

Electric Vehicle Data Analysis Dashboard

Tools: Tableau, Excel

This project showcases my data analysis expertise, focusing on the growing trend of electric vehicle (EV) adoption across the United States. Using a dataset of **130,816 vehicles**, I created a comprehensive dashboard in Power BI that provides actionable insights into EV market trends, vehicle performance, and regional distribution. My work in this project illustrates my proficiency in data processing, visualization, and reporting, with a keen focus on deriving valuable insights for stakeholders.

Key Responsibilities:

- **Data Collection and Preprocessing:**
 - I worked with a detailed dataset consisting of **Battery Electric Vehicles (BEV)** and **Plug-in Hybrid Electric Vehicles (PHEV)**.
 - Conducted **data cleaning** to handle missing values, inconsistent formats, and ensure data integrity for analysis.
 - Leveraged Power BI's **Power Query Editor** for transformation tasks like merging tables, filtering, and restructuring the data for optimal reporting.
- **Data Analysis & Insights:**
 - Analyzed key performance metrics, such as **average electric vehicle range** (73.1 miles) and **total vehicle registrations**. This allowed me to create high-level summaries and drill-down capabilities for end-users to understand EV performance.
 - Conducted trend analysis on vehicle registrations from **2010 to 2023**. The data revealed significant growth in recent years, particularly in **2021** and **2023**, where EV registrations spiked to over **30K vehicles**, signaling an industry shift towards electric mobility.
- **Data Segmentation and Visualizations:**
 - Developed a **state-by-state heat map** to illustrate the geographical distribution of EVs, providing insights into areas with the highest and lowest adoption rates. States like **California** lead with the highest number of registrations, while emerging states show increasing potential for growth.
 - Created a **Top 10 Vehicle Make and Model Chart** to highlight market leaders, with **Tesla** dominating the market with **52.7%** of registered vehicles. This chart also provided insights into how traditional automakers like **Chevrolet** and **Ford** are competing.
 - Segmented vehicles by **CAFV (Clean Air Vehicle) eligibility** using a donut chart. This analysis showed that **42.75%** of vehicles are eligible for environmental incentives, giving decision-makers insights into policy effectiveness.

Key Visualizations:

- **Year-over-Year Growth:** A line chart that tracks the exponential growth of EV registrations, particularly emphasizing years with industry breakthroughs (2021, 2023).
- **Geographic Distribution:** A U.S. map showing the state-wise spread of EV adoption, highlighting regions of opportunity for further market penetration.

- **Top Manufacturers & Models:** Bar charts that show leading EV brands and models, helping businesses gauge competitive positioning in the marketplace.
- **CAFV Eligibility Breakdown:** A donut chart offering a visual snapshot of vehicles' eligibility for environmental incentives, which can drive policy decisions.

Strategic Insights:

- **Market Dynamics:** The data revealed that **80.2%** of registered vehicles were BEVs, while **19.8%** were PHEVs, indicating a clear shift towards all-electric vehicles. Understanding this split helps stakeholders identify which vehicle types are gaining traction.
- **Regional Adoption:** States with higher EV registrations, like **California**, show readiness for greater EV infrastructure investment, while emerging states present potential growth opportunities for EV companies.
- **Top Models for Consumer Preference:** The dominance of models like the **Tesla Model Y** and **Model 3**, which together account for over **40%** of total vehicles, provides insights into consumer preferences, offering manufacturers key takeaways for future vehicle development.
- **CAFV Program Impact:** By analyzing eligibility for the **CAFV program**, I provided insights into how many vehicles are taking advantage of clean air incentives, which can influence policy-making and future environmental programs.

Tools & Technologies:

- **Power BI:** For data modeling, analysis, and creating highly interactive visualizations that help end-users understand trends and make data-driven decisions.
- **DAX:** Utilized Data Analysis Expressions (DAX) for creating custom metrics and insights within the dashboard.
- **Power Query:** Employed Power Query for extensive data cleaning and transformation, ensuring the dataset was optimized for reporting and visualization.
- **Advanced Filtering & Drill-Through Capabilities:** Set up advanced filtering options in Power BI, enabling users to explore data by state, vehicle type, and eligibility criteria for deeper insights.

In this project, I demonstrated my ability to take raw data and transform it into a powerful decision-making tool. My attention to detail in data cleaning, analysis, and visualization ensured that the dashboard not only looks visually appealing but also offers deep, actionable insights. The **Electric Vehicle Data Analysis Dashboard** is a perfect example of my proficiency as a data analyst, capable of turning complex datasets into user-friendly and business-relevant reports.