

October 2023

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

Nicholas Pallonetti – Research Analyst, CSE

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



Outline: Incentive Influence Through 2021

- Context: Program Design, Market Dynamics & Data
- Rebate Influence: Over Time, by Vehicle & Consumer Type, by MSRP
- Counterfactual Behavior: What might have happened?
- Designing for Cost-Effectiveness: Free-Rider Abatement Curve
- Federal Tax Credit Influence: Purchases vs. Leases, Over Time, by Rebate Type, by MSRP
- Wrap Up: Summary & Select Findings

Appendix: Additional Details and Resources

Context

Base Rebate Amount for Most Individuals At or Near 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

 = in effect during 2021, **highlights**



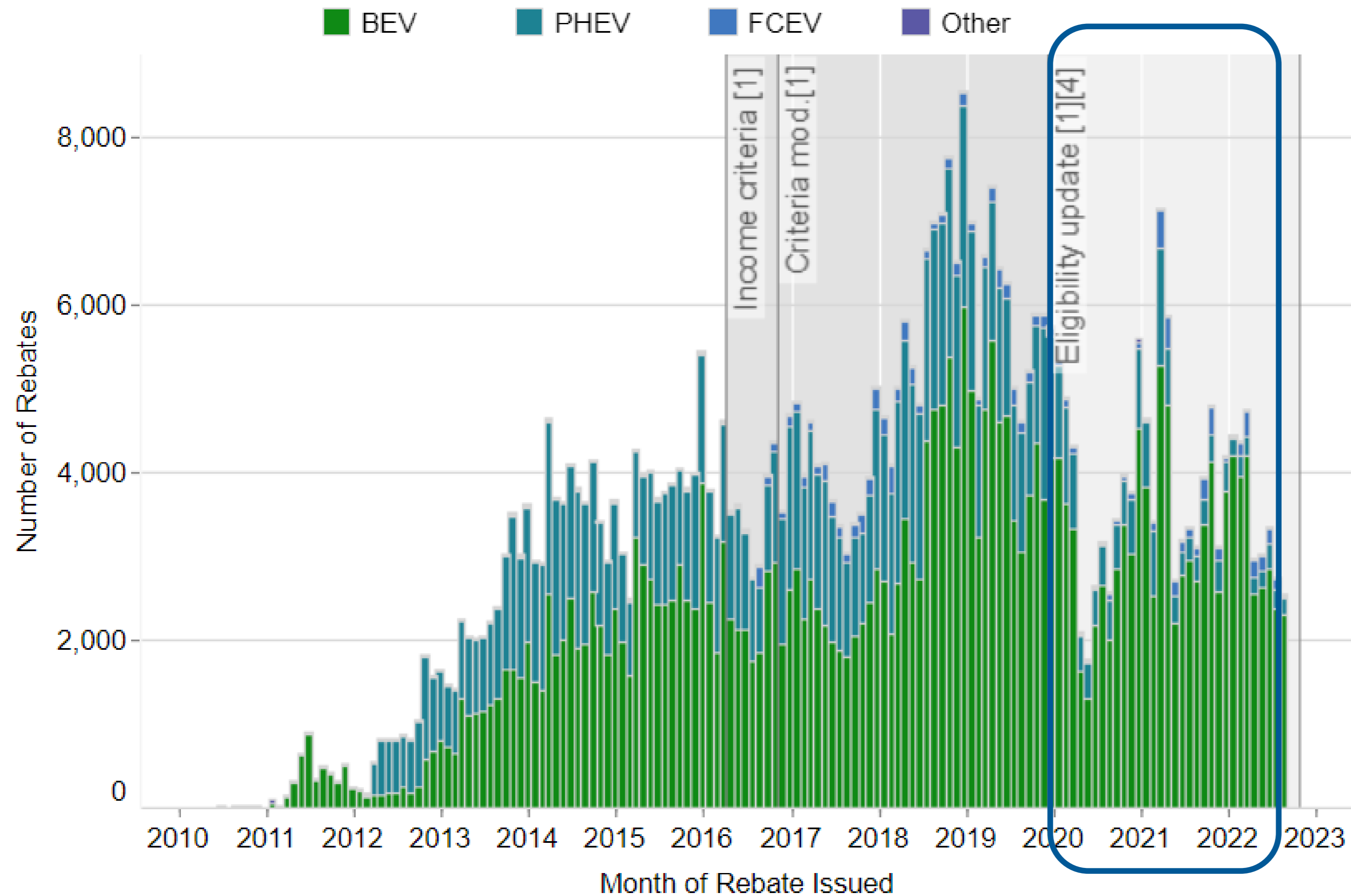
<p>as of Mar. 2010</p> <ul style="list-style-type: none"> • Incentive stacking permitted • 36-month ownership requirement • Rebates per year limit = 20 	<p>as of Dec. 2013</p> <ul style="list-style-type: none"> • Rebates per year limit = 2 <p>as of May 2014</p> <ul style="list-style-type: none"> • 18-month application window 	<p>as of Dec. 2014 / Jan. 2015</p> <ul style="list-style-type: none"> • 30-month ownership requirement (retroactive) • Total rebate limit = 2 	<p>as of Mar. 2016</p> <ul style="list-style-type: none"> • \$250k–\$500k income cap (PEVs) • +\$1,500 for income-qualified households ($\leq 300\%$ FPL), excluding ZEMs 	<p>as of Nov. 2016</p> <ul style="list-style-type: none"> • \$150k–\$300k income cap (PEVs) • ≥ 20 UDDS electric miles • +\$2,000 for income-qualified households ($\leq 300\%$ FPL), excl. ZEMs
<p>as of Jan. 2018</p> <ul style="list-style-type: none"> • \$150k–\$300k income cap on stacking HOV decal (only binding on FCEVs) • Rebate Now San Diego County preapproval pilot with point-of-sale option 	<p>as of Jan. 2019</p> <ul style="list-style-type: none"> • Stacking with CVAP grant not permitted (retroactive) 	<p>as of Dec. 2019</p> <ul style="list-style-type: none"> • Total rebates limit = 1 [§] • Base MSRP \leq \$60k (PEVs) • 3-month application window [‡] • ≥ 35 UDDS electric miles • +\$2,500 [†] for income-qualified households ($\leq 300\%$ FPL), excl. ZEMs 	<p>as of Apr. 2020</p> <ul style="list-style-type: none"> • Stacking with CVAP grant permitted <p>as of Jan. 2021</p> <ul style="list-style-type: none"> • +\$2,500 for income-qualified households, $\leq 400\%$ FPL, excl. ZEMs 	<p>as of Apr. 2021</p> <ul style="list-style-type: none"> • ≥ 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 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).

2020–21 Results/Trends Should be Interpreted with Caution (COVID)

Applications Saw Dramatic Decline But Some Recovery



Rebate applications for calendar year 2021 purchases/leases for individuals spanned 1/1/2021 – 7/1/2022*.

9% applied in 2022.

* Special waivers permitted ~20 applications beyond the 3-month application window. 1/5/23 image from <https://cleanvehiclerebate.org/eng/rebate-statistics>

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	2020–2022 Interim Dataset	Total
Vehicle Purchase/ Lease Dates	Sep. 2012 – May 2015	April 2015 – May 2016	May 2016 – May 2017	June 2017 – Nov. 2020	Dec. 2020 – Sep. 2022	Sep. 2012 – Sep. 2022
Survey Responses (total <i>n</i>)**	19,460	11,611	8,957	32,524	13,997	86,549
Program Population (<i>N</i>)***	91,081	45,685	46,839	193,167	79,780	456,552

*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 Used

(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	2020–2022 Interim Dataset	2021 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 – Sep. 2022	Jan. 2021– Dec. 2021	Sep. 2012 – Sep. 2022
Survey Responses (total n)	19,460**	11,611**	8,957**	32,524**	14,757	8,991	4,331**	13,997**	7,694**	86,549
Program Population (N)***	91,081	45,685	46,839	193,167	78,591 <small>(filtered subset of weighted Edition)</small>	61,277 <small>(filtered subset of weighted Edition)</small>	26,463	79,780	45,261	456,552

* ~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.
 - Weighting for the 2017–20 Edition & 2020–22 Interim Dataset also included year of purchase/lease.
- The 2020 & 2021 purchase/lease subsets were also independently weighted
 - This produced only minor differences compared to the filtered approach used for the 2018 & 2019 subsets.
 - Weighting for the 2021 subset also includes rebate type (Standard Rebate vs. Increased Rebate).
- Summary of weights, 2021 purchases/leases:

Min	Median	Mean	Max
0.29	0.999	1	2.72

Rebate Influence

Prior Incentive Influence Analysis: Select Publications



- ❖ 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 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](#). [CSE posting](#). [Slides](#).
- N. Pallonetti and B.D.H. Williams (2023, Feb.), [CVRP Greenhouse Gas Emission Reductions and Cost-Effectiveness: 2020 Purchases/Leases](#), Clean Vehicle Rebate Project. DOI: 10.13140/RG.2.2.21731.12324.
- 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.
- 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 6/2023; key sources marked with a diamond bullet. [Additional related items](#).

Prior Incentive Influence Analysis: Select Presentations & Video



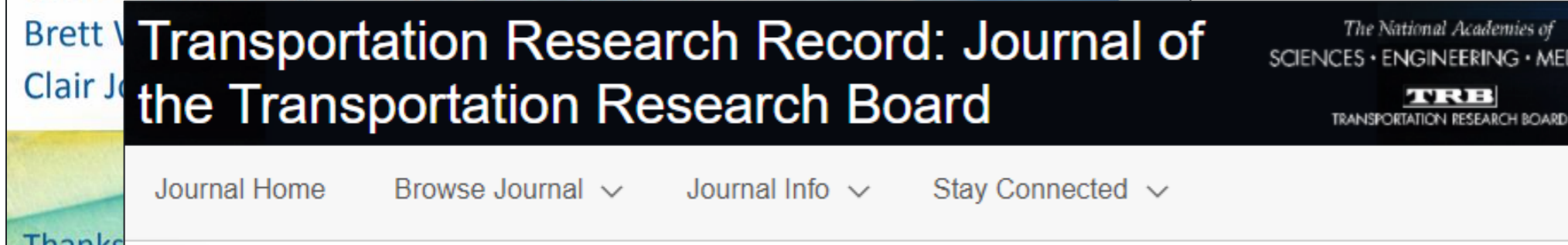
- ❖ [NY Drive Clean Rebates: Select Impacts Through 2021](#), (2023, June 12).
- ❖ [Lessons Learned About Electric Vehicle Consumers Who Rated the U.S. Federal Tax Credit ‘Extremely Important,’](#) (2022, Jun. 15). [Paper](#).
- ❖ [Targeting Incentives Cost Effectively: ‘Rebate Essential’ Consumers in 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](#).
- ❖ [CVRP 2020 Data Brief: MSRP Considerations](#), (2022, Jul.).
- ❖ [CVRP 2020 Data Brief: Incentive Influence](#) (2022, May).
- ❖ 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.).
- [EV Purchase Incentives: Program Design, Outputs, and Outcomes of Four Statewide Programs with a Focus on Massachusetts](#), (2020, Dec.).
- [What Vehicles Are Electric Vehicles Replacing and Why?](#), (2019, Nov.).
- [Electric Vehicle Incentives and Policies](#), (2019, Nov.).
- [Proposed FY 2019–20 Funding Plan: Final CVRP Supporting Analysis](#) (2019, Oct).
- [Cost-Effectively Targeting EV Outreach and Incentives to “Rebate-Essential” Consumers](#) (2018, Oct).
- [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 6/2023; key sources marked with a diamond bullet. [Additional related items.](#)

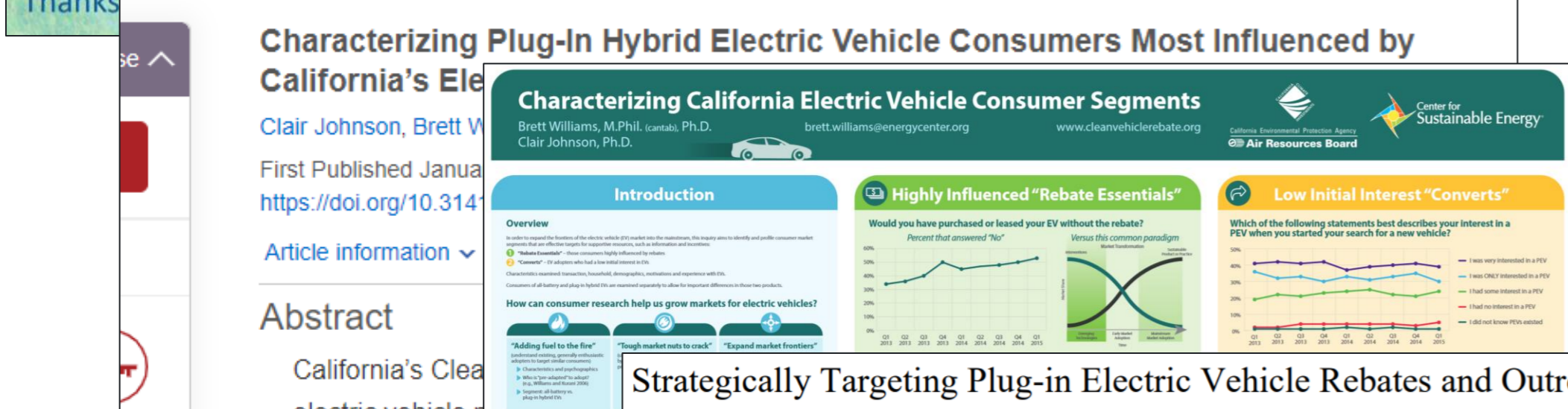
Previous Work on *Rebate Essentials*: Summary



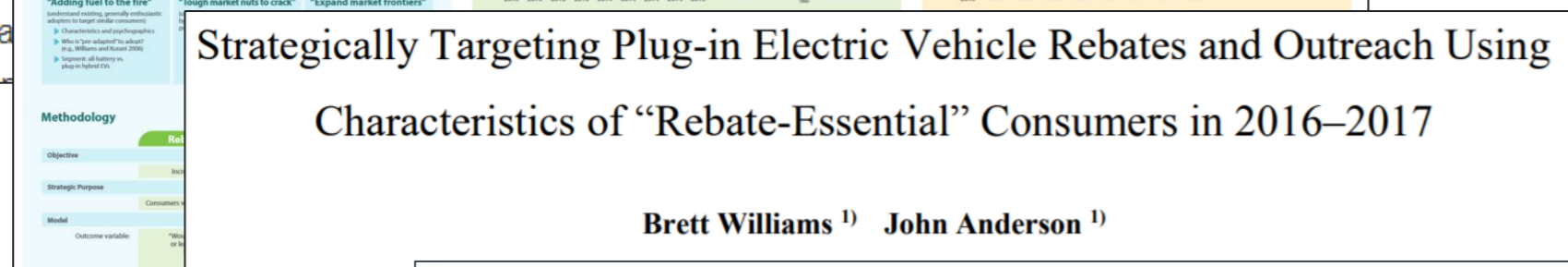
BECC Conference presentation ([Williams & Johnson 2016](#))



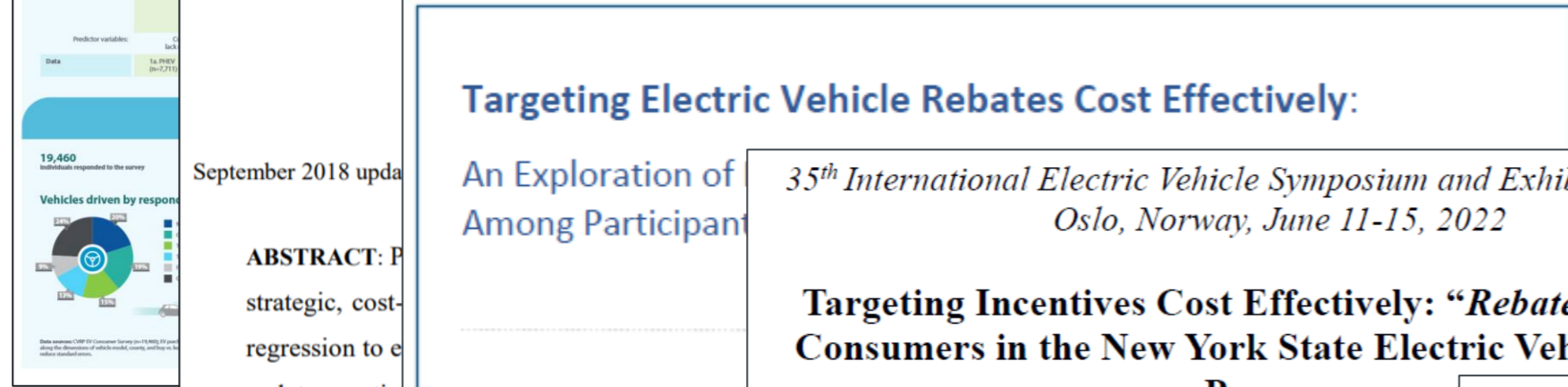
TRR journal article ([Johnson and Williams 2017](#))



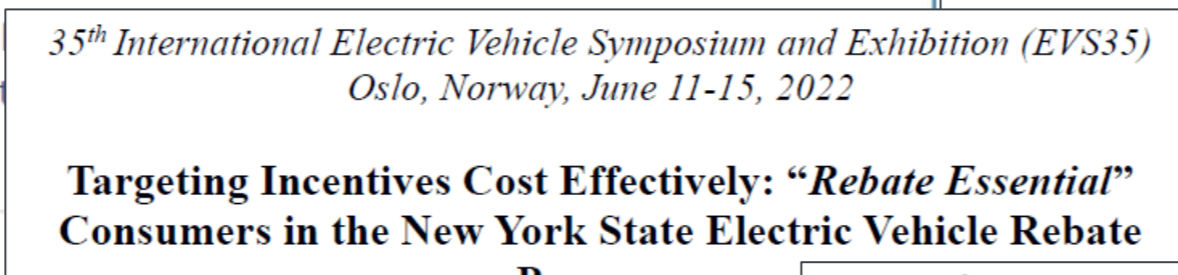
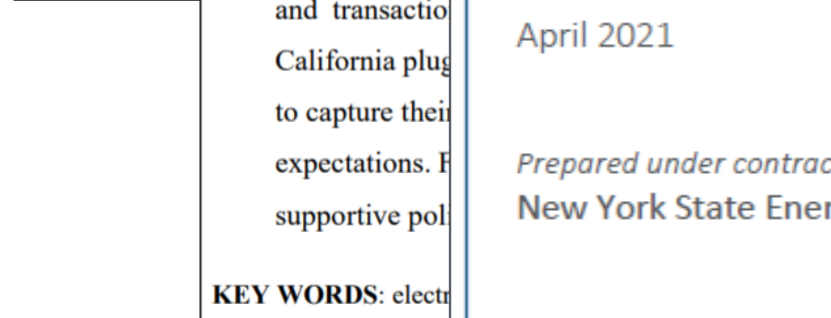
National Academies TRB poster ([Williams and Johnson 2017](#))



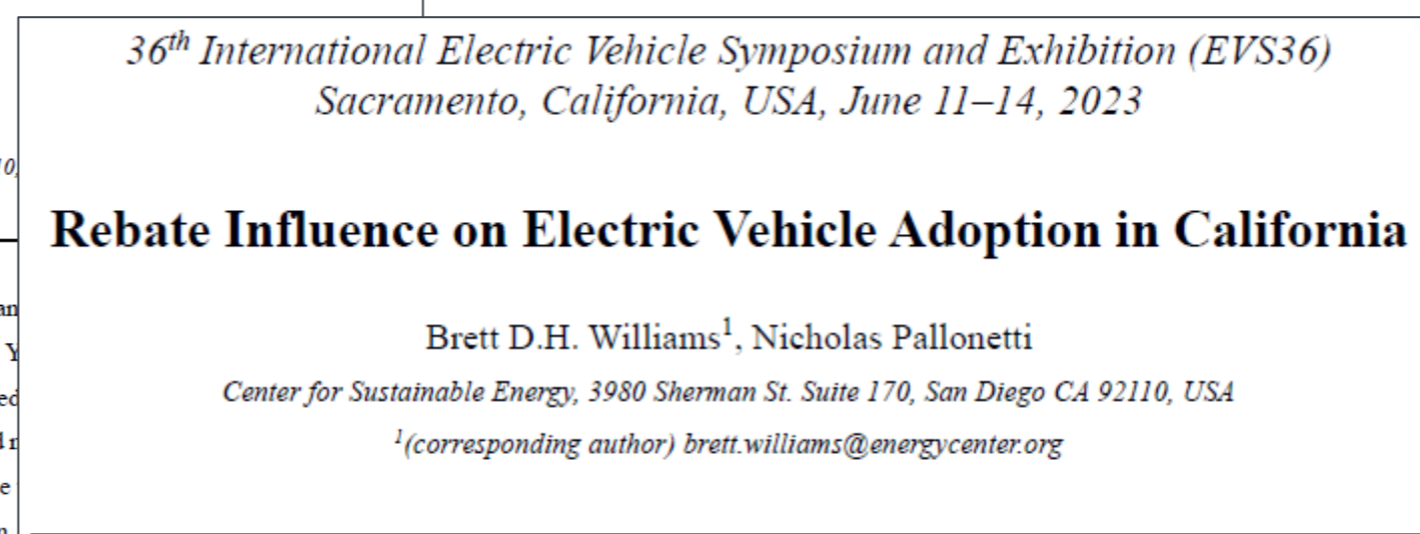
EVS 31 paper ([Williams & Anderson 2018](#))



Report for NYSERDA ([Williams & Anderson 2021](#))



EVS 35 paper (NY data) ([Williams 2022](#))



EVS 36 paper ([Williams and Pallonetti 2023](#))

KEY WORDS: electric vehicles, plug-in hybrid electric vehicles, rebates, consumer research, transportation research board, California's Clean Vehicle Rebate Project



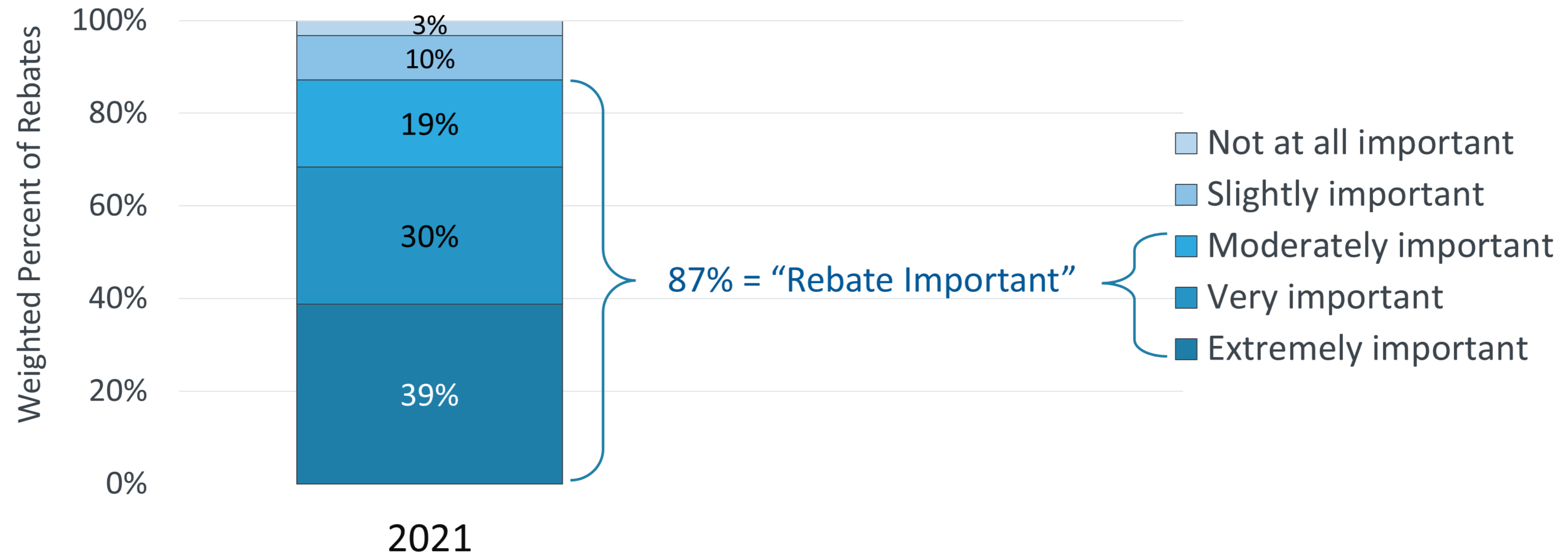
Rebate Influence

Through 2021

Rebate Importance

2021 plug-in EV purchases/leases

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



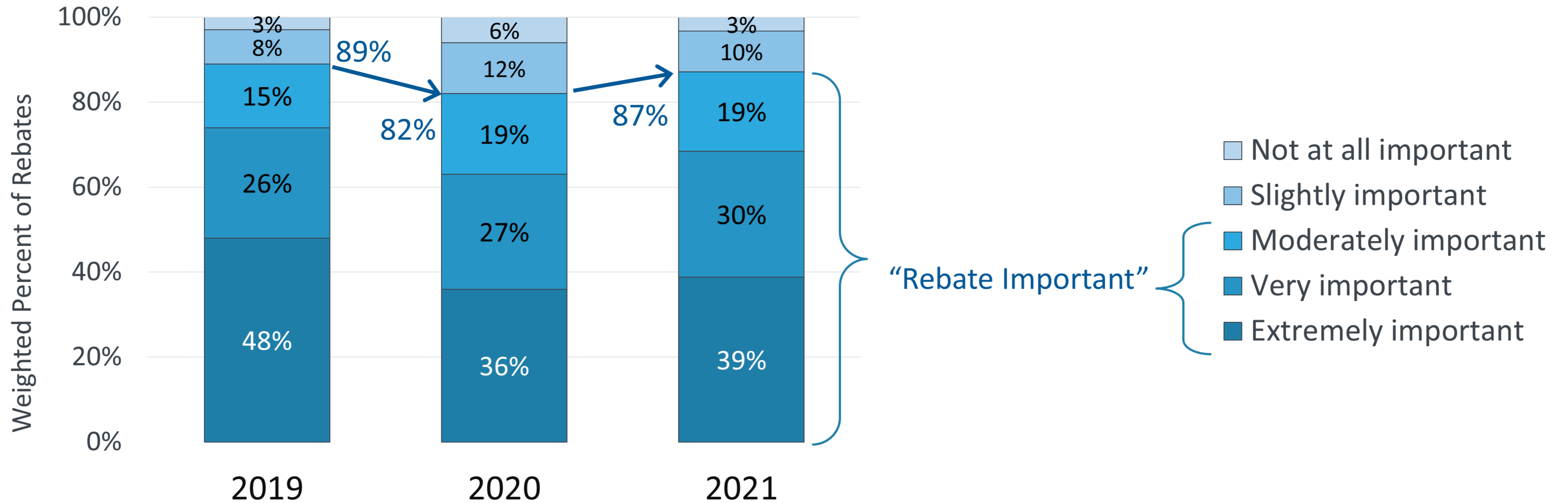
CVRP Consumer Survey, 2020–2022 Interim Dataset. Filtered, question-specific $n = 7,612$.

Results based on n -values < 30 are omitted or highlighted in red throughout.

Rebate Importance Bounced Back in 2021

2019–2021 plug-in EV purchases/leases

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



Plug-in EV purchases/leases.

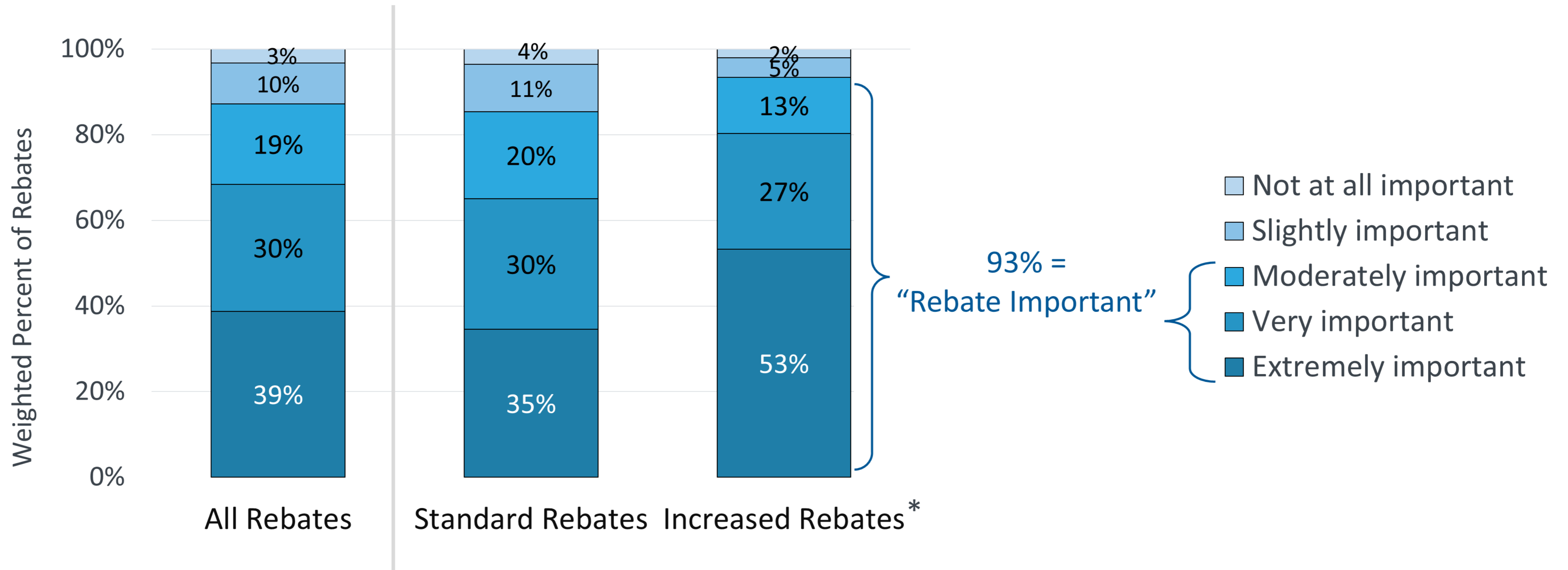
CVRP Consumer Survey, 2017–2020 Edition: 2019 n = 8,875; 2020 n = 4,269. 2020–2022 Interim Dataset: 2021 n = 7,612.

n-values are filtered and question-specific.

Rebate Importance Is High for Increased Rebates

2021 plug-in EV purchases/leases by Rebate Type

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

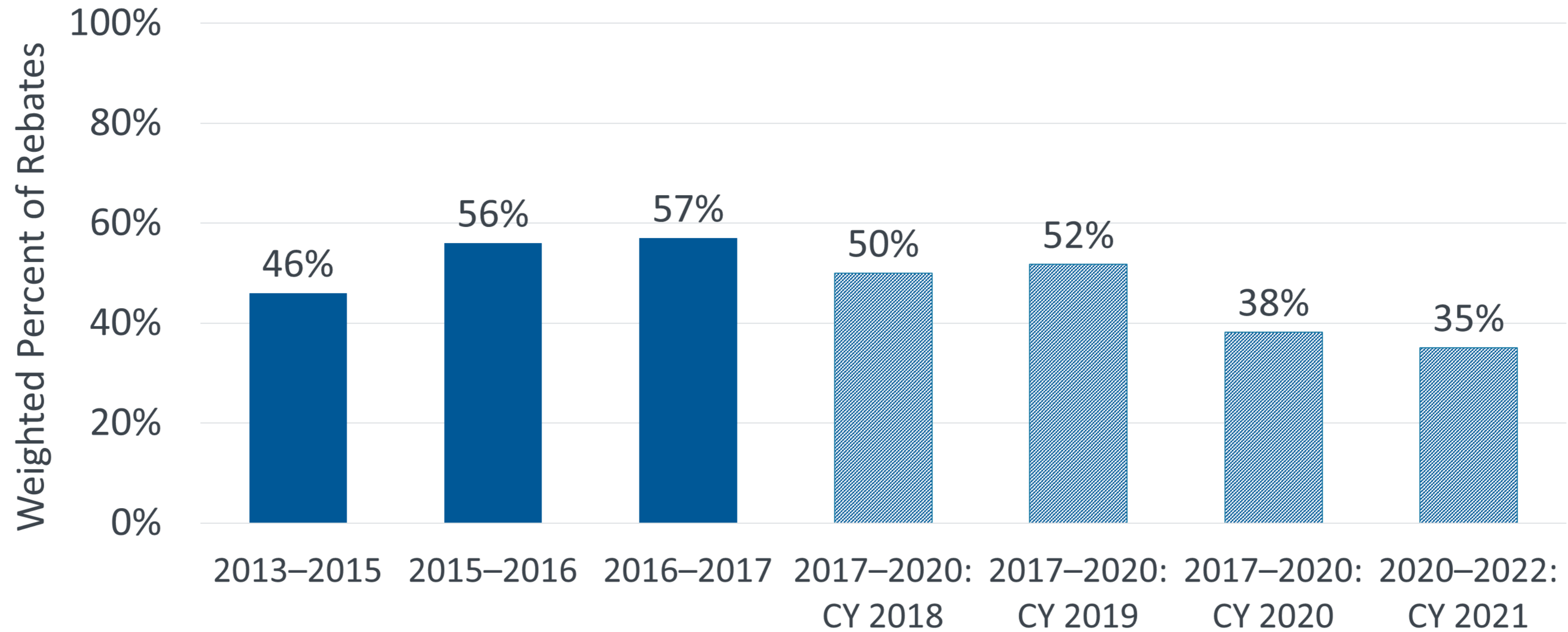


* Increased Rebate eligibility increased from 300% to 400% of the FPL in 2021.

Plug-in EV purchases/leases. CVRP Consumer Survey, 2020–2022 Interim Dataset. Filtered, question-specific n = 7,612.

Rebate Essentiality Over Time: COVID Effect?

Would **not** have purchased/leased their plug-in EV **without the state rebate**

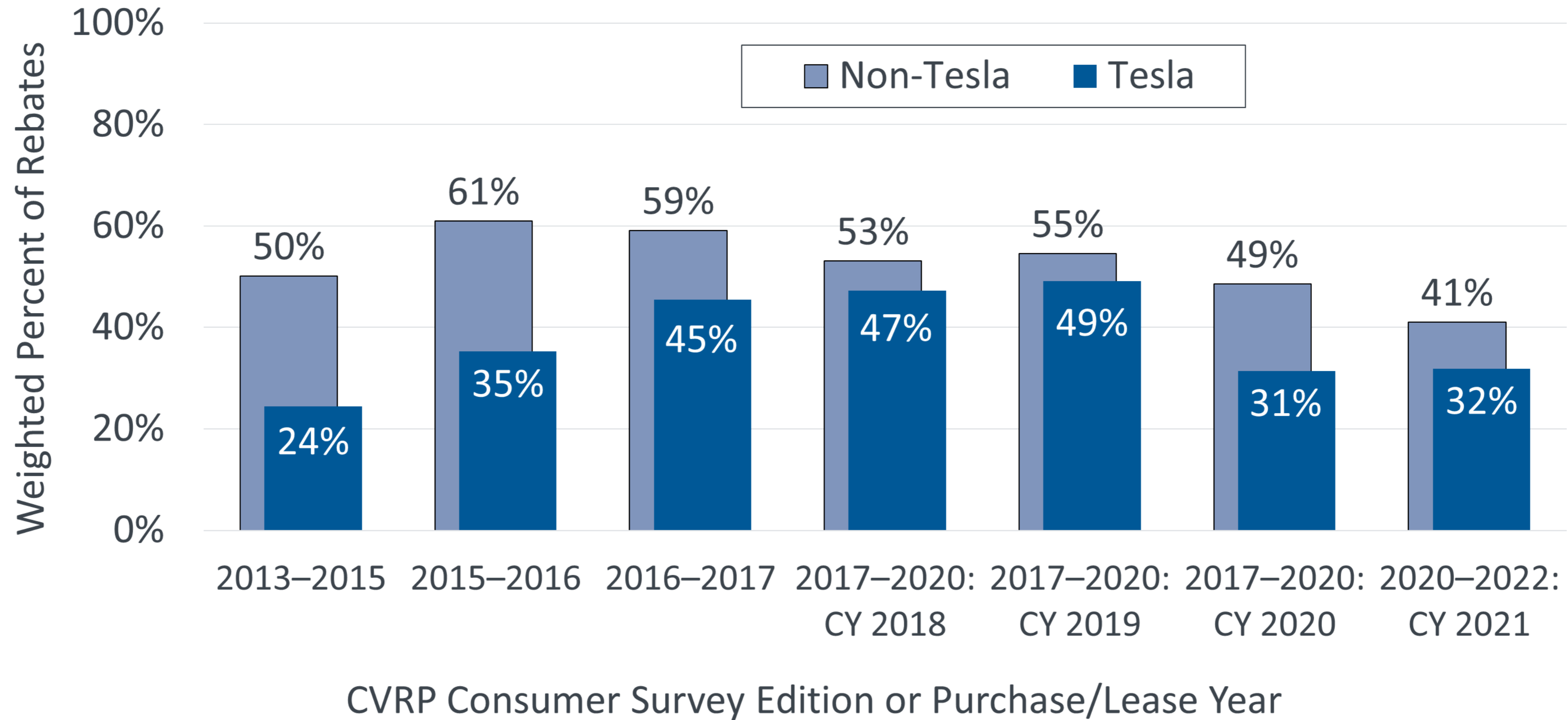


CVRP Consumer Survey Edition or Purchase/Lease Year

CVRP Consumer Survey, 2013-2015 Edition: n = 19,205. 2015-2016 Edition: n = 11,462. 2016-2017 Edition: n = 8,857. 2017-2020 Edition: CY (calendar year) 2018 n = 14,655; CY 2019 n = 8,929; CY 2020 n = 4,304. 2020-2022 Interim Dataset: CY 2021 n = 7,660. n-values are filtered and question-specific.

Rebate Essentiality Over Time: Tesla's Effect

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

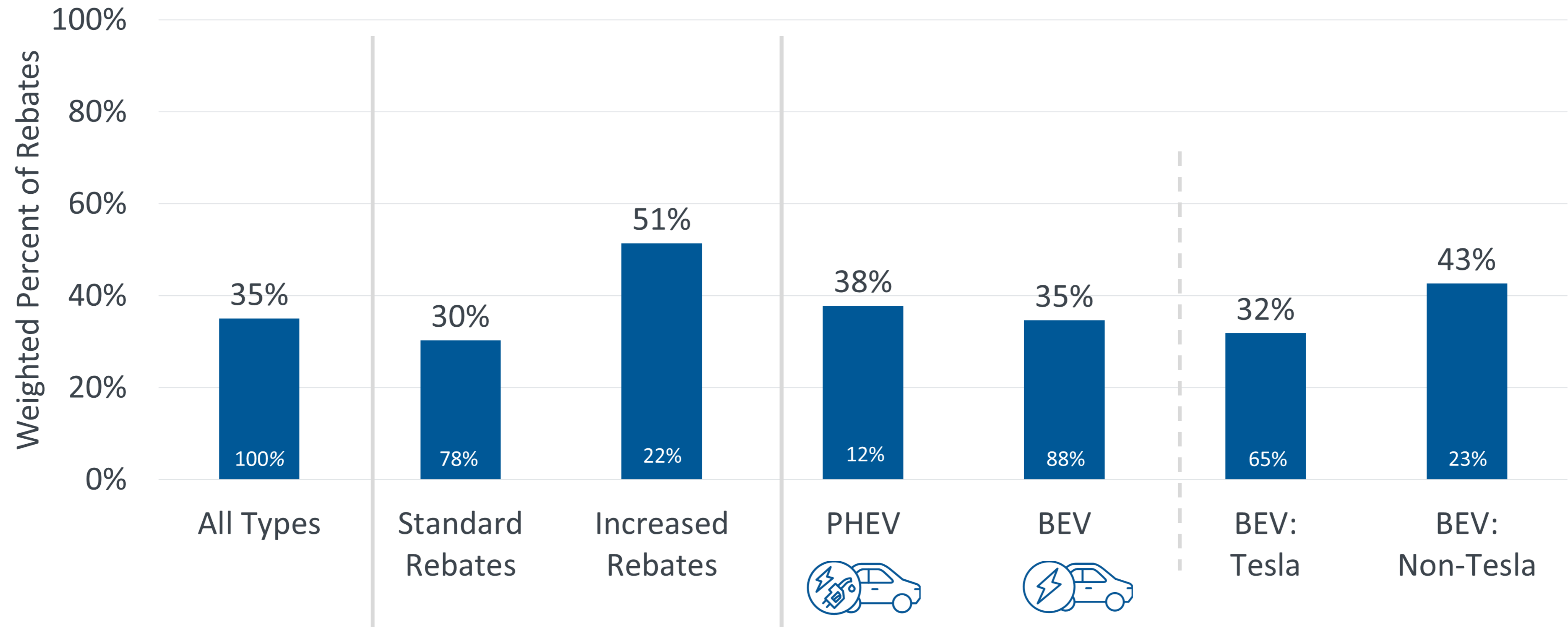


CVRP Consumer Survey, 2013–2015 Edition: n = 19,205. 2015–2016 Edition: n = 11,462. 2016–2017 Edition: n = 8,857. 2017–2020 Edition: CY (calendar year) 2018 n = 14,655; CY 2019 n = 8,929; CY 2020 n = 4,304. 2020–2022 Interim Dataset: CY 2021 n = 7,660. n-values are filtered and question-specific.

Rebate Essentiality by Rebate and Vehicle Type

2021 purchases/leases

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

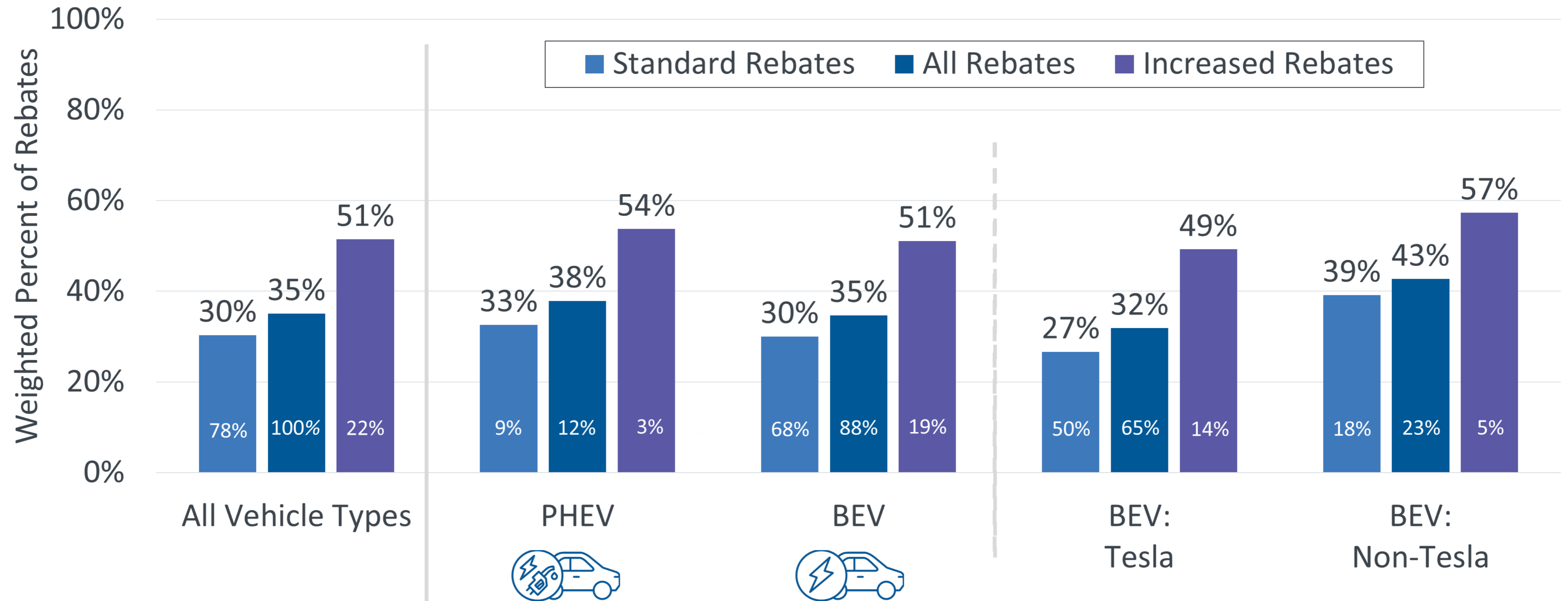


Rebate Essentiality percentages are calculated using the CVRP Consumer Survey, 2020–2022 Interim Dataset. Filtered, question-specific n = 7,660. Percentages in white inside columns indicate the **portion of total rebates** given to individual consumers.

Rebate Essentiality Overall and by Vehicle and Rebate Type

2021 purchases/leases

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

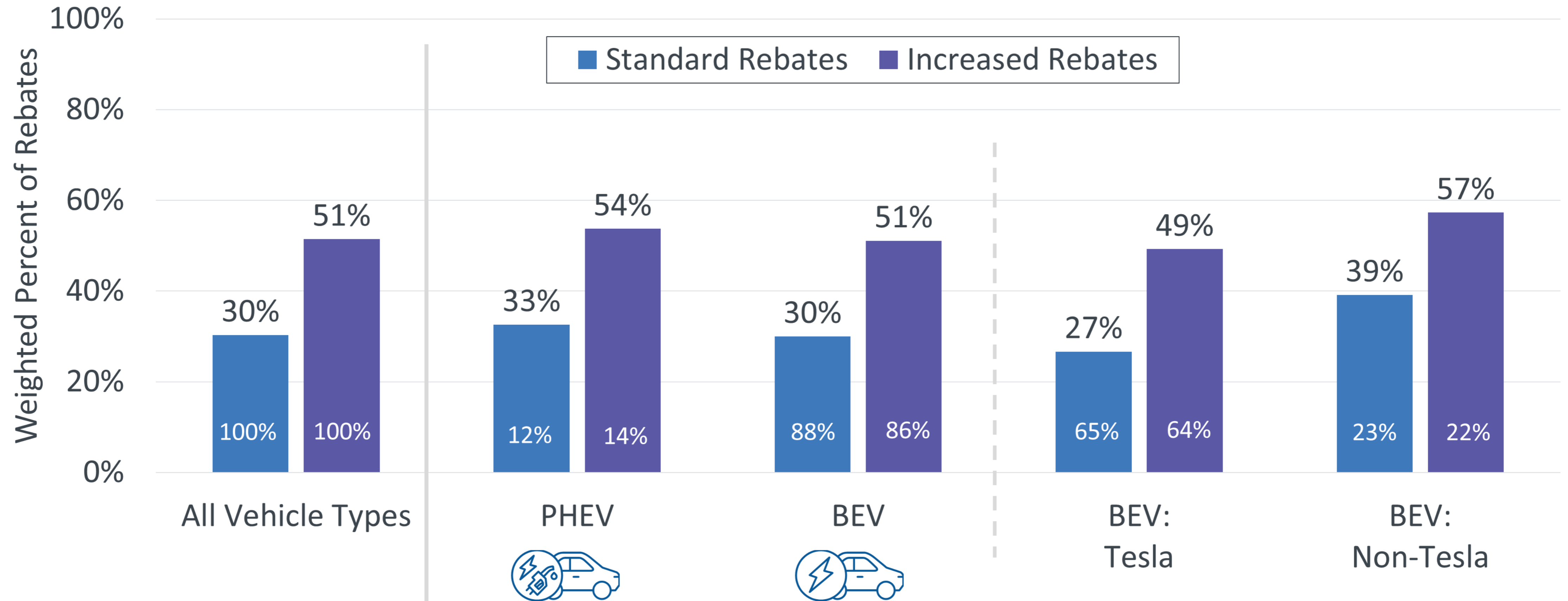


Rebate Essentiality percentages are calculated using the CVRP Consumer Survey, 2020–2022 Interim Dataset. Filtered, question-specific n = 7,660. Percentages in white inside columns indicate the **portion of a given rebate type (Increased or Standard) given to individual consumers.**

Rebate Essentiality by Vehicle and Rebate Type

2021 purchases/leases

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

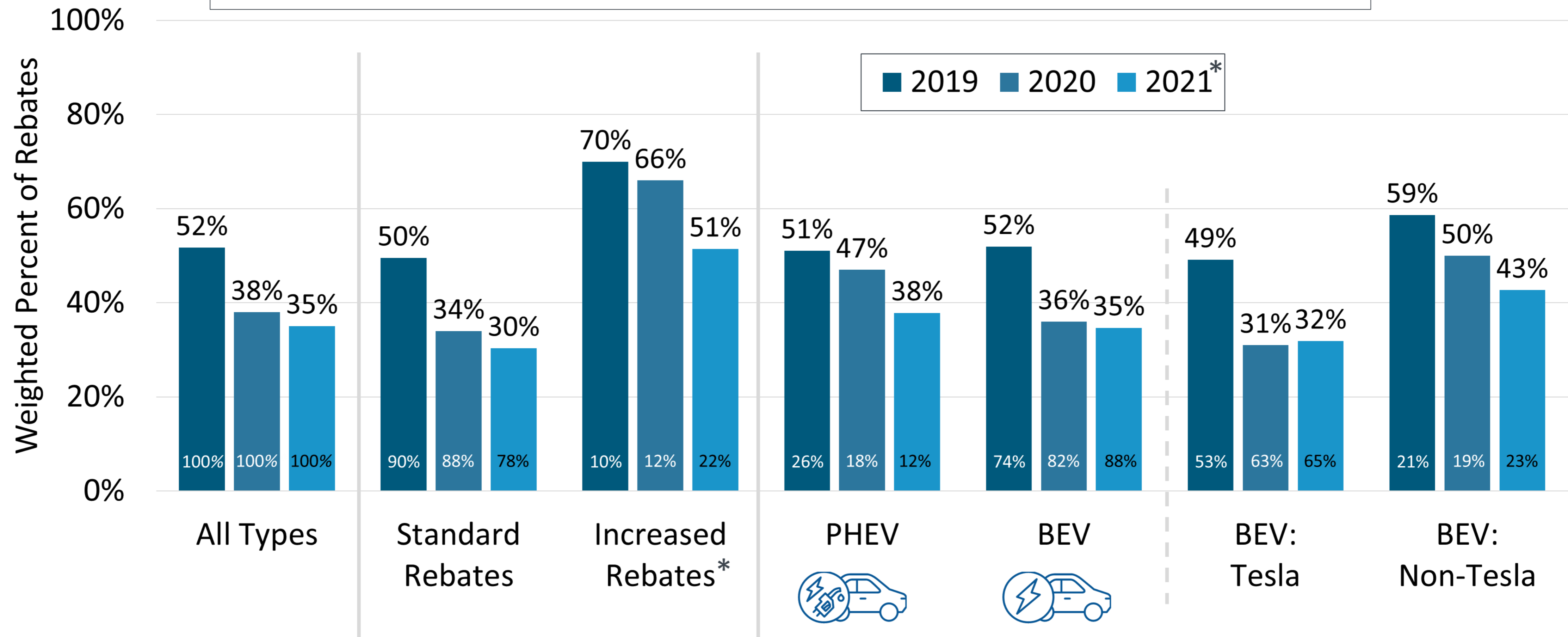


Rebate Essentiality percentages are calculated using the CVRP Consumer Survey, 2020–2022 Interim Dataset. Filtered, question-specific n = 7,660. Percentages in white inside columns indicate the **portion of a given rebate type (Increased or Standard) given to individual consumers.**

Rebate Essentiality by Vehicle and Rebate Type

2019–2021 purchases/leases

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



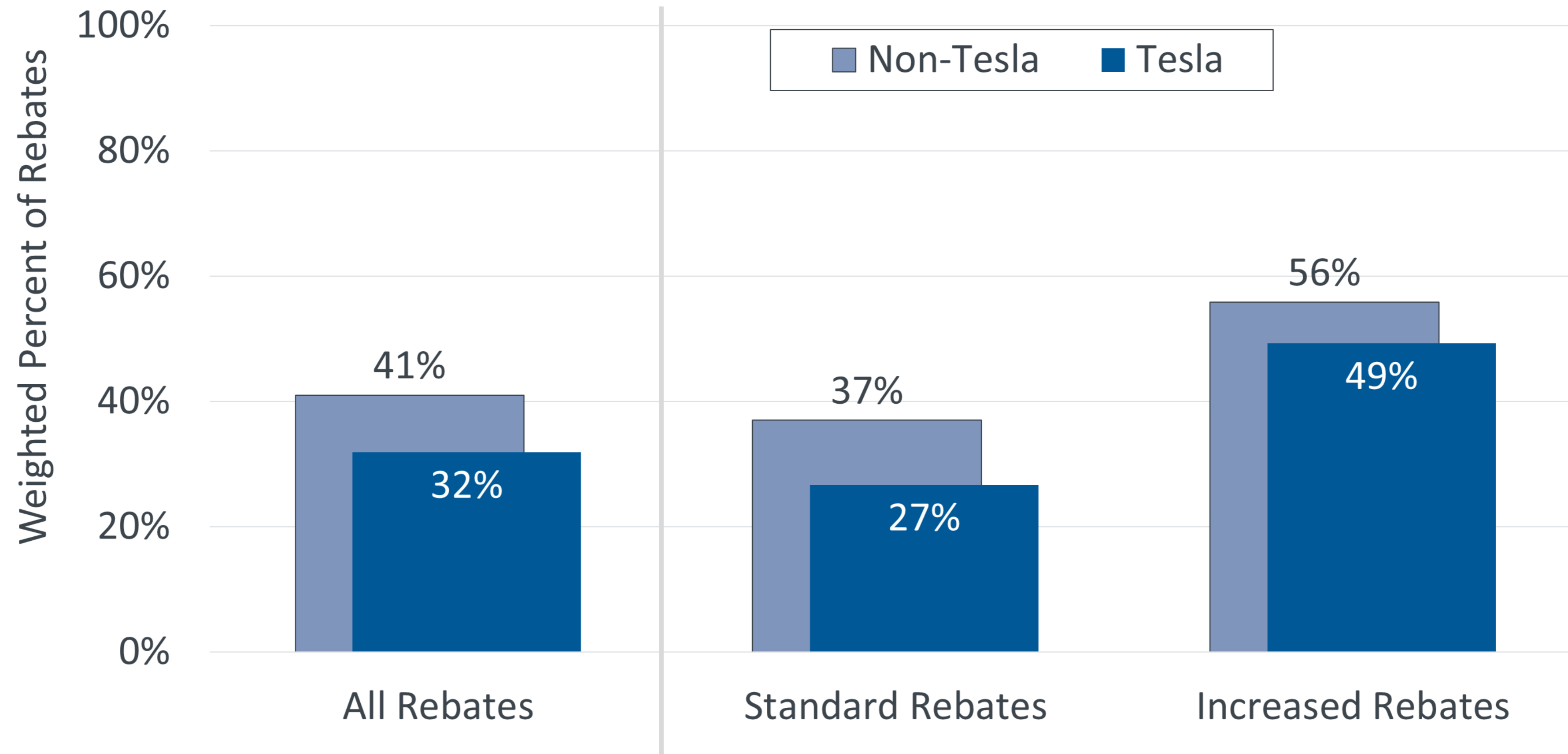
* Increased Rebate eligibility increased from 300% to 400% of the FPL in 2021.

Percentages inside columns are **the portion of total rebates** given to individual consumers. CVRP Consumer Survey, 2017–2020 Edition: 2019 n = 8,929; 2020 n = 4,304. 2020–2022 Interim Dataset: 2021 n = 7,660. n-values are filtered and question-specific.

Rebate Essentiality: Tesla's Effect by Rebate Type

2021 purchases/leases

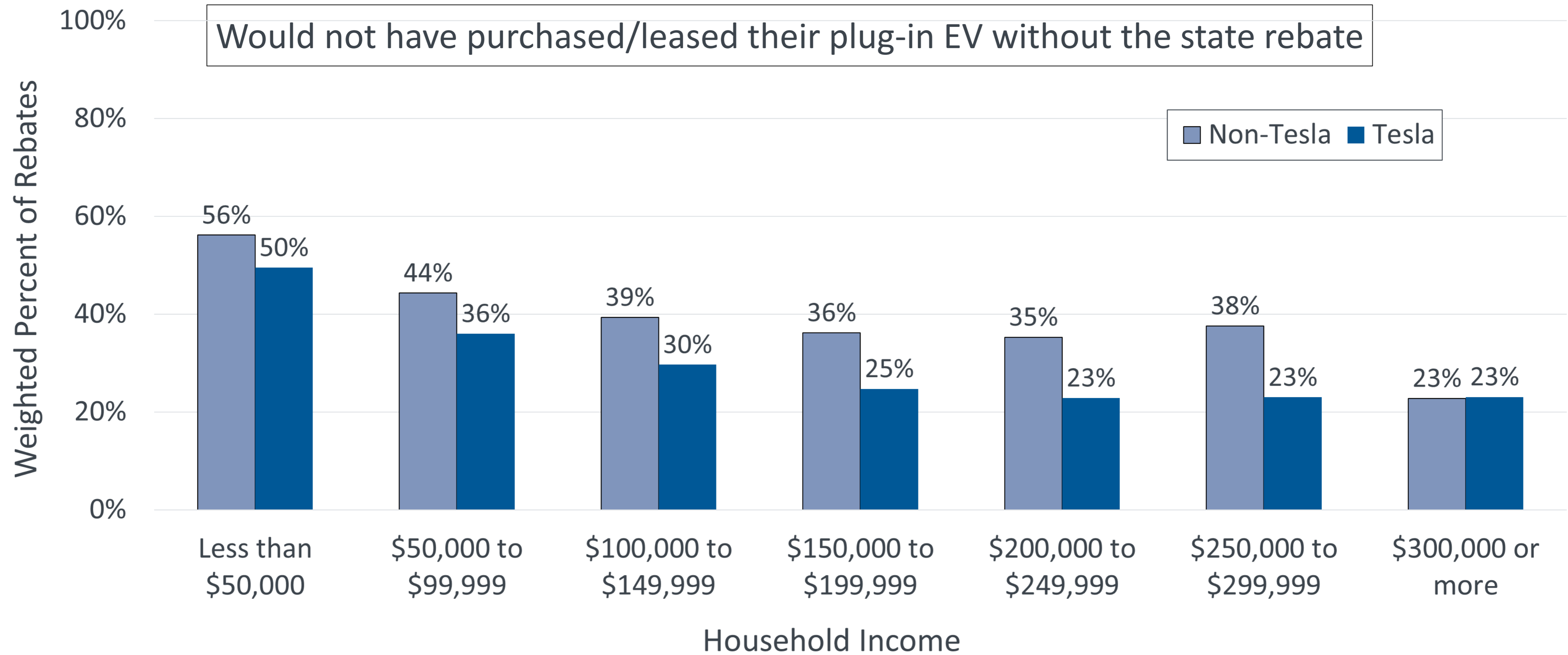
Would not have purchased/leased their plug-in EV without the state rebate



CVRP Consumer Survey, 2020–2022 Interim Dataset. Filtered, question-specific n = 7,660.

Rebate Essentiality Decreases as Income Increases, Lower for Tesla

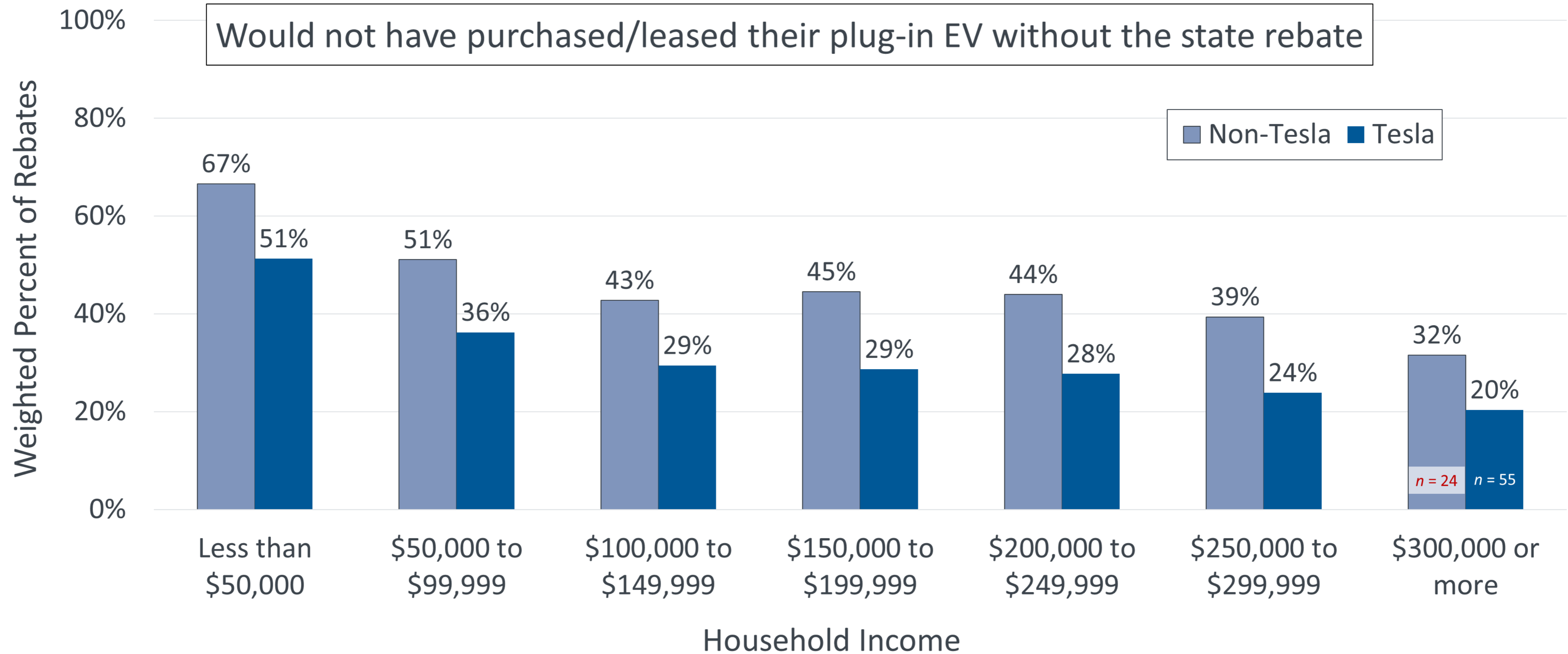
2021 purchases/leases



CVRP Consumer Survey, 2020–2022 Interim Dataset. Filtered, question-specific n = 6,848.

Rebate Essentiality Decreases as Income Increases, Lower for Tesla

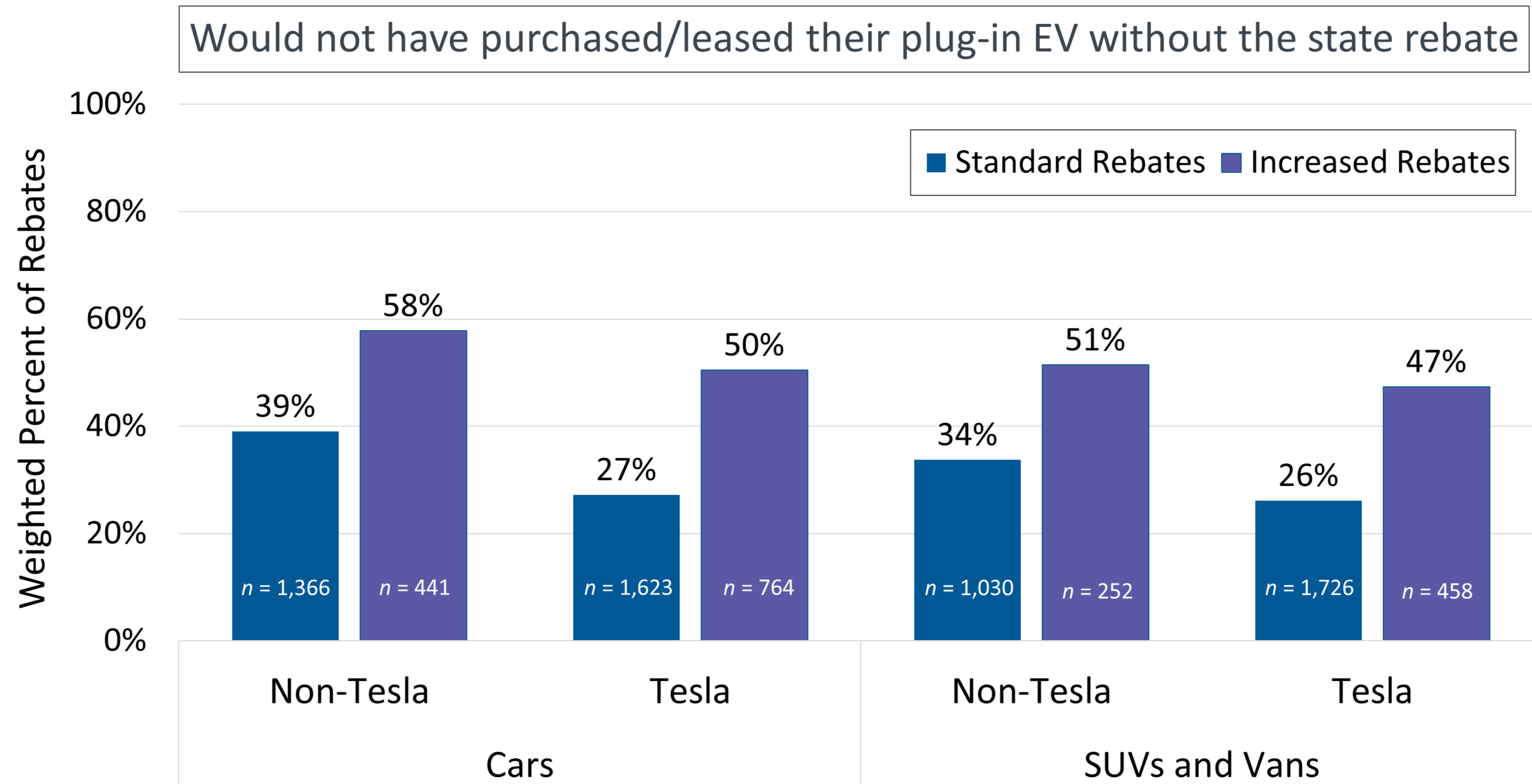
2020 purchases/leases



CVRP Consumer Survey, 2017–2020 Edition. Filtered, question-specific n = 3,805.
 Results based on n-values < 30 are omitted or highlighted in red throughout.

Rebate Essentiality Higher for Cars, Non-Tesla Vehicles

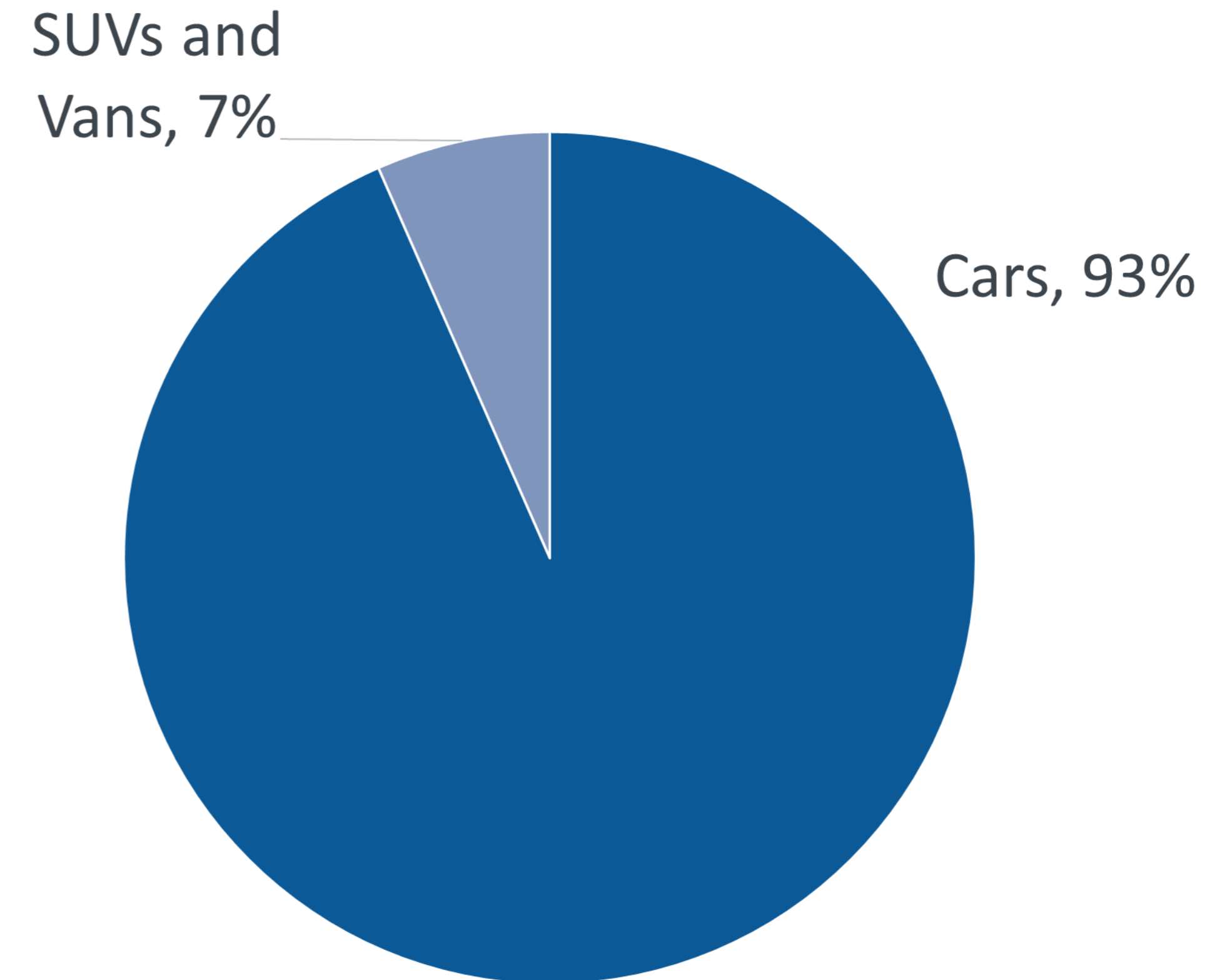
2021 purchases/leases



CVRP Consumer Survey, 2020–2022 Interim Dataset. Filtered, question-specific n = 7,660.

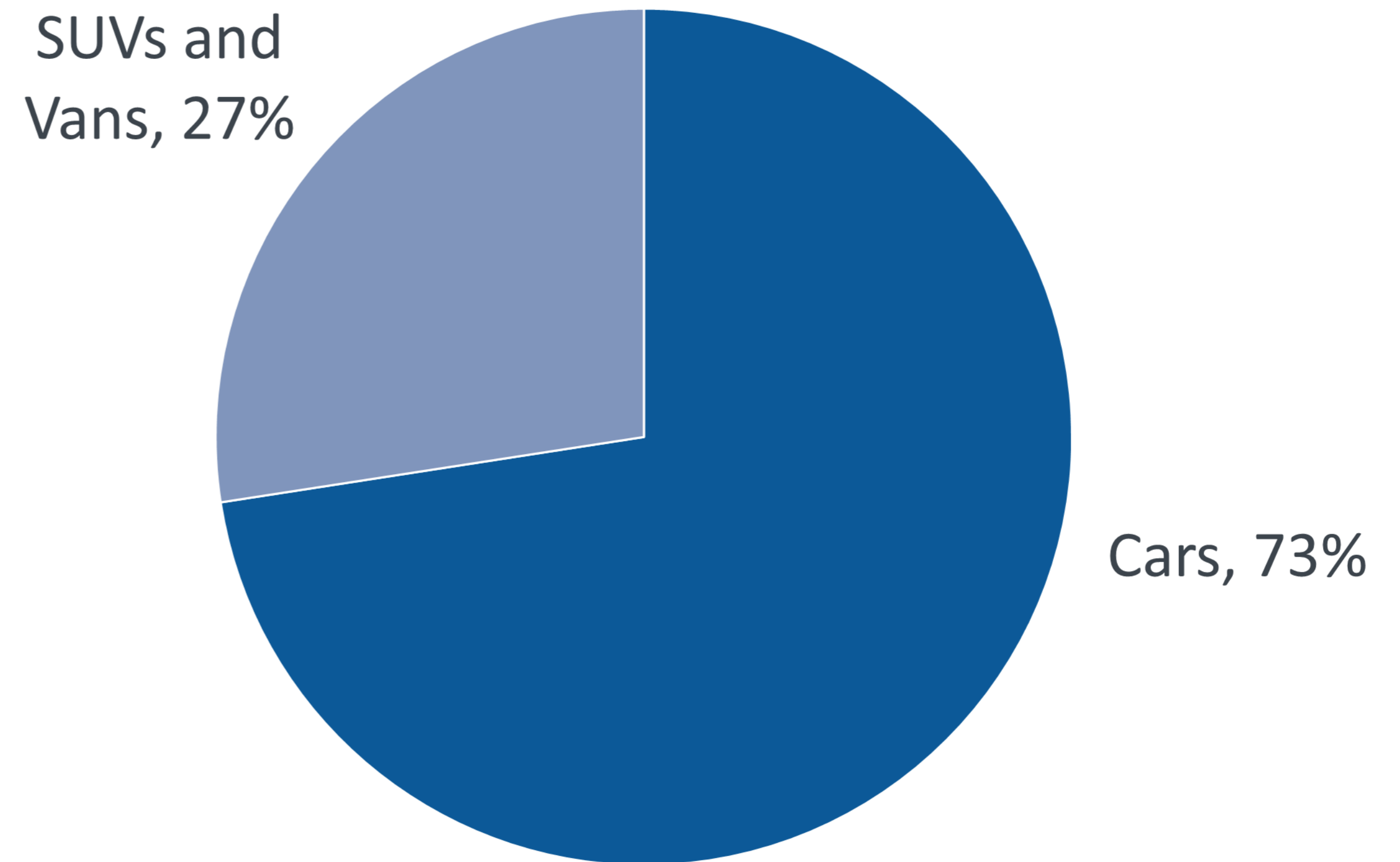
2019 Plug-In EV SUVs and Vans

- Audi e-tron
- Chrysler Pacifica
- Hyundai Kona Electric
- Jaguar I-PACE
- Mitsubishi Outlander PHEV
- Subaru Crosstrek Hybrid
- Tesla Model X
- Volvo XC60
- Volvo XC90



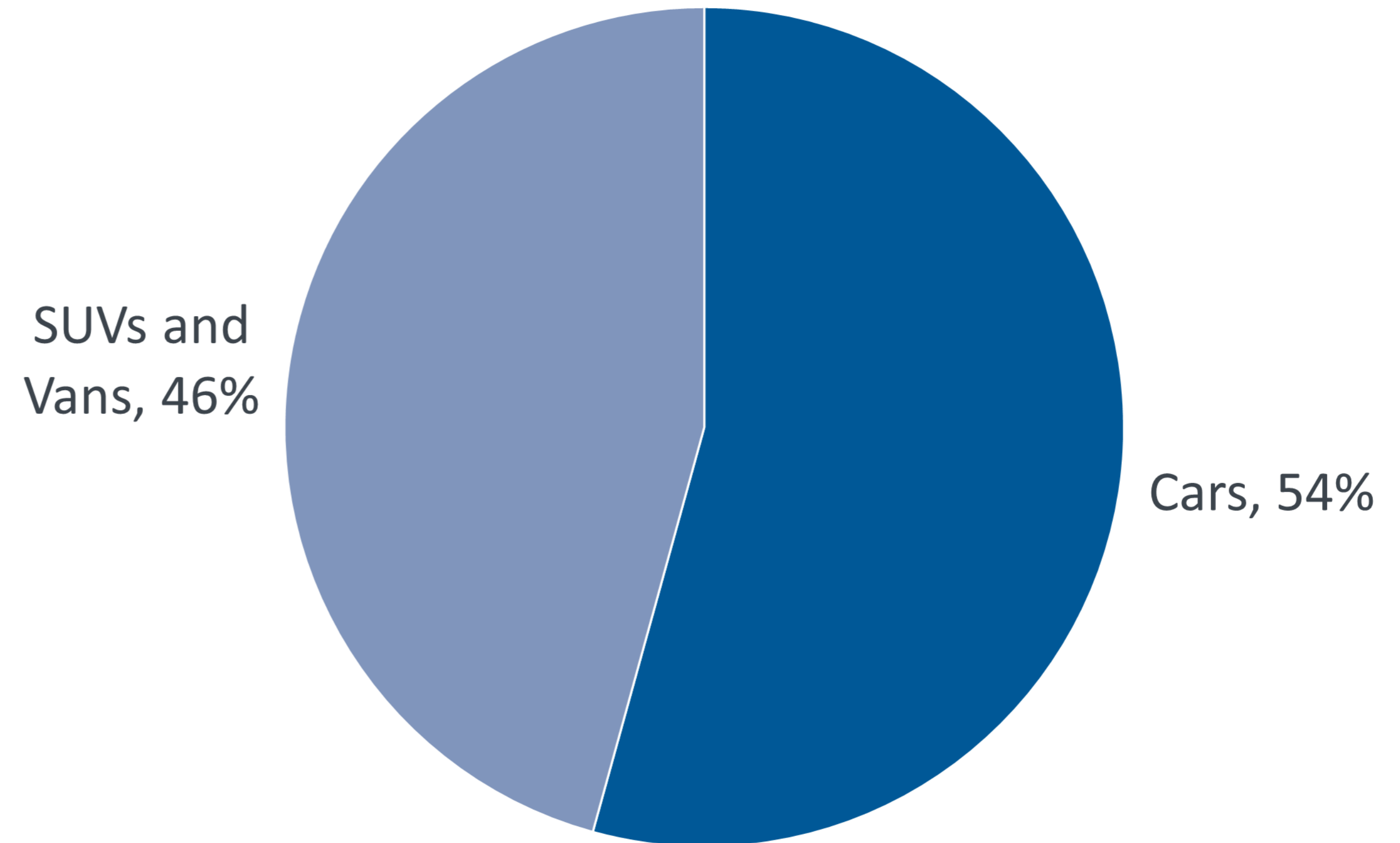
2020 Plug-In EV SUVs and Vans

- Chrysler Pacifica
- Hyundai Kona Electric
- Tesla Model Y
- Toyota RAV4 Prime



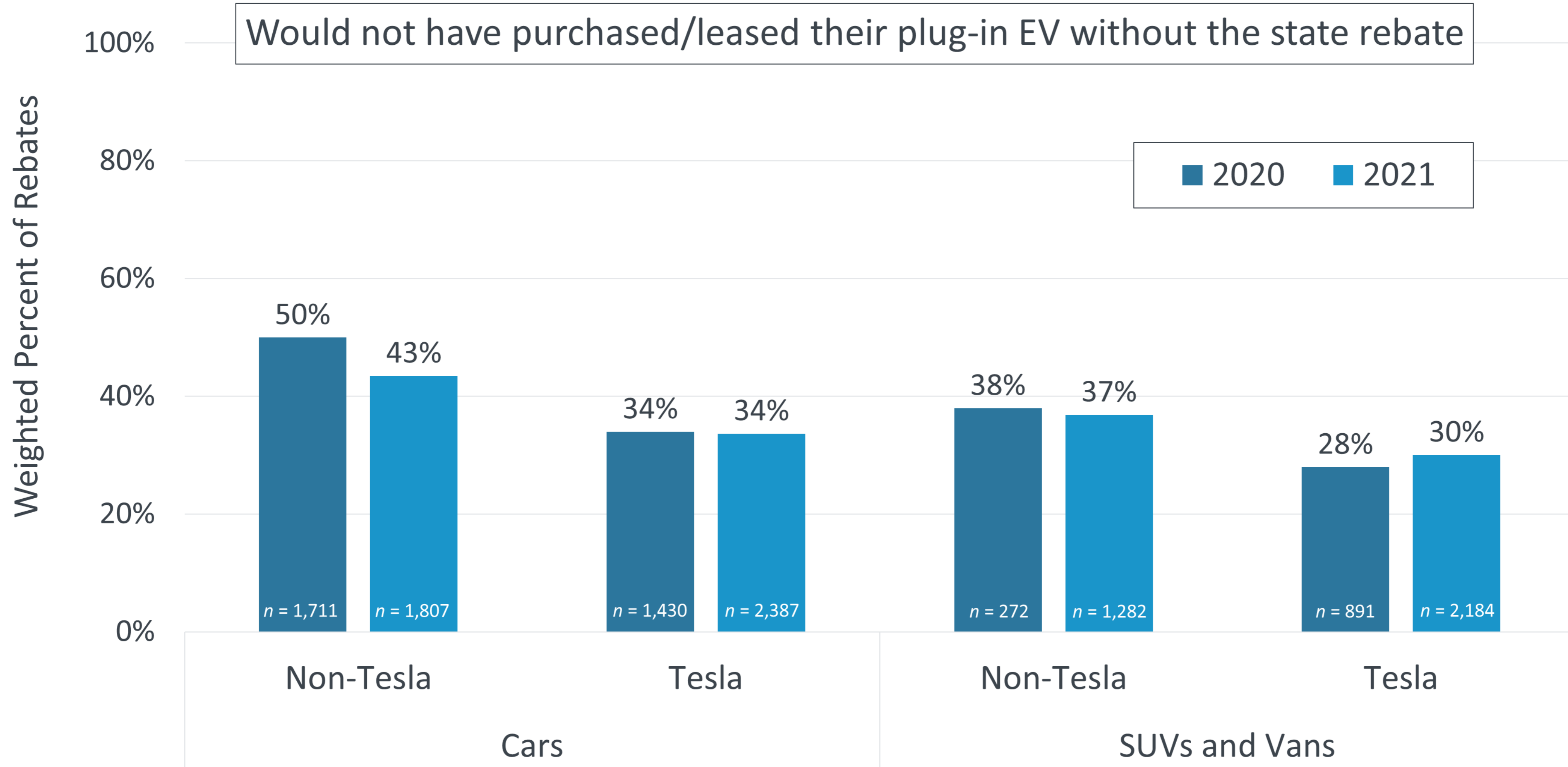
2021 Plug-In EV SUVs and Vans

- Chrysler Pacifica
- Ford Escape Plug-In Hybrid
- Ford Mustang Mach-E
- Hyundai Kona Electric
- Hyundai Santa Fe PHEV
- Hyundai Tucson PHEV
- Kia Sorento PHEV
- Tesla Model Y
- Toyota RAV4 Prime
- Volkswagen ID.4
- Volvo XC40 Recharge



Rebate Essentiality by Vehicle Class, Tesla vs. Non-Tesla, and Over Time

2020 and 2021 purchases/leases



CVRP Consumer Survey, 2017–2020 Edition: 2020 n = 4,304. 2020–2022 Interim Dataset: 2021 n = 7,660.
n-values are filtered and question-specific.



Rebate Distribution by MSRP

Through 2021

Select State EV Rebate Programs Administered by CSE (in order of launch, as of 7/6/2021)



Rebate Amounts	Fuel-Cell EVs	\$4,500 (+2,500*)	\$2,500	\$7,500 (+\$2,000*)	≥ 200 e-miles: \$2,000 ≥ 40 e-miles: \$1,000 < 40 e-miles: \$500 Base MSRP > \$42k: \$500	≥ 10 kWh: \$2,500 (+\$2,500*) < 10 kWh: \$1,500 (+\$2,500*)	--	
	All-Battery EVs	\$2,000 (+2,500*)	\$2,500	\$2,250 (+\$2,000*)			\$25/e-mile: \$2,000 max for MSRP < \$55k; \$5,000 max for MSRP < \$45k	
	Plug-in Hybrid EVs	BEVx = \$2,000 Others = \$1,000 (+\$2,500*)	BEVx = \$2,500 Others = \$1,500	\$750 (+\$1,500*)				
	Zero-Emission Motorcycles	\$750	--	--			\$750 (and NEVs)	--
	Rebate Adder	*Income-qualified	--	*Qualified by proxy			--	*Income-qualified
Program Design Elements	Point-of-Sale	--	--	Point-of-sale option	Point-of-sale	Point-of-sale option	Point-of-sale	
	Price Cap	Base MSRP: - PEVs ≤ \$60k	Purchase price ≤ \$50k	Base MSRP: - FCEVs ≤ \$60k - PEVs ≤ \$42k	Base MSRP > \$42k = \$500	Base MSRP < \$50k	Trim-specific MSRP < \$55k	
	E-range Min.	≥ 30 e-miles	≥ 25 e-miles	--	--	--	--	
	Misc.	Income cap	--	Used EV program (\$7.5k/\$3k/\$1.125k) \$125/\$75 dealer sales incentive	--	Used EVs also qualify	--	

Electric miles (e-miles) are U.S.-EPA-rated all-electric miles. BEVx = range-extended battery electric vehicle (BMW i3 REx). NEV = Neighborhood EV.

MSRP Methodology

2021 Plug-in EV purchases/leases



Model minimum MSRP:

- Each vehicle was assigned the minimum Manufacturer's Suggested Retail Price (MSRP) for that model/model-year (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 MSRPs do change mid-MY:

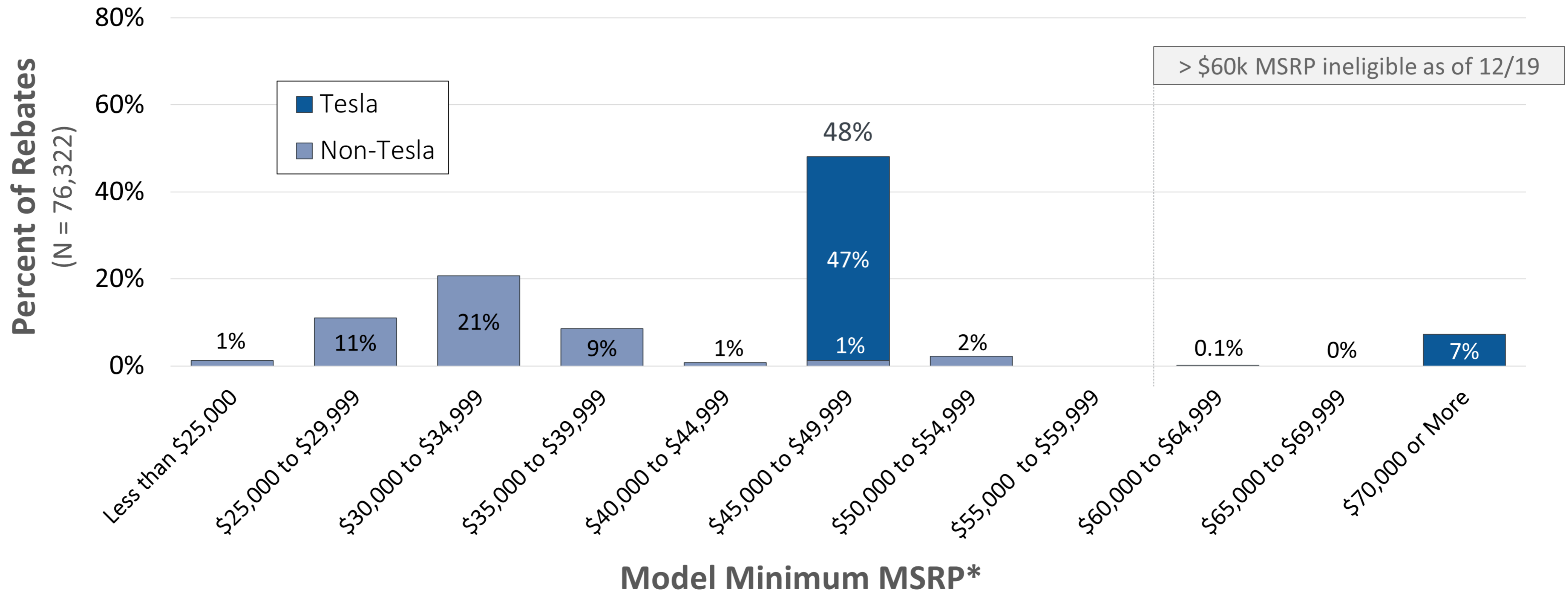
- Tesla Model 3 was assigned as follows.
 - MY 2018: \$40,000–\$49,999
 - MY 2019, 2020, 2021: \$30,000–\$39,999
 - The price increased to over \$40k in October 2021.
 - MY 2022: \$40,000–\$49,999
- Tesla Model Y was assigned as follows.
 - MY 2020: \$40,000–\$49,999
 - MY 2021, 2022: \$50,000+
 - They were available for less than \$50k until at least early April 2021.
 - Including as low as \$39,990, as used for MY 2021 when characterizing calendar-year 2020.
 - The price increased over the \$60k cap in March 2022.

Note: MSRP cap of \$60,000 introduced Dec. 2019, though waivers were granted into 2020.

Moderately-Priced Vehicles Receive Most Rebates (especially non-Tesla)

MY 2018

Rebated MY 2018 Plug-in Electric Vehicles (Purchased/Leased 1/2017–4/2020)

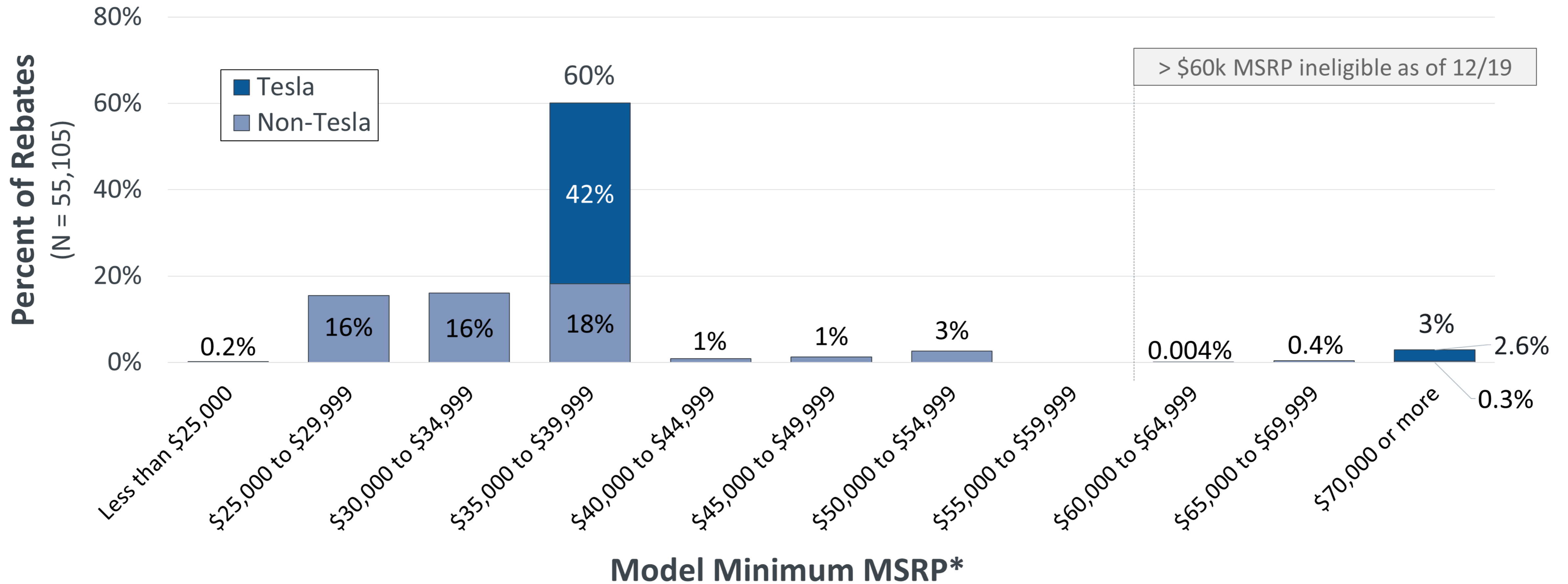


*Each vehicle was assigned the minimum Manufacturer's Suggested Retail Price (MSRP) for that model on fueleconomy.gov and does not reflect sale price. Where MY 2018 MSRPs were unavailable, MY'17 MSRPs (Chevrolet Volt & Bolt EV) or MY'19 MSRP (Kia Soul EV) were used. All Tesla Model 3's were assigned an MSRP of \$49k (that of the predominantly available model variant at the time, the Long Range).

Moderately-Priced Vehicles Receive Most Rebates

MY 2019

Rebated MY 2019 Plug-in Electric Vehicles (Purchased/Leased 1/2018–1/2021)



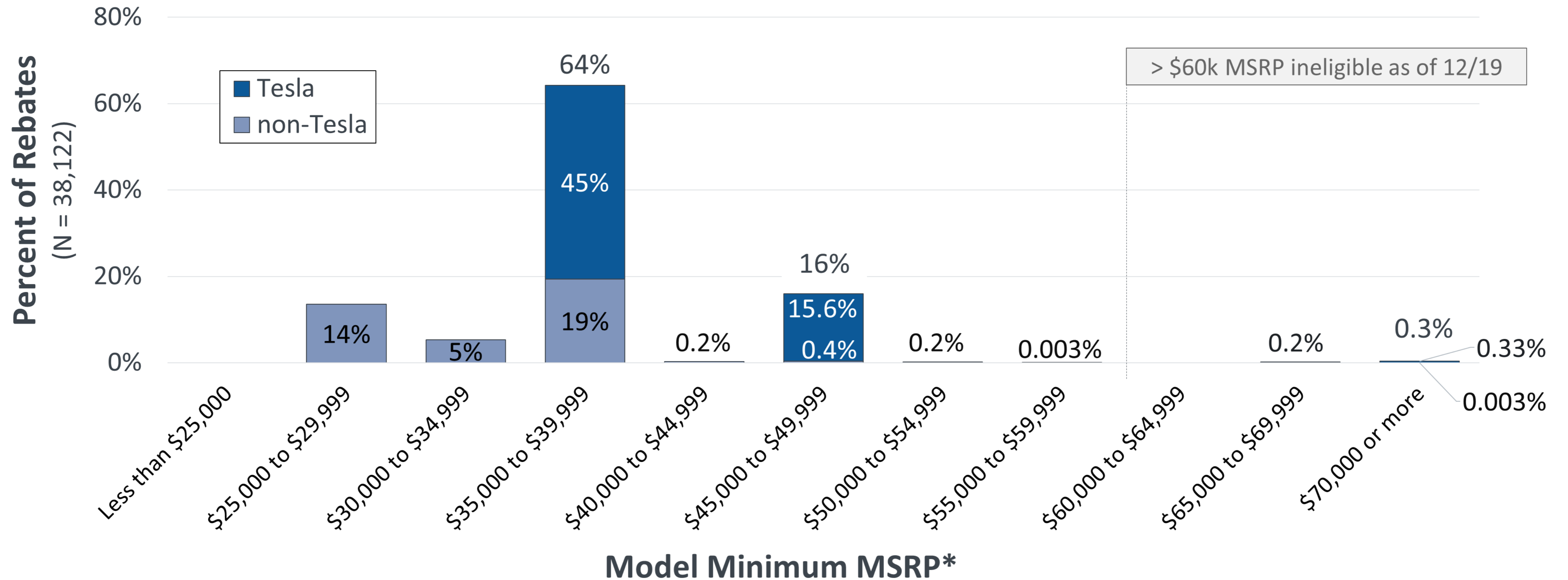
*Does not reflect sales price:

Each vehicle was assigned the minimum Manufacturer's Suggested Retail Price (MSRP) for that model/MY on fueleconomy.gov. Tesla Model 3's were assigned an MSRP of \$35k. Where MY 2019 MSRPs were unavailable, MY '18 MSRPs were used.

Moderately-Priced Vehicles Receive Most Rebates

MY 2020

Rebated MY 2020 Plug-in Electric Vehicles (Purchased/Leased 12/2018–7/2021)

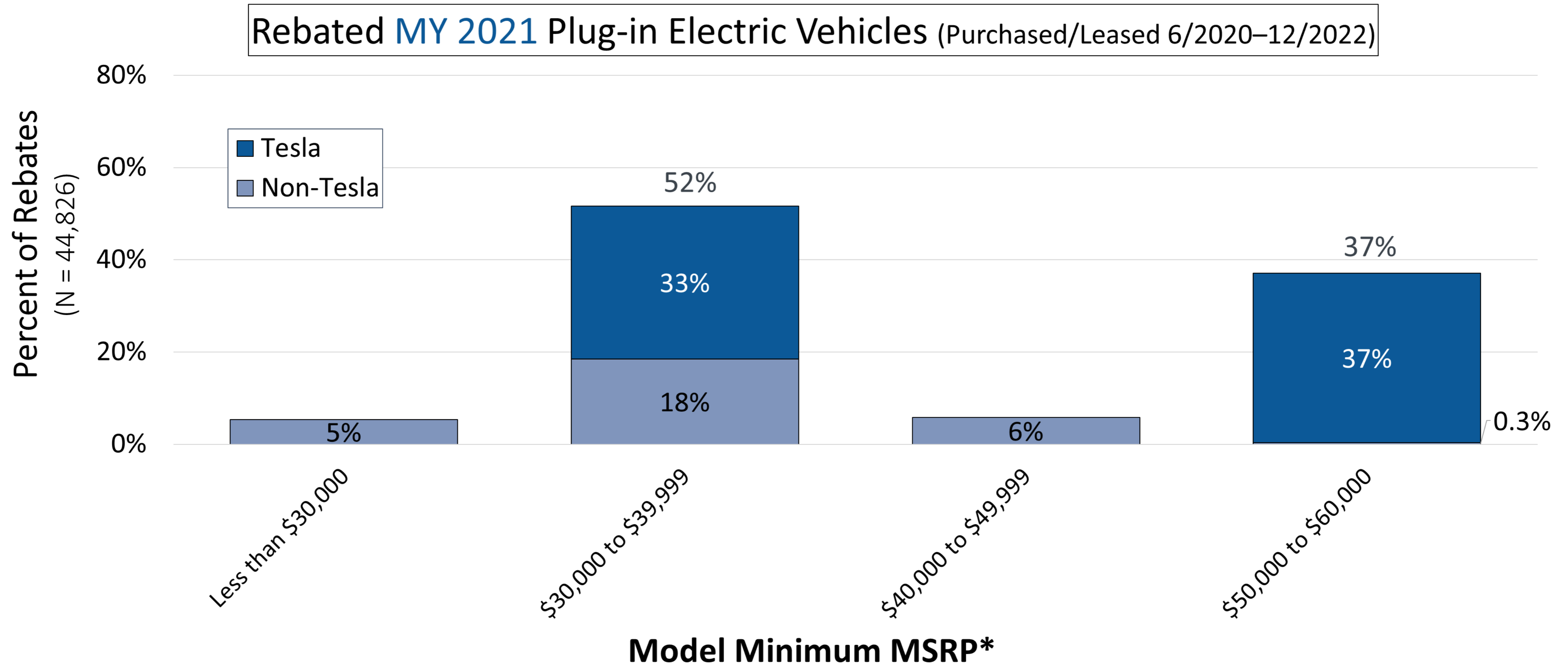


*Does not reflect sales price:

Each vehicle was assigned the minimum Manufacturer's Suggested Retail Price (MSRP) for that model/MY on fueleconomy.gov. Where MY 2020 MSRPs were unavailable, MY 2019 MSRPs were used. Tesla MSRPs do change mid-MY: Model 3's were assigned an MSRP of \$35k and Model Y's were assigned an MSRP of \$48k.

Moderately-Priced Vehicles Received Most Rebates

but the Tesla Model Y became popular at higher prices

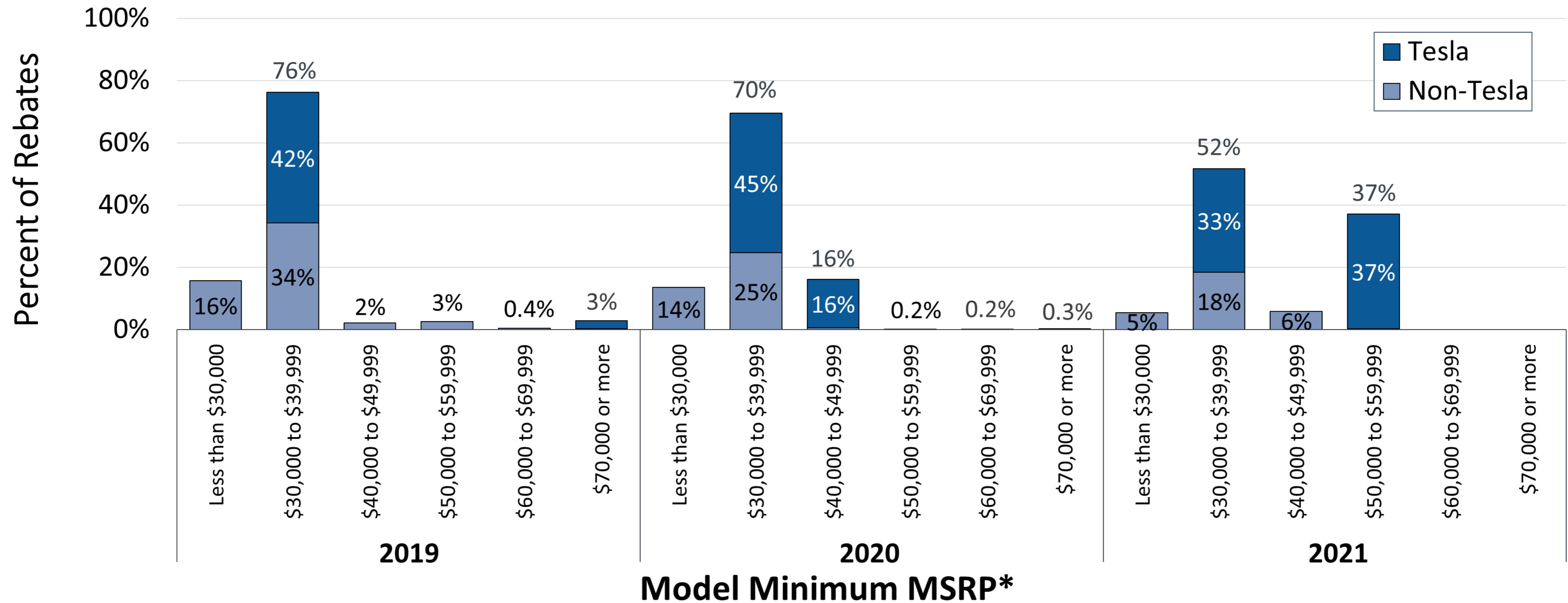


*Does not reflect sales price:

Each vehicle was assigned the minimum Manufacturer's Suggested Retail Price (MSRP) for that model/MY on fueleconomy.gov. Where MY 2021 MSRPs were unavailable, MY 2020 MSRPs were used. Tesla MSRPs do change mid-MY, see "MSRP Methodology" slide for further detail.

Model-Minimum MSRP by Model Year Increasing

Rebated MY 2019 thru MY 2021 Plug-in Electric Vehicles

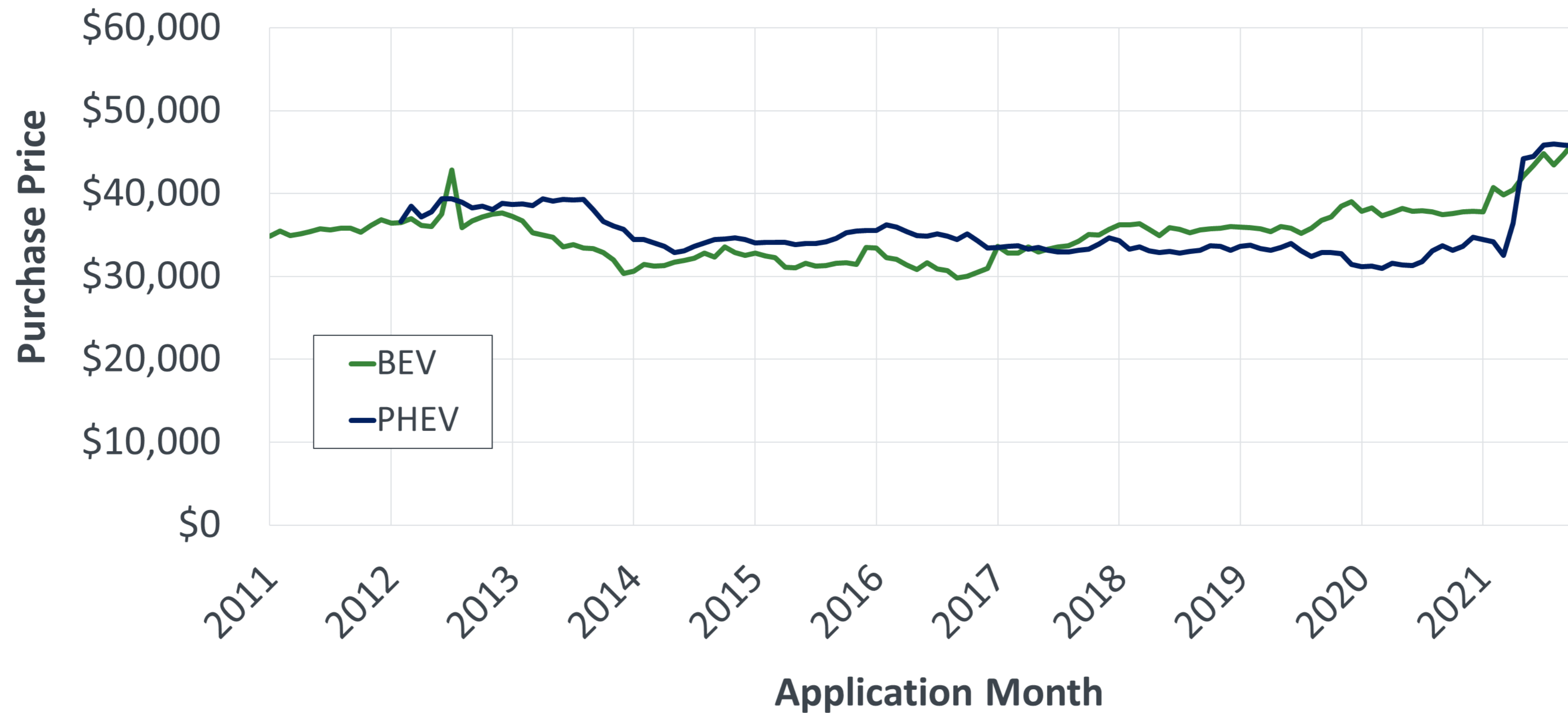


*Does not reflect sales price: Each vehicle was assigned the minimum Manufacturer's Suggested Retail Price (MSRP) for that model/MY on fueleconomy.gov. Where MSRPs were unavailable for a given MY, the value for the previous MY was used. Tesla MSRPs do change mid-MY, see "MSRP Methodology" slide for further detail.

MSRP Cap of \$60,000 introduced Dec. 2019. MY 2019 N = 55,105; MY 2020 N = 38,122; MY 2021 N = 44,826.

Decreasing Manufacturing Costs Don't Always Mean Decreasing Retail Prices

Average Purchase Price of Rebated non-Tesla Vehicles (as of 3/2022)



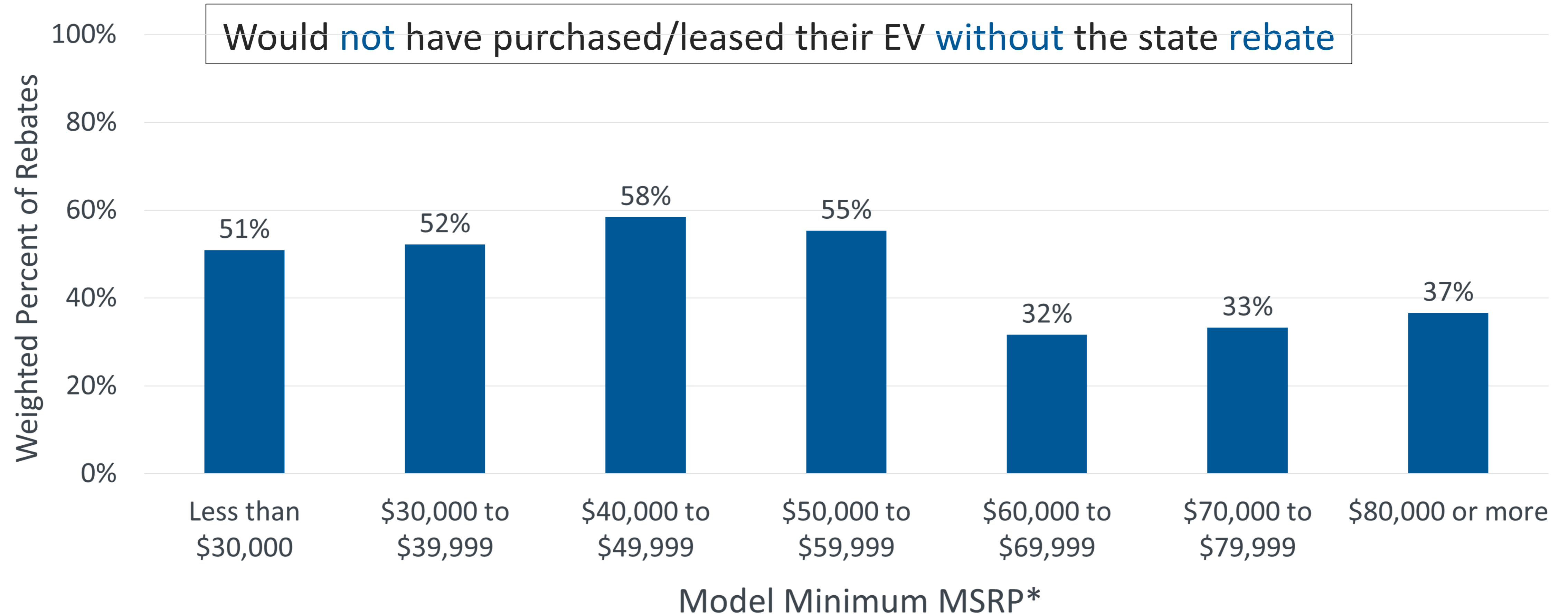


Rebate Influence by MSRP

Through 2021

Rebate Essentiality Decreases Above \$60k MSRP

2019 purchases/leases

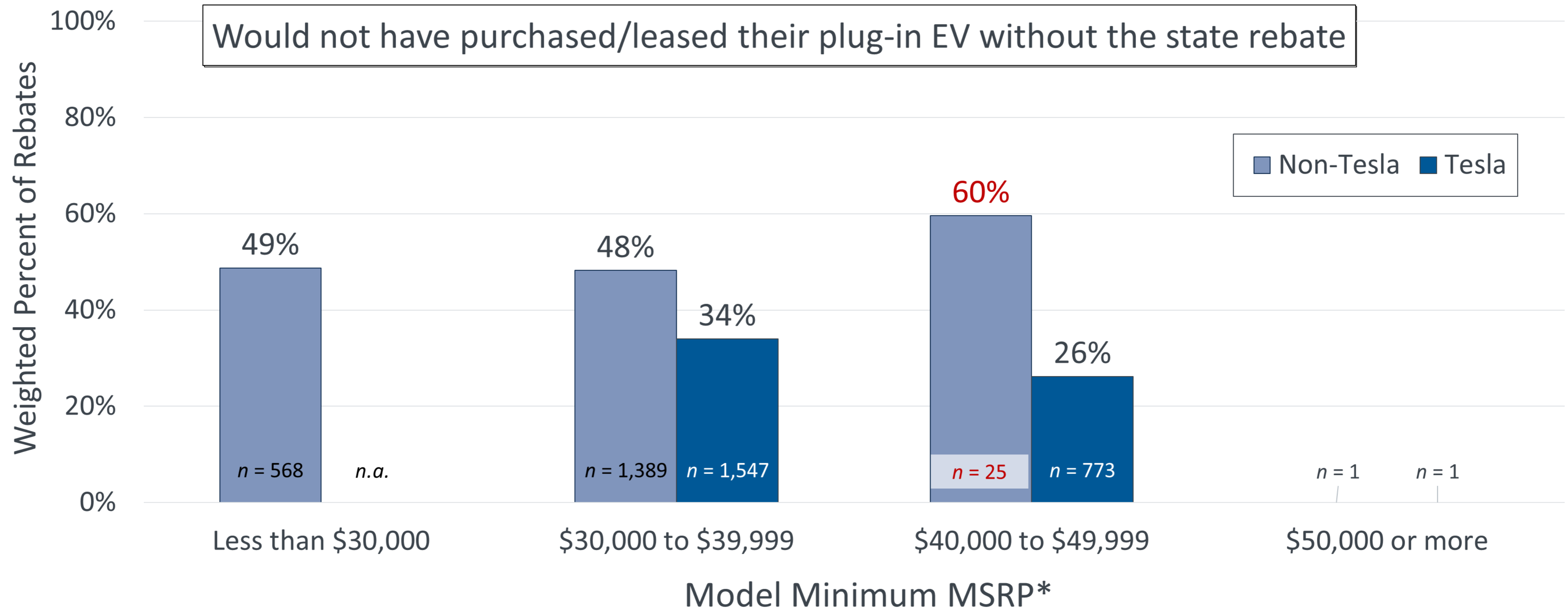


CVRP Consumer Survey: 2017–2020 Edition. Filtered question-specific $n = 8,929$. Starting 12/2019, PEVs with base MSRP $> \$60k$ became ineligible.

* Each vehicle was assigned the minimum Manufacturer's Suggested Retail Price (MSRP) for that model/MY on fuelconomy.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 Essentiality by MSRP Decreases for Tesla

2020 purchases/leases

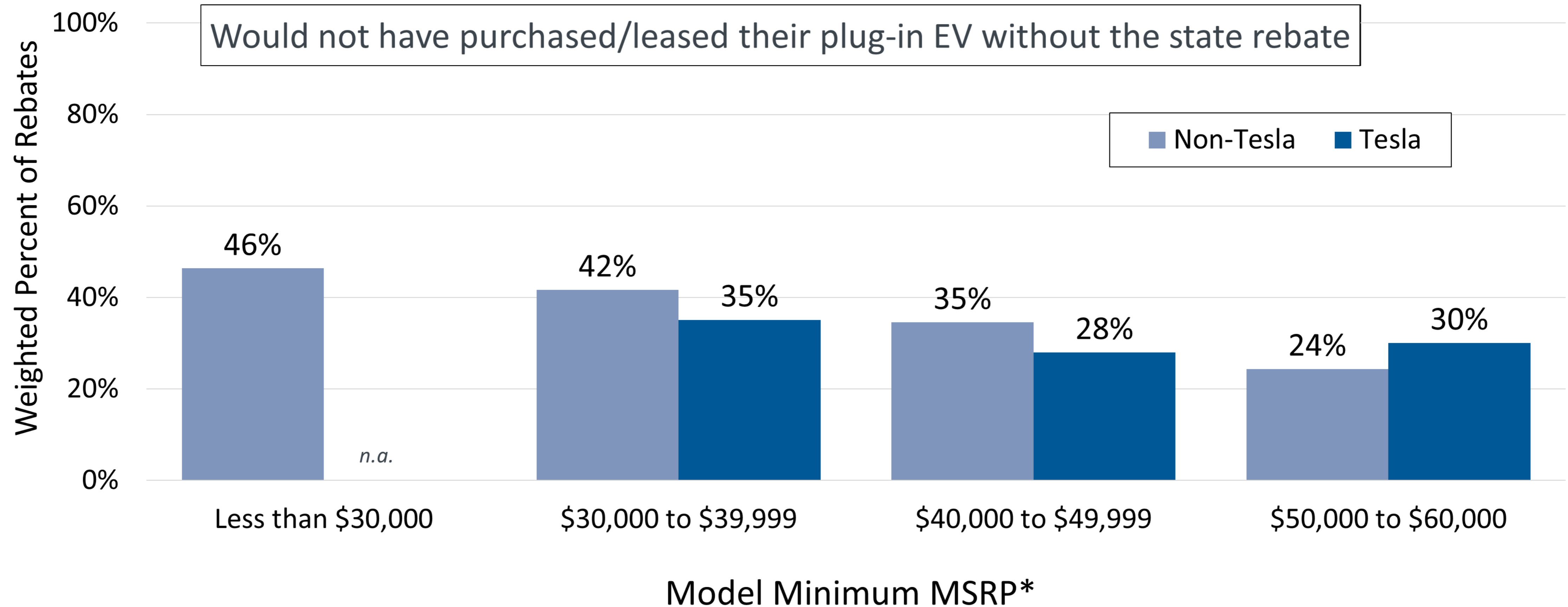


CVRP Consumer Survey, 2017–2020 Edition. Filtered, question-specific n = 4,304.

* 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 MSRPs do change mid-MY; Model 3’s were assigned an MSRP of \$49k for MY 2018, \$35k for MY 2019 and 2020, and \$39,990 for MY 2021. Model Y’s were assigned an MSRP of \$48k for MY 2020 and \$39,990 for MY 2021.

Rebate Essentiality Decreases with MSRP, Often Lower for Tesla

2021 purchases/leases

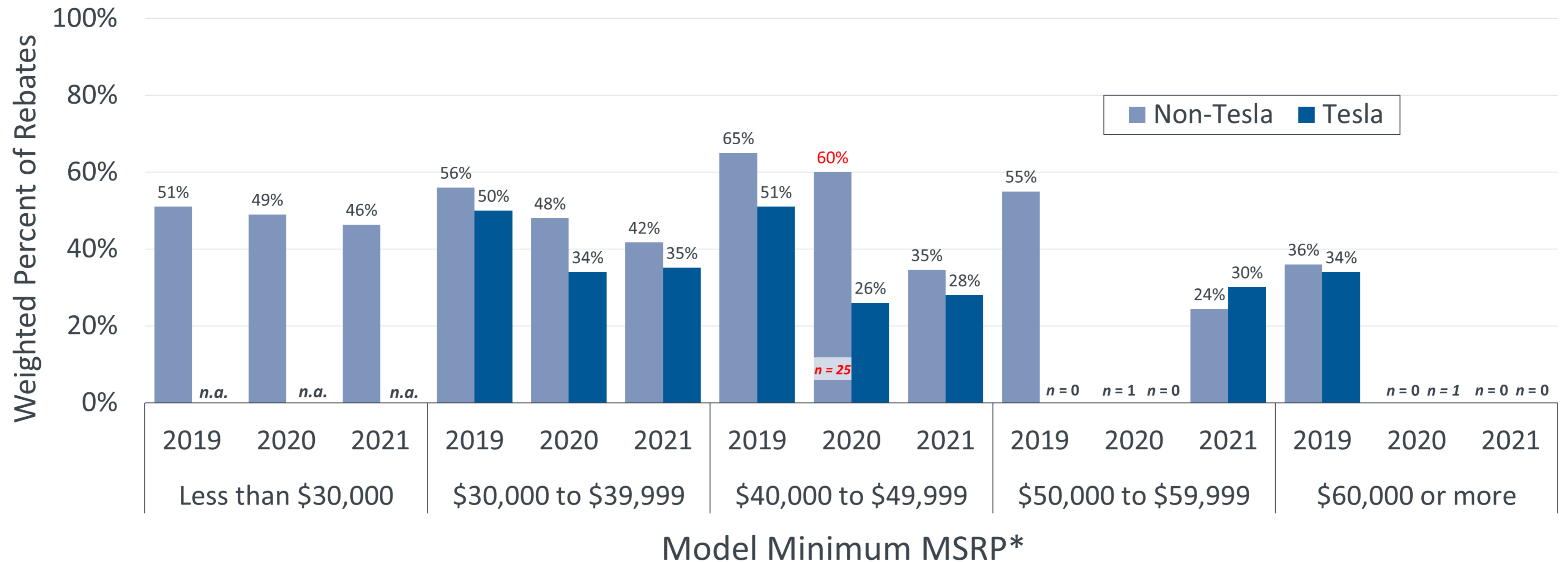


CVRP Consumer Survey, 2020–2022 Interim Dataset: Filtered, question-specific n = 7,660.

* 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. See “MSRP Methodology” slide for further detail.

Rebate Essentiality by MSRP Decreased in 2020, Particularly for Tesla and Decreased for Non-Tesla Vehicles in 2021

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



CVRP Consumer Survey, 2017–2020 Edition: 2019 n = 8,929; 2020 n = 4,304. 2020–2022 Interim Dataset: n = 7,660. n-values are filtered and question-specific.

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. See “MSRP Methodology” slide for further detail.

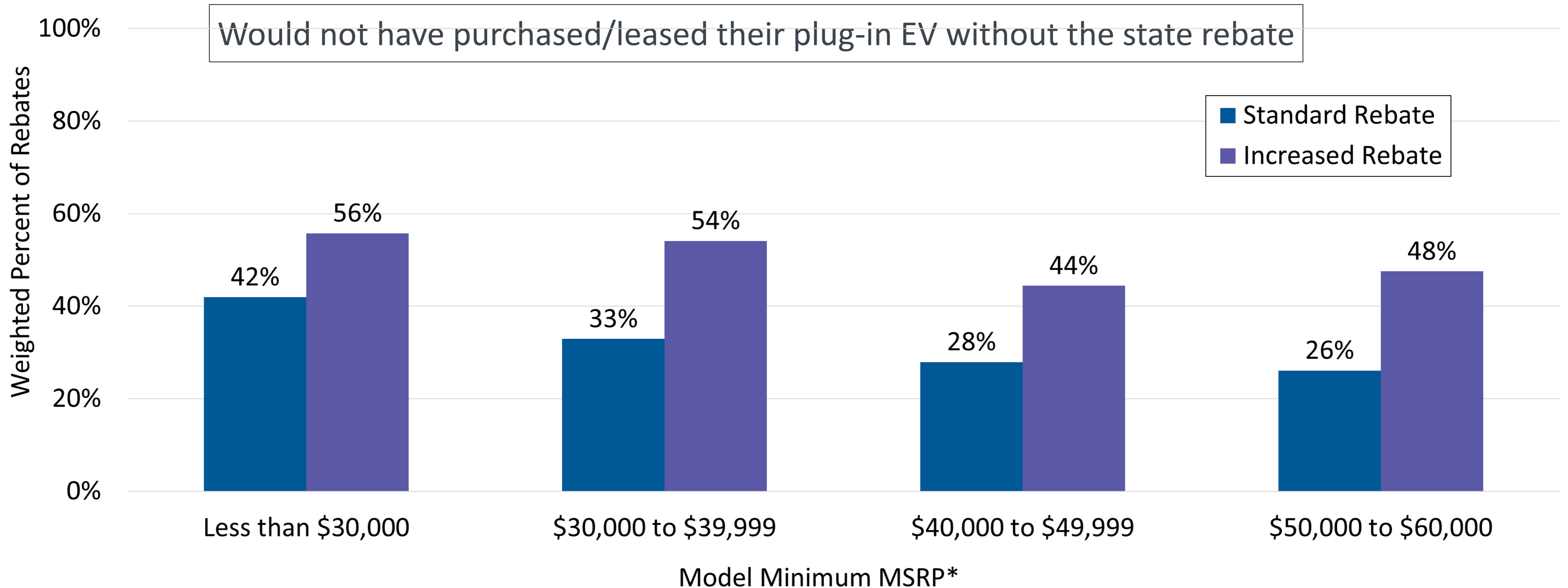


Rebate Influence by MSRP

Standard vs. Increased Rebates

Rebate Essentiality by MSRP

2021 purchases/leases

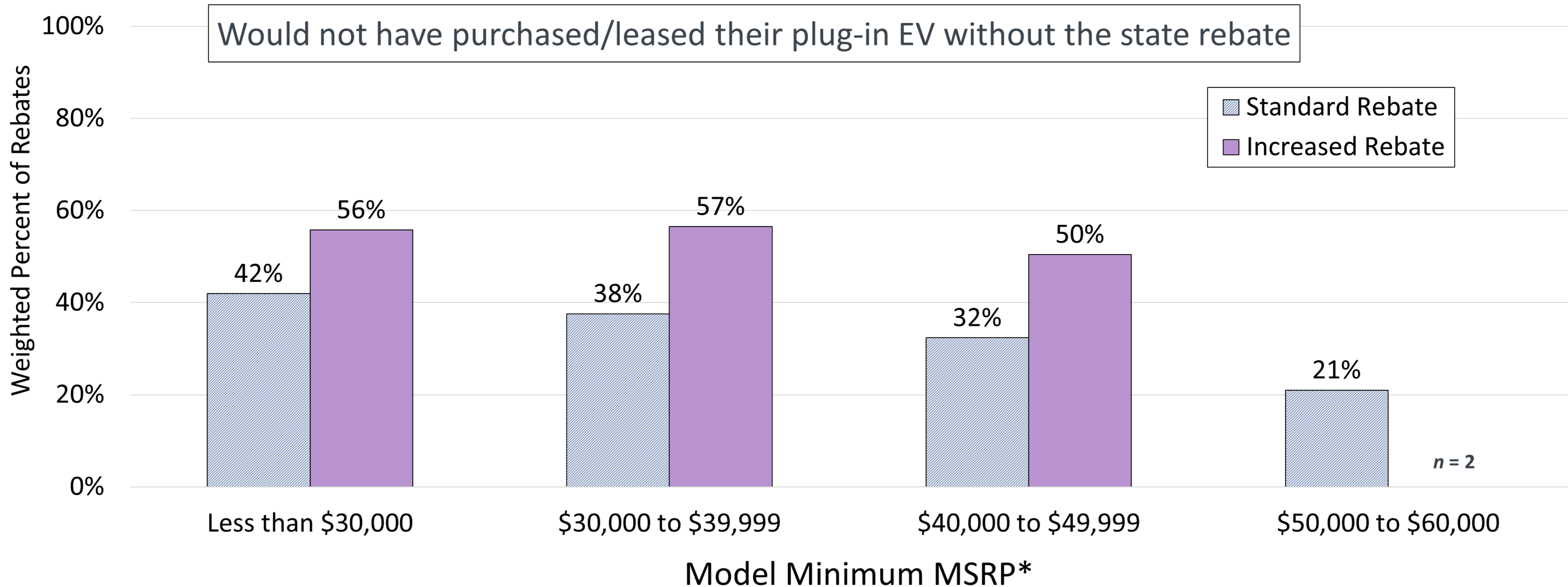


CVRP Consumer Survey, 2020–2022 Interim Dataset: Filtered, question-specific n = 7,660.

** 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. See “MSRP Methodology” slide for further detail.*

Rebate Essentiality by MSRP for Non-Tesla EVs

2021 purchases/leases



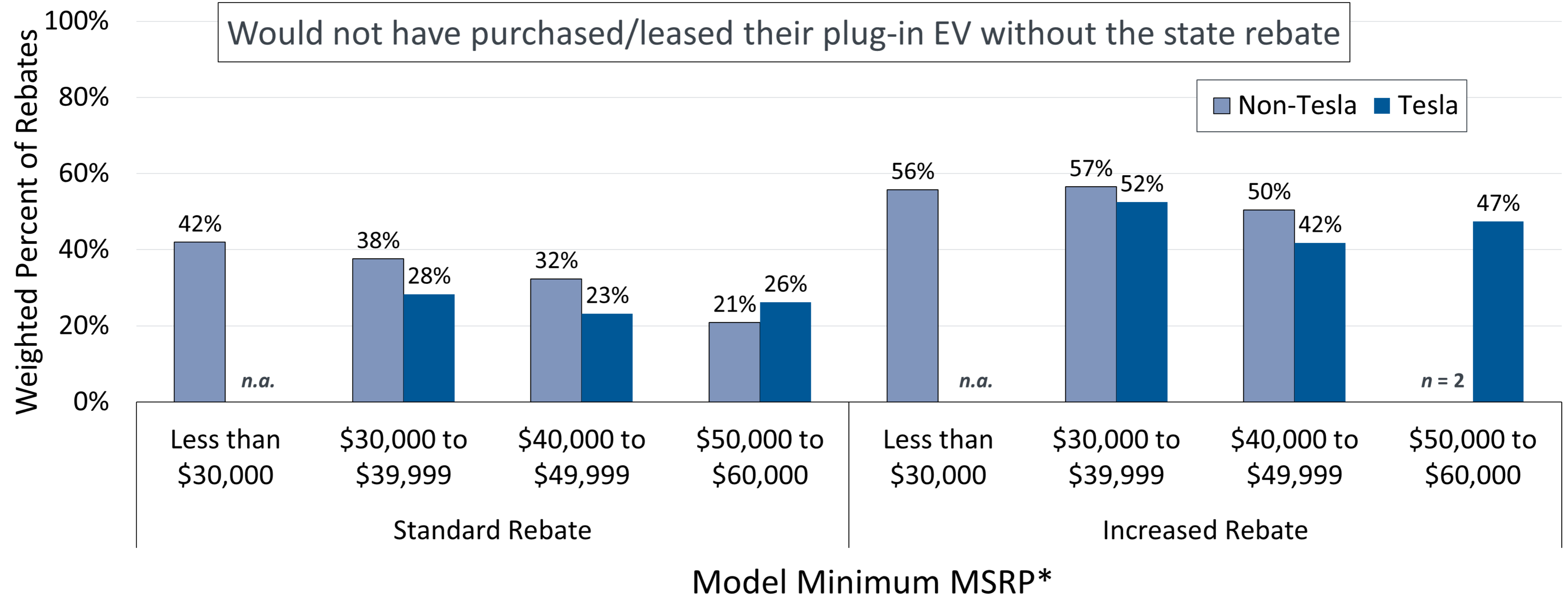
CVRP Consumer Survey, 2020–2022 Interim Dataset. Filtered, question-specific n = 3,089

** 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. See “MSRP Methodology” slide for further detail.*

Results based on n-values < 30 are omitted or highlighted in red throughout.

Rebate Essentiality by MSRP & Rebate Type

2021 purchases/leases



CVRP Consumer Survey, 2020–2022 Interim Dataset: Filtered, question-specific n = 7,660.

* 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. See "MSRP Methodology" slide for further detail.

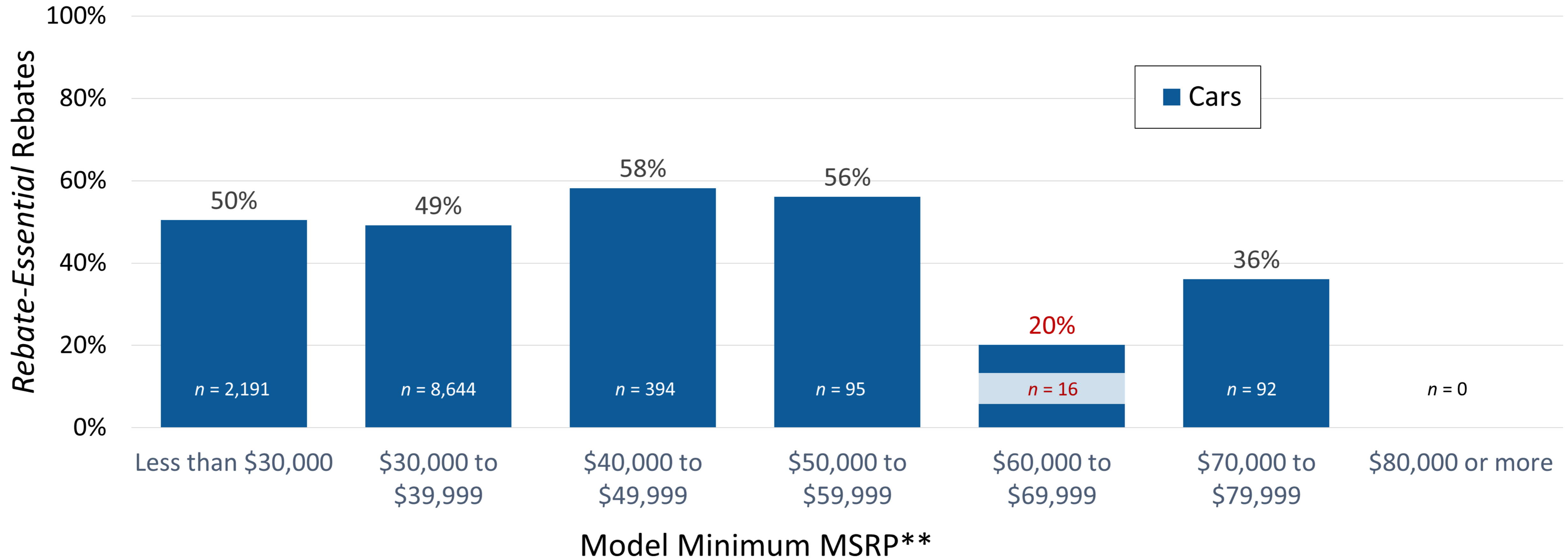


Rebate Influence by MSRP

Cars vs. SUVs/Vans

Rebate Essentiality High for Cars* Below \$60k MSRP

2019–2020 Plug-in EV Purchases/Leases



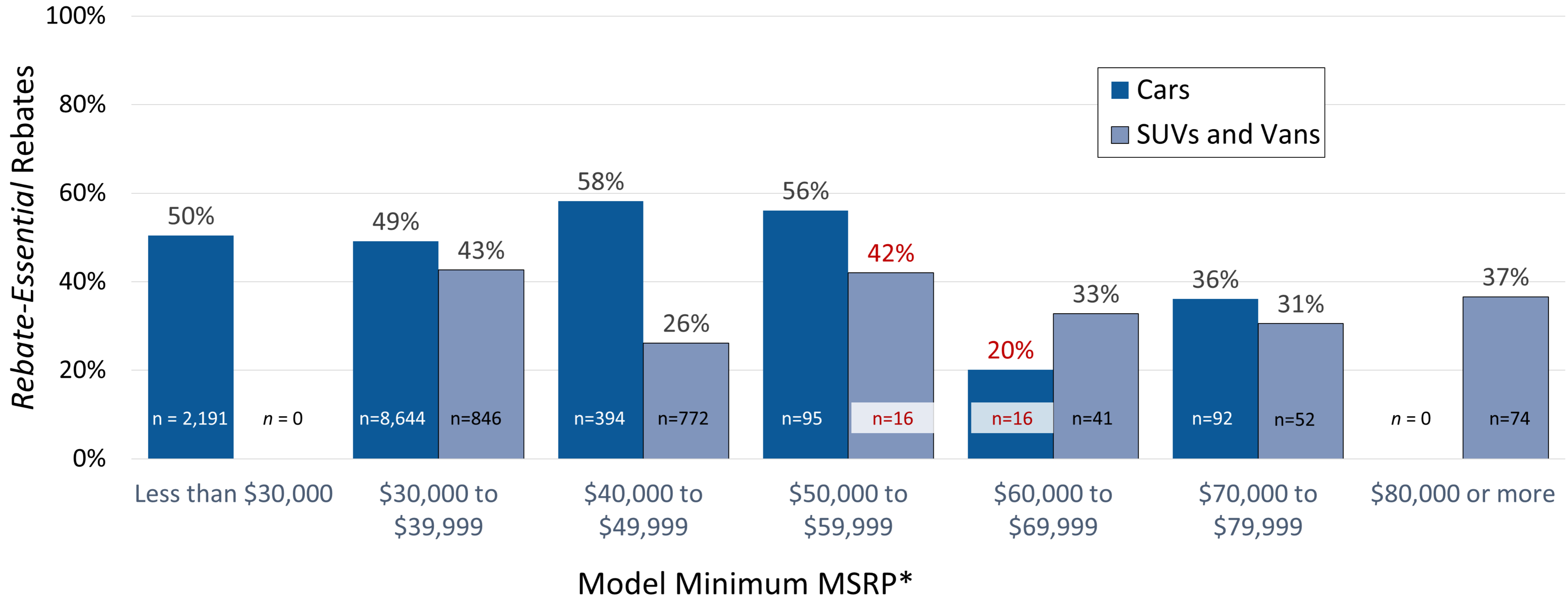
*Excludes SUVs and vans.

** 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 MSRPs do change mid-MY; Model 3's were assigned an MSRP of \$49k for MY 2018, \$35k for MY 2019 and 2020, and \$39,990 for MY 2021. Model Y's were assigned an MSRP of \$48k for MY 2020 and \$39,990 for MY 2021.

CVRP Consumer Survey, 2017–2020 Edition. Filtered, question-specific n = 11,432.

Rebate Essentiality Lower for SUVs and Vans

2019–2020 Plug-in EV Purchases/Leases

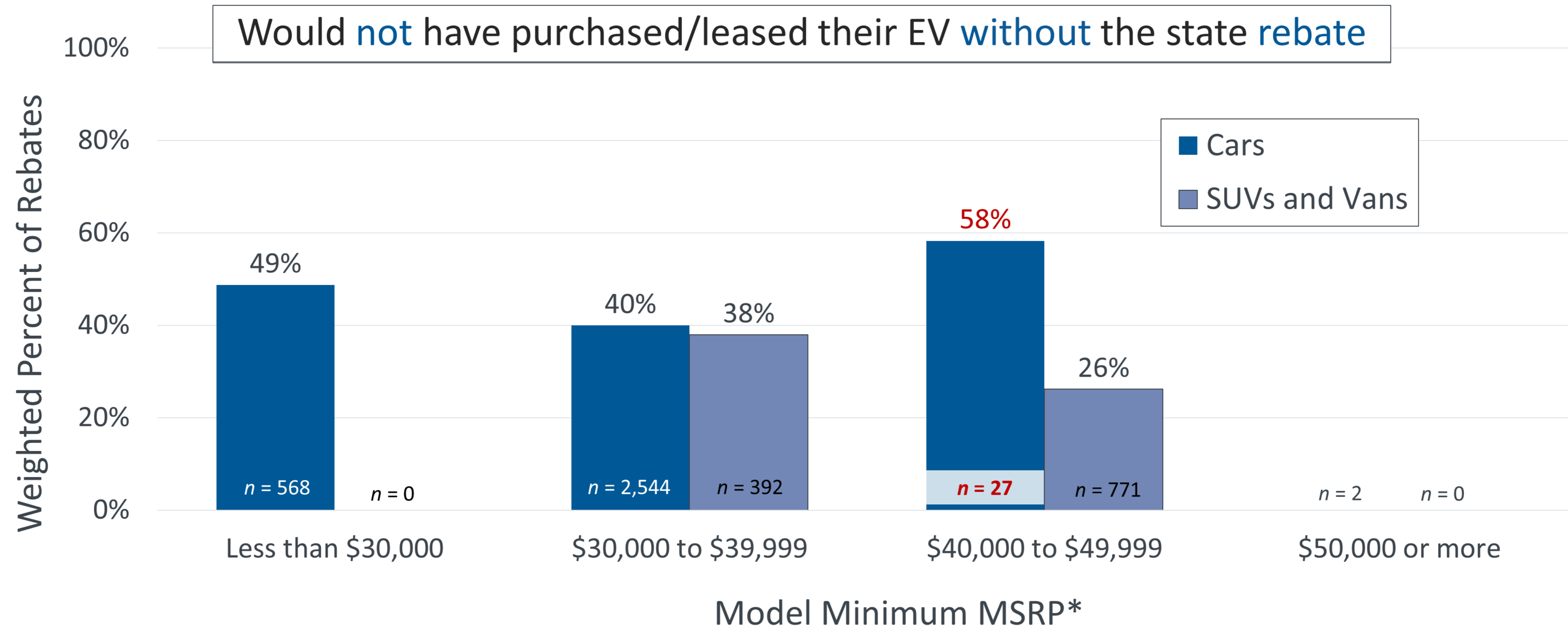


CVRP Consumer Survey, 2017–2020 Edition. Filtered, question-specific n = 13,233.

* 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 MSRPs do change mid-MY; Model 3’s were assigned an MSRP of \$49k for MY 2018, \$35k for MY 2019 and 2020, and \$39,990 for MY 2021. Model Y’s were assigned an MSRP of \$48k for MY 2020 and \$39,990 for MY 2021.

Rebate Essentiality by Vehicle Type & MSRP

2020 Plug-in EV Purchases/Leases

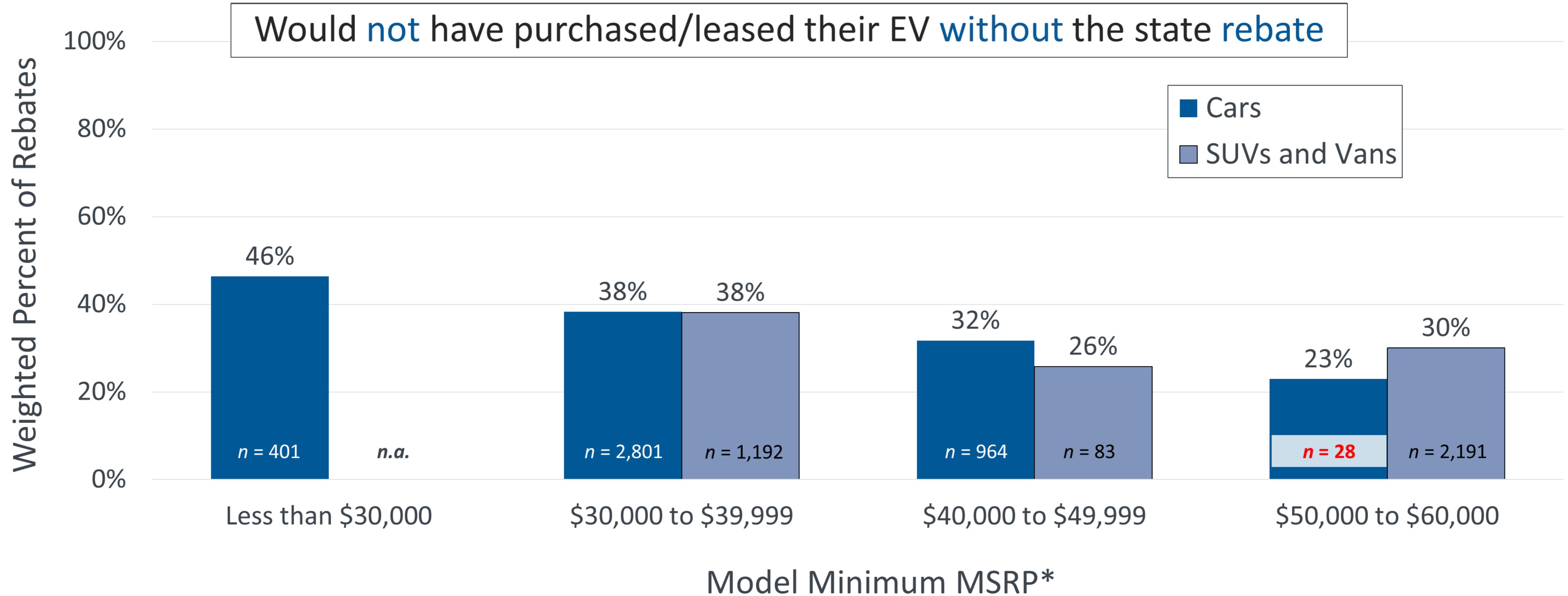


CVRP Consumer Survey, 2017–2020 Edition. Filtered, question-specific n = 4,304.

* 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 MSRPs do change mid-MY; Model 3's were assigned an MSRP of \$49k for MY 2018, \$35k for MY 2019 and 2020, and \$39,990 for MY 2021. Model Y's were assigned an MSRP of \$48k for MY 2020 and \$39,990 for MY 2021.

Rebate Essentiality by Vehicle Type & MSRP

2021 Plug-in EV Purchases/Leases

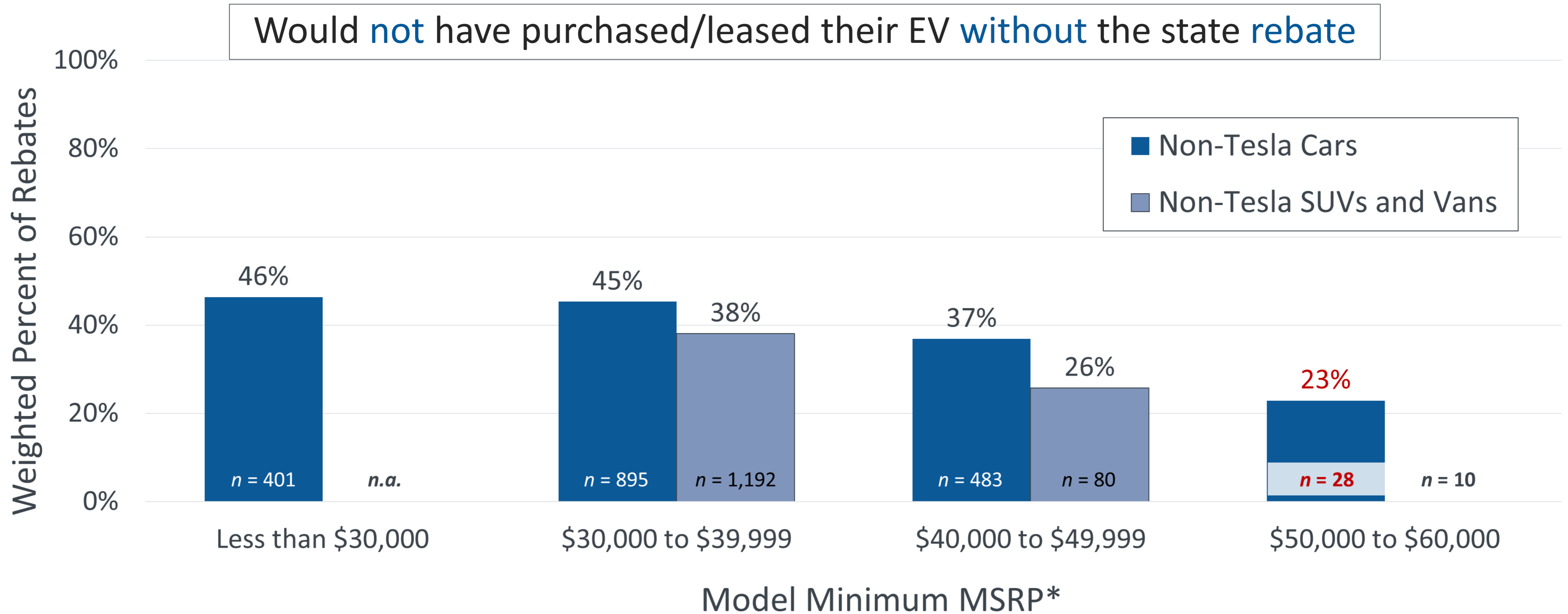


CVRP Consumer Survey, 2020–2022 Interim Dataset. Filtered, question-specific n = 7,660.

* 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. See “MSRP Methodology” slide for further detail.

Rebate Essentiality by Vehicle Type & MSRP for Non-Tesla EVs

2021 Plug-in EV Purchases/Leases



CVRP Consumer Survey, 2020–2022 Interim Dataset. Filtered, question-specific n = 3,104.

* 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. See “MSRP Methodology” slide for further detail.



Rebate Influence by Income & MSRP

Rebate Essentiality by Income and MSRP

2020 Plug-in EV purchases/leases



Model Minimum MSRP*

Income		Less than \$30,000	\$30,000 to \$39,999	\$40,000 to \$49,999	\$50,000 or more
	Less than \$100,000	55%	49%	36%	Insufficient Data
	\$100,000 to \$199,999	43%	36%	26%	Insufficient Data
	\$200,000 to \$299,999	44%	35%	19%	Insufficient Data
	\$300,000 or more	Insufficient Data	16%	Insufficient Data	Insufficient Data

CVRP Consumer Survey, 2017–2020 Edition. Filtered, question-specific n = 3,805.

* 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 MSRPs do change mid-MY; Model 3’s were assigned an MSRP of \$49k for MY 2018, \$35k for MY 2019 and 2020, and \$39,990 for MY 2021. Model Y’s were assigned an MSRP of \$48k for MY 2020 and \$39,990 for MY 2021.

Rebate Essentiality by Income and MSRP

2021 Plug-in EV Purchases/Leases

Model Minimum MSRP*

	Less than \$30,000	\$30,000 to \$39,999	\$40,000 to \$49,999	\$50,000 to \$60,000	
Income	Less than \$100,000	48%	46%	39%	37%
	\$100,000 to \$199,999	47%	34%	24%	29%
	\$200,000 to \$299,999	Insufficient Data	31%	32%	20%
	Over \$300,000	Insufficient Data	24%	18%	24%

CVRP Consumer Survey, 2020–2022 Interim Dataset. Filtered, question-specific n = 6,848.

** 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. See “MSRP Methodology” slide for further detail.*

Rebate Essentiality High for Increased Rebates, Low-MSRP Vehicles



2021 Plug-in EV Purchases/Leases

Model Minimum MSRP*

		Model Minimum MSRP*				
		Less than \$30,000	\$30,000 to \$39,999	\$40,000 to \$49,999	\$50,000 to \$60,000	
Income	Standard Rebate	Less than \$100,000	40%	36%	33%	25%
	\$100,000 to \$199,999	47%	33%	22%	27%	
	\$200,000 to \$299,999	Insufficient Data (I.D.)	30%	32%	21%	
	Over \$300,000	I.D.	23%	19%	21%	
Income	Increased Rebate	Less than \$100,000	55%	55%	45%	49%
	\$100,000 to \$199,999	Insufficient Data (I.D.)	51%	50%	45%	
	\$200,000 to \$299,999	I.D.	I.D.	I.D.	I.D.	
	Over \$300,000	I.D.	I.D.	I.D.	I.D.	

CVRP Consumer Survey, 2020–2022 Interim Dataset. Standard Rebate: n = 5,077. Increased Rebate: n = 1,771. n-values are filtered and question-specific.

* 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. See “MSRP Methodology” slide for further detail.

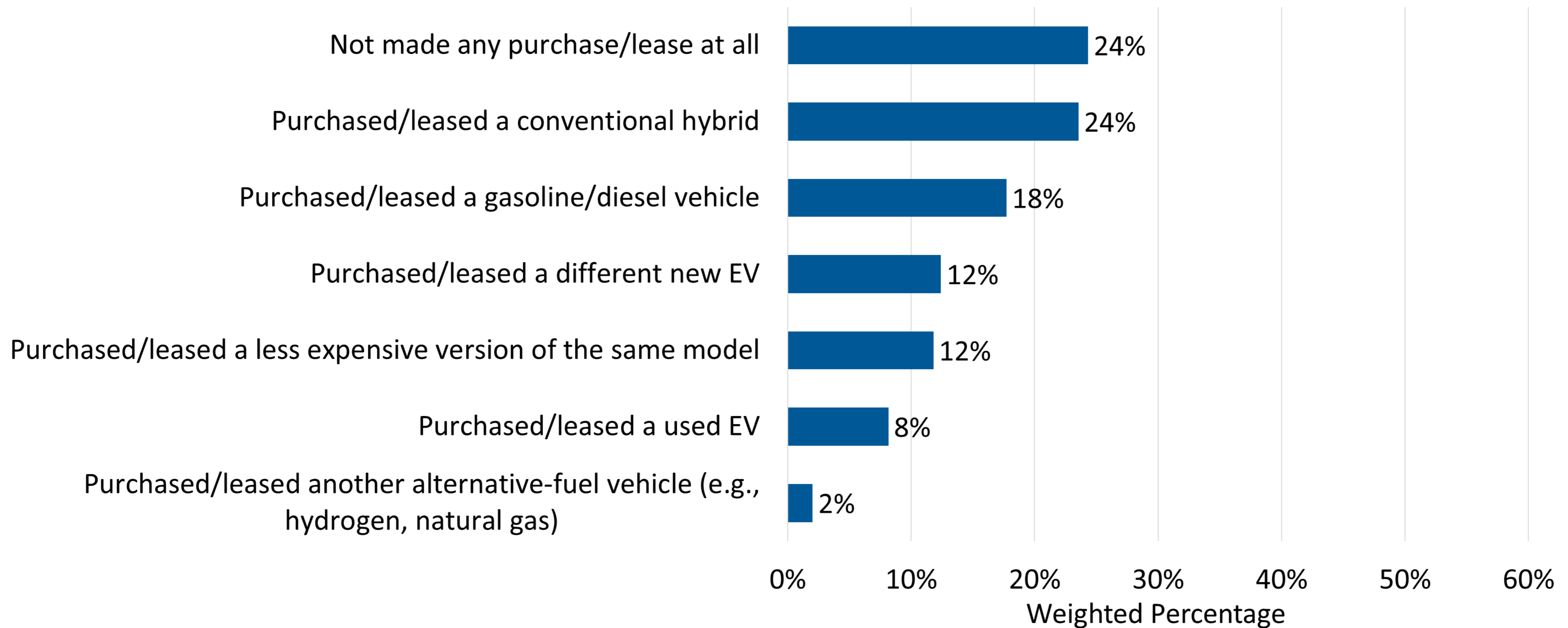
Counterfactual Behavior:

What might have happened without the rebate?

What might have happened without the rebate?

2021 purchases/leases

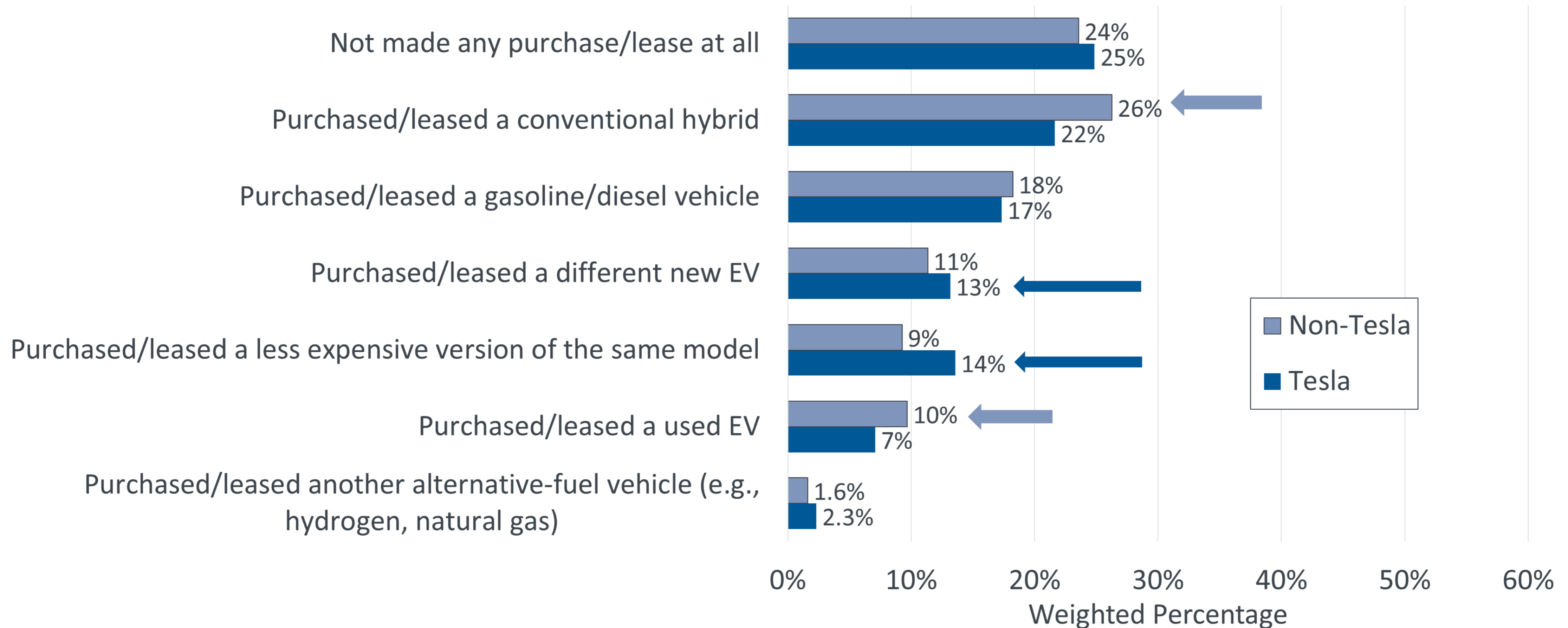
If CVRP were not available, what do you think you would have done?



This follow-up question shown only to those that responded they would not have acquired their EV without the rebate. Plug-in EVs purchased/leased in 2021. CVRP Consumer Survey, 2020–2022 Interim Dataset. Filtered, question-specific n = 2,718.

Tesla consumers more likely to have still acquired a **new EV**
Non-Tesla consumers more likely to have gone with a **hybrid or used EV**

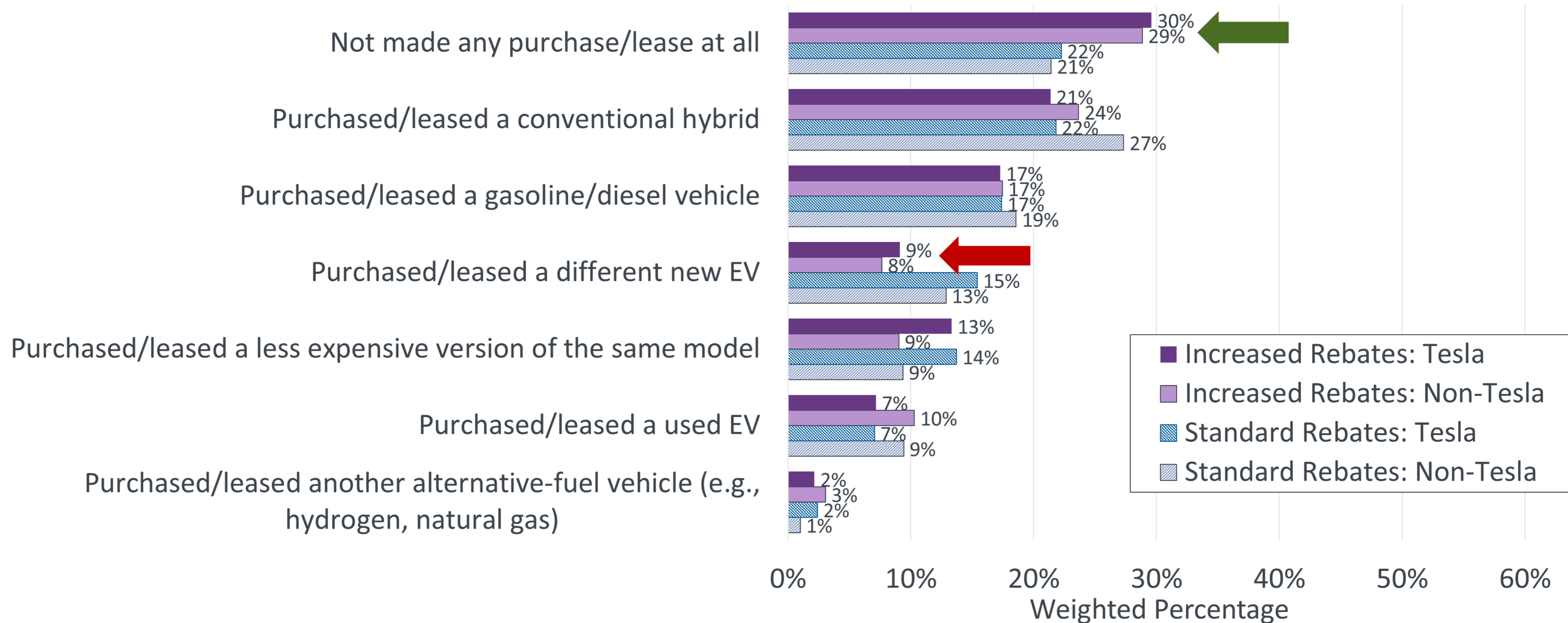
If CVRP were not available, what do you think you would have done?



This follow-up question shown only to those that responded they would not have acquired their EV without the rebate. Plug-in EVs purchased/leased in 2021. CVRP Consumer Survey, 2020–2022 Interim Dataset. Filtered, question-specific n = 2,718.

Increased Rebate recipients: **More likely to have not purchased/leased**
Less likely to have gone for a different new EV

If CVRP were not available, what do you think you would have done?



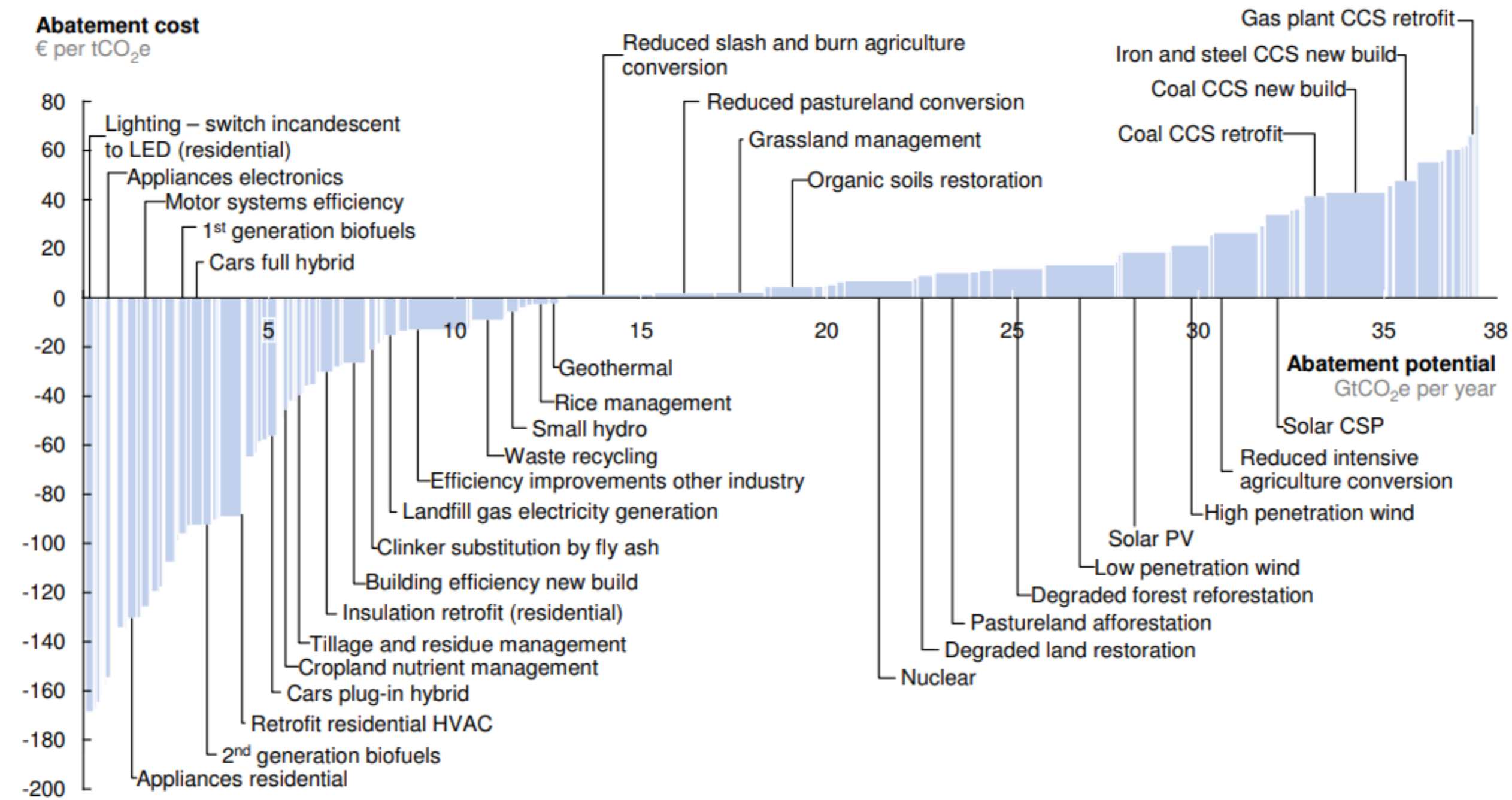
This follow-up question shown only to those that responded they would not have acquired their EV without the rebate. Plug-in EVs purchased/leased in 2021. CVRP Consumer Survey, 2020–2022 Interim Dataset. Filtered, question-specific n = 2,718.

Designing for Cost-Effectiveness with the Free-Rider Abatement Curve

McKinsey GHG Abatement Cost Curve

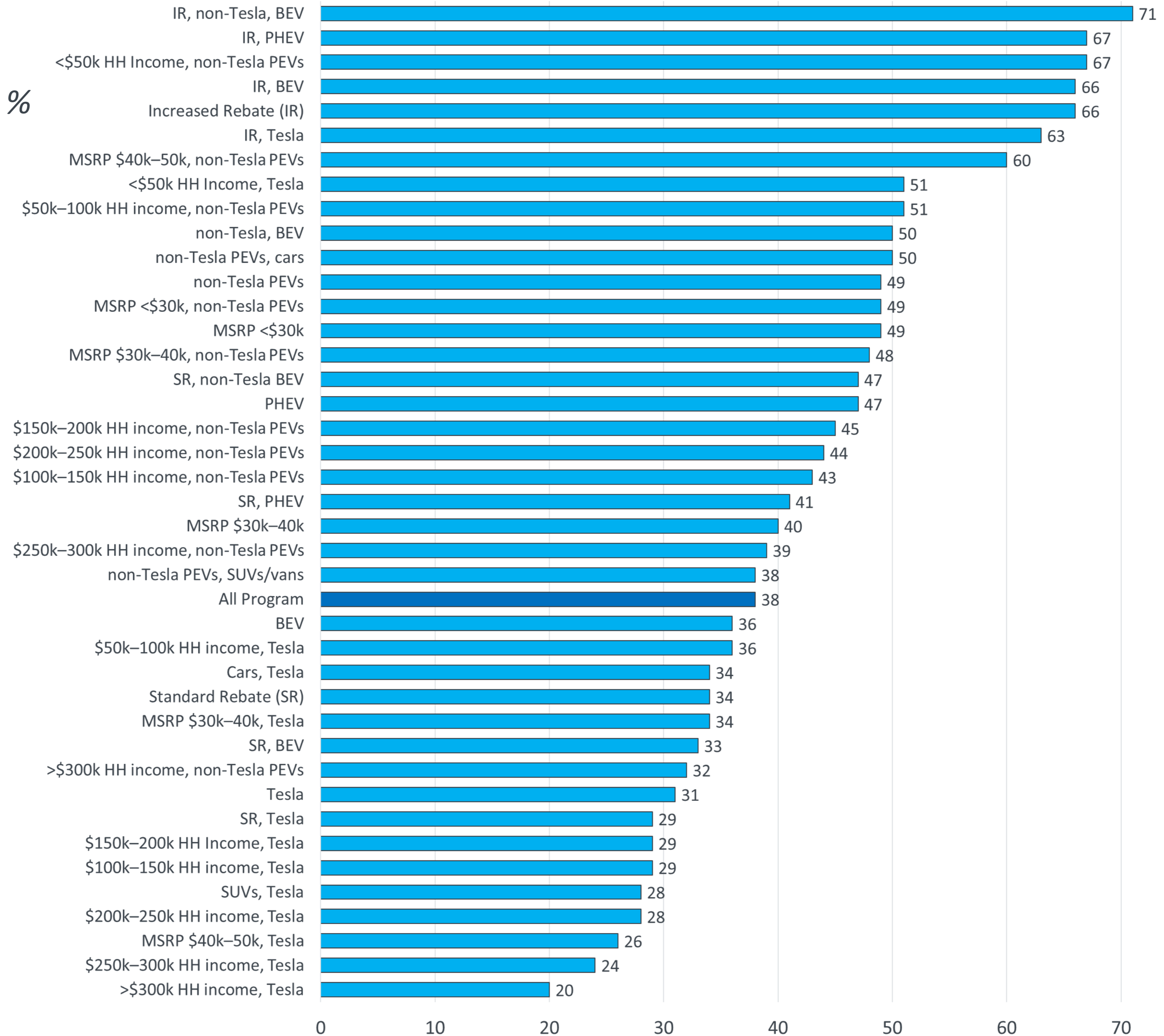
Exhibit 6

V2.1 Global GHG abatement cost curve beyond BAU – 2030



Note: The curve presents an estimate of the maximum potential of all technical GHG abatement measures below €80 per tCO_{2e} if each lever was pursued aggressively. It is not a forecast of what role different abatement measures and technologies will play.
 Source: Global GHG Abatement Cost Curve v2.1

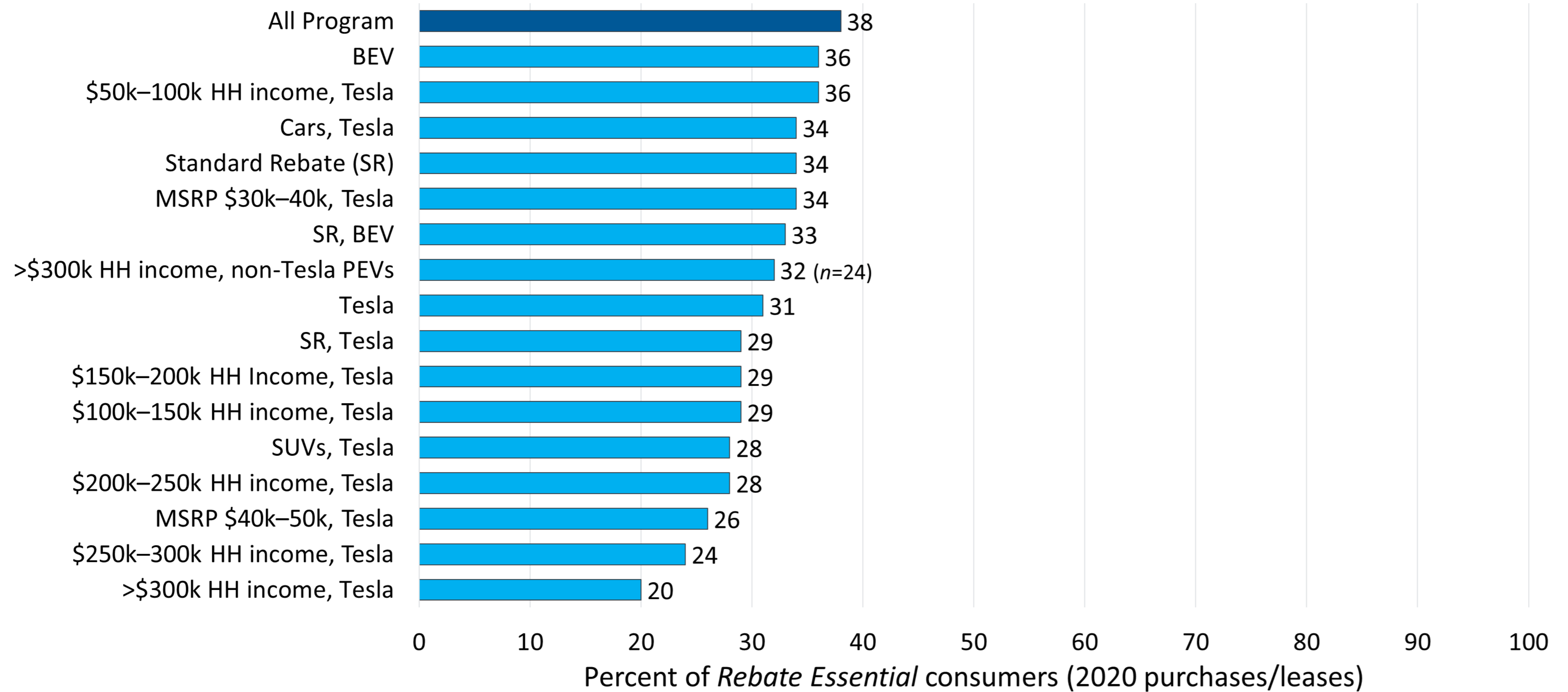
Free-Rider Hunting: PEV Rebate Essentiality % (2020 Purchases/Leases)



Compiles analysis
summarized [here](#) (May 2022)

Below Program Average *Rebate Essentiality*

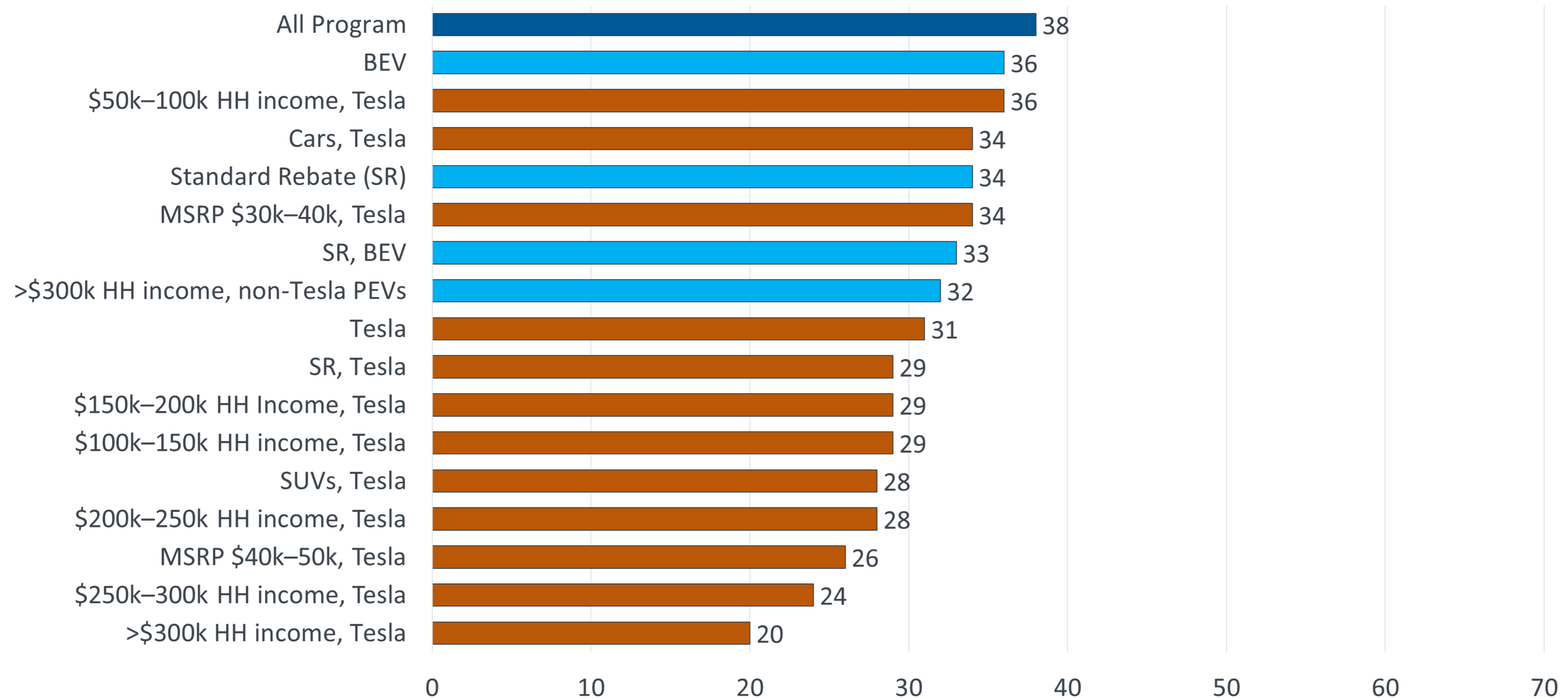
PEVs



Summarizes findings [here](#) (May 2022)

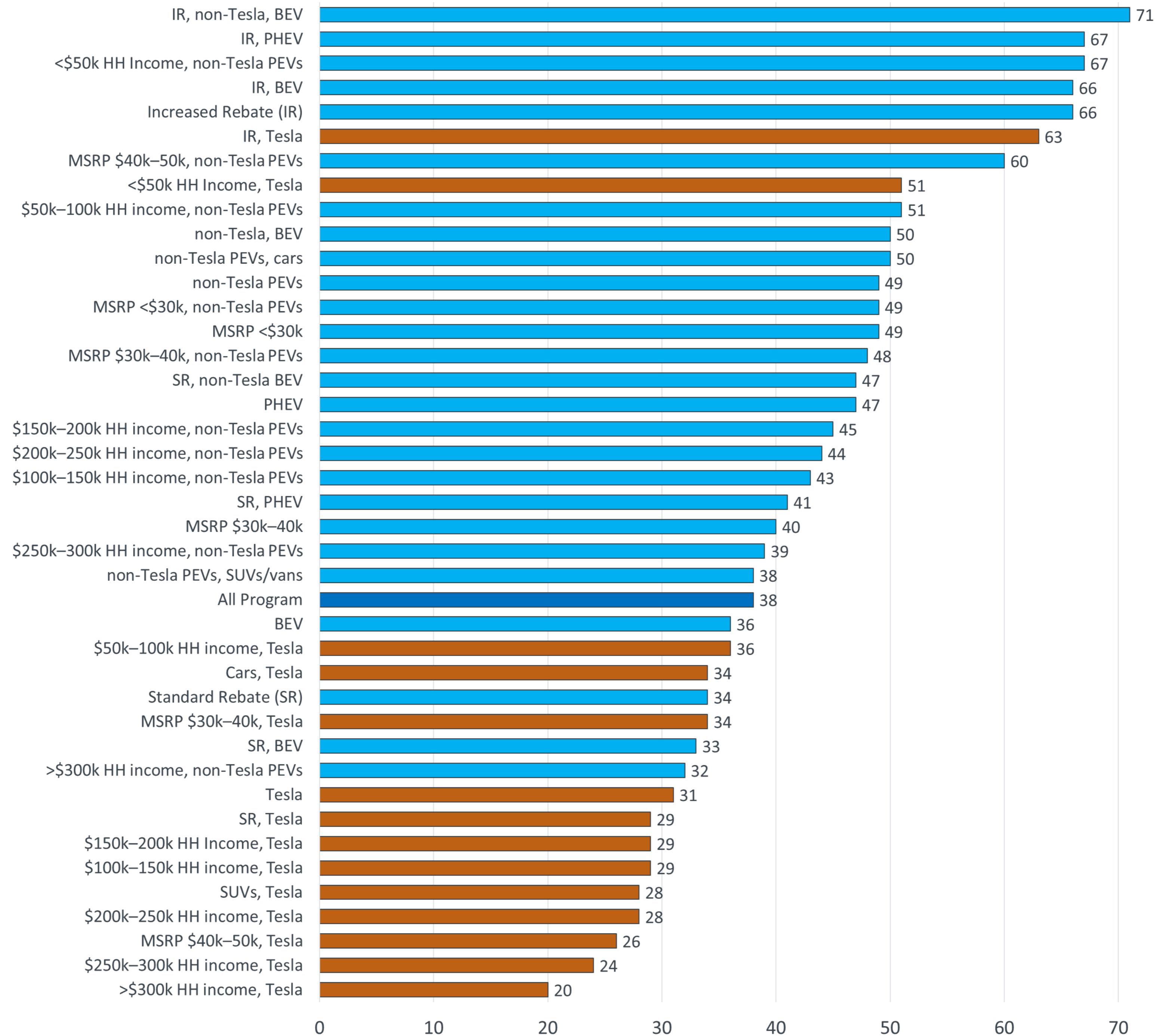
Below Program Average *Rebate Essentiality*

PEVs



Summarizes findings [here](#) (May 2022)

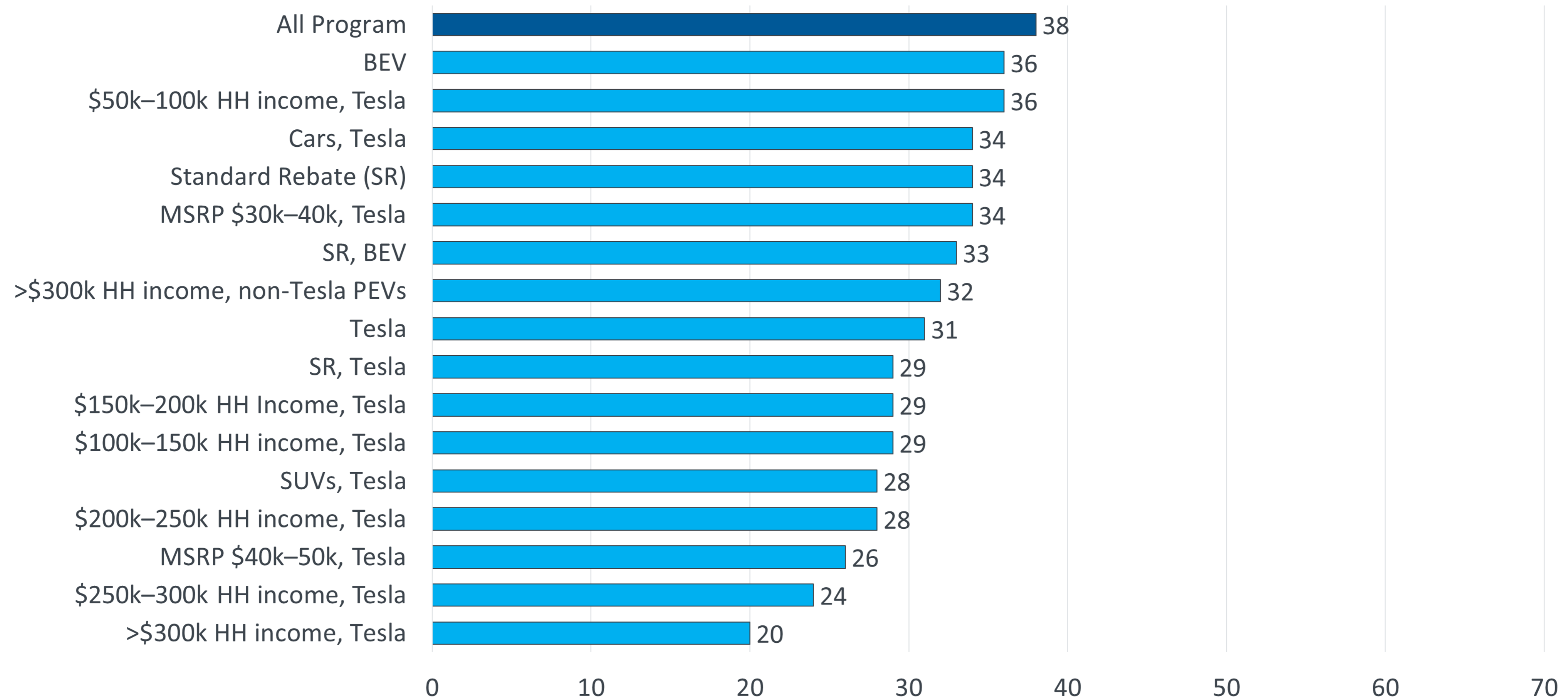
Double Check... Tesla Dilemma



Compiles analysis
summarized [here](#) (May 2022)

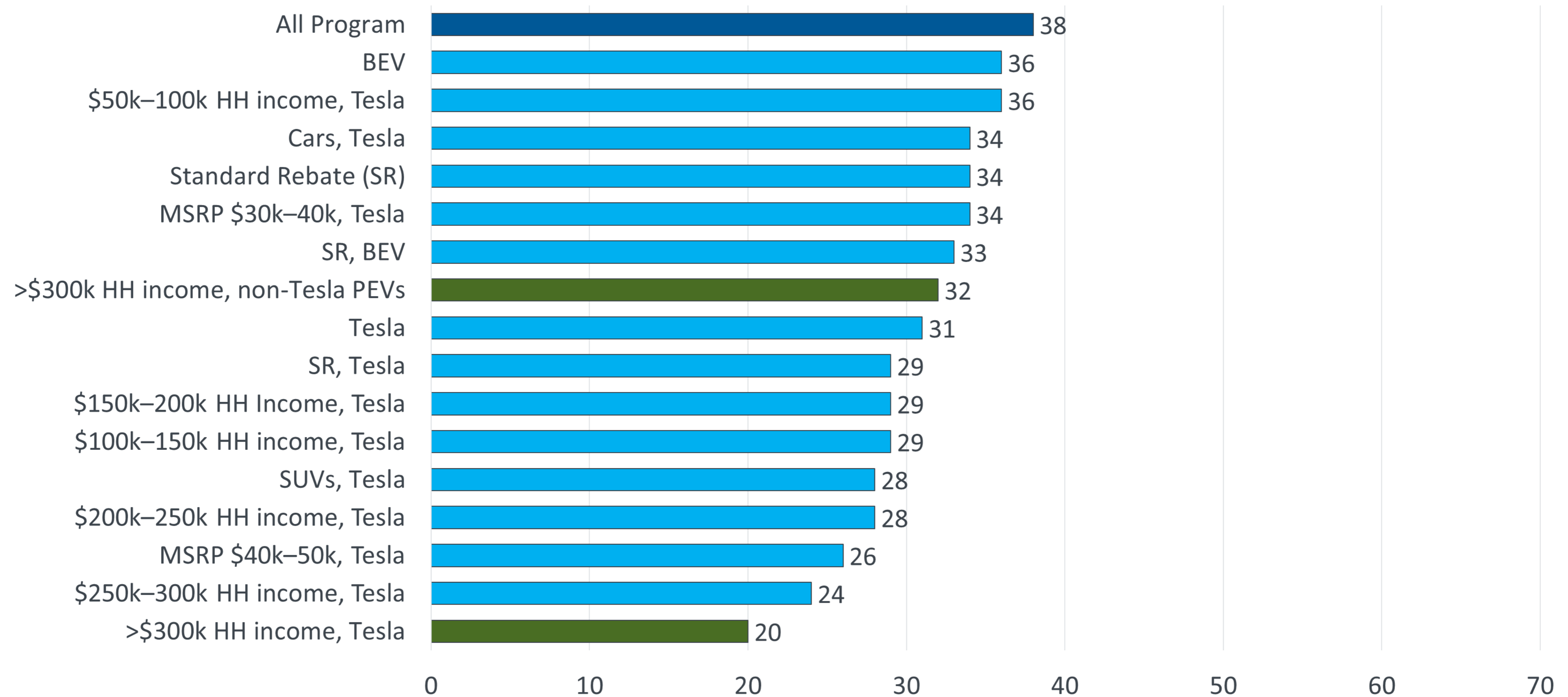
Below Program Average Redux...

PEVs



Summarizes findings [here](#) (May 2022)

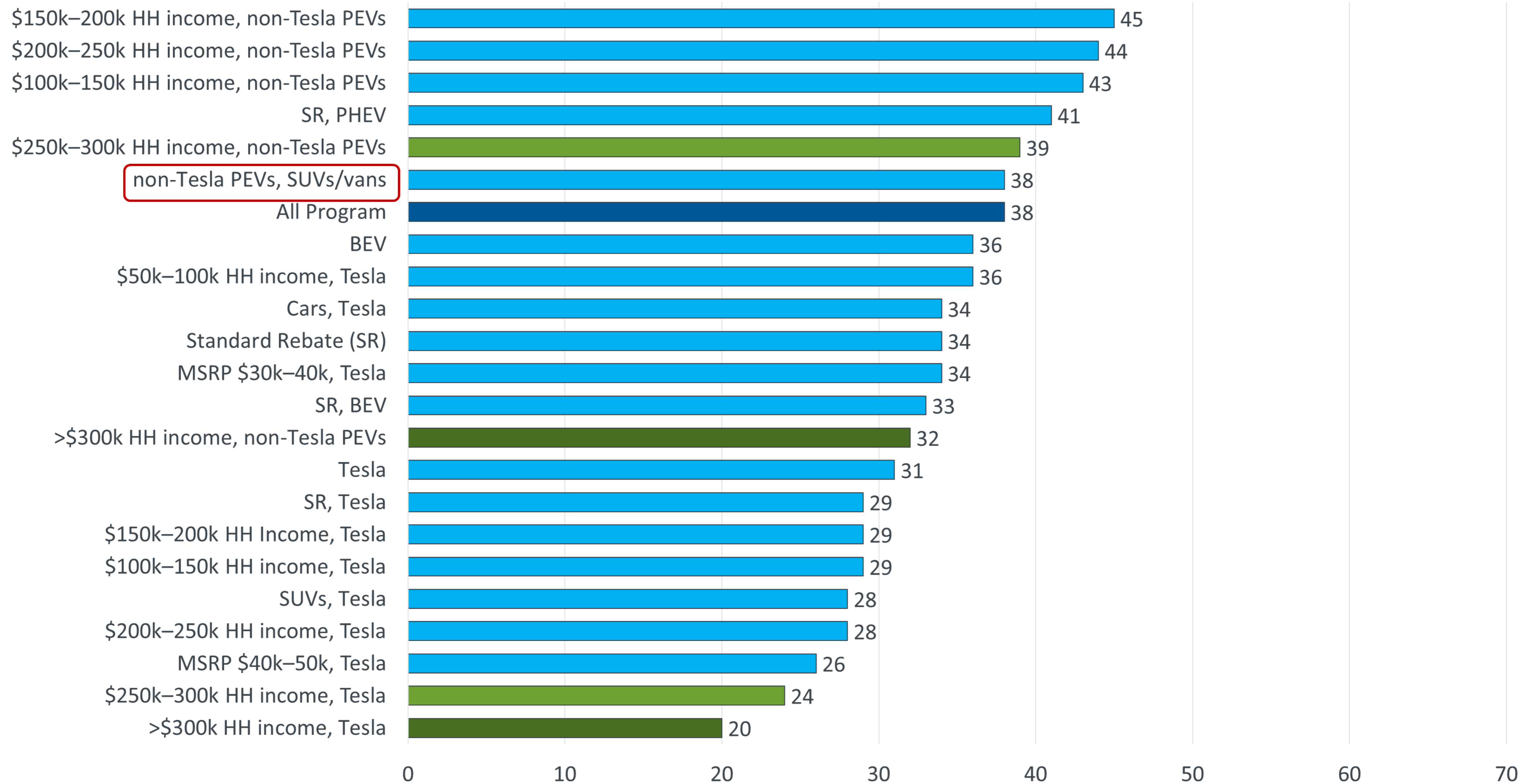
Below Program Average **Slam Dunk: Household Income >\$300,000** PEVs



Summarizes findings [here](#) (May 2022)

Below Program Average Next Step: Household Income >\$250,000?

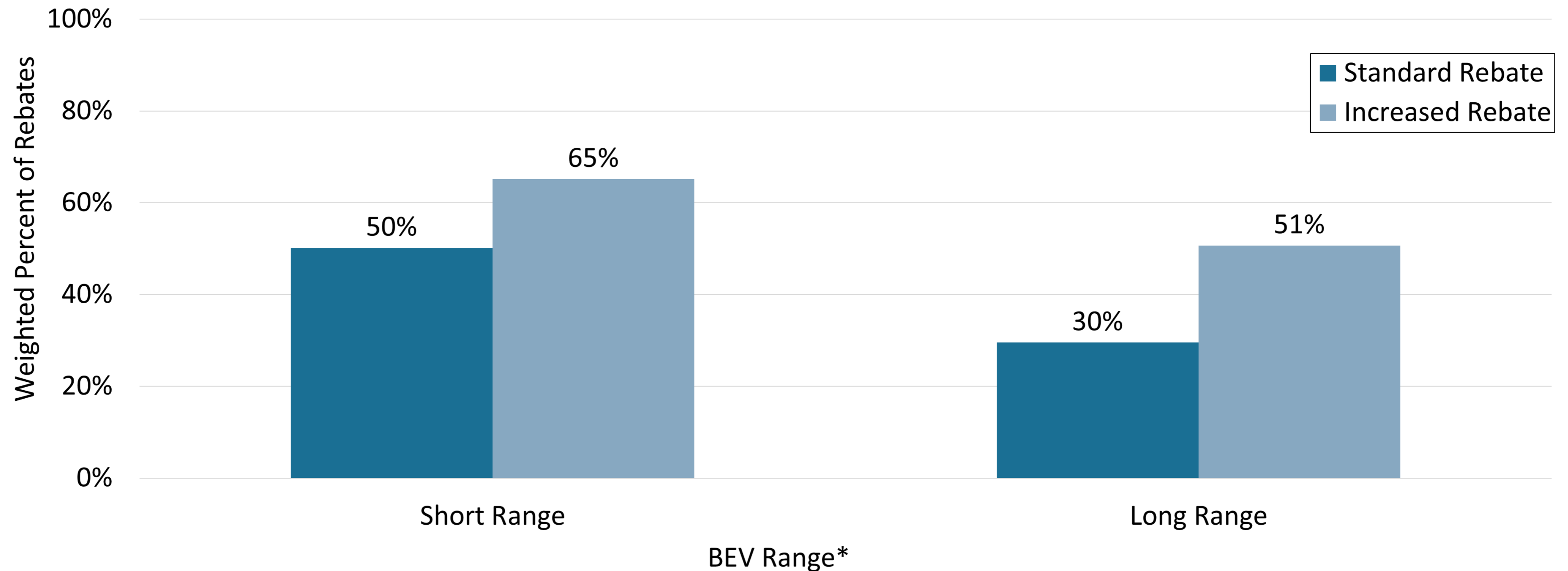
PEVs



Summarizes findings [here](#) (May 2022)

Rebate Essentiality by U.S. EPA all-electric range for BEVs

2021 purchases/leases



CVRP Consumer Survey, 2020–2022 Interim Dataset. Filtered, question-specific n = 6,702.

** Where range was unavailable for a given MY, ranges from the previous or following MY were used. Nissan LEAF was assumed to be the 40kW-hr battery variant (short range), and LEAF Plus was assumed to be 62 kW-hr battery variant (long range).*

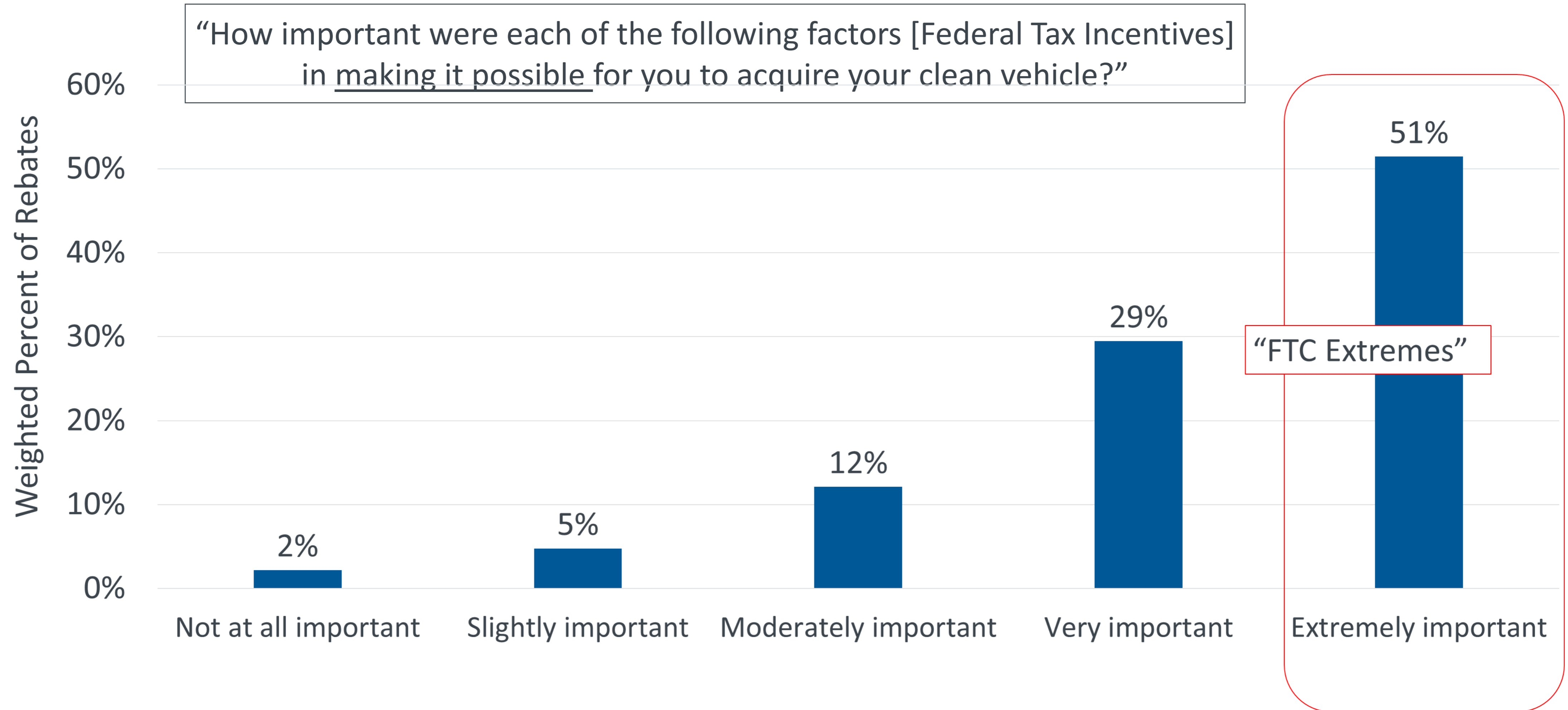
Next Steps

- Examine rebate influence by additional factors (like electric range)
- Utilize Free-Rider Abatement Curve approach to rank-order and assess impact of program-change recommendations
- Examine 2022 data (in progress)

Federal Tax Credit (FTC) Influence

Importance of Federal Tax Credit (FTC)

eligible* 2021 plug-in EV purchases/leases

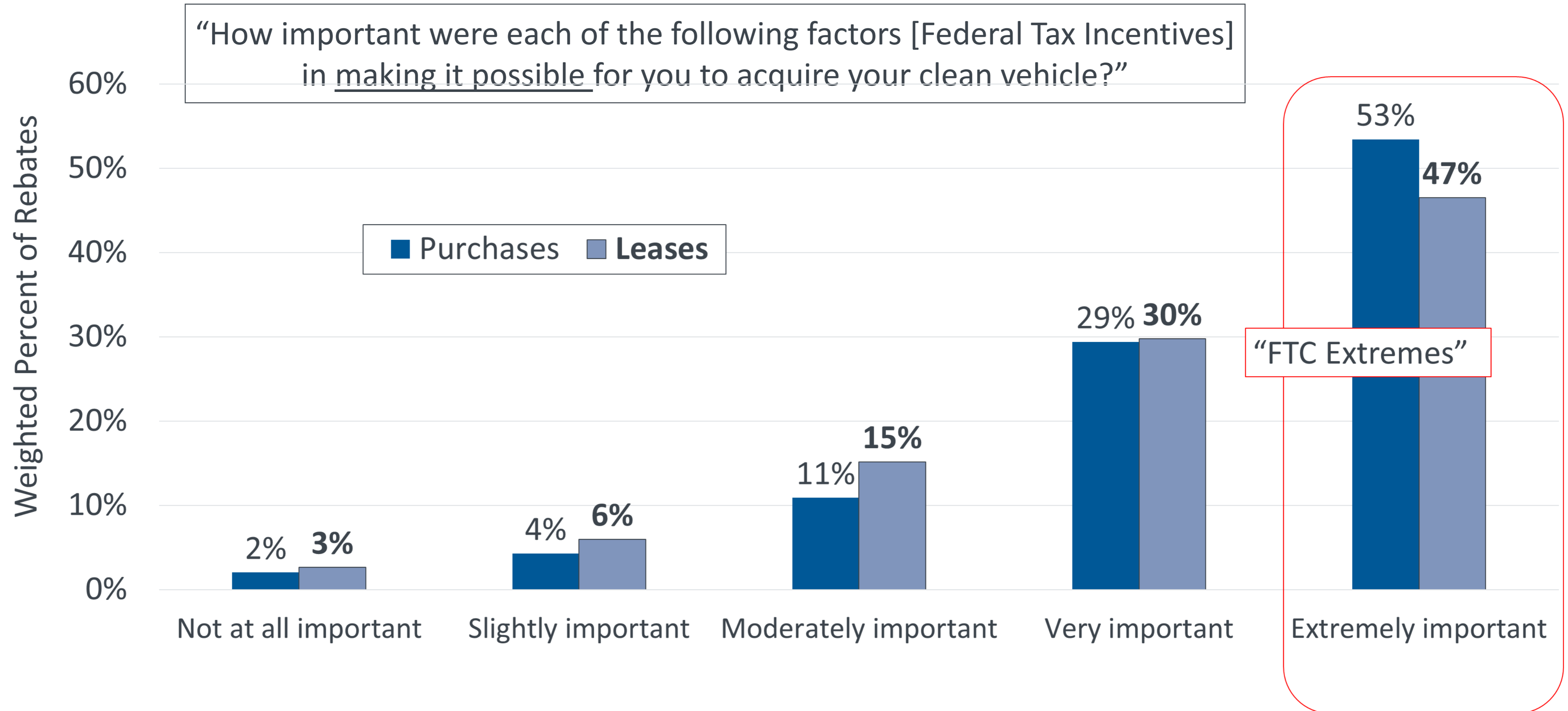


* Note: Tesla and GM ineligible.

CVRP Consumer Survey, 2020–2022 Interim Dataset. Filtered, question-specific n = 2,520

Importance of Federal Tax Credit: Purchases vs. Leases

eligible* 2021 plug-in EVs

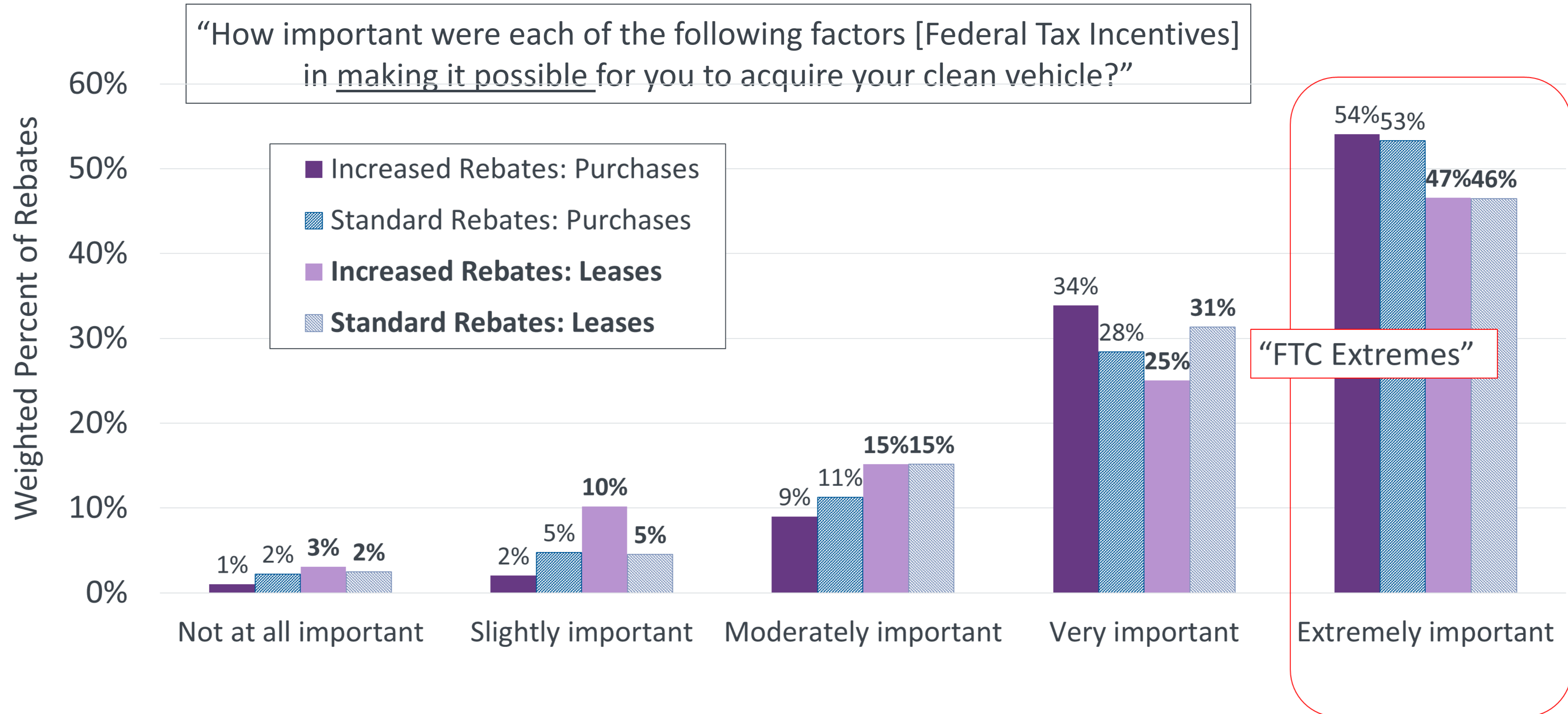


* Note: Tesla and GM ineligible.

CVRP Consumer Survey, 2020–2022 Interim Dataset. Filtered, question-specific n = 2,520

Importance of Federal Tax Credit: Rebate Type & Purchase/Lease

eligible* 2021 plug-in EVs



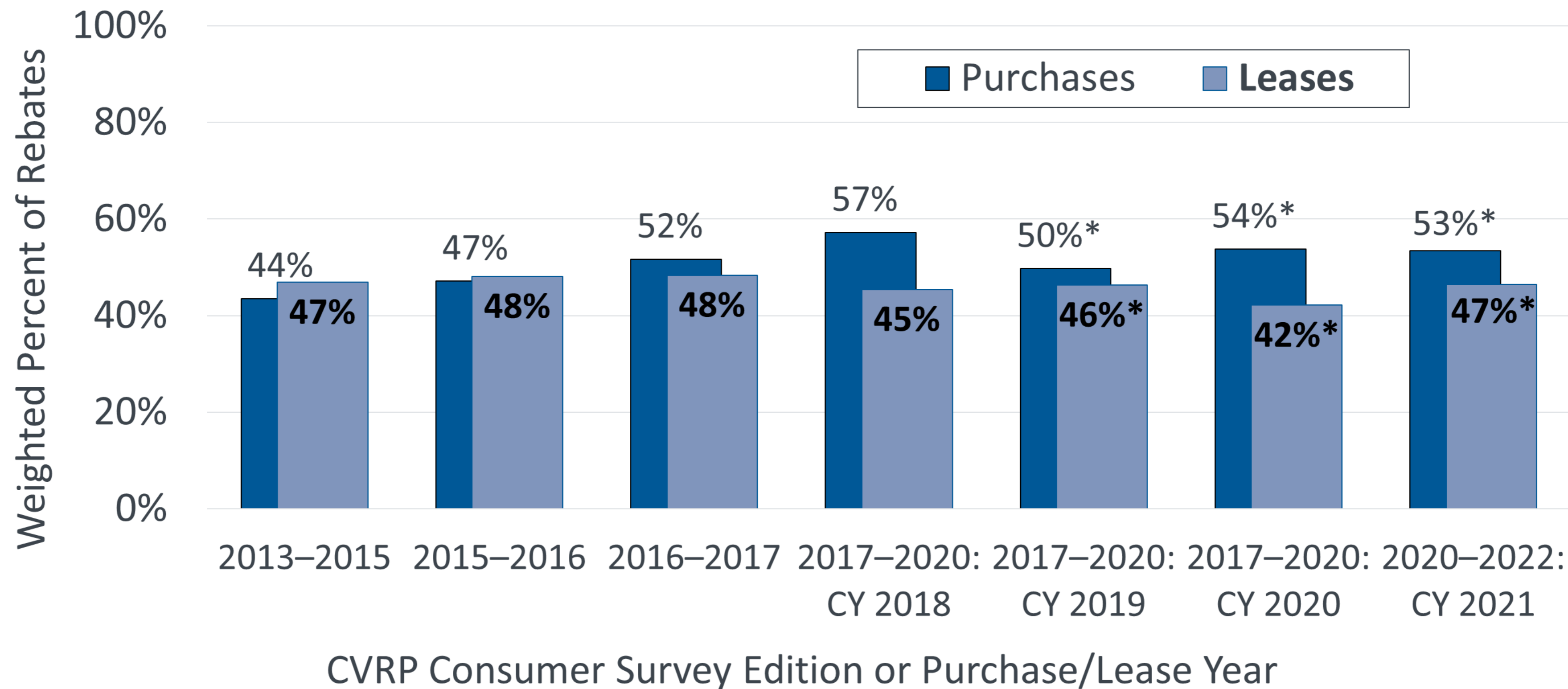
* Note: Tesla and GM ineligible.

CVRP Consumer Survey, 2020–2022 Interim Dataset. Filtered, question-specific n = 2,520

Extreme Importance of Federal Tax Credit Over Time

eligible* purchases vs. leases

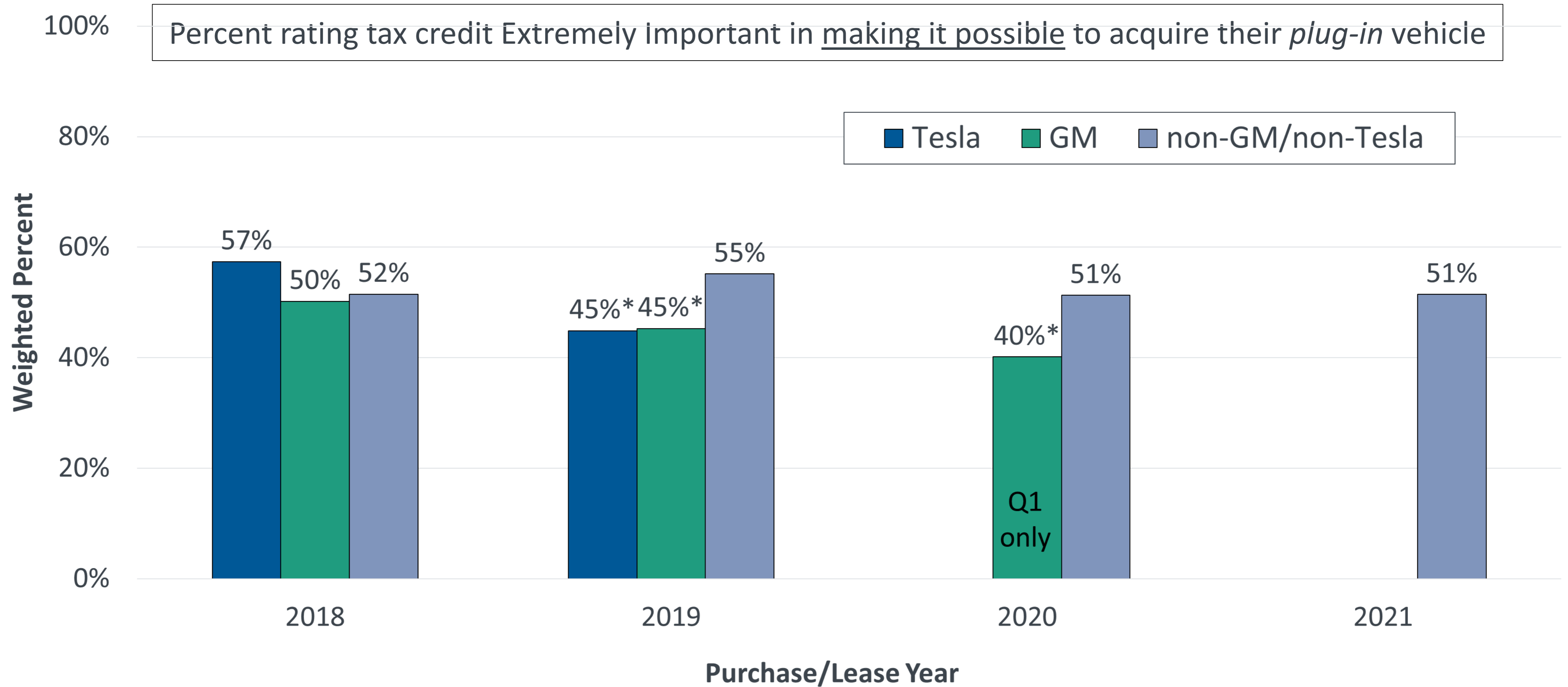
Percent rating tax credit Extremely Important in making it possible to acquire their *plug-in* vehicle



* Note: federal tax credit phase-out for Tesla began 1/1/2019 and concluded 12/31/2019. Phase out for GM began 4/1/2019 and concluded 3/31/2020.
 CVRP Consumer Survey, 2013–2015 Edition: n = 18,997. 2015–2016 Edition: n = 10,791. 2016–2017 Edition: n = 8,267.
 2017–2020 Edition: 2018 n = 14,225; 2019 n = 8,665; 2020 n = 1,550. 2020–2022 Interim Dataset: 2021 n = 2,520.
 n-values are filtered and question-specific.

Extreme Importance of Federal Tax Credit: Phase-Out Years

eligible* purchases/leases

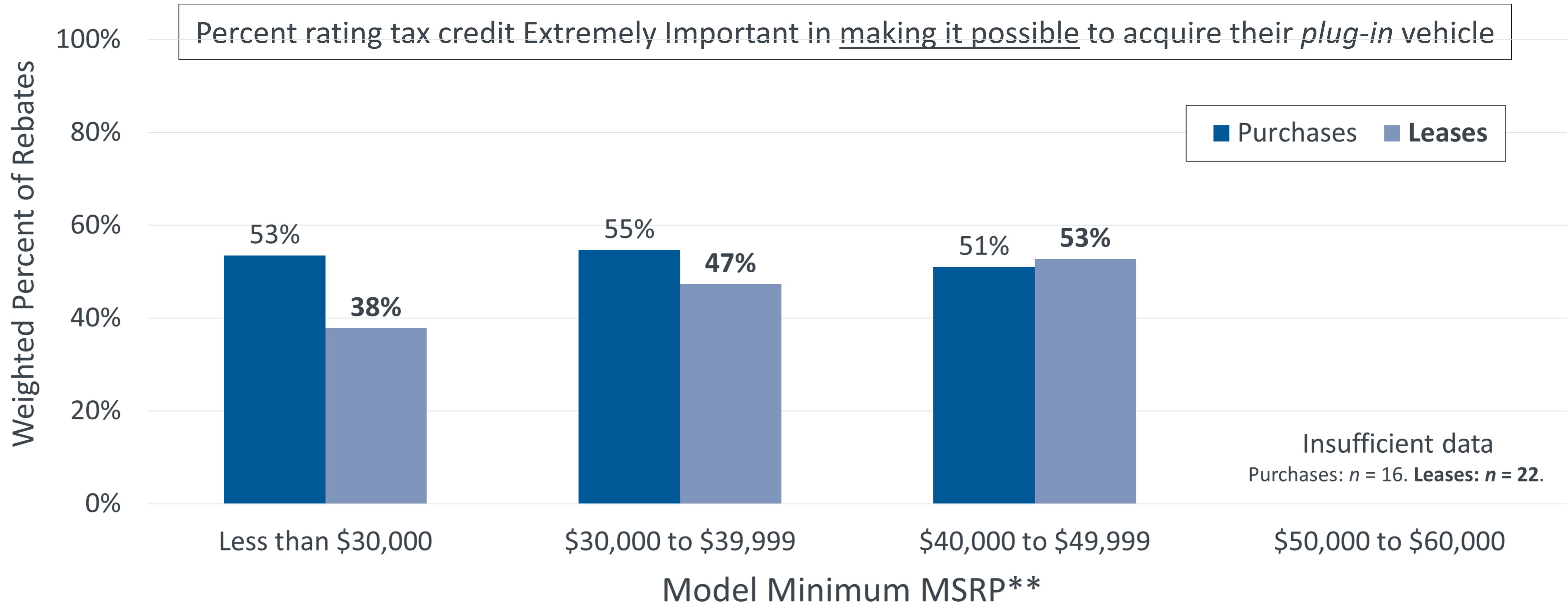


* Note: federal tax credit phase-out for Tesla began 1/1/2019 and concluded 12/31/2019. Phase out for GM began 4/1/2019 and concluded 3/31/2020. During Q1 2020, GM plug-in EVs were eligible for a reduced tax credit of \$1,875.

CVRP Consumer Survey, 2017–2020 Edition: 2018 n = 14,225. 2019 n = 8,665. 2020 n = 1,550. 2020–2022 Interim Dataset: 2021 n = 2,520. n-values are filtered and question-specific.

Extreme Importance of Federal Tax Credit by MSRP

eligible* 2021 purchases/leases



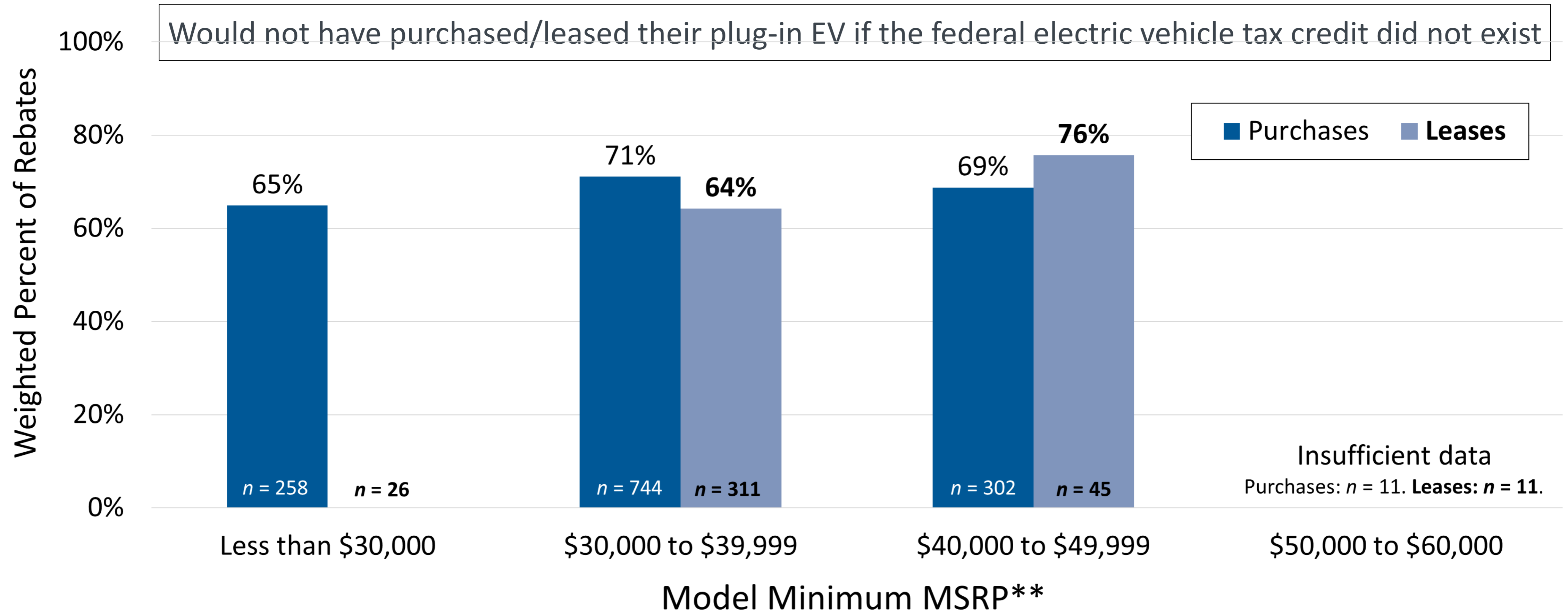
* Note: Tesla and GM ineligible.

** 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. See "MSRP Methodology" slide for further detail.

CVRP Consumer Survey, 2020–2022 Interim Dataset. Filtered, question-specific n = 2,520.

Essentiality of Federal Tax Credit High at all MSRPs in Data

eligible* 2021 purchases/leases



* Note: Tesla and GM 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. See "MSRP Methodology" slide for further detail.

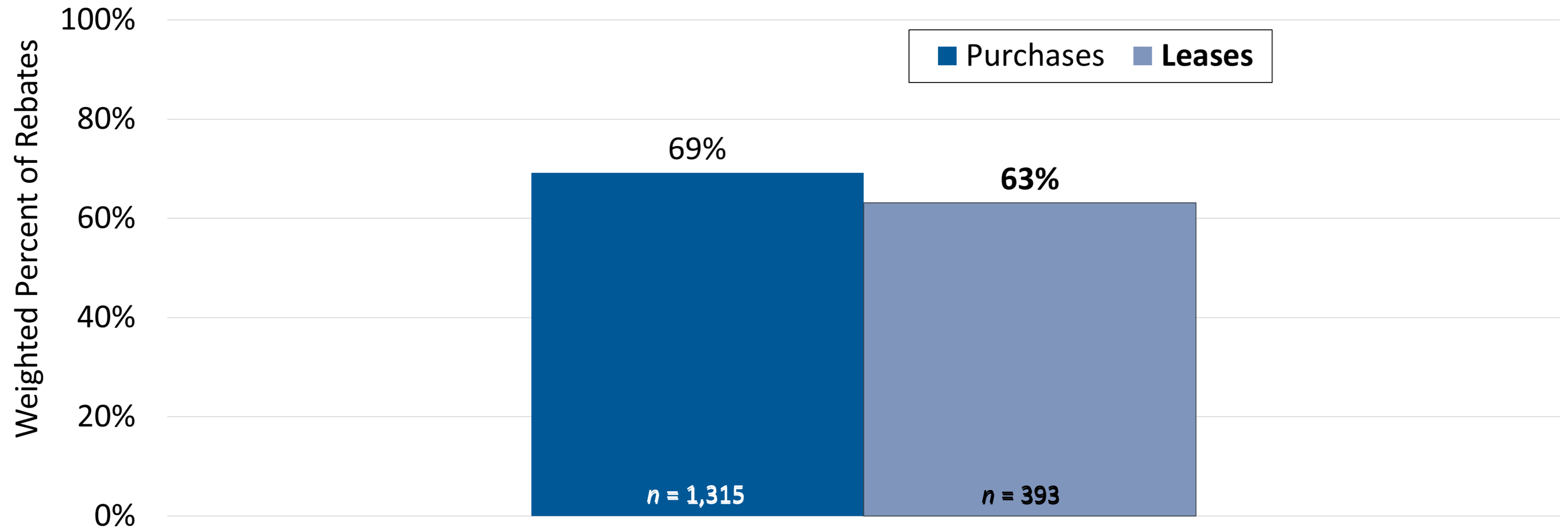
"Not sure" and "Not applicable" responses are excluded.

CVRP Consumer Survey, 2020–2022 Interim Dataset. Filtered, question-specific n = 1,708.

Federal Tax Credit Essentiality: Purchases vs. Leases

eligible* 2021 plug-in EVs

Would not have purchased/leased their plug-in EV if the federal electric vehicle tax credit did not exist



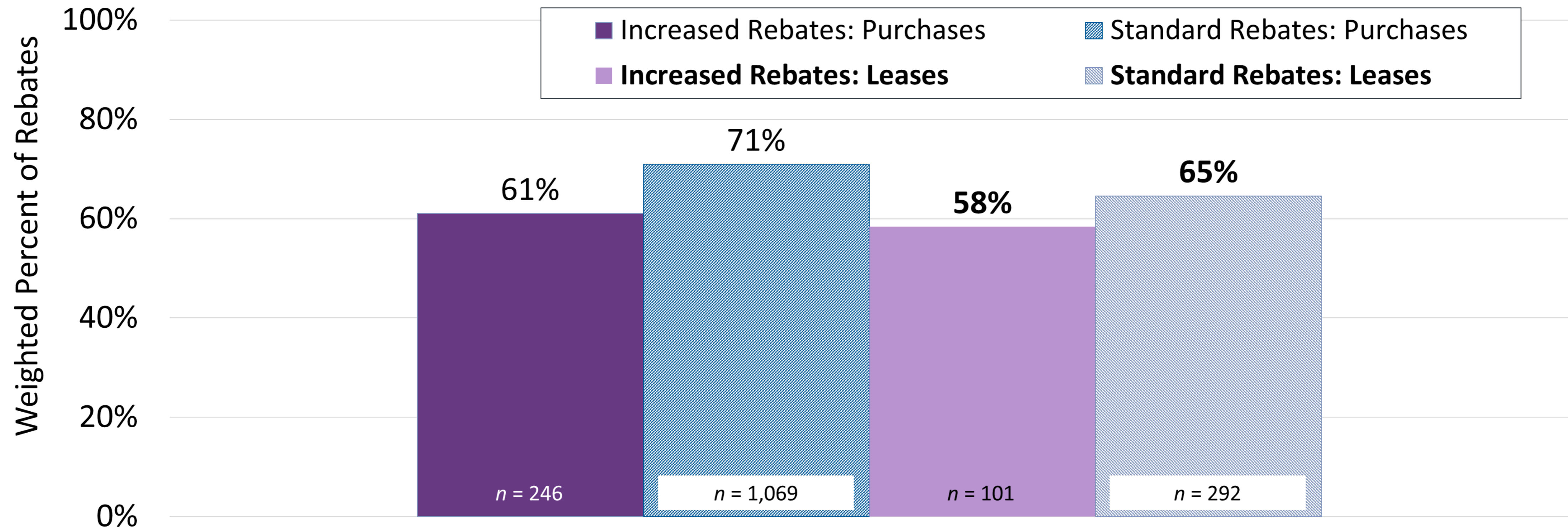
* Note: Tesla and GM ineligible.

“Not sure” and “Not applicable” responses are excluded.

CVRP Consumer Survey, 2020–2022 Interim Dataset. Filtered, question-specific n = 1,708

Federal Tax Credit Essentiality: Lower for Increased Rebate Recipients, Leases eligible* 2021 plug-in EVs

Would not have purchased/leased their plug-in EV if the federal electric vehicle tax credit did not exist



* Note: Tesla and GM ineligible.

“Not sure” and “Not applicable” responses are excluded.

CVRP Consumer Survey, 2020–2022 Interim Dataset. Filtered, question-specific n = 1,708

Wrap Up

Summary & Select Findings: Rebate Influence

Context:

- Eligibility for the Increased Rebate broadened to 400% FPL; Standard Rebate typically at/near historic lows.
- \$60k MSRP cap, e-range minimum, decreased standard rebate, and income caps create guardrails.
- COVID-19 and fallout.

Rebate Influence (2021):

- *Rebate Importance*: enabler of EV acquisition for 87% (up from 2020); 93% for Increased Rebate recipients.
- *Rebate Essentiality*: decreased in 2020, primarily for Tesla consumers, followed by decreases for non-Tesla in 2021.
 - 32% for Teslas, but 38% for PHEVs, 43% for non-Tesla BEVs, 51% for Increased Rebate recipients.
- Influence decreases as income increases, lower for Tesla.
 - Substantial influence up to \$300k for non-Tesla households.
- Attractive offerings (SUVs, long-range BEVs, Teslas) had lower *Rebate Essentiality*.
 - Difference between Tesla and non-Tesla was bigger than difference between cars and SUVs/vans
- Trend toward lower-MSRP cars through 2019 reversed in 2020 and 2021 with growth of Tesla Model Y
- Rebate influence decreases as MSRP increases for Standard Rebates
 - Evidence weak for MSRP caps below \$60k for Increased Rebates
- In absence of the rebate, Tesla consumers more likely to still have acquired a new EV, Increased Rebate recipients more likely to have not made any purchase/lease

Designing for Cost-Effective Emission Reduction and EV Market Growth

- Process for converting results into a “Free Rider Abatement Curve” to rank-order program-design recommendations

Summary & Select Findings: Federal Tax Credit (FTC) Influence

- Frequency of reporting FTC “extremely important” in making purchase/lease possible:
 - Relatively steady over time
 - Higher for purchases than leases, except for vehicles >\$40k model-minimum MSRP
 - Counterintuitively* similar for Standard and Increased Rebate Recipients
 - While Increased Rebate Recipients have higher *Rebate Essentiality* than Standard Rebate Recipients, the two rate the FTC similarly important
- *Essentiality* of FTC:
 - Similar patterns to Extreme Importance, except counterintuitively* higher for Standard Rebate Recipients

* Counterintuitive findings likely due to Increased Rebate recipients not having enough tax liability to benefit from FTC.

Appendix: Additional Details & Resources

Funding Availability Has Been Regularly Disrupted

(as of Sept. 2021)

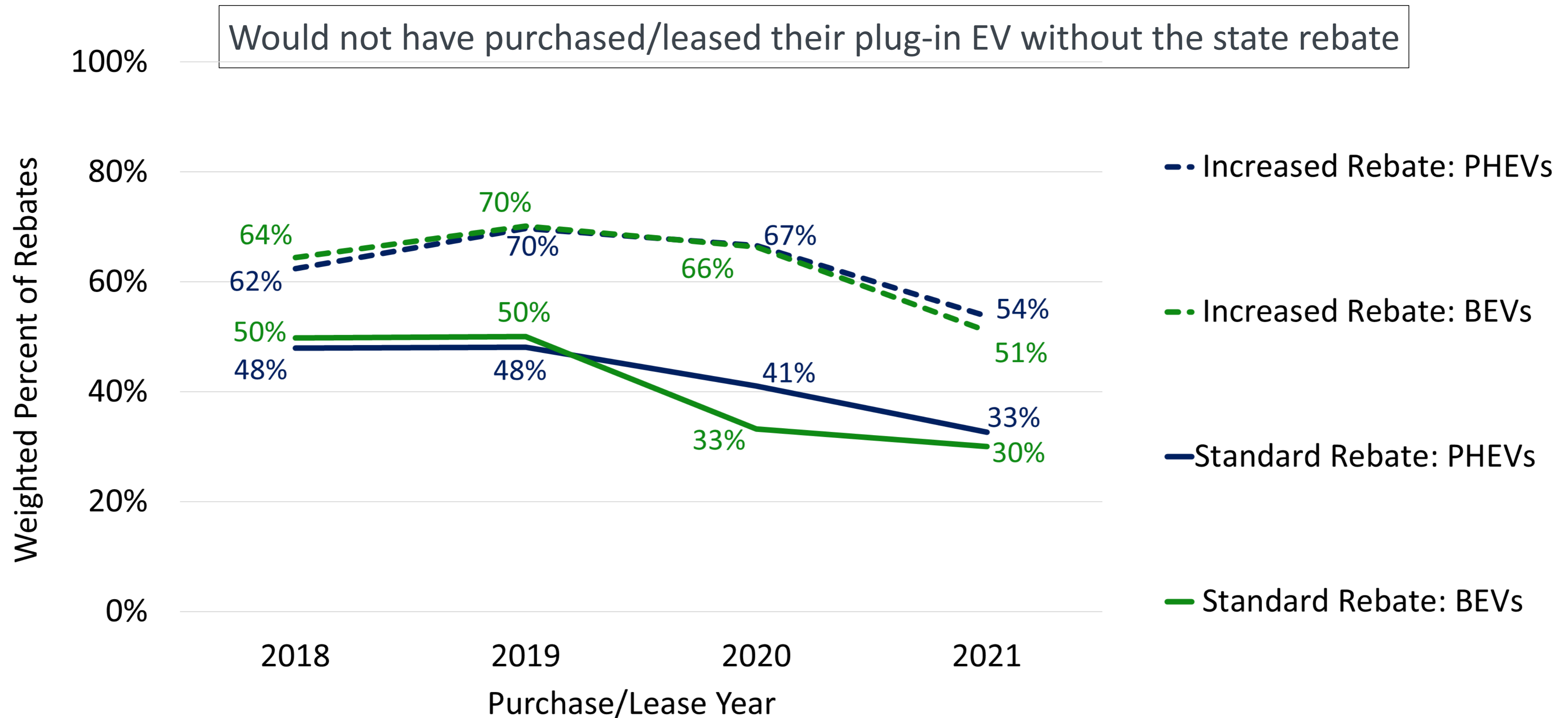
Table 4: CVRP Waitlists

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.

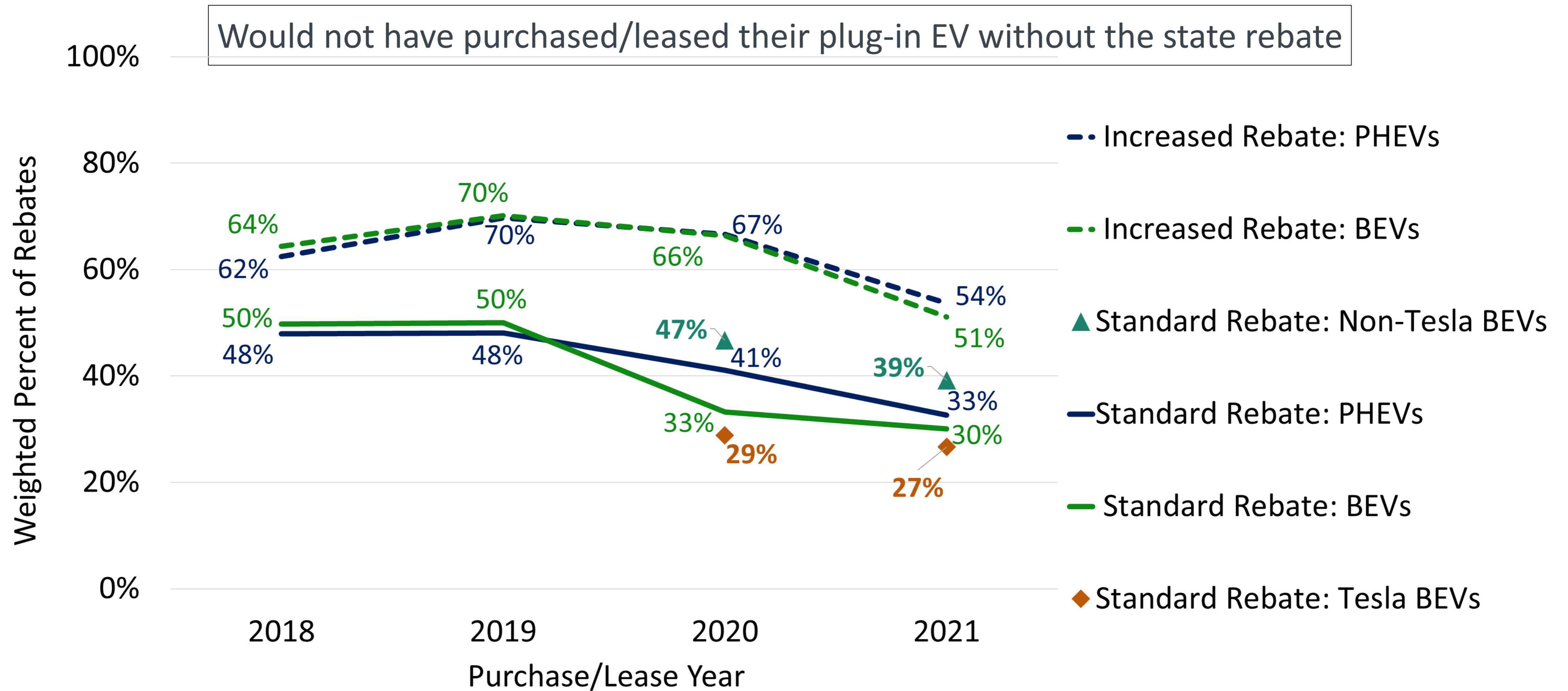
** For standard applications only; no waitlist for income-qualified increased rebates.

Rebate Essentiality by Vehicle and Rebate Type Over Time



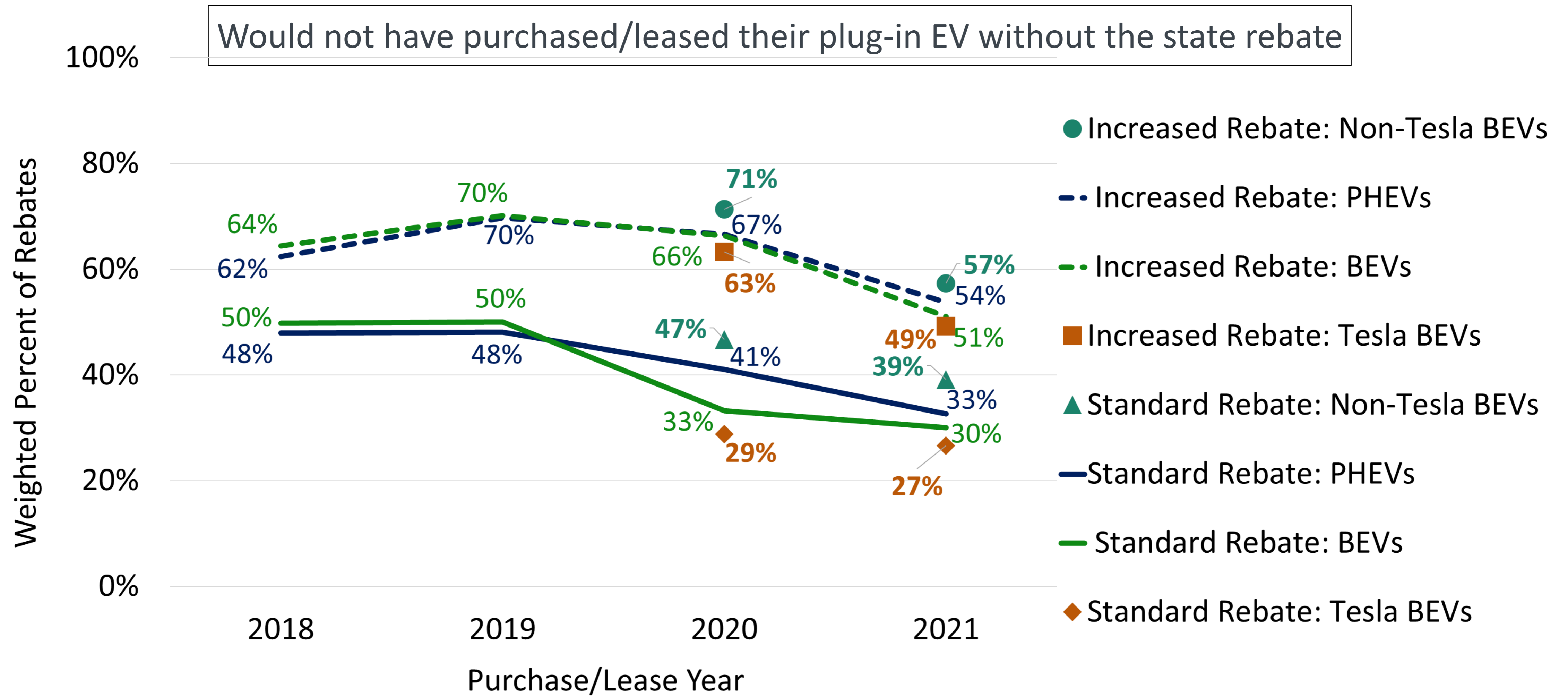
CVRP Consumer Survey, 2017–2020 Edition: 2018 n = 14,655; 2019 n = 8,929; 2020 n = 4,304. 2020–2022 Interim Dataset: 2021 n = 7,660. n-values are filtered and question-specific. 2020 & 2021 weights specific to 2020 & 2021 purchases/leases, respectively.

Rebate Essentiality by Vehicle and Rebate Type Over Time: Tesla's Effect



CVRP Consumer Survey, 2017–2020 Edition: 2018 n = 14,655; 2019 n = 8,929; 2020 n = 4,304. 2020–2022 Interim Dataset: 2021 n = 7,660. n-values are filtered and question-specific. 2020 & 2021 weights specific to 2020 & 2021 purchases/leases, respectively.

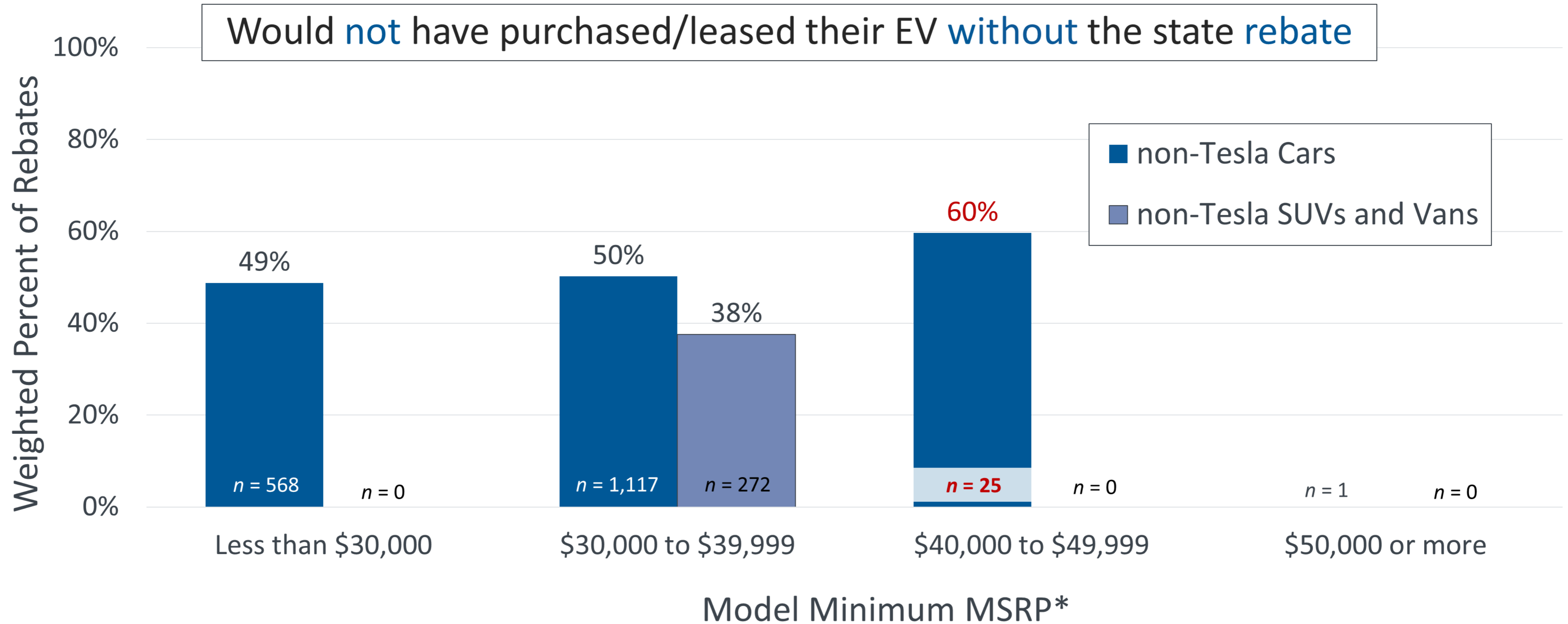
Rebate Essentiality by Vehicle and Rebate Type Over Time: Tesla's Effect



CVRP Consumer Survey, 2017–2020 Edition: 2018 n = 14,655; 2019 n = 8,929; 2020 n = 4,304. 2020–2022 Interim Dataset: 2021 n = 7,660. n-values are filtered and question-specific. 2020 & 2021 weights specific to 2020 & 2021 purchases/leases, respectively.

Rebate Essentiality by Vehicle Type & MSRP for Non-Tesla EVs

2020 Plug-in EV Purchases/Leases

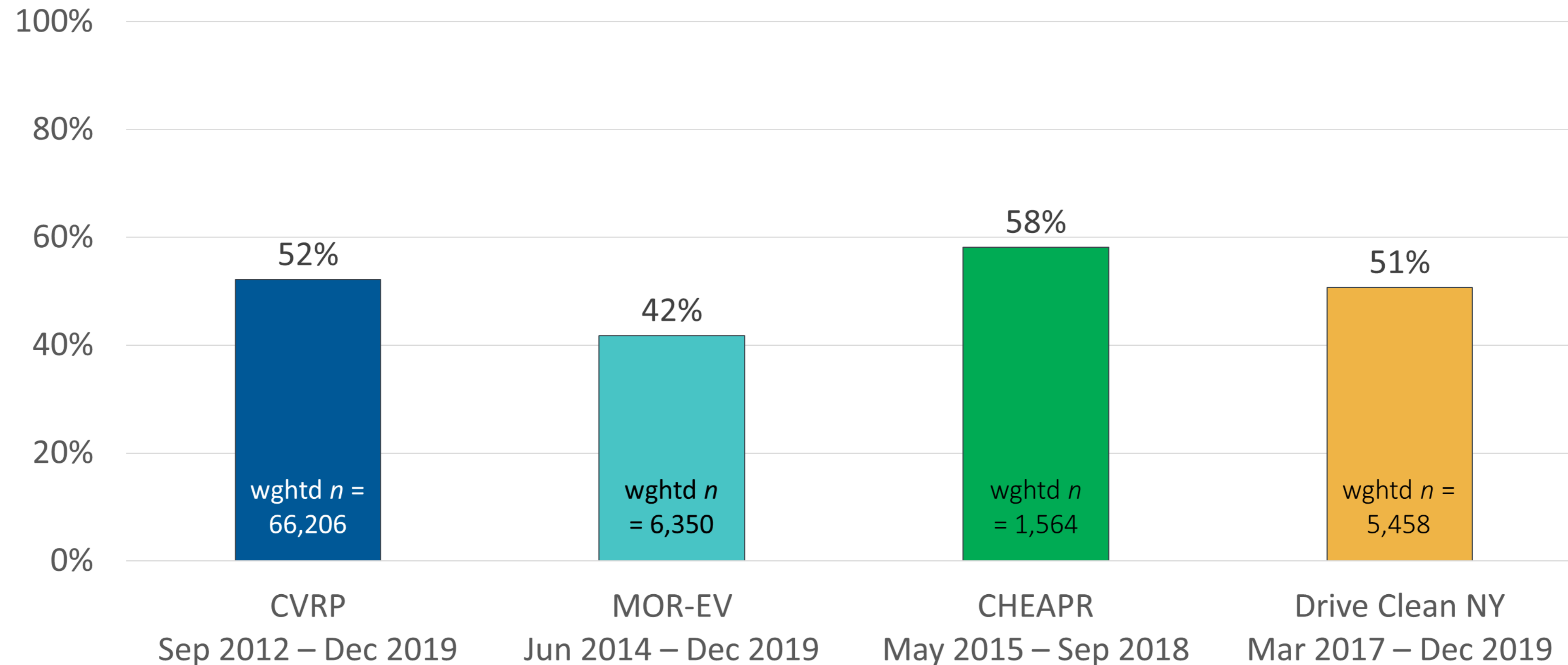


CVRP Consumer Survey, 2017–2020 Edition. Filtered, question-specific n = 1,983.

* 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 MSRPs do change mid-MY; Model 3’s were assigned an MSRP of \$49k for MY 2018, \$35k for MY 2019 and 2020, and \$39,990 for MY 2021. Model Y’s were assigned an MSRP of \$48k for MY 2020 and \$39,990 for MY 2021.

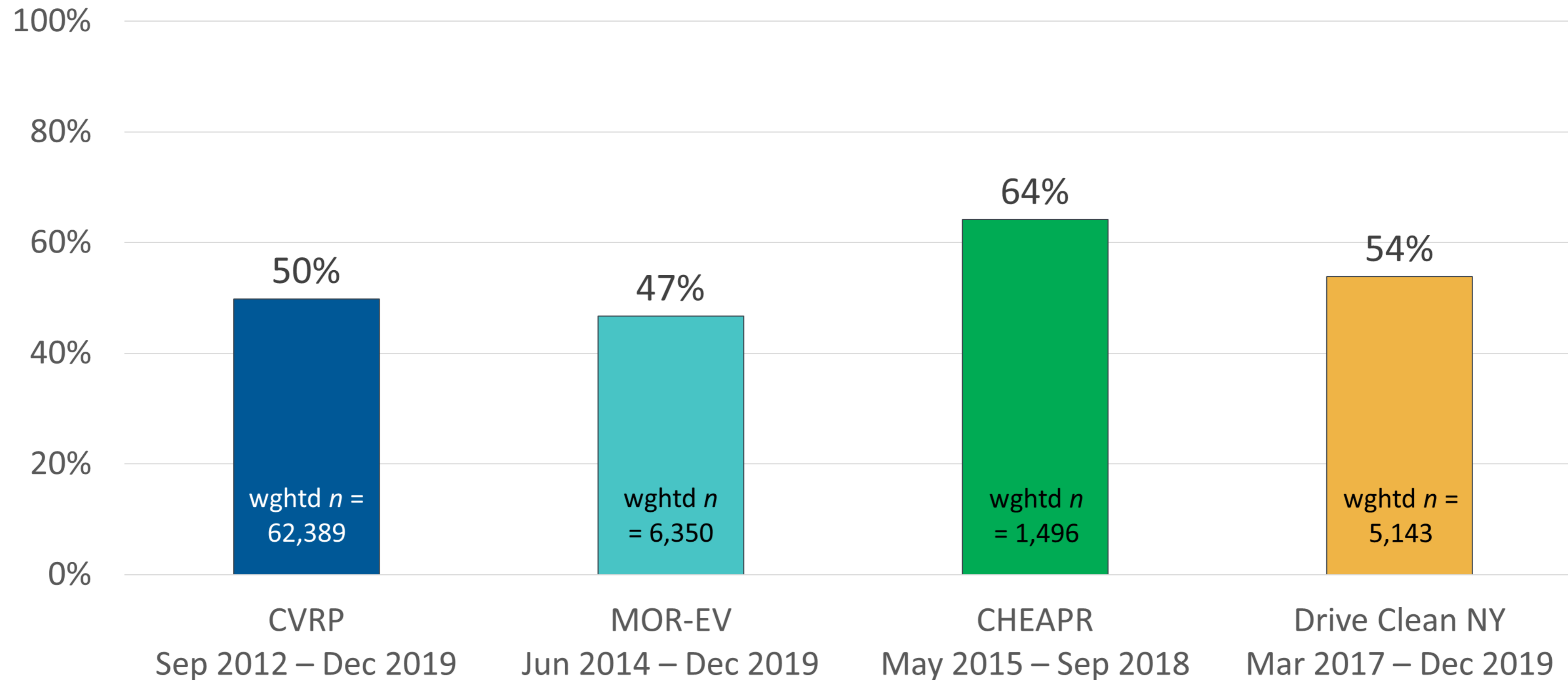
Rebate Influence: Essentiality

Would **not** have purchased/leased their clean vehicle **without rebate**



*Includes fuel-cell EVs (CVRP only). Weighted n values are question-specific.
Overall datasets: 80,557 total survey respondents weighted to represent 380,700 rebate recipients.*

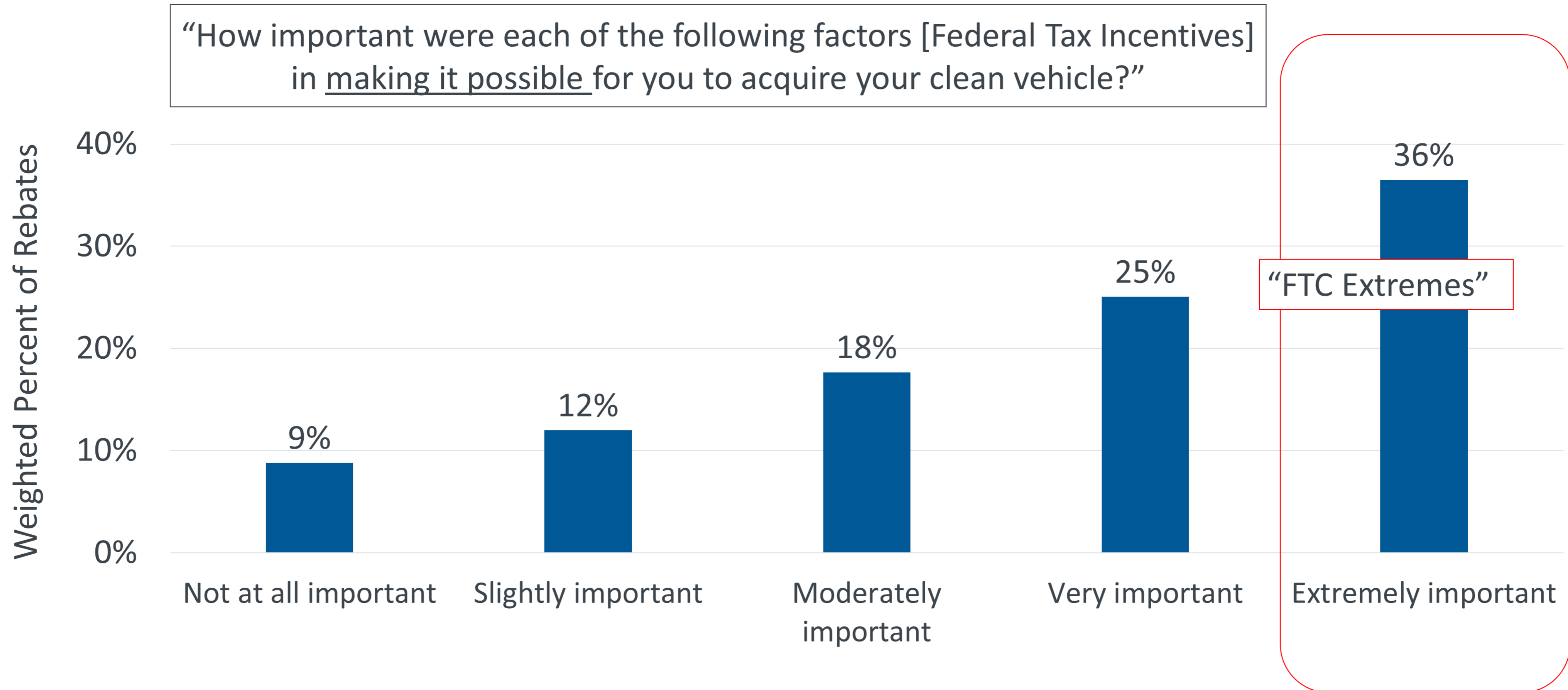
Percent Rating the Federal Tax Credit “Extremely Important” (“...in making it possible” to acquire plug-in EVs)



*Includes fuel-cell EVs (CVRP only). Weighted n values are question-specific.
 Overall datasets: 80,557 total survey respondents weighted to represent 380,700 rebate recipients.*

Importance of Federal Tax Credit

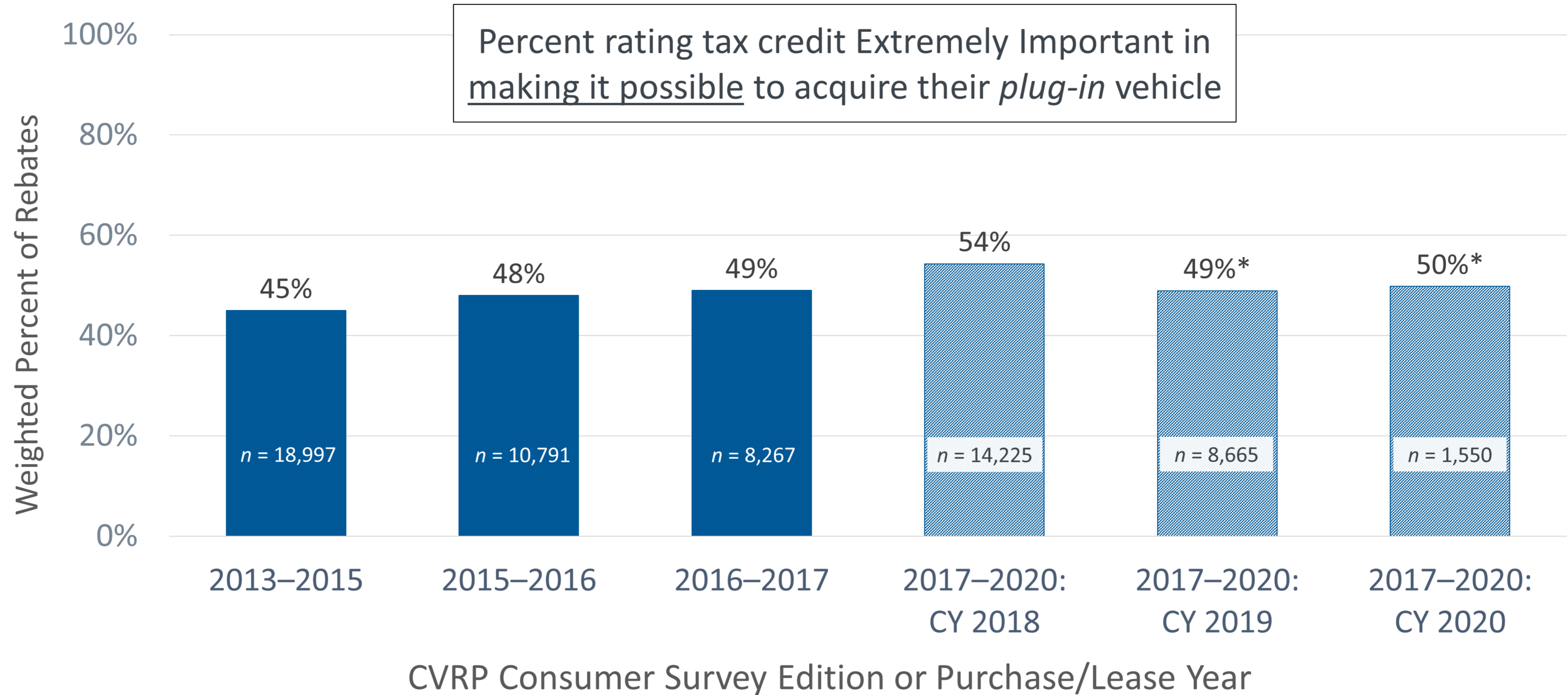
(CY 2020 Plug-in EVs)*



* Note: federal tax credit began phasing out for Tesla and GM in 2019
CVRP Consumer Survey, 2017–2020 Edition. Filtered, question-specific n = 3,536

Extreme Importance of Federal Tax Credit Over Time

eligible* purchases/leases



* Note: federal tax credit phase-out for Tesla began 1/1/2019 and concluded 12/31/2019. Phase out for GM began 4/1/2019 and concluded 3/31/2020. Overall datasets: 72,552 total survey respondents weighted to represent 376,800 rebate recipients. CY 2020 weights specific to 2020 purchases/leases. n-values are filtered and question-specific.

Strong demand in the U.S. is relative

U.S. is falling way behind Europe and China. Even though U.S. car market is 15 million and Europe's is 11 million:

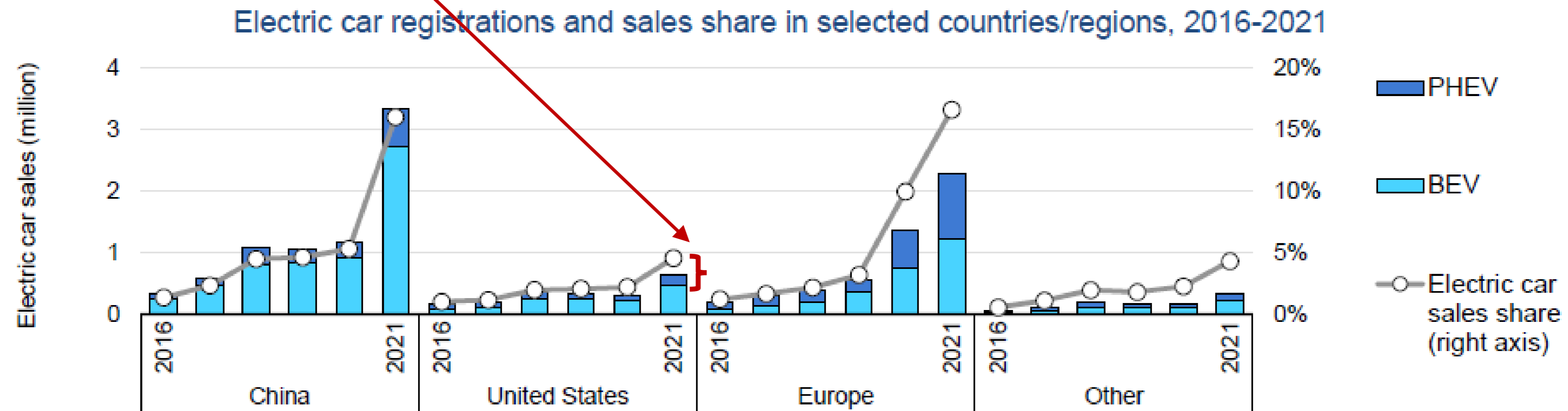


Image from IEA's "Global EV Outlook 2022"

Select State EV Rebate Programs Administered by CSE (in order of launch, as of June 2023)



		California Clean Vehicle Rebate Project	MOR-EV	CHEAPR	New York State	Oregon Clean Vehicle Rebate Program	ChargeUp New Jersey
Rebate Amounts	Fuel-Cell EVs	\$4,500 (+3,000*)	\$3,500	\$7,500 (+\$2,000*)	≥ 200 e-miles: \$2,000 ≥ 40 e-miles: \$1,000 < 40 e-miles: \$500 Base MSRP > \$42k: \$500	≥ 10 kWh: \$2,500 (+\$5,000*) < 10 kWh: \$1,500 (+\$5,000*)	--
	All-Battery EVs	\$2,000 (+5,500*)	\$3,500	\$2,250 (+\$2,000*)			\$25/e-mile: \$2k max for MSRP < \$55k; \$4k max for MSRP < \$45k
	Plug-in Hybrid EVs	BEVx = \$2,000 Others = \$1,000 (+\$5,500*)	BEVx = \$3,500 Others = \$1,500	\$750 (+\$1,500*)			--
	Zero-Emission Motorcycles	\$750	--	--			--
Program Design Elements	Rebate Adder	*Income-qualified	--	*Qualified by proxy, income, or location	--	*Income-qualified	--
	Point-of-Sale	--	--	Point-of-sale	Point-of-sale	Point-of-sale option	Point-of-sale
	Price Cap	Base MSRP: - Large PEVs ≤ \$60k - Car PEVs ≤ \$45k	Purchase price: - PHEVs ≤ \$50k - BEVs/FCEVs ≤ \$55k	Base MSRP ≤ \$50k	Base MSRP > \$42k = \$500	Base MSRP ≤ \$50k	Trim-specific MSRP < \$55k
	E-range Min.	≥ 30 e-miles	≥ 25 e-miles	--	--	--	--
	Misc.	Income cap Preapproval option for income-qualified in San Diego County or SJ Valley	--	Used EV program (\$7.5k/\$3k/\$1.125k with point-of-sale option) \$125/\$75 dealer sales incentive	--	Used EVs also qualify Program suspended as of 5/1/2023	Program suspended as of 4/17/2023

Electric miles (e-miles) are U.S.-EPA-rated all-electric miles. BEVx = range-extended battery electric vehicle (BMW i3 REx). NEV = Neighborhood EV.

About CSE

Mission-driven national nonprofit

Center for Sustainable Energy® (CSE) is a national nonprofit that accelerates adoption of clean transportation and distributed energy through effective and equitable program design, administration, and evaluation.

- Administer cutting-edge programs valued at over \$4 billion for governments, utilities and the private sector across the U.S.
- Leader in data-driven incentive program design and administration for:
 - Electric vehicle and EV charging incentive programs
 - Renewable energy incentive programs (solar and storage)
- Headquartered in San Diego with more than 250 employees across the nation

Objective and trusted

- Governments, utilities and the private sector trust CSE for its data-driven and software-enabled approach, deep domain expertise and customer-focused team.
- CSE's fee-for-service business model frees it from the influence of shareholders, members and donors, and ensures its independence.
- CSE's data and insights have informed policy at the local, state and federal level.

One mission —

DECARBONIZE.®

Our vision is a future with sustainable, equitable and resilient transportation, buildings and communities.



Center for
Sustainable
Energy®

Recommended citation:

B.D.H. Williams and N. Pallonetti (2023, Oct.), Presentation: “CVRP 2021 Data Brief: Incentive Influence,” prepared by the Center for Sustainable Energy for the Clean Vehicle Rebate Project, California Air Resources Board, Sacramento USA.

brett.williams@energycenter.org
EnergyCenter.org

 CleanVehicleRebate.org

