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Policies to Accelerate the Market for Zero Emission Light Duty Vehicles In response to Governor Gavin Newsom Executive Order N-27-25

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Summary of Key Policy Recommendations

1) **Maintaining EV Cost Advantage: Policies to Keep Charging Cheaper Than Fuel**
    a) Ensure that electricity remains more affordable than gasoline.
2) **Strategically Preserve Incentives for EVs**
    a) Optimize Incentive Levels to Maximize Additionality
    b) Make Leasing More Accessible
    c) Support the Used EV Market in California
    d) Feebate policy covers much of the required funding
3) **Prioritize Expanding Access to Home-Based Charging**
    a) Focus on growing ZEV markets, including renters in detached homes, city dwellers who park at the curb, residents of multi-unit dwellings (MUDs)
    b) Focus on home charging for renters and low-cost public chargers for MUDs.
4) **Support Development of Viable Business Models for DC Fast Charging (DCFC) Stations**
    a) Reevaluate projected demand for DCFC infrastructure.
    b) Prioritize development of sites with a higher number of chargers per location.
    c) Incorporate power-sharing capabilities to reduce infrastructure costs and optimize grid usage.
    d) Encourage creation of larger, amenity-rich charging hubs.
5) **Prioritize Reliability in Areas with Limited Charging**
    a) Non-redundant chargers at remote and critical corridor locations need a higher reliability standard.
6) **Reinstate Supply-Side Regulations when politically feasible.**

Introduction

Recent federal actions create headwinds to California's zero-emission vehicle goals, including suspension of National Electric Vehicle Infrastructure (NEVI) program funding, elimination of federal tax credits for the purchase of electric vehicles, revocation of California's waiver under the Clean Air Act, and most recently overturning of EPA's Endangerment Finding. Given these setbacks, California has reaffirmed its goal to accelerate the deployment of zero-emission technologies, including passenger cars and light-duty trucks—via Governor Gavin Newsom's Executive Order N-27-25 issued on June 12, 2025. This document summarizes insights from research, especially research conducted by the Electric Vehicle Research Center at the UC Davis Institute of Transportation Studies. While most of the research was completed prior to policy changes introduced by the current federal administration, we aim to interpret the results in a manner that reflects the evolving policy landscape. Our unique position as a research institute, with direct access to up-to-date data and extensive field experience, enables us to provide a timely and evidence-based assessment of current conditions, followed by informed policy recommendations.

This document includes two main parts: a review of empirical data and contextual information that informs our recommendations (pages 1–6), followed by specific policy recommendations (pages 7–10).

Context and Background Based on UC Davis and Other Research

ZEV Supply

More than 1.5 million zero-emission vehicles were sold in the United States in 2024, with approximately 28% of those sales occurring in California. Nationally, sales have been flat during the first five months of 2025. In 2024, 61% of ZEV sales came from vehicles produced in the United States, and more than 80% of the 1.2 million ZEVs manufactured domestically were also sold within the country (10% were exported to Mexico and Canada and another 10% to the rest of the world). Overall, the U.S. ZEV market is reliant on local production, which is tailored to the American light-duty vehicle market in terms of size, range, and performance. The 39% of ZEVs imported from overseas are also, in most cases, designed to meet North American preferences and are less popular in other regions. These production trends, along with manufacturers' announcements regarding changes in capacity, suggest that investment and production momentum will support similar volumes of production and sales in 2025 and 2026 and most likely 2027. Vehicles produced for the North American market, which tend to be large, cannot be easily redirected to other markets. Final production volumes will depend on several factors, including demand from other regions and whether manufacturers achieve positive variable profits on their ZEV production. Because of these market and vehicle realities, increased supply of ZEVs to California to meet state goals are unlikely in the absence of vehicle supply regulations and large vehicle purchase incentives.

ZEV Demand

ZEV sales share in California has been 20 to 25% over the past three years. With cumulative sales of more than 2.2 million vehicles. However, when considering the total fleet on the road, ZEVs account for less than 7% of vehicles. As an indicator of market maturity, this still places California well within the "early adopter" category. California households that buy or lease new vehicles represent a small portion of the overall population, as most households acquire vehicles through the used market (Figure 1). While 58% of households do not purchase new vehicles at all, 9% purchased 38% of all new vehicles and another 33% of households purchased the remaining 62% of new vehicles. The success of the ZEV transition depends on encouraging these new vehicle buyers to choose a ZEV for their first purchase or lease, and then to continue replacing them with newer ZEVs or adding a second electric vehicle to their household.

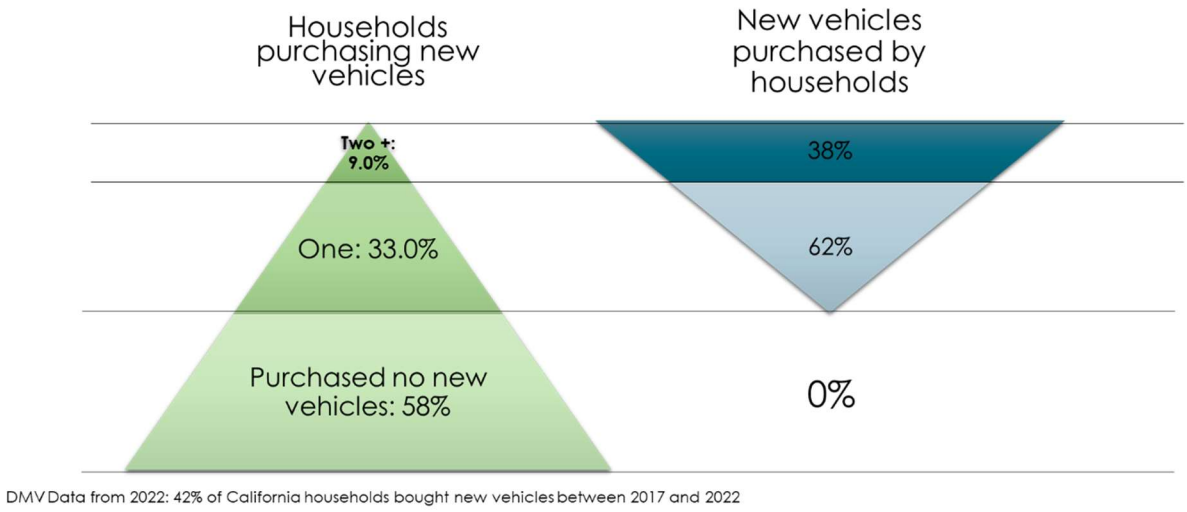

Figure 1: Households Purchasing or Leasing New Vehicles in California and Their Share of the New Vehicle Market, 2017–2022

UC Davis analysis of DMV data and results from our recent study of light-duty vehicle owners in California show that two out of every ten ZEVs sold in the state are added to households that already own one, becoming multi-ZEV households. Many additional ZEVs are purchased or leased by households that then sell their older ZEVs. As a result, by 2023, 35% of households that owned a ZEV had purchased it used, gaining experience with the technology through the pre-owned market. An additional 8% of households were multi-ZEV households in which one vehicle was purchased used and the other purchased new. Only 57% of ZEV households owned or leased a new vehicle, and we believe that this number is even lower in 2025 (figure 2). Our data indicates that in order to grow the ZEV market, attention must be paid to the flow of new vehicles from repeat buyers to the broader population, with a greater focus on supporting both repeat and second-time buyers.

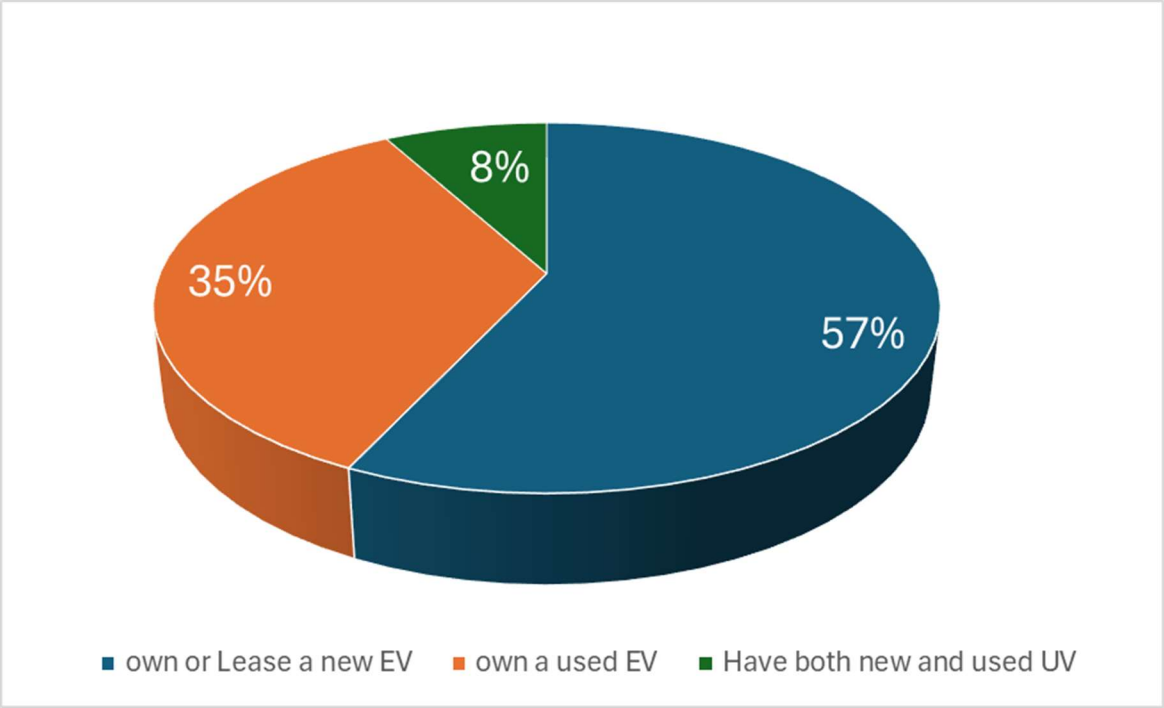

Figure 2: Distribution of New and Used EV Ownership Among EV-Owning Households in California

An additional point regarding the secondary market is that around a quarter million ZEVs originally sold in California, some with the support of state incentives, are now in use in other states. Our modeling suggests that in the future, the lack of incentives for new ZEVs in other states may increase this out-of-state flow of used ZEVs, unless policies are implemented to control or reduce it.

The Impact of Incentives on the LDV market

A recent study by UC Davis explored the impact of U.S. federal tax incentives that supports leasing and purchasing electric vehicles. According to the study, canceling the federal tax incentive could result in up to 30% of ZEV buyers not purchasing a ZEV, with a greater impact on leased vehicles and a smaller impact on higher MSRP models. However, the actual effect will depend heavily on how manufacturers respond, specifically whether they adjust vehicle pricing and availability, which could significantly reduce the overall impact. Similar studies from UC Davis and other sources suggest that the impact of incentives tends to grow as the market expands to include lower MSRP vehicles and lower-income groups. However, in all cases, most buyers consider additional factors such as operating costs, vehicle performance, and perceived social benefits, and most buyers will still choose to purchase a ZEV even if the price increases in the absence of incentives. Our research indicates that higher-income households and purchasers of higher-MSRP vehicles are more likely to proceed without incentives. However, no one has quantified the impact of incentives on repeat buyers, the overall market, vehicle residual values, or affordability for buyers in the secondary market.

Charging Infrastructure

The most influential charging location in the decision to purchase and continue to own a ZEV is home charging. Home charging is the most frequently used and convenient charging location. Our research suggests that households without access to home charging require higher incentives to adopt an electric vehicle. We also find that without the ability to charge at home, more households will return to internal combustion engine vehicles.

As electric vehicle (EV) adoption accelerates, ensuring access to residential charging infrastructure in multi-unit dwellings (MUDs) has become a critical equity and deployment challenge. Given that a substantial share of urban residents lives in MUDs, enabling charger access in these settings is essential to supporting widespread, inclusive electrification. Multi-unit dwellings vary widely in size, ownership structure, and physical layout, making uniform EV charging policies poorly suited to address their needs. While a common perception holds that MUDs are categorically incompatible with charger installation, this is misleading; a series of interviews conducted by our team indicates that the more significant barriers are procedural rather than technical. Issues such as unclear permitting pathways, limited awareness of incentives, and inadequate information sharing contribute to friction throughout the installation process. Compounding this, a disconnect between tenants and property managers or owners often results in latent demand for EV charging going unrecognized or unaddressed by decision-makers.

In a survey conducted in May 2025 among EV users, 27% of respondents reported the need to charge away from home to complete a trip, having exceeded the range of their EV at least once in the previous 30 days. This expanding segment of drivers, which includes a rapidly growing number of EV-only households, depends on fast charging infrastructure to fully utilize their vehicles and requires a sufficient number of chargers to ensure reliable and dependable experience. Our research indicates that some level of congestion will persist at charging stations due to the pattern of short periods of high demand and long periods of low demand, and that the effectiveness of the system depends on the presence of a robust business model. We examined the potential for generating positive revenue from electricity sales alone and argue that while more innovative approaches are feasible in certain regions, they will require policy support and targeted incentives.

Cost of Driving Electric Vehicles Compared to Gasoline Vehicles

Electricity affordability has become a growing concern for California households, with retail rates nearly doubling over the past several years. While rate increases result from unrelated issues such as wildfire risk mitigation and grid hardening, from a transportation standpoint, high electricity prices directly undermine the cost competitiveness of electric vehicles (EVs) relative to internal combustion engine vehicles. When electricity prices rise faster than gasoline prices, the fuel cost savings advantage of electrification is weakened, threatening consumer adoption and the broader policy goals of the zero-emission vehicle transition. Cost savings are not a primary motivating factor for most early adopters of ZEVs. These buyers were often motivated

by emotional, social, and epistemic reasons. However, we anticipate that cost savings will become increasingly important as the market progresses towards more mainstream buyers.

Cost challenges are exacerbated by drivers who rely on paid public charging. They often incur a higher per-mile cost compared to those driving a similar gasoline vehicle. For many users living in areas with high electricity rates and without access to solar panels, the situation is comparable. In both cases, the availability of more efficient hybrids and other fuel-efficient gasoline vehicles, combined with low gasoline prices, further widens the gap in operating costs between EVs and gasoline ICEVs.

Our recent survey suggests that most people still believe EVs save money during operation. However, as consumers begin to experience the reality of high electricity charging costs, we expect more consumers will reconsider purchasing or leasing an EV. This cost issue appears to be especially pronounced in lower-income and disadvantaged communities across the state.

Policy Recommendations

The recommendations below focus on near term policy gaps, adjustments to current strategies, and near term opportunities. We acknowledge the importance of prioritizing, given the constraints of a limited public budget, and direct attention toward opportunities with maximum impact and enhanced equity.

(1) Maintaining EV Cost Advantage: Policies to Keep Charging Cheaper Than Fuel

Ensure that electricity remains a more affordable fuel than gasoline. The underlying causes of this issue extend beyond the transportation sector and include factors such as the cost of wildfire mitigation, the integration of alternative energy sources, and broader pressures on the electricity grid. Meanwhile, efforts to maintain low gasoline prices also contribute to the challenge.

Pursuing transportation-specific electricity rates would be administratively complex and raise equity concerns via cross-subsidization by non-EV owners. Instead, we note that the growing EV fleet presents an underutilized opportunity to contribute to affordability and grid efficiency. Through managed or "smart" charging, EVs can help flatten demand peaks, improve load factor, and better align consumption with renewable generation. More advanced strategies, including vehicle-to-grid (V2G) and vehicle-to-home (V2H) technologies, can provide distributed storage and enhance grid resilience, especially during peak events or outages. Unlocking these capabilities will require updated interconnection standards, rate designs that reflect system value, and stronger coordination between transportation and energy regulatory bodies. EVs should not only be viewed as future consumers of electricity, but as flexible, dispatchable assets that can support a more affordable, reliable, and decarbonized grid. Policies that can streamline, incentivize, and/or subsidize the deployment of these technologies can help to address the rise in electricity prices.

Another pricing policy strategy that is not as broadly impactful as market wide reductions in electricity rates is to directly reduce travel costs for electric transportation. Support could be offered to EV owners who demonstrate that they incur electricity costs for transportation that exceed the cost of driving a comparable gasoline vehicle. Alternatively, a fixed support amount could be calculated based on the household's electricity rate. The funding source could be shared with vehicle purchase or lease incentives, allowing a reduction in purchase incentives for some buyers.

One example would be to offer refunds to households with high electricity rates, up to a capped amount annually, for the first 8,000 miles of EV driving per year. The challenge with this pricing policy is that it differentiates electricity prices for transportation from other use cases without addressing the root cause of the issue. The primary benefit is that it would maintain the beneficial operating costs of EVs and could be implemented short term within the constraints of the existing regulatory environment.

(2) Strategic preservation of incentives for EVs

Optimizing Incentive Levels to Maximize Additionality

While we support minimum incentives for most buyers, this moment also presents an opportunity to improve the design and targeting of state-level incentives. Future incentives, above a minimum threshold, should prioritize additionality, encouraging purchases that would not have occurred absent the incentive. This can be achieved by tightening eligibility around vehicle MSRP, with a focus on supporting new vehicle buyers' households who would otherwise not purchase an EV. Implementing this concept requires optimizing both the immediate impact on the probability that a new vehicle purchase will be electric and the overall new car market share within this segment. Incentives can also be made more efficient via simplifying application processes, always applying them at the point of sale/payment, and making buyers aware of incentives. A feebate policy, which imposes fees on inefficient or high-emission vehicles and uses the revenue to provide rebates for efficient or low-emission ones, can cover a large share of the required funding while creating a continuous financial incentive to choose cleaner options.

Make Leasing More Accessible

Short-term leasing can be an effective strategy to accelerate vehicle turnover, benefiting both first and second owners, increasing sales, and improving overall affordability. Incentivizing EV leasing through programs that reduce costs can support broader adoption. For example, subsidies that lower lease prices can help reduce the entry barrier for new drivers and incentives for leased EVs can be more influential than incentives toward purchased EVs. However, caution is needed to avoid outcomes that increase leases without a corresponding increase in the secondary market, an effect that has been observed with the "loophole" in the Inflation Reduction Act that allowed leasers to claim incentives that regular buyers could not.

Support the Used EV Market in California

If a policy goal is to retain newly sold PEVs in the state as used PEVs; policymakers should explore policies to keep used EVs within the state. This can also support lower-income buyers and households who are not in the new car market to access these vehicles as they become available in the secondary market. It may be beneficial to consider a one-time incentive, for the second owner of EVs coming out of lease or first ownership. This incentive will encourage the sale of these vehicles to in-state buyers and may reduce leakage to other states, though how changes to the support of secondary market buyers will impact new and used PEV values and sales is not clear. The discount will also benefit additional owners over time, as the vehicle continues to transfer to third and subsequent owners. Further research will be needed to understand the long-term market impacts of strong incentives in the used EV market.

(3) Prioritize Expanding Access to Home-Based Charging

The California Energy Commission, utilities, and other agencies are already focusing on home charging with notable success. We recommend adding an additional focus on the next growing markets for ZEVs, including renters in detached homes, city dwellers who park at the curbside and will require public chargers for overnight use, and residents of multi-unit dwellings (MUDs) who will need chargers installed by property owners or building managers. Contrary to the widespread perception that charger installation is unfeasible in MUDs, our field research indicates that the biggest barrier is not technical incompatibility but procedural friction, such as lack of information about available incentives, unclear installation responsibilities, and poor coordination between tenants, property owners, and service providers. Addressing these issues through targeted policy interventions such as streamlined permitting, standardized guidance for MUD property managers, and technical assistance for navigating installation, would unlock substantial latent demand and help ensure that California's zero-emission transition does not reinforce existing housing and income disparities. There is also a need to improve existing regulations and programs, for example expanding the right to charge program to include more dwelling types and living situations and pairing that program with funding. Additional focus could be on improving incentive programs, awareness of these programs, and streamlining them to make it easier to obtain funding, as well as exploring programs that give EV drivers more agency in getting EV charging installed where they live.

(4) Support development of viable business models for DC Fast Charging (DCFC) stations

Reevaluate the projected demand for DC fast chargers and prioritize the development of charging sites with more chargers per location. These stations should include power-sharing capabilities to optimize grid usage and reduce infrastructure costs. In addition, the State should encourage infrastructure providers to develop stations that meet consumers demands including stations that incorporate basic amenities such as lighting, shelter, restrooms, and access to food or retail services to enhance the user experience. Encouraging the development of larger, amenity-rich charging hubs could improve reliability, reduce queuing times, and support broader

EV adoption by addressing both functional and comfort-related barriers. Chargers with amenities may also be economically beneficial to charging providers if they can capture additional revenue from expenditures of EV drivers while they are charging.

(5) Prioritize Reliability in Areas with Limited Charging Redundancy

The California Energy Commission is offering new tools to improve charging reliability across the state. These are important measures that will enhance the experience of EV travel by increasing the dependability of charging infrastructure. However, they also introduce additional costs to the system.

Not all chargers serve the same functional role or exist within the same context of network redundancy. A single charger at a rural site or a critical corridor location, for example, carries a far greater reliability burden than a charger located in a dense urban area surrounded by multiple alternatives. Failures at non-redundant sites can leave drivers stranded, undermine confidence in the charging ecosystem, and present a disproportionate barrier to equitable EV adoption, particularly for those without access to home charging.

We recommend that reliability standards and accountability mechanisms be tiered according to the functional importance and redundancy of each charger. This would allow limited enforcement and maintenance resources to be directed toward sites where uptime matters most for system performance and user trust. In doing so, California can support a more resilient and user-centered charging network without imposing unnecessary costs on segments of the system where failures are less consequential.

Conclusion

The state has made strong progress in promoting electric vehicle adoption. This document offers policy recommendations based on recent research on zero emission vehicle market dynamics and usage trends that are not yet fully addressed in existing policies. Internationally there are few large vehicle markets without supply side regulations (such as a ZEV mandate) that have growing PEV markets. The markets without supply side regulations that do have growing PEV markets tend to have a combination of incentives for PEVs and strong disincentives for gasoline powered vehicles. California will need to be ambitious in its policy approach in order to remain on track with electrification goals.

Our research suggests that the proposed policies can maintain and marginally grow the market. However, to meet the state's goals, it will be necessary to reestablish supply-side regulations such as a ZEV mandate or CO_2 standards as soon as politically feasible. Developing a plan for reinstating these policies may assist automakers in planning future investments in EV manufacturing, reduce uncertainty, and generate both immediate and long-term benefits.

We recommend continuing monitoring of progress toward established goals, identification of barriers including those experienced or perceived by consumers, and the development of strategies to overcome them, including evaluation of these strategies prior to implementation. To maintain brevity, this document does not address specific funding sources or agency responsibilities. However, we welcome the opportunity to continue contributing to the policy development process.