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What is the State of the Current EV Market?

A Comprehensive Analysis of Electric Vehicle Sales and Trends

Introduction

Since 2010, when electric vehicles began breaking into the mainstream, the industry has grown at a staggering pace. What began with early models like the Nissan Leaf and Tesla's Roadster has expanded into a global market where nearly every major automaker now competes. EVs are no longer just symbols of innovation or climate ambition - they're a multi-billion-dollar sector reshaping supply chains, trade policy, and consumer behavior. Yet the market is far from settled: sales trends vary by country, costs remain heavily tied to batteries and rare earth minerals, and infrastructure build-out is still uneven. In this blog, we dive into the current state of the EV market - who's leading, where growth is happening, and what challenges lie ahead.

Sales & Revenue

To understand the current state of the market, perhaps the most crucial and obvious place to begin is sales and revenue. By looking into the sales of EV cars across the nation as well as zooming into sales of particular vehicle classes, we can better understand the current shape of the market, how it has grown in the last 15 years, and what we can expect for the future.

› Global Market Sales

Let's start by examining the overall global sales since 2010.

Year	Sales (millions)	Year	Sales (millions)
2010	0.019	2017	2.815
2011	0.114	2018	4.694
2012	0.283	2019	5.148
2013	0.510	2020	8.360
2014	0.811	2021	17.037
2015	1.411	2022	24.862
2016	1.836		

Table 1: Global EV Sales 2010-2022

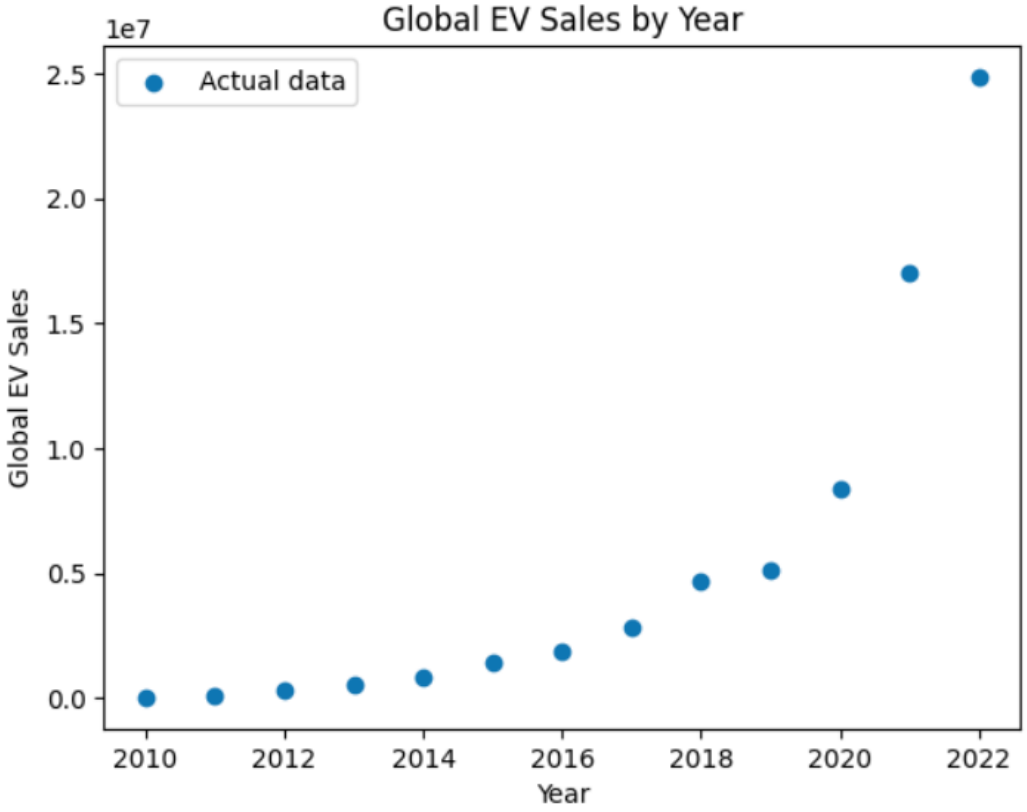


Figure 1: Global EV Sales Growth (2010-2022)

Key Insight

The scatter plot clearly shows this is not a linear plot but rather **quadratic in nature**. Between 2010-2016 we see a slow steady rise before an **explosion in 2018-2022**.

Quadratic Equation Fit:

Since the growth appears quadratic, we can fit an equation. The equation for this quadratic fit is:

$$y = 2.943787 \times 10^5 \cdot x^2 - 1.185347 \times 10^9 \cdot x + 1.193230 \times 10^{12}$$

This is clearly not a perfect fit, but it allows us to extrapolate to future years to estimate sales.

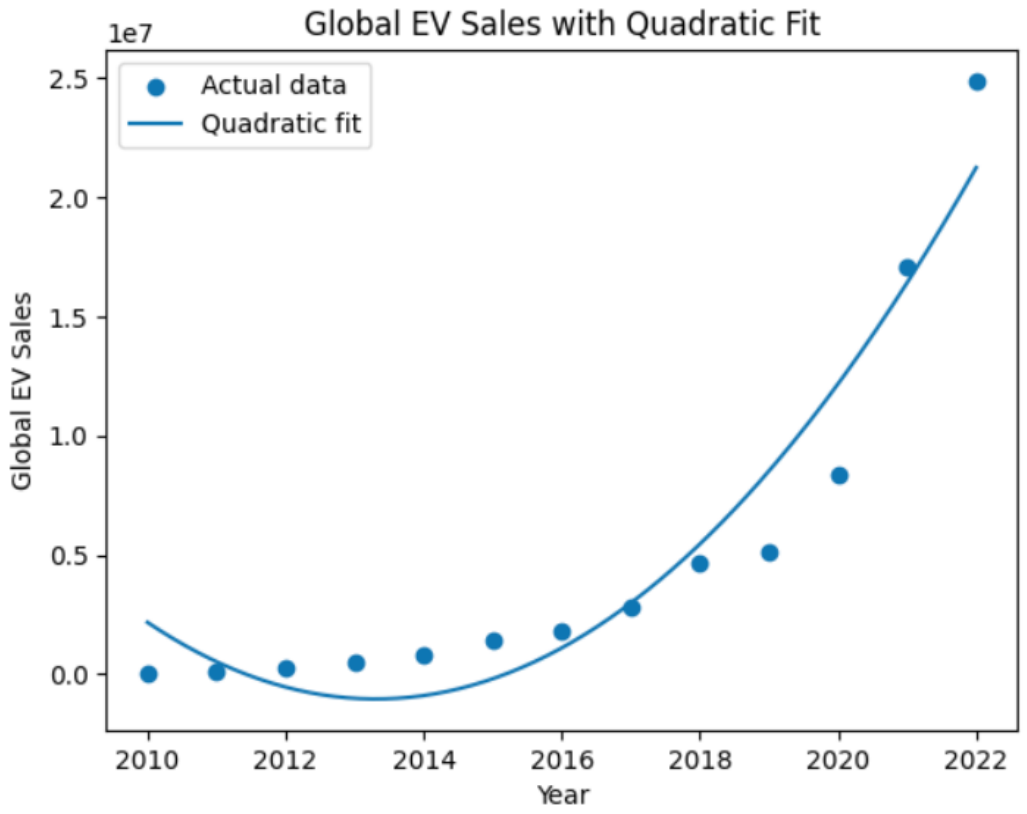


Figure 2: Global EV Sales with Quadratic Fit

Regional Breakdown

Right now we have examined global sales, but it is equally important to understand where most of these sales are coming from. We found the top regions in which the majority of sales come from:

- **China** leads with **12.44 million sales** over the past 5 years
- **Europe** as a whole is second with **7.24 million sales** over the last 5 years
- **United States** with **2.60 million sales**

Regional Analysis

This is roughly what you might have expected without looking at the data, as China has the majority of the raw materials to build EV batteries as well as a massive population.

BEV vs PHEV

Another important component of global sales is looking at the type - BEV or PHEV against the global sales:

- **BEV** = Battery Electric Vehicle
- **PHEV** = Plug-in Hybrid Electric Vehicle

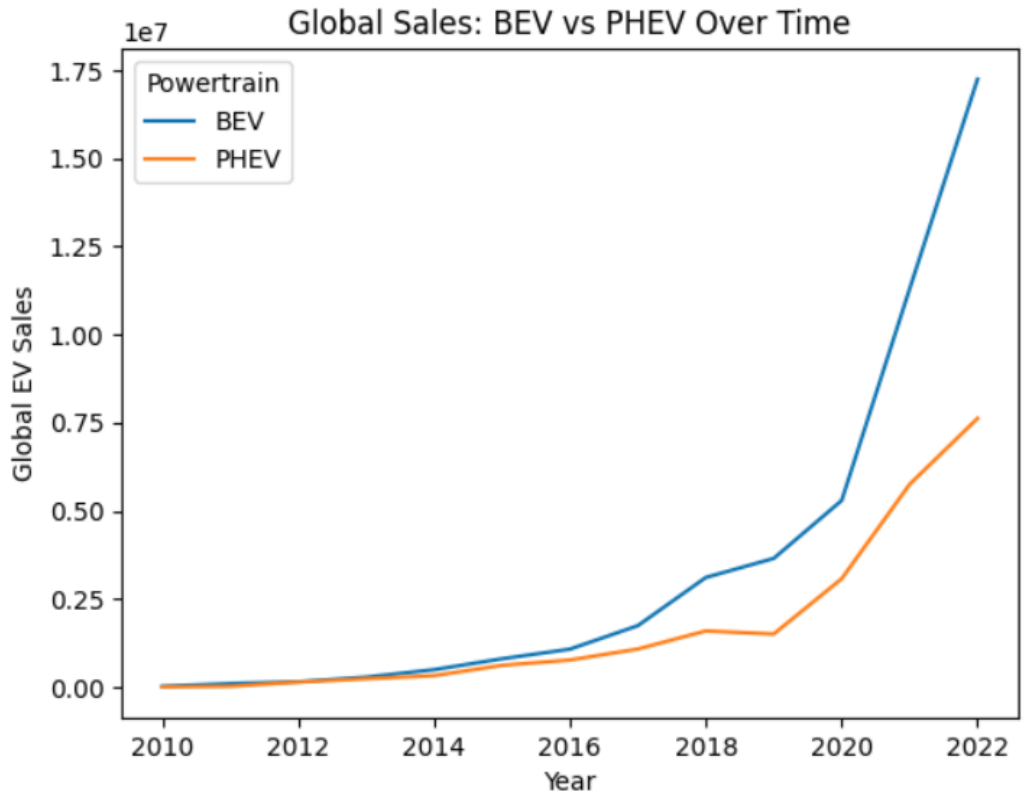


Figure 3: Global Sales: BEV vs PHEV Over Time

Finding

BEV vehicles have **outperformed PHEV since around 2015**, although both BEV and PHEV sales have been on an upward trend since about the same time.

US Market Sales

Looking at the global market sales is extremely important to understand the stage that EV as a whole is in as well as the direction it is headed in. But it is equally important to understand our own EV atmosphere here in the United States.

US Sales Trends

The US market shows an interesting pattern - a pretty steady gain from 2012-2020 (almost linear), with a large spike in 2018-2019 and a drop afterwards. Compared to the global data, this appears to be more linear in nature.

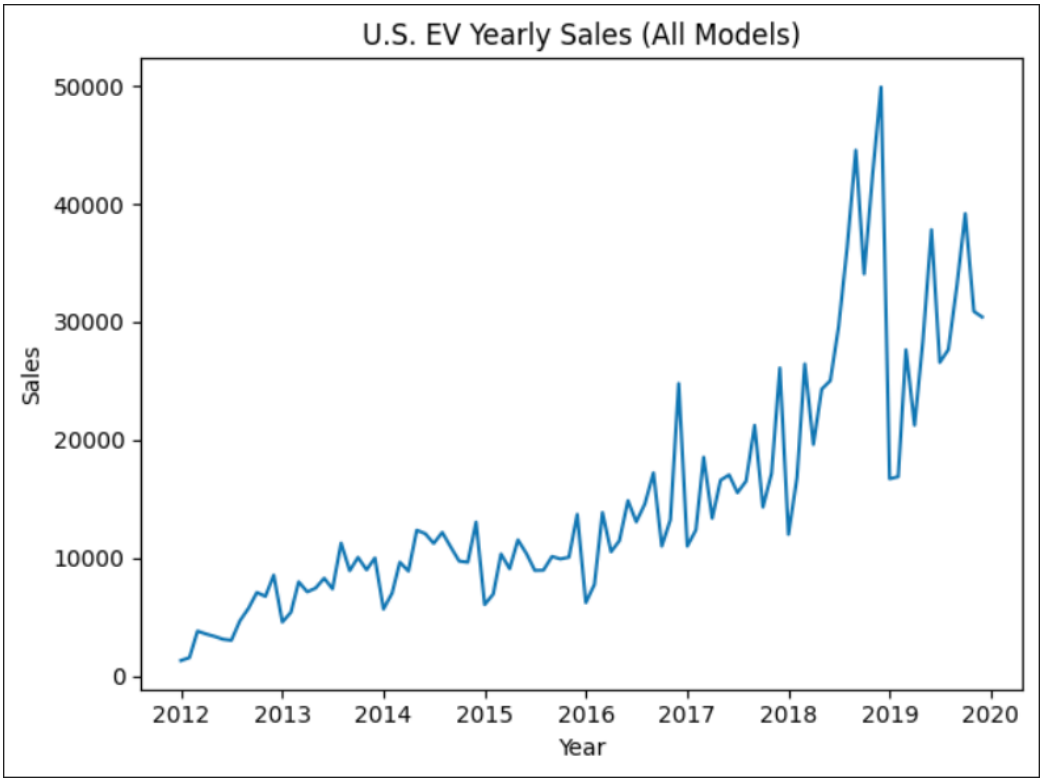


Figure 4: U.S. EV Yearly Sales (All Models)

Top EV Models in the US

The question then arises - what companies are causing the majority of these sales?

Top 10 EV Models by Total U.S. Sales (All Time):

1. **Tesla Model 3** - ˜300,000 sales
2. **Tesla Model S** - ˜150,000 sales
3. **Chevrolet Volt** - ˜145,000 sales
4. **Nissan Leaf** - ˜135,000 sales
5. **Tesla Model X** - ˜100,000 sales
6. **Toyota Prius Prime** - ˜85,000 sales
7. **Ford Fusion Energi** - ˜85,000 sales
8. **Chevrolet Bolt EV** - ˜70,000 sales
9. **Toyota Prius PHV** - ˜50,000 sales
10. **Ford C-Max Energi** - ˜50,000 sales

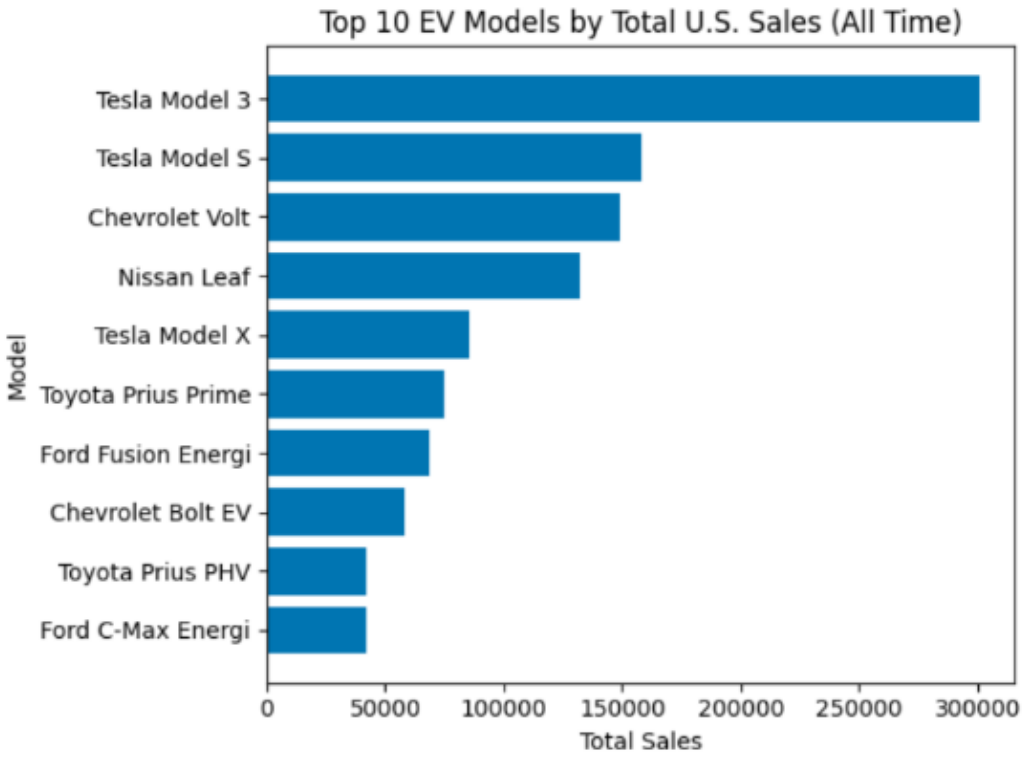


Figure 5: Top 10 EV Models by Total U.S. Sales (All Time)

Market Leader

As we might expect, the top models belong to Tesla, with the Chevy Volt following and then the Nissan after that. Compared to any other car, the **Tesla Model 3 has double the total sales**.

Top Manufacturers

When examining the top 8 makes by yearly sales, Tesla's dominance becomes even more apparent. The line plot shows how the massive peak in 2018-2019 and then drop afterwards was due to Tesla sales exploding and then dropping.

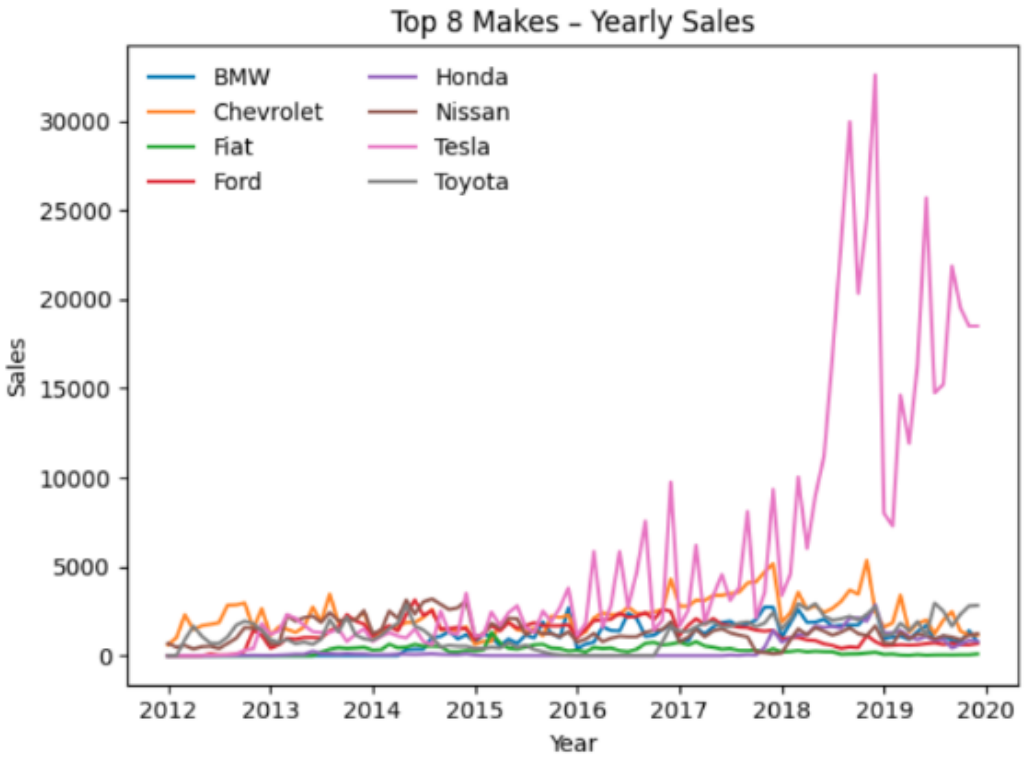


Figure 6: Top 8 Makes - Yearly Sales

Other notable manufacturers include:

- BMW
- Chevrolet
- Fiat
- Ford
- Honda
- Nissan
- Toyota

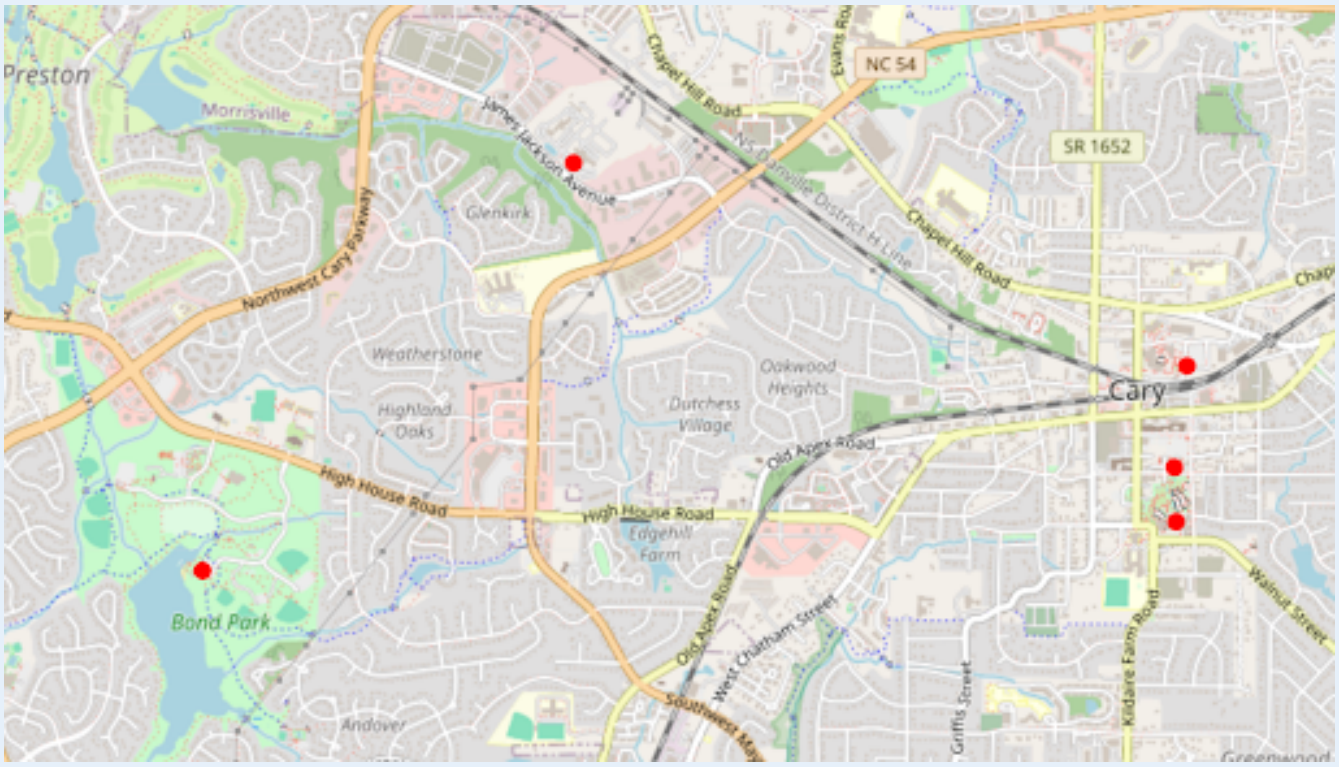
However, all these manufacturers' sales remain relatively flat compared to Tesla's dramatic growth curve.

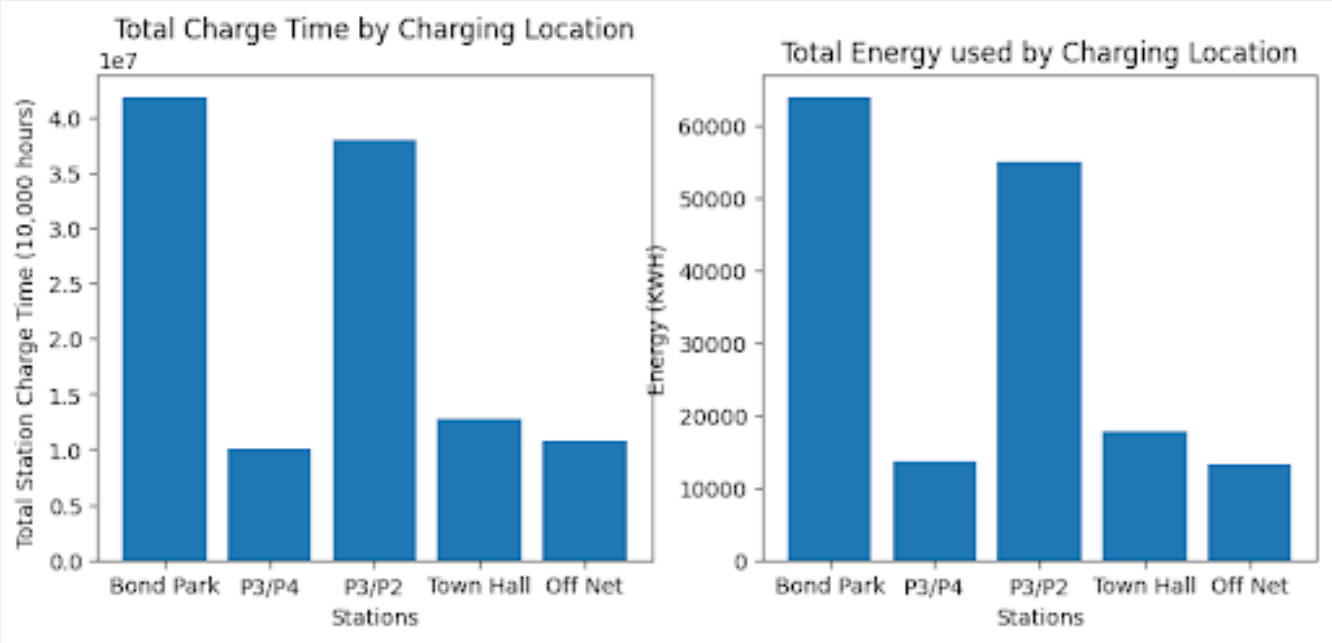
Let's Talk About Energy Infrastructure

This map shows electric vehicle charging stations in Cary, North Carolina. This visual would help users understand the charging stations available in the area. We can see the local locations of various charging stations in the area.

Each charging location depicted consisted of multiple individual stations. Note that the original dataset consisted of individual charge sessions within each station. I created a stations dataset to learn about which stations were getting the most charge. This dataset yielded 22 individual stations. I realized that most of these stations are geographically clustered and the best approach would be to combine close stations into

station hubs within the same longitude/latitude threshold. Upon looking at Google Maps, there are many stations spread out in the downtown area.



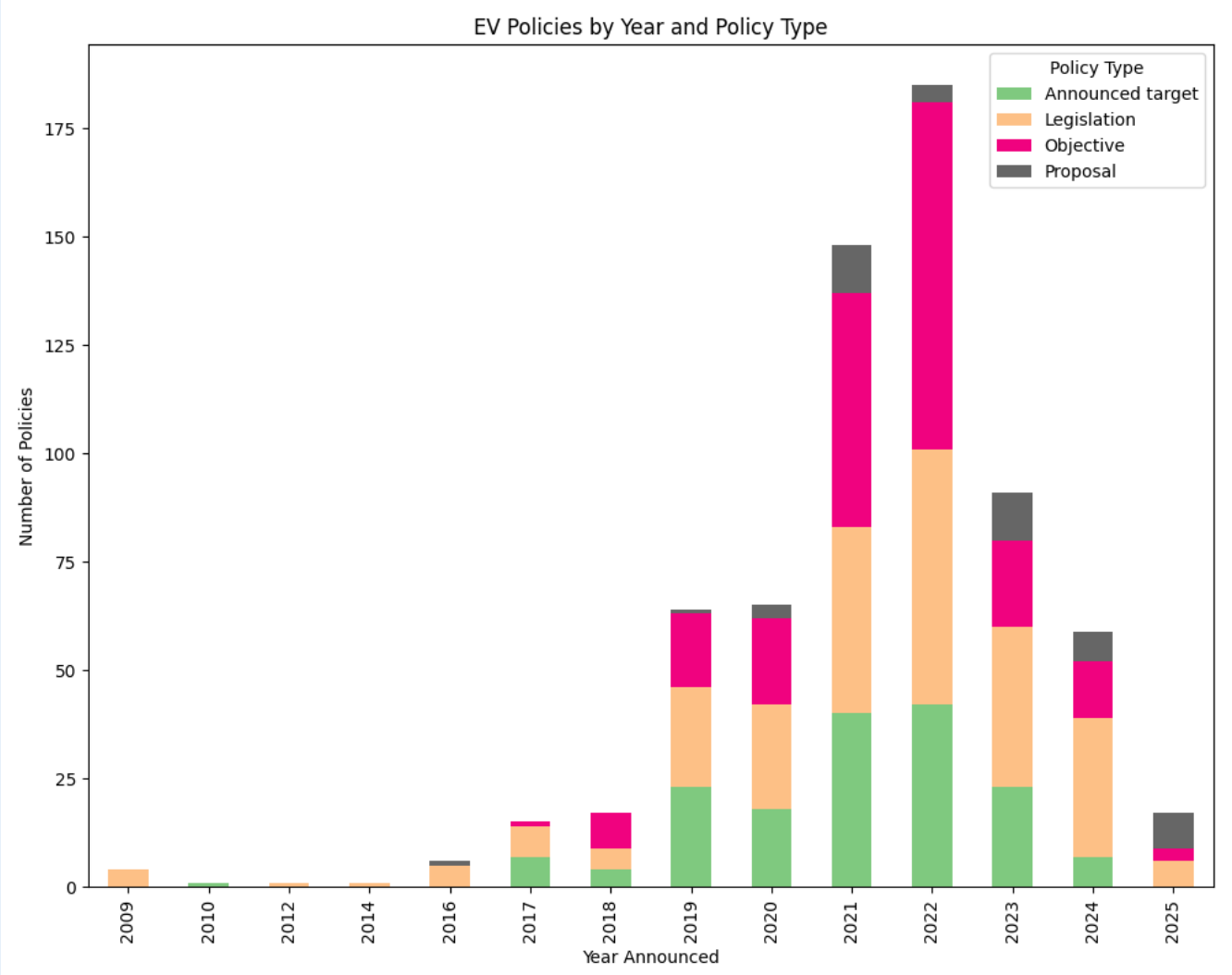


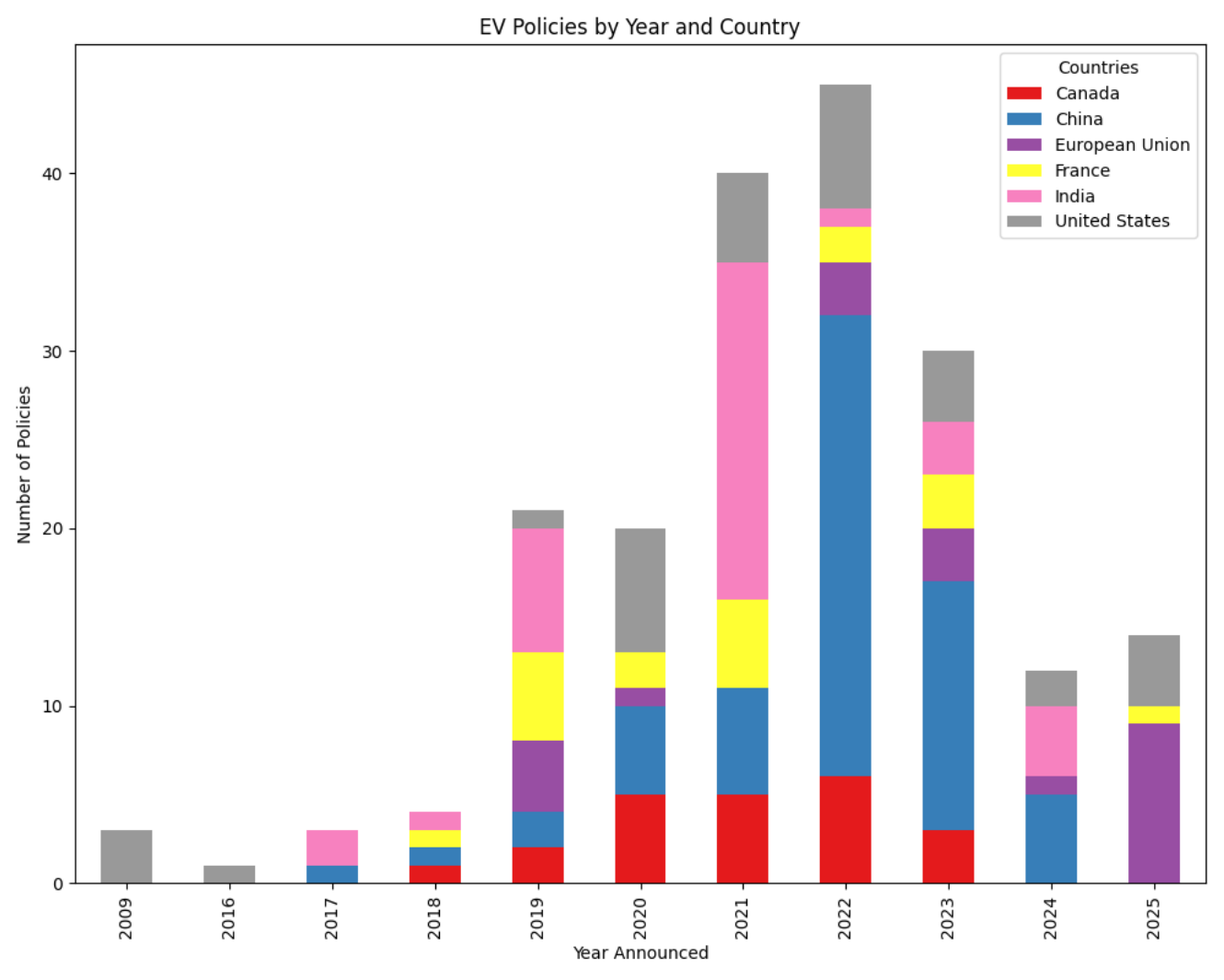
After I conducted my EDA of this dataset, I looked into my datasource to understand the time frame this data was collected. While the source did not note this, the earliest start date was January 2, 2018 and the latest was January 3, 2023. The above statistics describe total charge time and energy usage over 5 years. From the data source, not many details were shared about the sampling and data collection process.

Let's Talk About Policies

Below we have bar chart visualizations representing different aspects of EV policies sourced from the International Energy Agency (IEA).

Since 2009 there has been a noticeable upward trend overall, with certain China, the United States, and the European Union leading the way in implementing new policies. When observing a qualitative topic like EV adoption policies, numerical data limits our understanding of the nation's approach, priorities, and execution methods. We can, however, understand generally what types of policies are being passed each year and who is passing these policies. For example, the years 2021, 2022, and 2023 were large years for policy adoption. One hypothesis would be the global trend of government policies following the pandemic. India had a noticeable spurt of policies declared in the year 2021 similar to China in 2022. Announced target, legislative, and objective policies all reached all time highs in 2021 and 2022.





One of my first goals in this project was to find solid quantitative datasets that captured supply chain data for protected industries—especially rare earth minerals and batteries. These are two huge chokepoints in producing EVs, with labor-intensive processes and highly protected markets. Unfortunately, getting that kind of dataset isn't easy, and I wasn't successful this time around.

Instead, I ended up working more with the qualitative side of EVs—things like charging stations and policies. Policies, of course, aren't really "data points" in the numerical sense. With charging station data, one next step I'd love to try is building a time series to track the total volume and energy consumption of all stations combined, rather than just looking at distinct stations (which is where I got stuck at first).

On the policy side, I see an interesting opportunity to run policy descriptions through an embedding model to generate similarity scores. That way, we could group policies together, retrieve related ones, and get a stronger exploratory analysis of goals and actionable items. Or we could just read the policies ourselves.

The EV world is, in many ways, a fascinating conundrum. This is one of the most intricate, geopolitically sensitive supply chains out there. The hope is that EVs lead us to a sustainable future for transportation. Understanding the people who take us to that future is important.

Trying to untangle these problems with data has been both a challenge and an opportunity.

Conclusion

By looking more in depth into the US market, we can understand how our nation's EV progression looks, which companies are truly at the forefront, and where we might be going in the future. The data clearly shows **explosive growth in the EV sector**, with Tesla leading the charge in the US market while China dominates globally. As battery technology improves and infrastructure expands, we can expect this growth trajectory to continue, though perhaps with more competition as traditional automakers ramp up their EV offerings.