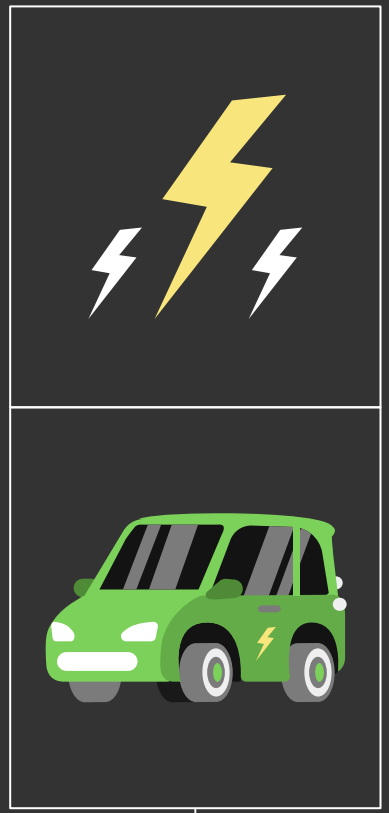
Market Analysis of EV/PHEV Car Sales and Infrastructure in Key U.S. States

Gian F. Villafañe Morales



Say.Co Consulting Group

Do you know what helps you make informed decisions about the future? Insights like these:

- Data-Driven Analysis: We utilize comprehensive data to provide accurate insights.
- Strategic Forecasting: Our analysis helps you anticipate industry trends and challenges.
- Expert Recommendations: Receive expert advice tailored to your business needs.

And the most important thing: our expertise ensures that you won't miss any critical trends or opportunities in the EV market.

Task:

Our company has been commissioned by a local dealership to analyze the growth and cost trends of Electric Vehicles (EVs) and to conduct a comprehensive study of the industry's future prospects. The dealership aims to increase their sales of EVs and Plug-in Hybrid Electric Vehicles (PHEVs) to customers.

Overview

Objective

The primary objective of this project is to analyze historical sales data of Electric Vehicles (EVs) and Plug-in Hybrid Electric Vehicles (PHEVs) and predict future sales trends. This analysis provides insights into growth patterns, market dynamics, and infrastructure needs of the EV/PHEV market.

We used data from the US Department of Energy, local DMVs of California, Florida, New York, Texas, and Washington, the U.S. Census Bureau, U.S. Energy Information Administration, Bureau of Labor Statistics, and The World Data Bank. Most of this data was already cleaned as it was provided by government agencies.

Overview

Focus States:

- California (CA): The leading state in EV adoption with the most developed infrastructure and policies supporting EVs. Population: 39,356,104
- Texas (TX): A large state with diverse urban and rural areas, currently Home state of Tesla. Population: 29,243,342
- Florida (FL): A rapidly growing market for EVs with increasing infrastructure development. Population: 21,634,529
- New York (NY): A state with a high population density and progressive policies supporting EV adoption. Population: 19,994,379
- Washington (WA): Known for its environmental initiatives and significant EV infrastructure. Population: 7,688,549

What is the difference between EVs/PHEVs?

- Electric Vehicles (EVs) are powered entirely by electricity, producing zero tailpipe emissions and relying on external charging sources.
- Plug-in Hybrid Electric Vehicles (PHEVs) combine an electric motor with a conventional gasoline engine, allowing for both electric-only driving and extended range using gasoline.

Key EV/PHEV Insights

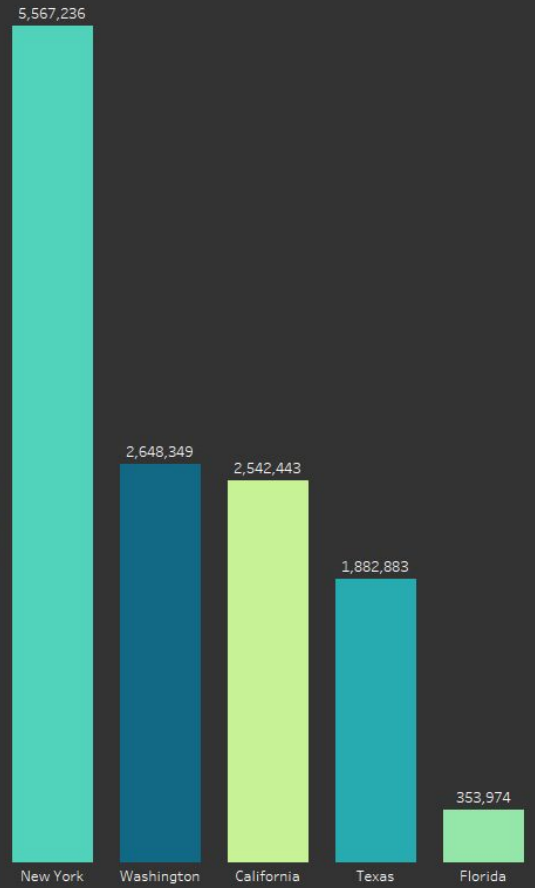
U.S. Infrastructure and Market Analysis

Brands by Total Registration

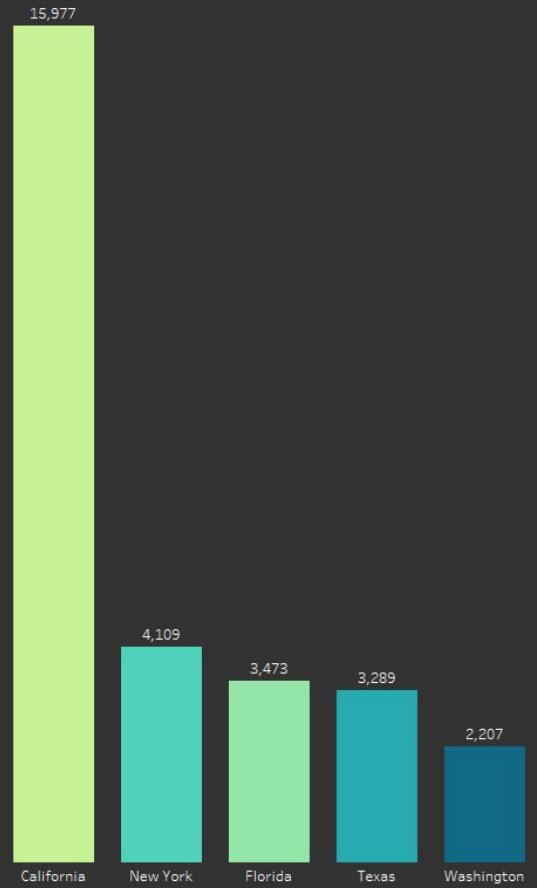
Top 10 Models by Registration

Model	
Model 3	2,068,010
Model S	1,124,319
Leaf	936,146
Volt	931,314
Model Y	929,757
Prius Prime	766,578
Model X	606,437
Fusion	249,305
Bolt EV	232,946
Rav4 Prime	231,500

Total EV Car Registration in 2024



Total EV Stations in 2024



Market and States Insights

37.71%

Tesla

In these five states alone, Tesla demonstrates massive market domination.

100.91%

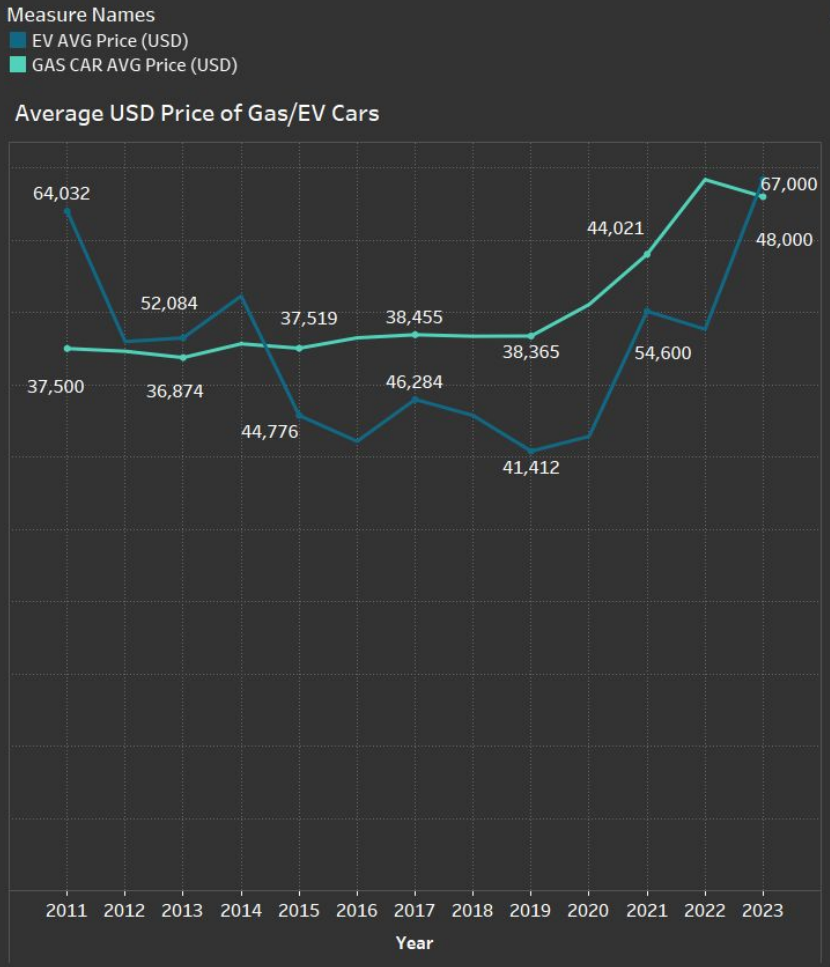
Sales Increase

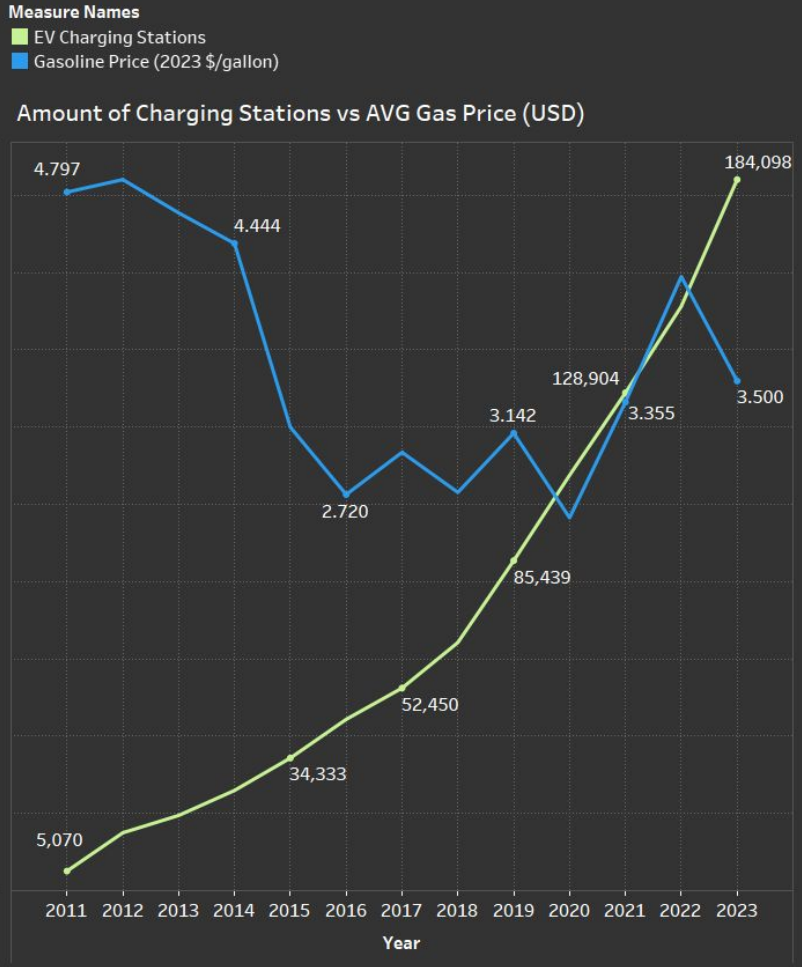
From 2011 to 2021, the average annual increase in EV/PHEV sales was approximately 100.91%. This suggests that, on average, EV/PHEV car sales doubled each year during this period.

57.07%

American EVs

More than half of the market share is held by American brands, highlighting strong domestic adoption.


Measure Names
EV AVG Price (USD)
GAS CAR AVG Price (USD)
Average USD Price of Gas/EV Cars
64,032
37,500
52,084
36,874
37,519
44,776
38,455
46,284
38,365
41,412
44,021
54,600
67,000
48,000
2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023
Year


Measure Names
EV Charging Stations
Gasoline Price (2023 $/gallon)
Amount of Charging Stations vs AVG Gas Price (USD)
4.797
4.444
2.720
3.142
3.355
3.500
5,070
34,333
52,450
85,439
128,904
184,098
2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023
Year

Infrastructure and US Insights

Price Convergence

By 2023, the price gap between gasoline cars and EVs has narrowed, with gasoline cars averaging $38,365 and EVs at $48,000. This convergence suggests increasing affordability and competitiveness of EVs.

Future Outlook

With the narrowing price gap between EVs and gasoline cars, along with continued infrastructure investments, the adoption of EVs is expected to rise

Correlation with Gas Prices

The increase in the number of charging stations seems to correlate with higher gasoline prices, suggesting that higher fuel costs may drive investment in and adoption of EV infrastructure.

Predictive Analysis

Data Analysis and Prediction of EV/PHEV Sales: A Key to Strategic Dealership Planning

Machine Learning - Predictive Analysis

- Using Machine Learning, we developed a predictive model to forecast the growth of EV/PHEV sales.
- Our approach utilized Ensemble Modeling, combining the best models for more accurate predictions. We evaluated performance with RMSE and R-squared metrics to ensure reliability.
- Identifying key features influencing sales helps guide strategic decisions. Visualizing predictions against actual values provides insights for the dealership to expand their EV/PHEV offerings strategically.

Predictive Analysis - Conclusion and Results

- The predictive analysis indicates a strong growth trajectory for EV/PHEV sales, with estimates between 200,000 and 500,000 units.
- For the dealership, this suggests a significant opportunity to expand EV/PHEV inventory and enhance charging infrastructure.
- By leveraging these predictions, the dealership can capitalize on market trends, ensuring long-term growth and leadership in the EV market.

SWOT analysis

Strengths

Lower fuel and maintenance costs compared to traditional vehicles.

Opportunities

Strengthening government policies and regulations to reduce carbon emissions

S W O T

Weaknesses

Higher upfront purchase price compared to gasoline-powered vehicles.

Threats

Misconceptions and lack of awareness about EV/PHEV benefits

Recommendations and conclusions

- Expand EV/PHEV Inventory: Given the significant market growth, the dealership should increase the inventory of EVs and PHEVs to meet the rising consumer demand.
- Invest in Charging Infrastructure: The Dealership should consider investing in on-site charging stations. This will not only support EV sales but also attract EV owners for servicing and other dealership offerings.
- Competitive Advantage: There is significant competition from brands like Chevrolet, Nissan, and Toyota. By diversifying the EV/PHEV offerings, dealerships can attract a broader customer base and compete effectively.
- Leverage Government Incentives: Utilize available government incentives and subsidies to reduce the upfront cost for consumers. Highlighting these financial benefits can make EVs and PHEVs more attractive to potential buyers.

Thank You!
Come Again