Project Report: Electric Vehicles Analysis

Introduction:

This project focuses on analyzing the electric vehicle (EV) market, encompassing both Battery Electric Vehicles (BEVs) and Plug-in Hybrid Electric Vehicles (PHEVs). The aim is to understand the market landscape, technological advancements in EV ranges, and the distribution of these vehicles by make, model, and geographic location.

Key Performance Indicators (KPIs):

1. Total Vehicles:

Objective: Analyze the total number of electric vehicles in the dataset, including both BEVs and PHEVs, to assess the market's size and growth potential.

Analysis: The dataset captures vehicles from different manufacturers, including BEVs and PHEVs. The total vehicle count provides an overview of the size of the electric vehicle market.

2. Average Electric Range:

Objective: Determine the average electric range of the vehicles to evaluate technological advancements and efficiency in the EV industry.

Analysis: By calculating the average range of all electric vehicles in the dataset, we can assess the progression in battery technology and the driving efficiency of modern electric vehicles.

3. Total BEV Vehicles and Percentage of Total Vehicles:

Objective: Analyze the number of Battery Electric Vehicles and calculate their percentage in relation to the total number of vehicles.

Analysis: BEVs represent fully electric vehicles, and understanding their proportion compared to PHEVs offers insight into the market's shift toward fully electric models.

4. Total PHEV Vehicles and Percentage of Total Vehicles:

Objective: Analyze the number of Plug-in Hybrid Electric Vehicles and calculate their percentage in relation to the total number of vehicles.

Analysis: PHEVs, which use both gasoline and electric power, represent a transition technology. Analyzing their market share helps understand the role they play in the broader EV adoption.

Chart Visualizations:

1. Total Vehicles by Model Year (From 2010 Onwards):

Visualization: Line/Area Chart
Objective: Show the distribution of electric vehicles by model year starting from 2010.
Insight: The chart shows the growth trend of electric vehicles over time, highlighting key years where adoption spiked, indicating possible factors such as government incentives or technological breakthroughs.

2. Total Vehicles by State:

Visualization: Map Chart
Objective: Display the geographical distribution of electric vehicles across different states.
Insight: States with higher adoption rates are highlighted, giving an understanding of regional preferences for electric vehicles. This could correlate with local regulations or infrastructure supporting EVs.

3. Top 10 Total Vehicles by Make:

Visualization: Bar Chart
Objective: Show the top 10 electric vehicle manufacturers based on the number of vehicles.

Insight: The bar chart shows which manufacturers dominate the EV market. This helps identify market leaders and trends in consumer brand preferences.

4. Total Vehicles by CAFV Eligibility:

Visualization: Pie/Donut Chart

Objective: Illustrate the percentage of vehicles eligible for Clean Alternative Fuel Vehicle (CAFV) incentives.

Insight: This visualization provides insights into how incentives impact EV adoption, showing the proportion of vehicles that benefit from these schemes.

5. Top 10 Total Vehicles by Model:

Visualization: Tree Map

Objective: Display the top 10 electric vehicle models based on the number of vehicles.

Insight: The tree map highlights the most popular EV models in the dataset. It provides insights into consumer preferences and popular models within the EV market.

Analysis & Insights:

- Growth Trends: The increasing number of EVs since 2010 indicates growing market adoption, likely driven by technological improvements and government incentives.
- Regional Distribution: Certain states show significantly higher EV adoption, suggesting that local policies and infrastructure support play a crucial role in EV uptake.
- Market Leaders: The top 10 manufacturers and models provide a clear view of market leaders, with some brands and models consistently dominating the market.
- Incentive Impact: The analysis of CAFV eligibility reveals how critical government incentives are in promoting EV adoption.
- Technological Advancement: The average electric range shows significant

improvements in EV technology, suggesting that range anxiety is becoming less of a barrier to adoption.

Conclusion:

This analysis provides a comprehensive overview of the electric vehicle market, showcasing its growth trajectory, key players, and the impact of government incentives. The project highlights the dominance of certain manufacturers and models and underscores the importance of regional support and incentives in driving EV adoption. The technological progress in terms of battery range also illustrates the ongoing advancements within the industry.