



# Assessing Effectiveness of Financing Subsidies on Clean Vehicle Adoption by Low- and Moderate-income Consumers

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## Project Objective

In this project, the authors address multiple gaps in the existing, policy-relevant literature regarding the cost-effectiveness of clean vehicle incentive programs in California. Their assessment considers financing—an understudied clean vehicle policy strategy—as well as the used vehicle market, which many previous studies have disregarded. Special attention was also given to low-moderate income consumers.

## Problem Statement

Clean vehicle adoption is an integral part of strategies in California and other jurisdictions to decarbonize transportation and mitigate climate change via reducing greenhouse gas emissions. However, cost barriers have thus far largely limited adoption of these technologies to more affluent households. 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.

## Research Methodology

Data was collected via an online survey administered in April and May 2018, to a representative sample

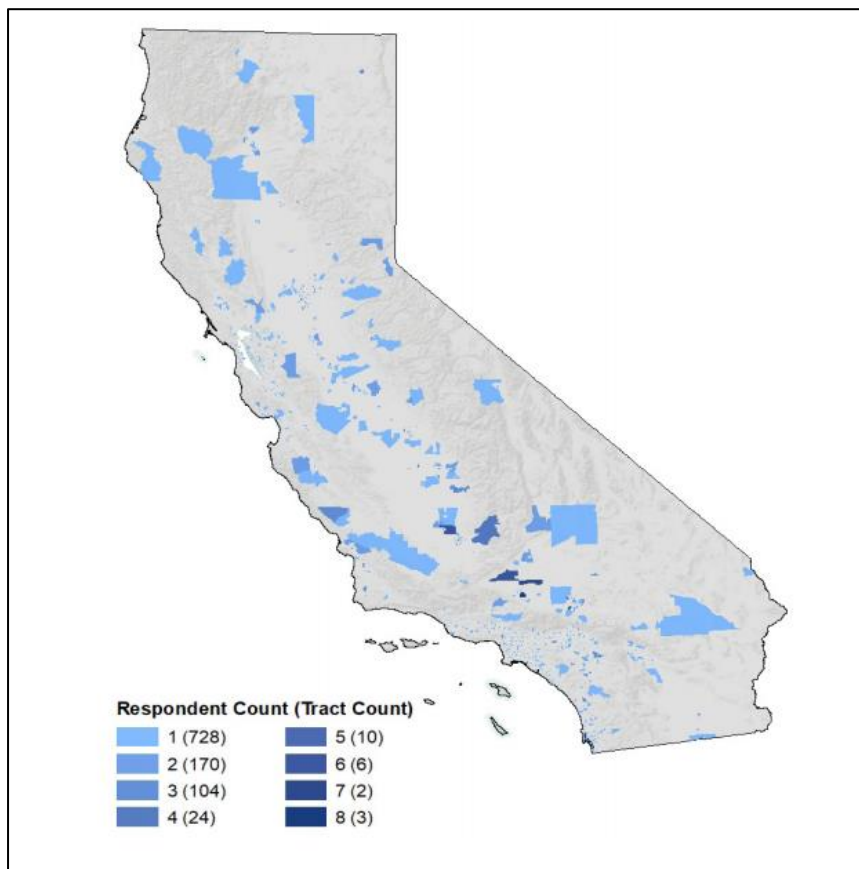


Figure 1. Number of Respondents by Census Tract in California

(n=1604) of Californian low-moderate income households—those with income less than 225% of the federal poverty line (FPL) (low income) or between 225% and 300% of the FPL (moderate income)—who expressed the intent to replace a vehicle within three years. Figure 1 shows the distribution of respondents throughout the state.

The authors used choice experiment data, considering three assistance intervention types (purchase subsidies, preferential loan terms, EVMT discounts) at different levels, to create a conditional logit model of low-moderate income consumer vehicle preferences, which they then use to predict the performance of five different policy scenarios with respect to clean vehicle adoption among this demographic.

### Results

The survey results, some of which are summarized in Table 1, suggest a strong preference for used vehicles over new vehicles in both low- and moderate-income respondents, underscoring the need to assess the efficacy of clean vehicle policies within the used vehicle market. Among the various drivetrain technology options for clean vehicles, HEVs were the most popular overall pick (31% among both low- and moderate-income respondents), with PHEVs and BEVs composing 8-10% of overall picks.

**Table 1: Summary Statistic Results of Choice Experiments**

Respondent Preferences	Low-Income	Moderate-Income
Used Vehicle	86%	78%
HEV	31%	31%
PHEV	8%	10%
BEV	8%	8%
Average Vehicle Price	\$11,056	\$12,710
Average MPG	31.3	32.2
Financed	18%	16%
Average Down/Monthly Payment	\$2,858/\$168	\$3,682/\$174

Results from the modeling suggest that, though the motivation behind California’s programs aimed at promoting clean vehicle adoption by low-moderate income households are valid, the historic emphasis on subsidies or rebates may not be the most effective approach. Financing programs, which have been underutilized to this point, may be as or more effective at promoting uptake of clean vehicles among these demographics while being more cost-effective. Future research can help to enhance and expand policy efforts in California that most effectively promote the retirement of functional, high-emitting vehicles and the adoption of advanced clean vehicles among lower- income Californians.