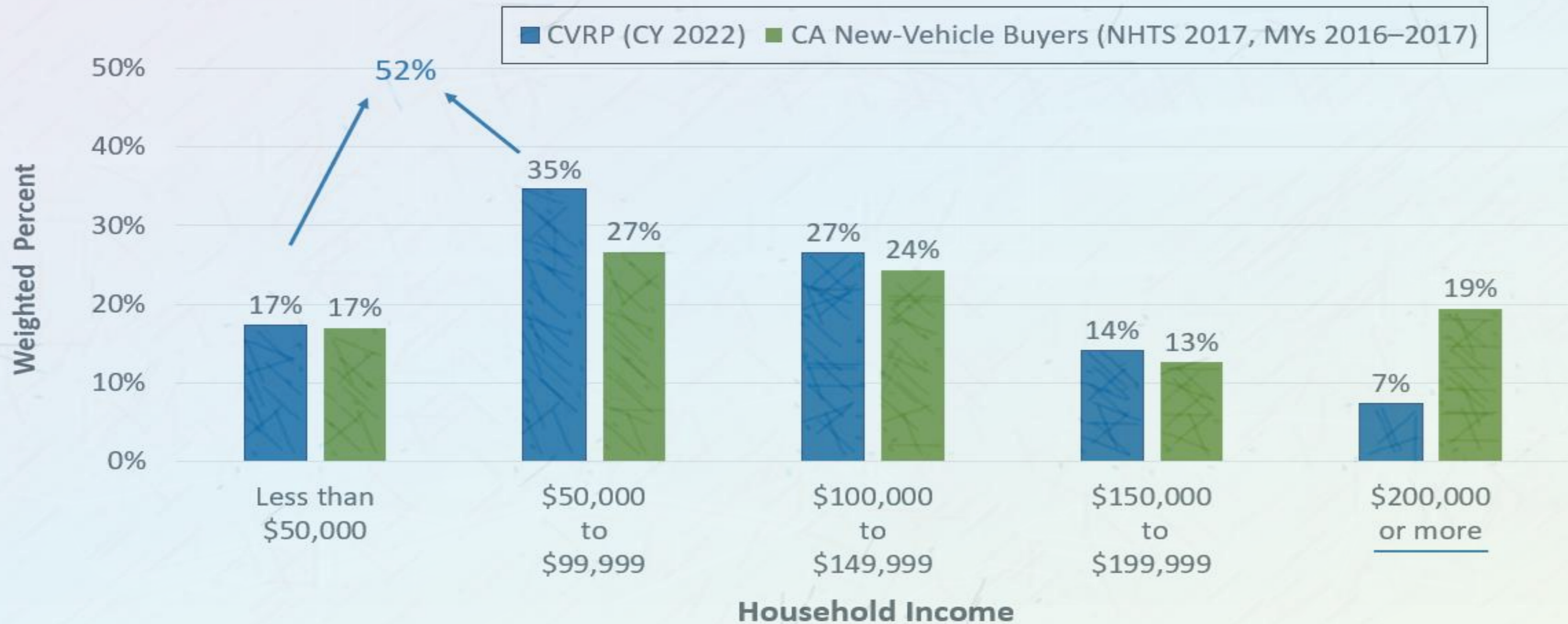# CVRP 2022 Data Brief: Consumer Characteristics & Equity Metrics

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with particular thanks to L. Puckett, as well as J. Galbiati, J. Bowers, and others at the Center for Sustainable Energy (CSE)

August 2024

Outline: Consumer Characteristics

I. Context: Consumer Eligibility Criteria
II. Data: Program Application and Survey
III. Where is the funding going?: Consumers Rebated
IV. What is the path forward?: Strategic Segments
V. Summary & Select Findings

Appendix: Additional Details & Resources

EVs = light-duty plug-in hybrid, battery, and fuel-cell electric vehicles (PHEVs, BEVx vehicles, BEVs, and FCEVs)
PEVs = PHEVs, BEVx vehicles, and BEVs

Preview: 2022 Consumer Characteristics

Context:

- Program design, COVID-19 fallout, and rising prices shaped impacts; Tesla prices above MSRP cap for much of 2022

Rebated Consumer Characteristics vs. CA New-Vehicle Buyers:

Updating with data for 2022 purchases/leases, we see **CVRP**:

- **Regressed** away from resembling mainstream car markets in terms of higher **home ownership** (but still lower than pre-2021 levels).
- **Progressed** further toward the mainstream in terms of **gender** and **educational attainment**.
- Was **mainstream** in terms of **age**.
- Was **beyond the mainstream** in terms of **income** and some metrics of **race/ethnicity**,
  - thereby **also addressing** decades-old **structural inequities in new-car buying** in these areas

The portion of disparities between CVRP and the CA population statistics that can **reasonably be attributed to new-car buying** rather than being particular to EVs:

- 2/5^{ths} of the differences in the home ownership metric
- 4/5^{ths} of the differences in educational attainment
- All off the differences in income, age, and some metrics of race/ethnicity

Paths Forward:

- *Strategic consumer segments* present possible steppingstones on a path toward the mainstream and beyond to increased access (see related work)

Context

Consumer Eligibility Criteria & Other Program Features

Base Rebate Amount for Most Individuals At Lowest Levels

	as of Mar. 2010	as of Jun. 2011	as of Jul. 2013	as of Jun. 2014	as of Mar. 2016	as of Nov. 2016	as of Dec. 2019
Fuel-Cell EVs	$3,000–$5,000 ‡	$1,500–$2,500 ‡	$2,500	$5,000	$5,000 *	$5,000**	$4,500***
Battery EVs †	$3,000–$5,000 ‡	$1,500–$2,500 ‡	$2,500	$2,500	$2,500 *	$2,500**	$2,000***
Plug-in Hybrid EVs	$3,000	$1,500	$1,500	$1,500	$1,500 *	$1,500**	$1,000***
Zero-Emission Motorcycles	$1,500	$900	$900	$900	$900	$900	$750
Neighborhood EVs	$1,500	$900	$900	$900	$900	None eligible	None eligible
Commercial Zero-Emission Vehicles	$20,000						

† Includes range-extended battery electric vehicles.

‡ Amounts varied by ZEV type. For definitions, see CCR 1962.1.

* Income-qualified consumers eligible for an additional $1,500.

** Income-qualified consumers eligible for an additional $2,000.

*** Income-qualified consumers eligible for an additional $2,500.

Program Design Shapes Outcomes

For personal rebates:

as of Mar. 2010
- Incentive stacking permitted
- 36-month ownership requirement
- Rebates per year limit = 20

as of Dec. 2013
- Rebates per year limit = 2

as of May 2014
- 18-month application window

as of Dec. 2014 / Jan. 2015
- 30-month ownership requirement (retroactive)
- Total rebate limit = 2

as of Mar. 2016
- $250k–$500k income cap (PEVs)
- +$1,500 for income-qualified households (≤ 300% FPL), excluding ZEMs

as of Nov. 2016
- $150k–$300k income cap (PEVs)
- ≥ 20 UDDS electric miles
- +$2,000 for income-qualified households (≤ 300% FPL), excl. ZEMs

as of Jan. 2018
- $150k–$300k income cap on stacking HOV decal (only binding on FCEVs)
- Rebate Now San Diego County preapproval pilot with point-of-sale option

as of Jan. 2019
- Stacking with CVAP grant not permitted (retroactive)

as of Dec. 2019
- Total rebates limit = 1 [§]
- Base MSRP ≤ $60k (PEVs)
- 3-month application window [‡]
- ≥ 35 UDDS electric miles
- +$2,500 [†] for income-qualified households (≤ 300% FPL), excl. ZEMs

as of Apr. 2020
- Stacking with CVAP grant permitted

as of Jan. 2021
- +$2,500 for income-qualified households, ≤ 400% FPL, excl. ZEMs

as of Apr. 2021
- ≥ 30 U.S. EPA electric miles (45 UDDS)
- Rebate Now preapproval option limited to income-qualified households, expanded to include SJ Valley

as of Feb. 2022
- Base MSRP: ≤ $60k for Large Vehicles*, ≤ $45k for Cars*
- $135k–$200k income cap (PEVs)
- $135k–$200k income cap on stacking HOV decal (only binding on FCEVs)

as of Jul. 2022
- $150k–$300k income cap on stacking HOV decal (only binding on FCEVs)

PEVs = plug-in EVs. FPL = Federal Poverty Level. ZEMs = zero-emission motorcycles. UDDS = Urban Dynamometer Driving Schedule. HOV = high-occupancy-vehicle. FCEVs = fuel-cell EVs. CVAP = Clean Vehicle Assistance Program. MSRP = manufacturer suggested retail price.

*§ A second rebate can be approved for a FCEV if the first rebate was for a PEV. ‡ COVID exemptions on application window effectively delayed implementation until 4/15/2021. † Change due to $500 decrease in standard rebate amounts (previous slide). * Large Vehicles include minivans, pickups, and SUVs; Cars include all other light-duty vehicle classes (e.g., hatchbacks, sedans, wagons, and two-seaters).*

2022 Saw a Decline in Applications When Tesla Model 3 & Y Prices Rose Above the MSRP Cap
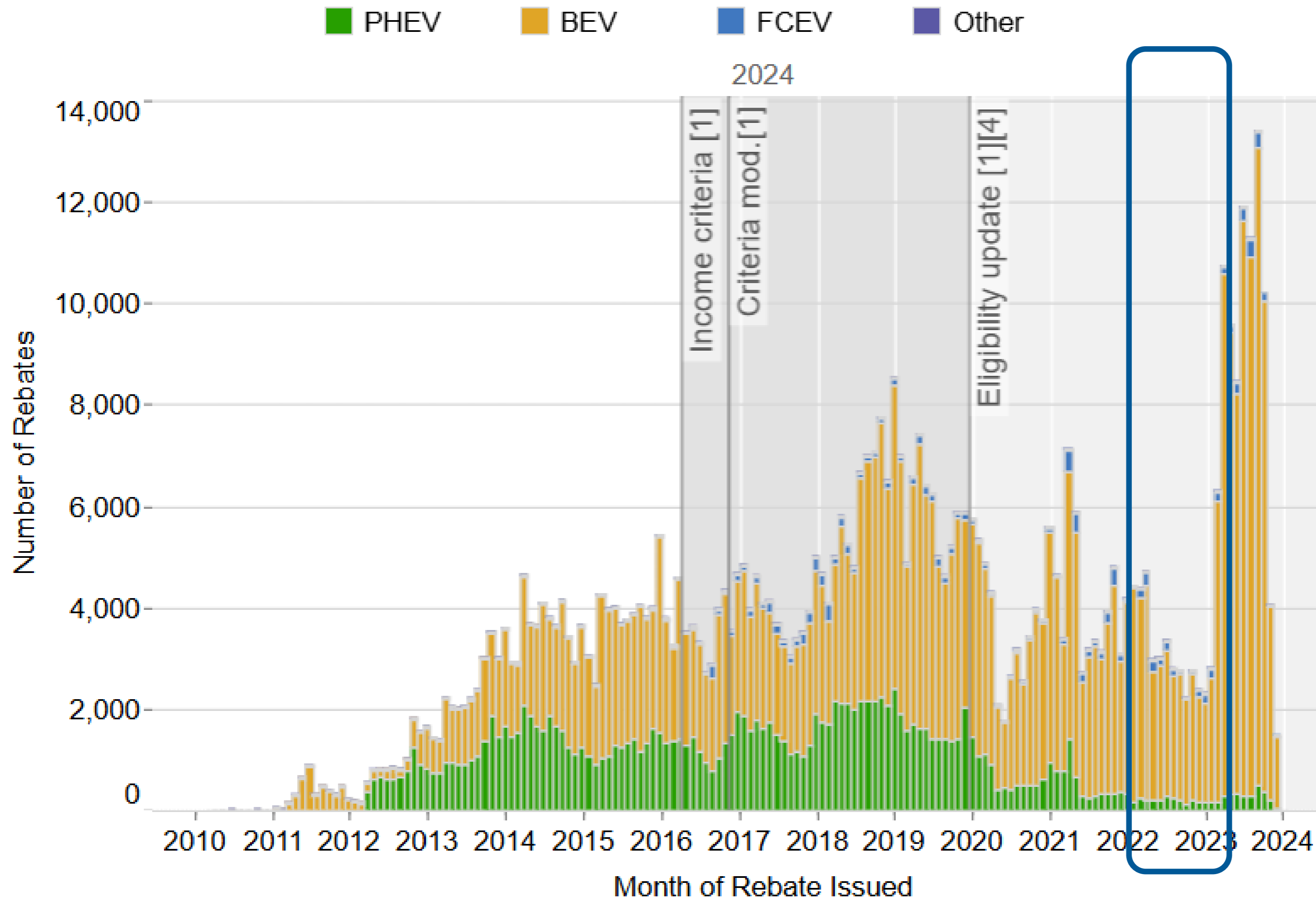
Rebate applications for calendar year 2022 purchases/leases for individuals spanned 1/1/2022 – 3/30/2023.

6% applied in 2023.

However, Total EV Sales in California Continued to Grow
2011–2023

Monthly Sales

~11% of registered EVs purchased in 2022 received rebates.

Legend: FCEV, BEV, PHEV

Image from https://www.autosinnovate.org/EVDashboard *(6/24/24)*

More Broadly, Electric Vehicle Sales in California Increased 2011–2018, Decreased in 2019 and During the Pandemic, and Rebounded in 2021 and Beyond

Annual Sales

FCEV BEV PHEV

VELOZ

Annual Electric Vehicle Sales in California
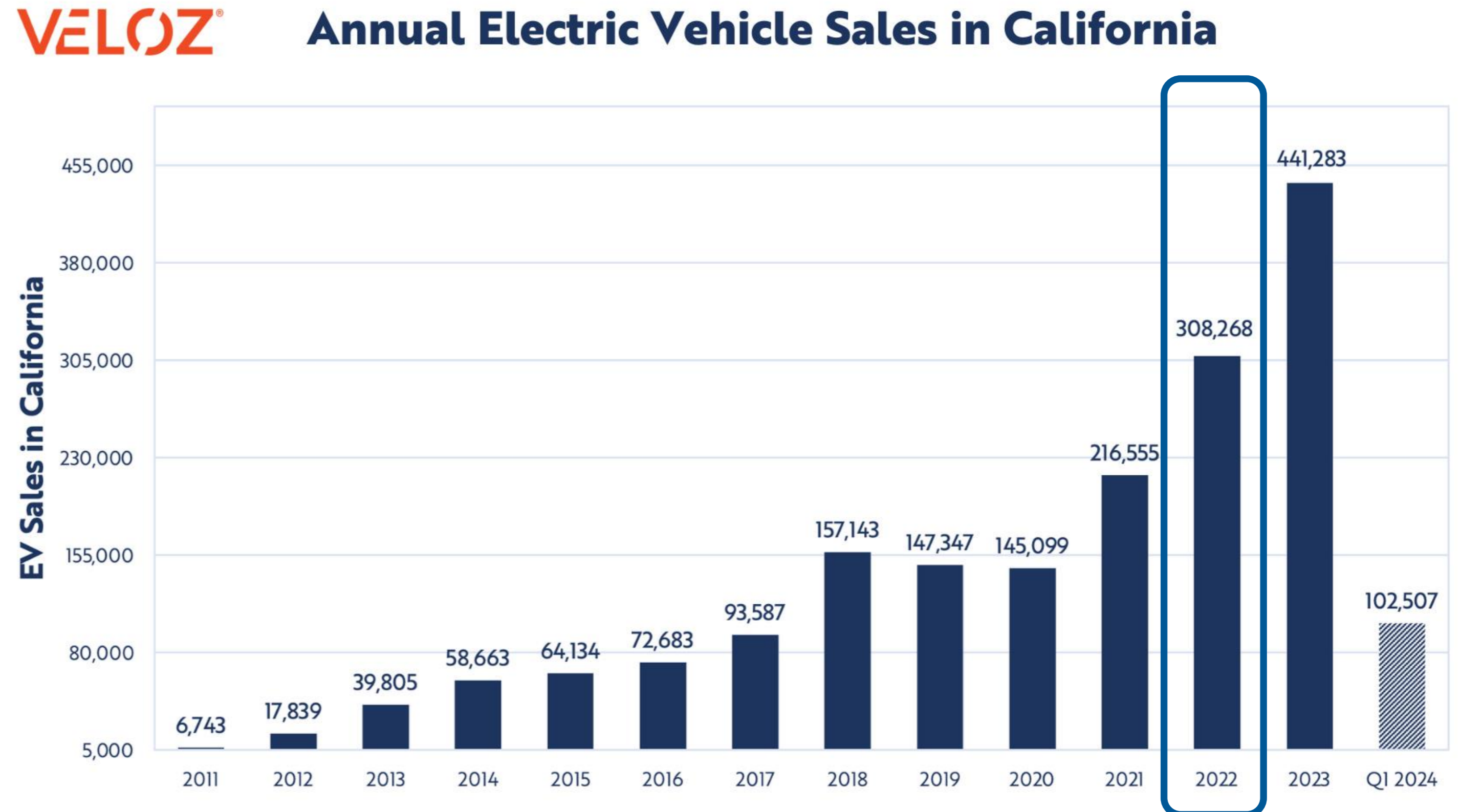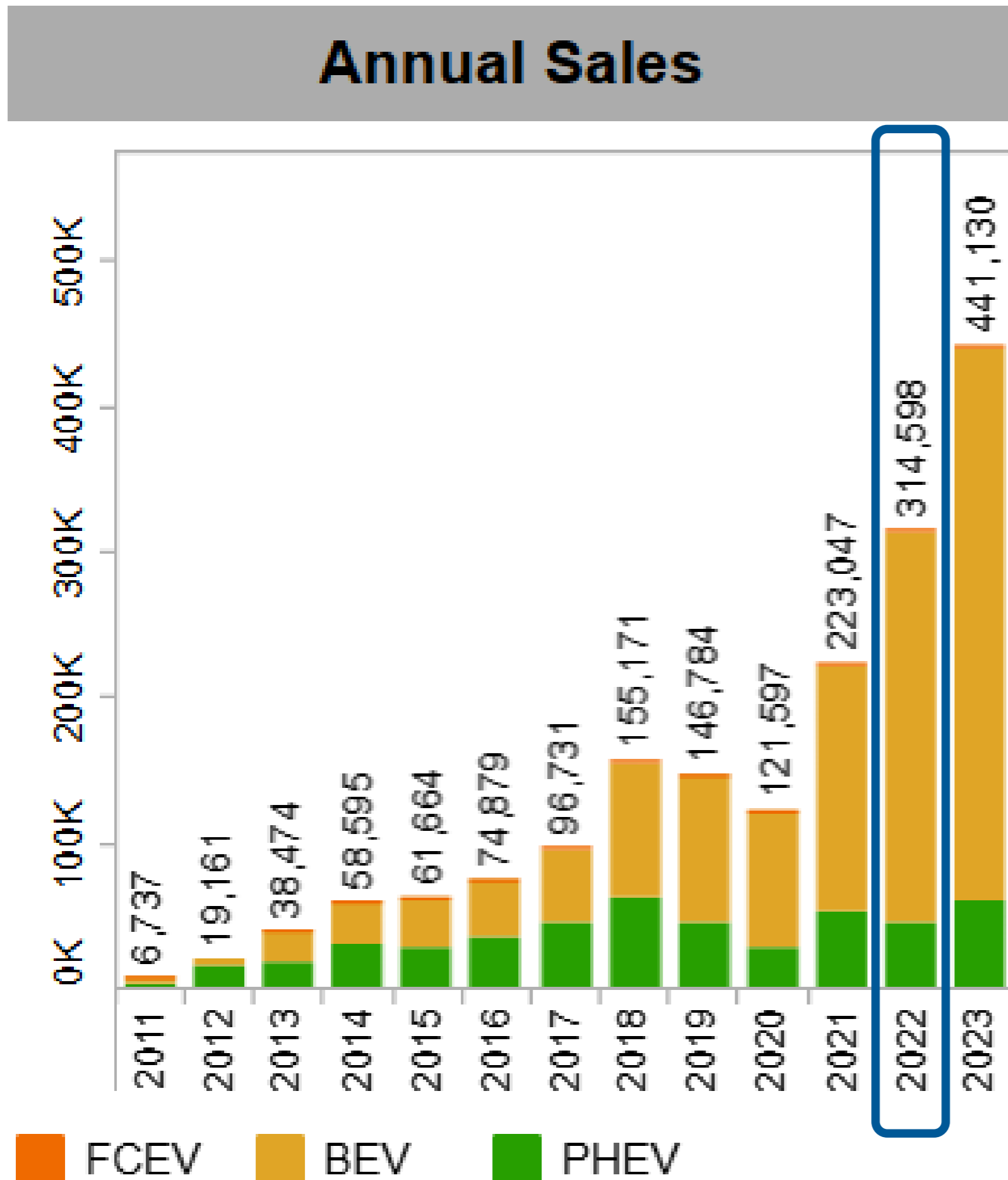
Data source: California Energy Commission Light-Duty ZEV Sales Data (March 2024). Quarterly data is subject to updates throughout the year.

Q1 2024 data update: Cumulative data from 2011 – Q1 2024.

Image 1 from https://www.autosinnovate.org/EVDashboard (6/24/24).
Image 2 from https://www.veloz.org/wp-content/uploads/2024/05/Q1-2024_Annual-EV-Sales-in-CA-1.png

Data

Application, Consumer Survey, Multi-State

CVRP Program Application Data Used

(Shows Rebates to Individuals for Plug-in EVs Only)

Vehicle Purchase/ Lease Year	2018	2019	2020	2021	2022	Total
Program Population (N)	78,611	61,422	36,481	45,292*	33,702	255,508

* Reflects data settling since prior reporting (some prior reporting included with N = 45,288).

CVRP Consumer Survey Data Used
(shows rebates to individuals for plug-in EVs* only)

	2017–2020 Edition	2018 purchases/ leases subset	2019 purchases/ leases subset	"2020" purchases/ leases subset	2020–2023 Edition (in progress) Interim Datasets	Interim 2021 purchases/ leases subset	Interim 2022 purchases/ leases subset	Total
Vehicle Purchase/ Lease Dates	June 2017 – Nov. 2020	Jan. 2018 – Dec. 2018	Jan. 2019 – Dec. 2019	Jan. 2020 – Nov.** 2020	Dec. 2020 – Dec. 2022	Jan. 2021– Dec. 2021	Jan. 2022 – Dec. 2022	Jan. 2018 – Dec. 2022
Survey Responses (total _n_)	32,524***	14,757	8,991	4,331***	15,482	7,694***	6,674***	42,447
Program Population (_N_)**	193,167	78,591 (filtered subset of weighted Edition)	61,277 (filtered subset of weighted Edition)	26,463	86,451	45,261	33,685	245,277

*Plug-in EVs (PEVs) include PHEVs and BEVs.

** ~8k 2020 purchases/leases were invited to respond to the successive survey edition and are not represented in these data.

*** Subsequently weighted to represent the program population, see "CVRP Consumer Survey: Weighting Detail" slide for further detail.

**** Small numbers of vehicles are not represented in the time frames due to application lags. Numbers may not be exactly comparable due to evolving weighting practices.

CVRP Consumer Survey: Weighting Detail

- Each survey edition is individually weighted to represent the program population along the dimensions of vehicle category, vehicle model, buy vs. lease, and county.
  - Year of purchase/lease was also included in weighting for the 2017–20 Edition & 2020–22 Interim Dataset.
    - Weighting for the 2021 subset & 2022 Interim Dataset also included rebate type (Standard Rebate vs. Increased Rebate).

- The 2020 and 2021 purchase/lease subsets were also independently weighted
  - This produced only minor differences compared to the filtered approach used for the 2018 & 2019 subsets.

- Summary of weights, 2022 Interim Dataset:

Min	Median	Mean	Max
0.17	0.986	1	5.51

Multi-State Consumer Survey Data
(latest available year, shows rebates to individuals for plug-in EVs* only)

	CALIFORNIA CLEAN VEHICLE REBATE PROJECT	MOR-EV Massachusetts Offers Rebates for Electric Vehicles	CHEAPR Connecticut Hydrogen and Electric Automobile Purchase Rebate	NEW YORK STATE	Total
Vehicle Purchase/ Lease Dates	Jan. 2022 – Dec. 2022	Oct. 2021 – Dec. 2022	Jul. 2022 – Jun. 2023	Jan. 2022 – Dec. 2022	Oct. 2021 – Jun. 2023
Survey Responses (total *n*)	6,674	1,309	958	5,472	14,761
Program Population (*N*)*	33,685	4,551	2,308	27,187	67,731

*Plug-in EVs (PEVs) include PHEVs and BEVs.
** Subsequently weighted to represent the program population.
*** Small numbers of rebated vehicles are not represented in the time frames due to application lags. Numbers may not be exactly comparable due to evolving weighting practices.
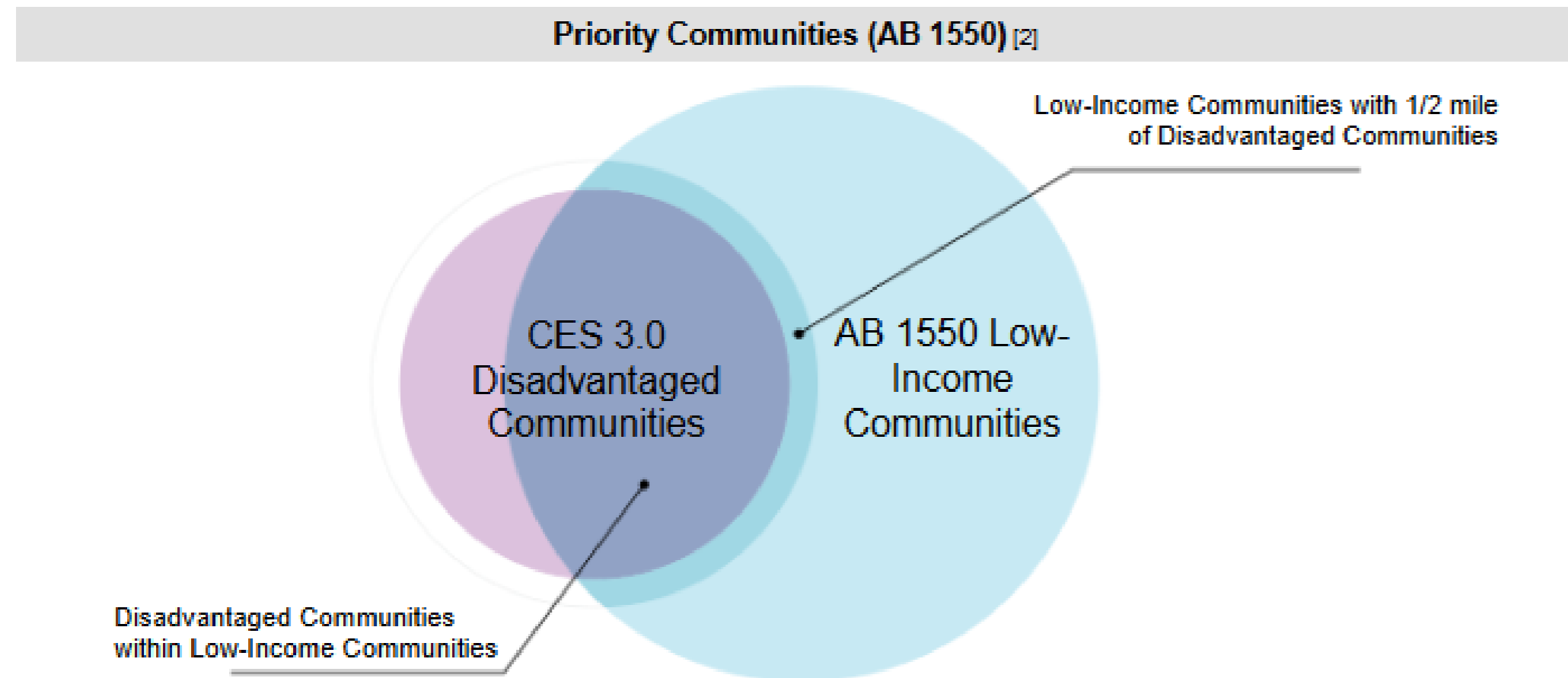
14

Consumers Rebated

Dashboards, Previous Products, and Analysis of 2022 Purchases/Leases

Dashboards

Priority Communities (AB 1550) [2]

Low-Income Communities with 1/2 mile of Disadvantaged Communities

CES 3.0 Disadvantaged Communities

AB 1550 Low-Income Communities

Disadvantaged Communities within Low-Income Communities

This is a Venn diagram describing the priority communities of California Assembly Bill (AB) 1550. The small circle on the left represents CalEnviroScreen 3.0 Disadvantaged Communities and the larger circle on the right represents AB 1550 Low-Income Communities. The larger overlapping area represents Disadvantaged Communities within Low-Income Communities. The smaller overlapping area represents Low-income Communities within one half mile of Disadvantaged Communities.
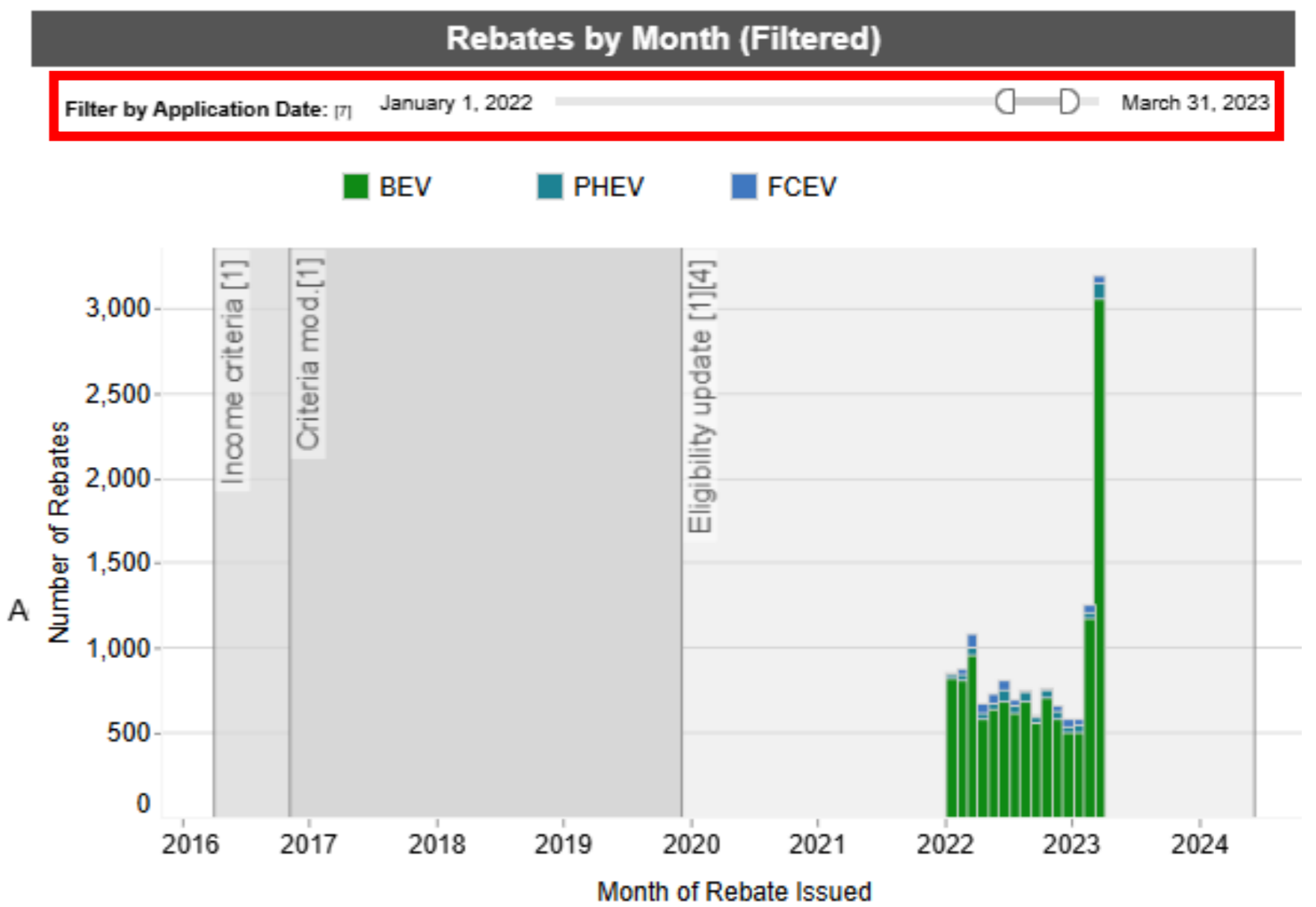
Rebates by Equity Group [2]

Timeframe: [1] Current Income Criteria (11/1/2016 – Present)

	Rebates	Funding	Percent of Funding
All Equity Groups	156,604	$567,424,563	49.9%
Disadvantaged Communities	48,452	$147,762,800	13.0%
Low-Income Communities	100,915	$299,149,453	26.3%
Disadvantaged Communities within Low-Income Communities	33,905	$106,633,167	9.4%
Low-Income Communities within 1/2 mile of a Disadvantaged Community [2]	100,915	$299,149,453	26.3%
Increased Rebates for Low-/Moderate-Income Consumers [1]	69,150	$382,009,049	33.6%

This chart summarizes the number of rebates, amount of funding, and the percent of funding by all equity groups, by geography, and by rebate type. Geography is broken down into two main categories: Disadvantaged Communities (DACs) and Low-Income Communities (LIC). LICs are further split into two subcategories based on distance to DACs.

Filter by:

Consumer Type: (Individual)

Purchase or Lease: (All)

Rebate Type [1]: (Low-/Moderate-Income Increas...)

Equity Communities [2]: (All)

County: (None)

Electric Utility: (None)

Air District: (None)

CA Senate District [3]: (None)

CA Assembly District [3]: (None)

Vehicle Category [4]: (None)

Make: (All)

Model: (None)

Funding Source [5]: (None)

Grant Number [6]: (None)

Rebates by Month (Filtered)

Filter by Application Date: [7] January 1, 2022 ———— March 31, 2023

Legend: ■ BEV ■ PHEV ■ FCEV

This figure displays the total number of rebates by month from 2010 to 2021 as a stacked bar chart with each bar containing number of rebates per vehicle technology type. Plug-in Hybrid Electric Vehicles are represented in blue, Battery Electric Vehicles are represented in green, Fuel-cell Electric Vehicles are represented in light purple, Other vehicle categories are represented in dark purple. Additionally, it contains three date markers that represent program changes – the income criteria on 3/29/2016, the modified income criteria on 11/1/2016, and eligibility update on 12/3/2019.

Rebates Issued or Approved to Date [9] (Filtered)

BEV — 91.1%
PHEV — 4.8%
FCEV — 4.1%
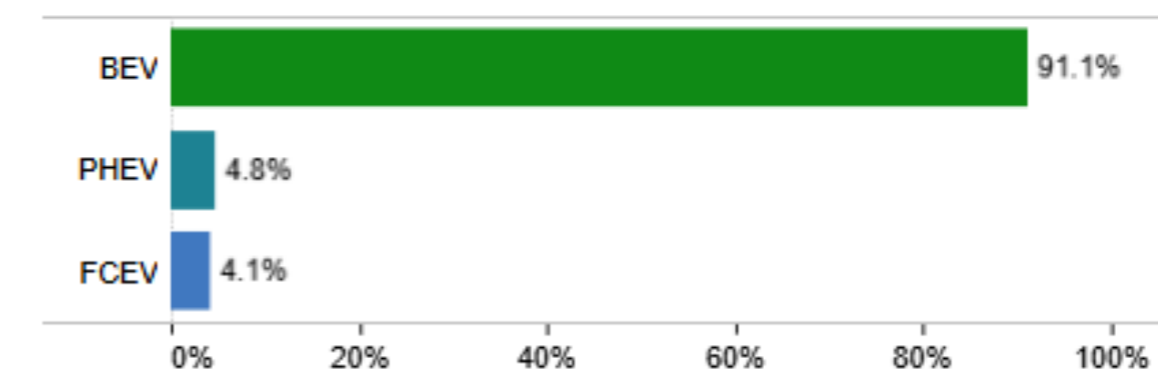
This figure shows four horizontal bars each representing the percent of rebates issued or approved per vehicle technology type.

Last updated: 6/5/2024

[1–7] Please select the Notes tab of this dashboard for additional details and links to related information.

08/05/24 images from https://cleanvehiclerebate.org/eng/rebate-statistics

17

Consumer Survey Dashboard: Demographics

Data from the first four survey editions (2013–15, '15–16, '16–17 and '17-'20) available online…

Consumer Survey Dashboard Demographics: Household Income

6/2023 images excerpted from https://cleanvehiclerebate.org/en/rebate-survey-dashboard

Consumer Survey Dashboard Demographics: Sex/Gender

3/2023 images excerpted from https://cleanvehiclerebate.org/en/rebate-survey-dashboard

Previous Products

❖ B.D.H. Williams (2023, Apr.), Assessing progress and equity in the distribution of electric vehicle rebates using appropriate comparisons, *Transport Policy*, *137*, 141–151. DOI: 10.1016/J.TRANPOL.2023.04.009. Paper. CVRP posting. CSE posting. Precursor video. Slides.

❖ B.D.H. Williams and N. Pallonetti (2023, Mar.), New York State's Drive Clean Rebate for Electric Vehicles: Measures of Impact, *36th International Electric Vehicle Symposium (EVS36)*, EDTA, Sacramento CA, USA. Paper. Slides. CSE posting.

• B.D.H Williams and J.B. Anderson (2022, Sep.), From Low Initial Interest to Electric Vehicle Adoption: "EV Converts" in New York State's Rebate Program, *Transportation Research Record: Journal of the Transportation Research Board*. Includes open-access data-summary appendix. DOI: 10.1177/03611981221118537

• B.D.H. Williams (2022, Jun.), Targeting Incentives Cost Effectively: "Rebate Essential" Consumers in the New York State Electric Vehicle Rebate Program, Procs. *35th International Electric Vehicle Symposium (EVS35)*, Session A3, AVERE. Paper. Slides.

❖ B.D.H. Williams, J.B. Anderson (2022, Jun.), Lessons Learned About Electric Vehicle Consumers Who Found the U.S. Federal Tax Credit Extremely Important in Enabling Their Purchase, Procs. *35th International Electric Vehicle Symposium (EVS35),* Session H3*,* AVERE. Paper. Slides.

❖ B.D.H. Williams (2021, Oct.), *An Electric-Vehicle Consumer Segmentation Roadmap: Strategically Amplifying Participation in the New York Drive Clean Rebate Program*, Report 21-30, *Clean Transportation Reports*, NYSERDA.

• B.D.H. Williams and J. B. Anderson (2021, Mar.), "Strategically Targeting Plug-In Electric Vehicle Rebates and Outreach Using 'EV Convert' Characteristics," *Energies*, vol. 14, no. 7, p. 1899. DOI: 10.3390/en14071899.

❖ B.D. Williams, J. Orose, M. Jones, J.B. Anderson (2018, Oct.), Summary of Disadvantaged Community Responses to the Electric Vehicle Consumer Survey, 2013–2015 Edition, Clean Vehicle Rebate Project, San Diego CA. DOI: 10.13140/RG.2.2.36500.58243

• B.D. Williams, J.B. Anderson (2018, Sep.), Strategically Targeting Plug-in Electric Vehicle Rebates and Outreach Using Characteristics of 'Rebate-Essential" Consumers in 2016–2017, in: 31st Int. Electr. Veh. Symp. (EVS31), Society of Automotive Engineers of Japan, Inc., Kobe, Japan.

❖ C. Johnson, B.D. Williams, C. Hsu, J.B. Anderson, Summary Documentation of the Electric Vehicle Consumer Survey, 2013–2015 Edition, Clean Vehicle Rebate Project, San Diego CA, 2017.

Reverse chronological as of 10/2023; key sources marked with a diamond bullet. Additional related items.

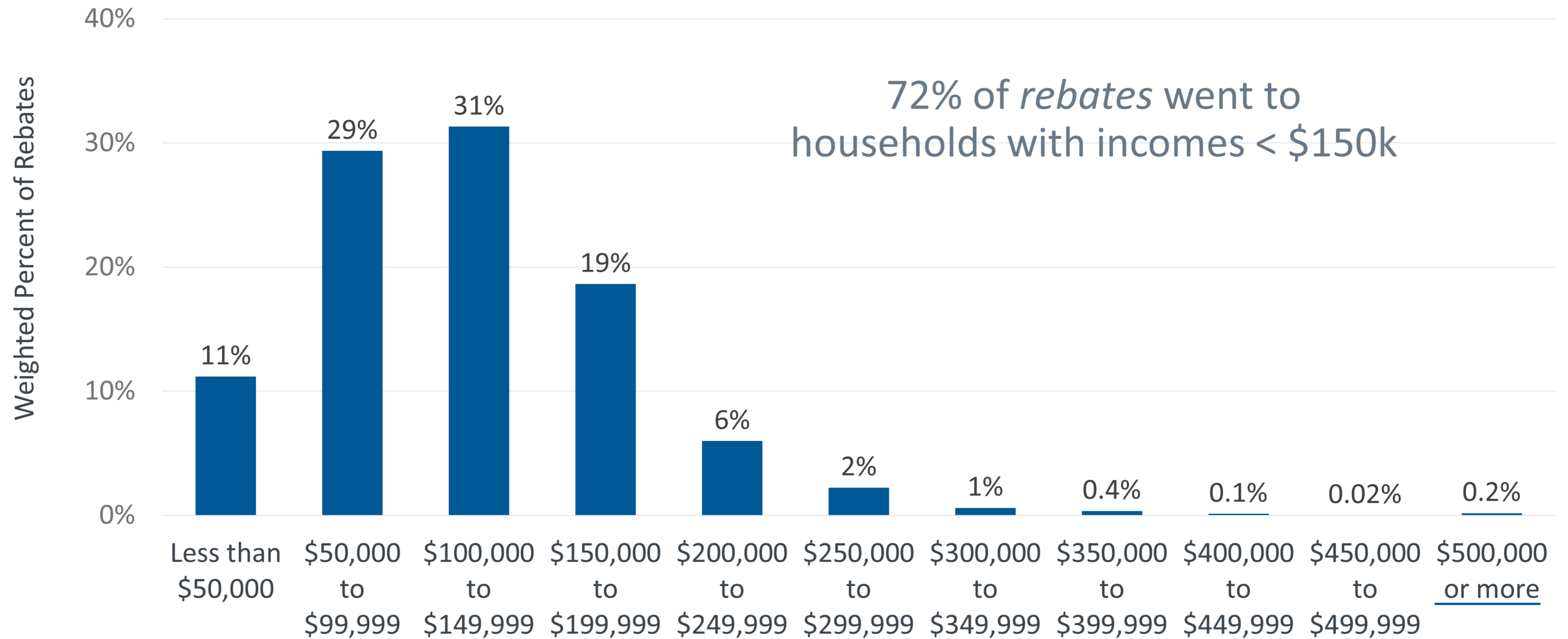# Consumer Characteristics: Select Presentations, Panels & Video

❖ B.D.H. Williams and N. Pallonetti (2023, Dec.), Presentation: "CVRP 2021 Data Brief: Consumer Characteristics," *Program Reports*, Clean Vehicle Rebate Project. DOI: 10.13140/RG.2.2.33506.50888.

❖ B.D.H. Williams (2023, Oct. 25), Panel: "E-Mobility Research and Data Analytics," National E-Mobility Diversity, Equity, & Inclusion Conference 2023, EV Noire, Washington DC, USA.

❖ NY Drive Clean Rebates: Select Impacts Through 2021, EVS36, DOI: 10.13140/RG.2.2.19062.16966. Paper. CSE posting. (2023, Jun. 12)

• Lessons Learned About Electric Vehicle Consumers Who Rated the U.S. Federal Tax Credit 'Extremely Important' in Enabling Their Purchase, EVS35, DOI: 10.13140/RG.2.2.32943.61602. Paper. (2022, Jun. 15)

• Targeting Incentives Cost Effectively: 'Rebate Essential' Consumers in the New York State Electric Vehicle Rebate Program, EVS35, DOI: 10.13140/RG.2.2.22877.28640. Paper. (2022, Jun. 13)

❖ Video: "HEC 2022 Panel - Electrification and Transportation," opening presentation minutes 2–10; 40-minute panel total. Slides. (2022, May)

❖ CARB Video: "CVRP 2020 Data Brief: Consumer Characteristics," time 1:05:43–1:26:09. Slides. DOI: 10.13140/RG.2.2.19493.58089. Paper. (2022, Mar.)

• Data from Statewide Electric Vehicle Rebate Programs: Vehicles, Consumers, Impacts, and Effectiveness (2021, Jul.)

• EV Purchase Incentives: Program Design, Outputs, and Outcomes of Four Statewide Programs with a Focus on Massachusetts DOI: 10.13140/RG.2.2.13166.08001. (2020, Dec.)

• Electric Vehicle Incentives and Policies DOI: 10.13140/RG.2.2.34976.46089. (2019, Nov.)

• CVRP: Data and Analysis Update DOI: 10.13140/RG.2.2.12750.33609. (2018, Dec.)

• Electric Vehicle Rebates: Exploring Indicators of Impact in Four States DOI: 10.13140/RG.2.2.21138.94404. (2018, Jun.)

• Yale Webinar: "Supporting EV Commercialization with Rebates: Statewide Programs, Vehicle & Consumer Data, and Findings," 58 minutes. Slides. (2017, Apr.)

❖ Electric Vehicle Rebates in Disadvantaged Communities: Evaluating Progress with Appropriate Comparisons (2016, Oct.)

• Implementation Status Update (2015, Dec.)

Reverse chronological as of 12/2023; key sources marked with a diamond bullet. Additional related items.

Analysis of 2022 Purchases/Leases and Trends

Distribution of Plug-in EV Rebates by Household Income:
Calendar Year (CY) 2022 Purchases/Leases

CALIFORNIA
CLEAN VEHICLE
REBATE PROJECT™

72% of *rebates* went to households with incomes < $150k

Weighted Percent of Rebates

- 11% — Less than $50,000
- 29% — $50,000 to $99,999
- 31% — $100,000 to $149,999
- 19% — $150,000 to $199,999
- 6% — $200,000 to $249,999
- 2% — $250,000 to $299,999
- 1% — $300,000 to $349,999
- 0.4% — $350,000 to $399,999
- 0.1% — $400,000 to $449,999
- 0.02% — $450,000 to $499,999
- 0.2% — $500,000 or more

CVRP Consumer Survey, 2022 Interim Dataset.
Filtered, question-specific n = 6,108.

Distribution of Plug-in EV *Funding* by Household Income:
Calendar Year (CY) 2022 Purchases/Leases

78% of *funding* went to households with incomes < $150k

Chart: Weighted Percent of Funding by household income:
- Less than $50,000: 17%
- $50,000 to $99,999: 35%
- $100,000 to $149,999: 27%
- $150,000 to $199,999: 14%
- $200,000 to $249,999: 5%
- $250,000 to $299,999: 2%
- $300,000 to $349,999: 0.5%
- $350,000 to $399,999: 0.3%
- $400,000 to $449,999: 0.1%
- $450,000 to $499,999: 0.01%
- $500,000 or more: 0.2%
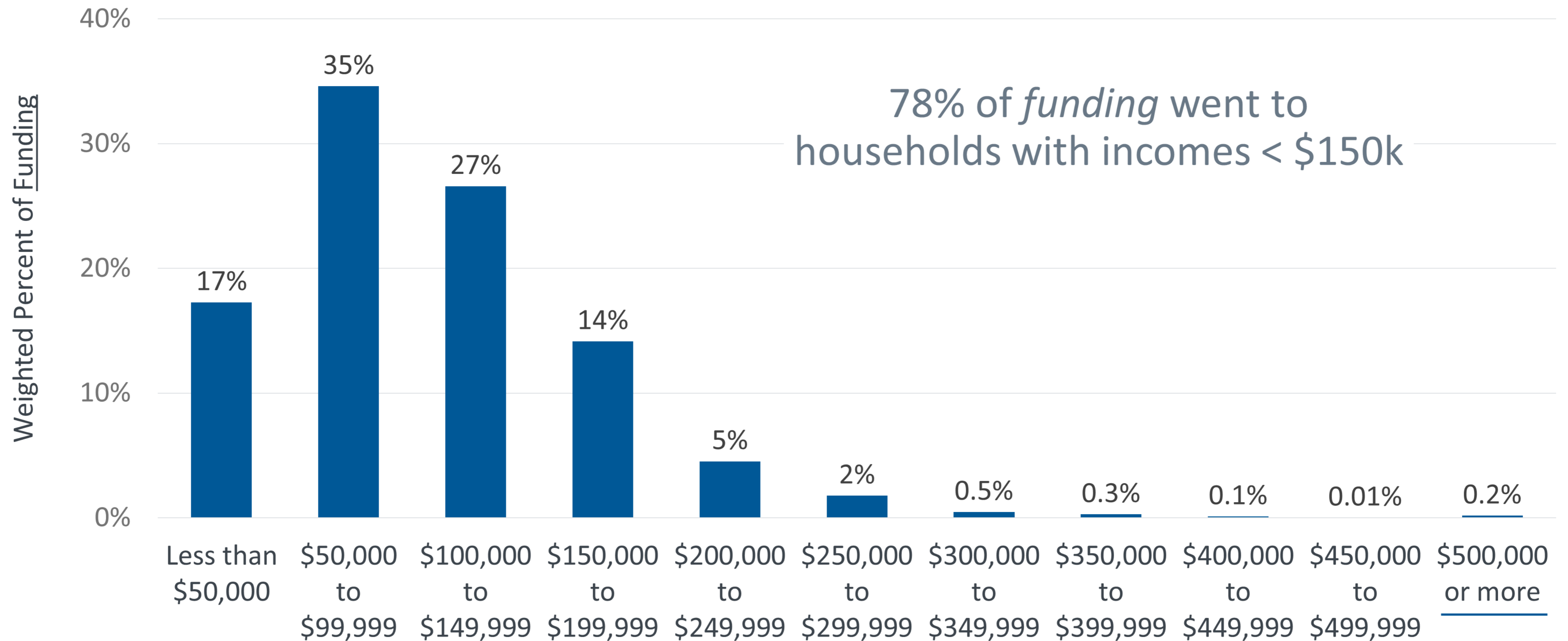
CVRP Consumer Survey, 2022 Interim Dataset.
Filtered, question-specific n = 6,108.

Despite COVID-19, funding continued to shift toward lower-income households.
But did rising prices in 2022 create a countercurrent?

Legend: ■ CY 2019 ■ CY 2020 ■ CY 2021 □ CY 2022

Weighted Percent of Funding

Income Category	CY 2019	CY 2020	CY 2021	CY 2022
Less than $50,000	14%	17%	18%	17%
$50,000 to $99,999	23%	24%	31%	35%
$100,000 to $149,999	27%	25%	25%	27%
$150,000 to $199,999	17%	16%	13%	14%
$200,000 to $249,999	11%	10%	8%	5%
$250,000 to $299,999	6%	5%	3%	2%
$300,000 to $349,999	1%	1%	1%	0.5%
$350,000 to $399,999	0.3%	0.4%	1%	0.3%
$400,000 or more	0.5%	0.4%	0.6%	0.3%

78% of CY 2022 funding went to households with incomes <$150k

CVRP Consumer Survey, 2017–2020 Edition: 2019 n = 7,992; 2020 n = 3,831. 2020–2022 Interim Dataset: 2021 n = 6,874.
2022 Interim Dataset: 2022 n = 6,108. n-values are filtered and question-specific.

Household Income Distribution:
CA, MA, CT, and NY Plug-in EV Rebates (most recent year available)
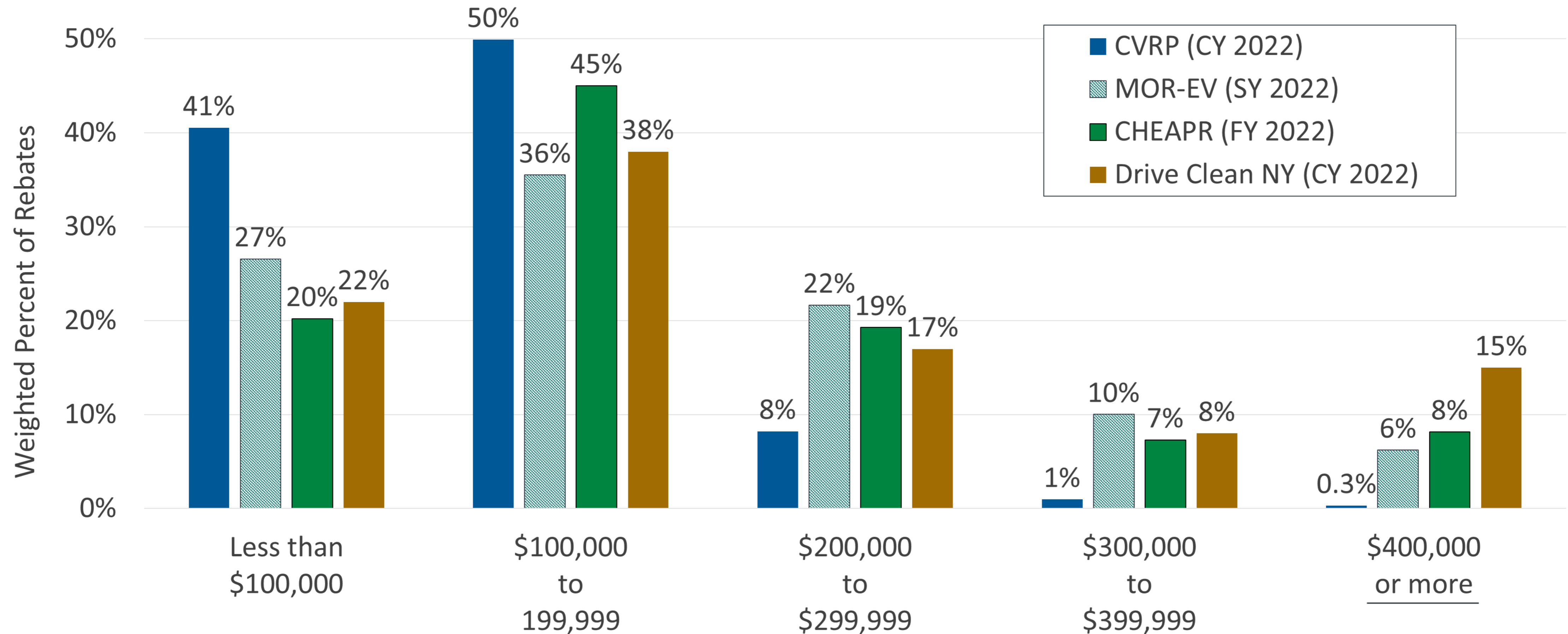
CVRP Consumer Survey: 2022 Interim Dataset. Filtered, question-specific n = 6,108.
MOR-EV Consumer Survey. Filtered, question-specific n = 1,067. Survey year (SY) 2022: October 2021 – December 2022.
CHEAPR Consumer Survey. Filtered, question-specific n = 821. Fiscal year (FY) 2022: July 2022 – June 2023.
Drive Clean NY Adoption Survey. Filtered, question-specific n = 4,607.

Setting an Appropriate Baseline:
U.S. Car Buyers Are Different Than the Population

	U.S. Population 2015–2019 (Census 2019)		U.S. New-Vehicle Buyers MYs 2016–17 (2017 NHTS)
Selected solely white/Caucasian	61%	<<	74%
≥ 50 Years Old	35%	<<	51%
≥ Bachelor's Degree	24%	<<<<	57%
≥ $75k HH Income*	42%	<<<	62%
Own Residence*	64%	<<	77%
Selected Male	49%	≈	51%

New-car buyers are different on almost every dimension.

- More frequently:
  - White
  - Older
  - Degree holders
  - Higher income
  - Residence owners
- *Some* of the difference explained by driving or buying age
- The rest may be due in part to *social inequities*

* Based upon household level data.

Census 2019: 2015–2019 American Community Survey, PUMS. NHTS 2017 is weighted to represent population, not new-vehicle subset. New-vehicle buyers identified based on within-100-mile match between odometer and miles driven while owned. "Prefer not to answer," "I don't know," and similar responses are excluded throughout.

Households with income < $100k are just 44% of new-vehicle buyers.
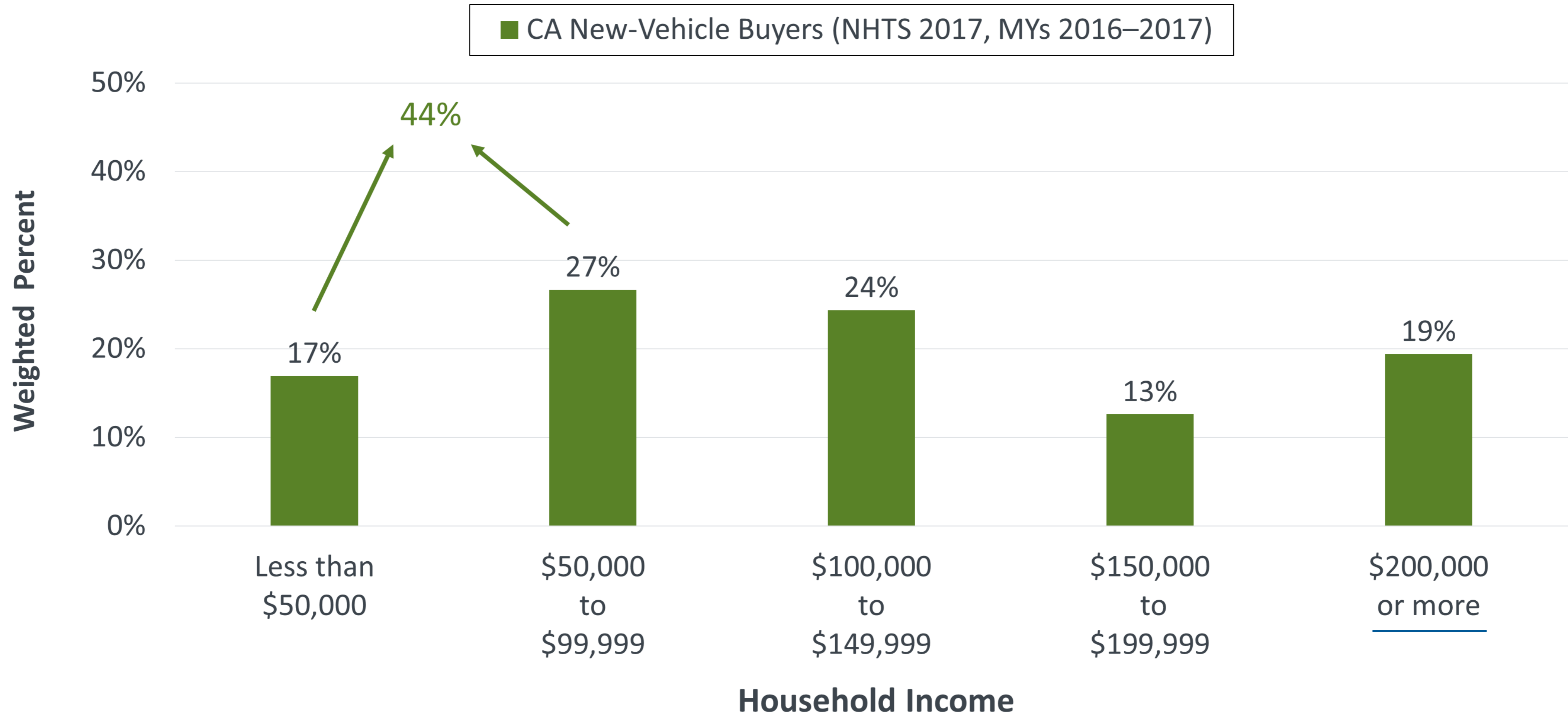
NHTS 2017 (CA add-on) is weighted to represent population, not new-vehicle subset. New-vehicle buyers identified based on within-100-mile match between odometer and miles driven while owned.

Households with income < $100k are just 44% of new-vehicle buyers, but received 52% of funding.
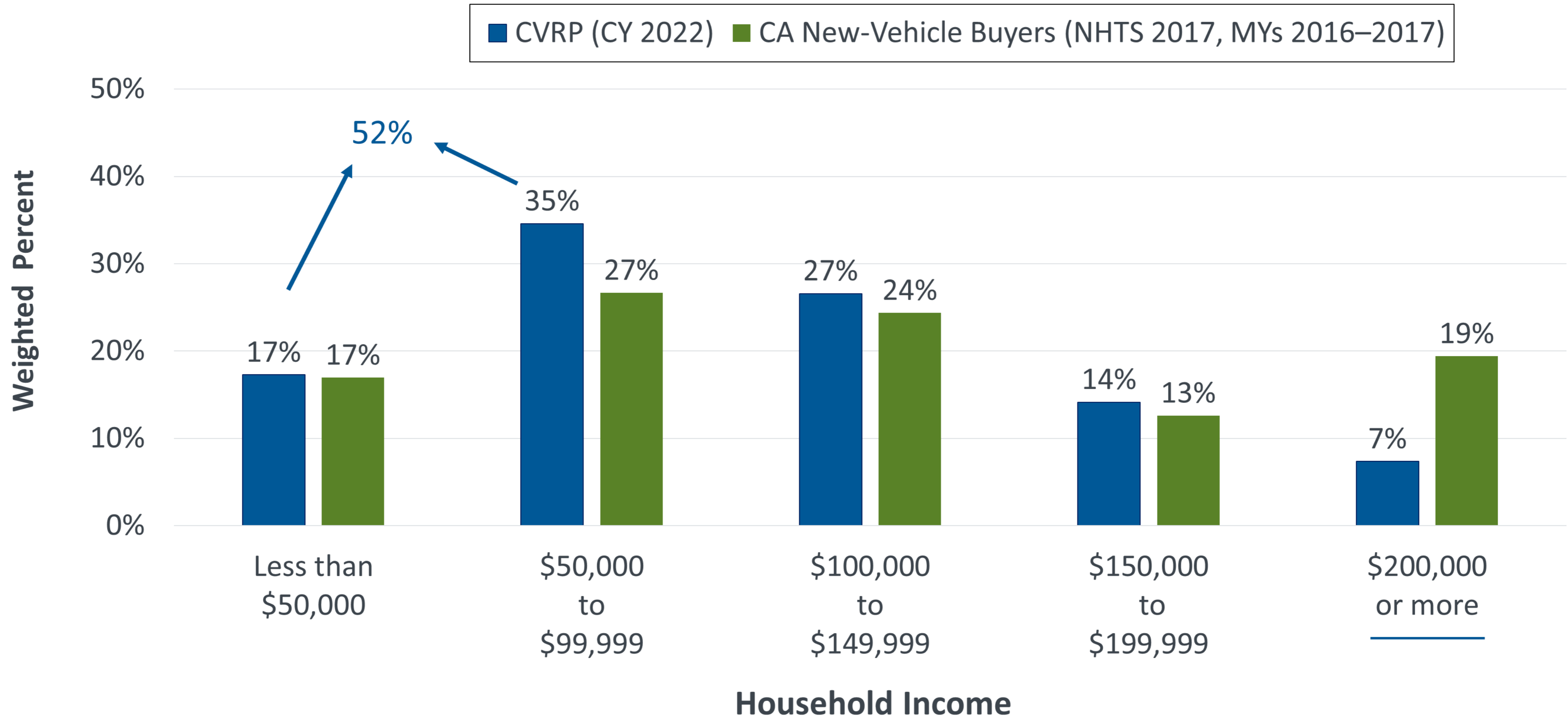
CVRP Consumer Survey, 2022 Interim Dataset. Filtered, question-specific n = 6,108.
NHTS 2017 (CA add-on) is weighted to represent population, not new-vehicle subset. New-vehicle buyers identified based on within-100-mile match between odometer and miles driven while owned. Total rebate funding for 2022 purchases/leases = $85,929,854.

...and that is up from 41% for 2020 purchases/leases.

Legend: CVRP (CY 2020) | CVRP (CY 2021) | CVRP (CY 2022) | CA New-Vehicle Buyers (NHTS 2017, MYs 2016–2017)

Y-axis: Weighted Percent (0% to 50%)

X-axis: Household Income

41%

Household Income	CVRP (CY 2020)	CVRP (CY 2021)	CVRP (CY 2022)	CA New-Vehicle Buyers
Less than $50,000	17%	18%	17%	17%
$50,000 to $99,999	24%	31%	35%	27%
$100,000 to $149,999	25%	25%	27%	24%
$150,000 to $199,999	16%	13%	14%	13%
$200,000 or more	17%	13%	7%	19%

CVRP Consumer Survey, 2017–2020 Edition, 2020 n = 3,831. 2020–2022 Interim Dataset, 2021 n = 6,874. 2022 Interim Dataset: 2022 n = 6,108. n-values are filtered and question-specific. NHTS 2017 (CA add-on) is weighted to represent population, not new-vehicle subset. New-vehicle buyers identified based on within-100-mile match between odometer and miles driven while owned.
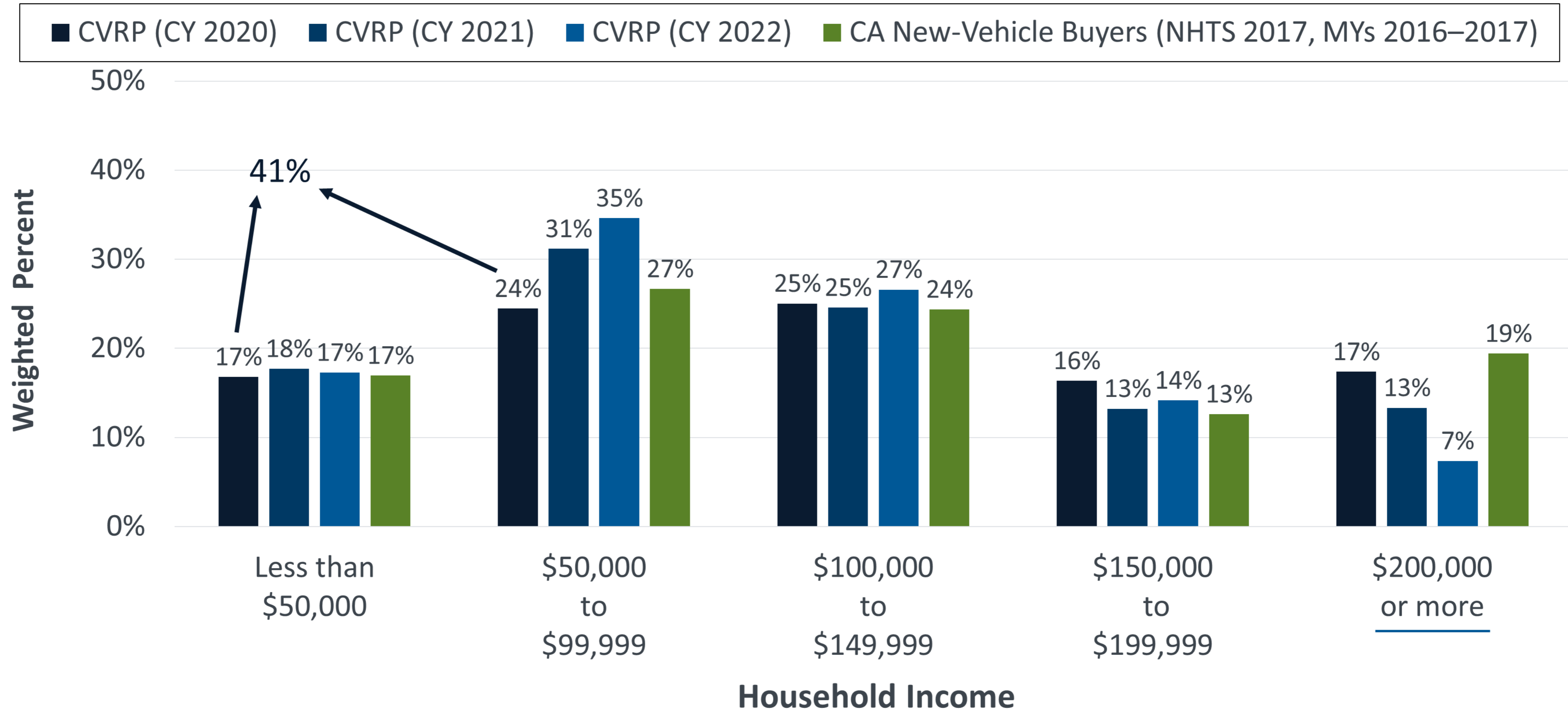
...and from 49% for 2021 purchases/leases.

Weighted Percent vs **Household Income**

Legend: CVRP (CY 2020) · CVRP (CY 2021) · CVRP (CY 2022) · CA New-Vehicle Buyers (NHTS 2017, MYs 2016–2017)

Household Income	CVRP (CY 2020)	CVRP (CY 2021)	CVRP (CY 2022)	CA New-Vehicle Buyers
Less than $50,000	17%	18%	17%	17%
$50,000 to $99,999	24%	31%	35%	27%
$100,000 to $149,999	25%	25%	27%	24%
$150,000 to $199,999	16%	13%	14%	13%
$200,000 or more	17%	13%	7%	19%

Annotations: 41% · 49% · 52%

Households with income > $100k are the majority: 56% of new-vehicle buyers.

CA New-Vehicle Buyers (NHTS 2017, MYs 2016–2017)

Weighted Percent

- Less than $50,000: 17%
- $50,000 to $99,999: 27%
- $100,000 to $149,999: 24%
- $150,000 to $199,999: 13%
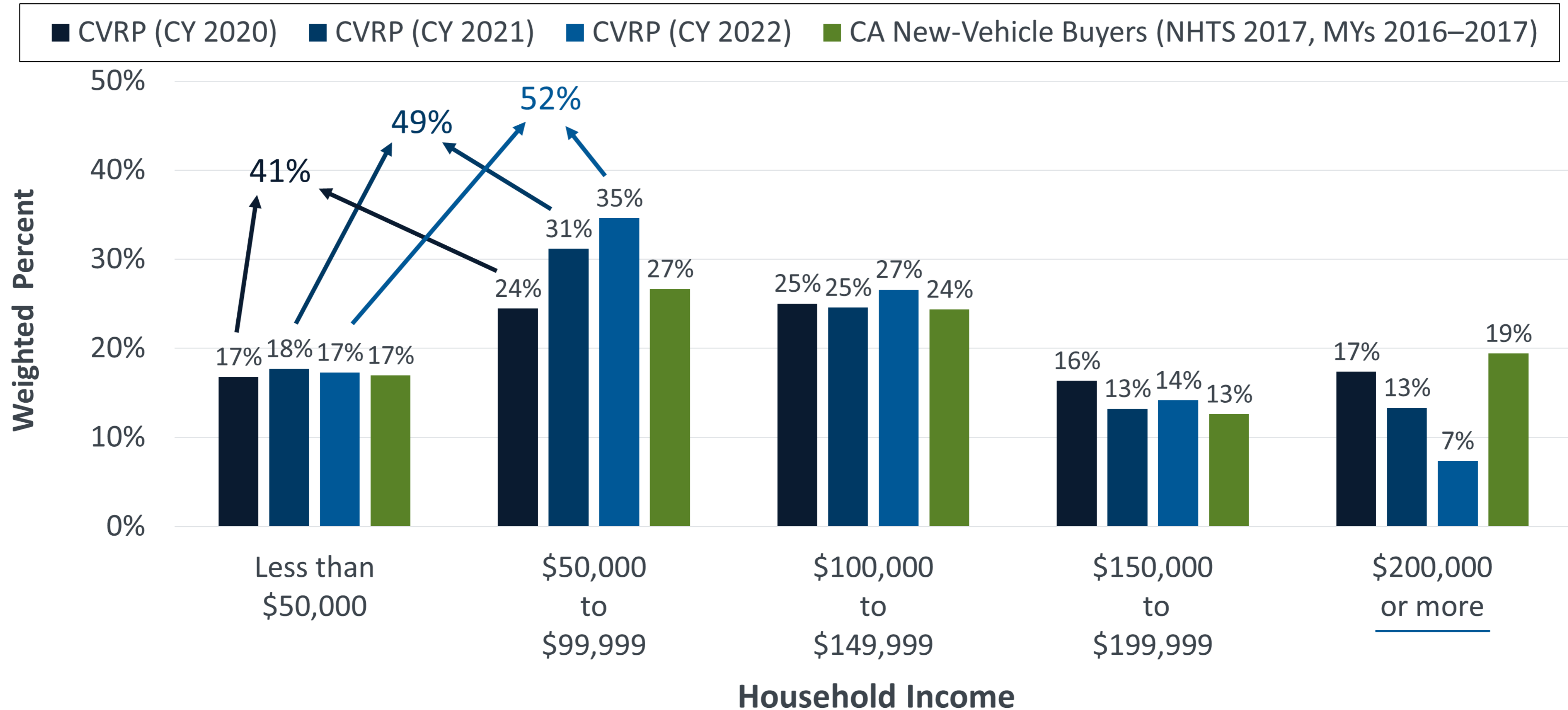- $200,000 or more: 19%

56%
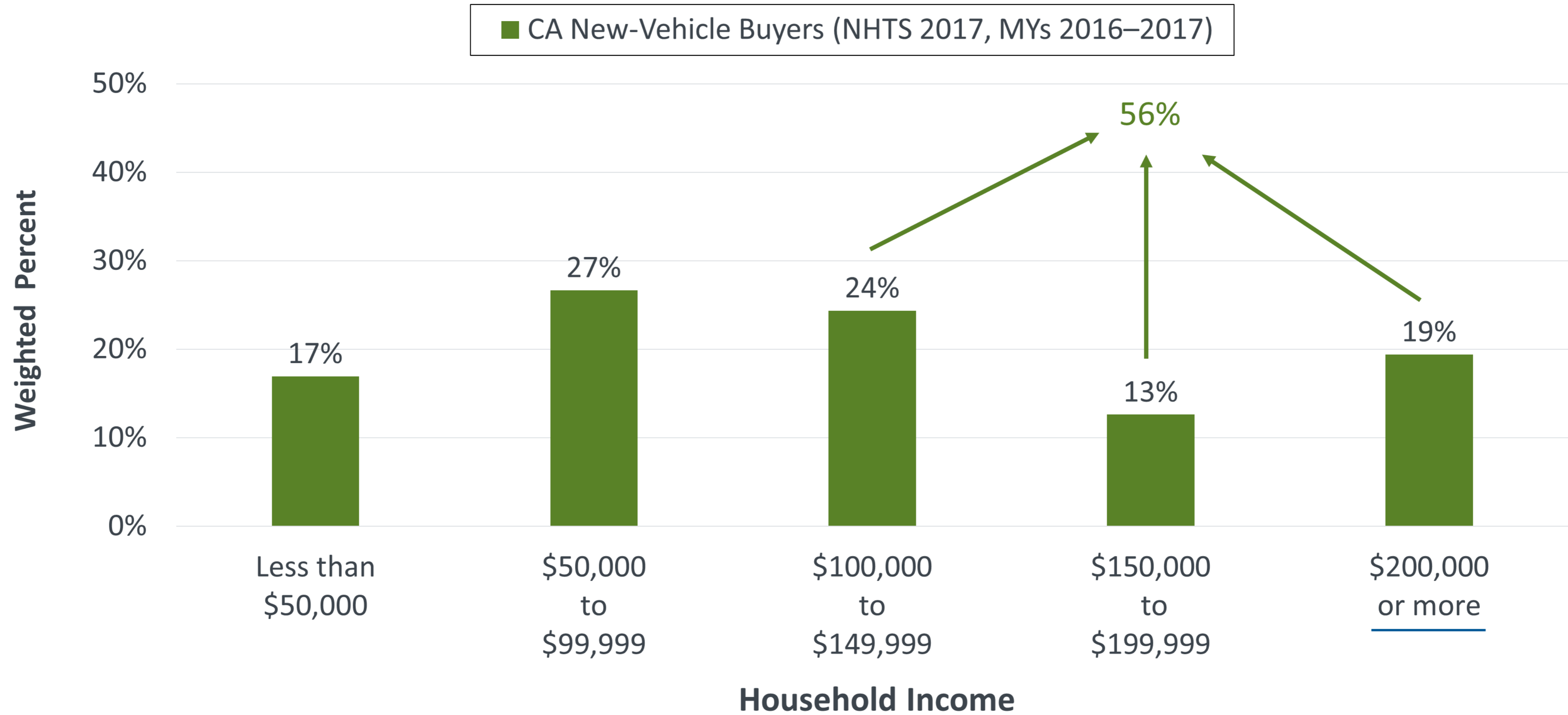
Household Income

NHTS 2017 (CA add-on) is weighted to represent population, not new-vehicle subset. New-vehicle buyers identified based on within-100-mile match between odometer and miles driven while owned.

Households with income > $100k are the majority: 56% of new-vehicle buyers, but received 48% of funding.

CVRP Consumer Survey, 2022 Interim Dataset. Filtered, question-specific n = 6,108.
NHTS 2017 (CA add-on) is weighted to represent population, not new-vehicle subset. New-vehicle buyers identified based on within-100-mile match between odometer and miles driven while owned.
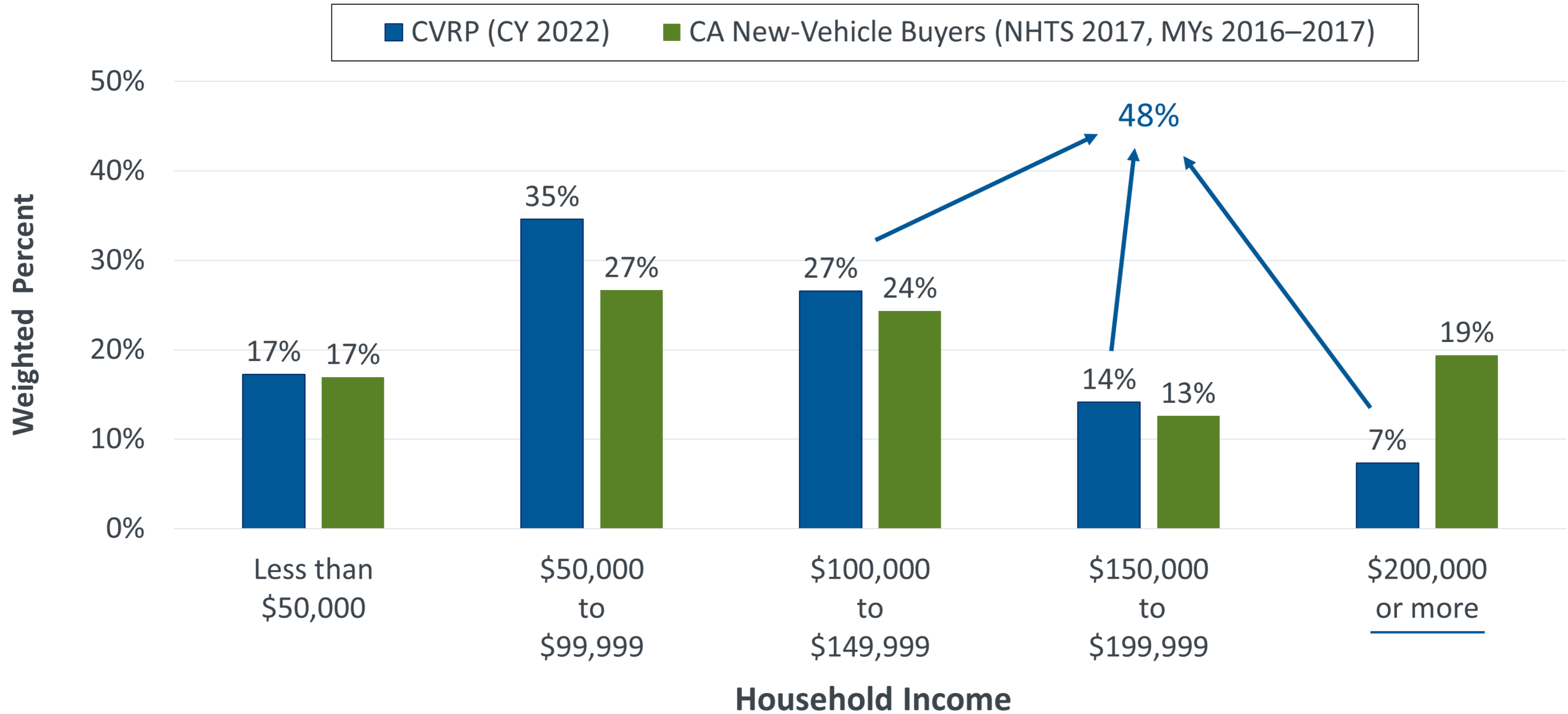
2022 Household Income Metric with an Appropriate Program-Evaluation Comparison

The majority of new-car buyers	CVRP Plug-in EV Rebate Funding 2022	CA New-Vehicle Buyers MYs 2016–17 (2017 NHTS CA add-on)	CA Population 2018–2022 (Census 2022)
≥ $100k household income	48%	56% §	42% §

§ Based upon household-level data. "Prefer not to answer," "I don't know," and similar responses are excluded throughout. Census 2022: 2018–2022 American Community Survey, PUMS. NHTS weighted to represent population, not new-vehicle subset. New-vehicle buyers identified by within-100-mile match between odometer and miles driven while owned.

2022 Consumer Characteristics with Comparisons

The majority of new-car buyers	CVRP Plug-in EV Funding 2022	CA New-Vehicle Buyers MYs 2016–17 (2017 NHTS CA add-on)	CA Population 2018–2022 (Census 2022)
Selected male	62%*¶	50%	50%
Own residence	75%	63% §	55% §
≥ Bachelor's degree	67%	58%	26%
≥ $100k household income	48%	56% §	42% §
≥ 40 years old	54%*	68%	46%
Selected solely white/Caucasian	30%*	51%	36%

Asterisks indicate values created using application data due to unavailability of survey questions; other values created with weighted survey data per usual.

§ Based upon household-level data. ¶ 100% includes non-binary options.

"Prefer not to answer," "I don't know," and similar responses are excluded throughout. Census 2022: 2018–2022 American Community Survey, PUMS. NHTS weighted to represent population, not new-vehicle subset. New-vehicle buyers identified by within-100-mile match between odometer and miles driven while owned.

Decomposing Differences Between Rebate Recipients and the Population

The majority of new-car buyers	CVRP Plug-in EV Funding 2022	Portion of total difference attributable to EVs	CA New-Vehicle Buyers MYs 2016–17 (2017 NHTS CA add-on)	Portion of total difference explained by car buying	CA Population 2018–2022 (Census 2022)
Selected male	62%*¶	← 100% →	50%	← 0% →	50%
Own residence	75%	← 60% →	63% §	← 40% →	55% §
≥ Bachelor's degree	67%	← 22% →	58%	← 78% →	26%
≥ $100k household income	48%	← -133% →	56% §	← 233% →	42% §
≥ 40 years old	54%*	← -175% →	68%	← 275% →	46%
Selected solely white/Caucasian	30%*	← -(350%) →	51%	← -(-250%) →	36%

Asterisks indicate values created using application data due to unavailability of survey questions; other values created with weighted survey data per usual.

§ Based upon household-level data. ¶ 100% includes non-binary options.

"Prefer not to answer," "I don't know," and similar responses are excluded throughout. Census 2022: 2018–2022 American Community Survey, PUMS. NHTS weighted to represent population, not new-vehicle subset. New-vehicle buyers identified by within-100-mile match between odometer and miles driven while owned.

Application Data Two Ways*: 1. all application data vs. 2. (in parentheses) the subset that responded to the survey, weighted in the same way as the survey

The majority of new-car buyers	CVRP Plug-in EV Funding 2022	CA New-Vehicle Buyers MYs 2016–17 (2017 NHTS CA add-on)	CA Population 2018–2022 (Census 2022)
Selected male	62% (65%)¶	50%	50%
Own residence	75%	63% §	55% §
≥ Bachelor's degree	67%	58%	26%
≥ $100k household income	48%	56% §	42% §
≥ 40 years old	54% (68%)	68%	46%
Selected solely white/Caucasian	30% (33%)	51%	36%

CVRP cells with a single value use weighted survey data. Cells with two values use application data: all application data values are followed in parentheses by values based on the subset of applicants that responded to the survey, weighted in the same manner as the survey data.

§ Based upon household-level data. ¶ 100% includes non-binary options.

"Prefer not to answer," "I don't know," and similar responses are excluded throughout. Census 2022: 2018–2022 American Community Survey, PUMS. NHTS weighted to represent population, not new-vehicle subset. New-vehicle buyers identified by within-100-mile match between odometer and miles driven while owned.

Constructing Baselines with Different Data
NVES vs. NHTS

The majority of new-car buyers	CVRP Plug-in EV Funding 2022	CA New-Vehicle Buyers CY 2022 (Strategic Vision NVES)	CA New-Vehicle Buyers MYs 2016–17 (2017 NHTS CA add-on)	CA Population 2018–2022 (Census 2022)
Selected male	62% (65%)¶	58%	50%	50%
Own residence	75%	62%	63% §	55% §
≥ Bachelor's degree	67%	60%	58%	26%
≥ $100k household income	48%	58% §†	56% §	42% §
≥ 40 years old	54% (68%)	66%	68%	46%
Selected solely white/Caucasian	30% (33%)	44%	51%	36%

CVRP cells with a single value use weighted survey data. Cells with two values use application data: all application data values are followed in parentheses by values based on the subset of applicants that responded to the survey, weighted in the same manner as the survey data.

§ Based upon household-level data. ¶ 100% includes non-binary options. † NVES represents income > $100k (not ≥). "Prefer not to answer," "I don't know," and similar responses are excluded throughout. Census 2022: 2018–2022 American Community Survey, PUMS. NHTS weighted to represent population, not new-vehicle subset. New-vehicle buyers identified by within-100-mile match between odometer and miles driven while owned. Strategic Vision New Vehicle Experience Survey (NVES) weighted to represent CA light-duty new-vehicle population. No Tesla consumers are in the NVES sample.

Funding to Different Racial Identities with Comparisons

2022

Racial Identity (Sole Identity)	CVRP Plug-in EV Funding Application data N = 28,895	Portion of total difference attributable to EVs	CA New-Vehicle Buyers MYs 2016–17 (2017 NHTS CA add-on)	Portion of total difference explained by car buying	CA Population 2018–2022 (Census 2022)
East Asian	21%	← 133% →		← -33% →	
South Asian	6%	← -(78%) →	13%	← -(22%) →	15%
Southeast Asian	14%	← -(-100%) →		← -(200%) →	
Middle Eastern or North African	3%	← TBD →	TBD	← TBD →	TBD
Black or African American	3%	← -(100%) →	5%	← -(-0%) →	5%
American Indian or Alaskan Native	0.2%	← -100% →	0.3%	← 200% →	0.1%
Native Hawaiian or other Pacific Islander	1%	← 86% →	0.4%	← 14% →	0.3%
white or Caucasian	30%	← -(350%) →	51%	← -(-250%) →	36%
Two or more Races	3%	← 0% →	3%	← 100% →	4%
"Other"	4%	← 83% →	1%	← 17% →	0.4%

Note: "portion of total difference" percentages highly sensitive to uncertainty in smaller-sample results. 17% of funding went to participants who self-identified as Hispanic or Latino (separate question, n = 31,988). "Prefer not to answer," "I don't know," and similar responses are excluded throughout. Census 2022: 2018–2022. American Community Survey, PUMS. NHTS weighted to represent population, not new-vehicle subset. New-vehicle buyers identified by within-100-mile match between odometer and miles driven while owned.

Funding to Ethnic Identity with Comparisons
2022

Ethnicity-Question Identity	CVRP Plug-in EV Funding Application data *N* = 31,988	Portion of total difference attributable to EVs	CA New-Vehicle Buyers MYs 2016–17 (2017 NHTS CA add-on)	Portion of total difference explained by car buying	CA Population 2018–2022 (Census 2022)
Identifies as Hispanic or Latino(a)	17%	← -(43%) →	27%	← -(57%) →	40%

Funding by Vehicle Type
2022 CVRP Consumer Survey Data & Application Data*

The majority of new-car buyers	CVRP Plug-in EV Funding		CA New-Vehicle Buyers		CA Population
	Vehicle Type:				
	CY 2022 BEVs	CY 2022 PHEVs	MYs 2016–17 (2017 NHTS CA add-on)		2018–2022 (Census 2022)
Selected male	62% (65%)¶	58% (61%)¶	>	50%	50%
Own residence	75%	79%	>	63% §	55% §
≥ Bachelor's degree	67%	70%	>	58%	26%
≥ $100k household income	48%	46%	<	56% §	42% §
≥ 40 years old	54% (68%)	60% (73%)	~	68%	46%
Selected solely white/Caucasian	29% (32%)	40% (47%)	<	51%	36%

* CVRP cells with a single value use weighted survey data. Cells with two values use application data: all application data values are followed in parentheses by values based on the subset of applicants that responded to the survey, weighted in the same manner as the survey data.

§ Based upon household-level data. ¶ 100% includes non-binary options.

"Prefer not to answer," "I don't know," and similar responses are excluded throughout. Census 2022: 2018–2022 American Community Survey, PUMS. NHTS weighted to represent population, not new-vehicle subset. New-vehicle buyers identified by within-100-mile match between odometer and miles driven while owned.

43

Assessing Progress
Funding: CVRP Consumer Survey data & application data*

The majority of new-car buyers	CVRP Plug-in EV Funding Purchase/Lease Dates:					CA New-Vehicle Buyers MYs 2016–17 (2017 NHTS CA add-on)	CA Population 2018–2022 (Census 2022)
	CY 2018	CY 2019	CY 2020	CY 2021	CY 2022		
Selected male	71% (73%)	69% (70%)¶	65% (69%)¶	63% (66%)¶	62% (65%)¶	50%	50%
Own residence	83%	78%	78%	73%	75%	63% §	55% §
≥ Bachelor's degree	83%	81%	77%	69%	67%	58%	26%
≥ $100k household income	70%	63%	59%	51%	48%	56% §	42% §
≥ 40 years old	63% (76%)	59% (72%)	57% (73%)	52% (66%)	54% (68%)	68%	46%
Selected solely white/Caucasian	38% (47%)	40% (48%)	39% (48%)	32% (37%)	30% (33%)	51%	36%

* CVRP cells with a single value use weighted survey data. Cells with two values use application data: all application data values are followed in parentheses by values based on the subset of applicants that responded to the survey, weighted in the same manner as the survey data.

§ Based upon household-level data. ¶ 100% includes non-binary options.

"Prefer not to answer," "I don't know," and similar responses are excluded throughout. Census 2022: 2018–2022 American Community Survey, PUMS. NHTS weighted to represent population, not new-vehicle subset. New-vehicle buyers identified by within-100-mile match between odometer and miles driven while owned.

Quantifying the Road that Remains to the Mainstream

Funding (2022) Percentage-Point Differences from the New-Vehicle-Buyer Baseline

The majority of new-car buyers	All CVRP
Selected male*	12
Own residence	12
≥ Bachelor's degree	9
≥ $100k household income	-8
≥ 40 years old*	-14
Selected solely white/Caucasian*	-21
Total points:	-10

CA New-Vehicle Buyers
0
0
0
0
0
0
0

* Asterisks indicate values created using unweighted application data. CVRP data filtered by purchase/lease date. "Prefer not to answer," "I don't know," and similar responses are excluded throughout.

CA New-Vehicle Buyers (2017 NHTS) weighted to represent population, not new-vehicle subset. New-vehicle buyers identified based on within-100-mile match between odometer and miles driven while owned, using most-recent model years available (2016–17).

Strategic EV Market Segments

Paths Forward

What Are the Paths Forward?

Expanding Market Frontiers Through Strategic Segmentation

Existing Adopters: Market Acceleration

Characterize existing, generally enthusiastic and pre-adapted consumers, to target similar consumers who have the highest likelihood of adoption and maximize scale

"*Rebate Essential*" Consumers: Minimizing Free Ridership

Characterize adopters most highly influenced by supportive resources to join the EV market, to improve the cost-effectiveness of outreach and program design

"*EV Converts*": Moving Mainstream

Characterize EV consumers with low initial interest in EVs, to look for additional opportunities to expand into the mainstream

Priority Populations: Increasing Equity

1. Characterize adoption by priority populations, to understand & reinforce adoption that is successfully overcoming hurdles
2. Identify and break down barriers, to further diversity and expand access

Starting Point
Funding (2022)

	Low-Hanging Fruit (Existing Adopters) CY 2022	CA New- Vehicle Buyers MYs 2016–17 (2017 NHTS)
The majority of new-car buyers		
Selected male	62% (68%) ‡	50%
Own residence	75%	63% †
≥ Bachelor's degree	67%	58%
≥ $100k HH income	48%	56% †
≥ 40 years old	54% (65%)	68%
Selected solely white/Caucasian	30% (33%)	51%

* CVRP cells with a single value use weighted survey data. Cells with two values use application data: all application data values are followed in parentheses by values based on the subset of applicants that responded to the survey, weighted in the same manner as the survey data.

§ Based upon household-level data. ¶ 100% includes non-binary options.

"Prefer not to answer," "I don't know," and similar responses are excluded throughout. Census 2022: 2018–2022 American Community Survey, PUMS. NHTS weighted to represent population, not new-vehicle subset. New-vehicle buyers identified by within-100-mile match between odometer and miles driven while owned.

Paths Forward

Funding (2022): CVRP Consumer Survey Data & Application Data*

The majority of new-car buyers	Low-Hanging Fruit (Existing Adopters) CY 2022	"Rebate Essentials" CY 2022 n = 6,652 Weighted results	"EV Converts" CY 2022 n = 1,261 Weighted results	CA New-Vehicle Buyers MYs 2016–17 (2017 NHTS)	Increased Rebate Recipients Low-/Moderate-Income CY 2022
Selected male	62% (68%) ‡	TBD	TBD	50%	59% (62%) ‡
Own residence	75%	72%	72%	63% †	67%
≥ Bachelor's degree	67%	68%	63%	58%	56%
≥ $100k HH income	48%	40%	42%	56% †	14%
≥ 40 years old	54% (65%)	TBD	TBD	68%	54% (65%)
Selected solely white/Caucasian	30% (33%)	TBD	TBD	51%	24% (25%)

* CVRP cells with a single value use weighted survey data. Cells with two values use application data: all application data values are followed in parentheses by values based on the subset of applicants that responded to the survey, weighted in the same manner as the survey data.

† Based upon household-level data. ‡ 100% includes non-binary options.

"Prefer not to answer," "I don't know," and similar responses are excluded throughout. Census 2022: 2018–2022 American Community Survey, PUMS. NHTS weighted to represent population, not new-vehicle subset. New-vehicle buyers identified by within-100-mile match between odometer and miles driven while owned.

Quantifying the Paths Forward
Funding (2022) Percentage-Point Differences from the New-Vehicle-Buyer Baseline

The majority of new-car buyers	All CVRP	Rebate Essentials	EV Converts	CA New-Vehicle Buyers	Increased Rebate Recipients
Selected male*	12	TBD	TBD	0	9
Own residence	12	9	9	0	4
≥ Bachelor's degree	9	10	5	0	-2
≥ $100k household income	-8	-16	-14	0	-42
≥ 40 years old*	-14	TBD	TBD	0	-14
Selected solely white/Caucasian*	-21	TBD	TBD	0	-27
Total points:	-10	TBD	TBD	0	-72

*CVRP survey and application data filtered by purchase/lease date. * Asterisks indicate values created using unweighted application data. "Prefer not to answer," "I don't know," and similar responses are excluded throughout. CA New-Vehicle Buyers (2017 NHTS) weighted to represent population, not new-vehicle subset. New-vehicle buyers identified based on within-100-mile match between odometer and miles driven while owned, using most-recent model years available (2016–17).*

Summary & Select Findings

Summary & Select Findings: 2022 Consumer Characteristics

Context:

- Program design, COVID-19 fallout, and rising prices shaped impacts; Tesla prices above MSRP cap for much of 2022

Rebated Consumer Characteristics vs. CA New-Vehicle Buyers:

- Depending on the characteristic, much of the difference between rebate funding beneficiaries and the population can be explained by new-vehicle buying (e.g., 78% of the educational-attainment difference is not particular to EVs)

- ***Race/ethnicity more diverse***
  - Funding progressed beyond the majority. Picture varies by racial/ethnic category.

- ***Income lower***
  - Funding continued overall shift toward lower-income consumers, some 2022 countercurrents at lowest incomes (due to high prices?)
  - On a funding basis, CVRP's income metrics were *lower* than for new-car buyers → CVRP went beyond "mainstreaming EVs" and disproportionately benefited lower-income consumers, **helping to also address structural inequities in new-car buying**
    - 52% of funding went to households <$100k, who are 44% of new-vehicle buyers

- Metric of ***age*** ranges from ***younger to comparable***

- ***Home ownership*** and ***male gender much more frequent***, *but have progressed toward mainstream*

- Metrics and "heat maps" can help ***quantify "length of road ahead"***

- PHEV consumers still have lower income and are more frequently female; BEVs now closer to the mainstream in other ways

Paths Forward:

- ***Strategic consumer segments*** present possible steppingstones on a path toward the mainstream and beyond to increased access (see related work)

Appendix:
Additional Details & Resources

Funding Availability Has Been Regularly Disrupted
(as of Dec. 2022)

Table 4: CVRP Waitlists

Waitlist Year	Start Date	End Date	Length in Days
2011*	Jun. 20	Sept. 30	102
2013*	May 1	Jun. 30	60
2014	Mar. 28	Jul. 22	116
2016	Jun. 11	Sept. 28	109
2017**	Jun. 30	Nov. 20	143
2019**	Jun. 5	Sept. 23	110
2021	Apr. 23	Sept. 15	145

Dates approximate.

*** For standard applications only; no waitlist for income-qualified increased rebates.*

Note: *Tesla MSRP exceeded cap, became ineligible 3/15/2022.*

Table adapted from https://cleanvehiclerebate.org/sites/default/files/attachments/Disruptions_Fact_Sheet_9_2021.pdf

CVRP Consumer Survey Editions

(shows rebates to individuals for plug-in EVs* only)

	2013–2015 Edition	2015–2016 Edition	2016–2017 Edition	2017–2020 Edition	2020–2023 Edition (in progress) Interim Datasets	Total
Vehicle Purchase/ Lease Dates	Sep. 2012 – May 2015	April 2015 – May 2016	May 2016 – May 2017	June 2017 – Nov. 2020	Dec. 2020 – Dec. 2022	Sep. 2012 – Dec. 2022
Survey Responses (total _n_)	19,460	11,611	8,957	32,524	15,482	88,034
Program Population (_N_)*	91,081	45,685	46,839	193,167	86,451	463,223

*Plug-in EVs (PEVs) include PHEVs and BEVs.

** Subsequently weighted to represent the program population, see "CVRP Consumer Survey: Weighting Detail" slide for further detail.

*** Small numbers of rebated vehicles are not represented in the time frames due to application lags. Numbers may not be exactly comparable due to evolving weighting practices.

CVRP Consumer Survey Data Available

(shows rebates to individuals for plug-in EVs* only)

	2013–2015 Edition	2015–2016 Edition	2016–2017 Edition	2017–2020 Edition	2018 purchases/ leases subset	2019 purchases/ leases subset	"2020" purchases/ leases subset	2020–2023 Edition (in progress) Interim Datasets	Interim 2021 purchases/ leases subset	Interim 2022 purchases/ leases subset	Total
Vehicle Purchase/ Lease Dates	Sep. 2012 – May 2015	April 2015 – May 2016	May 2016 – May 2017	June 2017 – Nov. 2020	Jan. 2018 – Dec. 2018	Jan. 2019 – Dec. 2019	Jan. 2020 – Nov.** 2020	Dec. 2020 – Dec. 2022	Jan. 2021– Dec. 2021	Jan. 2022 – Dec. 2022	Sep. 2012 – Dec. 2022
Survey Responses (total *n*)	19,460***	11,611***	8,957***	32,524***	14,757	8,991	4,331***	15,482	7,694***	6,674***	86,920
Program Population (*N*)**	91,081	45,685	46,839	193,167	78,591 (filtered subset of weighted Edition)	61,277 (filtered subset of weighted Edition)	26,463	86,451	45,261	33,685	455,718

*Plug-in EVs (PEVs) include PHEVs and BEVs.

** ~8k 2020 purchases/leases were invited to respond to the successive survey edition and are not represented in these data.

*** Subsequently weighted to represent the program population, see "CVRP Consumer Survey: Weighting Detail" slide for further detail.

**** Small numbers of vehicles are not represented in the time frames due to application lags. Numbers may not be exactly comparable due to evolving weighting practices.

Consumer Survey Design Changes: Home Ownership

Source	CVRP Consumer Survey, 2013–2015 thru 2017–2020 Editions	CVRP Consumer Survey, 2020–2023 Edition	NHTS 2017	Census 2022
Question Language	Do you own or rent your residence?	Do you own or rent your residence?	Do you own or rent your home?	Is this house, apartment, or mobile home – Mark (X) ONE box.
Response Options	• Own • Rent • Prefer not to answer	• Own • Rent • Neither rent nor own • Prefer not to answer	• I don't know • I prefer not to answer • Own • Rent • Some other arrangement	• Owned by you or someone in this household with a mortgage or loan? Include home equity loans. • Owned by you or someone in this household free and clear (without a mortgage or loan)? • Rented? • Occupied without payment of rent?

Question Language: Gender

Source	CVRP Consumer Survey, 2013–2015 thru 2017–2020 Editions	CVRP Application 3/16/2017 thru 1/14/2019	CVRP Application as of 1/15/2019	NHTS 2017	Census 2022
Question Language	How do you prefer to describe your gender?	Please indicate your gender	How do you prefer to describe your gender?	Gender:	What is Person 1's sex?
Response Options	• Female • Male • Transgender • Not listed • Prefer not to answer	• Female • Male • Prefer not to answer	• Female • Male • Nonbinary • Transgender • Not listed • Prefer not to answer	• Female • Male • I prefer not to answer • I don't know	• Male • Female

Question Language: Race

Source	CVRP Consumer Survey, 2013–2015 thru 2017–2020 Editions	CVRP Application 3/16/2017 thru 1/14/2019	CVRP Application as of 1/15/2019	NHTS 2017	Census 2022
Question Language	How do you prefer to describe your racial/ethnic identity? [check all that apply]	How do you prefer to describe your racial/ethnic identity? [check all that apply]	How do you prefer to describe your racial identity? [check all that apply]	Which of the following describes your race? Please SELECT ALL that apply.	What is Person 1's race? Mark one or more boxes AND print origins. (Census recoded)
Response Options	• Black or African American • East Asian • Latino(a) or Hispanic • Middle Eastern • Native American or Alaska Native • Native Hawaiian or other Pacific Islander • South Asian • White or Caucasian • Other, please specify: • Prefer not to answer	• American Indian or Alaska Native • Black or African American • East Asian • Latino(a) or Hispanic • Middle Eastern • Native Hawaiian or other Pacific Islander • South Asian • White or Caucasian • Other, please specify • Prefer not to answer	• American Indian or Alaska Native • Black or African American • East Asian • South Asian • Southeast Asian • Middle Eastern or North African • Native Hawaiian or other Pacific Islander • White or Caucasian • Other • Prefer not to answer	• American Indian or Alaska native • Black or African American • Asian • Native Hawaiian or other Pacific islander • White • Some other race • I don't know • I prefer not to answer	• American Indian alone • Alaska Native alone • American Indian and Alaska Native tribes specified; or American Indian or Alaska Native, not specified and no other races • Black or African American alone • Asian alone • Native Hawaiian and Other Pacific Islander alone • White alone • Some Other Race alone • Two or More Races

59

Question Language: Ethnicity

Source	CVRP Consumer Survey, 2013–2015 thru 2017–2020 Editions	CVRP Application 3/16/2017 thru 1/14/2019	CVRP Application as of 1/15/2019	NHTS 2017	Census 2022
Question Language	How do you prefer to describe your racial/ethnic identity? [check all that apply]	How do you prefer to describe your racial/ethnic identity? [check all that apply]	Are you Hispanic or Latino?	Are you of Hispanic or Latino origin?	Is Person 1 of Hispanic, Latino, or Spanish origin?
Response Options	• Black or African American • East Asian • Latino(a) or Hispanic • Middle Eastern • Native American or Alaska Native • Native Hawaiian or other Pacific Islander • South Asian • White or Caucasian • Other, please specify: • Prefer not to answer	• American Indian or Alaska Native • Black or African American • East Asian • Latino(a) or Hispanic • Middle Eastern • Native Hawaiian or other Pacific Islander • South Asian • White or Caucasian • Other • Prefer not to answer	• Yes • No • Prefer not to answer	• Yes, Hispanic or Latino • No, Not Hispanic or Latino • I don't know • I prefer not to answer	• No, not of Hispanic, Latino, or Spanish origin • Yes, Mexican, Mexican Am., Chicano • Yes, Puerto Rican • Yes, Cuban • Yes, another Hispanic, Latino, or Spanish origin

Funding to Different Racial and Ethnic Identities [check all that apply]: 2022

Racial Identity [check all that apply]	CVRP Plug-in EV Funding All application data n = 29,203
American Indian or Alaskan Native	1%
Black or African American	4%
East Asian	22%
Middle Eastern or North African	3%
Native Hawaiian or other Pacific Islander	2%
South Asian	7%
Southeast Asian	14%
white or Caucasian	39%
"Other"	13%
Ethnicity-Question Identification	n = 31,988
Identifies as Hispanic or Latino(a)	17%

* CVRP results are created with weighted data from the application using the subset of program participants that responded to the survey.
"Prefer not to answer," "I don't know," and similar responses are excluded throughout.

Funding to Different Racial and Ethnic Identities [check all that apply]: 2022

Different Data Sources

Racial Identity [check all that apply]	CVRP Plug-in EV Funding All application data *n* = 29,203	Difference	CVRP Plug-in EV Funding Weighted subset of Application data* *n* = 5,980
American Indian or Alaskan Native	1%	← −0.02% →	1%
Black or African American	4%	← −0.6% →	4%
East Asian	22%	← 2.4% →	19%
Middle Eastern or North African	3%	← 1.1% →	2%
Native Hawaiian or other Pacific Islander	2%	← −0.2% →	2%
South Asian	7%	← 1.1% →	5%
Southeast Asian	14%	← −1.7% →	16%
white or Caucasian	39%	← −3.2% →	42%
"Other"	13%	← 1.3% →	12%
Ethnicity-Question Identification	*n* = 31,988	Difference	*n* = 6,418
Identifies as Hispanic or Latino(a)	17%	← 0.4% →	16%

* CVRP results are created with weighted data from the application using the subset of program participants that responded to the survey.
"Prefer not to answer," "I don't know," and similar responses are excluded throughout.

Rebates to Different Racial and Ethnic Identities [check all that apply]: 2022

Different Data Sources

Racial Identity [check all that apply]	CVRP Plug-in EV Rebates All application data *n* = 29,203	Difference	CVRP Plug-in EV Rebates Weighted subset of Application data* *n* = 5,980
American Indian or Alaskan Native	1%	← −0.04% →	1%
Black or African American	4%	← −0.4% →	4%
East Asian	20%	← 2.6% →	18%
Middle Eastern or North African	3%	← 1.0% →	2%
Native Hawaiian or other Pacific Islander	2%	← −0.2% →	2%
South Asian	7%	← 1.2% →	5%
Southeast Asian	14%	← −1.4% →	16%
white or Caucasian	41%	← −3.9% →	45%
"Other"	12%	← 1.4% →	11%
Ethnicity-Question Identification	*n* = 31,988	Difference	*n* = 6,418
Identifies as Hispanic or Latino(a)	16%	← 0.4% →	16%

* CVRP results are created with weighted data from the application using the subset of program participants that responded to the survey. "Prefer not to answer," "I don't know," and similar responses are excluded throughout.

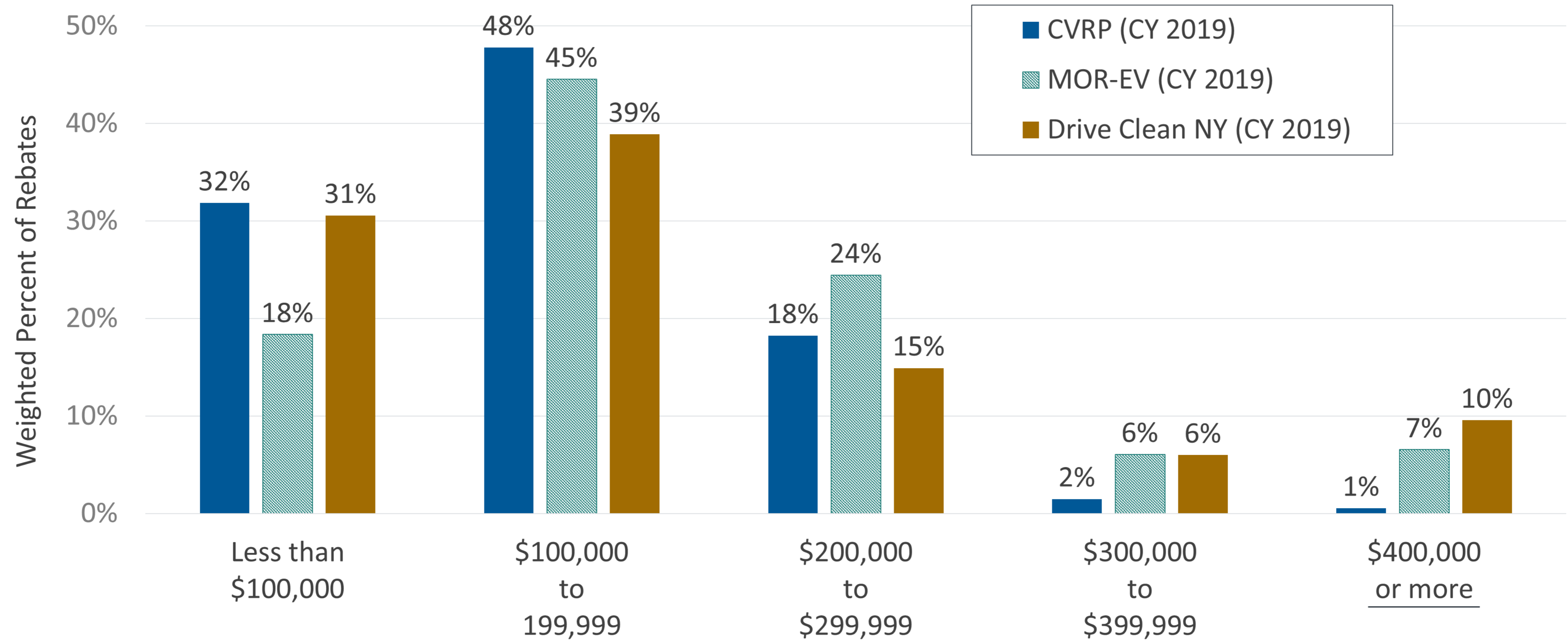# Rebates and Funding to Different Racial and Ethnic Identities [check all that apply]

Progression Away from the Majority

Racial Identity [check all that apply]	CVRP Plug-in EV Rebates 2021 All application data n = 39,464	CVRP Plug-in EV Rebates 2022 All application data n = 29,203	CVRP Plug-in EV Funding 2022 All application data n = 29,203
American Indian or Alaskan Native	1%	1%	1%
Black or African American	4%	4%	4%
East Asian	18%	20%	22%
Middle Eastern or North African	3%	3%	3%
Native Hawaiian or other Pacific Islander	2%	2%	2%
South Asian	7%	7%	7%
Southeast Asian	14%	14%	14%
white or Caucasian	43%	41%	39%
"Other"	12%	12%	13%
Ethnicity-Question Identification	n = 42,928	n = 31,988	n = 31,988
Identifies as Hispanic or Latino(a)	16%	16%	17%

* CVRP results are created with weighted data from the application using the subset of program participants that responded to the survey.

"Prefer not to answer," "I don't know," and similar responses are excluded throughout.

Household Income Distribution:
CA, MA, and NY Plug-in EV Rebates (pre-COVID)

Center for Sustainable Energy™

Weighted Percent of Rebates

Legend:
- CVRP (CY 2019)
- MOR-EV (CY 2019)
- Drive Clean NY (CY 2019)

Income Range	CVRP	MOR-EV	Drive Clean NY
Less than $100,000	32%	18%	31%
$100,000 to 199,999	48%	45%	39%
$200,000 to $299,999	18%	24%	15%
$300,000 to $399,999	2%	6%	6%
$400,000 or more	1%	7%	10%

Rebate Percentages

2022 CVRP Consumer Survey Data & Application Data Two Ways*

The majority of new-car buyers	CVRP Plug-in EV Rebates 2022	CA New-Vehicle Buyers MYs 2016–17 (2017 NHTS CA add-on)	CA Population 2018–2022 (Census 2022)
Selected solely white/Caucasian	32% (36%)	51%	36%
≥ 40 years old	55% (69%)	68%	46%
≥ Bachelor's degree	71%	58%	26%
≥ $100k household income	59%	56% [§]	42% [§]
Own residence	78%	63% [§]	55% [§]
Selected male	63% (66%)[¶]	50%	50%

* CVRP cells with a single value use weighted survey data. Cells with two values use application data: all application data values are followed in parentheses by values based on the subset of applicants that responded to the survey, weighted in the same manner as the survey data.

§ Based upon household-level data. ¶ 100% includes non-binary options.

"Prefer not to answer," "I don't know," and similar responses are excluded throughout. Census 2022: 2018–2022 American Community Survey, PUMS. NHTS weighted to represent population, not new-vehicle subset. New-vehicle buyers identified by within-100-mile match between odometer and miles driven while owned.

Rebate Percentages: Explaining Differences

CVRP Consumer Survey Data & Application Data*

The majority of new-car buyers	CVRP Plug-in EV Rebates 2022	Portion of total difference attributable to EVs	CA New-Vehicle Buyers MYs 2016–17 (2017 NHTS CA add-on)	Portion of total difference explained by car buying	CA Population 2018–2022 (Census 2022)
Selected solely white/Caucasian	32%*	← 475% →	51%	← -375% →	36%
≥ 40 years old	55%*	← -144% →	68%	← 244% →	46%
≥ Bachelor's degree	71%	← 29% →	58%	← 71% →	26%
≥ $100k household income	59%	← 18% →	56% §	← 82% →	42% §
Own residence	78%	← 65% →	63% §	← 35% →	55% §
Selected male	63%*¶	← 100% →	50%	← 0% →	50%

Asterisks indicate values created using unweighted application data. § Based upon household-level data. ¶ 100% includes non-binary options.

"Prefer not to answer," "I don't know," and similar responses are excluded throughout. Census 2022: 2018–2022 American Community Survey, PUMS. NHTS weighted to represent population, not new-vehicle subset. New-vehicle buyers identified by within-100-mile match between odometer and miles driven while owned.

Rebates to Different Racial Identities with Comparisons

2022

Racial Identity (Sole Identity)	CVRP Plug-in EV Rebates Application data N = 28,895	Portion of total difference attributable to EVs	CA New-Vehicle Buyers MYs 2016–17 (2017 NHTS CA add-on)	Portion of total difference explained by car buying	CA Population 2018–2022 (Census 2022)
East Asian	19%	← 150% →		← -50% →	
South Asian	6%	← 78% →	13%	← 22% →	15%
Southeast Asian	14%	← -100% →		← 200% →	
Middle Eastern or North African	2%	← TBD →	TBD	← TBD →	TBD
Black or African American	3%	← 100% →	5%	← 0% →	5%
American Indian or Alaskan Native	0.2%	← -100% →	0.3%	← 200% →	0.1%
Native Hawaiian or other Pacific Islander	2%	← 94% →	0.4%	← 6% →	0.3%
white or Caucasian	32%	← 475% →	51%	← -375% →	36%
Two or more Races	3%	← 0% →	3%	← 100% →	4%
"Other"	4%	← 83% →	1%	← 17% →	0.4%

Note: "portion of total difference" percentages highly sensitive to uncertainty in smaller-sample results. In a separate question, 16% self-identified as Hispanic or Latino (n = 31,988). "Prefer not to answer," "I don't know," and similar responses are excluded throughout. Census 2022: 2018–2022 American Community Survey, PUMS. NHTS weighted to represent population, not new-vehicle subset. New-vehicle buyers identified by within-100-mile match between odometer and miles driven while owned.

Rebates to Ethnic Identity with Comparisons

2022

Ethnicity-Question Identity	**CVRP Plug-in EV Rebates** Application data *N* = 31,988	Portion of total difference attributable to EVs	**CA New-Vehicle Buyers** MYs 2016–17 (2017 NHTS CA add-on)	Portion of total difference explained by car buying	CA Population 2018–2022 (Census 2022)
Identifies as Hispanic or Latino(a)	16%	← 46% →	27%	← 54% →	40%

"Prefer not to answer," "I don't know," and similar responses are excluded throughout. Census 2022: 2018–2022 American Community Survey, PUMS. NHTS weighted to represent population, not new-vehicle subset. New-vehicle buyers identified by within-100-mile match between odometer and miles driven while owned.

Latest Characteristics by Vehicle Type: **Rebates**

2022 CVRP Consumer Survey data & application data*

The majority of new-car buyers	CVRP Plug-in EV Rebates Vehicle Type:		CA New-Vehicle Buyers MYs 2016–17 (2017 NHTS CA add-on)	CA Population 2018–2022 (Census 2022)
	CY 2022 BEVs	**CY 2022 PHEVs**		
Selected solely white/Caucasian	31% (35%)	44% (49%)	51%	36%
≥ 40 years old	54% (68%)	60% (75%)	68%	46%
≥ Bachelor's degree	71%	75%	58%	26%
≥ $100k household income	59%	64%	56% §	42% §
Own residence	77%	82%	63% §	55% §
Selected male	63% (66%)¶	59% (62%)¶	50%	50%

* CVRP cells with a single value use weighted survey data. Cells with two values use application data: all application data values are followed in parentheses by values based on the subset of applicants that responded to the survey, weighted in the same manner as the survey data.

§ Based upon household-level data. ¶ 100% includes non-binary options.

"Prefer not to answer," "I don't know," and similar responses are excluded throughout. Census 2022: 2018–2022 American Community Survey, PUMS. NHTS weighted to represent population, not new-vehicle subset. New-vehicle buyers identified by within-100-mile match between odometer and miles driven while owned.

Characteristics by Vehicle Type: **Rebates**

2020

The majority of new-car buyers	CVRP Plug-in EV Rebates		CA New-Vehicle Buyers	CA Population
	Vehicle Type:			
	CY 2020 BEVs _n_ = 3,464 Weighted results	**CY 2020 PHEVs** _n_ = 867 Weighted results	**MYs 2016–17** (2017 NHTS CA add-on)	2015–2019 (Census 2019)
Selected solely white/Caucasian	50%	49%	51%	37%
≥ 40 years old	74%	76%	68%	45%
≥ Bachelor's degree in HH	80%	77%	‡	‡
≥ $100k household income	69%	52% <	56% §	38% §
Own residence	81%	75%	63% §	54% §
Selected male	72% ¶	66% ¶	50%	50%

‡ Census & NHTS data characterize individual educational attainment, whereas rebate data characterize highest household attainment. § Based upon household-level data. ¶ 100% includes non-binary options. "Prefer not to answer," "I don't know," and similar responses are excluded throughout. Census 2019: 2015–2019 American Community Survey, PUMS. NHTS weighted to represent population, not new-vehicle subset. New-vehicle buyers identified by within-100-mile match between odometer and miles driven while owned.

Assessing Progress: **Rebates**

CVRP Consumer Survey data & weighted application data subset*

The majority of new-car buyers	CVRP Plug-in EV Rebates					CA New-Vehicle Buyers	CA Population
	Purchase/Lease Dates:					MYs 2016–17	2018–2022
	CY 2018 *n* = 14,757 Weighted results	CY 2019 *n* = 8,991 Weighted results	CY 2020 *n* = 4,331 Weighted results	CY 2021 *n* = 7,694 Weighted results*	CY 2022 *n* = 6,674 Weighted results*	(2017 NHTS CA add-on)	(Census 2022)
Selected solely white/Caucasian	52%	50%	50%	(40%)	(36%)	51%	36%
≥ 40 years old	76%	73%	75%	(67%)	(69%)	68%	46%
≥ Bachelor's degree	84% ‡	83% ‡	79% ‡	72%	71%	58%	26%
≥ $100k household income	73%	68%	66%	62%	59%	56% §	42% §
Own residence	83%	79%	80%	76% †	78% †	63% §	55% §
Selected male	73%¶	71%¶	71%¶	(66%)¶	(66%)¶	50%	50%

* Shaded CVRP cells are created with data from the application using the subset of program participants that responded to the survey. ‡ Based upon highest household attainment, whereas CY 2021–2022, NHTS & Census characterize individual educational attainment. † A "Neither rent nor own" response option was added, see Appendix for further detail. § Based upon household-level data. ¶ 100% includes non-binary options. Census 2022: 2018–2022 American Community Survey, PUMS. NHTS weighted to represent population, not new-vehicle subset. New-vehicle buyers identified by within-100-mile match between odometer and miles driven while owned.

Starting Point: CA Plug-in Vehicle **Rebates**

The majority of new-car buyers	Low-Hanging Fruit (Existing Adopters) CY 2022	CA New-Vehicle Buyers MYs 2016–17 (2017 NHTS)
Selected solely white/Caucasian	32% (36%)	51%
≥ 40 years old	55% (69%)	68%
≥ Bachelor's degree	71%	58%
≥ $100k HH income	59%	56% [†]
Own residence	78%	63% [†]
Selected male	63% (66%) [‡]	50%

* CVRP cells with a single value use weighted survey data. Cells with two values use application data: all application data values are followed in parentheses by values based on the subset of applicants that responded to the survey, weighted in the same manner as the survey data.

§ Based upon household-level data. ¶ 100% includes non-binary options.

"Prefer not to answer," "I don't know," and similar responses are excluded throughout. Census 2022: 2018–2022 American Community Survey, PUMS. NHTS weighted to represent population, not new-vehicle subset. New-vehicle buyers identified by within-100-mile match between odometer and miles driven while owned.

Paths Forward: CA Plug-in Vehicle **Rebates**
CVRP Consumer Survey data & application data*

The majority of new-car buyers	Low-Hanging Fruit (Existing Adopters) CY 2022	*"Rebate Essentials"* CY 2022 n = 6,652 Weighted results	*"EV Converts"* CY 2022 n = 1,261 Weighted results	CA New-Vehicle Buyers MYs 2016–17 (2017 NHTS)	Increased Rebate Recipients Low-/Moderate-Income CY 2022
Selected solely white/Caucasian	32% (36%)	TBD	TBD	51%	24% (25%)
≥ 40 years old	55% (69%)	TBD	TBD	68%	54% (65%)
≥ Bachelor's degree	71%	72%	66%	58%	56%
≥ $100k HH income	59%	52%	54%	56% †	15%
Own residence	78%	75%	76%	63% †	67%
Selected male	63% (66%) ‡	TBD	TBD	50%	59% (62%) ‡

* CVRP cells with a single value use weighted survey data. Cells with two values use application data: all application data values are followed in parentheses by values based on the subset of applicants that responded to the survey, weighted in the same manner as the survey data.

§ Based upon household-level data. ¶ 100% includes non-binary options.

"Prefer not to answer," "I don't know," and similar responses are excluded throughout. Census 2022: 2018–2022 American Community Survey, PUMS. NHTS weighted to represent population, not new-vehicle subset. New-vehicle buyers identified by within-100-mile match between odometer and miles driven while owned.

Paths Forward: CA Plug-in Vehicle **Rebates**

The majority of new-car buyers	Low-Hanging Fruit (Existing Adopters) CY 2020 n = 4,331 Weighted results	"Rebate Essentials" CY 2020 n = 1,669 Weighted results	"EV Converts" CY 2020 n = 834 Weighted results	CA New-Vehicle Buyers MYs 2016–17 (2017 NHTS)	Increased Rebate Recipients Low-/Moderate-Income CY 2020, n = 507 Weighted results
Selected solely white/Caucasian	50%	42%	36%	51%	34%
≥ 40 years old	75%	71%	67%	68%	67%
≥ Bachelor's degree in HH	79%	79%	75%	*	63%
≥ $100k HH income	66%	57%	58%	56% †	9%
Own residence	80%	76%	74%	63% †	60%
Selected male	71% ‡	71% ‡	70% ‡	50%	66% ‡

* NHTS data characterize individual educational attainment, whereas other data characterize highest household attainment. † Based upon household-level data. ‡ 100% includes non-binary options. Rebate data filtered by purchase/lease date. "Prefer not to answer," "I don't know," and similar responses are excluded throughout. NHTS weighted to represent population, not new-vehicle subset. New-vehicle buyers identified based on within-100-mile match between odometer and miles driven while owned.

The majority of new-car buyers	All CVRP		CA New-Vehicle Buyers
Selected solely white/Caucasian	-1		0
≥ 40 years old	7		0
≥ $100k HH income	10		0
Own residence	17		0
Selected male	21		0
Total points:	54		0

Rebate data filtered by purchase/lease date. "Prefer not to answer," "I don't know," and similar responses are excluded throughout.
CA New-Vehicle Buyers (2017 NHTS) weighted to represent population, not new-vehicle subset. New-vehicle buyers identified based on within-100-mile match between odometer and miles driven while owned, using most-recent model years available (2016–17).

Quantifying the Path Forward: **Rebates** (CY 2020):
Percentage-Point Differences from the New-Vehicle-Buyer Baseline

The majority of new-car buyers	All CVRP	Rebate Essentials	EV Converts	CA New-Vehicle Buyers	Increased Rebate Recipients
Selected solely white/Caucasian	-1	-9	-15	0	-17
≥ 40 years old	7	3	1	0	-1
≥ $100k HH income	10	1	2	0	-47
Own residence	17	13	11	0	-3
Selected male	21	21	20	0	16
Total points:	**54**	**29**	**19**	**0**	**-52**
Percent of journey from segment to segment:		46%	19%	35%	96%
Percent of journey from start:		46%	65%	100%	196%

Rebate data filtered by purchase/lease date. "Prefer not to answer," "I don't know," and similar responses are excluded throughout.
CA New-Vehicle Buyers (2017 NHTS) weighted to represent population, not new-vehicle subset. New-vehicle buyers identified based on within-100-mile match between odometer and miles driven while owned, using most-recent model years available (2016–17).

EV Rebate Program Impacts: Select Publications

- B.D.H. Williams and J.B. Anderson (2024, May). Expanding Electric Vehicle Adoption in Disadvantaged Communities. *Transportation Research Record: Journal of the Transportation Research Board*. https://doi.org/10.1177/03611981241242753. Includes open-access data-summary appendix. Paper. CSE posting. TRB slides.

- N. Pallonetti, B.D.H. Williams, and B. Sa (2023, Oct.), *CVRP Greenhouse Gas Emission Reductions and Cost-Effectiveness: 2021 Purchases/Leases*, Clean Vehicle Rebate Project. DOI: 10.13140/RG.2.2.28157.95207. Paper. CVRP Posting. GHG compilation.

- B.D.H. Williams and N. Pallonetti (2023, Mar.), New York State's Drive Clean Rebate for Electric Vehicles: Measures of Impact, *36th International Electric Vehicle Symposium (EVS36)*, EDTA, Sacramento CA, USA. Paper. Slides. CSE posting.

- B.D.H. Williams and N. Pallonetti (2023, Mar.), Rebate Influence on Electric Vehicle Adoption in California, *36th International Electric Vehicle Symposium (EVS36)*, EDTA, Sacramento CA, USA. Paper. CSE posting. Precursor slides. Conference slides with updates.

- N. Pallonetti and B.D.H. Williams (2023, Mar.), Vehicle Replacement: Findings from California's Clean Vehicle Rebate Project, *36th International Electric Vehicle Symposium (EVS36)*, EDTA, Sacramento CA, USA. Paper. CSE posting. Precursor slides.

- B.D.H. Williams (2023, Apr.), Assessing progress and equity in the distribution of electric vehicle rebates using appropriate comparisons, *Transport Policy*, *137*, 141–151. DOI: 10.1016/J.TRANPOL.2023.04.009. Paper. CVRP posting. CSE posting. Precursor video. Slides.

- B.D.H Williams and J.B. Anderson (2022, Sep.), From Low Initial Interest to Electric Vehicle Adoption: "EV Converts" in New York State's Rebate Program. *Transportation Research Record: Journal of the Transport. Research Board*, 2677, 866–882. DOI: 10.1177/03611981221118537. Data-summary appendix.

- B.D.H. Williams (2022, Jun.), Targeting Incentives Cost Effectively: "Rebate Essential" Consumers in the New York State Electric Vehicle Rebate Program, *35th International Electric Vehicle Symposium (EVS35)*, AVERE, Oslo, Norway. Paper. Slides.

- B.D.H. Williams, J.B. Anderson (2022, Jun.), Lessons Learned About Electric Vehicle Consumers Who Found the U.S. Federal Tax Credit Extremely Important in Enabling Their Purchase, *35th International Electric Vehicle Symposium (EVS35),* Oslo, Norway. Paper. Slides.

- B.D.H. Williams (2021, Oct.), *An Electric-Vehicle Consumer Segmentation Roadmap: Strategically Amplifying Participation in the New York Drive Clean Rebate Program*, Report 21-30, *Clean Transportation Reports*, NYSERDA.

- B.D. Williams, J. Orose, M. Jones, J.B. Anderson (2018, Oct.), Summary of Disadvantaged Community Responses to the Electric Vehicle Consumer Survey, 2013–2015 Edition, Clean Vehicle Rebate Project Report, San Diego CA. DOI: 10.13140/RG.2.2.36500.58243.

- C. Johnson, B.D. Williams, J.B. Anderson, N. Appenzeller (2017, Jun.), *Evaluating the Connecticut Dealer Incentive for Electric Vehicle Sales*, Center for Sustainable Energy (CSE). DOI: 10.13140/RG.2.2.24448.00004. CSE posting.

- C. Johnson, B.D. Williams (2017, Jan.), Characterizing Plug-In Hybrid Electric Vehicle Consumers Most Influenced by California's Electric Vehicle Rebate, *Transportation Research Record: Journal of the Transport. Research Board,* 2628, 23–31.

(Reverse Chronological, as of 6/2024. Additional related items.)

EV Rebate Program Impacts: Select Presentations & Videos

- CVRP 2021 Data Brief: Vehicle Replacement (2024, Apr.). CVRP posting.

- NY Drive Clean Rebate: Vehicle Replacement & Rebate Influence thru 2022 (2024, Mar.).

- Amplifying Electric Vehicle Adoption in Disadvantaged Communities, Consumer Segmentation Roadmaps, and Additional Equity Considerations (2024, Jan). TRB posting.

- Pickup Trucks: The Path to Electrification and CVRP Participation Through Q1 2023 (2023, Dec.). CVRP posting.

- CVRP 2021 Data Brief: Consumer Characteristics (2023, Dec.).

- CVRP 2021 Data Compilation: Incentive Influence and MSRP Considerations (2023, Oct.).

- NY Drive Clean Rebates: Select Impacts Through 2021 (2023, Jun. 12). Paper. CSE posting.

- Lessons Learned About Electric Vehicle Consumers Who Rated the U.S. Federal Tax Credit 'Extremely Important' (2022, Jun. 15). Paper.

- Targeting Incentives Cost Effectively: 'Rebate Essential' Consumers in the New York State Electric Vehicle Rebate Program (2022, Jun. 13). Paper.

- Conference video: "HEC 2022 Panel - Electrification and Transportation," opening pres. minutes 2–10; 40-min. panel total, (2022, May). Slides.

- CARB Video: "CVRP 2020 Data Brief: Consumer Characteristics," time 1:05:43–1:26:09, (2022, Mar.). Slides. Related journal article.

- CARB Video: "Cost-Effectiveness of Greenhouse Gas Emission Reductions Associated with California's Clean Vehicle Rebate Project in 2019 (and 2020)," time 2:01-2:31, (2022, Feb.). Slides.

- Data from Statewide Electric Vehicle Rebate Programs: Vehicles, Consumers, Impacts, and Effectiveness (2021, Jul.).

- What Vehicles Are Electric Vehicles Replacing and Why? (2019, Nov.).

- Electric Vehicle Incentives and Policies (2019, Nov.).

- Targeting EV Consumer Segments & Incentivizing Dealers (2017, Jun.).

- Yale Webinar: "Supporting EV Commercialization with Rebates: Statewide Programs, Vehicle & Consumer Data, and Findings," 58 minutes, (2017, Apr.). Slides.

- Electric Vehicle Rebates in Disadvantaged Communities: Evaluating Progress with Appropriate Comparisons (2016, Oct.)

- Characterizing California Electric Vehicle Consumer Segments (2016).

(Reverse Chronological, as of 4/2024. *Additional related items.*)

Recommended citation

B.D.H. Williams and N. Pallonetti (2024, Aug.), Presentation: "CVRP 2022 Data Brief: Consumer Characteristics," prepared by the Center for Sustainable Energy for the Clean Vehicle Rebate Project, California Air Resources Board, Sacramento USA.

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