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Research

Notes

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Project Title:
The Effectiveness of Alternative
Policy Designs on Electric Vehicle
Adoption: Purchase Rebates,
Guaranteed Financing and Per-
eVMT

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The Effectiveness of Alternative Policy Designs on Electric Vehicle Adoption: Purchase Rebates, Guaranteed Financing and Per-eVMT

Market research to identify possible Electric Vehicle Adoption incentives: Purchase Rebates, Guaranteed Financing and Per-eVMT

WHAT IS THE NEED?

To achieve air quality and climate change goals in California, the state must transform its light duty vehicle fleet. Yet current levels of electric vehicle (EV) adoption remain very low, especially for moderate and low-income Californians. Achieving the desired transformation will require that California policymakers understand the relative effectiveness of alternative policy strategies for clean vehicle adoption.

California's dominant policy strategy is administrated by the Air Resources Board and involves reducing the purchase prices of plug-in electric vehicles (PEVs) through rebates for new car buyers. While the state recognizes the need to expand rebate programs for low-income drivers who may consider new and used hybrids, partial hybrid EVs (PHEVs) and battery EVs (BEVs), policymakers currently have no guidance on relative cost-effectiveness or the distributional impacts of such programs.

Recently, in addition to the vehicle rebate programs, there is now a pilot program operating to provide guaranteed financing to low-income Californians when they seek to purchase clean vehicles. Policymakers have also proposed measures to reduce the cost of electric fuel, such as through EV-time of use rates and the Low Carbon Fuel Standard Program. However, there are currently no studies of the effects of these programs or of how lowering the relative cost per electric mile driven will increase the propensity to purchase PEVs.

WHAT ARE WE DOING?

The research will undertake the first side-by-side comparison of the performance of three commonly proposed policies for increasing



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the adoptions of clean vehicles: i) vehicle purchase rebates, ii) guaranteed low-interest financing, and iii) incentives that lower the costs of electric vehicle miles traveled (e-VMT).

For each of these policies, the researchers will predict how drivers' propensity to purchase new or used hybrids, PEVs and BEVs varies at different incentive levels. Rather than focusing on wealthy new car buyers, which most researchers have done, we will undertake this comparative policy analysis using a representative survey sample of moderate and low-income Californians collected in 2018, as this sub-population will likely need more substantial support to access clean vehicles.

The research team draws on survey data that was originally conducted with the broad goal of identifying barriers to clean vehicle adoption by moderate and low-income households. Within the survey we deployed a series of conjoint choice exercises, which now will enable us to estimate a random utility model for vehicle attributes that include the vehicle purchase price, the availability of financing, and the cost per mile of travel.

WHAT IS OUR GOAL?

We can then use this estimated model to forecast how changes in policies that affect a representative driver's utility will also affect their propensity to purchase clean vehicles. With an understanding of how many additional clean vehicles each policy will induce at different incentive levels, we can then ask:

- When there is a fixed budget for public subsidies, which of these three policies maximizes the number of additional clean vehicles purchased?
- How do household characteristics such as income, ethnicity, and geography attenuate the propensity to purchase associated with these rebate, loan and eVMT-incentive programs?

WHAT IS THE BENEFIT?

These analyses will likely impact the policy designs and incentive levels chosen by the California Air Resources Board, non-profits, state electrical utilities, and other entities involved in EV policy and program decisions. For example, the California Air Resources Board would benefit from our results when setting new levels of rebates (and income eligibility thresholds) for both the Clean Vehicle Rebate Program and the Efficient Fleet Modernization Program Plus-Up.

More broadly, the California Air Resources Board (CARB) influences policy development across all three policy domains since it also manages the Low Carbon Fuel Standard Program, which can influence the cost per electric mile driven as well as funds the Beneficial State Foundation that operates the first statewide vehicle financing program. Our research will also inform how California's major electrical utilities (PG&E, SCE and SDG&E) design their dedicated electric vehicle time of use rates. These are rates for sellers of electricity as a transportation fuel, which are designed in part to incentivize the expansion of the PEV fleet.

WHAT IS THE PROGRESS TO DATE?

1. Kickoff meeting with Caltrans task manager
2. Consultation with CARB staff who run relevant incentive and loan programs
3. Outreach to additional agency experts for advisory meeting (scheduling still pending)
4. Begun estimating the base random utility model
5. Begun draft literature review
6. Further consultation with CARB staff who run relevant incentive and loan programs
7. Outreach to advocates for EV incentive programs
8. Finished estimating the base random utility model