

The effects of equity policies on the ZEV market: Evidence from California's Clean Vehicle Rebate Project

POLICY BRIEF
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Summary

California's Clean Vehicle Rebate Program (CVRP) is the largest zero-emissions vehicle (ZEV) incentive program in the United States. In 2016, this program underwent three changes intended to improve equity in California's ZEV market. These were:

- **Addition of an income cap** to eligibility requirements for CVRP benefits.
- **Increased rebates** for lower-income consumers.
- **Increased outreach** to raise public awareness of ZEVs and the CVRP.

Although no research has yet established a causal link, data suggests that these policies coincided with intended goals, namely:

- **Increased ZEV adoption rates** among lower-income households.
- **A reduction in inefficient benefit allocation** (e.g., ZEV subsidies for high-income households).
- **Maintained or increased total levels of ZEV adoption** in California.

Research also indicates how policymakers can most effectively and efficiently deploy ZEV incentive programs. For example, DeShazo et al. (2017) found that more progressive rebate structures reduce costs and improve equity of such programs. Pursuing these recommended policy approaches could help communities achieve linked environmental and equity objectives.

Issue/Background

The CVRP, created by Assembly Bill (AB) 118 in 2007, is a key effort to incentivize ZEV adoption and reduce emissions from the light-duty transportation sector in California. The CVRP's primary purpose is to support widespread commercialization of the cleanest vehicles by helping to motivate consumer purchase decisions. The program was originally designed to be "first-come, first-served," with no provisions

addressing equitable incentive allocation.

2014's Senate Bill (SB) 1275 required CARB to develop a plan for realizing California's then-goal of achieving 1 million ZEVs on the road by 2023 without excluding low-income individuals. The bill directed CARB "...to increase access to and direct benefits for disadvantaged, low-income, and moderate-income communities and consumers from electric transportation." In March 2016, the state made several fundamental changes to the CVRP based on CARB's recommendations responding to SB 1275.

First, the state set income caps limiting allocation of CVRP incentives to wealthy households. Caps were set at \$250,000 for single individuals, \$340,000 for a head of household, and \$500,000 for a joint filing. In November 2016, SB 859 reduced these caps to \$150,000, \$204,000, and \$300,000 respectively.

Second, the state increased rebates by an additional \$1,500 for CVRP participants with incomes below 300% of the federal poverty level. In November 2016, SB 859 added an additional \$500 rebate, bringing the total additional rebate extended to low-income households to \$2,000.¹

Finally, the state expanded CVRP outreach to individuals and car dealerships in low-income areas and created a new webpage designed to provide low-income consumers with information about purchasing ZEVs. In 2018, CARB, in collaboration with California's Department of Motor Vehicles, included information about ZEV purchase incentives in 700,000 DMV title notices distributed to vehicle owners who had either purchased their vehicle outright or had finished paying off their car loans.

Key Findings

Incentives

Internal CVRP data is consistent with the idea that **the program's income caps and increased rebates**

¹ As of December 2019, this additional rebate had been increased again to \$2,500.

have improved equitability in California’s ZEV market (see figure on next page). The data are also consistent with literature showing that **rebates and other incentives tend to more effectively influence ZEV purchase decisions among lower-income buyers than among higher-income buyers.** For instance, Muehlegger & Rapson (2018) found that rebates (offered through a different incentive program) were a deciding factor among lower-income consumers who chose to purchase a ZEV rather than a conventional vehicle.

It is important to note that research has not yet established a definitive causal link between changes to the CVRP program and changes in ZEV sales in California. The concurrent implementation of CVRP changes makes it difficult to parse contributions of each change to observed shifts in ZEV adoption.

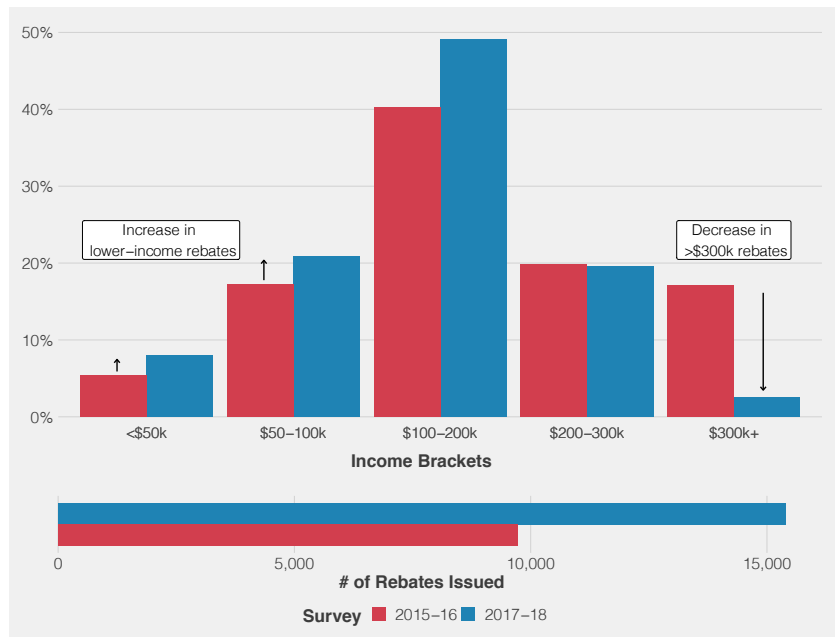
Increased Outreach

Research indicates that most potential buyers are unaware that ZEVs are already available in consumer markets. Those who are aware are often turned off by range anxiety and high upfront purchase costs. Evidence suggests that **emphasizing the lifetime cost savings associated with ZEV ownership is a particularly effective way to drive consumer interest in ZEVs.** Emphasizing environmental benefits is generally less effective.

Policy Recommendations

The CVRP has been effective in improving equitability of ZEV adoption in California. Research suggests that the following strategies would help policymakers build on this progress—for the CVRP as well as other policies that incorporate similar components:

- **Consider more targeted incentives.** CVRP incentives could be even more granularly determined by income (e.g., establishing more income brackets). This is likely to further improve program equity and cost-effectiveness, though would also increase program complexity and potentially confuse consumers.
- **Continue using income caps.** Well-designed income caps reduce incentive “freeriding” among price-insentitive buyers without decreasing ZEV adoption rates.
- **Expand incentives to new groups.** As the early-



After California set income caps for CVRP incentives in 2016, the percentage of rebates issued to lower-income households increased, the number of rebates issued to the highest-income households sharply dropped, and the total number of rebates issued grew by more than 50%. These data illustrate the effectiveness of targeted incentives in improving ZEV access and equity. (Totals are calculated using weighted n. For more information, visit <https://cleanvehiclerebate.org/eng/survey-dashboard/ev>).

adopter market for ZEVs becomes saturated, new incentives will become increasingly important to grow ZEV adoption.

- **Incorporate car dealerships into outreach efforts.** Car dealerships are influential in purchase decisions, but at present are largely uninformed and unenthusiastic about ZEVs.
- **Focus on overall cost savings in outreach.** Emphasizing the greater lifetime financial benefits of ZEVs relative to conventional vehicles is a powerful way to motivate ZEV adoption.

This policy brief was prepared by Sam Fuller (sjfuller@ucdavis.edu) and Austin Brown (dokbrown@ucdavis.edu). The authors thank CARB for their invaluable comments and feedback on the whitepaper series, and Hannah Safford for editing.

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For more information, refer to the first three whitepapers in the 2019 series “How Zero-Emission Vehicle Incentives and Related Policies Affect the Market” (available at <https://policyinstitute.ucdavis.edu/about-our-materials/library/>).

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