

## Question

Can California provide a sustainable funding source for the Clean Vehicle Rebate Program (CVRP) by applying new vehicle purchase fees in an equitable way?

## Background

California wishes to accelerate the adoption rates of Zero Emission Vehicles (ZEVs) and transitional ZEVs (TZEVs). California's ZEV mandate requires that 22% of new vehicle sales must be ZEVs or TZEVs by 2025. The CVRP provides \$5,000 for purchasing new Fuel Cell Vehicles (FCEV), \$2,500 for Battery Electric Vehicles (BEV), and \$1,500 for Plug-in Hybrid Electric Vehicles (PHEV). Senate Bill 1275 places a cap on household income in order to receive a rebate, and reduces rebate amounts for the top tier income group. Purchase incentives may be needed for many years, until the new technology costs associated with manufacturing these vehicles decrease.

## Goal

This research creates potential revenue streams that can pay for new vehicle rebates issued through California's CVRP. The goal to generate \$200 million is thought to be sufficient out to 2018, with increased funding requirements as ZEV/TZEV sales grow.

## Fee Structure Scenarios

This research created six fee structure scenarios based on various combinations involving household income, vehicle emissions, and MSRP to generate revenue by assessing a new vehicle purchase fee on poor emitting vehicles. Each scenario must generate \$200 million to fund California's CVRP (to 2018), with a minimum \$100 fee.

## The Data Set

The data came from the 2010-2012 California Household Travel Survey, encompassing 42,431 households, over 70,000 vehicles, and divided by self-reported income groups. Data was filtered to study only 2011-2013 model year vehicles (some 2013 vehicles were available for early purchase). Vehicle MSRP and fuel economy (converted to g CO<sub>2</sub>/mile) was obtained from Edmunds.com.

## Results and Conclusions

- A \$140 flat fee per non-ZEV purchased would be sufficient to fund California's CVRP at the \$200 million level, through 2018.

- Alternatively, a flat 0.5% tax on vehicle price would also achieve this.

- Exempting households earning < \$75,000 shifts the average fee for other households to \$200+ per vehicle. Combining the \$75,000 income exemption and < 400 g CO<sub>2</sub>/mile emissions requirement results in about a \$50 average fee for those lower income households (with some paying nothing and others paying more than \$100 per car).

- Exempting vehicles with MSRP < \$27,000 has a significant effect, since 55% of all new vehicles purchased were below this price. Household average fees rise in direct proportion to income. Also, requiring vehicles to have < 400 g CO<sub>2</sub>/mile does not substantially change this result.

- CO<sub>2</sub> emissions fees can send a signal to buyers regarding the CO<sub>2</sub> impacts of their purchases. However, varying fee structures by household income or vehicle MSRP can have a significant impact on the distribution of fees across household income levels.

- Excluding vehicles emitting < 250g CO<sub>2</sub>/mile has a small impact on the average fees for vehicles emitting 250+ g CO<sub>2</sub>/mile, but may be an important element that highlights to consumers which models achieve zero fees.

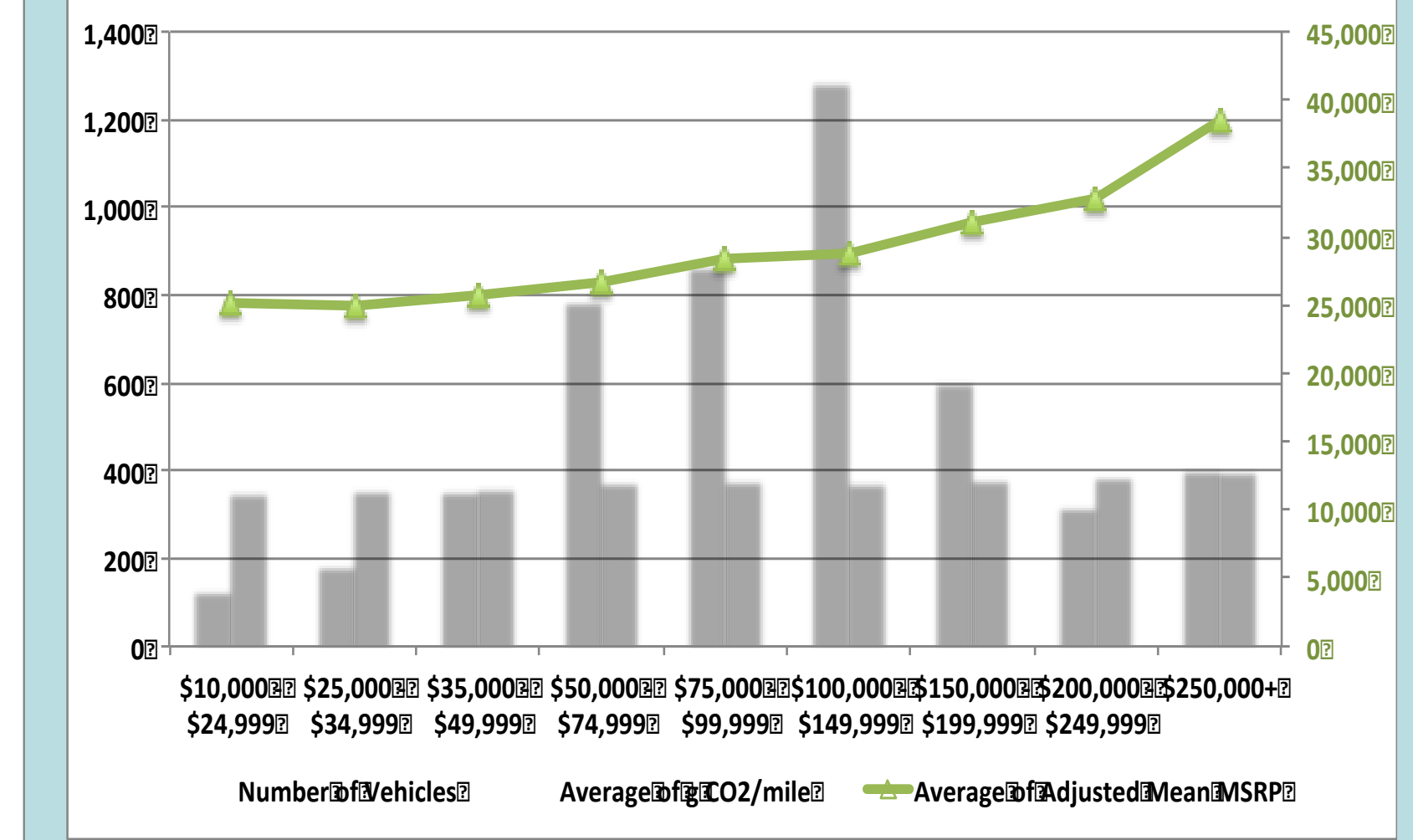
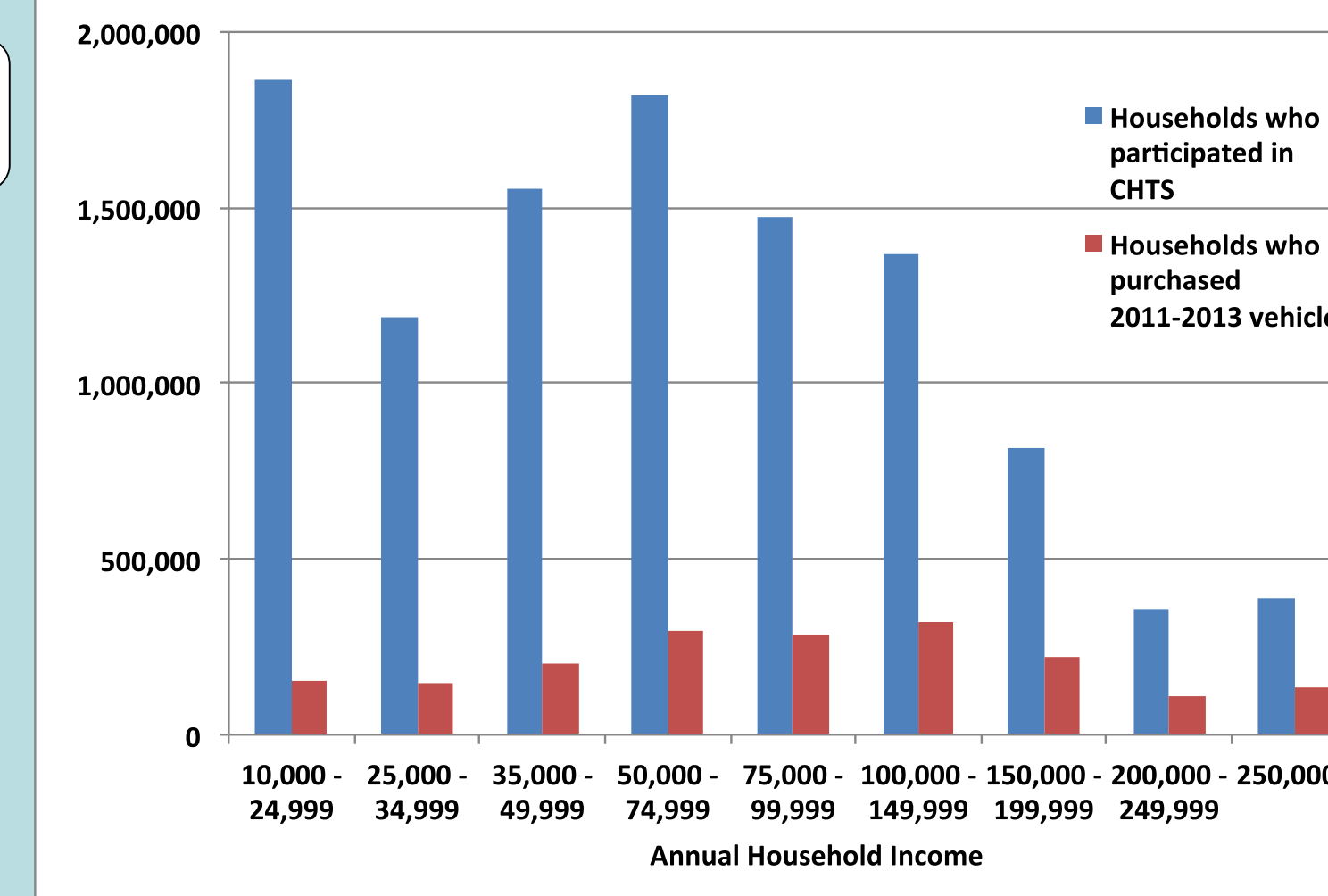
- Any incentives or fee systems should be included as part of the information on the car window sticker so it is obvious at time of sale.

- Lower income households buying a new car use a large share of their income (neglecting financing options to spread out costs over time). Such households may be quite sensitive to incentive schemes for purchasing cleaner vehicles.

- Overall, it appears possible to construct vehicle fee systems that raise the \$200 million (to 2018) with greater impacts on higher income households.

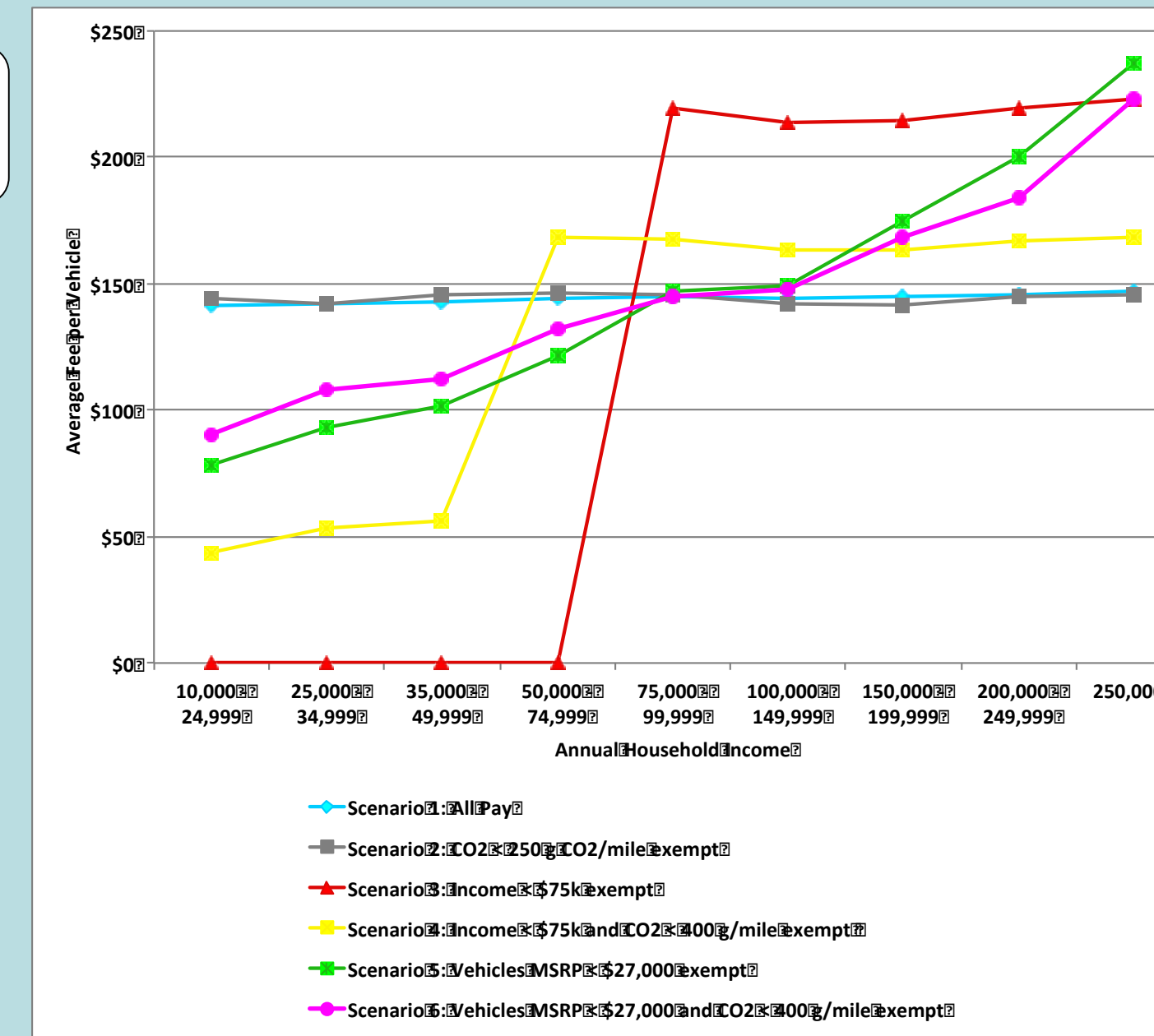
## Data Overview

- 2011-2013 model year vehicles
- Divided into 10 income groups (ignored <\$9,999)
- Weighted to represent the state of California



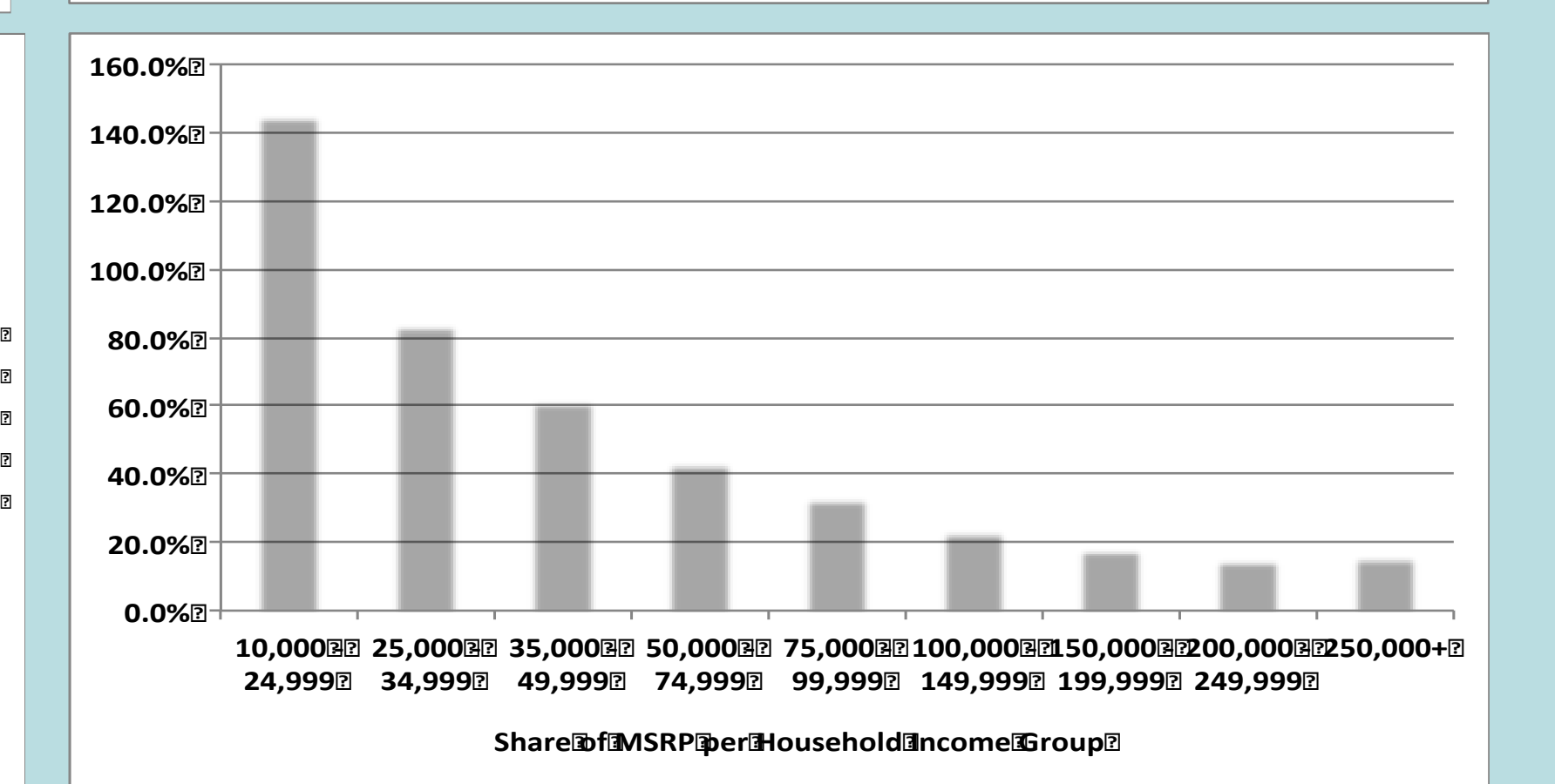
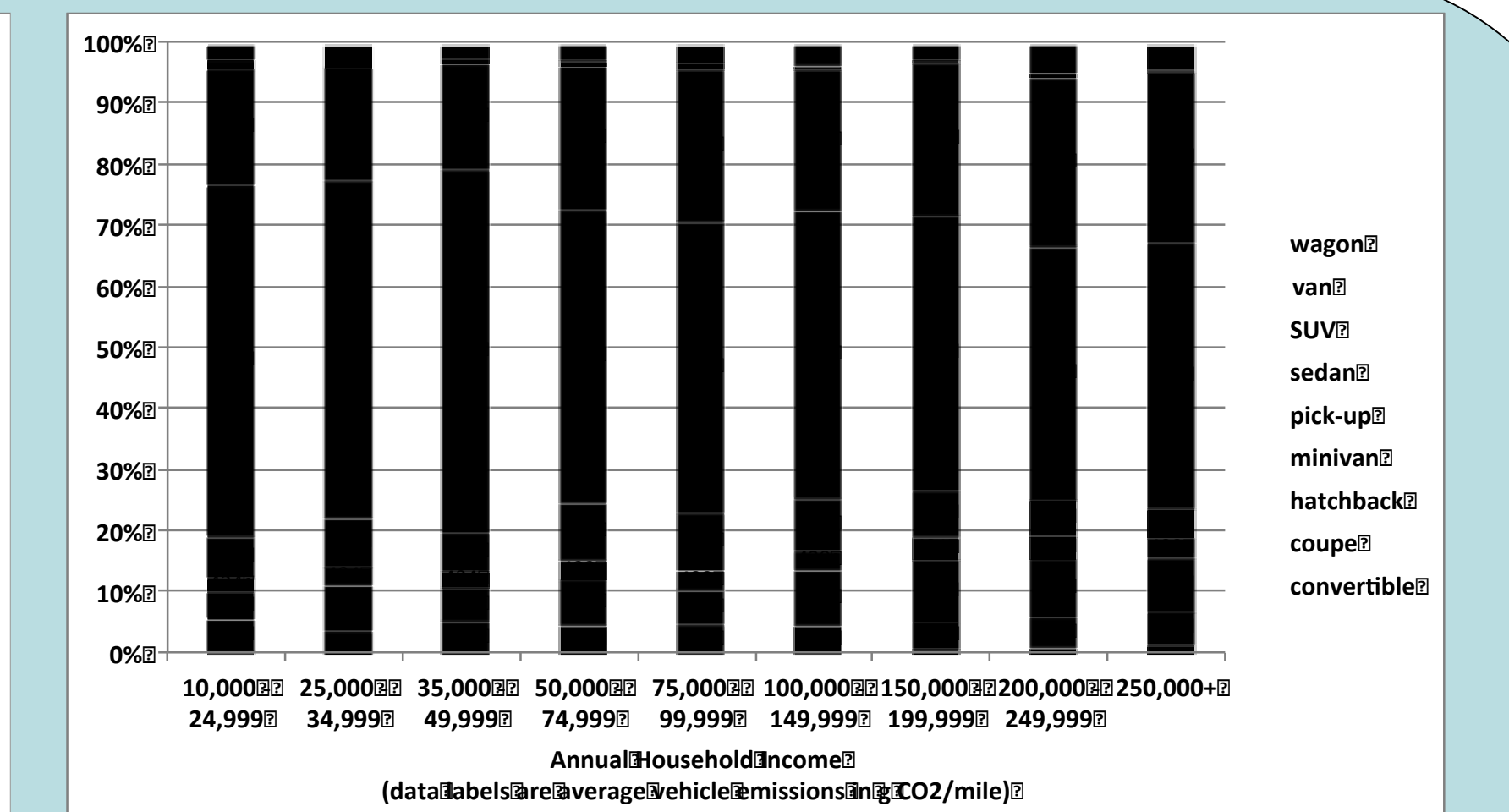
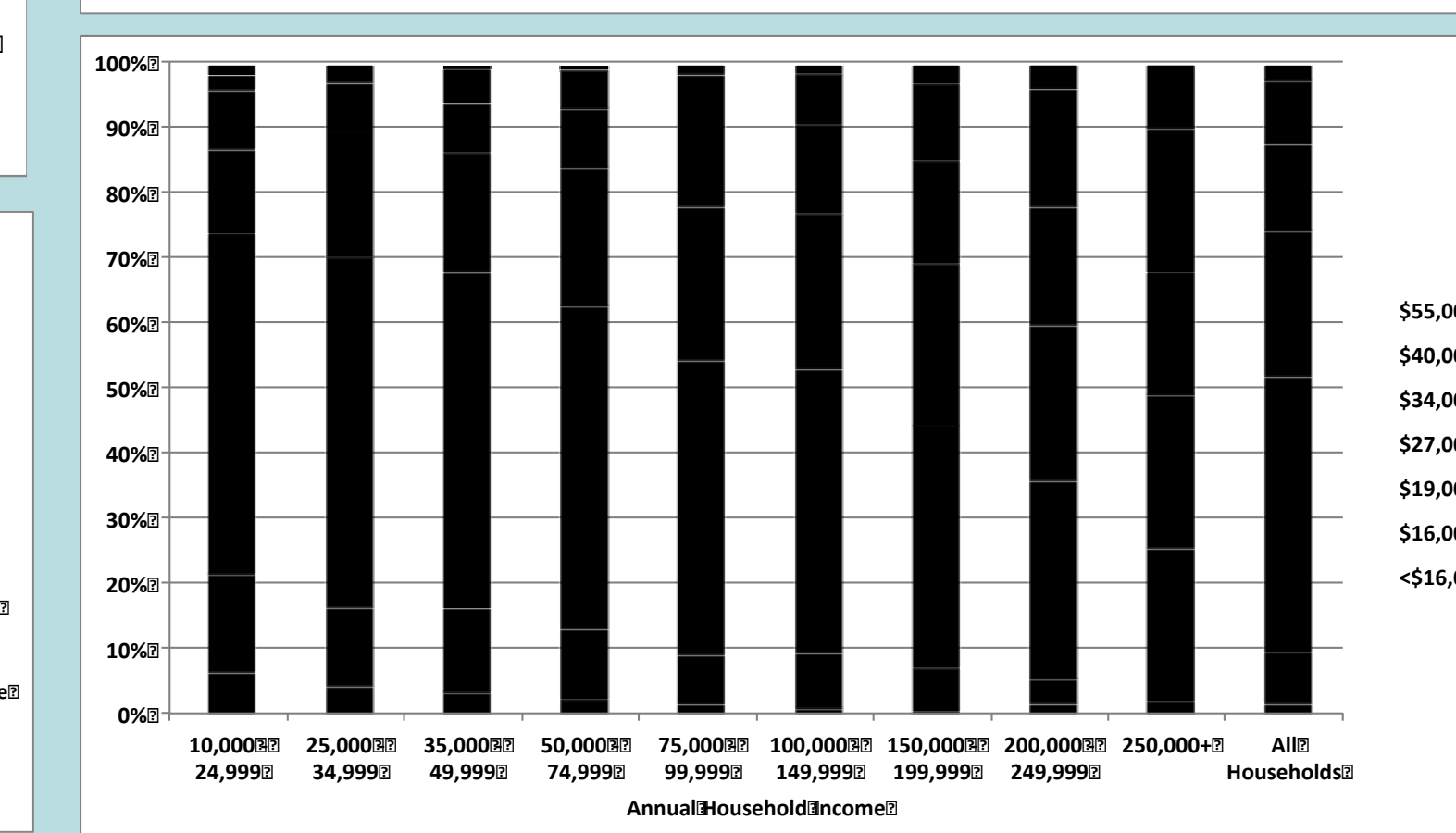
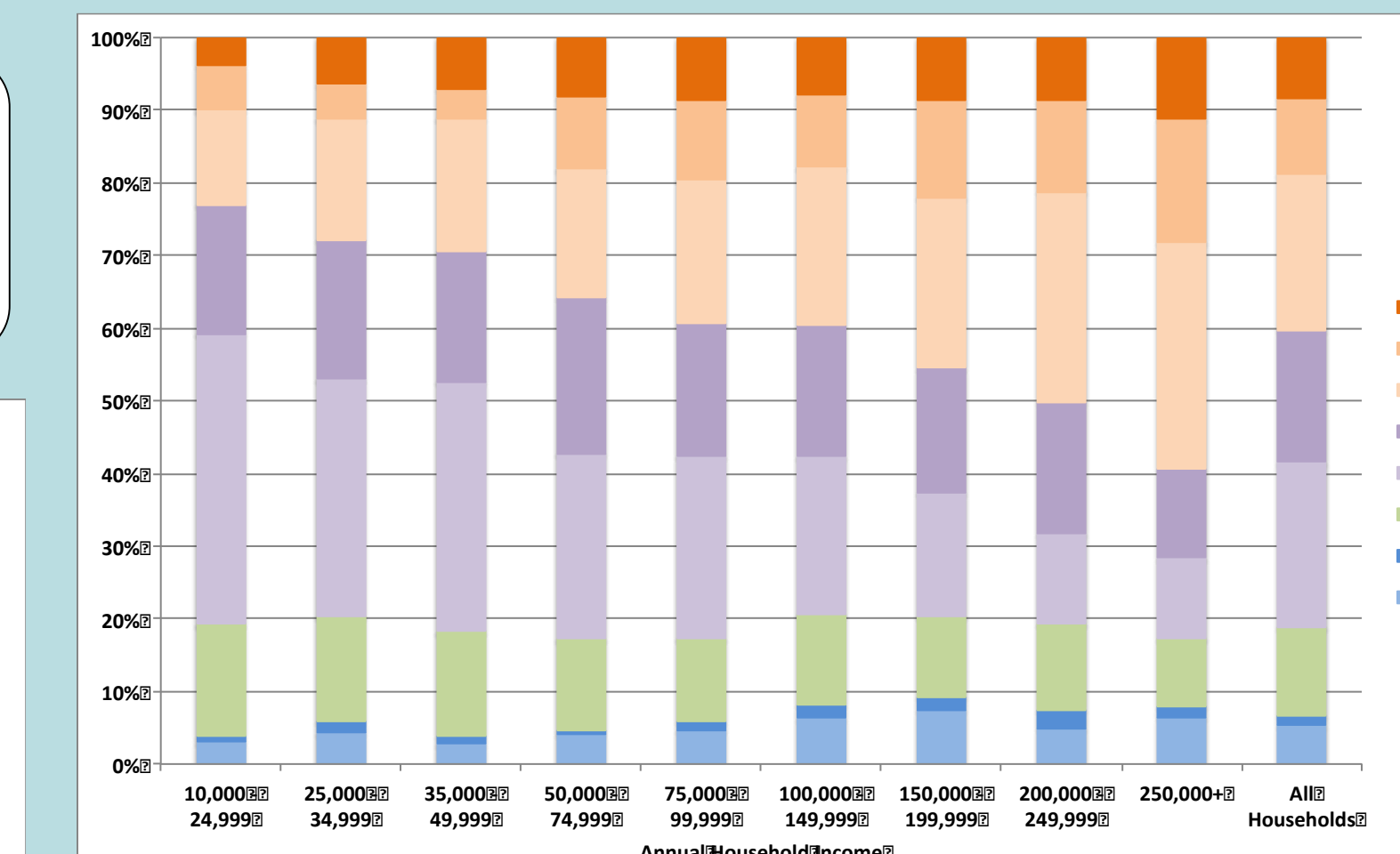
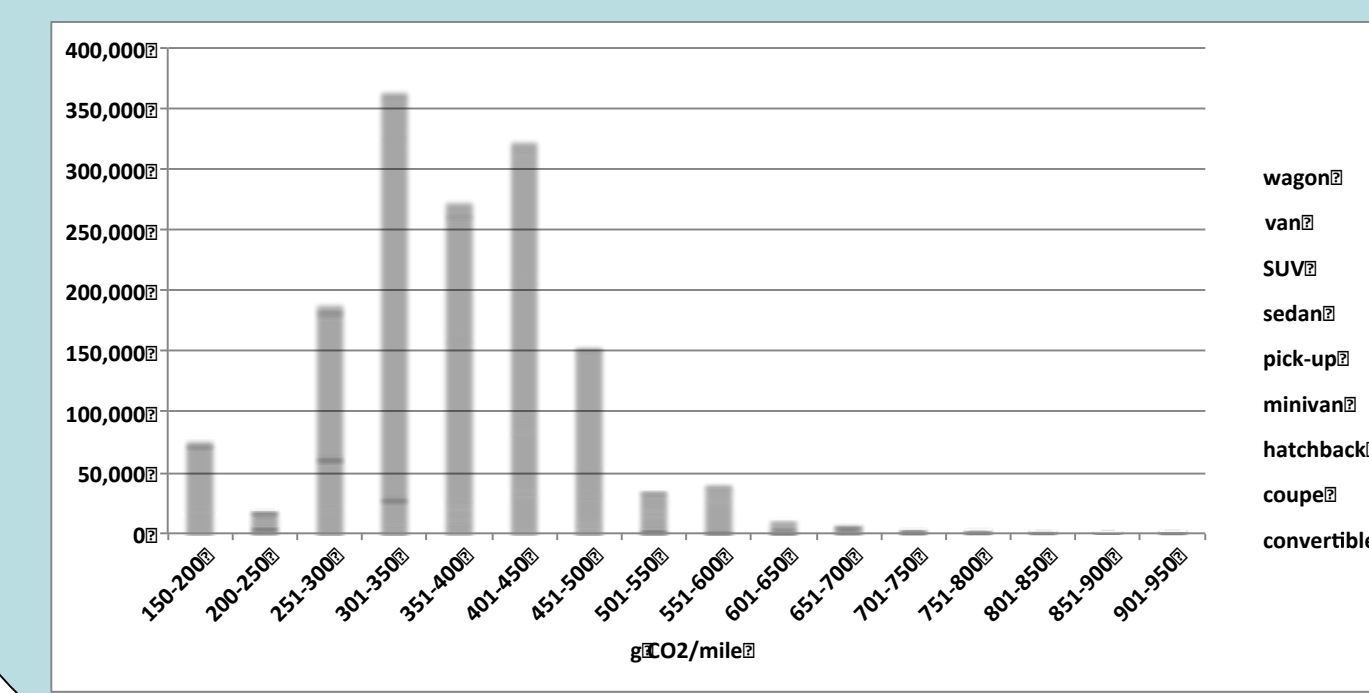
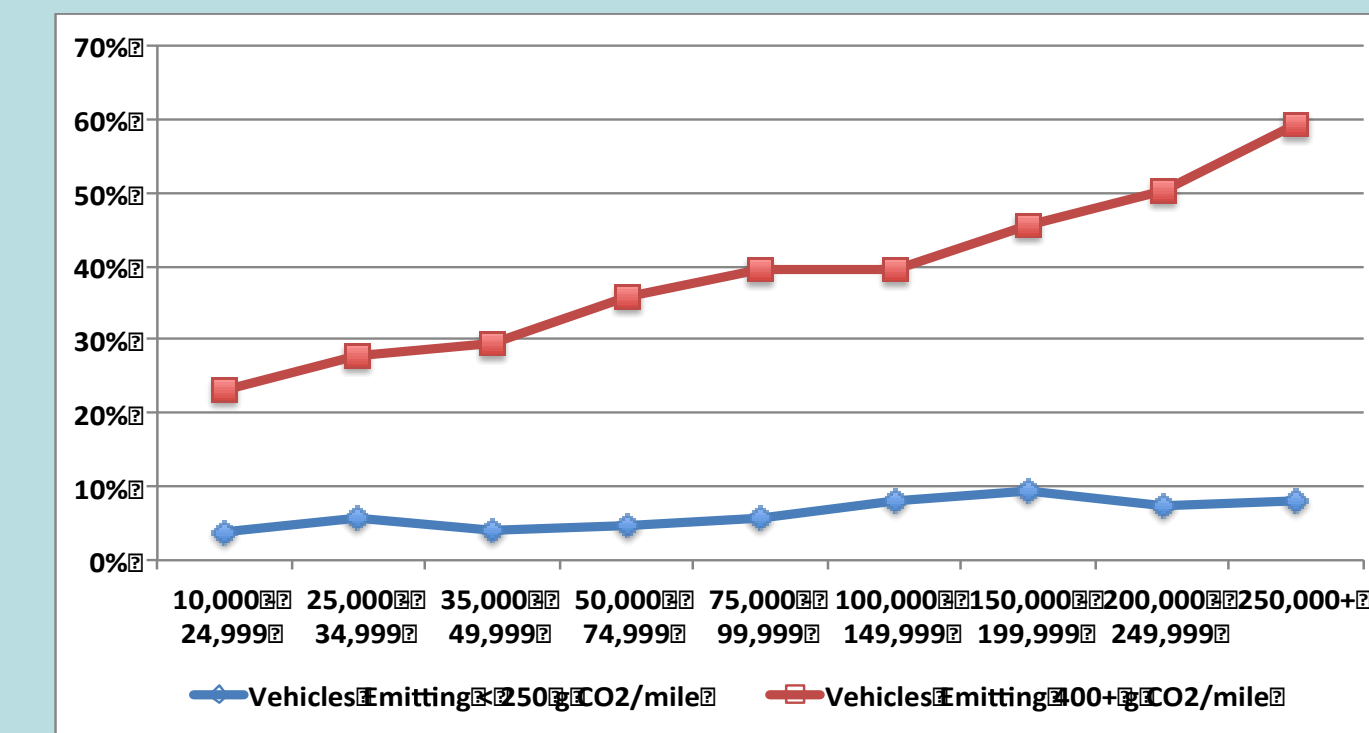
## Fee Structure Scenarios

Scenario	CO <sub>2</sub>	Income	MSRP
Scenario 1	All pay	All pay	All pay
Scenario 2	Vehicles emitting less than 250g CO <sub>2</sub> /mile are exempt	---	---
Scenario 3	---	Exempt households with income below \$75,000	---
Scenario 4	Vehicles emitting less than 250g CO <sub>2</sub> /mile are exempt	Exempt households with income below \$75,000	---
Scenario 5	---	---	Exempt vehicles with MSRP below \$27,000
Scenario 6	Vehicles emitting less than 250g CO <sub>2</sub> /mile are exempt	---	Exempt vehicles with MSRP below \$27,000



Scenario	Description	Average vehicle fee	Minimum vehicle fee	Maximum vehicle fee	Average vehicle fee for households earning below \$75,000	Average vehicle fee for highest CO <sub>2</sub> emitting 10%	Strengths	Weaknesses
Scenario 1	All vehicles and incomes pay	\$140	\$120	\$210	\$179	\$167	Lowest to max fee	Low income pays same as high income
Scenario 2	Exempt vehicles emitting below 250g CO <sub>2</sub> /mile	\$140	\$130	\$230	\$183	\$180	Only higher emitting vehicles pay	Top tier higher than all other CO <sub>2</sub> levels pay, though in many cars are below 250g CO <sub>2</sub> /mile, so not much different
Scenario 3	Exempt households with income below \$75,000	\$152	\$180	\$413	\$0	\$299	Only wealthier households pay	Top tier higher than all other pay, some decaying expensive vehicles
Scenario 4	Exempt households with income below \$75,000 and vehicles emitting up to 250g CO <sub>2</sub> /mile	\$150	\$150	\$283	\$97	\$216	Lower income HH pay for high CO <sub>2</sub> vehicles, but have many choices with low fee	Higher top tier, but to fewer vehicles included
Scenario 5	MSRP-based approach: vehicles pay only if MSRP over \$27,000	\$150	\$193	\$583	\$115	\$431	Those buying below average price cars do not pay	Somewhat high CO <sub>2</sub> cars are exempt, high average price for those who do pay
Scenario 6	MSRP below \$27,000 and emit below 250g CO <sub>2</sub> /mile	\$150	\$215	\$200	\$138	\$383	Below average price, low CO <sub>2</sub> cars exempt	High top fee for those who pay

## Emissions and MSRP per Household Income



## Funding Projections

Model Years	Total ZEV Percent Required	Minimum ZEV floor	TZEVs	Projected LDV Sales (millions) (Vision)	ZEV Rebates (\$millions)	TZEV Rebates (\$millions)	Total Rebates (\$millions)	Average fee per non-ZEV/TZEV purchased to pay for rebates
2018	4.5%	2.0%	2.5%	1.686	84	94	178	\$111
2019	7.0%	4.0%	3.0%	1.700	170	113	283	\$179
2020	9.5%	6.0%	3.5%	1.707	256	131	387	\$251
2021	12.0%	8.0%	4.0%	1.695	339	150	489	\$328
2022	14.5%	10.0%	4.5%	1.711	428	169	596	\$407
2023	17.0%	12.0%	5.0%	1.727	518	188	706	\$493
2024	19.5%	14.0%	5.5%	1.752	613	206	819	\$581
2025	22.0%	16.0%	6.0%	1.761	705	225	930	\$677

\*\* This research does not take into account market shifts due to behavioral changes

