**Exploratory Data Analysis**

The analysis began with exploratory techniques to gain a clear overview of the EV dataset. The process started by cleaning and standardizing the data, then using summary statistics and visualizations—such as charts, and geographic maps—to reveal key trends. For instance, a strong preference for BEVs over PHEVs was observed, along with significant regional adoption differences and varied battery ranges that could affect overall market growth.

Key questions were established to guide the analysis:

*? What drives the regional differences in EV adoption?*

*? How do vehicle types and battery ranges influence market growth?*

*? What factors are critical for Clean Alternative Fuel Vehicle (CAFV) eligibility?*

**Key Findings**

**Total Vehicle**

Diving into the dataset reveals a total fleet of 173,533 Electric Vehicles cruising on American roads. It’s clear that the EV revolution is gaining momentum and reshaping transportation­. Stakeholders should note, this is not just a trend, but, the future unfolding before us.

**Geographical Distribution**

Mapping out the EV landscape in the USA shows that EVs are present in 46 states, 194 counties, and 711 cities. Washington stands out as a leader with 173,157 EVs, while California trails far behind with only 98. Most other states recorded fewer than 50 sales, underscoring the varied adoption levels across regions. This underscores the importance of tailored strategies to boost adoption where it lags while celebrating areas that are leading the charge.

**EV Types**

The EV market in the USA comprises two main types: The cutting-edge Battery Electric Vehicles (BEVs) dominate with 135,617 vehicles (78%), and Plug-in Hybrid Electric Vehicles (PHEVs) contribute 37,916 vehicles (22%). The overwhelming preference for BEVs highlights consumer confidence in fully electric technology, while the PHEVs’ presence reflects the transitional mindset of some buyers.

**EV Vehicles by Make & Model**

Consumer choices include 40 makes and 139 models, showcasing the diversity of the EV market. (Tracing the evolution of the EVs model over time, they range between the year 1997 & 2024). Tesla leads with 77,805 sales, followed by Nissan and Chevrolet with 14,005 and 13,486 sales, respectively. BMW, Audi, and Mercedes-Benz stand out with the largest extensive unique models, offering 14, 12, and 10 models each; while others have less than 10 models.

**Clean Alternative Fuel Vehicle (CAFV) Eligibility**

CAFV eligibility is a key driver for EV adoption, with 65,846 vehicles meeting criteria thanks to ranges between 30 and 337 miles. However, 19,385 vehicles fall short due to limited ranges below 30 miles, and 88,302 vehicles remain ineligible due to insufficient battery range data. This competitive diversity fuels progress, ensuring options for every type of driver.

**Battery Range Insights**

Battery ranges vary significantly, from 0 to 337 miles. The average range of 60 miles highlights the need for technological advancements to improve practicality and boost consumer confidence. Stakeholders must seize this as a call to action: pushing for extended ranges can unlock the next wave of adoption, ensuring EVs are not only sustainable but also practical for everyday use.

Analysis of the average battery range across EV makes reveals significant variations. Jaguar leads with the highest average range, surpassing 200 miles, while other brands, Chevrolet, Nissan, and Tesla maintain moderate battery performance, but improvements are still needed to enhance overall efficiency.

**Recommendation**

* **What drives EV adoption across regions?** Policies, infrastructure, and incentives play a major role—Washington is proof of this.
* **How can stakeholders leverage this data?** Focus on expanding EV-friendly policies and infrastructure in underperforming regions.
* **How do vehicle types and battery ranges influence growth?** The dominance of BEVs signals consumer trust, while battery range remains a limitation that must be addressed.
* **What factors are critical for CAFV eligibility?** Range, efficiency, and eligibility criteria need attention to increase incentive-qualified vehicles.

The analysis suggests focusing efforts where they’re needed most.

1. Address Regional Gaps: With Washington dominating with over 173K EVs and California trailing far behind, there’s a clear need to target regions with low EV adoption by understanding local challenges like limited charging infrastructure, and design customized incentive programs and public awareness campaigns.
2. Promotion of Battery Electric Vehicles (BEVs) since it clearly outshines hybrids by 78% in popularity, policies should favour BEVs through incentives, subsidies and better charging solutions to support consumer confidence.
3. Improving battery performance is crucial, as the 60-mile average range may hinder long-term adoption. Advancing battery technology can enhance driving range, boost consumer confidence, and accelerate EV adoption. Stakeholders should prioritise research, development, and strategic incentives to bridge this gap and make EVs more appealing to a wider audience.
4. Addressing gaps in Clean Alternative Fuel Vehicle (CAFV) eligibility initiatives to improve battery performance could boost the overall eligibility of EVs. This may involve updating standards and supporting technological upgrades.