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The Impacts of Government Policy on Electric Vehicle Adoption and Economic Development Across the U.S.

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ABSTRACT: In the past few years, many governments have pursued policies such as tax rebates/incentives and charging station infrastructure investment to promote electric vehicle (EV) adoption and curb emissions. While many studies have examined the impact of these measures on EV adoption and the economy, findings vary due to different markets and economic landscapes. There is also limited research on the effectiveness of EV policies on a state-by-state basis in terms of EVs per capita. This paper analyzes state and federal government EV policies to determine how they affect EV adoption and consumer behavior, EV production, private investment, manufacturing capacity, employment, and the automotive industry. It also focuses on the factors that influence government EV measures, and how EV adoption compares across different states in the U.S. This study uses data on EV sales over time, charging stations, and tax incentives across all 50 states, and references the number of EVs per capita per state as a baseline for comparison. This study's findings reveal correlations between state policies and EV growth, factors that influence state policies and consumer adoption, and the practical and economic implications of current and future federal EV policy.

KEYWORDS: Behavioral and Social Sciences, Other; Electric Vehicles, Tax Credits, Charging Infrastructure Expansion.

Introduction

Transportation is one of the leading causes of pollution in the world, accounting for nearly 30.9% of all carbon dioxide emissions.[1] In 2022, transportation made up 28% of all greenhouse gas emissions in the U.S., making it the largest contributor of any sector.[2] As a result, many efforts have been made to promote the transition to electric vehicles (EVs) as a sustainable alternative and to reduce emissions.

Two of the main factors that influence consumers' decisions regarding EV purchases are the price in relation to combustion counterparts and the number of charging stations. Thus, policies at the local, state, and national levels have focused on subsidization incentives and infrastructure investments. Since August 2022, there has been a federal tax credit of as much as $7,500, and the government has invested $50 million into expanding EV infrastructure.[1] Additionally, more than 400 incentives have been implemented at the state and local level to promote EV growth since 2008.[3] Many studies have examined the effectiveness of such policies, including the impact on consumer adoption and market development. For instance, Dabush *et al.*'s findings that subsidies lead to higher EV adoption rates correlate with the findings of Wang *et al.*, suggesting that incentives help lower the prices of EVs to be more on par with combustion cars. The study also found that direct subsidies for consumers are more effective than investment in charging infrastructure. More specifically, Narassimhan and Johnson found that among tax incentives, rebates tend to be more effective than credits. However, different markets and consumer demographics can lead to differing conclusions on the effectiveness of policies. For example, Dabush *et al.* recorded that the conclusion Wang *et al.* and Huang *et al.* both came to in their studies of China's EV market was opposite to theirs, finding that subsidies for charging infrastructure were more effective than consumer benefits. This indicates that due to market and socioeconomic variations across countries, EV adoption is influenced by different factors. While this has been examined across countries, there is a lack of research focusing specifically on states in the U.S. that analyzes varying policies and market trends. Furthermore, little has been found on how EV adoption and the market fluctuate under different federal policy measures in the U.S. As the federal incentive for EVs is repealed under provisions of Trump's One Big Beautiful Bill Act, the future of EVs is unclear, especially as the tax credits have not been eliminated since their implementation.

This study investigates the extent to which government subsidies, charging infrastructure investment, and federal policy impact EV market adoption and economic prospects in the transportation sector across the U.S., drawing upon empirical evidence from states and research regarding the impact of such incentives.

The findings in this study demonstrate that there is a strong correlation between EV adoption and tax incentives and infrastructure investment in many states. This positive relationship indicates that a lowering or absence of such policies, possibly due to shifting national political agendas, can lead to less EV adoption. Furthermore, without strict regulations such as emissions standards, automakers can be less inclined to manufacture EVs, and private investors may be less incentivized to expand charging infrastructure, leading to an even smaller supply and market. While there may be initial fiscal savings for the government not having to fund incentive policies, economic prospects will likely worsen over time due to decreases in manufacturing and innovation in the transportation sector. Granted, state-level incentives may remain to mitigate the effects of eliminating federal support.

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This paper includes secondary data analysis mixed with descriptive statistics, with comparative studies of monetary incentives and infrastructure investment regarding EV sales across all 50 states. Data on EVs, charging stations, and tax incentives/rebates will be used to determine the correlation between policies and EV sales. The number of EVs per capita per state will be used as a baseline for comparison. This study also documents the progression of EV sales in the U.S., with a longitudinal approach to monitor consumer preferences and purchase habits over time, potentially determining causal relationships or long-term effects of policies. Lastly, the federal government's influence will be explored through analyses of various federal policies on EV sales, private investment, manufacturing, and overall economic outlook.

Discussion

Tax Incentives and Rebates Across States:

States EV Incentives:

States with EV tax incentives/rebates tend to have higher rates of EV sales. Since 2008, more than 400 incentives have been issued by local and state governments in the U.S. to promote EVs.[3] The most common are tax credits and rebates. As of 2023, states with subsidy policies include California ($7,500), Connecticut ($7,500), Maine ($7,500), Oklahoma ($5,500), Colorado ($5,000), Oregon ($5,000), Vermont ($4,000), Illinois ($4,000), New Jersey ($4000), Massachusetts ($3,500), Pennsylvania ($3,000), Maryland ($3,000), Virginia ($2,500), Rhode Island ($2,500), Delaware ($2,500 rebate), Kansas ($2,400), New York ($2,000), and Alaska ($1,000).[4] Eligibility for such credits depends on factors like the vehicle's MSRP, final assembly location, battery components origins, and individual or household incomes.

Impact of Government Incentives on EVs:

Dabush *et al.* found that consumers are heavily influenced by government incentives, which lower the price of EVs to be more in line with combustion counterparts. It also found that incentives targeted towards consumers achieve higher rates of adoption in a short period of time, especially in areas with fewer EVs. More specifically, among tax incentives, rebates tend to be more advantageous than credits.[3] However, the efficacy of subsidies varies depending on the specific market. Compared to charging infrastructure investment, consumer subsidies have a greater effect on EV growth as fluctuations in their value more significantly alter EV rates. Doubling a consumer subsidy of $1,875 to $3,750 correlates with a substantial increase in EVs, while a doubling of a charging station subsidy of $50,000 to $100,000 does not. Conversely, a reduction in the consumer subsidy by half leads to a 8.8% decrease in sales, while the same reduction in charging station subsidies only yields a decrease of 0.87% in the first ten years.[1] The larger increase and decrease in EVs when consumer subsidies are doubled and reduced by half, respectively, compared to fluctuations for charging station subsidies, indicate that EV sales are more sensitive to changes in consumer subsidies than charging station subsidies. This suggests that incentives directly for consumers may boost EV sales more, but it doesn't mean those are more effective in the long-run and sufficient for EV policy.

State Incentives and EV per capita by State:

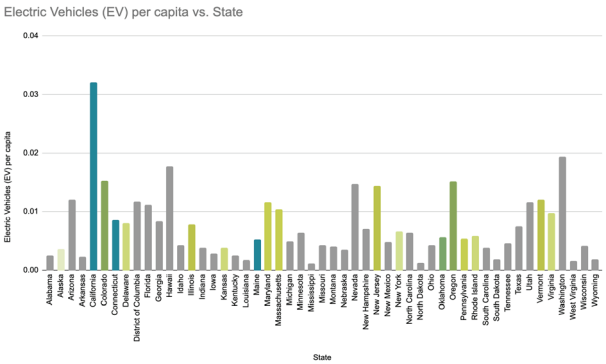

Figure 1: Graphical comparison of EV per capita and state. This graph depicts the number of EVs per capita in each state, with columns color-coded based on the incentive amount. It highlights the trend that states with EV incentives tend to have more EVs per capita.[6]

Table 1: States with the highest EV per capita. This table lists the states with the highest EV per capita from highest to lowest. It illustrates that states with EV incentives have more EVs per capita and that having a larger incentive tends to correlate with a higher ranking. [6]

Rank	State	EV per capita
1	California ($7,500)	0.0321
2	Washington	0.0194
3	Hawaii	0.0178
4	Colorado ($5,000)	0.0153
5	Oregon ($5,000 rebate)	0.0151
6	Nevada	0.0147
7	New Jersey ($4000 rebate)	0.0144
8	Vermont ($4,000)	0.012024
9	Arizona	0.012017
10	District of Columbia	0.0118
11	Utah	0.011617
12	Maryland ($3,000)	0.011597
13	Florida	0.0111
14	Massachusetts ($3,500)	0.0104
15	Virginia ($2,500)	0.0097
16	Connecticut ($7,500)	0.0087
17	Georgia	0.0084

From Figure 1, it appears that states with some form of EV tax incentive tend to have higher rates of EVs per capita, graphically. California has the highest EV per capita by far, and it also has the most generous EV incentive policy. States with the lowest EV per capita are overwhelmingly those without any EV incentive. From Table 1, 9 out of the 17 states with the highest EVs per capita have some form of EV tax incentive, which supports that monetary incentives lead to increased rates of EVs, but also indicates that there are other factors at play. Exceptions may exist because federal incentives apply even if states do not offer their own incentives. Additionally, states without separate tax incentives may still have high EVs per capita through other forms of incentives, such as charging rebates, reduced charging fees, free EV parking, HOV lane

access, and more. These factors show that EV rates are not dependent on just tax subsidies. Another trend is that states with more EVs per capita and/or that have EV tax incentives tend to be blue. In fact, 6 of the 8 states in Table 1 that do not have state-level tax incentives but still have high rates of EVs per capita are primarily Democratic-leaning. This backs up the research of Sintov *et al.*, which determines that Democrats buy EVs at higher rates than Republicans, thus areas with Democratic majorities will tend to have more EVs, meaning political ideology is also a factor.

From the secondary data analysis and descriptive data correlation statistics, it is clear that tax incentives/rebates promote EV adoption, but possibly to a limited extent, as the presence of outliers (8 of the 17 states not having such policies) implies there are other potential confounding variables.

Charging Infrastructure Across States:

Federal and State EV Infrastructure Policies:

States with more charging infrastructure tend to have higher rates of EVs, with many state and federal policies expanding EV charging station infrastructure. The Bipartisan Infrastructure Law, also known as the Infrastructure Investment and Jobs Act (IIJA), passed in November 2021, provides $7.5 billion for constructing a nationwide EV charging station network, with particular focus on developing infrastructure in rural and disadvantaged areas.[5] $5 billion will go to states as part of the National Electric Vehicle Infrastructure (NEVI) Formula Program for adding charging stations along corridors and highways from 2022-2026, which could help finance a minimum 33,000 charging ports.[6,7] At the end of 2024, 12 states used NEVI funds to implement 44 public charging stations.[8] $1.25 billion will go towards the Charging and Fueling Infrastructure Grants to build EV infrastructure on public roads, schools, parks, and parking in areas of highest need (i.e., rural, low-income, multi-family units).[6] In addition to helping the environment, this legislation creates jobs, improves infrastructure, and strengthens American competitiveness in the transportation and technological sectors.[9] Some states have implemented their own funding, such as California's $1.4 billion investment and New York's $60 million investment, while local governments fund and install charging stations on government-owned land and work with private interests to expand EV infrastructure investment.[10,11] The private sector also plays a large role, with companies like ChargePoint, Tesla, EVgo, Electrify America, and Blink Charging expanding their charging networks.

EV Charging Stations in the U.S.:

As of January 2025, all 50 states have EV charging stations, with a total of 69,679 public charging stations and 195,874 public charging ports. U.S. EV infrastructure has dramatically expanded in the past few years to address the surge in EVs, multiplying by more than 6 times since 2016. However, it continues to be more abundant in urban areas with more EVs. California takes the lead with 49,128 public EV chargers (triple that of any other state), followed by New York (15,890), Florida (11,100), Texas (10,629), Massachusetts (8,426), Washington (6,427), Georgia (5,867), Colorado (5,627), Pennsylvania (4,937), and Virginia (4,908). Though more charging stations are not indicative of more chargers for drivers. The density of EV chargers is highest in northeastern states. For the average number of public EV charging stations per 10 square miles, Massachusetts ranks first (8), followed by Connecticut (6), Rhode Island (5), New Jersey (5), Maryland (4), California (3), New York (3), Delaware (3), Florida (2), and Vermont (1).[12]

Types of Chargers:

There are also different types of chargers. Around 74% of EV chargers in the U.S. are Level 2 chargers, which typically charge at a rate of around 10-20 miles per hour, while 25% are DC (direct current) fast chargers that charge much quicker at around 180-240 miles per hour. DC fast chargers have increased rapidly since 2016, growing by 14 times, and are usually found along frequented U.S. highways.[12]

Charging Infrastructure and EV per capita By State:

Table 2: Top 15 states with the highest EV Charging Ports per capita. This table lists the states with the most EV Ports per capita from highest to lowest. States with more EV Ports per capita tend to have high rates of EVs per capita.[6]

State	EV Ports per capita
Vermont	0.00193
District of Columbia	0.00161
California	0.00148
Massachusetts	0.00135
Connecticut	0.0012
Colorado	0.0011
Maine	0.001
Oregon	0.0009128
Washington	0.00091276
New York	0.000895
Maryland	0.00084
Rhode Island	0.00076
Nevada	0.00075
Utah	0.00075
Delaware	0.00070

Table 3: Top 15 states with the highest EVs per capita. This table lists the states with the most EVs per capita from highest to lowest. States with more EVs per capita tend to be those with more EV Ports per capita.[6]

State	EV per capita
California	0.0321
Washington	0.0194
Hawaii	0.0178
Colorado	0.0153
Oregon	0.0151
Nevada	0.0147
New Jersey	0.0144
Vermont	0.012024
Arizona	0.012017
District of Columbia	0.0118
Utah	0.0116
Maryland	0.01159
Florida	0.0111
Massachusetts	0.0104
Virginia	0.0097

*Bolded are states that appear on both lists

According to Table 2 and Table 3, 10 of the 15 states with the most EV charging ports per capita are in the top 15 for the highest EVs per capita. This represents that there is a correlation between EV charging ports and the number of EVs, with more charging infrastructure potentially resulting in more EVs. However, this correlation is not perfectly linear, as the order is relatively random, suggesting other confounding factors may affect the link between charging ports and EV adoption.

Impact of Charging Infrastructure on EVs:

Some studies have found the availability of charging stations to be an indicator of EV sales.13 Fast chargers are especially influential in promoting EVs and make up the largest portion of infrastructure finances that are being used to bolster EV adoption.

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Government Subsidization of EV Charging Infrastructure:

Government incentives are important when it comes to charging infrastructure due to the discrepancy over whether increased charging stations lead to more EVs or if more EVs lead to more charging infrastructure. Additionally, EV chargers are not economically desirable due to high upfront costs and potential low returns (with revenue based on the number of kilowatts being charged). Thus, government subsidies for charging infrastructure are important to encourage investment that promotes EV growth. Charging station subsidization may also be more economically attractive than direct consumer subsidies when it comes to stimulating EV adoption, which could make it more strategic even if it is less effective than direct incentives.[13] Future research could focus specifically on how consumer incentives fare in comparison to charging station investment to see which leads to the most EV growth at the lowest cost.

It appears that even if charging infrastructure does not have as strong an effect on EV adoption, it still influences how likely a state is to have a high number of EVs. Additionally, states with more charging ports per capita tend to have more EVs per capita, suggesting that without charging infrastructure, EVs would not be as abundant.

Progression of EV Growth & Other Factors:

EV sales have greatly increased over time as a result of private investment and greater government support, though other factors also play into their growth in recent years.

Progression of State Subsidies:

From 1990 to 2009, before many new EVs hit the market, 9 states had EV sales subsidies. There was an increase of 14 states from 2010 to 2018. In 2015, the number of state subsidies reached a high of 17 before dipping to 13 in 2018 as states repealed such measures. From 2010 to 2018, more states adopted annual EV fees, with California, Colorado, and Oregon having both subsidies and fees in place.[14]

Timeline of Federal EV Policy:

Federal EV policy has changed throughout the years. In 2008, the Energy Improvement and Extension Act established the first consumer tax credits for EVs, which only applied to the first 250,000 battery and plug-in hybrid (PHEV) vehicles of specific battery sizes sold. In 2009, the American Recovery and Reinvestment Act changed the cap from 250,000 total to 200,000 per manufacturer. In 2022, the Inflation Reduction Act renamed the EV tax credit the Clean Vehicle Credit, removed the manufacturer sales cap, made Fuel Cell Electric Vehicles (FCEVs) eligible, stipulated requirements for final assembly in North America and mandates for minerals and battery part origins, and implemented limits on automakers' suggested retail price (MSRP) and consumers' modified adjusted gross income. In 2025, the One Big Beautiful Bill Act eliminated the Clean Vehicle Tax Credit for all EV sales after September 30, 2025.[15]

Other Factors:

Many other factors also affect EV adoption in terms of it being a type of new technology, such as time, awareness, knowledge, and the number of EV models. General barriers to new forms of technology include lack of knowledge, high upfront prices, and low risk tolerance, but these barriers can be alleviated through education, higher income, and environmental awareness. For the most part, more widespread knowledge about EVs has led to higher acceptance and use. Additional factors include electricity price, emission regulations, gasoline costs, and urban road use, though these vary significantly across states. For example, Vermont is most sensitive to electricity prices, while New Jersey is most sensitive to urban road use and incentives.[16] This alters states' focuses when attempting to increase EV adoption. Buckberg notes that dramatic increases in EV sales were brought on by high gas prices that made EVs the more financially sound option, and lower battery costs, which led to more affordable EV models with longer ranges. External factors can also affect EV adoption. For example, the minimal number of EVs in 2005 and 2006 was due to Hurricane Katrina, and a similar result in 2008 was because of the financial crisis. Still, time trend models indicate that time increases the number of EVs as consumers are more willing to buy into new technology that becomes further developed and researched.[13] These findings reveal that other factors contribute to shifting consumer preferences and increasing EVs over time, implying that surges in EVs should not be attributed to just tax incentives and EV infrastructure expansion.

Net Environmental Benefit:

As renewable energy sources and natural gas infrastructure expanded into the electricity grid while coal power plants decreased over time, the net environmental benefit of EVs (identified by Holland *et al.* as "the avoided pollution damages from a gasoline-powered vehicle minus the pollution damages from the power plant generating the electricity used to charge the EV") increased in all regions of the U.S. Specifically, Holland et al's study analyzing the average annual net environmental benefit of a Ford Focus EV compared to its gas version found that from 2010-2017, it increased from $75 to $107 in Texas, $233 to $258 in the West, and -$192 to $205 in the East.[14] This increase in net environmental benefit means EVs are increasingly more beneficial for the environment, which makes states more willing to incentivize them to reduce greenhouse gas emissions. Thus, another factor influencing EV sales is how much more environmentally friendly they are compared to gas counterparts.

While growth in EV sales was likely most influenced by consumer subsidies and expansion of charging infrastructure, there is evidence that other factors shape consumer decisions. This is crucial as it shows that tax and charging policies are not the only areas to focus on in attempting to increase EV sales.

Federal Policy Influences:

Federal policies have a large influence on private-sector investment, manufacturing, and the cost of purchase, thus affecting EV adoption and the rate of innovation. Government

tax incentives, subsidies, financing for research or development, and others can encourage EV adoption and stimulate the private sector to invest. In fact, Tesla's growth was largely supported by government policies like tax credits and subsidies. Government mandates (i.e., renewable energy baselines, EV quotas, EPA guidelines) can further prompt the private sector to act to comply with such standards. EV infrastructure relies on partnerships between the government and private companies.[17]

Inflation Reduction Act:

One such government policy that had a large impact on EVs was the Inflation Reduction Act (IRA), passed in August 2022. The following sections examine the impact of the IRA on EV growth and investment, employment, manufacturing, and clean energy projects.

EV Growth:

The IRA did not result in an immediate increase in EV adoption, partly due to stringent guidelines that originally disqualified 15 EV models from tax credits.[18] Overall, however, it does appear that the IRA is supporting a steady increase in EVs over time, as evident in Figure 2. In fact, compared to years prior, 2023 had the highest number of EV sales in the U.S. at 1.46 million—a 50% increase from 2022.[19] This is important as it shows that government policies are effective in increasing consumer demand for EVs.

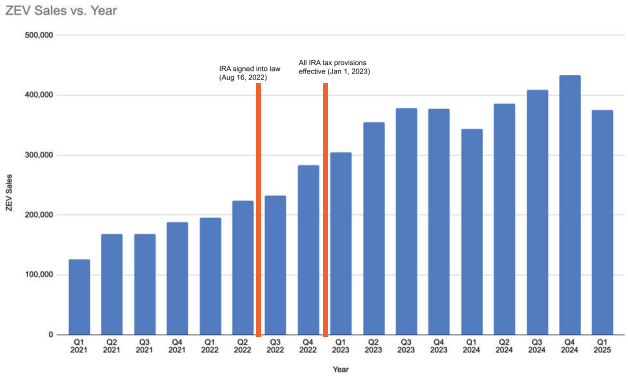

Figure 2: Growth of ZEVs from 2021 to 2025. This graph depicts the number of ZEV sales in each quarter of 2021, 2022, 2023, and 2024, and quarter 1 of 2025. It shows a steady rise in ZEVs and an increase following the IRA.[28]

EV and Clean Energy Investment:

Due to the IRA, many private companies invested extensively to produce EVs, batteries, and other clean energy elements, which has led to the creation of thousands of jobs, growth in local economies, and the U.S.'s lead in the sustainable energy transition. Despite the IRA being heavily opposed by Republicans, many of these major projects are located in Republican congressional districts, as indicated by Table 4. Before the IRA, EV investment was already higher in Republican-led areas, but the IRA enlarged the difference in EV investment between Republican-led districts and Democrat-led districts from $6.1 billion to $14.5 billion.[20] This trend may be primarily due to Republican districts representing more rural areas, which are particularly suitable for large-scale EV factories because of the availability and affordability of land, lower labor costs, and access to mineral resources. Regardless, this outcome suggests that federal EV policy especially boosts investment and economic prospects in Republican-majority areas.

Table 4: Republican congressional districts with major post-IRA clean energy manufacturing projects such as gigafactories, EV assembly facilities, battery recycling operations, and lithium extraction sites. This table indicates that many of these projects are located in Republican congressional districts, leading to increased investment and job creation.[20]

Congressional District	# Projects Underway	Planned jobs	Capital investment
Nevada, District 2	16	14,805	$14.3B
Missouri, District 1	1	2,000	$3.0B
South Carolina, District 1	4	4,660	$4.0B
Indiana, District 2	3	1,617	$3.5B
Ohio, District 15	3	3,550	$4.4B
Tennessee, District 7	4	944	$3.4B
Michigan, District 5	2	1,700	$2.6B
Georgia, District 1	4	12,640	$9.0B
South Carolina, District 4	7	1,440	$2.5B
Arkansas, District 4	3	100	$2.6B
Oklahoma, District 2	3	1,920	$2.2B

Employment:

The IRA is estimated to have generated ~109,026 jobs in the U.S. EV sector, and to result in a net job creation of 118,000+ jobs in the U.S. car, battery, and charging sectors from 2026 to 2030.[21, 22] This shows that federal EV policy further bolsters the economy by significantly increasing job creation.

Manufacturing:

The IRA also boosts domestic manufacturing and supply chains while limiting foreign influence through Section 30D New Clean Vehicle Tax Credit which requires that EVs be assembled in North America, comprise of battery parts mainly from North America, and use critical minerals that are made, handled, or recycled in North America or countries with free trade agreements (FTA) with the U.S. to be eligible for the federal tax credit. Cars are automatically ineligible if they use battery parts from a Foreign Entity of Concern (FEOC), which are any type of entity that is based in or owned by China, Iran, North Korea, or Russia. These provisions incentivize automakers to produce cars in the U.S. and use parts sourced domestically. Section 45X Advanced Manufacturing Production Tax Credit further promotes domestic production as it directly subsidizes the production of U.S. batteries and the mining, processing, and recycling of critical minerals.[18] According to Buckberg 2023, these two sections have backed over $85 billion in investment towards EV vehicle assembly and battery production facilities in the U.S., providing some 100,000 American jobs. This exemplifies how EV policy facilitates economic activity through increased domestic production.

Federal Policy Repeal Impact:

With President Trump back in office, the future of EV federal policy could be at stake. In addition to the Clean Ve-

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hicle Tax Credit being phased out after September 30, 2025, Trump has signaled doing away with federal regulations for vehicle emissions and government funding for EV charging infrastructure expansion. The following sections examine the potential impacts changes to government policies under the second Trump administration may have on the EV vehicle market and U.S. manufacturing.

EV Sales:

If EPA car emissions guidelines and the federal government's EV tax credits are repealed, EV sales could decrease 30% in 2027 and 40% in 2030 compared to if policies remained, as illustrated by Figure 3. Additionally, the projected percentage of new cars sold that are EVs could go from 18% to 13% in 2026 and 40% to 24% in 2030. In 2030, there could be 8.3 million fewer EVs or PHEVs in the U.S.[23] Another study estimates that Trump removing the EV tax credits will cut the portion of new cars in 2030 that are EVs from 48% to 42%, and save $168.5 billion from 2026-2035. However, it would decrease EV adoption and significantly increase emissions, with the 2030 baseline prediction going up 20.3 million metric tons.

Furthermore, ending the NEVI program would decrease the EV portion of new car sales by 3.2 percentage points, while removing all IRA and IIJA EV measures would lead to a decrease of 14 percentage points.[24] Elimination of clean air and vehicle emissions regulations, like Congress's recent repeal of California's vehicle emissions waiver that outlined the goal of all new car sales being zero-emission by 2035, will also drive down demand and manufacturing of EVs. Similarly, the removal of fines for car manufacturers that do not meet Corporate Average Fuel Economy (CAFE) standards will not only disincentivize automakers from producing more fuel-efficient vehicles, but ends an added revenue source for EV manufacturers who previously profited from selling zero-emission credits to manufacturers that did not meet guidelines.[25]

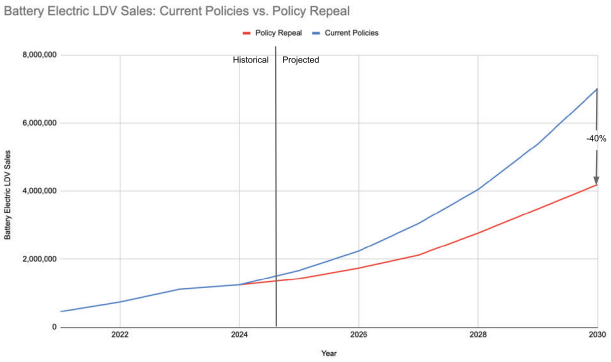

Figure 3: Projected EV Sales after Policy Repeal. This graph illustrates the number of battery electric LDV sales in a scenario with current policies in place and in a policy repeal scenario. By 2030, there are projected to be 40% less sales with a policy repeal scenario compared to current policies being in place.[23]

Tariffs:

Another policy that could impact EVs is tariffs. As of May 3, 2025, there is a 25% tariff on imported car parts, with possible future expansion of the tariff to cover other parts.[26] While parts coming from Canada and Mexico are exempt, these tariffs could impact prices of all cars in the U.S., though it is not clear if it would have unique repercussions for EVs specifically.[23] More research needs to be conducted, especially considering EVs' heavy reliance on components like batteries and critical minerals.

Manufacturing:

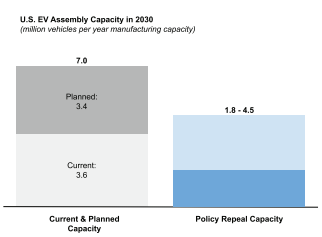

Figure 4: U.S. EV Assembly Capacity. This graph shows the amount of EV assembly capacity needed in 2030 if current policies remain in place and if policies are repealed. It illustrates that a policy repeal would lead to a significant reduction in the amount of EV assembly capacity needed.[23]

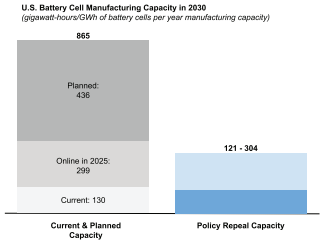

Figure 5: U.S. Battery Manufacturing Capacity. This graph shows battery cell manufacturing capacity needed in 2030 with current policies and a policy repeal. It illustrates that a policy repeal would lead to a significant reduction in the amount of battery cell manufacturing needed.[23]

U.S. EV manufacturing could significantly drop if EV tax credits are repealed. Figure 4 indicates that the scale of EV manufacturing needed with no EV tax credits is significantly less than the current and planned scale that accounts for EV tax credits being in place. In fact, the current capacity could even meet the capacity needed under a repeal scenario. This suggests that future expansion of manufacturing capacity currently being planned or constructed will be futile, and that some current manufacturing plants may close due to low demand. In fact, up to 100% of planned EV assembly facilities and 50% of current ones could be closed or called off. The repeal of EV tax credits would also lead to large excesses of battery cell manufacturing capacity, which would even render 2025 levels to be higher than needed, as is apparent from Figure 5. Of all battery cell manufacturing facilities currently or on track to be running by the end of 2025, an estimated 29% to 72% would not be needed and could shut down. All planned projects would likely be scrapped. This endangers the U.S.'s battery manufacturing boom, potentially halting it completely. Domestic production would be affected, including EV and battery component producers in the U.S. and critical minerals suppliers, processors, and recyclers, as there becomes a significant dip in demand for EVs and battery cells made in the U.S. It is clear that a repeal of federal EV credits and other changes in government policy would have large repercussions for the EV market and manufacturing in the U.S.

Private Sector Investment:

The government also significantly influences private investment in EV infrastructure. If it were to adopt an unfavorable EV policy, the future EV market could be unpredictable, which steers investors away for fear of not turning a profit. This uncertainty, along with the irreversible and flexible nature of investment, leads to the opportunity cost of the timing of in-

vestment, creating optionality for investors.[13] This could delay or even eliminate private sector investment. Thus, not only does the federal government impact whether or not incentives are repealed, but it can also create an unfavorable EV market that deters private investors. This phenomenon is especially true in rural areas with low competition and demand, resulting in inequality as areas with less EV demand continue to lag with no federal government help.

State Policies:

State policies may remain in place, which can partially alleviate the negative impacts of limited federal measures. In addition to tax rebates/incentives and charging infrastructure investment, there are several other policies that states have implemented. These include New Jersey's law for EVs to make up 85% of all light-duty vehicle (LDV) sales by 2040; Massachusetts', New York's, and California's mandates for zero-emissions vehicles (ZEVs) to make up 100% of all passenger LDV sales by 2035; and Washington's requirement for 100% of LDV sales to be ZEVs by 2030.[27] However, there are also several factors that affect state EV policies. The first is state politics, and which party is in power. Between 2010 and 2016, the Republican Party gained many seats in state elections. In 2010, 24 governors were Republican, and 14 states had Republican majorities in state legislatures, while in 2018, there were 33 Republican governors and 32 Republican-majority state legislatures. A political party can determine environmental ideology, which can affect the implementation and ratification of EV policies. Specifically, the Republican takeover of the House of Representatives in 2010, the Senate in 2014, and the presidency in 2017 led to more opposition surrounding environmental policies as the average League of Conservation Voters (LCV) score for the Senate and House dropped from 52 to 45 from 2010 to 2018.[14] (LCV scores are yearly gauges of how a state's congressional members vote on legislation relating to the environment.) Republican majorities can hinder the passage of EV policy, which impacts demand. Another factor is how environmentally friendly EVs are, measured by their net environmental benefit. A higher net environmental benefit means that EVs are more beneficial to the environment, which makes them more appealing, both for consumers and states. One factor that could turn states away from implementing beneficial policies or even start instituting disadvantageous measures is the economic impact of EVs. Fuel taxes are one such economic factor, as states rely on revenues generated from the tax to fund road infrastructure and other projects relating to transportation. EVs are predicted to lower fuel tax revenues by $200-$900 million by 2025.[14] This reduction may make states less inclined to incentivize EVs or even start charging annual EV fees to make up for losses.

Overall, the federal government has a large sway over EV sales due to its impact on private sector investment and financial support for subsidies and expansion. It can significantly boost manufacturing, employment, and investment into clean energy through its policies, as seen by the IRA. But a removal of such measures could be devastating for EV sales and manufacturing and would result in major environmental and economic consequences. However, states are affected by many other factors that make their decisions to implement EV policies less dependent on the federal political landscape, which could mean that states can take the lead in promoting EV adoption when the federal incentives are not there. Nonetheless, more research needs to be done on how EV sales can fluctuate due to different presidencies and federal political landscapes, and how this affects economic outlooks as the U.S. sees less manufacturing and job growth, and clean energy project investments dwindle. The U.S. could also be more behind on EV research and innovation when there is less incentive and demand for manufacturers to produce EVs. This is especially pertinent as many countries around the world, particularly China, are attempting to lead the EV sector with technological innovation and investment into research.

Conclusion

Tax incentives and rebates are the most common form of EV subsidies, and many studies have found them effective in increasing EVs, and to a larger extent than charging infrastructure investment. Tax incentives generally indicate higher EV per capita, with 9 of the top 17 states with the highest EVs per capita having some form of incentive. There have been many policies expanding EV charging infrastructure, most notably the NEVI program under the IIJA. States and private companies have also contributed. In addition to increasing charge ports, these measures also help create jobs and strengthen American competitiveness in the transportation and technological sectors. While all 50 states have charging stations, they are still primarily clustered in urban areas or places with more EVs. Most states that have high EV charging ports per capita also have high EVs per capita. However, the correlation is not as strong as it is not a linear relationship. Due to the charging infrastructure being more economically sustainable and uncertainties for investors, government funding for charging expansion is especially important. In addition to government subsidies, EVs are also impacted by time, awareness, knowledge, the number of models, electricity price, emission regulations, gas costs, and urban road use, and face barriers such as a lack of knowledge, high upfront prices, and low risk tolerance. Over time, as EVs' net environmental benefits increased and became more environmentally friendly, states became more inclined to support EV policies. Government subsidies encourage EVs and promote private sector investment, while mandates like renewable energy baselines, EV quotas, and EPA guidelines compel companies to prioritize sustainable efforts. As with the IRA, government policies can stimulate EV growth, create jobs, promote domestic manufacturing, and boost investment in Republican congressional districts. However, changes in government measures, such as tax credits and emission regulations repeals, can drastically decrease EV sales and manufacturing. Though state policies, which are dependent on state politics and the environmental and economic impact of EVs, can support EV adoption in the absence of federal policies.

This paper sets the foundation for further research regarding EV growth and policies. With correlations established between tax incentives and charging infrastructure with EVs per capita,

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future analysis can focus on the specifics behind each option to predict which is more effective and economically strategic in the long run. For example, studies can test how much incentives and charging infrastructure investment increase EVs per dollar spent to determine which yields the most significant outcomes at the lowest cost, or if a combination of both is needed. Further research can help to better understand the optimal balance between these strategies and develop predictions on the impact of various policy scenarios on EV adoption across different market conditions, levels of infrastructure, charging costs, and demographics. This paper can also guide government EV efforts. By pointing out the clear correlations, future policy can focus on increasing incentives and infrastructure in places where there is lower EV per capita. The in-depth analysis of the IRA can also guide future legislation and predictions on its impact in different sectors. This study's examination of the factors that influence state policies demonstrates how policies and EV adoption can fluctuate over time. The findings also contextualize the growth of EVs as a new form of technology. Some limitations of this paper are that the data and correlations do not account for states that do not have their own tax incentives but have other forms of incentives, such as charging rebates, reduced charging fees, free EV parking, and HOV lane access. These factors could be confounding variables, as they may result in those states having higher EVs per capita despite not having tax incentives. This can make the relationship appear not as strong because such data is not included.

While the future repeal of federal EV measures will almost certainly affect EV adoption, the exact quantifiable scale of its impact is yet to be known. What is certain is that through policies like the IRA, tax incentives/rebates, and charging infrastructure investment, the government has helped boost EV adoption over the years. In addition to driving consumer demand for EVs, it has expanded domestic manufacturing for batteries, EV assembly, and other components needed for EV production; created thousands of American jobs; boosted the economies of many regions in the U.S.; and heavily incentivized innovation, research, and development in the transportation sector. Advances in these areas will be at risk when federal EV policy is rolled back. To alleviate some of the impact, states with EV policies should keep them in place, and those without EV policies should adopt them. States might even consider increasing measures to fill in the gap, such as creating grant programs co-funded by private investors that will encourage companies to scale up infrastructure. Only time will reveal how accurate researchers' predictions are and how influential an absence of government policies can be.

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References

1. Dabush, Itay; Battat, Idan; Cohen, Chen; Lavee, Doron. "Navigating the Electric Vehicle Revolution: Optimal Subsidy Allocation for Electric Vehicles and Charging Infrastructure." *Journal of Cleaner Production*, vol. 486, Jan. 2025, p. 144586. *ScienceDirect*, https://doi.org/10.1016/j.jclepro.2024.144586.
2. US EPA, OAR. *Fast Facts on Transportation Greenhouse Gas Emissions*. 25 Aug. 2015, https://www.epa.gov/greenvehicles/fast-facts-transportation-greenhouse-gas-emissions.
3. Narassimhan, Easwaran; Johnson, Caley. "The Role of Demand-Side Incentives and Charging Infrastructure on Plug-in Electric Vehicle Adoption: Analysis of US States." *Environmental Research Letters*, vol. 13, no. 7, July 2018, p. 074032. Institute of Physics, https://doi.org/10.1088/1748-9326/aad0f8.
4. Aviles, Steven. "Tracking the Adoption of Electric Vehicles in the U.S." *ArcGIS Blog*, 15 Mar. 2024, https://www.esri.com/arcgis-blog/products/arcgis-living-atlas/decision-support/tracking-the-adoption-of-electric-vehicles-in-the-u-s.
5. U.S. Senate Committee on Environment and Public Works. *Bipartisan Infrastructure Law*. 2025, https://www.epw.senate.gov/public/index.cfm/bipartisan-infrastructure-law.
6. U.S. Department of Energy. *State Planning and Funding for Electric Vehicle Charging Infrastructure*. 2025, https://afdc.energy.gov/fuels/electricity-infrastructure-state-planning.
7. Pierce, Logan; Slowik, Peter. *Assessment of U.S. Electric Vehicle Charging Needs and Announced Deployments through 2032*. Mar. 2024.
8. U.S. Congress. *EV Charging Infrastructure: Frequently Asked Questions*. https://www.congress.gov/crs-product/R48351. Accessed 24 Aug. 2025.
9. BlueGreen Alliance. *How New and Expanded Federal Programs Can Deliver Good Jobs and Environmental Benefits*. 27 Jan. 2023, https://www.bluegreenalliance.org/site/a-user-guide-to-the-bipartisan-infrastructure-law-bil/.
10. Spiller, Beia; Russo, Suzanne. "Leveraging Investments in Electric Vehicle Charging Stations to Maximize Public Benefits." *Resources for the Future*, 7 Apr. 2025, https://www.resources.org/common-resources/leveraging-investments-in-electric-vehicle-charging-stations-to-maximize-public-benefits/.
11. Cain, Bruce E.; Gerber, Elisabeth R.; Lee, Nathan; Miller, Susan. "Investing in the Future of Mobility: The Role of US Local Governments in Building EV Infrastructure." *Energy Policy*, vol. 195, Dec. 2024, p. 114372. *ScienceDirect*, https://doi.org/10.1016/j.enpol.2024.114372.
12. Climate Central. *Electric Vehicle Charge Up*. 23 Apr. 2025, https://www.climatecentral.org/climate-matters/electric-vehicle-charge-up.
13. Dimanchev, Emil; Fleten, Stein-Erik; MacKenzie, Don; Korpås, Magnus. "Accelerating Electric Vehicle Charging Investments: A Real Options Approach to Policy Design." *Energy Policy*, vol. 181, Oct. 2023, p. 113703. *ScienceDirect*, https://doi.org/10.1016/j.enpol.2023.113703.
14. Hayashida, Sherilyn; La Croix, Sumner; Coffman, Makena. "Understanding Changes in Electric Vehicle Policies in the U.S. States, 2010–2018." *Transport Policy*, vol. 103, Mar. 2021, pp. 211–23. *ScienceDirect*, https://doi.org/10.1016/j.tranpol.2021.01.001.
15. Plug in America. "Federal EV Policy Timeline & Tracker." *Plug In America*, 2025, https://pluginamerica.org/policy/federal-ev-policy-timeline/.
16. Soltani-Sobh, Ali; Heaslip, Kevin; Stevanovic, Aleksandar; Bosworth, Ryan; Radivojevic, Danilo. "Analysis of the Electric Vehicles Adoption over the United States." *Transportation Research*

Procedia, vol. 22, Jan. 2017, pp. 203–12. *ScienceDirect*, https://doi.org/10.1016/j.trpro.2017.03.027.
17. Nwokolo, Samuel. "From Policy to Practice: Evaluating the Role of Private-Sector Champions Like Elon Musk in Shaping Trump's 2.0 Climate Agenda." *Trends in Renewable Energy*, vol. 11, no. 1, Jan. 2025, pp. 122–54. *Crossref*, https://doi.org/10.17737/tre.2025.11.1.00190.
18. Buckberg, Elaine. *Clean Vehicle Tax Credit: The New Industrial Policy and Its Impact | Stanford Institute for Economic Policy Research (SIEPR)*. Aug. 2023, https://siepr.stanford.edu/publications/policy-brief/clean-vehicle-tax-credit-new-industrial-policy-and-its-impact.
19. Bassett, Luke; Sun, Chris. "After Just Three Months, the Inflation Reduction Act (IRA) Has Saved Americans an Estimated $600 Million on Clean Vehicle Purchases at the Time of Sale." *U.S. Department of the Treasury*, 3 May 2024, https://home.treasury.gov/news/featured-stories/after-just-three-months-the-inflation-reduction-act-ira-has-saved-americans-an-estimated-600-million-on-clean-vehicle-purchases-at-the-time-of-sale.
20. Shivdasani, Janina; Zablotska, Yelyzaveta. "The Clean Energy Manufacturing Landscape in Republican-Led Congressional Districts: Investment, Jobs, and Industrial Growth." *The Big Green Machine*, 20 Apr. 2025, https://drive.google.com/file/u/0/d/1I4QlNFzGGiUcOafrnICTrPxjwZO0bUtt/view?usp=embed_facebook.
21. Bui, Anh; Pierce, Logan; Slowik, Peter; Searle, Stephanie; Orvis, Robbie. *How the Inflation Reduction Act Is Driving U.S. Job Growth across the Electric Vehicle Industry*. Apr. 2025, https://theicct.org/wp-content/uploads/2025/04/ID-344-%E2%80%93-IRA-jobs_report_final.pdf
22. *Environmental Defense Fund. U.S. Electric Vehicle Manufacturing Investments and Jobs: Characterizing the Impacts of the Inflation Reduction Act after 2 Years*. 20 Aug. 2024, https://library.edf.org/AssetLink/07l26xtk0xv2bw713c64na3g5g1kmbb7.pdf?_gl=1*1s5mecw*_gcl_au*MTQwNDk5NjI0Ni4xNzU1MTgzMjIz*_ga*NDYzMjU1MTkuMTc1NTE4MzIyMw..*_ga_2B3856Y9QW*czE3NTUxODMyMjMkbzEkZzEkdDE3NTUxODUyOTckajM4JGwwJGgw.
23. Jenkins, Jesse. *Potential Impacts of Electric Vehicle Tax Credit Repeal on the US Vehicle Market and Manufacturing*. REPEAT Project, 18 Mar. 2025. *Zenodo*, https://doi.org/10.5281/zenodo.15047921.
24. Buckberg, Elaine; Cole, Cassandra. "Quantifying Trump's Impacts on EV Adoption." *The Salata Institute*, 18 Mar. 2025, https://salatainstitute.harvard.edu/quantifying-trumps-impacts-on-ev-adoption/.
25. Turner, Jay; Zablotska, Yelyzaveta; Yang, Emily. "Post-Trump Changes | US Clean Energy Manufacturing Investment Update: Trump + 6 Months." *The Big Green Machine*, 29 July 2025, https://www.the-big-green-machine.com/post-trump-shifts.
26. U.S. Congress. *Section 232 Automotive Tariffs: Issues for Congress*. https://www.congress.gov/crs-product/IN12545. Accessed 24 Aug. 2025.
27. International Energy Agency. "Global EV Policy Explorer." *IEA*, 14 May 2025, https://www.iea.org/data-and-statistics/data-tools/global-ev-policy-explorer.
28. Alliance for Automotive Information. "Electric-Vehicle-Sales-Dashboard." *Www.autosinnovate.org*, 2025, www.autosinnovate.org/EVDashboard.
29. Conte, Niccolò. "Interactive: EV Charging Stations Across the U.S. Mapped." *Elements by Visual Capitalist*, 22 Oct. 2022, https://elements.visualcapitalist.com/interactive-ev-charging-stations-across-the-u-s-mapped/.
30. Holland, Stephen P.; Mansur, Erin T; Muller, Nicholas Z; Yates, Andrew J. "Are There Environmental Benefits from Driving Electric Vehicles? The Importance of Local Factors." *American Economic Review*, vol. 106, no. 12, Dec. 2016, pp. 3700–29. *DOI.org (Crossref)*, https://doi.org/10.1257/aer.20150897.
31. Holland, Stephen P.; Mansur, Erin T.; Muller, Nicholas Z.; Yates, Andrew J. "Decompositions and Policy Consequences of an Extraordinary Decline in Air Pollution from Electricity Generation." *American Economic Journal: Economic Policy*, vol. 12, no. 4, Nov. 2020, pp. 244–74. www.aeaweb.org, https://doi.org/10.1257/pol.20190390.
32. Huang, Xingjun; Lin, Yun; Zhou, Fuli; Lim, Ming K.; Chen, Simin. "Agent-Based Modelling for Market Acceptance of Electric Vehicles: Evidence from China." *Sustainable Production and Consumption*, vol. 28, Oct. 2021, pp. 206–17. ScienceDirect, https://doi.org/10.1016/j.spc.2021.04.007.
33. Ledna, Catherine; Muratori, Matteo; Brooker, Aaron; Wood, Eric; Greene, David. "How to Support EV Adoption: Tradeoffs between Charging Infrastructure Investments and Vehicle Subsidies in California." *Energy Policy*, vol. 165, June 2022, p. 112931. *ScienceDirect*, https://doi.org/10.1016/j.enpol.2022.112931.
34. Sinton, Jonathon; Cervini, Gaia; Gkritza, Konstantina; Labi, Samuel; Song, Ziqi. "Examining Electric Vehicle Adoption at the Postal Code Level in US States." *Transportation Research Part D: Transport and Environment*, vol. 127, Feb. 2024, p. 104068. *ScienceDirect*, https://doi.org/10.1016/j.trd.2024.104068.
35. Sintov, Nicole D.; Abou-Ghalioum; Victoria; White, Lee V. "The Partisan Politics of Low-Carbon Transport: Why Democrats Are More Likely to Adopt Electric Vehicles than Republicans in the United States." *Energy Research & Social Science*, vol. 68, Oct. 2020, p. 101576. *ScienceDirect*, https://doi.org/10.1016/j.erss.2020.101576.
36. Wang, Ning; Tang, Linhao; Zhang, Wenjian; Guo, Jiahui. "How to Face the Challenges Caused by the Abolishment of Subsidies for Electric Vehicles in China?" *Energy*, vol. 166, Jan. 2019, pp. 359–72. *ScienceDirect*, https://doi.org/10.1016/j.energy.2018.10.006.

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