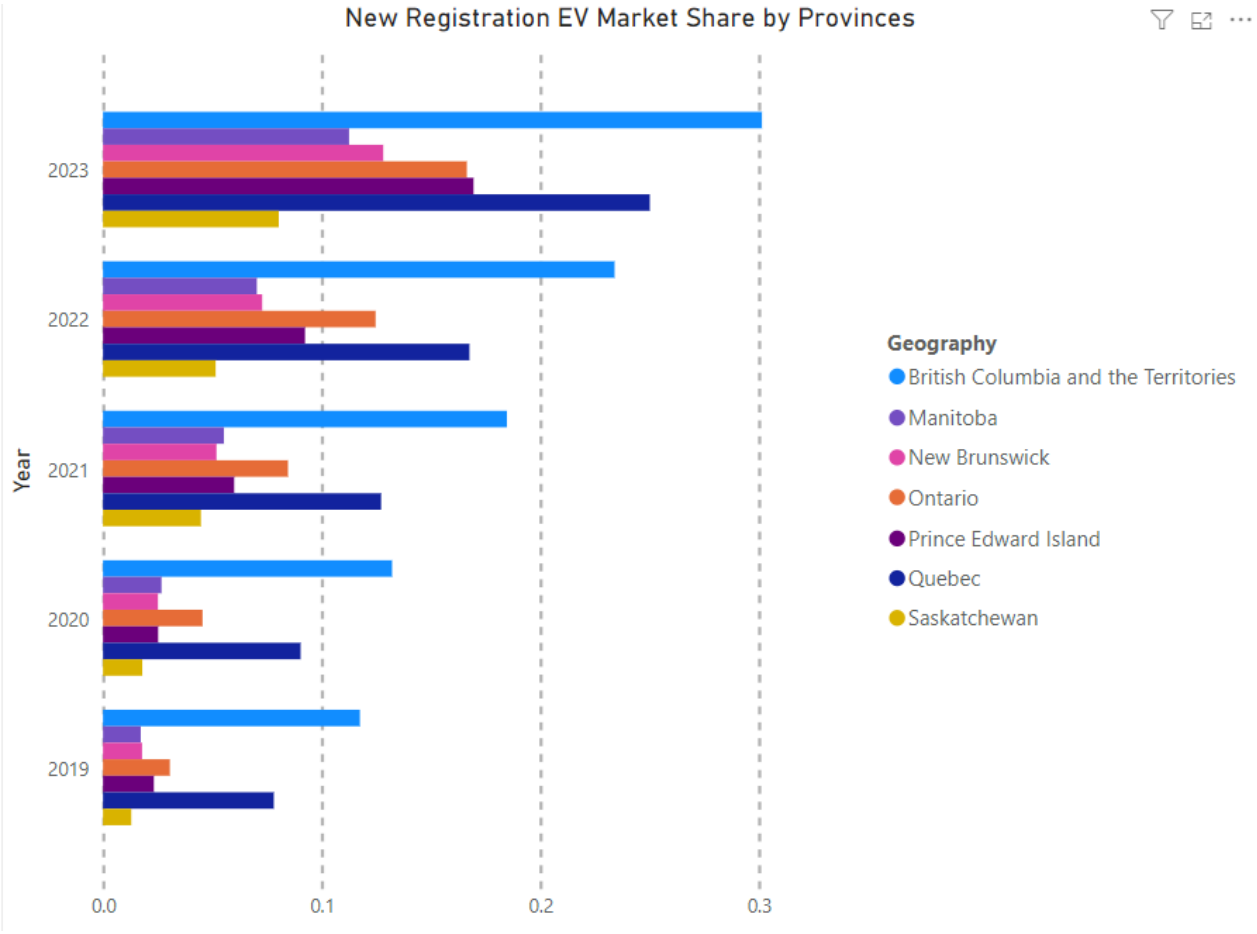


Figure 94 New Registrations EV Market Share by Provinces

Figure 14 shows a visual of electric vehicle (EV) market shares across Canadian regions from 2019 to 2023. The data reveals that British Columbia, the Territories, and Quebec lead the nation in EV adoption, holding the largest market shares. Factors contributing to these include the implementation of government incentives, the availability of electric vehicle (EV) models, and the development of supporting infrastructure.

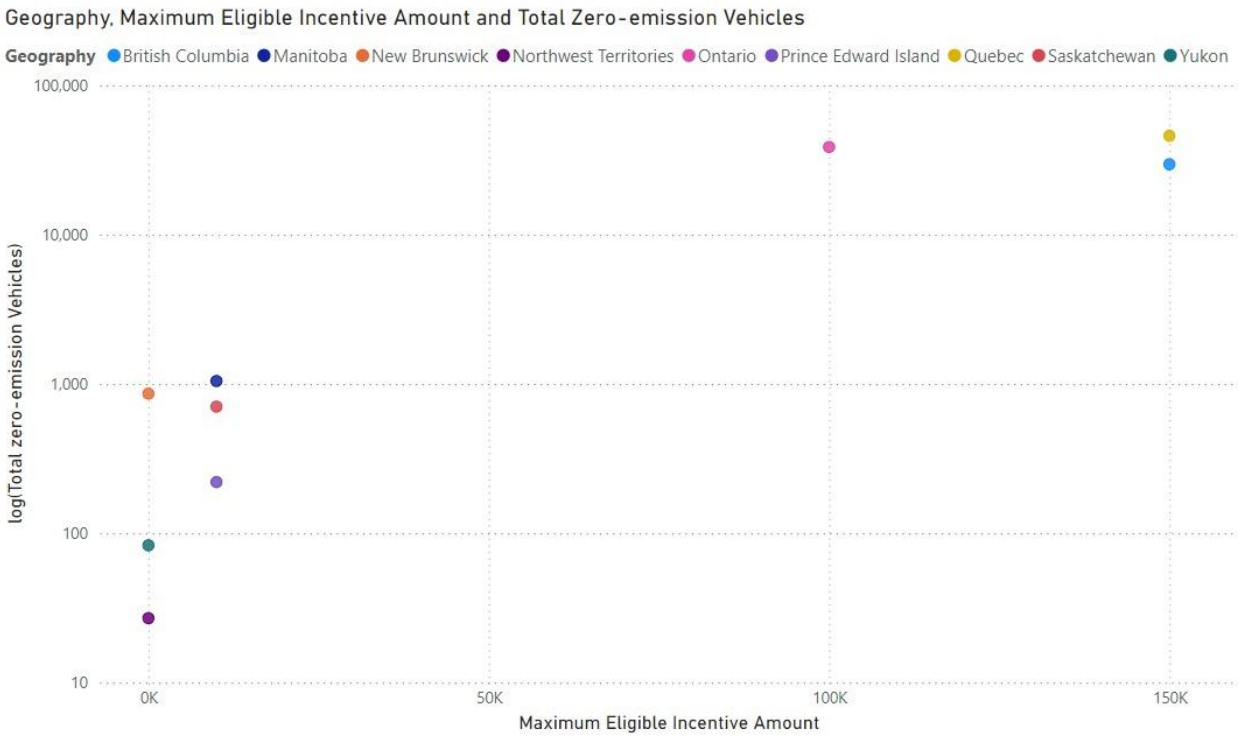


Figure 105 relationship between incentives and the number of newly purchased electric vehicles

Figure 15 shows a scatter plot illustrating the correlation between incentives offered by each province and the total number of zero-emission vehicles. There's a linear correlation of 0.949 and a linear correlation with the logged total zero emission vehicles of 0.895. It means that after the government provided incentives, people became more inclined to buy electric vehicles.

Conclusion

Gas emissions have been decreasing over the years, particularly since 2020. This decline is due to the increased in accessibility of electric vehicles (Electric Vehicle Availability Standard) and the government's introduction of incentives to reduce manufacturing costs, invest in infrastructure, and partnered with automakers to provide facilities for ZEV production (Environment and Climate Change Canada, 2023).

To achieve the goal of net-zero emissions by 2050, Canada must continue promoting electric vehicle adoption, improve its accessibility, and continue handing out incentives for customers and manufacturers. The transportation sector is the second largest contributors of gas emissions and transitioning from internal combustion engines to zero-emission vehicles is important for reducing this. This transition aligns with Canada's goal of achieving a net-zero emissions and building a green economy.

British Columbia, the Territories, and Quebec are the leading regions with the highest number of registered electric vehicles. To make it more accessible to all Canadians, the government should expand to rural areas and innovate to make electric vehicles more affordable for customers.

References

Environment and Climate Change Canada. (2023, December 19). Canada's Electric Vehicle Availability Standard (regulated targets for zero-emission vehicles). Canada. Retrieved from https://www.canada.ca/en/environment-climate-change/news/2023/12/canadas-electric-vehicle-availability-standard-regulated-targets-for-zero-emission-vehicles.html

Environment and Climate Change Canada. (2023, December 19). New Electric Vehicle Availability Standard will give Canadians better access to more affordable cars and cleaner air. Toronto, Ontario, Canada. Retrieved from https://www.canada.ca/en/environment-climate-change/news/2023/12/new-electric-vehicle-availability-standard-will-give-canadians-better-access-to-more-affordable-cars-and-cleaner-air.html

Government of Canada. (2024, February 5). Greenhouse gas and air pollutant emissions projections – 2023. Canada. Retrieved from https://www.canada.ca/en/environment-climate-change/services/climate-change/greenhouse-gas-emissions/projections/2023-report.html?utm_source=chatgpt.com

Government of Canada. (n.d.). *National Occupational Classification Hierarchy and structure*. Retrieved from Government of Canada: https://noc.esdc.gc.ca/Structure/Hierarchy?objectid=%2Fd0IGA6qD8JPRfoj5UCjpg%3D%3D

Natural Resources Canada. (2021). Transportation Sector - GHG Emissions. Canada. Retrieved December 5, 2024, from https://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/showTable.cfm?type=AN&sector=aaa&juris=00&rn=5&page=0

Statistics Canada. (2024, September 9). New motor vehicle registrations, quarterly. Canada. doi:https://doi.org/10.25318/2010002401-eng

Statistics Canada. (2024, September 9). New zero-emission vehicle registrations, quarterly. Canada. doi:https://doi.org/10.25318/2010002501-eng

Statistics Canada. (2024, 10 21). Vehicle registrations, by type of vehicle and fuel type. Canada. doi:https://doi.org/10.25318/2310030801-eng

Transport Canada. (2021, June 29). Retrieved from https://www.canada.ca/en/transport-canada/news/2021/06/building-a-green-economy-government-of-canada-to-require-100-of-car-and-passenger-truck-sales-be-zero-emission-by-2035-in-canada.html