



Trade Policies and Competitiveness in the Electric Vehicle Market

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Abstract. The global electric vehicle (EV) industry is growing very fast, and China and the United States are the two most important players. This paper focuses on the policies, market systems, and industrial strength that shape EV development in both countries. China follows a centralized, long-term plan. The government sets national goals, assigns production targets, and gives local support to factories and charging projects. This helps build a full supply chain—from minerals and batteries to final assembly—and keeps costs down. As a result, China can scale production quickly and sell cars at lower prices. The United States takes a different path. It relies on federal tax credits, funding for chargers, and state rules, which makes the system more divided. Some states push EVs faster than others. Even so, the U.S. is strong in new ideas, branding, and advanced tech like self-driving software and smart vehicle systems. Companies such as Tesla and newer startups benefit from venture capital and supportive policies that reward innovation. Because of these differences, China now leads in mass manufacturing, battery output, and exports, while the U.S. leads in high-end technology and design. Each model has clear strengths, and understanding both helps explain where the global EV race is headed.

Keywords: Competitive Analysis; Trade Policies; Electric Vehicle Market

1 Introduction

The EV industry has grown very fast. In 2023, global EV sales reached about 14 million units. This was 35% higher than the year before and made up 18% of all new passenger car sales worldwide [1]. China sold about 8.1 million EVs in the same year. EVs were 48% of all new cars in its market [2]. This strong result came from more than ten years of steady policy support and a large, low-cost manufacturing base [3]. The United States sold about 1.4 million EVs in 2023. That was just over 9% of its market [2]. The U.S. carmakers like Tesla lead in innovation, but the national EV system is still behind in charging stations, battery production, and price. These differences in sales and market systems show the deeper policy gap between the two countries.

China and the United States manage EV policy in very different ways. China uses a centralized model with long-term planning. The United States uses a decentralized model with incentives. It depends more on market signals and decisions made at the

state level [3]. These two ways give clear examples of how governments can shape the growth and direction of the EV industry.

2 Electric Vehicle Market Overview

2.1 China's Electric Vehicle Market Overview

China's EV industry has followed top-down national plans for more than ten years. One of the first steps was the 2009 program called "Ten Cities, Thousand Vehicles". The main policy today is the New Energy Vehicle Industry Development Plan (2021–2035), released by the State Council. This 15-year plan sets national goals for EVs: 20% of new car sales by 2025 and 40% by 2030. It also supports full electrification of public buses [3]. The plan asks for better battery performance, higher safety, and smarter driving systems. It also works to build strong global firms.

A key rule is the Dual Credit Policy, which started in 2018. It combines fuel economy rules with EV production requirements. Automakers must earn credits by selling new energy vehicles (NEVs) or they will be fined. For every gas car sold, they must balance emissions by making a set number of EVs, plug-in hybrids, or hydrogen cars. This is a strict requirement that does not change with market demand. Because of this rule, even foreign firms like Tesla must follow the quota if they want to sell in China [4].

In addition to national mandates, Chinese local governments offer differentiated support. Municipalities like Shanghai provide free license plates for EVs, while cities like Shenzhen subsidize charging infrastructure construction. In 2024–2025, provinces such as Guangdong and Jiangsu launched additional incentives for EVs using domestic operating systems, such as those integrated with Huawei's HarmonyOS, to accelerate digital convergence. This vertical coordination—from the State Council to local transport bureaus—ensures policy coherence and accelerates deployment, particularly for buses, taxis, and logistics fleets.

2.2 The U.S.'s Electric Vehicle Market Overview

By contrast, the United States governs EV policy through a patchwork of federal tax incentives, environmental regulations, and state-specific mandates. At the federal level, the Inflation Reduction Act (IRA) of 2022 represents the single largest EV-focused policy intervention to date. It restructured the Clean Vehicle Credit to offer up to \$7,500 for new EVs and \$4,000 for used EVs, contingent on strict eligibility criteria. These include North American final assembly, price caps (\$55,000 for sedans, \$80,000 for SUVs/trucks), and domestic sourcing of battery materials and components [5]. The goal is to reduce dependence on Chinese supply chains and incentivize domestic investment.

The Bipartisan Infrastructure Law (BIL), passed in 2021, further allocates \$7.5 billion for the construction of a nationwide EV charging network, targeting 500,000 chargers by 2030 [6]. However, rollout has been slow: as of mid-2025, fewer than 400 federally funded charging ports had become operational, despite over \$635 million in grants distributed to 24 states. The federal government attributes delay to permitting

issues and contractor bottlenecks, while critics point to misalignment between state readiness and federal criteria.

The U.S. Environmental Protection Agency (EPA) has also proposed new greenhouse gas emissions standards for passenger vehicles covering model years 2027 through 2032. These would effectively require 56% of all new car sales by 2032 to be EVs, aligning with the Biden administration's goal of reaching 50% EV penetration by 2030 [7]. Yet these rules face legal challenges and could be overturned under a different political administration.

In addition to federal policy, state rules are also very important. California's Advanced Clean Cars II law requires that 100% of new car sales be zero-emission by 2035, with smaller goals set for each year before that. Other states, like New York, Washington, and Massachusetts, have made the same rule. Some states, like Texas and Mississippi, do the opposite. They give no support for EV buyers and have added extra fees for EV registration [8]. This creates a mixed policy map across the country. For automakers and charging companies, it makes planning harder.

3 Comparative Analysis of the EV Markets in China and the United States

The differences between the two countries are very clear. In China, automakers follow one set of national rules with steady quotas and reliable support. Central and local governments work closely together. In the United States, rules are not the same everywhere. Subsidy rules also change based on the type of car, the place where it was built, the origin of the battery, and sometimes the politics of the moment. This leads to a less stable market that makes companies more careful with investment, even while more buyers show interest in EVs. China's system focuses on large-scale production, stable rules, and clear long-term goals. The U.S. system focuses on competition, new technology, and lower cost for consumers. Both have strong points. China can grow the market quickly, while the U.S. has supported new high-tech firms like Tesla. Both also face risks. China may build too much and waste resources because of strict top-down rules. The U.S. may fall behind because of weak coordination and political change.

To study the strength of each EV industry, it is important to look at several areas: production capacity, battery supply, costs, technology, and exports. Both countries have made progress, but China now leads in scale and global reach. The U.S. is strong in innovation and brand value, but its growth is slowed by divided policies, weak infrastructure, and dependence on imports [9]. By 2024, China produced approximately 58% of the world's electric vehicles and more than 75% of the global battery supply, according to the International Energy Agency (IEA). The country's dominance is a direct result of its long-standing national strategy to develop a vertically integrated EV industry [10]. Chinese firms control the extraction, refining, and processing of critical raw materials such as lithium, cobalt, and nickel. For example, Chinese companies process more than 65% of global lithium and over 70% of cobalt, both essential for lithium-ion batteries.

The economies of scale China have achieved are immense. Battery pack prices in China fell below \$100 per kilowatt-hour (kWh) in 2023, compared to a global average of about \$139/kWh, as reported by Bloomberg NEF [9]. Cheaper batteries translate directly into lower vehicle prices: in China, over 50% of EVs sold in 2024 were priced below comparable gasoline vehicles, making them affordable to mass consumers without relying heavily on subsidies. BYD's Dolphin and Wuling's Hong Guang Mini EV are examples of successful low-cost models that cater to working-class consumers—vehicles priced between \$5,000 and \$15,000. China's industrial competitiveness is also evident in its infrastructure. As of late 2024, China had deployed over 2.6 million public EV chargers, including over 1 million DC fast chargers, far surpassing the U.S., which had just over 206,000 public charging ports [10]. China's ability to coordinate public and private investment in infrastructure—especially through state-owned utilities and local governments—accelerates adoption and supports supply chain efficiency.

In contrast, the U.S. has been slower to build industrial scale, but maintains a strong competitive edge in innovation and premium EV technology. Tesla, headquartered in California, remains the global leader in EV design, autonomous driving software, and high-performance electric drivetrains. The company shipped over 1.8 million vehicles in 2023 and operates Gigafactories in multiple countries, including one in Shanghai [11]. However, Tesla remains a partial exception in a market where most U.S. automakers are still transitioning from internal combustion to EV platforms. The Inflation Reduction Act (IRA) has triggered a wave of industrial investment in U.S.-based EV and battery production. According to the U.S. Department of Energy, over \$100 billion in private investment has been announced since 2022 for new battery plants, mineral processing facilities, and EV assembly lines. Notable examples include Ford's Blue Oval SK battery plants in Kentucky and Tennessee, GM's Ultium battery joint venture with LG Energy, and Panasonic's \$4 billion factory in Kansas. However, many of these facilities are still under construction or in early production stages, meaning the full benefits won't be realized until after 2026.

One major weakness in U.S. competitiveness is its reliance on international supply chains for critical minerals. As of 2023, the U.S. imported over 75% of its lithium and nearly all of its cobalt, much of which originates from geopolitical hotspots like the Democratic Republic of Congo or is refined in China. To counter this, the Biden administration has launched the Federal Strategy to Ensure Secure and Reliable Supplies of Critical Minerals, which allocates funding for domestic mining and recycling projects. Still, the U.S. lacks the vertical integration seen in China, resulting in higher production costs and strategic vulnerability. Another barrier is infrastructure fragmentation. Despite federal targets for 500,000 chargers by 2030, implementation has been slow and uneven [11]. Moreover, the distribution of charging stations is regionally unequal: California hosts over 30% of all U.S. chargers, while large rural states remain underserved [6]. This regional gap impairs the scalability of EV adoption and limits the competitiveness of U.S. automakers outside coastal urban markets.

Export competitiveness is another differentiator. In 2023, China became the world's largest auto exporter, shipping over 4.1 million vehicles, including more than 1.2 million EVs, according to the China Association of Automobile Manufacturers (CAAM) [10]. Europe is now a major destination for Chinese EVs, including models from BYD,

NIO, and MG (owned by SAIC Motor). The low cost and improved quality of these exports have made Chinese automakers increasingly competitive in developed markets. In contrast, the U.S. remains a net importer of EVs and exports only a small share of domestically produced EVs, most of which are high-end models from Tesla .

Despite its innovation leadership, the U.S. EV industry faces higher labor costs, inconsistent policy support, and longer supply chains, all of which constrain competitiveness. The fragmented policy environment, along with uncertain continuation of IRA benefits beyond 2025, discourages long-term investment planning [5]. If Congress fails to renew key provisions of the IRA, several battery and assembly projects could stall or be canceled. Furthermore, the expiration of the "leased EV loophole" in 2025 may eliminate a key channel through which foreign EVs currently access U.S. tax credits, potentially affecting pricing competitiveness.

The United States has set a goal of achieving 50% EV sales share by 2030. This is backed by executive orders, federal tax incentives, and major investments in public charging infrastructure. However, the pace of adoption will depend heavily on whether key provisions—such as the Clean Vehicle Credit—remain in place beyond 2025 [5]. Infrastructure bottlenecks, affordability concerns, and reliance on foreign battery supply chains are also pressing issues. In both countries, achieving these goals will require expanding charging networks and securing critical mineral supply chains, and ensuring that policy remains consistent over the long term. Without these elements, even the most ambitious targets may be difficult to reach.

In summary, China has established itself as the global EV manufacturing hub through centralized planning, economies of scale, and a vertically integrated supply chain. The U.S. has made significant strides in innovation and investment but remains years behind in scale, infrastructure, and cost competitiveness [9]. To close the gap, the U.S. must secure its critical mineral supply chains, accelerate infrastructure build-out, and maintain policy consistency to encourage industrial investment. Without these structural reforms, the U.S. risks losing long-term competitiveness in the most important industrial transition of the 21st century. Looking forward, both China and the United States have set ambitious targets for the EV transition. China aims for 40% of new car sales to be electric by 2030. This goal is reinforced by ongoing government investment in battery research, electric buses, and a rapidly expanding nationwide charging network. Yet China's progress is not without complications. Trade tensions with major partners have introduced uncertainty, while concerns about industrial overcapacity raise questions about the long-term stability of growth. At the same time, subsidies that once fueled domestic adoption are scheduled to taper off after 2025, forcing companies to compete on cost and innovation rather than state support. These pressures have prompted Chinese automakers to push aggressively into international markets, which in turn highlights a larger issue: how will existing regulatory frameworks adapt to a surge of foreign electric vehicles.

4 Conclusion

China and the United States represent two distinct pathways in the global shift toward electric mobility. China's approach has been highly centralized, relying on long-term industrial planning, national production targets, and coordinated investment across the supply chain. This consistency has produced rapid growth in battery manufacturing, vehicle output, and charging networks. By contrast, the United States has built its EV sector through a more decentralized framework, where federal tax incentives, infrastructure programs, and state-level rules intersect with private investment. The result is a system that may appear fragmented, yet it allows flexibility and room for entrepreneurial innovation.

The strengths of each approach are evident. China demonstrates how scale can be achieved when policy is stable and nationwide objectives are clear. Automakers benefit from predictable regulations and can expand with less financial uncertainty. At the same time, the United States shows the power of innovation-driven growth. Companies such as Tesla, Rivian, and General Motors have pioneered technologies in autonomous driving, software integration, and advanced branding. These successes highlight the benefits of a market that rewards creativity and risk-taking. Yet no system is without its challenges. China risks creating overcapacity, where production exceeds demand and efficiency suffers. Reliance on top-down mandates may also discourage competition and limit experimentation. The United States, on the other hand, faces obstacles tied to political cycles and policy inconsistency. Subsidy rules vary by state, supply chains remain dependent on imports, and infrastructure expansion has often lagged behind consumer demand. Both countries, despite their progress, must contend with the tension between rapid adoption and long-term sustainability.

This comparison raises an important question: is there a model that can balance stability with innovation? A hybrid strategy offers one possible answer. Borrowing from China, governments could provide consistent policy signals and long-term infrastructure commitments. Drawing from the U.S., they could also encourage technological breakthroughs and entrepreneurial energy. Together, these elements could form a system that grows quickly but remains adaptable to future needs. The broader global context makes this lesson even more urgent. Countries across Europe, Asia, and Africa are also trying to expand EV adoption, yet many lack the industrial base of China or the venture capital networks of the United States. For them, the most valuable lesson may be the importance of policy stability combined with openness to innovation. Without reliable rules and funding, investment slows; without innovation, adoption becomes expensive and inefficient.

As the EV transition accelerates, its impact will reach far beyond the auto industry. It will reshape energy demand, alter global trade flows, and create new forms of employment. The direction of this transition will not be set by a single country. Instead, it will depend on how leading nations choose to guide their industries, and whether they can find common ground on trade, standards, and technology sharing. What remains clear is that both China and the United States, despite their differences, hold critical pieces of the puzzle. By learning from both, the global community can design strategies that are ambitious, balanced, and sustainable.

References

1. Bloomberg NEF. Electric Vehicle Outlook 2024. <https://www.bloomberg.com/professional/insights/webinar/bloombergnefs-electric-vehicle-outlook-2024/>, 2024/6/26.
2. Gomes, A. D. P.; Pauls, R.; ten Brink, T. Industrial policy and the creation of the electric vehicles market in China: demand structure, sectoral complementarities and policy coordination. *Cambridge Journal of Economics*, 47(1), 45–66 (2023).
3. Mekky, M. F.; Collins, A. R. The impact of state policies on electric vehicle adoption: A panel data analysis. *Renewable and Sustainable Energy Reviews*, 191, 114014 (2024).
4. Yao, X.; Ma, S.; Bai, Y.; Jia, N. When are new energy vehicle incentives effective? Empirical evidence from 88 pilot cities in China. *Transportation Research Part A: Policy and Practice*, 165, 207–224 (2022).
5. State Council of China. New Energy Vehicle Industry Development Plan (2021–2035). <https://english.www.gov.cn/policies/latestreleases/>, 2020/11/02.
6. Wu, F.; Li, P.; Dong, X.; Lu, Y. Exploring the effectiveness of China's dual credit policy in a differentiated automobile market when some consumers are environmentally aware. *Energy Economics*, 111, 106077 (2022).
7. Zhao, X.; Li, X.; Jiao, D.; Mao, Y.; Sun, J.; Liu, G. Policy incentives and electric vehicle adoption in China: From a perspective of policy mixes. *Transportation Research Part A: Policy and Practice*, 190, 104235 (2024).
8. Chen, Y.; Dai, X.; Fu, P.; Luo, G.; Shi, P. A review of China's automotive industry policy: Recent developments and future trends. *Journal of Traffic and Transportation Engineering (English Edition)*, 11(5), 867–895 (2024).
9. Abdul Qadir, S., Ahmad, F., Al-Wahedi, A. M. A. B., Iqbal, A., Ali, A. Navigating the complex realities of electric vehicle adoption: A comprehensive study of government strategies, policies, and incentives. *Energy Strategy Reviews*, 53, 101379 (2024).
10. U.S. Department of Energy; National Renewable Energy Laboratory. The 2030 National Charging Network: Estimating U.S. Light-Duty Demand for Electric Vehicle Charging Infrastructure. <https://docs.nrel.gov/docs/fy23osti/85654.pdf>, 2023/6/1.
11. U.S. Environmental Protection Agency (EPA). Proposed Rule: Multi-Pollutant Emissions Standards for Model Years 2027 and Later Light- and Medium-Duty Vehicles. <https://www.epa.gov/regulations-emissions-vehicles-and-engines/proposed-rule-multi-pollutant-emissions-standards-model>, 2023/4/12.

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