Driving Security? U.S. Auto Industrial Policy in a Changing World

HARVARD Kennedy School
MOSSAVAR-RAHMANI CENTER
for Business and Government

Driving Security? U.S. Auto Industrial Policy in a Changing World

Elaine Buckberg
The Salata Institute for Climate and Sustainability at Harvard University

Presented at M-RCBG's Industrial Policy and Economic Security Conference, October 2025

November 2025

M-RCBG Associate Working Paper Series | No. 267

Driving Security? U.S. Auto Industrial Policy in a Changing World

Elaine Buckberg[1]
November 14, 2025

Industrial policy may have come back into fashion—controversially—in the last few years, but it was arguably never out for the auto sector. Auto manages to have outsized political importance in the U.S., and around the world, thanks to its relatively high paying jobs for workers without college education, unionization, and the political romance around manufacturing jobs. That political pull wins the auto sector repeat special treatment.

Today's U.S. industrial policy is not about picking winners for export potential, unlike 20th century industrial policy, but about economic security. It aims either to build domestic capacity in industries viewed as pivotal (semiconductors), achieve geopolitically secure supply by reducing dependence on China (critical minerals, rare earths), or protect politically important domestic industries and their share in the U.S. market (autos).

Today *is* different. Auto is transforming rapidly in the shift to electric and autonomous vehicles (EVs and AVs)—a change that requires different engineering and supply chains. Automakers around the world continue to emphasize that EVs are the future of the industry, although Toyota is a notable skeptic. The EV shift is upending a long-stable competitive landscape. China's indigenous EV automakers have become major producers and exporters in a handful of years. The Chinese government is pervasively involved in the growth of its EV industry, while having developed a national monopoly position in global EV supply chains. Adding to security considerations, domestic auto manufacturing offers contingent defense manufacturing capability—as has long been true—while the computerization of vehicles raises new surveillance and cyberattack risks.

This article examines today's U.S. auto industrial policy in international and technological context, reviews the short track record of Biden EV policies, discusses how we should evaluate Trump's auto industrial policy, and closes with recommendations for where industrial policy would be best focused to support the U.S. auto sector.

Is there a market failure?

You may ask, is there a market failure to justify policy intervention? Yes, several.

First, auto manufacturing capability can again convert to defense capacity if needed—think not only automakers making planes during World War II, but also Ford and GM making ventilators during the COVID pandemic. Conversion of auto production to military production would not be seamless, with the difficulty depending on the defense product, but having sophisticated and heavy manufacturing capacity is a running start.

[1] The author thanks Chris Miller, Jonathan Sallet, Katherine Tai, and David Teolis for thoughtful comments that made this paper stronger. Participants in the Harvard Kennedy School Mossavar-Rahmani Center's Industrial Policy and Economic Security Conference also provided valuable input. All errors and omissions are my own.

Second, China's non-market support of EV makers enables weak players a longer survival—state-owned banks, for example, may not enforce loan terms as would a fully commercial lender—leading to a prolonged shakeout and price war. Without any limitation on entry of Chinese EVs into the U.S. market, bringing that price war to the U.S. could beat U.S.-made EVs out of the market before U.S. EV manufacturing can scale up and, through learning, improve production efficiency.[1] Slower-than-expected EV production launches from Tesla to General Motors (GM) signal that that EV production involves specific learning, even for experienced automakers.[2,3] Assuming EVs will ultimately supplant gas-powered (ICE) vehicles, that would leave the U.S. with little to no auto capacity for potential conversion to defense or other emergency production. (To be fair, China could similarly point to past U.S. policy support for the auto industry, detailed below, or measures such as the Biden Administration's restrictions on chip exports to China as market failures to justify its own EV or chip industrial policies.)

Third, the computerization of vehicles also makes them potentially usable for surveillance and vulnerable to cyberattacks, risks increased if they come from a rival power. Because of these national security angles, the collective need for U.S. EV production to scale exceeds that of individual companies.

Industrial policy never went out for autos

Consider U.S. auto industrial policy over the last 20 years, some of which has intersected with climate policy:

- The "chicken tax," a 25% tariff on light trucks such as pickups in force since 1964, has supported the Detroit 3 automakers' dominance and profitability in the full-size pickup segment.[4]
- The 2008 federal bailouts of GM and Chrysler, including the Treasury Department's coordination of Chrysler's sale to Fiat.
- The 2008 Cash-for-Clunkers program offered a rebate for households replacing low fuel-efficiency vehicles with new, more fuel-efficient vehicles, designed to lift auto demand during the Great Recession.[5]
- The 2008 EV tax credits for the first 200,000 EVs sold by each automaker.
- Loan Programs Office loans to Tesla, Ford, and Nissan for plant construction and upgrades, as well as battery manufacturing and other EV supply chain companies.
- Negotiation of USMCA as a successor to NAFTA—which is in large part a managed auto trade agreement.
- The Biden Administration's 100% tariffs on Chinese EVs and 25% tariffs on Chinese lithium-ion EV batteries.

Past auto industrial policies have offered a template for the Trump Administration's industrial and tariff policies: the chicken tax as a model for Biden and Trump auto tariffs, the GM and Chrysler bailouts as models for the Trump Administration's direct investments in Intel, MP Materials, and others.

Industrial policy as national security policy

National security arguments for industrial policy are not new—and have been rejected in the past. R.D. Norton wrote in a 1983 *Journal of Economic Literature* review, "In sum, the economic arguments against an American industrial policy are persuasive. The national-security case for a program of sectoral intervention is weak.... The microscopic or market failure rational fails also...."[6]

The new national security justifications cross partisan divides. The first Trump Administration resuscitated national security-related industrial policy with Section 232 tariffs on steel and aluminum (important auto inputs).[7,8] The Biden Administration restricted the sale to China of advanced computing chips with potential defense uses.[9] The Biden Administration doubled down with the CHIPS Act, Inflation Reduction Act (IRA), and more chip export bans. A new, bipartisan report from the Council on Foreign Relations says that "economic and national security have converged, if not collided. Around the world, policymakers are directly confronting a range of national security risks by turning to industrial policy....[10]"

Strikingly, Biden's National Security Advisor, Jake Sullivan, defined the administration's industrial policy theory—not an economic official. In an April 2023 speech, Sullivan set out three criteria an industry must meet for industrial policy support: it must be economically critically important; it must have national security implications; and private investment alone in that industry would likely fall short and catalyze less near-term growth than the administration deemed necessary to achieve growth and national security goals.[11]

Without question, the external environment has changed. Today's rivalry with China resembles the Cold War era in two ways: a global competition between two superpowers where the U.S.'s opponent has pervasive government involvement in its economy. Like the Cold War, the rivals are competing for influence with third countries—especially those with important natural resources. Today's Global South comprises many of the same countries as the Cold War's Third World. Today, however, we depend heavily on China for final manufactured products and all kinds of supply chains, whereas the U.S.'s Cold War supply chains did not run through the Soviet Union or Eastern Europe.

Relative to the Cold War, however, we see different choices of policy tools. The U.S. long built trading relationships and granted foreign aid as soft power tools to improve bilateral relationships.[12] In contrast, the Trump Administration is erecting new tariffs to close off U.S. markets and promote more domestic manufacturing, then negotiating. Both the Biden and Trump Administrations have deployed sanctions and export bans on products deemed sensitive from a surveillance or defense perspective, such as telecom equipment and chips. China has similarly used export bans, hitting the chip and auto industries by restricting exports of rare earths and magnets, demonstrating its chokehold over the U.S.[13]

China changed the industrial policy game, the U.S. is responding

Much old school industrial policy was transparent—announced, well-defined, national-level support for certain industries. China's landscape always featured prominent state-owned

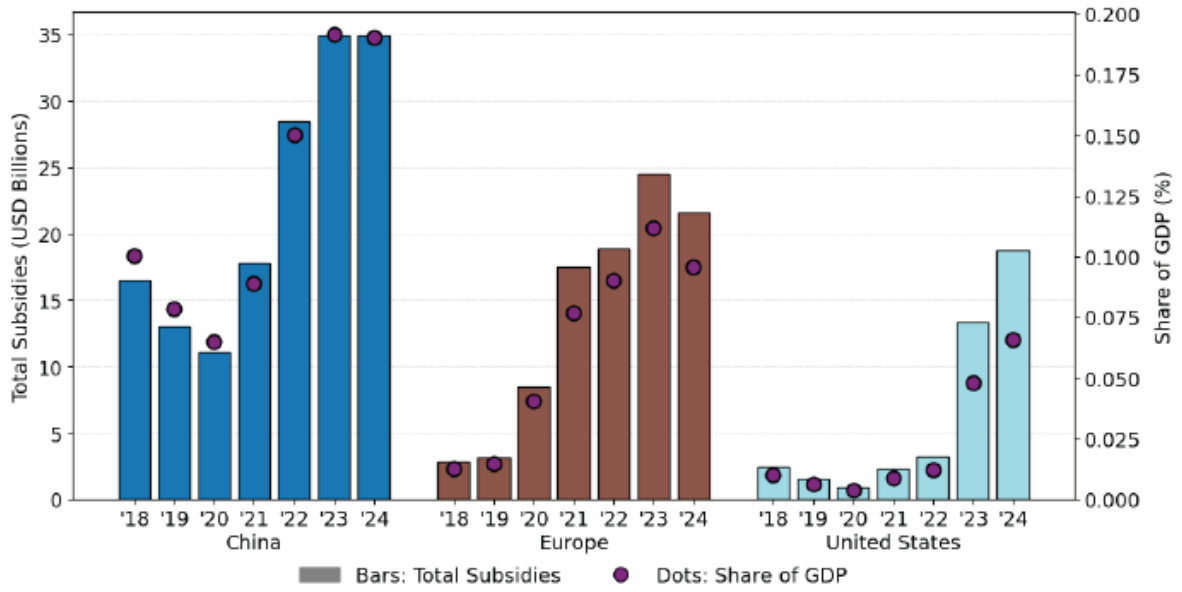
enterprises. All the global major auto companies have operated in China through joint ventures for decades, often with a state-owned enterprise partner, as long required by the Chinese government.

The Chinese national government's 2015 report, *Made in China 2025*, explicitly targeted EVs among 10 high-tech industries, marking a turning point for Chinese EV and battery policy at both the national and provincial government levels.[14] Chinese policy is often directed by the national government but then implemented by provincial governments, often in diverse ways.

The state became newly, and less transparently, active in the auto industry. Provinces heaped support on start-up indigenous EV makers, rather than the long-dominant joint ventures with global automakers. First, the boundary between state and company blurs along the spectrum from state-owned enterprises to government equity stakes in (previously) private Chinese companies to state representatives on the boards of Chinese companies with no government shareholding. Second, the national and provincial governments have offered an array of subsidies to EV makers. Some are transparent, like the purchase tax exemption for consumers buying an EV. Others are not, like building plants, offering free rent, or favorable credit terms from state-owned banks. That every province is pursuing independent strategies further reduces transparency. Third, the weakening of WTO, in which both the U.S. and China played leading roles, made the WTO's limits on state subsidies unenforceable.

The multiple, non-transparent ways the Chinese government has subsidized the EV industry at the national and provincial levels makes it hard to quantify the total support. Deese et al. (2025) attempt to quantify them, concluding that China's 2018-24 average annual EV and battery subsidies reached $22.4 billion, vastly dominating EU ($13.8 billion) and U.S. ($6.1 billion) averages.[15] While China started heavily subsidization earlier, its peak subsidies of $35 billion (2023 and 2024) also exceed the EU ($25.4 billion) and U.S. ($18.8 billion) peaks, as Chart 1 shows. [16] Deese et al (2025) estimate that about a third of government support to Chinese EV and battery makers took the form of below-market lending and equity financing. In contrast, the U.S. and Europe relied almost entirely on tax incentives and grants.[17]

Chart 1



Source: Deese et al., "Global Clean Investment Monitor: Government Support for Electric Vehicles and Batteries," MIT CEEPR Research Commentary, July 2025.

In addition to financial support, the Chinese government used other policy levers to build up its auto capability: for example, mandating ongoing technology transfer from the global automakers in joint ventures to their Chinese partners, and requiring that EVs be made-in-China and contain Chinese batteries to qualify for certain subsidies.[18]

China's excess auto capacity is a threat: production capacity around 50 million vehicles, versus domestic sales of 25 million and global sales for 90 million, based on Setser (2024).[19] With about half this excess capacity in ICE plants, China has the potential to be at least as potent a global supplier of ICE vehicles as EVs.[20]

China also has a dagger at the auto industry's throat with its monopoly position in rare earth supply chains. EVs depend on rare earth magnets in their motors; EVs and ICE vehicles contain them in other parts. In April through June 2025, China halted exports to the U.S. of seven rare earths essential to auto production, in the heat of the U.S.-China tariff escalation. Automakers were scrambling, with Ford halting production at several plants including a plant making the Explorer SUV—an ICE vehicle containing rare earth magnets.[21]

Now, China has a second dagger with the largest maker of automotive chips, Nexperia, a Dutch company, sending those through China for processing, under a Chinese parent company, and with a Chinese CEO. On September 30, 2025, the Netherlands government moved to seize Nexperia from parent Wingtech and ousted the Wingtech CEO from Nexperia leadership. This maneuver, however, led the Chinese government to halt exports of Nexperia chips and order Wingtech not to yield control of Nexperia assets, leading auto plants in the U.S. and Europe to the brink of

production stoppages.[22,23] Following a November 1, 2025 Trump-Xi meeting, China agreed to a limited easing of these export controls, the extent and terms of which are not public.[24]

National security arguments are more relevant today

China's role in EV supply chains, the computerization and increasing use of safety cameras on vehicles, and the shrinking of U.S. heavy industry all create stronger national security arguments for auto industrial policy today. The arguments I find most salient differ from the quantity arguments cited by the Trump Administration in announcing its auto tariffs in March 2025.[25]

First, China has a dominant position in refining critical minerals and rare earths used in EVs. While mineral reserves exist in many other countries, including the U.S., attempts at diversification of both sourcing and refining are in early stages. In critical mineral processing, China has a 55% share or higher in copper, lithium, cobalt, graphite, and rare earths, according to the IEA.[26] See chart 2. Moreover, in all of these, its share rose from 2020-2024.[27] In rare earth magnet elements, China had a 60% production share and 91% refining share in 2024.[28]

In rare earths, China has repeatedly weaponized its overwhelming monopoly position—most recently on October 9, 2025, when China added export restrictions to another five rare earths.[29] Rare earths comprise 17 metals that are essential inputs not only to EVs and other autos, but also semiconductors, and defense equipment, and other industries. China now restricted exports of 12 elements—and not only from China. As written, China's restrictions are extraterritorial, and would affect exports of products containing even 0.1% rare earth content from a country other than China to a third country.[30] On October 30, the U.S. and China reached a deal was reached that would ease, but not eliminate, those rare earth controls; few details were provided.[31]

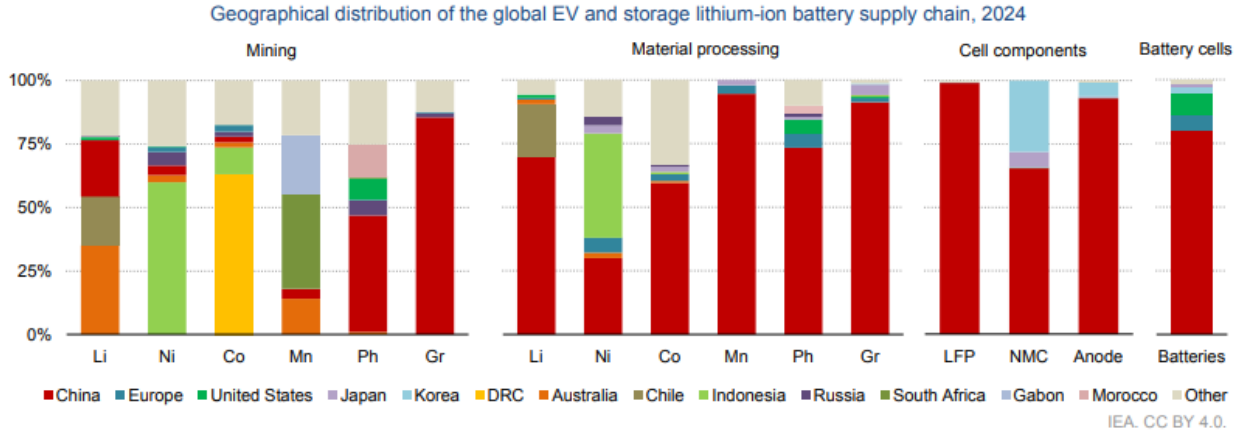
Easing China's chokehold requires diversifying sourcing or shifting battery chemistry and magnet composition. Domestic mining and processing will meet NIMBY concerns about environmental damage; other countries may face similar hurdles. While universities, companies, and the U.S. national labs are researching less environmentally harmful processes, those will also need to approach the costs of their dirtier competition to compete. A reasonable diversification goal might be to reduce China's share toward OPEC's 36% share of global oil production, but that's a huge shift made even harder by a rapidly growing market.[32]

Second, the computerization of vehicles arguably makes them spyware. Consider the multiple cameras on today's vehicles. China has banned the export of all such data, so that companies developing autonomous vehicles (AVs) need to undertake separate development in China from in other countries. Similarly, cybersecurity risks make Chinese vehicles and software at minimum a perceived risk in the U.S., if not an actual one. These concerns led the Department of Commerce to issue the "connected vehicle rule" banning the import of Chinese vehicle connectivity systems, automated driving systems, and connected vehicles containing such systems effective in model year 2027. Demonstrating consensus on this risk, the development of this rule spanned the first Trump Administration and the Biden Administration.[33]

Third, the auto industry's manufacturing prowess ties closely to defense capabilities. This matters more in today's U.S. economy with limited manufacturing, especially heavy manufacturing, than when auto plants converted to make military planes during World War II. Witness GM and Ford quickly launching production of ventilators at the start of COVID.

Chart 2

China continues to dominate the downstream and midstream global EV battery supply chain, but Indonesia is quickly growing its share of nickel mining and refining



Notes: Li = lithium; Ni = nickel; Co = cobalt; Mn = manganese; Ph = phosphate; Gr = graphite; Refining: Li = battery-grade lithium chemicals; Ni = nickel final products including nickel sulphate; cobalt = final refined cobalt products including cobalt sulphate; Mn = battery-grade manganese sulphate; Ph = battery-grade phosphoric acid. LFP = lithium iron phosphate; NMC = lithium nickel manganese oxide. LFP and NMC refer to cathode material production and NMC includes all nickel-based cathode material such as nickel cobalt aluminium oxide (NCA). DRC = Democratic Republic of the Congo. Geographical breakdown refers to the country where the production occurs. All stages of the supply chain are based on data for production in 2024 except for cell components, which is based on production capacity in 2024. Graphite refining refers to all battery-grade graphite production.

Source: IEA analysis based on USGS (2025), Mineral commodity summaries, BloombergNEF, EV Volumes and Benchmark Mineral Intelligence.

Source: IEA, Global Critical Minerals Outlook 2025.

Shifting goals: Build a U.S. EV industry, or just make autos at home

Stable policy is valuable to an industry that plans in 10-12 year product cycles. Auto companies have typically planned vehicles on a roughly five-year timeline before the first rolls off the line, then aimed to keep a vehicle in market for about six years, although Chinese entrants are operating on much faster timelines. The sharp shift in industrial policy between the Biden and Trump Administrations risks leaving the auto industry with a mix of investments they regret. EV investments that were right-sized under Biden policy, in terms of production volumes, may be bigger than needed under Trump policy. Multi-billion dollar investments in new programs in Mexican and Canadian plants—automakers' own assembly plants and supplier plants—may not be the locations they would choose in the new tariff environment and with uncertainty about the durability of USMCA terms as renegotiation looms in 2026.

Biden EV Industrial Policy

The Biden Administration used carrots and sticks to drive the U.S. auto industry to ramp up EV production and ramp down internal combustion engine vehicle (ICE) vehicle sales, as chart 3 summarizes. Its industrial policy doubled as climate policy—every new EV sold would have lower lifetime emissions than if an ICE vehicle had sold instead. Tax credits and grants incentivized

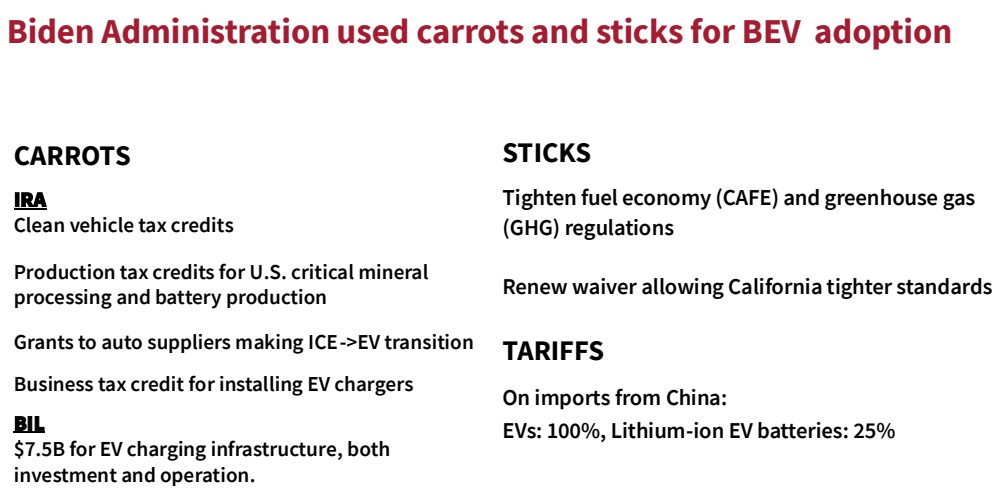
investment in EV, battery, and supply chains, as well as charging investment, over 10 years. Tougher fuel economy and tailpipe emissions standards pushed automakers to shift their sales rapidly to EVs from ICE.[34] In 2024, the Biden Administration added a 100% tariff on Chinese EVs and a 25% tariff on lithium-ion EV batteries.

To be clear, the EV and battery tariffs were industrial policy over climate policy. A more climate-forward policy would not have created barriers to Chinese EV imports, instead encouraging entry of lower cost Chinese EVs. Reducing the price gap between EVs and ICE vehicles would accelerate EV adoption and avoid more emissions—but risked a decline in U.S. auto manufacturing and sales by U.S. auto companies (even if made outside the U.S.)[35]

The Manchin provisions of the EV tax credit were designed to ensure that, by 2025, taxpayers would only subsidize EV purchases if their battery and critical mineral supply chains were China-free, pressing automakers to develop alternative sourcing. (These arose in a last minute deal between Senator Manchin and Democratic leaders to pass IRA.) The lease loophole, however, undermined that goal.[36]

Tariffs on Chinese EVs and batteries shielded U.S. EV production from Chinese competition during a shakeout among Chinese EV makers. China withdrew some of its policies supporting Chinese EV production and sales, leaving the industry in a price war and with massive excess capacity.

Chart 3



Source: Author

The Biden Administration's tariffs on EVs and EV batteries resemble infant industry tariffs, designed to protect nascent U.S. EV production from import competition with China's more mature industry. (Arguably, the Administration designed them to win popular and union support for Biden's climate policies and help him win re-election.) Well-designed infant industry tariffs, however, would phase

out over time, creating pressure for EV production to achieve efficiency. (The budget reconciliation rules may have compelled the IRA's EV and charger tax credits to phase out after 10 years, but that had the right incentive effect. An earlier version of the EV tax credit phased out within a year after the annual EV share of new vehicle sales reached 50%—well past the infant industry stage and dominant in the market.[37])

Trump auto industrial policy pivots away from EVs

The Trump Administration's auto tariffs aim to protect and boost U.S. auto production and jobs, which are disproportionately in swing and red states in the Midwest and Southeast U.S.
The stated aim is to increase the share of auto and part production in the U.S. to protect national security, according to the executive order announcing the tariffs; the Department of Commerce has never released its 2019 Section 232 report.[38]

The U.S. auto industry faces a tangle of new tariffs:

- Auto and part tariffs, from which USCMA-compliant vehicles are exempt
- non-USMCA compliant vehicles or parts made in Mexico or Canada, an additional 25%-35% tariff (for vehicles, this applies only to non-U.S. content), and
- higher steel and aluminum tariffs.

Bilateral agreements with certain major auto exporters have produced wide variation in auto tariffs by country, as Chart 4 shows.

President Trump's Inauguration Day Executive Order on "Unleashing American Energy" called for eliminating regulatory policies that favor EVs and instead "promote true consumer choice, which is essential for economic growth and innovation."[39] Consistent with that, the Section 232 auto tariffs are technology neutral. While the Trump Administration has reversed or openly plans to reverse most of the Biden Administration's EV policies, the 100% tariff on Chinese EVs and 25% tariff on lithium-ion EV batteries remain in place. EV imports from China face a whopping 135% tariff: 25% auto base rate + 100% Chinese EV rate + 10% reciprocal tariff, as of October 2025. The 25% auto tariffs may help discourage imports of Chinese ICE vehicles, in which China also has excess capacity.

EV policy reversals include eliminating the IRA's tax credits for EV sales and EV charger investment (which enable EV sales), as well as eliminating regulatory requirements that pressured automakers to increase the EV share of their sales (zeroing penalties for missing fuel economy targets, eliminating California's ability to set tougher emissions standards, and seeking to eliminate federal tailpipe emission rules.) The IRA's production tax credit for critical mineral processing and battery production (Section 45X) remains in place.

Chart 4

Auto and Parts Tariff Rates by Country of Origin
As of October 10, 2025

General rate	**25%**
Major Auto Producers (selected)	
Canada	
USMCA compliant	0
non-USMCA compliant, non-U.S. content [1]	60%
Mexico	
USMCA compliant	0
non-USMCA compliant, non-U.S. content [2]	50%
China	
non-EV [3]	35%
EVs [4]	135%
EU	15%
Japan	15%
South Korea	15%
UK	10%
Vietnam	20%

Source: Chad P. Bown, "Trump's trade war timeline: an up-to-date guide, Peterson Institute for International Economics, https://www.piie.com/blogs/realtime-economics/2025/trumps-trade-war-timeline-20-date-guide, as of Oct. 10, 2025.

[1] 25% auto tariff + 35% Canada Fentanyl/immigration tariff.

[2] 25% auto tariff + 25% Mexico Fentanyl/immigration tariff.

[3] 25% auto tariff + 10% Fentanyl tariff

[4] 25% auto tariff + 100% China EV tariff + 10% China Fentanyl tariff

Who wins from the shift in U.S auto industrial policy?

Slowing the U.S. ramp up in EV and battery production is a risky bet. China and the EU have more aggressive suites of policy than does the U.S. to increase the EV share of sales. If the U.S. falls farther behind, it becomes harder to catch up.

True, taking pressure off auto companies to rapidly escalate EV sales offsets some of automakers' pain from tariffs and the removal of the EV tax credits. It also rebalances policy toward the oil and gas industry by slowing EV adoption, keeping more ICE vehicles on the road, and supporting gasoline sales.

But learning by doing is important to efficiency in both EV production and battery production. Slower than planned EV production ramp-ups by Tesla and GM demonstrate that manufacturing vehicles, including EVs, is hard—and experience in ICE manufacturing is not full preparation for EV production. Errors that slow production translate into delayed and lower returns on investment. Poor quality production raises warranty costs and hurts profits. Similarly, learning in battery production reduces scrappage, raising efficiency and profitability.

Producers sheltered by high tariff walls will be less efficient and innovate less, reducing their ability to compete internationally and to compete domestically if tariff barriers fall in the future. (Also making it harder to lower them.) So long as the Detroit 3 automakers continue to operate in international markets and foreign automakers continue to make and sell in the U.S., competition in international markets will bring innovation to the U.S. Automakers generally want to share vehicles across major markets (especially U.S., Europe, China) to better leverage their high development costs. However, they may offer different variants and features in different markets. But tariffs are likely to reduce innovation by the Detroit 3 and lead European and Korean transplant automakers to bring less of their innovation to the U.S. market. Consumers and businesses will get vehicles that are lower quality, more expensive, or both as a result. The full-size pickup truck market, protected since 1964 by the 25% "chicken tax" tariff, remains dominated by American brands GM, Ford, and RAM.[40] Pickups are widely acknowledged to be high profit lines for these automakers.[41]

Do workers win? Earlier, I referred to the political romance of manufacturing jobs. American workers are not eager to take manufacturing jobs and demand a substantial wage premium. Manufacturing jobs tend to be physically demanding (although less so than in the past). Plants tend to be less comfortable or attractive workplaces than offices or retail outlets; their locations may also be less centrally located. Shift times are inflexible and work is in person, in contrast to the post-COVID flexibility of hybrid work.[42]

In the long run, whether U.S. auto jobs rise, hold steady, or drop will depend on whether the U.S. auto industry modernizes and stays competitive with the rest of the world or, if not, is adequately sheltered by tariff walls to retain jobs, if not competitiveness.

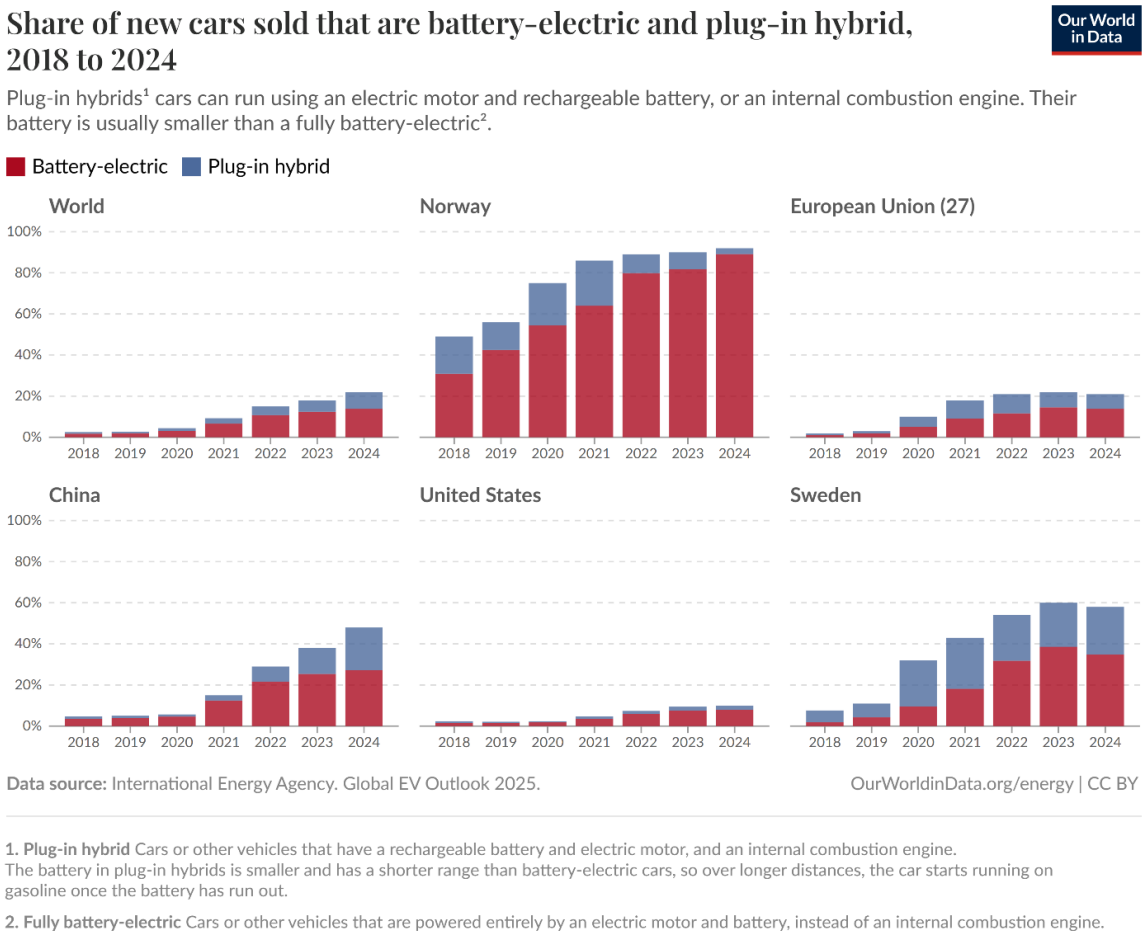
How do we assess if U.S. auto industrial policy is successful?

How to measure success depends on the policy. Biden EV policy sought to boost EV production and sales. Several papers show it did so, with some distortions. Trump auto policy explicitly seeks to increase auto and part production in the U.S.—presumably with commensurate auto jobs, although that is less explicit in President Trump's and Administration's public statements. A secondary motive behind the elimination of pro-EV policies may be supporting gasoline sales by slowing the drop in ICE vehicles.

I would argue that a healthy U.S. auto industry must be transitioning into an efficient U.S. EV industry, competitive by international standards. Despite widespread discussion that Chinese automakers are so far ahead in EVs that the U.S. and Europe cannot catch up, the U.S. is only a few years behind even China. At 8% EV (pure battery electric) share of sales in 2024, the U.S.'s BEV share is between China's 2020 and 2021 shares and in line with the EU's 2021 share—about 3 years

behind, as Chart 4 illustrates. Moreover, China is not the world leader in EV adoption, even if it is in production. Norway and Sweden have higher shares at 89% and 35%, respectively, vs. China's 27%, as Chart 5 shows.

Chart 5



Source: Our World in Data, IEA data.

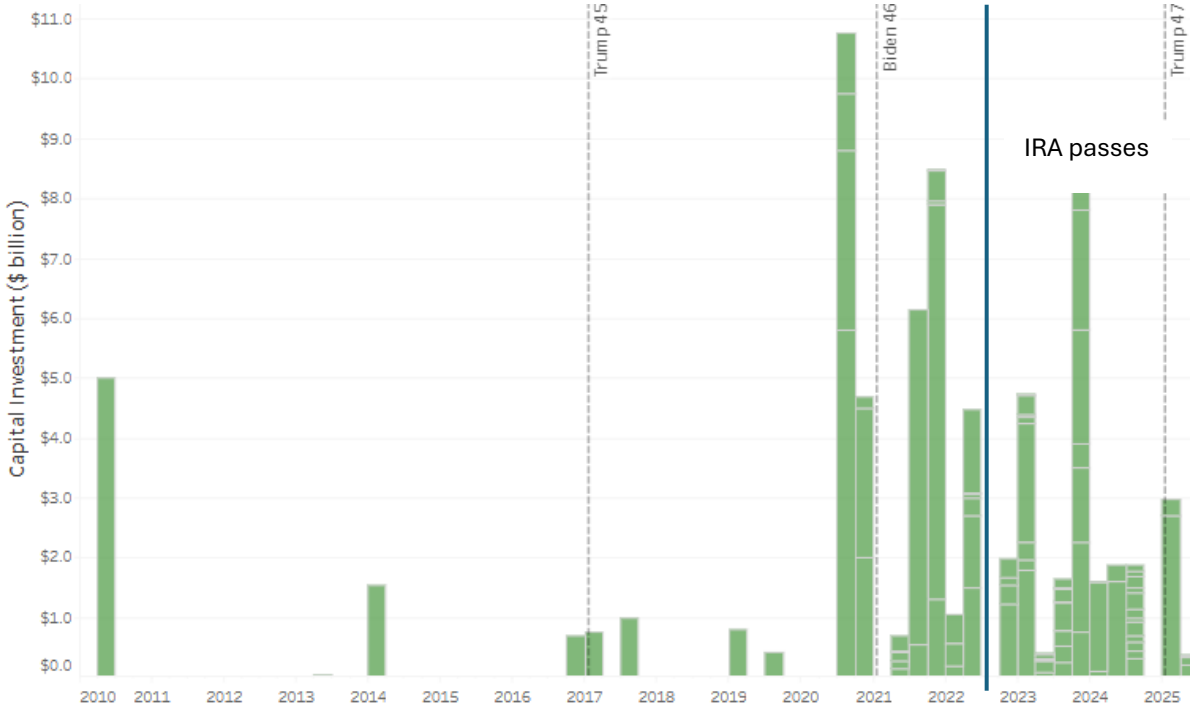
How did Biden policy do?

Overall, EV industrial policy under the Biden Administration clearly drove EV battery production investment in the U.S., although the effect on EV assembly plant investment is less clear. Buyers and automakers tried to take advantage of the EV tax credits, including driving into the lease channel sales of those EVs that did not meet the origin criteria for the consumer EV tax credit. Closing the lease loophole without eliminating the consumer purchase tax credit could have driven a larger share of EV sales to North American assembled EVs with China-free batteries, reduced taxpayer costs of the credit, or both.

Domestic EV investment announcements slowed after IRA (Chart 6), while battery investment picked up (Chart 7). However, Rhodium Group estimates that that U.S. EV investment in 4Q24

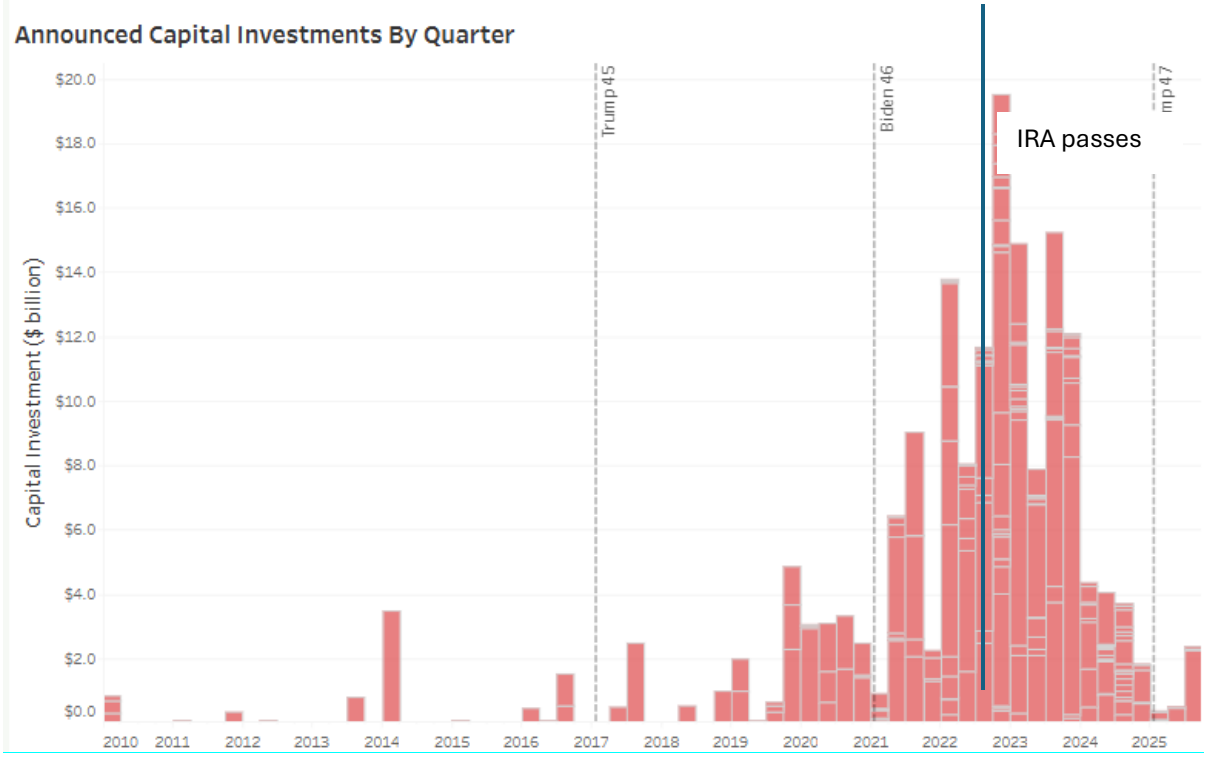
reached a level comparable with China's falling incremental investment, and roughly matched Europe's since 2Q23.[43] (Chart 8)

Chart 6: U.S. EV Investment Announcements by Quarter



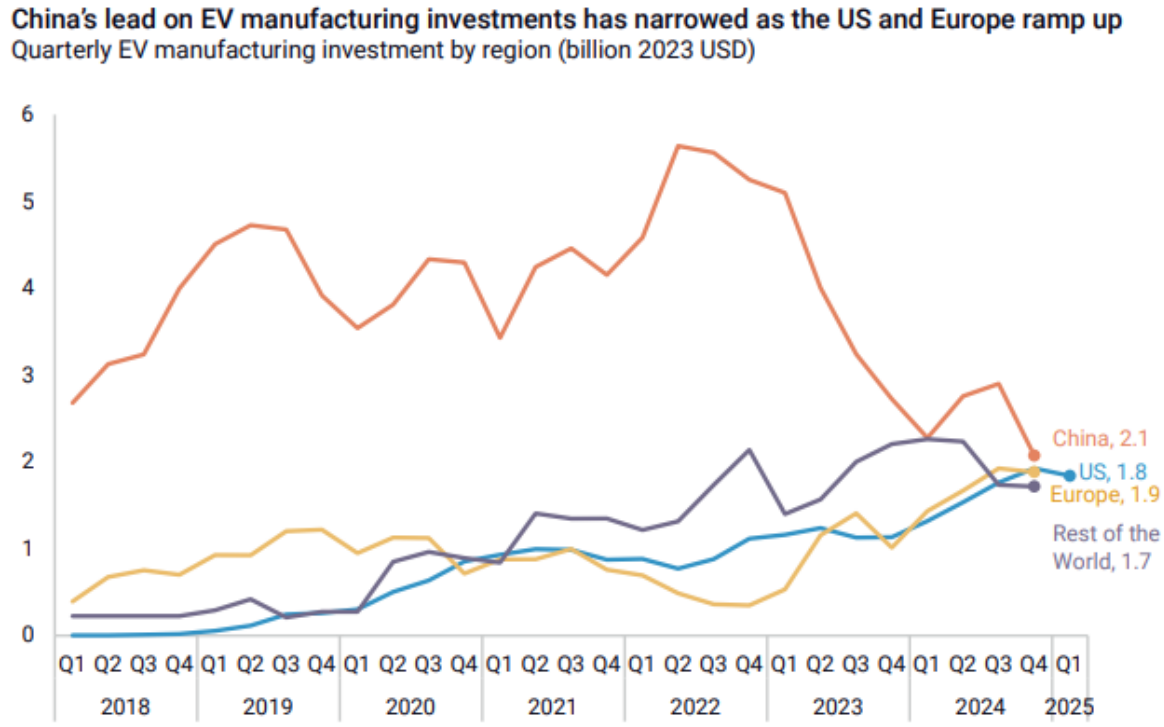
Source: thebiggreenmachine.com https://www.the-big-green-machine.com/ (accessed 10/10/2025), IRA label added.

Chart 7: U.S. Battery Investment Announcements by Quarter



Source: thebiggreenmachine.com https://www.the-big-green-machine.com/ (accessed 10/10/2025), IRA label added.

Chart 8



Source: Rhodium Group, "Global Clean Investment Monitor: Electric Vehicles and Batteries," June 18, 2025.

By restricting the EV consumer purchase tax credit (30D) to North American-assembled EVs—versus the previous credit with no origin rules but caps of 200,000 per automaker—the number of tax credit eligible EVs immediately plummeted. From 26 pre-IRA eligible EVs, the number dropped to 11 on IRA's passage, recovering to only 15 in model years 2024-25 (Chart 9). The number of eligible sales doubtless rose as Tesla, with a market share over 50% in 2022, and GM, regained eligibility for the credit. In 2024, 75% of tax-credit-eligible models sold were Teslas.[44]

Chart 9

BEVs eligible for consumer purchases quickly dropped after IRA

	Model years 2022-23			Model Years
Credit amount	Pre-IRA	8/17-12/31/22	2023	2024-25
$7,500	26	11	8	15
$3,750			4	

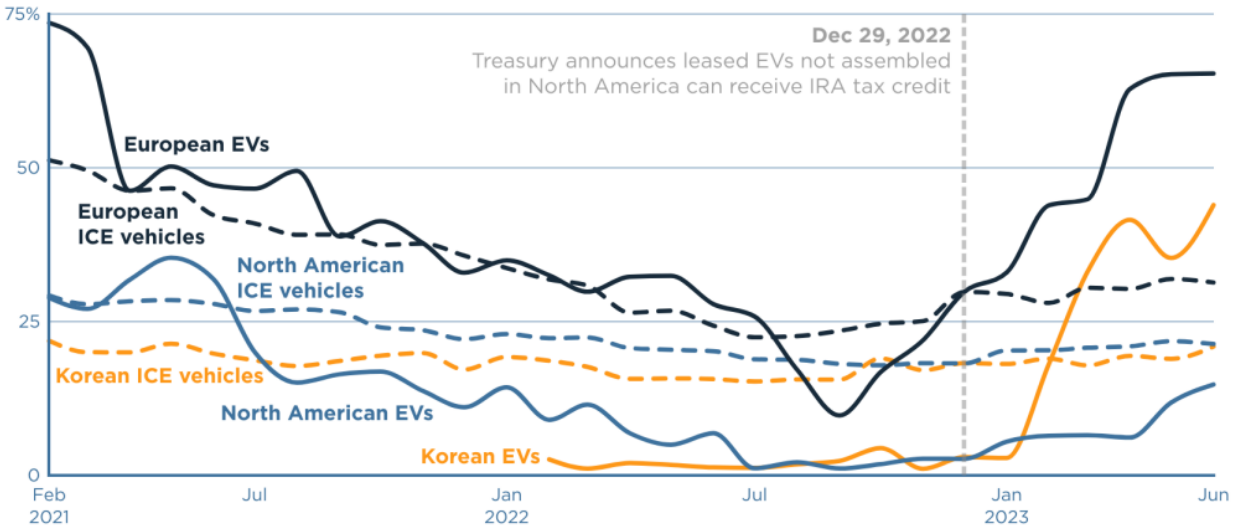
Source: Fueleconomy.com, author's analysis

The lease loophole, enabling auto finance companies to pass on the unrestricted commercial EV tax credit (45W), caused leasing to boom. The consumer purchase tax credit carried not only origin rules (North American assembled, limits on imported content of battery components and critical minerals), but also buyer income and vehicle price caps. Bown (2024) found an immediate jump in leases of EVs from outside North America, as shown in Chart 10.[45] BEVs and PHEVs saw sustained higher lease penetration than ICE vehicles, as Chart 11 shows. Alcott et al (2024) found GM and Tesla EVs, however, leased at lower rates than ICE vehicles.[46]

Chart 10

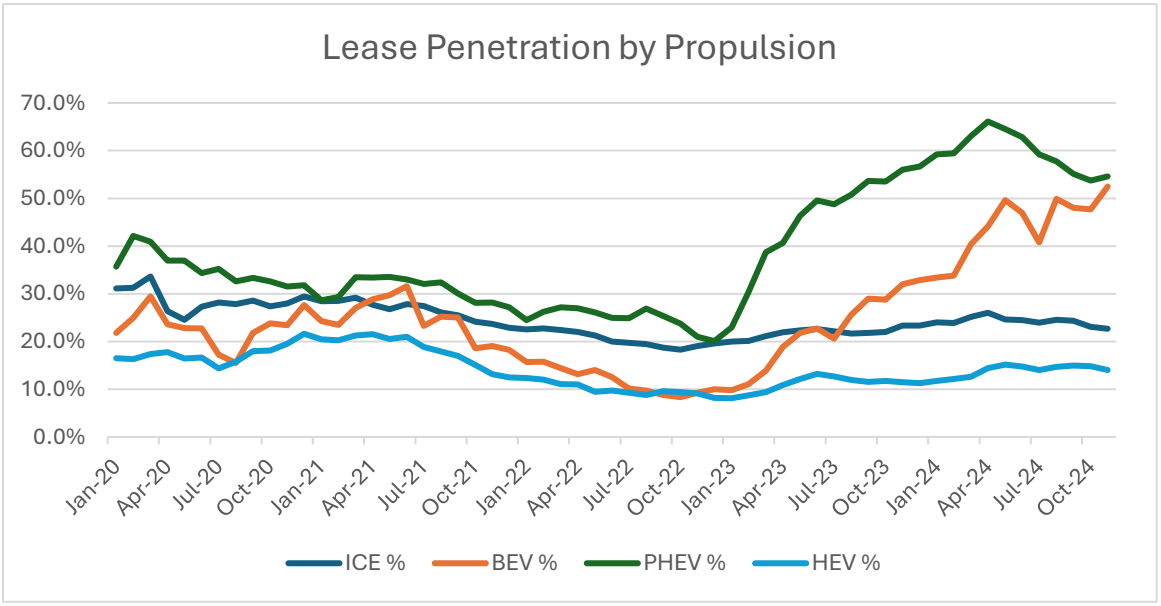
Leases for electric vehicles in the US have increased since the eligibility for IRA tax credits expanded, especially sharply for Korean models

Leases as a share of all new vehicles entering US market by vehicle type, 2021–23, percent



Source: Chad P. Bown, "How the United States solved South Korea's problems with electric vehicle subsidies under the Inflation Reduction Act," Peterson Institute for International Economics working paper 23-6, July 2023.

Chart 11



Source: Cox Automotive.

As to the effect of the 100% EV tariffs, Chinese EV imports stayed near zero, with only a trickle of luxury Polestar and Volvo EVs that had already begun entering the U.S. market.

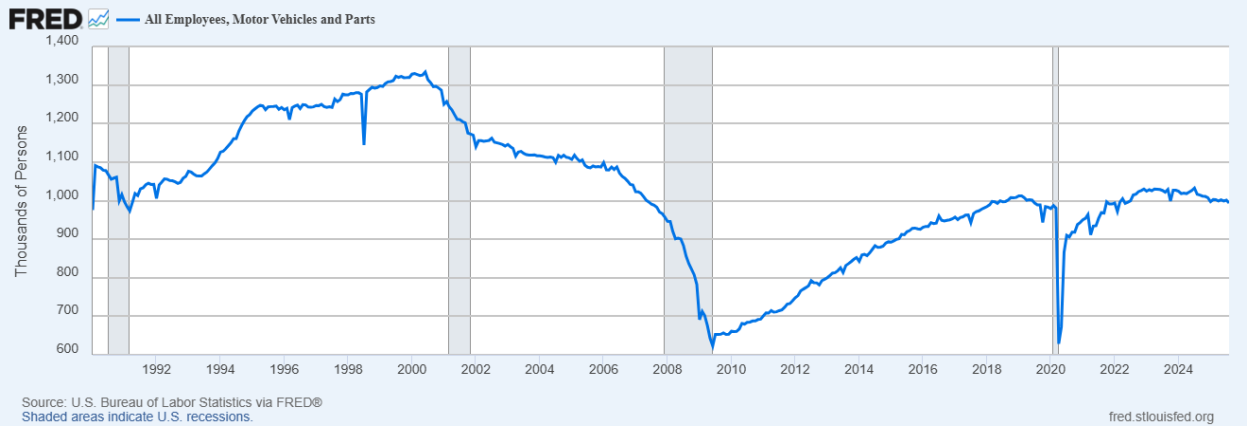
Removing the EV tax credit lifted a barrier to Chinese EVs and batteries. For consumer purchases, the $7,500 tax credit required zero Chinese content in either the critical minerals or the battery components. Not only did that apply to EVs imported from China, but it was a barrier against Chinese automakers making EVs in North America (especially lower cost Mexico) unless there was zero Chinese battery content. While such Chinese EVs could have been leased and gained the credit through the lease loophole, leasing is financially more demanding than selling. Leasing is generally through an auto finance company related to the automaker, so new market entrants would need to create one (whereas vehicles buyers can finance purchases through an unrelated bank). In addition, leasing puts more demands on a finance company's balance sheet than a comparable loan because the principal is not paid down over time.

How should we assess Trump auto industrial policy?

I suggest tracking the following measures to assess the success of the Trump Administration's auto policies:

- U.S. auto production, in units and share of U.S. sales
    - If tariffs yield more expensive vehicles and falling sales, an increase in production is at best a mixed success.
- U.S. auto parts production, in value, inflation adjusted
- U.S. auto jobs, as one automaker response may be to increase automation, both to offset higher U.S. labor and other costs, and to keep pace with increased automation in China.
    - Doing so could limit the cost disadvantage of producing domestically.
    - U.S. auto jobs today are about on par with 2018-19 and 2007, following a very gradual recovery after the Great Recession, as Chart 12 shows.
- New vehicle CPI
    - Quality-adjusted, are prices rising?
- EV share of production and sales in absolute and vs. other major markets.
    - Has the U.S. fallen behind technologically? If so, that is not a success, but a future vulnerability.

Chart 12



How the U.S. could hold its ground, or even win

EVs are the auto market of the future, and a still nascent one. Leapfrogging is possible, as demonstrated by BYD overtaking Tesla in 2024 EV sales (including PHEVs). China will not necessarily hold its current advantage in the EV market. Keep in mind that China and Europe are only a few years ahead of the U.S., as Chart 5 shows. Industrial policy can help position U.S. industry; market failures, including national security considerations, can justify targeted policies of limited duration.

Enabling the U.S. to be an auto producer into the future demands EV production and diversified supply chains. That means easing China's critical mineral and rare earth dominance while swiftly becoming efficient at making EVs and batteries. Developing critical mineral and rare earth processing that is low cost and less environmentally damaging should be a priority. Government-funded research, competitions, and public-private partnerships offer productive avenues.

Batteries are the lynchpin of the EV market, with massive investment around the globe, public and private. The holy grail is commercializable solid state. Breakthroughs seem likely, but who will win is unclear. Investing in battery research—public, private, and joint—including through the U.S. Department of Energy and national labs, can improve the odds that the U.S. leapfrogs the competition.

Tariffs on Chinese EV and battery imports enable the U.S. to scale EV production, learn, and improve production efficiency during the Chinese EV maker shakeout and price war. (Other tools or lower tariffs might have been effective, but the EV tariffs are in place; and the Clean Vehicle Tax credit, with its anti-China provisions, is gone. Again, slow scaling of EV production signals that EV-specific learning is involved, even by experienced auto manufacturers.) However, the EV tariffs should have a well-defined phase-out schedule to compel U.S. EV manufacturing to drive to international competitiveness. Once the connected vehicle rule is in force, banning imports of Chinese vehicles with any connectivity software effective model year 2027, that should serve as an effective barrier against Chinese EV imports. The tariffs should sunset by a date tied to the connected vehicle rule, and certainly within five years.

Incentives to speed EV adoption remain valuable, although the Trump Administration has dismantled many of them, in inducing faster scaling and efficiency of U.S. battery and EV production. More extensive automation of production (through dark factories, robots) has the potential to narrow China's advantage in labor and real estate costs.

Last, to maximize the chance for a vital U.S. auto industry, all our auto industrial policy should phase out, creating the incentive for U.S. companies to be internationally competitive by a date certain.

ENDNOTES

[1] Protecting domestic production with tariffs, however, reduces competition and can therefore lead to other forms of inefficiency.
[2] Jack Stewart, "Tesla Delays Its Model 3 Production Goals-Again," *WIRED,* January 3, 2018, https://www.wired.com/story/musk-model-3-tesla-production-delays-january/.
[3] Mike Colias, "Mary Barra Spent a Decade Transforming GM," *Wall Street Journal*, December 16, 2024, https://www.wsj.com/business/autos/mary-barra-spent-a-decade-transforming-gm-it-hasnt-been-enough-d82f4c5a.
[4] Lyndon B. Johnson, *Proclamation 3564—Proclamation Increasing Rates of Duty on Specified Articles*, January 7, 1964, *The American Presidency Project*, University of California, Santa Barbara, https://www.presidency.ucsb.edu/documents/proclamation-3564-proclamation-increasing-rates-duty-specified-articles
[5] Council of Economic Advisers, *Economic Analysis of the Car Allowance Rebate System (CARS)* (Washington, DC: Executive Office of the President, 2009), https://obamawhitehouse.archives.gov/node/5397
[6] R.D. Norton, "Industrial Policy and American Renewal," *Journal of Economic Literature*, March 1986, Vol. 24, No. 1 (Mar. 1986), pp. 1-40.
[7] Donald J. Trump, *Proclamation 9705: Adjusting Imports of Steel Into the United States*, March 8, 2018, 83 Fed. Reg. 10949.
[88] Donald J. Trump, *Adjusting Imports of Aluminum Into the United States*, 83 Fed. Reg. 10917 (Mar. 15, 2018).
[9] U.S. Department of Commerce, Bureau of Industry and Security, *BIS Imposes New Export Controls on Advanced Computing and Semiconductor Manufacturing Items to the People's Republic of China (PRC)*, October 7, 2022, https://www.bis.doc.gov/index.php/documents/about-bis/newsroom/press-releases/3158-2022-10-07-bis-press-release-advanced-computing-and-semiconductor-manufacturing-controls-final/file.
[10] Council on Foreign Relations, "U.S. Economic Security: Winning the Race for Tomorrow's Technologies," Task Force Report No. 83, November 2025, https://assets.cfr.org/images/TFR83_EconomicSecurity_Full_2025-10-30_Final/TFR83_EconomicSecurity_Full_2025-10-30_Final.pdf?_i=AA.
[11] Remarks by National Security Advisor Jake Sullivan on Renewing American Economic Leadership at the Brookings Institution, April 27, 2023; Elaine Buckberg, "Clean vehicle tax credit: The new industrial policy and its impact," Stanford Institute for Economic Policy Research, August 2023.
[12] China is leaning heavily on the Belt & Road program's official lending for infrastructure projects to build relationships with the Global South. The U.S. is pulling back its traditional foreign aid by shuttering the U.S. Agency for International Development.
[13]See, for example, "China Imposes New Controls over Rare-Earth Exports," *Wall Street Journal*, accessed October 10, 2025, https://www.wsj.com/economy/trade/china-imposes-new-controls-over-rare-earth-exports-35a4b106 and "China Flexes Chokehold on Rare-Earth Magnets as Exports Plunge in May," *Wall Street Journal*, accessed October 10, 2025, https://www.wsj.com/world/china/china-flexes-chokehold-on-rare-earth-magnets-as-exports-plunge-in-may-c1adac50?mod=article_inline.
[14] James McBride and Andrew Chatzky, "Is 'Made in China 2025' a Threat to Global Trade?" CFR, May 13, 2019, https://www.cfr.org/backgrounder/made-china-2025-threat-global-trade.
[15] Deese et al., "Global Clean Investment Monitor: Government Support for Electric Vehicles and Batteries," MIT CEEPR Research Commentary, July 2025, https://ceepr.mit.edu/workingpaper/global-clean-investment-monitor-government-support-for-electric-vehicles-and-batteries/.
[16] Deese et al., "Global Clean Investment Monitor: Government Support for Electric Vehicles and Batteries," MIT CEEPR Research Commentary, July 2025, https://ceepr.mit.edu/workingpaper/global-clean-investment-monitor-government-support-for-electric-vehicles-and-batteries/.
[17] Deese, 2025.
[18] Brad Setser, "Will China Take Over the Global Auto Industry," CFR blog, December 8, 2024, https://www.cfr.org/blog/will-china-take-over-global-auto-industry.

[19] Setser, 2024.
[20] Setser, 2024.
[21] Reuters, "Ford Struggles with Supply of Rare Earth Magnets, CEO Tells Bloomberg News," *Reuters*, June 13, 2025, https://www.reuters.com/business/autos-transportation/ford-struggles-with-supply-rare-earth-magnets-ceo-tells-bloomberg-news-2025-06-13/ and Gabrielle Coppola, "Ford Forced to Idle Multiple U.S. Plants on China Magnet Shortage," *Bloomberg News*, June 27, 2025, https://www.bloomberg.com/news/articles/2025-06-27/ford-forced-to-idle-multiple-us-plants-on-china-magnet-shortage
[22] Sam Schechner and Raffaele Huang, "How U.S. Pressured Netherlands to Oust CEO of Chinese-Owned Chip Maker," *Wall Street Journal,* October 14, 2025.
[23] Ryan Felton, Kim Macrael, and Stephen Wilmot, "Automaker Production Stoppages Begin Over Semiconductor Shortage," *Wall Street Journal,* October 29, 2025.
[24] Yoko Kubota and Ryan Felton, "Xi-Trump Deal Leads to Resumed Shipments of Crucial Auto Semiconductors," *Wall Street Journal,* November 1, 2025.
[25] Donald J. Trump, *Proclamation: Adjusting Imports of Automobiles and Automobile Parts Into the United States*, 90 Fed. Reg. 14705 (Apr. 3, 2025). The report itself was not released, but the proclamation states, "Based on the facts considered in that investigation, the Secretary found and advised me of his opinion that automobiles and certain automobile parts are being imported into the United States in such quantities and under such circumstances as to threaten to impair the national security of the United States."
[26] IEA, Global Critical Minerals Outlook 2025, https://iea.blob.core.windows.net/assets/ef5e9b70-3374-4caa-ba9d-19c72253bfc4/GlobalCriticalMineralsOutlook2025.pdf.
[27] IEA, 2025.
[28]IEA 2025.
[29] China Expands Rare Earths Restrictions, Targets Defense and Chips Users," *Reuters*, October 10, 2025, https://www.reuters.com/world/china/china-tightens-rare-earth-export-controls-2025-10-09/
[30] Gracelin Baskaran, "China's New Rare Earth and Magnet Restrictions Threaten U.S. Defense Supply Chains," *CSIS*, October 9, 2025, https://www.csis.org/analysis/chinas-new-rare-earth-and-magnet-restrictions-threaten-us-defense-supply-chains
[31] Josh Chin and Meridith McGraw, "Trump Meets with Xi, Declares Immediate Cut to Tariffs," *Wall Street Journal,* October 30, 2025, https://www.wsj.com/world/china/trump-meets-xi-for-high-stakes-u-s-china-summit-a9c7738f?mod=hp_lead_pos1.
[32]Statista.com, https://www.statista.com/statistics/292590/global-crude-oil-production-opec-share/.
[33] Department of Commerce, Bureau of Industry and Security, Securing the Information and Communications Technology and Services Supply Chain: Connected Vehicles, 15 CFR Part 791. Published in the *Federal Register on January 16, 2025*.
[34] Elaine Buckberg, "Clean Vehicle tax credit: The new industrial policy and its impact," Stanford Institute for Economic Policy Research, August 2023, https://siepr.stanford.edu/publications/policy-brief/clean-vehicle-tax-credit-new-industrial-policy-and-its-impact.
[35] Undercutting international automakers does not mean Chinese EV makers would offer their vehicles here at Chinese prices. When I have compared the Chinese and EU prices of several Chinese EV models sold in both markets, I find that the European prices are about twice Chinese prices—and this was true before EU tariffs on Chinese EVs.
[36] Buckberg, 2023.
[37] Senate Finance Committee, *Clean Energy for America Act: Chairman's Mark Summary* (Washington, DC: U.S. Senate, May 2021), https://www.finance.senate.gov/download/clean-energy-for-america-act-chairmans-mark-summary
[38] Donald J. Trump, *Proclamation: Adjusting Imports of Automobiles and Automobile Parts Into the United States*, 90 Fed. Reg. 14705 (Apr. 3, 2025).
[39] Donald J. Trump, *Unleashing American Energy*, Executive Order 14154, 90 Fed. Reg. 5947 (Jan. 29, 2025).
[40] Johnson, 1964.
[41] See, for example, Kurt Nagl, "Fallout from aluminum supplier plant fire spreads beyond Ford to Stellantis," *Automotive News*, October 16, 2025.

[42] Manufacturing Institute and Deloitte, "Competing for talent: Recasting perceptions of manufacturing, 2024, https://www.themanufacturinginstitute.org/wp-content/uploads/2022/03/DI_ERI-The-workforce-experience-in-manufacturing-Does-manufacturing-need-to-recast-its-image_final-copy-1.pdf.
[43] Rhodium Group, "Global Clean Investment Monitor: Electric Vehicles and Batteries," June 18, 2025, https://rhg.com/research/global-clean-investment-monitor-electric-vehicles-and-batteries/.
[44] Author's analysis of Cox Automotive, *Electric Vehicle Sales Report Q4 2024*, https://www.coxautoinc.com/wp-content/uploads/2025/01/Q4-2024-Kelley-Blue-Book-EV-Sales-Report.pdf.
[45] Chad P. Bown, "How the United States solved South Korea's problems with electric vehicle subsidies under the Inflation Reduction Act," Peterson Institute for International Economics working paper 23-6, July 2023.
[46] Alcott et al, "The Effects of 'Buy American': Electric Vehicles and the Inflation Reduction Act," NBER Working Paper 33032, December 2025.