



A Comparative Study on the Policies and Sales of Electric Vehicles between China and the United States

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Abstract. Due to the development of the economy, people's environmental awareness and the responsibility of being a global citizen has significantly raised. Therefore, energy transition is taken into account to reduce carbon emission and achieve sustainable development. Among all these, the electrification of transportation is the most essential one. Electric vehicles (EV) are being actively produced and purchased in many countries. China and the United States are two countries who have representative market characteristics and government behaviors in EV promotion. In general, China currently takes the leading place, while in the USA, the EV industry is also developing fast. China has the world biggest EV market, taking nearly 60% of global EV sales, driven by a large consumer base and dominant industry players like BYD and CATL. China's rapid EV development focusing on affordability is further supported by a well-established manufacturing ecosystem, which benefits from low production costs, advanced technology, and a highly integrated supply chain. At the same time, the US dominated high-quality EV production with federal tax incentives and private investment. Furthermore, the US government is also acting efficiently to complete the domestic EV manufacturing sector. As for the future growing trend, China will probably focus on cost-effective production to further benefit on affordability. And for the US, innovation and tech-advancement might be the main target of EV market development.

Keywords: Electric Vehicles, Policies, Sales.

1 Introduction

Electric vehicles are rapidly developing nowadays. First introduced in the late 1800s, electric vehicles (EVs) have grown in popularity due to advancing technology and falling battery costs. With the support which gathered global efforts to reduce emissions, EV offers benefits like zero air pollution, lower maintenance, and a more comfortable driving experience. When powered by clean electricity, they help cut greenhouse gas emissions, helping to accelerate the progress of decarbonization of transportation. Nevertheless, the environmental impact which EVs are aiming to have heavily depends on renewable resources such as solar energy and wind, which may be relevant technical barriers and other challenges. Profoundly, EV also plays an essential role in future

power systems by storing energy and supporting grid stability. As renewable energy expands, EVs are set to transform both transportation and energy sectors [1].

The growth of EV is directly presented in the growth of sales volume. At present, the growth of EV sales is a undeniable fact globally, as reported by Kühnbach [2]. In China, EV sales reached over 3 million units in 2020. Later in 2022, over 6 million units of EVs were sold, taking nearly 60% of the global EV market share. More significantly, sales volume exceeds 8 million in 2023, and the positive growing trend is predicted to maintain in the future. Similar trends can be found in the USA. The EV sales grew from 328000 units in 2020 to 1.3 million in 2023, showing a trend of increasing according to Figure 1.

China's EV sales

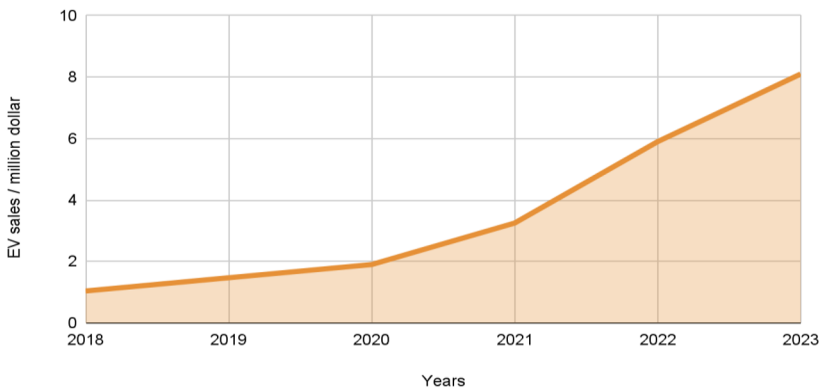


Fig. 1. China's EV sales growth from 2018 to 2023 (million dollar).

The rapid growth of the EV market is benefiting from the supportive policies in these two countries to a large extent. Chinese and US governments are both behaving energetically to contribute to the electrification of vehicles. Nevertheless, the policies in two countries do have both similarities and distinct varieties. Both countries' policies have included tax incentives and legislation which prioritizes the development of electric vehicles. Meanwhile, the differences are also distinct. Due to the imparity in the governing pattern, China's policies are basically centralized while those for the US contain policies introduced by the states and the federal [3].

According to previous studies, researchers have analyzed the impacts of public investment on the EV industry. Technology and market comparisons between China and the US have also been summarized. Based on the previous findings, this article focuses on the policies made by China's and the US's governments and the impacts caused by these interventions. The insights which will be presented in this research will help readers to gain better knowledge about the EV development guided by the government. For the investors, the information provided will help them better understand and chase the trend better on investing in businesses relating to EVs. Individuals can also know more about the current situation in the EV market to better decide their choice on transportation.

2 Policy Comparison

2.1 A Subsection Sample

The Chinese government provides strong support for the EV industry. According to previous research done by CSIS, the Chinese government support is calculated to be cumulatively total \$230.9 billion from 2009 to 2023. These national funding includes mainly five kinds of supportive measures: nationally approved buyer rebates, reduction in purchasing tax by 10%, public investment for infrastructure (primarily charging poles), R&D promotion for EV markets and the procurement of EVs by the government. Particularly, the buyer's rebate and sales tax exemption have accounted for the vast majority of support for the industry. Furthermore, in the Made in China 2025 plan, China has particularly emphasized the importance of EV development and shows a strong preference on providing substantial support for this industry. More significantly, on June 21st 2023, the Ministry of Finance, the State Taxation Administration and the Ministry of Industry and information Technology jointly issued the "Announcement on Continuing and Optimizing the Vehicle Purchase Tax Exemption Policy for New Energy Vehicles" to state that the purchase tax will be exempted if you buy a new EV between January 1st 2024 and December 31st 2025. For each new energy passenger vehicle, the exemption amount will not exceed 30,000 yuan [4]. For new EV purchased between January 1st, 2026, and December 31st, 2027, vehicle purchase tax will be levied at half the rate. For each new energy passenger vehicle. The tax reduction amount will be no more than 15,000 yuan. Despite these national movements, local policies also provide support to the development of the EV market. Shanghai, China, has introduced a fee waiver for the license plate of EVs, further reducing the cost of EV transition for households.

2.2 Policies in United States

The US government introduced subsidies, tax incentives and several other strategic policies and regulations to support the growth of EV. On August 16, 2022, the government signed the Inflation Reduction Act, bringing investment in transportation electrification and a remarkable shift in the future of transportation. This is perhaps the most significant legislation in US history to accelerate the growth of the EV industry. Many kinds of tax were introduced in the IRA for the promotion of EV selling. For instance, in 2022, individuals and businesses see a tax credit up to \$7500 each EV through 2032 due to the tax credits that have been introduced in IRA. Meanwhile, A 5 billion incentive on the construction of EV charging facilities was applied by the federal government. Later in 2023, a rise in the numbers of EV models available on the market can be seen, along with the rapid-improving charging facilities an increased number of electric medium- and heavy-duty vehicles, and accessional manufacturing of vehicles, batteries and charging equipment. Additional key methods in the law include support for EV manufacturing and the construction of supply chains, such as a \$60 million investment in the Diesel Emission Reduction Act program (DERA), a long-term extension of the Advanced Technology Vehicle Manufacturing Loan program and also a \$2 billion subsidy for the Domestic Manufacturing Conversion Grant program in order to accelerate the localization of EV manufacturing [5].

Furthermore, a report from EDF in 2023 indicated over \$120 billion in private investments, which required hiring domestic workers in the US to establish a domestic EV supply chain to encourage domestic production of EVs. The Bipartisan Infrastructure Law, came out in 2021, also allocated billions in tax credits, charging infrastructure expansion and domestic battery manufacturing incentives.

2.3 Comparisons

Both China and the United States have strong government support for the electrification of transportation. Governments are behaving actively to stimulate the growth of the market by providing several kinds of tax and making supportive legislations. Infrastructure construction is the sector that attracts great attention during the stimulation of transportation electrification. Both China's and the USA's government invest in EV facilities' establishment, for instance, the charging stations. Furthermore, manufacturing push is used in the promotion of the supply chain in both countries [6].

Meanwhile, there are also varieties between policies in these two countries. China's policies concentrate on subsidizing the industry chain in order to expand the EV market rapidly, which helps to form advantages in low cost and high technology. It's aimed at influencing the global EV market. Those policies in China are mainly high-centralized and dominated by the government bringing investment on infrastructure, for example the charging station, and manufacturing. For the US, federal policies mainly focus on market access and subsidies for the industry to reform the supply chain. In this case, the US is trying to reduce its reliance on China's EV export and promote the recovery of domestic manufacturing. US policies are quite decentralized and the funding mechanism there shows a public private partnership. Moreover, while the Chinese EV market mainly focuses on cost effective production, the USA concentrates on tech-innovation and automation.

3 Policy Impact

Due to the interconnected global world economy, the policies in China and USA not only influence the development of domestic EV market but also have impacts on the global EV market and the process of energy transition.

These policies have significant positive impacts on EV market growth. Consumers' motivation has been stimulated due to the lower price they are required to pay and the tax exemption. Also, the infrastructure relative to EV has been significantly improved to facilitate EV use. Market growth is also obvious evidence of progress. China's annual EV sales surpassing 8 million units in 2023, which is more than double the 2020 figure. A positive growing trend can also be detected in the US EV market. In 2024, U.S. EV sales reached 1.3 million units, reflecting a 7.3% increase from 2023. Competition in technology has been enforced. For instance, China is in the lead in LFP batteries and quick charging. And the US bets on solid state batteries and other next-generation technology.

Specifically, relative policies in America promote the innovation of technologies and boost the motivation of updating current techniques. They are mainly involved in satisfying the demand of the US market and perfecting the construction of relevant infrastructure such as charging stations. An affordable charge facility is essential for the EVs adoption [3]. This indicates that these policies which aim in achieving improvement in infrastructure can be really effective in promotion of EV use. Progress in the US also stimulates the structure of the global supply chain. Job opportunities have also been

increased due to the application of policies, reducing domestic unemployment in America [4].

In China, due to the driving effect brought by the applying policies, the enlargement of the market scale and the competitiveness of the EV industry has been effectively enforced. They have also made a difference in promoting innovation, just like that in the US, and forming a standardized leadership in the EV market, raising China's position in global electric vehicle supply chain. All of these accelerate the green transformation and upgrading of energy [7].

However, there are still some negative impacts caused by the policies. Most typically, the government expenditure has hugely increased in order to support the growth of the EV industry, leading to a risk of experiencing a budget deficit in both countries. Furthermore, international competition on EV is fierce, countries may build up trade barriers to reduce the threats for domestic EV business. This can impede the progress of EV promotion. Particularly, as the policies tend to construct independent supply chains in the USA, this method may gradually evolve into protectionism, if they are not carefully applied on a reasonable scale. The USA plays an essential role in world trade; thus, their behaviour can directly influence the situation of the global market. The cost of supply may therefore rise, leading to a reduction in productivity. There may therefore be some imbalances in policies and fluctuations in EV market, which will largely weaken the positive effects that have been brought. For China, there are potential risks for over-reliance on subsidies and imbalances in regions on infrastructure establishment, during the promotion of transition.

4 Chances and Challenges

The development of EV in China and the US both face opportunities and barriers.

4.1 Opportunities and Challenges Faced by China

China has the world's biggest EV market, containing a dramatic domestic demand for electric vehicles. China's government also set a goal that the sales of NEV in 2035 will be 50% of the annual total car sales. The completed supply chain also provides benefits. 70% of the dynamic battery production is in China, which contributes to the independence of China's EV industry. The scaled economy brings about cost advantages of production, making China the country with the world lowest EV price. The potential for exports to expand the EV market cannot be ignored. In 2023, China's EV export increased by 67%, focusing on the market in Southeast Asia, Latin America and the Middle East [8].

However, trade barriers raised by European countries and America pose challenges on China's EV market. The EU imposes tariff on China's EV which can be as high as 38.1% and IRA in the US limits the battery supply chain from China to enter American market. Moreover, the large demographic figure makes it hard to ensure mass electrification of transportation as the policies can be hard to effect in all the areas especially for those remote places.

4.2 Opportunities and Challenges Faced by United States

The policies imposed by the US government are really powerful, particularly for the IRA. The domestic supply chain completion is observably accelerated. Due to the supportive policies and optimistic development prospects, some battery producers are attracted to open factories in the US, such as LG, SK and Panasonic, further benefiting the domestic supply chain [9]. Technology advancement is the biggest advantage of the US EV market. Tesla leads the world in auto-driving technology while the NVIDIA Corporation's AI chip is at the front edge globally. The US also dominates the high-end market. For example, the profits earned by each Tesla Model Y are more than twice a BYD EV [10].

Nevertheless, the supply chain in US shows a reliance on China. Also, IRA has limited the usage of batteries produced in China, but the key resources still rely on the production in China. Also, the cost of domestic production really high (about 45,000 to 60,000 dollars each) due to the high cost of labor and technology, so the price may not be really competitive compared to importing EVs.

5 Conclusion

The differences in policies in China and the US leads to the varieties in market situations. While both two countries' governments are supportive in promoting the development, China shows a preference on cost-effective production and the US spares more effort on domestic supply chain completion and tech-innovation. The differences in national conditions and consumer base set up a varied consumer target between Chinese and American EV firms. And the design of subsidizing system directly shapes the market structure, and the differences in the paths taken by China and the US reflect the varying priorities of policy goals.

From the future perspective, both China and the USA will continue to push the electrification of transportation in order to reduce the emission of carbon, save fossil fuel and therefore benefit the environment and achieve sustainable development. While benefiting its comprehensive facilities and manufacturing chain, low price will be a core advantage for China's EVs to compete with others. The large domestic demand makes China much easier to gain more market share globally and to promote the sales of EV. In this case, China will focus on consolidating its supply chain dominance, exporting affordable EVs, and advancing relevant technology. As for the U.S., the cutting-edge technology is the key factor of their EV advancement. Despite the dominant firms like Tesla, there are also some traditional car manufacturers (such as GM and Ford) and some new manufacturers (such as Rivian and Lucid) getting involved in the promotion of EVs. Generally, it will prioritize reshoring manufacturing, leveraging innovation, and navigating policy headwinds.

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