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How collaboration with China can revitalize U.S. automotive innovation

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Abstract:

This article proposes that strategic collaboration with China can revitalize American competitiveness in the plug-in electric vehicle (PEV) industry. Chinese manufacturers have established a commanding lead in electric vehicle technology, offering vehicles with superior range performance at significantly lower prices, with China's PEV market reaching 12.86 million sales (46.7% of new vehicles) in 2024 compared to just 1.56 million (9.8%) in the U.S. Comparisons of historically successful engagement with foreign competition, such as Tesla's entry into China, demonstrate that collaboration rather than isolation can yield mutual benefits. The paper calls for a policy framework that takes effective security solutions while pursuing strategic collaboration rather than isolation to accelerate innovation. This approach presents a pragmatic pathway to maintain global competitiveness while addressing climate goals and avoiding the risk of the U.S. becoming an isolated "island of tailpipes" in a rapidly electrifying global automotive market.

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Main Text:

The U.S. stands at a crossroads in its approach to China's rapidly advancing plug-in electric vehicle (PEV) industry, one that will shape not only domestic economic competition but also global climate goals, the future of automotive innovation, and the principles that will govern international trade in an era of rapid technological transformation. While current protectionist U.S. policies may temporarily benefit the Big Three U.S. automakers, they can also stifle competitive pressure that drives innovation. The European Union offers an example of how a more collaborative approach can lead to important local investments that accelerate PEV development. Rather than retreating behind protectionist barriers, U.S. policymakers and industry leaders should pursue strategic collaboration that leverages China's manufacturing scale and cost advantages while preserving U.S. strengths in advanced research.

Ford chief executive officer Jim Farley recently provided stark evidence of the competitive gap with China after personally evaluating a Xiaomi SU7—a Chinese battery electric vehicle (BEV) priced at around $30,000 with a driving range of over 450 miles (the PEV category includes both BEVs and plug-in hybrid vehicles, or PHEVs) (*1*). The verdict was unambiguous: Chinese manufacturers are now producing superior electric vehicles at considerably lower price points than U.S. manufacturers.

Market data unequivocally support this conclusion. While Chinese manufacturers offer numerous options under $40,000 with competitive driving ranges of 300 to 450 miles, U.S. offerings remain concentrated in premium segments with considerably higher pricing for comparable ranges (see the figure). Chinese BEV makers are also pushing the frontier of achievable charging speeds and driving ranges on a single charge. Both BYD and CATL (Contemporary Amperex Technology Co., Limited) have produced batteries capable of charging at rates as high as 1 MW, translating to 250 to 325 miles of range in just 5 minutes (*2*). The highest-range BEV in China, the Zeekr 001, delivers 645 miles at $56,426, while the sole U.S. BEV exceeding 500 miles—the Lucid Air—costs $169,000 for 517 miles (*3*). In 2024, China had 52 BEV models with ranges above 400 miles; the U.S. had 4, all priced above $75,000 (*3*).

With high driving ranges, rapid charging speeds, and low prices, BEVs are quickly becoming the dominant vehicle technology in China, with PEV sales reaching 12.86 million in 2024 (46.7% of new vehicle sales, see Fig. S1) compared to just 1.56 million (9.8%) in the U.S. (*3*). China has also emerged as a net vehicle exporter, exporting 1.28 million PEVs in 2024—nearly as much as domestic U.S. PEV sales (*3*).

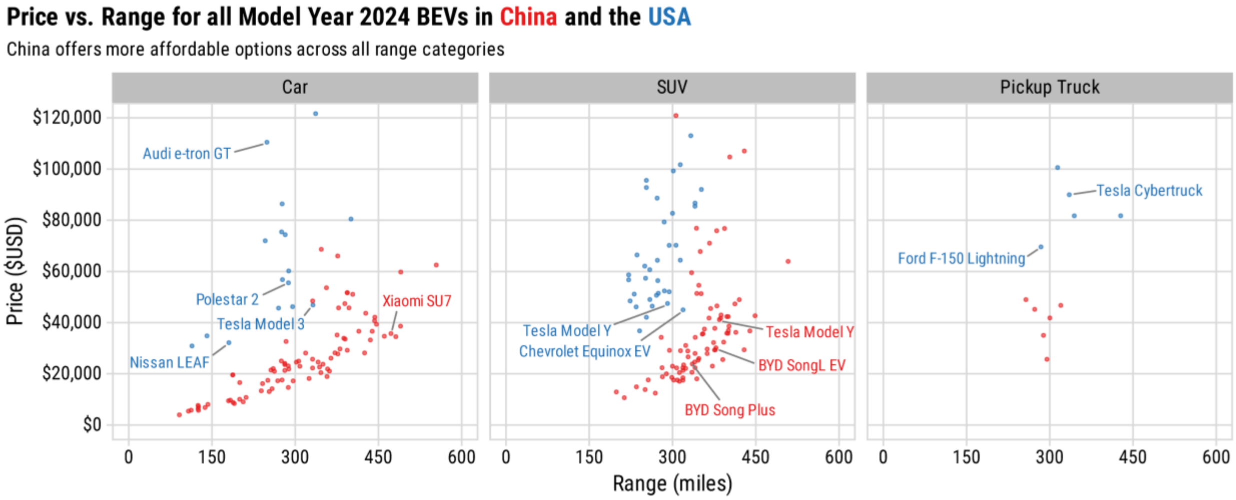

Fig. 1. Price versus driving range for model year 2024 BEVs available in the U.S. and China. Chinese manufacturers offer numerous BEVs at more affordable prices with higher driving ranges on a single charge while U.S. offerings remain concentrated in premium segments with significantly higher pricing for comparable range performance. Data include BEV specifications collected from autocango.com for China (*4*) and carsheet.io for the U.S. (*5*).

The U.S. auto industry faces a concerning future, with implications that could reverberate throughout the U.S. economy. Protectionist policies may not only stifle domestic innovation, they also cannot prevent losses abroad where Chinese PEV manufacturers are rapidly gaining ground. General Motors' (GM) trajectory illustrates this challenge: once a leading manufacturer in China, the company finished 2024 ranked 16th in sales, going from highly profitable (25% margins) to losing money on every sale (-20.5% margins) and acknowledging that its Chinese operations are worth \$5 billion less than previously estimated (*6*). The U.S. risks becoming an "island of tailpipes," isolated from global automotive innovation and dependent on domestic sport utility vehicle and truck sales while forfeiting historical global profits derived from international markets. The employment impacts could be substantial, as the auto industry supports an estimated 10.1 million U.S. jobs (about 5% of private-sector employment) and generates \$730 billion in annual paychecks (*7*).

The path to revitalizing the American auto industry requires strategic engagement with the forces reshaping the global automotive landscape through carefully structured agreements that address security concerns, protect worker interests, and ensure reciprocity in market access. The success of such engagement depends on the willingness of China to collaborate on more balanced terms than in previous decades and the willingness of the U.S. to allow innovative Chinese firms market access while managing risks instead of imposing wholesale restrictions.

HOW CHINA GOT AHEAD

China's current leadership in PEVs is the result of a long history of factors, not the least of which is a 20-year policy strategy that included forced technology transfer requirements for foreign automakers, preferential treatment for domestic battery suppliers, and an estimated $230 billion in subsidies between 2009 and 2023 (*8*). Local level policies were also critical; in many Chinese cities, obtaining a license plate for an internal combustion engine vehicle (ICEV) involves lengthy wait times and high costs, while PEV plates are often free and immediately available. PEV drivers also enjoy access to many parts of cities where ICEVs face restrictions. Finally, Chinese firms have made substantial investments into production innovations and supply chain development (*9*), scaling up critical material processing and battery manufacturing (*10*) while pioneering automation techniques that have reduced vehicle-development time to 18 months—nearly half that of typical incumbents.

Despite pioneering electric vehicle development with GM's EV1 in 1996 and Tesla's innovations in the 2000s, the U.S. has struggled to develop a competitive PEV industry to counter Chinese market dominance. Policy inconsistency made it difficult for automakers to justify large investments into building a comprehensive PEV supply chain (*11*). Consumer preferences are also important, with research showing that U.S consumers are on average less willing to adopt a PEV than their Chinese counterparts (*12*). Electricity rates are also considerably lower relative to gasoline prices in China compared to in the U.S., making the operational cost advantages of PEVs more pronounced in China. The U.S. also has fewer local-level policy tools to promote PEV adoption beyond preferential parking or access to restricted lanes on highway. Finally, the U.S. has struggled to keep pace with China's charging infrastructure construction. The $5 billion National Electric Vehicle Infrastructure program exemplifies this struggle, with only 19 stations built over two years due to coordination challenges between installers, utilities, and other stakeholders (*13*). By the end of 2024, the U.S. had installed just 200,000 public charging points compared to China's 3.58 million (*2*), translating to over three times as many chargers per EV in China than in the U.S. (see the table).

Table 1. Summary of public charge points in China and the U.S. as of January 2025.

	Total Public Chargers		Chargers per 100 EVs	
	United States	**China**	**United States**	**China**
All Charge Points	200,000	3,580,000	3.1	10.4
Fast (DC) Charge Points	50,000	1,600,000	0.8	4.7
Slow (Level 2) Charge Points	150,000	1,980,000	2.3	5.8

Data source: "Global EV Outlook 2025: Electric Vehicle Charging", International Energy Agency (*2*)

COMPETITIVENESS THROUGH COOPERATION

The disparities in PEV market offerings between China and the U.S. reflect not merely differences in policy priorities but a fundamental divergence in innovation and manufacturing capabilities that raises an urgent question: How can the US gain access to affordable, high-performance PEVs? The answer may lie not in protectionism, but rather in strategic collaboration with Chinese manufacturers.

Strategic collaboration can facilitate the transfer of leading battery and PEV technology from China without necessarily creating over-dependency. One path is to pursue technology licensing agreements with Chinese firms that have developed cost-effective battery and vehicle technologies. The discussions between Ford and CATL, for example, on licensing battery technology represent a promising model that would give Ford access to high-performance battery technology while maintaining local manufacturing in the U.S. Likewise, the U.S. could leverage access to its large domestic market as a negotiating tool to secure more favorable terms for U.S. companies operating in China while facilitating Chinese investment in the U.S. A strategic integration with Chinese manufacturing expertise through foreign direct investment (FDI) by leading Chinese firms could improve the cost competitiveness of U.S.-made vehicles. Investments by Gotion Battery in Illinois and Michigan demonstrate how Chinese firms can bring capital and expertise to the U.S. while creating local jobs for U.S. auto workers. Strategic coordination of these investments, rather than blanket restrictions, would better serve long-term U.S. interests.

Furthermore, the U.S. maintains substantial advantages in fundamental research, software development, and advanced materials, while China excels in manufacturing scale, commercialization, and cost reduction (*10*). Fostering formal and informal innovation networks that connect these complementary strengths could accelerate progress in next-generation technologies like solid-state batteries and autonomous systems more effectively than either nation could achieve independently. For example, the U.S. and China could establish a dedicated advanced transportation technology dialogue focused on technical standards, regulatory harmonization, and targeted joint research initiatives, potentially leveraging the recently renewed US-China Science and Technology Agreement. This government-to-government engagement would create a supportive framework for private sector collaboration while addressing legitimate concerns about intellectual property protection and market access.

Equally important is to revise existing policy to facilitate these opportunities. Current Foreign Entity of Concern (FEOC) restrictions—which ban Chinese, Russian, Iranian, and North Korean companies from U.S. EV supply chains and federal incentives—should be refined to allow case-by-case security reviews for manufacturers seeking to establish U.S. facilities. Restoring and expanding the Inflation Reduction Act (IRA) incentives—particularly the $7,500 consumer tax credits for EV purchases that have been restricted by FEOC rules—would help establish a domestic market for more affordable PEVs while preserving the IRA's effectiveness in stimulating domestic investments. The IRA spurred $277 billion in announced private investments for battery and PEV manufacturing facilities across the U.S., supporting an estimated 350,000 manufacturing jobs (*14*). Likewise, when evaluating Chinese investments, the Committee on Foreign Investment in the United States review process should distinguish between strategic and non-strategic technologies, like advanced semiconductors or defense systems versus commercial EV manufacturing. Rather than relying solely on tariffs—which provide temporary market protection but no access to cutting-edge technologies—the U.S. could implement a calibrated approach combining modest protective tariffs sufficient to encourage foreign investment with streamlined approval processes for companies willing to manufacture domestically and share technological expertise with U.S. partners.

LESSONS FROM SUCCESSFUL COLLABORATIONS

Historical precedent supports a more balanced approach that embraces FDI from Chinese firms to revitalize local manufacturing while creating jobs. When Japanese automakers like Toyota established U.S. production facilities in southern U.S. states beginning in the 1980s, initial concerns about job displacement gave way to recognition of substantial benefits. U.S. automakers learned from the Toyota Production System, adopting lean manufacturing principles that improved their own capabilities and efficiencies. These investments brought not just jobs but knowledge transfer that strengthened the entire U.S. automotive ecosystem. A similar dynamic could occur with Chinese EV investments, where U.S. firms could gain exposure to cutting-edge manufacturing techniques and supply chain innovations developed in China.

Tesla's entry into China is another example that demonstrates how engagement can yield mutual benefits rather than zero-sum outcomes. When Tesla established its Shanghai Gigafactory in 2019, local suppliers upgraded their capabilities to meet Tesla's quality requirements, all while reducing manufacturing costs. The Shanghai facility became Tesla's most efficient factory, producing vehicles at substantially lower costs than its U.S. operations and improving the company's global competitiveness by applying that manufacturing knowledge to newer facilities. The competitive pressure brought by Tesla benefited both sides: Tesla achieved profitability, and Chinese manufacturers benefitted from better quality suppliers, sparking an innovation cycle that drove down costs industrywide. The first Tesla BEVs rolled off the Shanghai facility lines in December 2019, and PEV prices in China fell below ICEV prices on average for the first time just two years later, leading China's government to phase out consumer purchase subsidies for PEVs (*2*).

Crucially, Tesla's experience shows that security concerns can be managed through targeted solutions rather than blanket restrictions. China was concerned that Tesla's vehicles—equipped with cameras and sensors for navigation—could potentially collect sensitive visual data near government buildings, military installations, or high-technology zones. To address these concerns, Tesla agreed to specific requirements: storing all vehicle data collected in China within Chinese data centers (preventing potential U.S. government access), restricting vehicle operations in designated sensitive areas, and using only Chinese government-approved mapping and navigation systems. Only after implementing these cybersecurity measures did the Chinese government grant Tesla permission to activate its Full Self-Driving technology. In contrast, the U.S. has used cybersecurity concerns to justify broad restrictions specifically targeting Chinese companies, including legislation that categorically blocks Chinese EV manufacturers from the U.S. market (*15*). While security risks are real, blanket exclusions are counterproductive. A more effective approach would develop transparent security standards and compliance verification that all connected vehicles must meet, regardless of origin (*16*).

In Europe we can see promising examples of such cooperation. By opening to investments from Chinese firms, incumbent automakers are gaining access to the latest battery technologies, improving their competitiveness in the European market. CATL is building a $7.6 billion battery plant in Debrecen, Hungary, expected to produce 100 GWh of batteries annually for European automakers including Mercedes-Benz, BMW, and Volkswagen. Similarly, BYD is constructing its first European electric vehicle manufacturing facility in Hungary to produce both BEVs and PHEVs specifically for the European market.

THE STAKES ARE GLOBAL

An isolationist approach in the US undermines both climate and innovation objectives. Light duty vehicles generate 16% of U.S. carbon emissions (*2*), making the rapid deployment of affordable PEVs essential for meeting climate targets. Furthermore, isolating one of the world's largest automotive markets from leading PEV technology could have profound negative consequences for global innovation. Solid-state batteries, advanced materials, and more efficient motors could all develop more rapidly through collaborative networks than through parallel, isolated efforts. Research on wind and solar industries demonstrates that cross-border partnerships accelerated innovation while allowing each country to maintain distinctive industrial specializations when appropriate collaborative frameworks were established (*17*).

At the center of the PEV revolution lies a nexus of advanced computing, data security, and critical minerals that requires engagement to develop sustainable solutions. By developing a policy strategy that fosters FDI while protecting core interests, the U.S. can accelerate its electric transition and maintain a globally competitive automotive industry. The alternative—excluding Chinese technology and expertise—risks leaving U.S. automakers uncompetitive while delaying the urgent global transition to sustainable transportation.

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