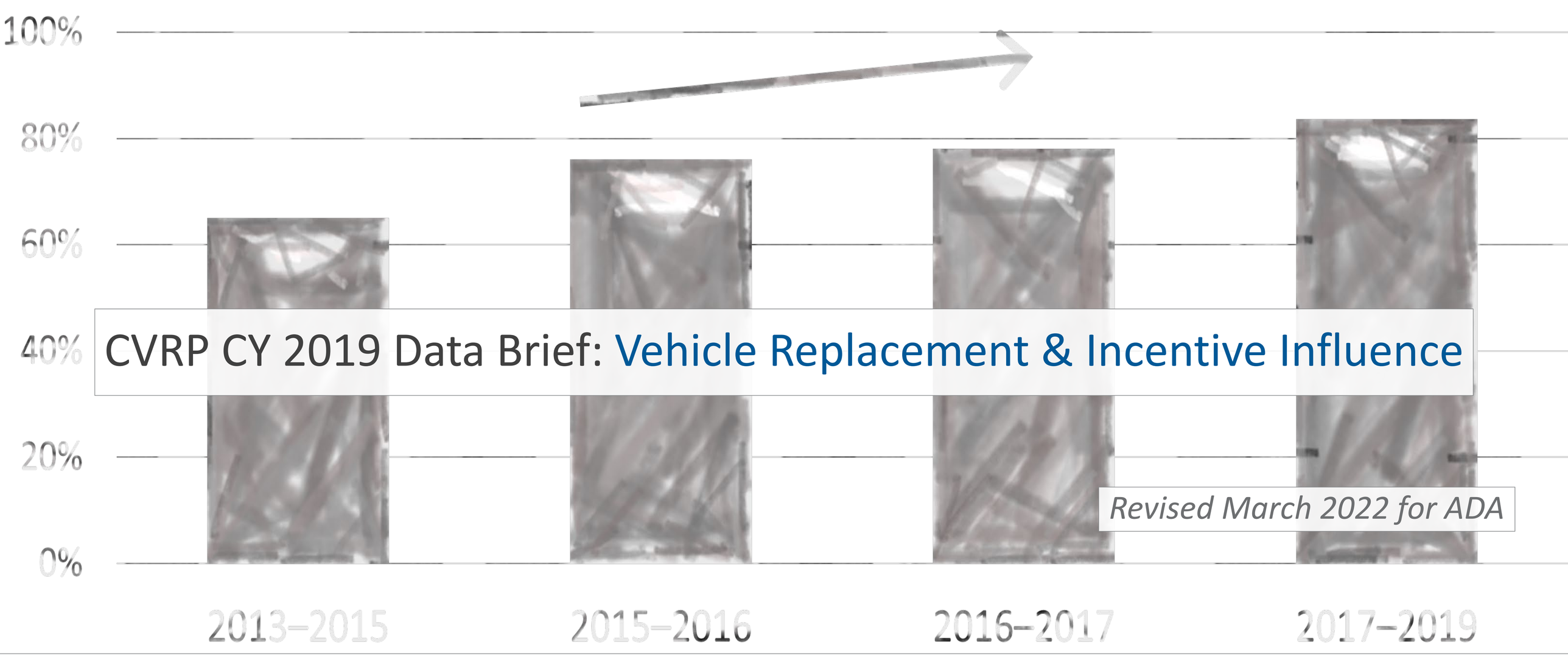


CVRP CY 2019 Data Brief: Vehicle Replacement & Incentive Influence

Revised March 2022 for ADA

Brett Williams, PhD – Principal Advisor, EV Programs, CSE

Nicholas Pallonetti – Research Analyst, CSE

CALIFORNIA CLEAN VEHICLE REBATE PROJECT℠

with thanks to M. Eluganti, M. Jones, and others at the Center for Sustainable Energy (CSE)

Outline: Vehicle Replacement & Incentive Influence Brief

I. Program Design (data context)
II. Vehicle Replacement
    A. Replacement Rates
    B. Vehicle Types Replaced
III. Incentive Influence
    A. Rebates
    B. Federal Tax Credit
IV. Summary & Select Findings

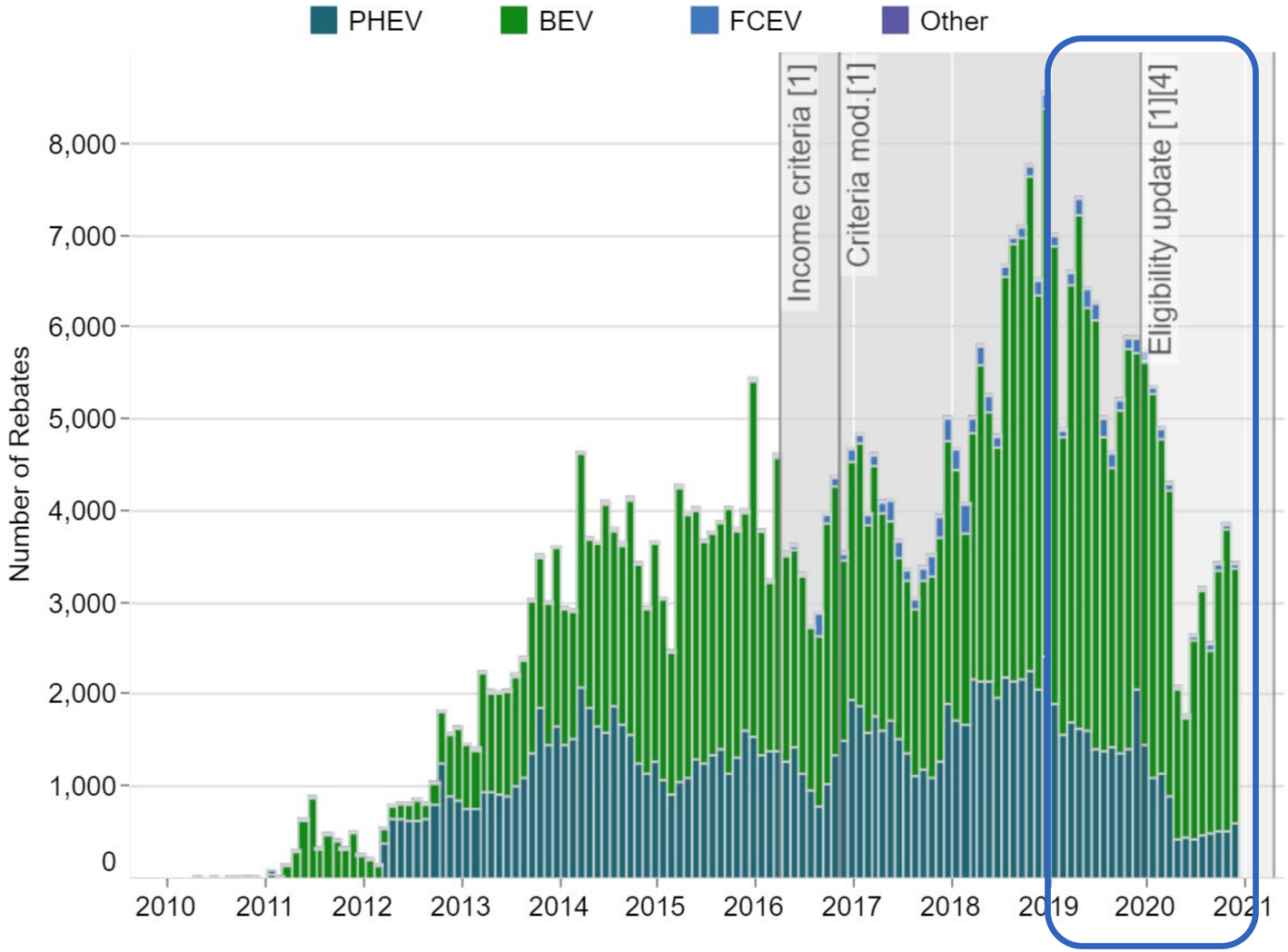
Additional Resources

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

Context

Program Design

Approved Applications Over Time



With COVID exemptions, rebate applications for CY 2019 purchases/leases for individuals spanned 1/1/2019 – 1/6/2021.

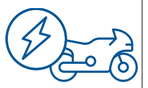
16% applied in 2020.

5/3/21 image from https://cleanvehiclerebate.org/eng/rebate-statistics

Base Rebate Amounts for Individuals

= in effect during 2019

CALIFORNIA CLEAN VEHICLE REBATE PROJECT™

	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.
* Lower-income consumers eligible for an additional $1,500.
** Lower-income consumers eligible for an additional $2,000.
*** Lower-income consumers eligible for an additional $2,500.

Program Design Shapes Outcomes

= in effect during 2019

CALIFORNIA CLEAN VEHICLE REBATE PROJECT™

as of Mar. 2010	as of Dec. 2013	as of Dec. 2014 / Jan. 2015	as of Mar. 2016	as of Nov. 2016
• Incentive stacking permitted • 36-month ownership requirement • Rebates per year limit = 20	• Rebates per year limit = 2 **as of May 2014** • 18-month application window	• 30-month ownership requirement (retroactive) • Total rebate limit = 2	• $250k–$500k income cap (PEVs) • +$1,500 for income-qualified households (≤ 300% FPL), excluding ZEMs	• $150k–$300k income cap (PEVs) • +$2,000 for income-qualified households (≤ 300% FPL), excl. ZEMs • ≥ 20 UDDS electric miles

as of Jan. 2018	as of Jan. 2019	as of Dec. 2019	as of Apr. 2020	as of Apr. 2021
• $150k–$300k income cap on stacking HOV decal • (only binding on FCEVs) • Rebate Now San Diego County preapproval pilot with point-of-sale option	• Stacking with CVAP grant not permitted (retroactive)	• Base MSRP ≤ $60k (PEVs) • ≥ 35 UDDS electric miles • +$2,500 † for income-qualified households (≤ 300% FPL), excl. ZEMs • 3-month application window ‡ • Total rebates limit = 1 §	• Stacking with CVAP grant permitted **as of Jan. 2021** • +$2,500 for income-qualified households (≤ 400% FPL), excl. ZEMs	• ≥ 30 U.S. EPA electric miles (45 UDDS) • Rebate Now preapproval option limited to income-qualified households, expanded to include SJ Valley

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

† Change due to $500 decrease in standard rebate amounts. ‡ COVID exemptions on application window effectively delayed implementation until 4/15/2021.

§ A second rebate can be approved for a FCEV if the first rebate was for a PEV.

Funding Availability Has Been Regularly Disrupted

(as of Oct 2019)

Table 3: CVRP Waitlists

Waitlist Year	Start Date	End Date	Length in Days
2011*	6/20	9/30	102
2013*	5/1	6/30	60
2014	3/28	7/22	116
2016	6/11	9/28	109
2017**	6/30	11/20	143
2019**	6/5	9/23	110

** Dates approximate.*

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

Image from https://cleanvehiclerebate.org/sites/default/files/attachments/CVRP_Disruptions_Fact_Sheet.pdf

CA Consumer Survey Data: Plug-in EVs*

(Shows Rebates to Individuals Only)

	2013–2015 Edition	2015–2016 Edition	2016–2017 Edition	2017–2019 Edition	Total
Vehicle Purchase/ Lease Dates	Sep. 2012 – May 2015	April 2015 – May 2016	May 2016 – May 2017	June 2017 – Dec. 2019	Sep. 2012 – Dec. 2019
Survey Responses (total n)**	19,460	11,611	8,957	25,615	65,643
Program Population (N)***	91,100	45,700	46,800	149,000	332,600

* PEVs include PHEVs and BEVs.

** Subsequently weighted to represent the program population along the dimensions of vehicle category, vehicle model, buy vs. lease, and county.

*** Small numbers of rebated vehicles are not represented in the time frames due to application lags. Rounded to nearest 100.

Consumer Survey Data *(Shows Rebates to Individuals 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	Sep. 2012* – Dec. 2019	Jun. 2014 – Apr. 2020	May 2015 – Sep. 2018	Mar. 2017 – Jul. 2018	Sep. 2012* – Apr. 2020
Survey Responses (total n)**	66,902	6,616	1,565	1,808	76,891
Program Population (N)***	339,200	16,100	3,500	8,600	367,400

*Two fuel-cell EVs rebated by CVRP with purchase/lease dates from Dec. 2010 – Sep. 2012 are included.

** Subsequently weighted to represent the program population along the dimensions of vehicle category, model, buy vs. lease, and county.

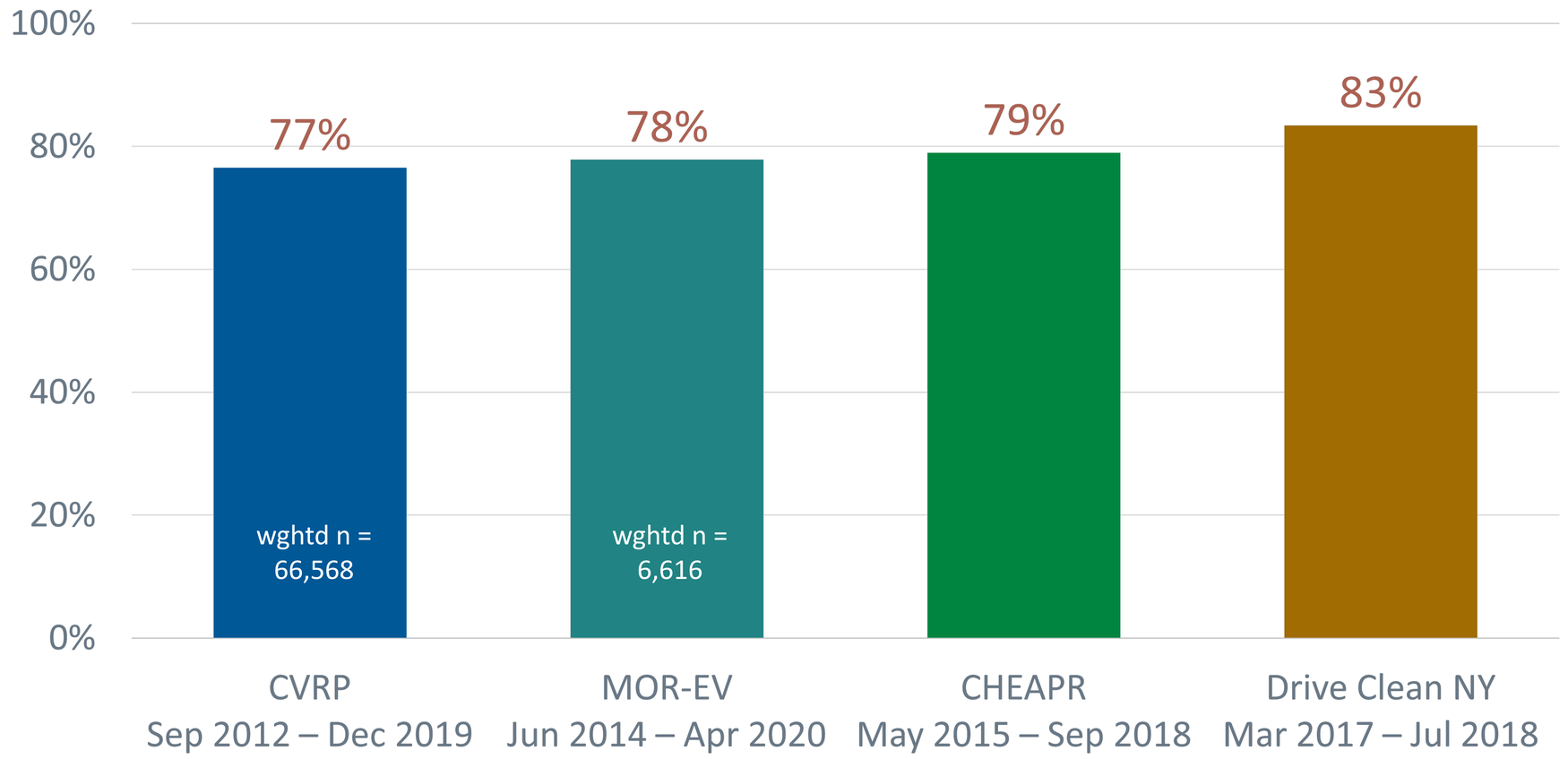
*** Small numbers of rebated vehicles are not represented in the time frames due to application lags. Rounded to nearest 100.

Vehicle Replacement

Vehicle Replacement Rates

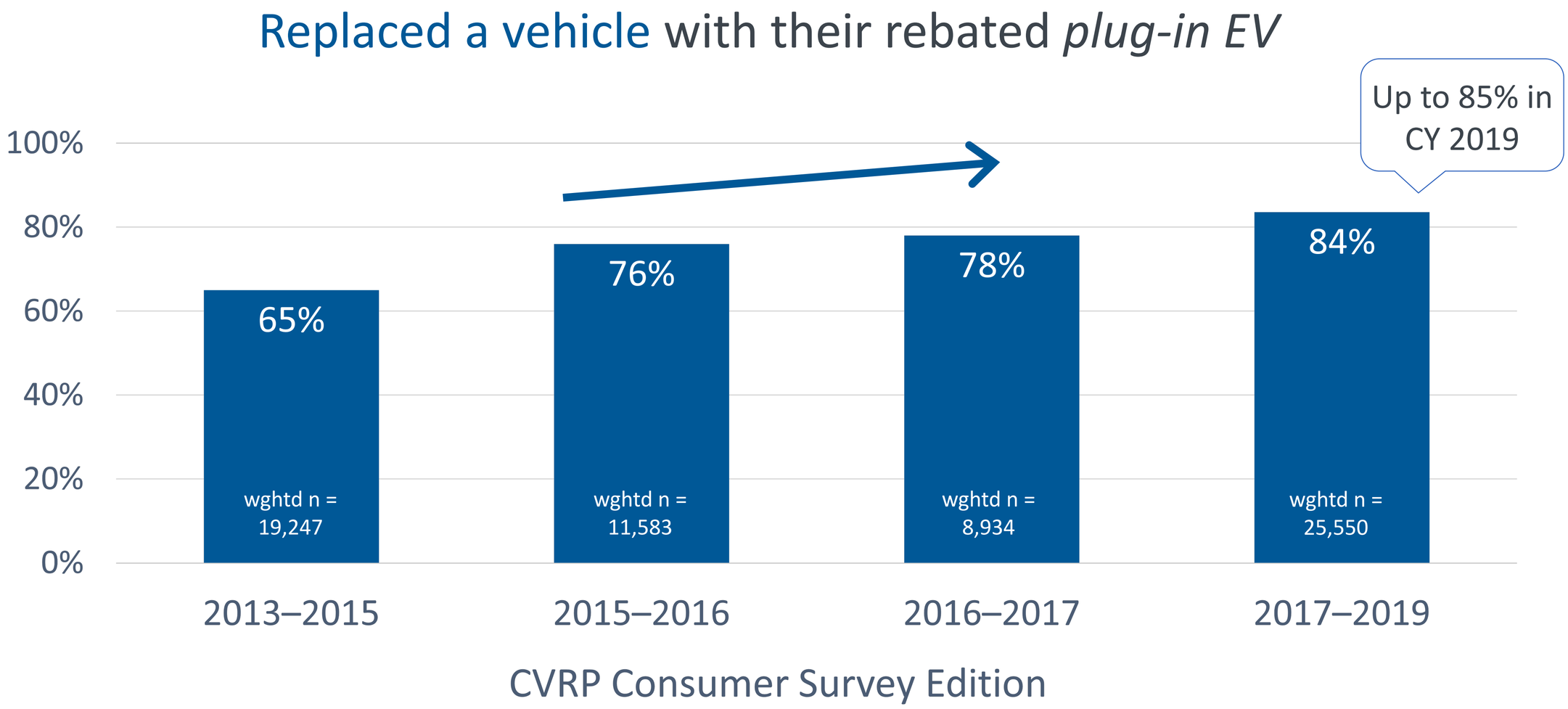
Do EVs Get Used?

Replaced a vehicle with their rebated *clean vehicle*



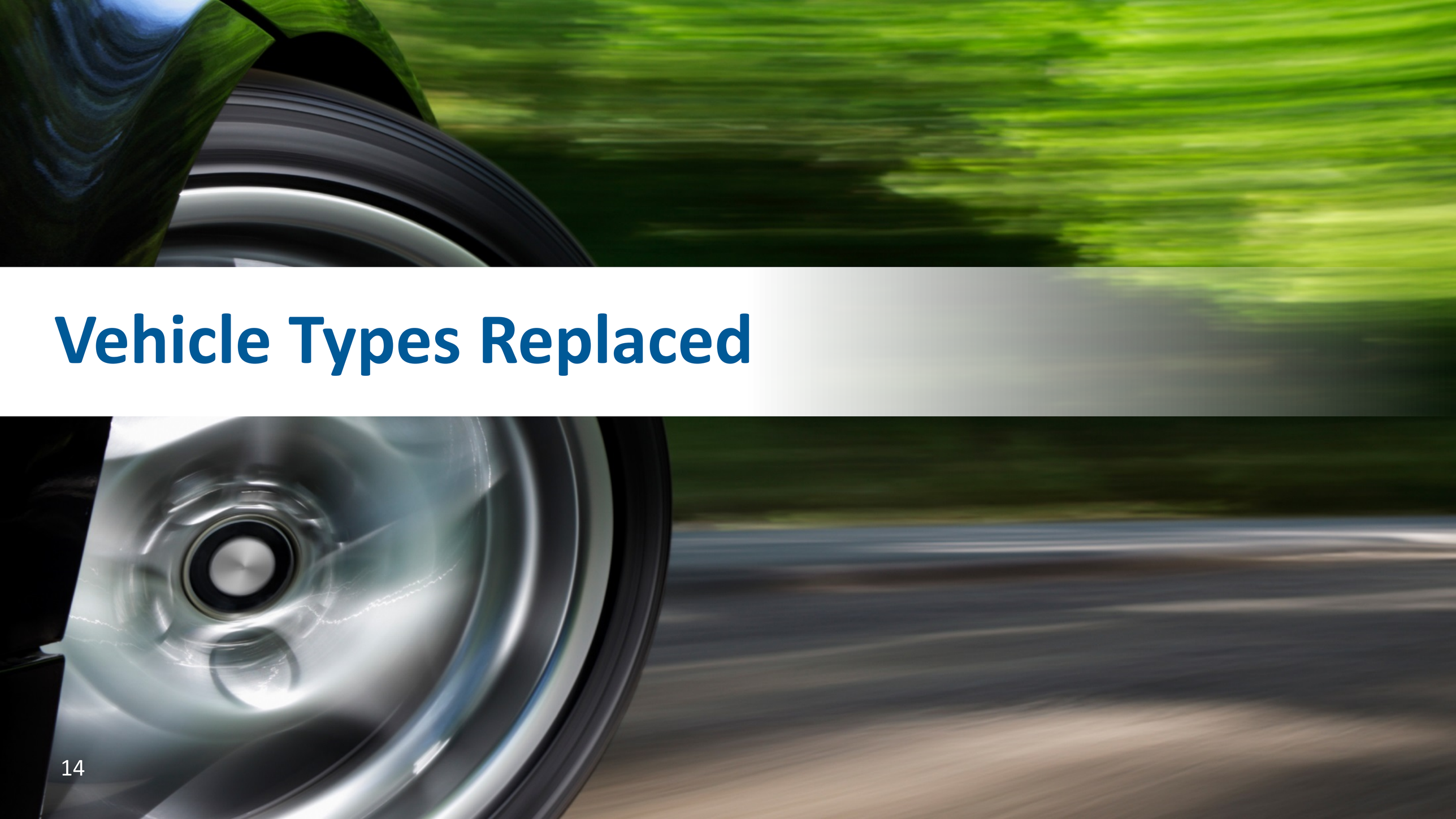
Overall datasets: 76,891 total survey respondents weighted to represent 367,400 rebate recipients.

Vehicle Replacement is Increasing



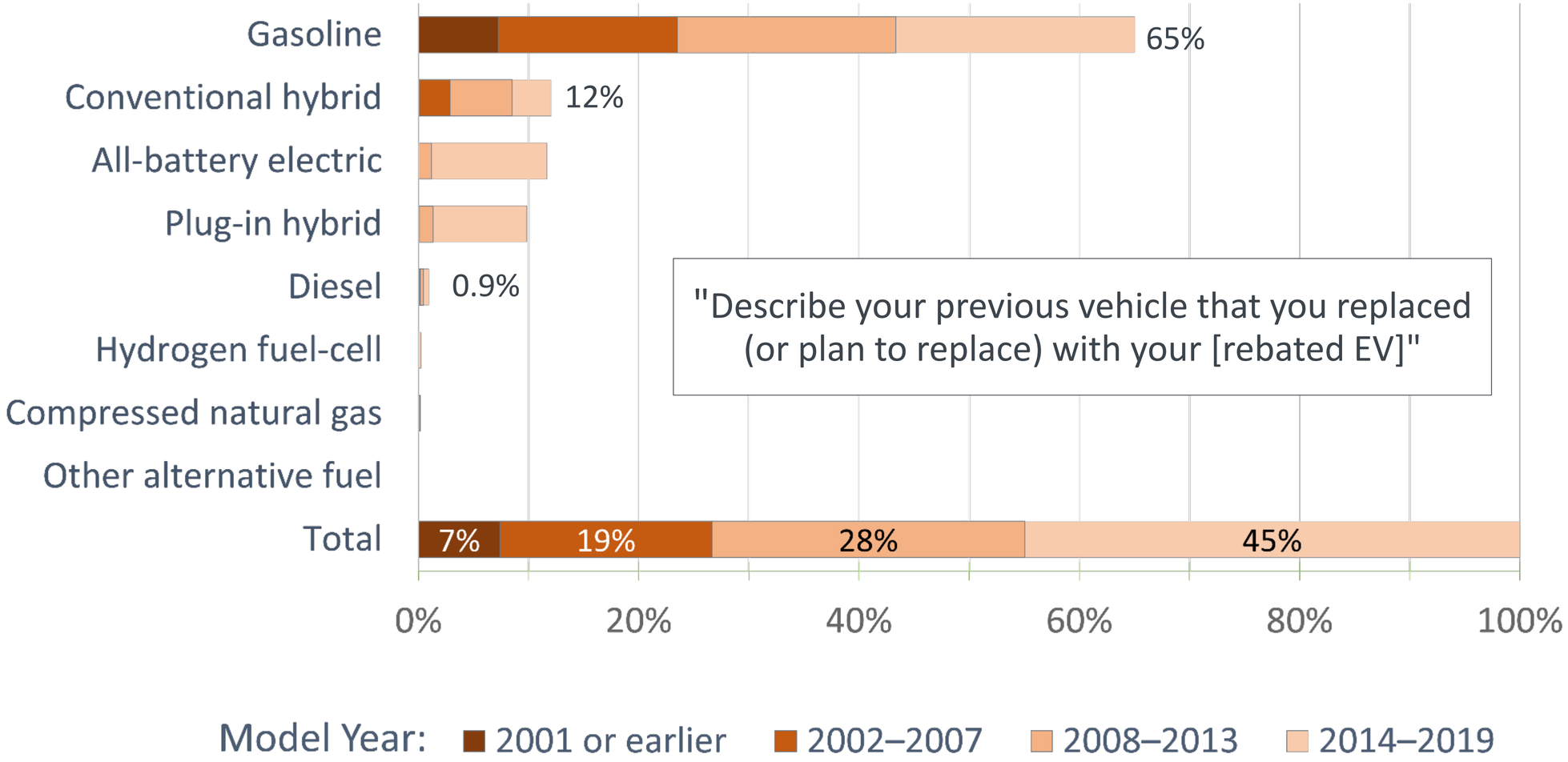
Overall datasets: 65,643 total survey respondents weighted to represent 332,600 rebate recipients.

Vehicle Types Replaced



What Vehicles Have Rebates Helped Replace?

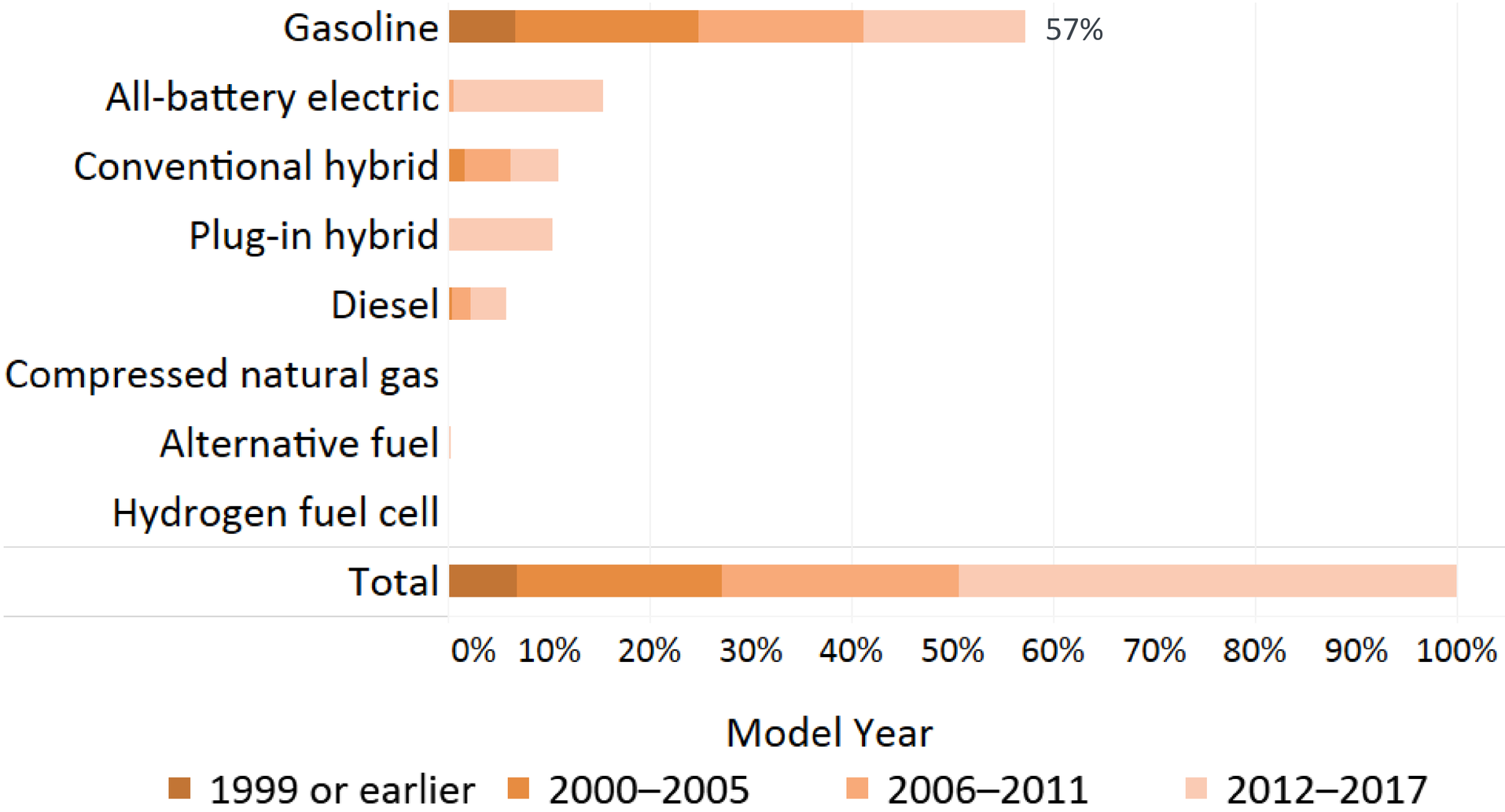
CY 2019 Plug-in Electric Vehicle Purchases/Leases



CVRP Consumer Survey: 2017–2019 edition. Filtered, question-specific, weighted n = 4,465.

What Vehicles Have Rebates Helped Replace?

Plug-in Electric Vehicle Purchases/Leases



CVRP Consumer Survey. ***2016–2017*** *edition,* ***trimmed to start November 2016****, weighted n=4,695*

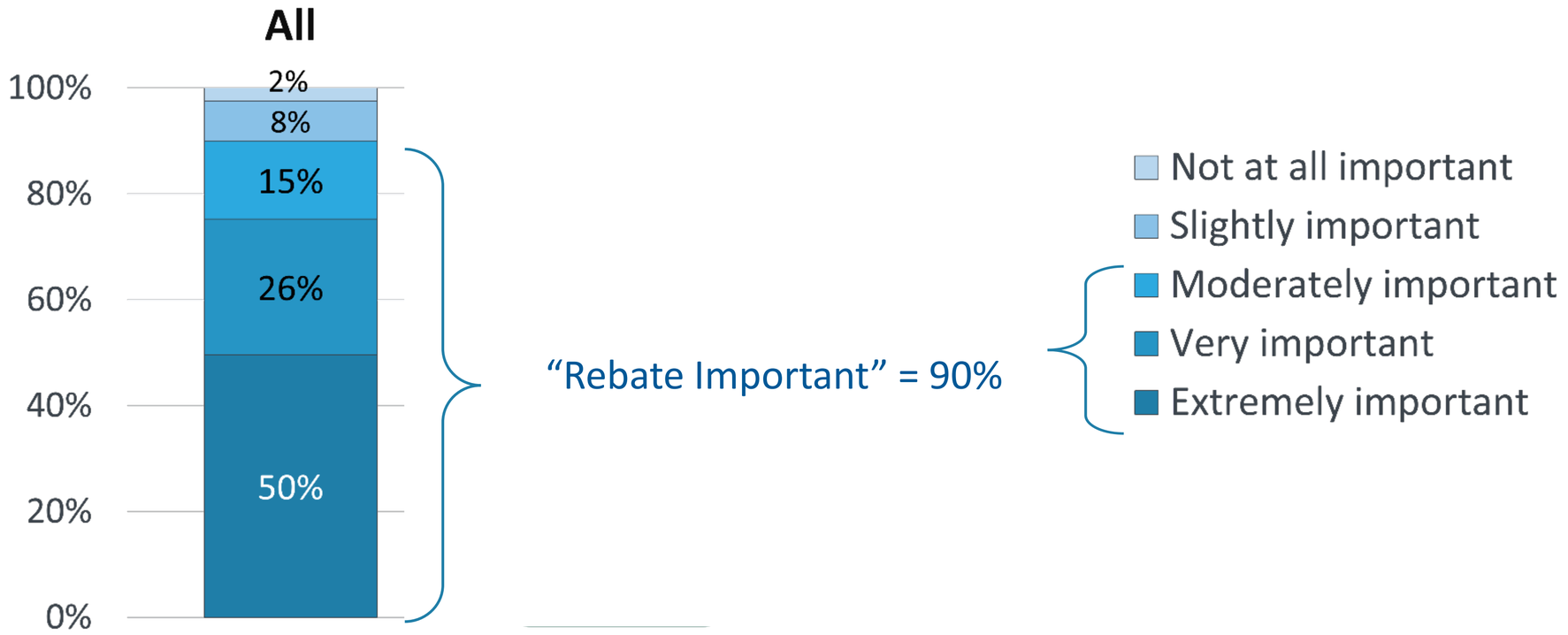
Incentive Influence

Rebate Influence

Rebate Importance

(CY 2019 Plug-in EVs)

How important was the state rebate in making it possible for you to acquire your clean vehicle?

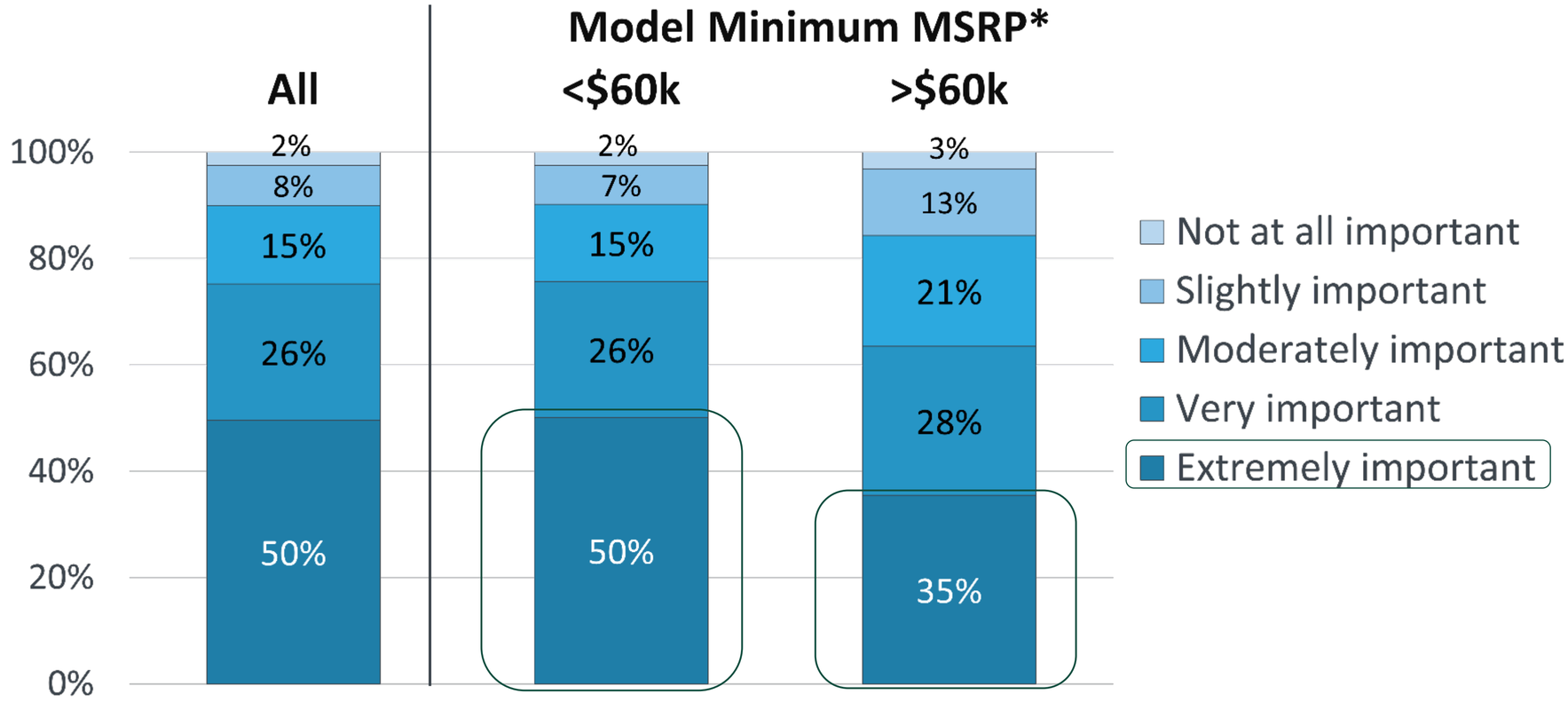


CVRP Consumer Survey: 2017–2019 edition. Question-specific weighted n = 6,120.
Starting Dec. 2019, PEVs with base MSRP greater than $60k became ineligible.

Rebate Importance Decreases Above $60k MSRP

(CY 2019 Plug-in EVs)

How important was the state rebate in making it possible for you to acquire your clean vehicle?

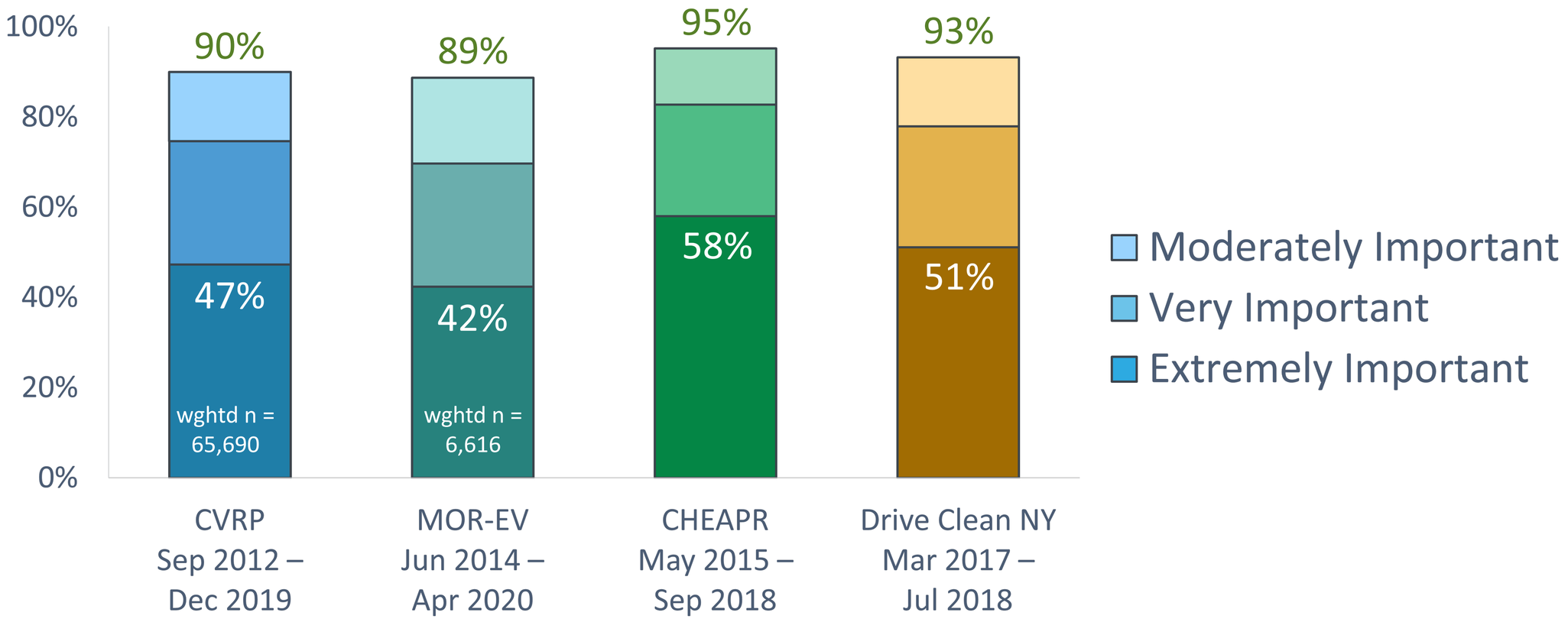


**Each vehicle was assigned the minimum Manufacturer's Suggested Retail Price (MSRP) for that model/MY on fueleconomy.gov and does not reflect sale price. Where MSRPs were unavailable for a given MY, MSRPs from the previous or following MY were used. Tesla Model 3's were assigned an MSRP of $49k for MY 2018, $35k for MY 2019 and 2020.*

CVRP Consumer Survey: 2017–2019 edition. Question weighted n = 6,120. Starting Dec. 2019, PEVs with base MSRP greater than $60k became ineligible.

Rebate Influence: Importance

How important was the state rebate in making it possible for you to acquire your clean vehicle?

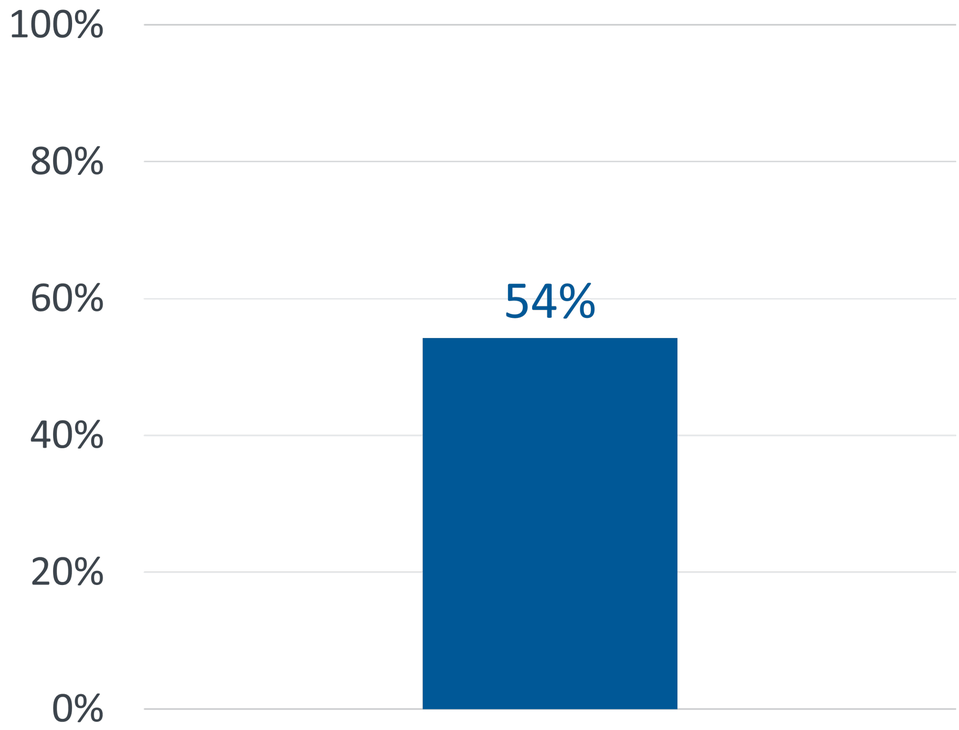


Overall datasets: 76,891 total survey respondents weighted to represent 367,400 rebate recipients.

Rebate Essentiality

(CY 2019 Plug-in EV Purchases/Leases)

Would not have purchased/leased their EV without the state rebate

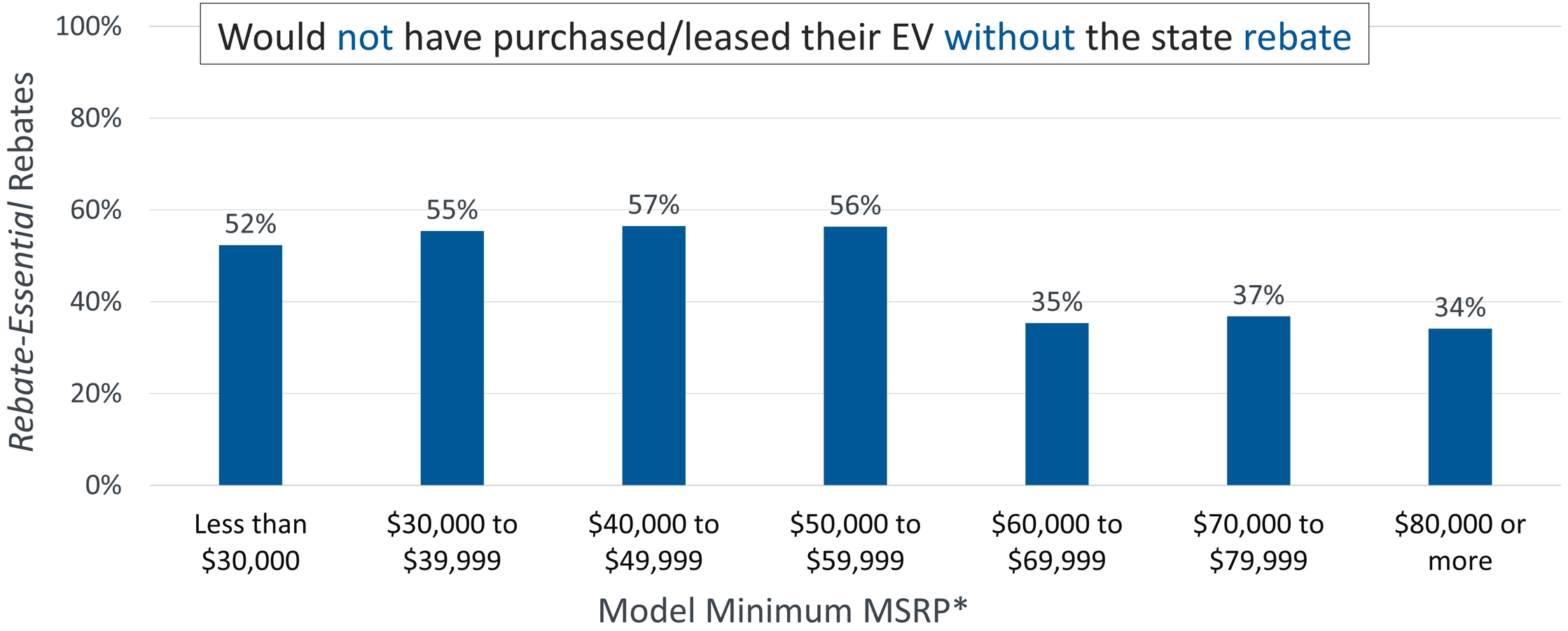


CVRP Consumer Survey: 2017–2019 edition. Filtered question, weighted n = 6,158.

Starting 12/2019, PEVs with base MSRP > $60k became ineligible.

Rebate Essentiality Decreases Above $60k MSRP

(CY 2019 Plug-in EV Purchases/Leases)

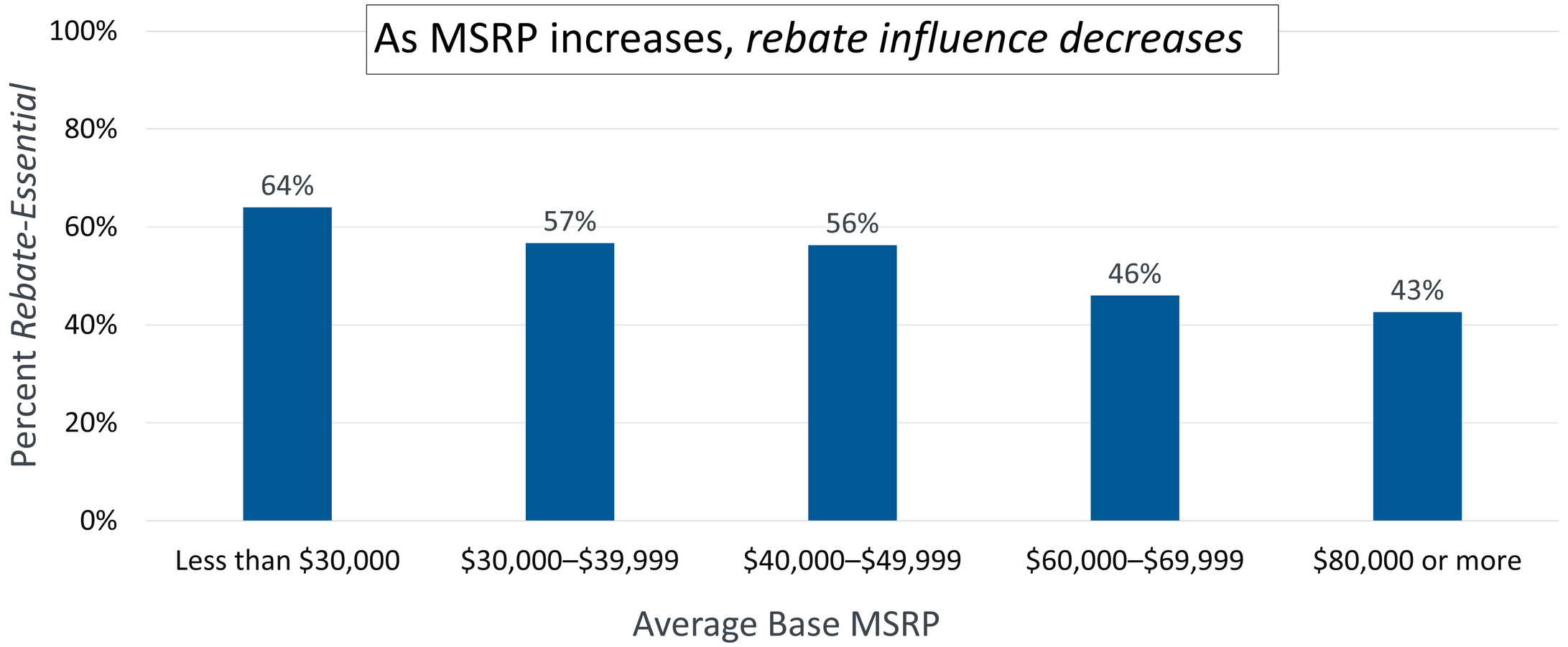


** Each vehicle was assigned the minimum Manufacturer's Suggested Retail Price (MSRP) for that model/MY on fueleconomy.gov and does not reflect sale price. Where MSRPs were unavailable for a given MY, MSRPs from the previous or following MY were used. Tesla Model 3's were assigned an MSRP of $49k for MY 2018, $35k for MY 2019 and 2020.*

CVRP Consumer Survey: 2017–2019 edition. Filtered question, weighted n = 6,158. Starting 12/2019, PEVs with base MSRP > $60k became ineligible.

Rebate Essentiality Reflects Interesting Trends

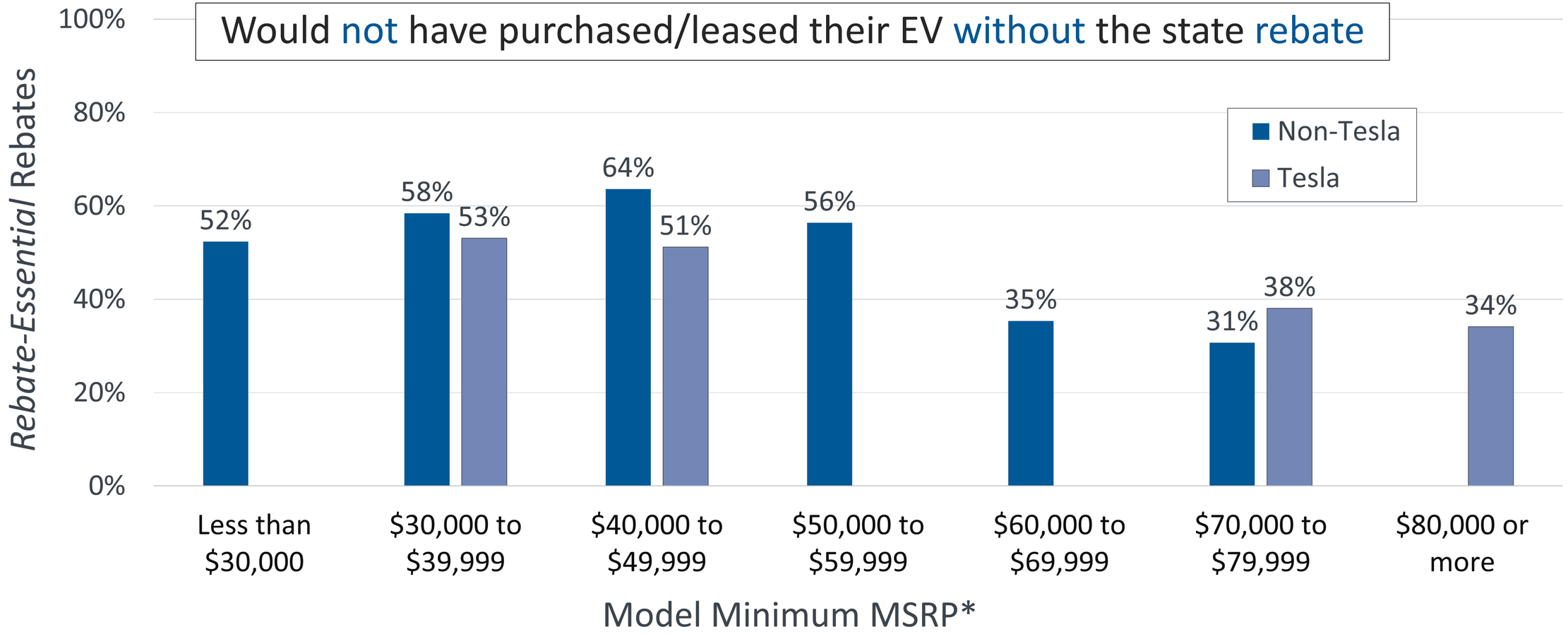
Consumer Survey, 2016–17 Edition



CVRP Consumer Survey: 2016–17 edition, weighted n = 8,927

Rebate Essentiality Similar But Lower for Tesla

(CY 2019 Plug-in EV Purchases/Leases)



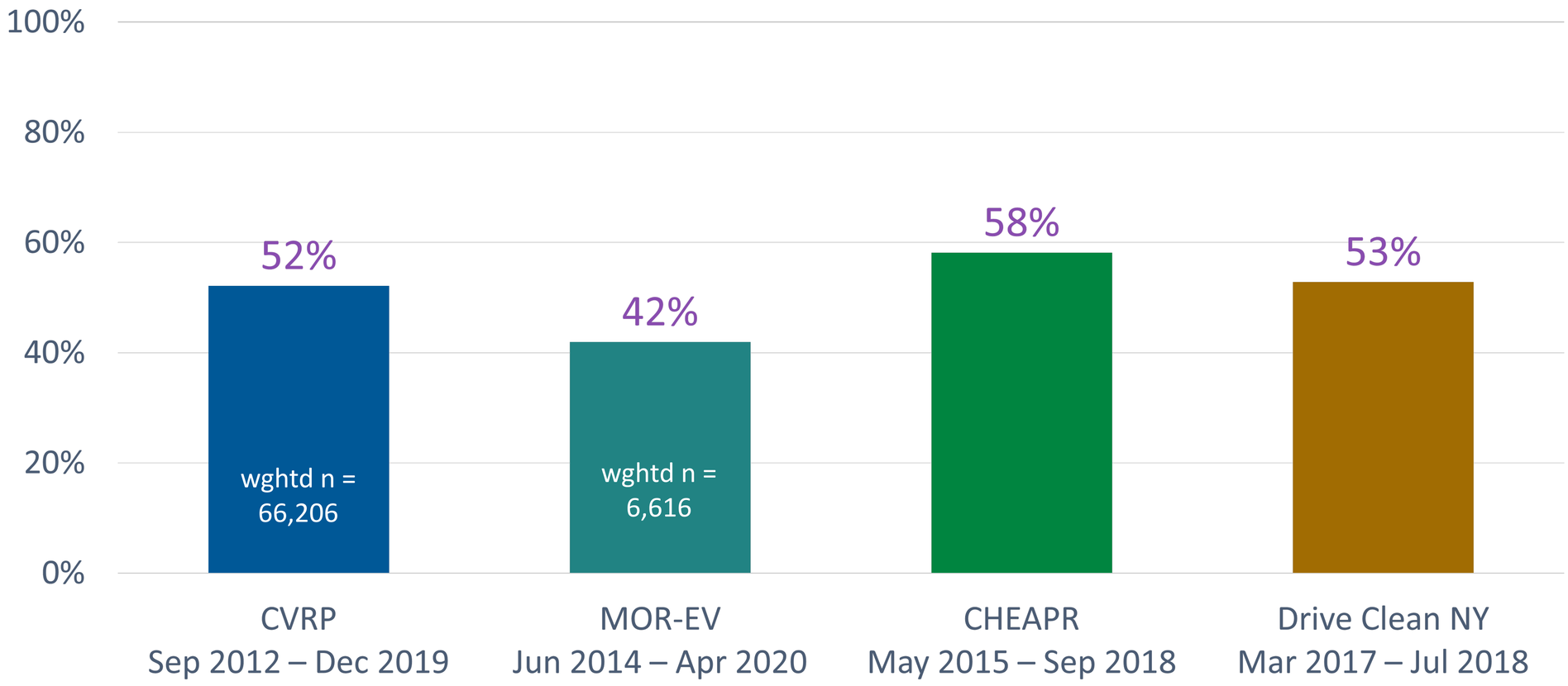
CVRP Consumer Survey: 2017–2019 edition. Filtered question, weighted n = 6,158. Starting 12/2019, PEVs with base MSRP > $60k became ineligible.

** Each vehicle was assigned the minimum Manufacturer's Suggested Retail Price (MSRP) for that model/MY on fueleconomy.gov and does not reflect sale price. Where MSRPs were unavailable for a given MY, MSRPs from the previous or following MY were used.*

Tesla Model 3's were assigned an MSRP of $49k for MY 2018, $35k for MY 2019 and 2020.

Rebate Influence: Essentiality

Would not have purchased/leased their clean vehicle without rebate

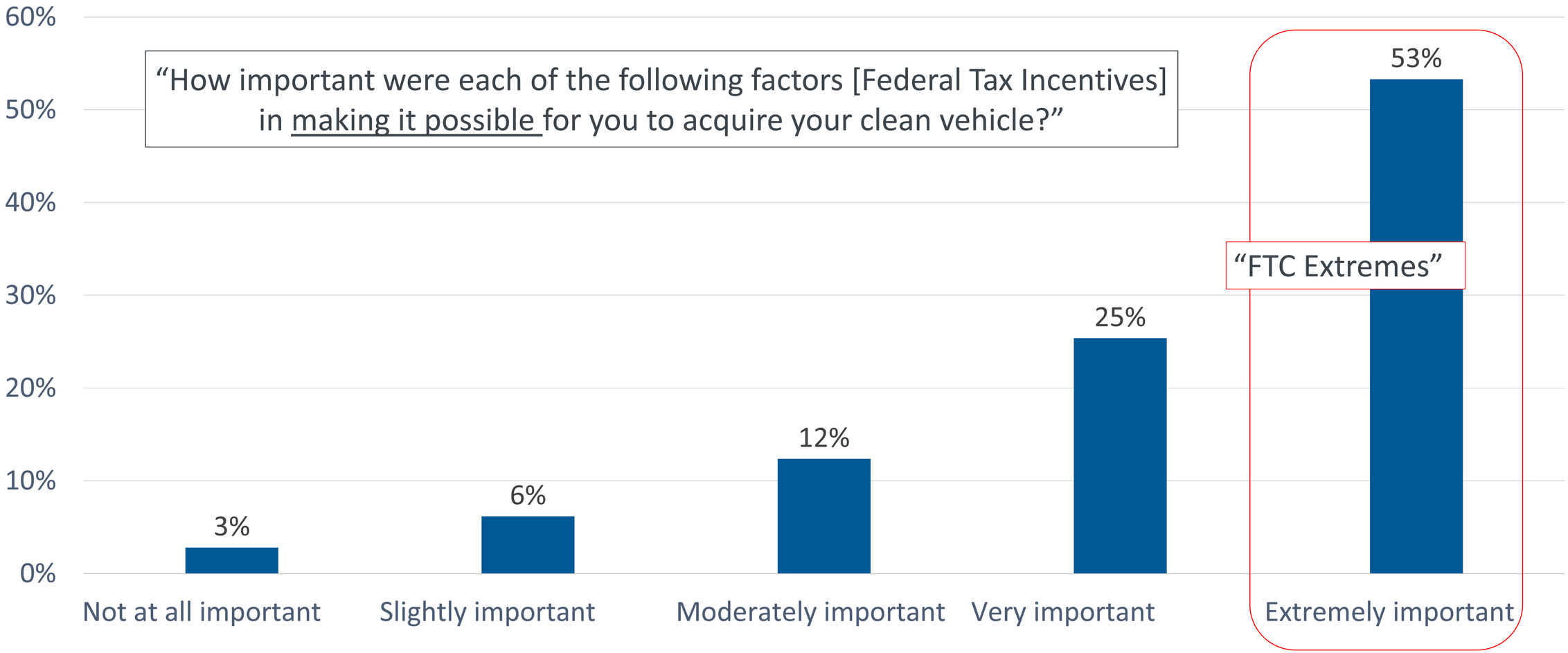


Overall datasets: 76,891 total survey respondents weighted to represent 367,400 rebate recipients.

Federal Tax Credit Influence

Importance of Federal Tax Credit for Plug-in EVs

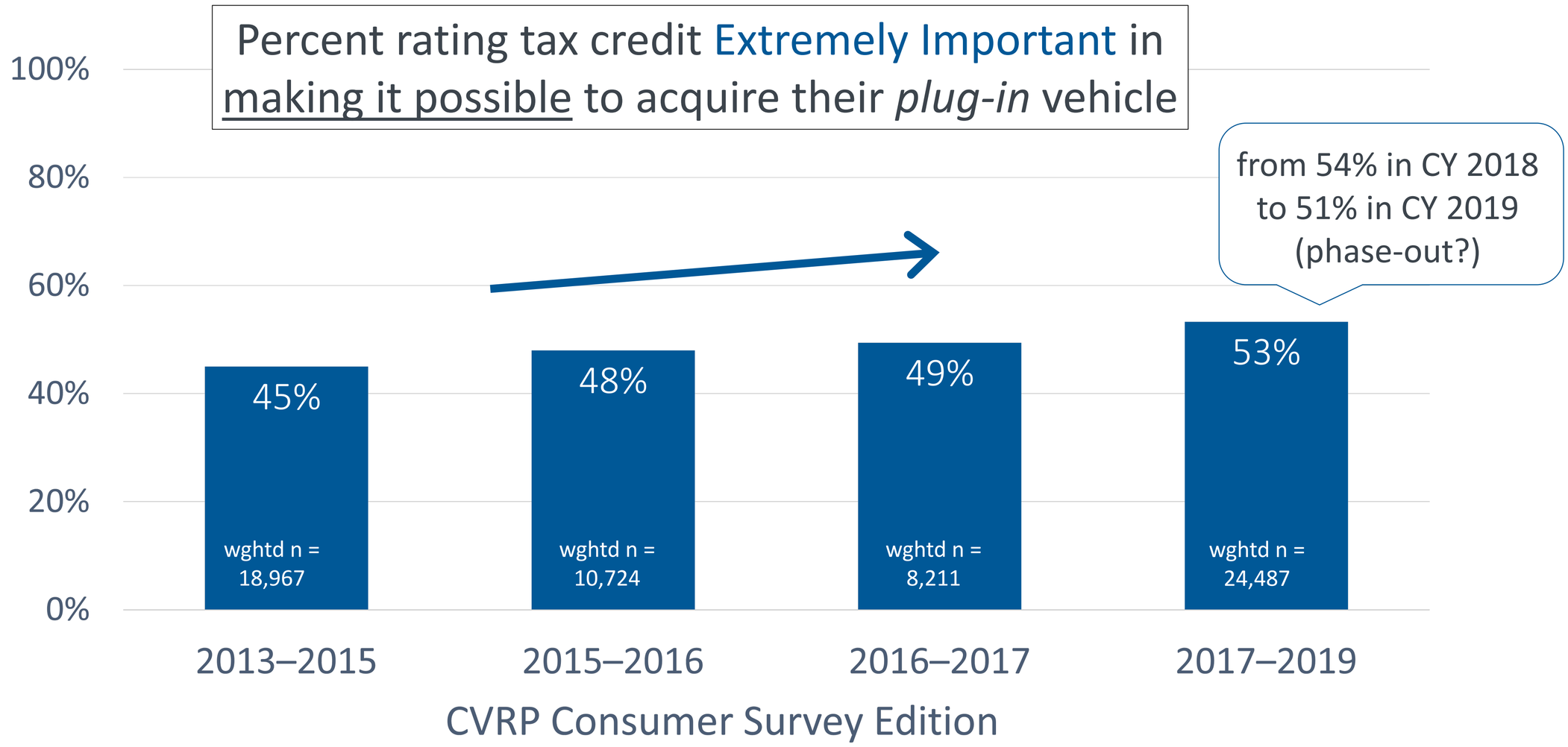
Consumer Survey, 2017–19 Edition*



** Note: federal tax credit began phasing out for Tesla and GM in 2019*

Question-specific weighted n = 24,487.

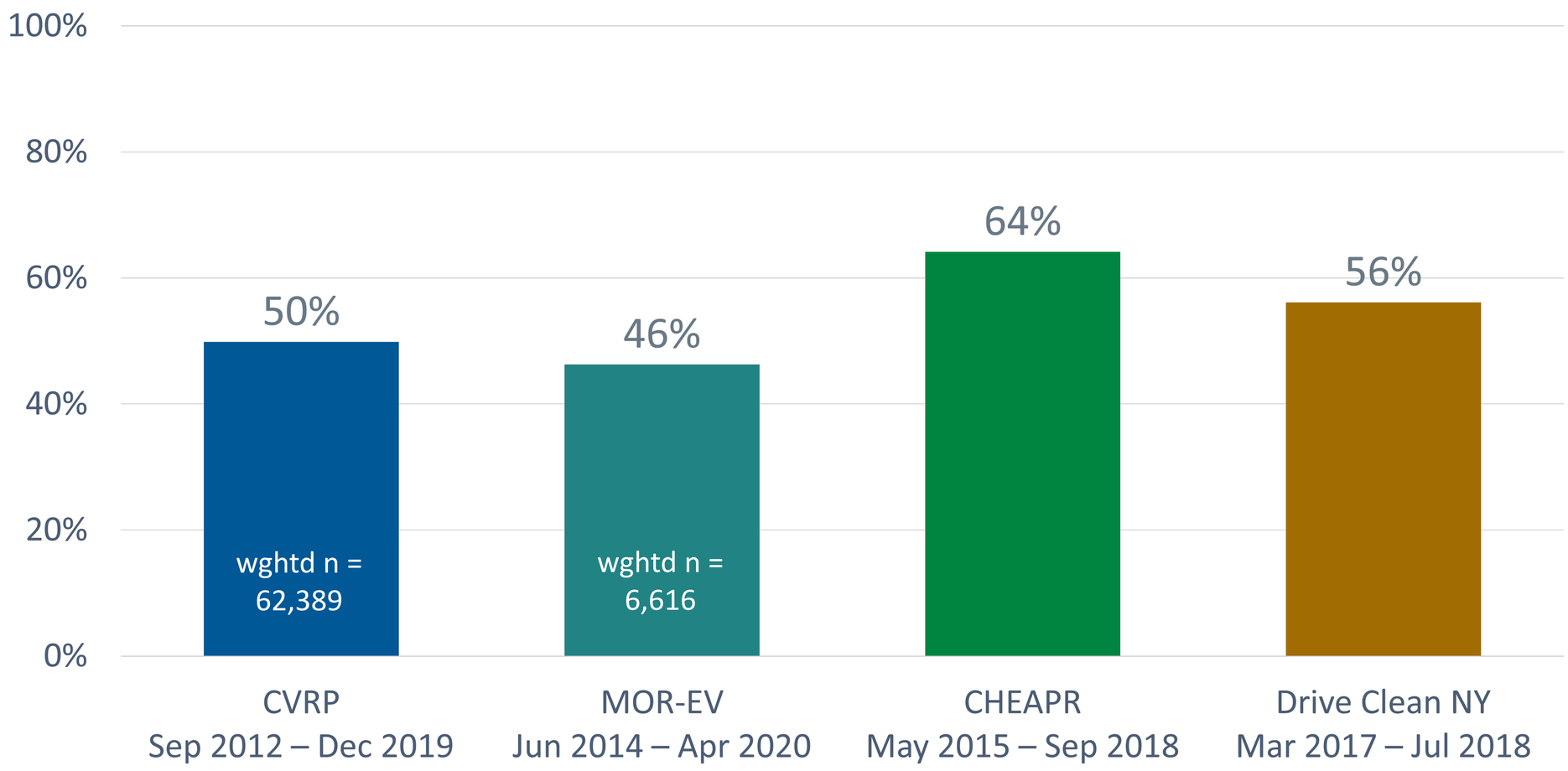
Extreme Importance of Federal Tax Credit is Increasing



Overall datasets: 65,643 total survey respondents weighted to represent 332,600 rebate recipients.

Percent Rating the Federal Tax Credit "Extremely Important"

("…in making it possible" to acquire *plug-in* EVs*)*



Overall datasets: 75,632 total survey respondents weighted to represent 360,800 rebate recipients.

Summary & Select Findings

Summary & Select Findings: Replacement & Influence

Program design and disruptions (e.g., waitlists) **shape impacts**

Vehicle Replacement

- Increased to 85%
- >77% of replaced vehicles were gasoline-fueled; over half were MY 2013 or older

Incentive Influence

- 90% found rebate important enabler of EV acquisition; 54% would not have purchased/leased without it
- At MSRP greater than $60k, rebate influence decreases substantially
- Attractive offerings (including Tesla products) have somewhat lower *Rebate Essentiality*, but the differences between luxury/non-luxury MSRPs are bigger
- Rebate influence and federal-tax-credit influence are similar
  - Over half rated federal tax credit an extremely important enabler
  - Down somewhat from 2018 peak when all vehicles were still eligible

Additional Resources

Select Publications (Reverse Chronological, as of 12/21/21)

- N. Pallonetti and B.D.H. Williams (2022, January). "Evaluating the Cost-Effectiveness of Greenhouse Gas Emission Reductions Associated with Statewide Electric Vehicle Rebate Programs in California and Massachusetts in 2019," in procs. *International Energy Program Evaluation Conference 2022*.
- N. Pallonetti and B. D. H. Williams, "Refining Estimates of Fuel-Cycle Greenhouse-Gas Emission Reductions Associated with California's Clean Vehicle Rebate Project with Program Data and Other Case-Specific Inputs," Energies, vol. 14, no. 15, Jul. 2021.
- B. D. H. Williams and J. B. Anderson, "Strategically Targeting Plug-In Electric Vehicle Rebates and Outreach Using 'EV Convert' Characteristics," Energies, vol. 14, no. 7, p. 1899, Mar. 2021.
- B.D.H. Williams, J.B. Anderson, A. Lastuka, Characterizing Plug-in Hybrid Electric Vehicle Consumers Who Found the U.S. Federal Tax Credit Extremely Important in Enabling Their Purchase, in: 33rd Electr. Veh. Symp., Electric Drive Transportation Association (EDTA), EVS33, and Zenodo, Portland OR, 2020. https://doi.org/10.5281/ZENODO.4021408
- S. Hardman, P. Plötz, G. Tal, J. Axsen, E. Figenbaum, P. Jochem, S. Karlsson, N. Refa, F. Sprei, B.D. Williams, J. Whitehead, B. Witkamp, Exploring the Role of Plug-In Hybrid Electric Vehicles in Electrifying Passenger Transportation, International EV Policy Council, UC Davis Plug-in Hybrid and Electric Vehicle Research Center, 2019.
- B.D. Williams, J. Orose, M. Jones, J.B. Anderson, Summary of Disadvantaged Community Responses to the Electric Vehicle Consumer Survey, 2013–2015 Edition | Clean Vehicle Rebate Project, Center for Sustainable Energy (CSE), San Diego CA, 2018.
- B.D. Williams, J.B. Anderson, Strategically Targeting Plug-in Electric Vehicle Rebates and Outreach Using Characteristics of 'Rebate-Essential" Consumers in 2016–2017, in: 31st Int. Electr. Veh. Symp., Society of Automotive Engineers of Japan, Inc., Kobe, Japan, 2018.
- C. Johnson, B.D. Williams, J.B. Anderson, N. Appenzeller, Evaluating the Connecticut Dealer Incentive for Electric Vehicle Sales, Center for Sustainable Energy (CSE), 2017.
- C. Johnson, B.D. Williams, Characterizing Plug-In Hybrid Electric Vehicle Consumers Most Influenced by California's Electric Vehicle Rebate, *Transp. Res. Rec*. 2628 (2017) 23–31.

Select Presentations (Reverse Chronological, as of 2/22)

- Cost-Effectiveness of Greenhouse Gas Emission Reductions Associated with California's Clean Vehicle Rebate Project in 2019 (and 2020)
- California Plug-in Hybrid EV Consumers Who Found the U.S. Federal Tax Credit Extremely Important in Enabling Their Purchase
- Data from Statewide Electric Vehicle Rebate Programs: Vehicles, Consumers, Impacts, and Effectiveness
- CVRP CY 2019 Data Brief: Vehicle Replacement & Incentive Influence
- CVRP CY 2019 Data Brief: Consumer Characteristics
- CVRP Data Brief: MSRP Considerations
- EV Purchase Incentives: Program Design, Outputs, and Outcomes of Four Statewide Programs with a Focus on Massachusetts
- What Vehicles Are Electric Vehicles Replacing and Why?
- Electric Vehicle Incentives and Policies
- Proposed FY 2019–20 Funding Plan: Final CVRP Supporting Analysis
- CVRP: Data and Analysis Update
- Cost-Effectively Targeting EV Outreach and Incentives to "Rebate-Essential" Consumers
- Electric Vehicle Rebates: Exploring Indicators of Impact in Four States
- Targeting EV Consumer Segments & Incentivizing Dealers
- Supporting EV Commercialization with Rebates: Statewide Programs, Vehicle & Consumer Data, and Select Findings
- Yale Webinar: Supporting EV Commercialization with Rebates: Statewide Programs, Vehicle & Consumer Data, and Findings
- CVRP Income Cap Analysis: Informing Policy Discussions

Recommended citation:

B.D.H. Williams and N. Pallonetti, Presentation: “CVRP CY 2019 Data Brief: Vehicle Replacement & Incentive Influence,” Clean Vehicle Rebate Project, administered by the Center for Sustainable Energy on behalf of the California Air Resources Board, revised March 2022 for ADA.

CleanVehicleRebate.org

Center for Sustainable Energy™

CALIFORNIA CLIMATE INVESTMENTS
Cap and Trade Dollars at Work

CALIFORNIA AIR RESOURCES BOARD