**DAB 201 Data Visualization & Reporting**

Group 6: Project, Part II

**Incentive for Zero Emission Vehicles (iZEV)**

**Introduction and Background:**

As per the United Nations Sustainable Transport Conference, held in Beijing from October 14-16, 2021, the transport sector is responsible for approximately one-quarter of greenhouse gas emissions, and fossil fuels account for 95 percent of the world's transport energy. The CO2 emissions in the transport sector are about 30% in developed countries and about 23% in the case of total man-made CO2 emissions worldwide. By achieving a 60% share of battery-electric and plug-in hybrid vehicles on the road, more than 60 billion tons of CO2 could be saved by 2050. [[UN](https://www.un.org/sites/un2.un.org/files/media_gstc/FACT_SHEET_Climate_Change.pdf), 2021]

Electric vehicles reduce greenhouse gas emissions and can significantly reduce fuel costs. They can reduce greenhouse gas (GHG) emissions and other pollutants that form smog as they produce zero tailpipe emissions. If the source of the vehicle’s electricity is clean (such as solar or hydroelectric power) the vehicle will have no overall GHG emissions. The cost of electricity per kilometer is much lower than that of gasoline. For illustrative purposes, a BEV costs about 3 to 4 ¢/km (at 15 ¢/kWh), compared to a typical 4-cylinder gasoline vehicle at 11 to 12 ¢/km (at $1.50/L). [[Canada](https://natural-resources.canada.ca/energy-efficiency/transportation-alternative-fuels/personal-vehicles/choosing-right-vehicle/buying-electric-vehicle/21034), 2022]

The automotive industry around the globe is trying to bring about driving experiences that are kinder to the planet. Electric car sales reached a record high in 2021, despite supply chain bottlenecks and the ongoing Covid-19 pandemic. Compared with 2020, sales nearly doubled to 6.6 million, bringing the total number of electric cars on the road to 16.5 million. [[IEA](https://www.iea.org/reports/electric-vehicles), 2022]

**Objectives and Goals:**

Our project team will work on a descriptive analysis with the help of multiple visualizations using Tableau on the selected dataset about ‘Incentives for Zero-Emission Vehicles’ with the vision of identifying the hidden patterns and trends by the users in different Canadian provinces.

We intend to make this project beneficial for those who ask questions such as below,

1. Which are the provinces that lead in Zero-emission vehicle purchases?
2. How are the recent trends in the purchasing patterns of Zero emission vehicles over years?
3. Which Vehicle Manufacturers are leading in the sales of Zero emission vehicles?
4. Is there any relationship between the Zero Emission Vehicle sales and the geographical locations?
5. Identify patterns in Incentives paid overtime to different Vehicle Makes.

**Dataset Description:**

Statistics on the Incentives for Zero-Emission Vehicles (iZEV) was launched by Transport Canada on May 1, 2019. Since the launch, Transport Canada has been producing statistics on consumer uptake under the program.

The dataset contains incentive request data from May 2019 to May 2023, for Canadian Provinces and Dealership Postal Codes. The dataset contains 220157 records of incentive request records from May 2019 to May 2023 and has 18 variables that are described below.

It includes information about the Country (Canada), the Province and Postal Code of the Dealership, and the Province of the Recipient. [[T C Open Government](https://open.canada.ca/data/en/dataset/42986a95-be23-436e-af15-7c6bf292a2e1), 2022]

**Variables**:

|  |  |  |
| --- | --- | --- |
| **Sl#** | **Variables** | **Description** |
| 1 | Incentive Request Date | Incentive request date |
| 2 | Month and Year | Month and year of the incentive request |
| 3 | Government of Canada Fiscal Year (FY) | Government of Canada fiscal year |
| 4 | Calendar Year | Calendar year in which the request was received |
| 5 | Dealership Province/Territory | Province or Territory of the dealership |
| 6 | Dealership Postal Code | Dealership Postal Code |
| 7 | Purchase or Lease | The vehicle has been purchased or leased |
| 8 | Vehicle Year | Vehicle Year |
| 9 | Vehicle Make | The make of the zero-emission vehicle |
| 10 | Vehicle Model | The model of the zero-emission vehicle |
| 11 | Vehicle Make and Model | Make and model of the zero-emission vehicle |
| 12 | Battery-Electric Vehicle (BEV), Plug-in Hybrid Electric Vehicle (PHEV) or Fuel Cell Electric Vehicle (FCEV) | Battery-Electric Vehicle (BEV), Plug-in Hybrid Electric Vehicle (PHEV), or Fuel Cell Electric Vehicle (FCEV) |
| 13 | BEV/PHEV/FCEV - Battery equal to or greater than 15 kWh or electric range equal to or greater than 50km | Whether the BEV/PHEV/ VÉPC battery is equal to or greater than 15kWh or the electric range is equal to or over 50km |
| 14 | BEV, PHEV ≥ 15 kWh or PHEV < 15 kWh (until April 24, 2022) and PHEV ≥ 50km or PHEV < 50km and FCEVs ≥ 50km or FCEVs < 50km (April 25, 2022, onward) | Indicates the dates when the definition of longer-range plug-in hybrid vehicles (PHEVs/FCEVs) moved from battery size in kilowatts (kWh) to electric range in kilometers (km) |
| 15 | Eligible Incentive Amount | Eligible Incentive Amount (dollars) |
| 16 | Individual or Organization (Recipient) | Individual or Organization (Recipient) |
| 17 | Recipient Province/Territory | Province and Territory of recipients |
| 18 | Country | Country of the recipient |

**Visualization Plan:**

1. Map – Variables Dealership Province/Territory v/s Number of Incentive Requests (EV sold)
2. Line – Incentive Request Date v/s Eligible Incentive Amount
3. Pie Chart – Vehicle Purchased and Leased
4. Table – Displaying the Eligible amount requested or paid by different provinces per year / month.
5. Bubble Chart – to visualize the prominent province based on the Incentive amount paid.
6. Bar Char – Make / model of the vehicle vs their Incentive amount paid by province.

**Charts:**

A picture containing text, screenshot, plot, font

Description automatically generated

\*\* Above line chart provides quick overview of the Eligible Incentive Amounts requested by users in different Canadian provinces over time.

A screenshot of a graph

Description automatically generated

\*\* Above table provides an overview of the Incentive Amount paid per Vehicle Make over years.

**References:**

1. UN, U. N. (2021). (rep.). *Sustainable Transport Conference Fact Sheet Climate Change [Fact Sheet]* (pp. 1–2). Beijing, Beijing: United Nations.

<https://www.un.org/sites/un2.un.org/files/media_gstc/FACT_SHEET_Climate_Change.pdf>

2. Canada, N. R. (2022, October 20). *Buying an electric vehicle*. Natural Resources Canada. <https://natural-resources.canada.ca/energy-efficiency/transportation-alternative-fuels/personal-vehicles/choosing-right-vehicle/buying-electric-vehicle/21034>

3. IEA (2022), Electric Vehicles, IEA, Paris License: CC BY 4.0

<https://www.iea.org/reports/electric-vehicles>

4. T C Open Government, T. C. (2022, November 11). *Statistics on the incentives for zero-emission vehicles (iZEV) program*. Open Government Portal. <https://open.canada.ca/data/en/dataset/42986a95-be23-436e-af15-7c6bf292a2e1>