

# DRISI

CALTRANS DIVISION OF RESEARCH,  
INNOVATION AND SYSTEM INFORMATION

TRANSFORMING IDEAS INTO SOLUTIONS

# Research

# Results

Planning, Policy  
and  
Programming

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

Purchase Rebates, Guaranteed Financing and Per-eVMT

### WHAT WAS 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 remains 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 administered 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.

Although California has instituted subsidy-based programs to reduce the effective cost of clean vehicles, financing policies and the performance of clean vehicle adoption incentives among low-moderate income households have been historically understudied.



DRISI provides solutions and knowledge that improves California's transportation system

## WHAT WAS OUR GOAL?

This research was based on a statewide representative survey of 1,604 low- and moderate-income households. Across almost all variables examined this model found statistically significant impacts of considered factors (including fiscal factors, vehicle traits, and consumer preferences) on respondent vehicle choice.

This model was then used to predict vehicle adoption patterns by low-moderate income households in California in response to five different policy scenarios. These simulations considered varying levels of financing or subsidies for clean vehicles, predicting under each what percent of vehicle-buying consumers would purchase a new or used clean vehicle and comparing these results to a baseline.

## WHAT DID WE DO?

The research conducted a side-by-side comparison of the performance of three commonly proposed policies for increasing the adoptions of clean vehicles:

1. vehicle purchase rebates,
2. guaranteed low-interest financing, and
3. incentives that lower the costs of electric vehicle miles traveled (e-VMT).

For each of these policies, we predicted 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 undertook a comparative policy analysis using a representative survey sample of moderate and low-income Californians collected in 2018, as this sub-population needed more substantial support to access clean vehicles.

We drew 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 enabled 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 WAS THE OUTCOME?

The findings summarized in this report explored how such policies could influence behavior of these consumers with respect to clean vehicle adoption. Sheldon et al. used choice experiment data to create a conditional logit model of low-moderate income consumer vehicle preferences, which they then used to predict the performance of five different policy scenarios with respect to clean vehicle adoption among this demographic. Their results suggest that financing policies are significantly more cost-effective than subsidies at promoting clean vehicle adoption by low-moderate income households in California.

## WHAT IS THE BENEFIT?

The results suggest that vehicle financing policies are more cost-effective than subsidies at promoting adoption of clean vehicles among low-moderate income Californians, producing a greater marginal increase in adoption for a given cost or, alternatively, achieving greater adoption levels for a given cost.

The implications of these findings are relevant for clean, light-duty car policy expansion to meet the state's near-term air quality and transportation electrification mandates.

## LEARN MORE

[Effectiveness of Alternative Policy Designs on Electric Vehicle Adoption Final Report](#)



**IMAGES**

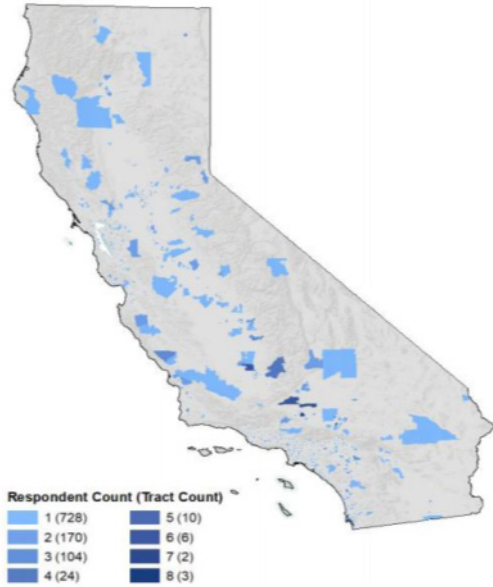


Image 1: Number of Respondents by Census Tract

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