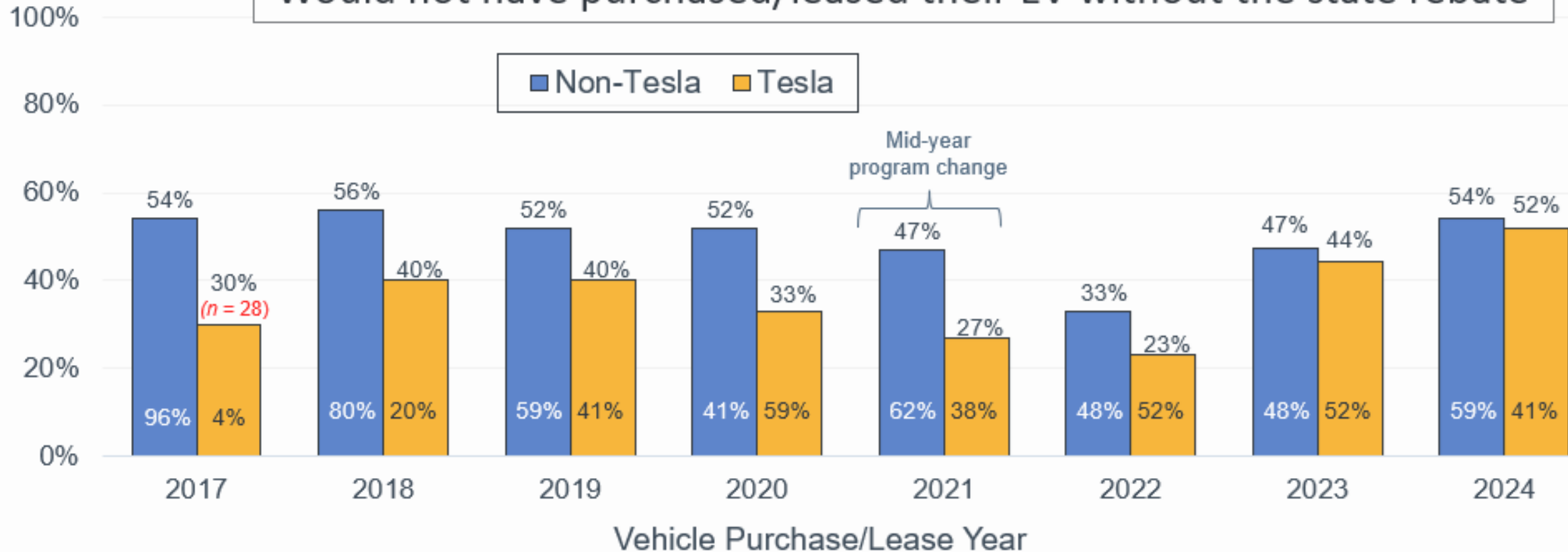


Would not have purchased/leased their EV without the state rebate

Weighted Percent of Rebates



Rebate Influence through 2024 and Designing for Cost-Effectiveness

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

Nicholas Pallonetti – Senior Research Analyst, CSE

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



June 2025

Outline

Intro & Preview of Findings

Context

Are rebates effective?

- Rebate Importance
- Rebate Essentiality

How can rebate influence inform cost-effective program design?

- Free-Rider Abatement Curve

Wrap Up

Appendix

Introduction

- Summarizes metrics of the influence of the NY Drive Clean Rebate Program, focusing on survey data characterizing vehicles acquired in 2024
 - 5,593 survey responses weighted to represent 45,443 program participants (see [Appendix](#))
- Aggregates results to propose a tool and process that uses rebate influence to inform cost-effective program design
- Note: Tesla vehicles are the most frequently rebated and thus analyzed separately in some cases to highlight their unique characteristics

Preview of Select Findings for 2024 Purchases/Leases

DCRP Rebate Influence

- Continued *increasing*
- Influence still **highest** for \$2,000 rebates, households (HHs) with income <\$300k, and EVs with MSRP < \$60k
- Surprisingly high for Tesla, \$500 rebates, HH income \$300–400k, and MSRP \$50–60k
- **Unambiguously lowest** for HH income >\$400k/year, MSRP >\$60k

Recommendations

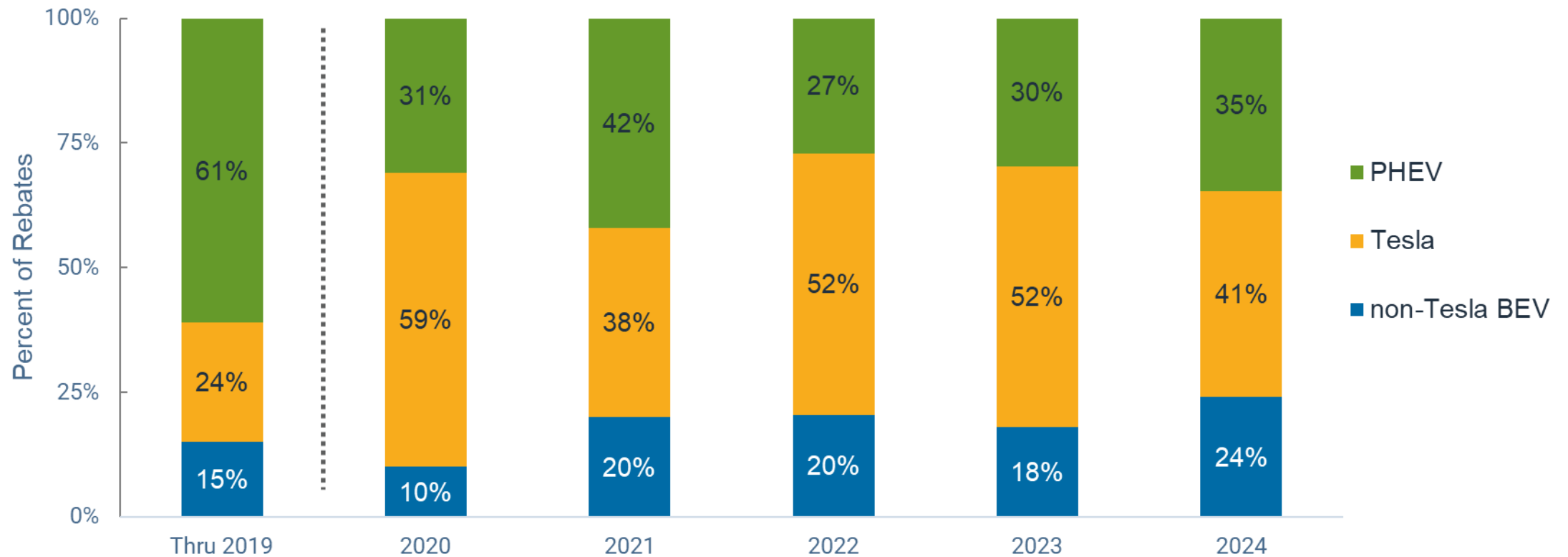
- **Target away from lowest categories** to improve cost-effectiveness and equity
- **Consider a focus on larger rebate amounts** to increase equity
- **Develop and use a “Free-Rider Abatement Curve” tool and process** to iteratively inform designing for program cost-effectiveness and equity within a given budget constraint or other goal.

Context

- **Distribution of rebates by vehicle category, rebate amount, and MSRP**

Since 2020, the majority of rebates went to BEVs

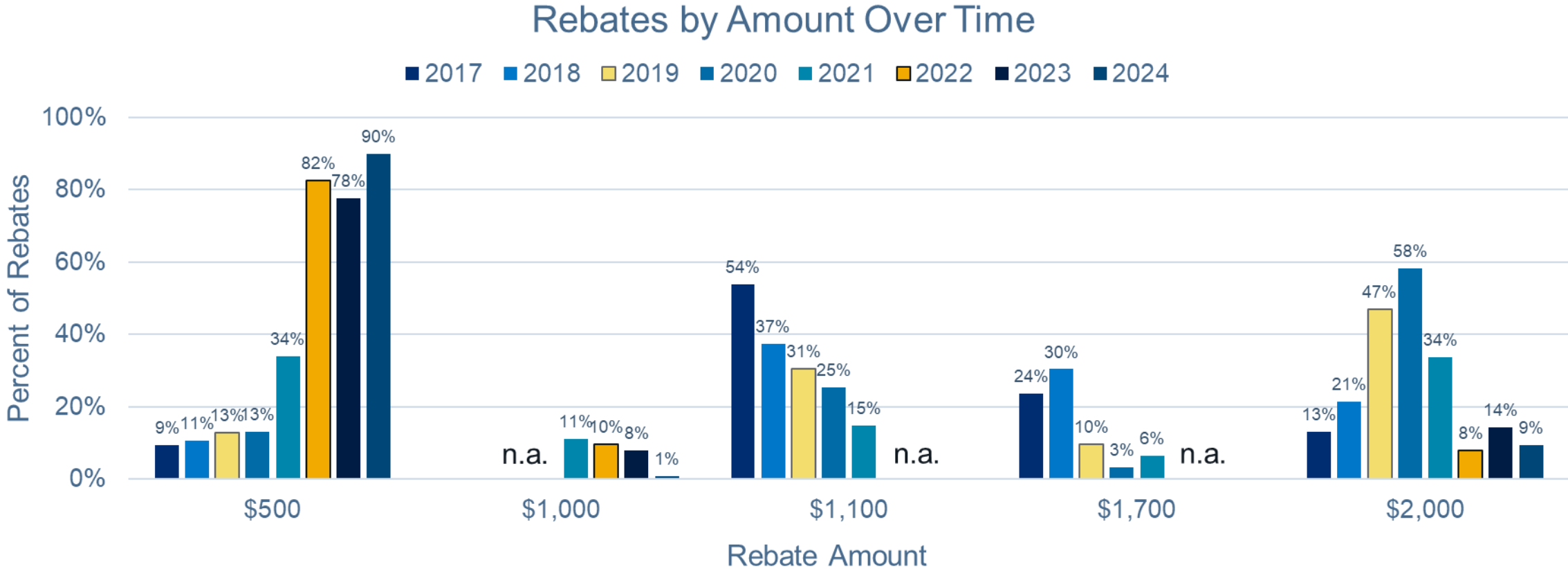
Most were **Tesla**, which we continue to analyze separately



Based on the year of purchase/lease. 2017–19 values for DCRP are from: B.D.H. Williams (2021), [An Electric-Vehicle Consumer Segmentation Roadmap: Strategically Amplifying Participation in the New York Drive Clean Rebate Program](#), NYSERDA Report 21-30.

The program has shifted dramatically toward \$500 rebates

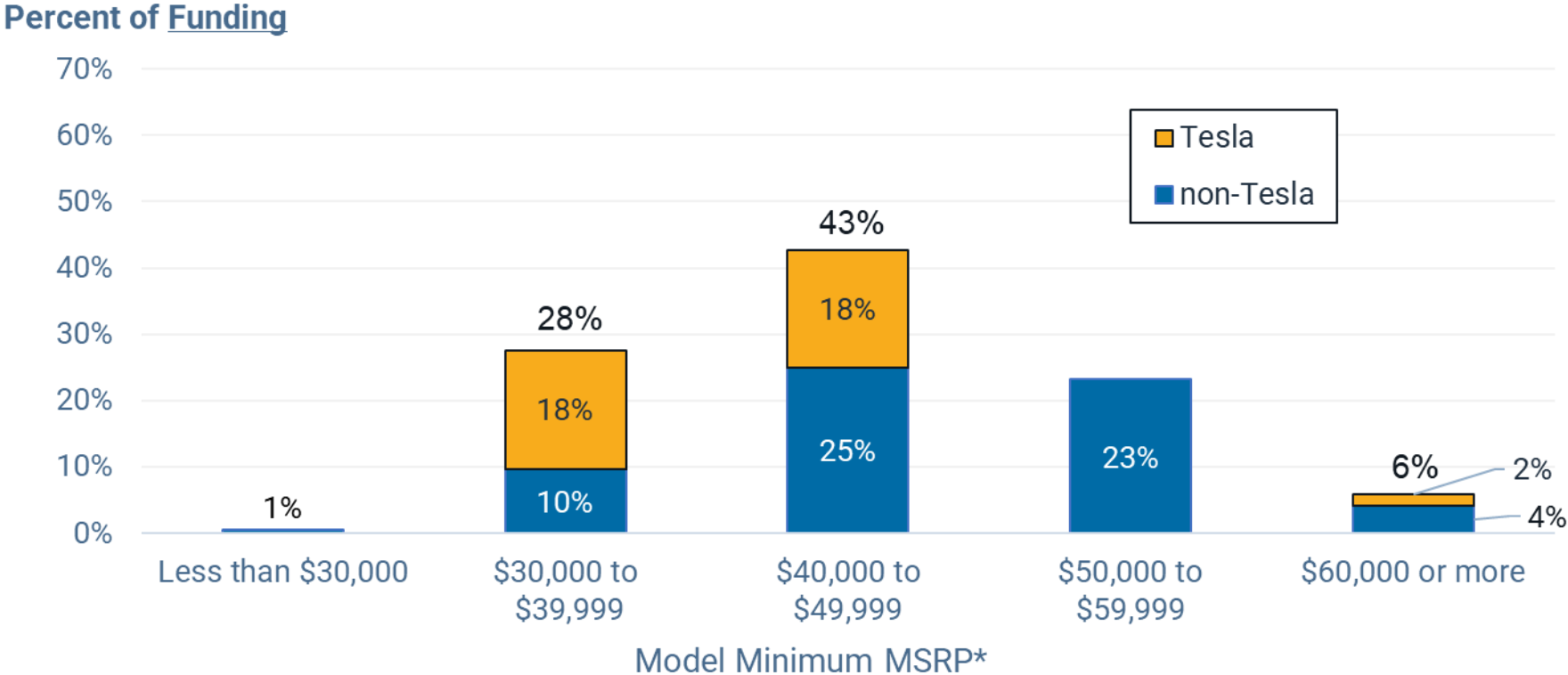
\$1,000 rebates were only 1% of program (2024)



Excludes 12 rebates with irregular amounts (< 0.1% of rebates).

94% of funding went to models with minimum MSRPs between \$30k and \$60k

Rebated model year 2024 vehicles (purchased/leased 4/'23–4/'25, N = 42,450)



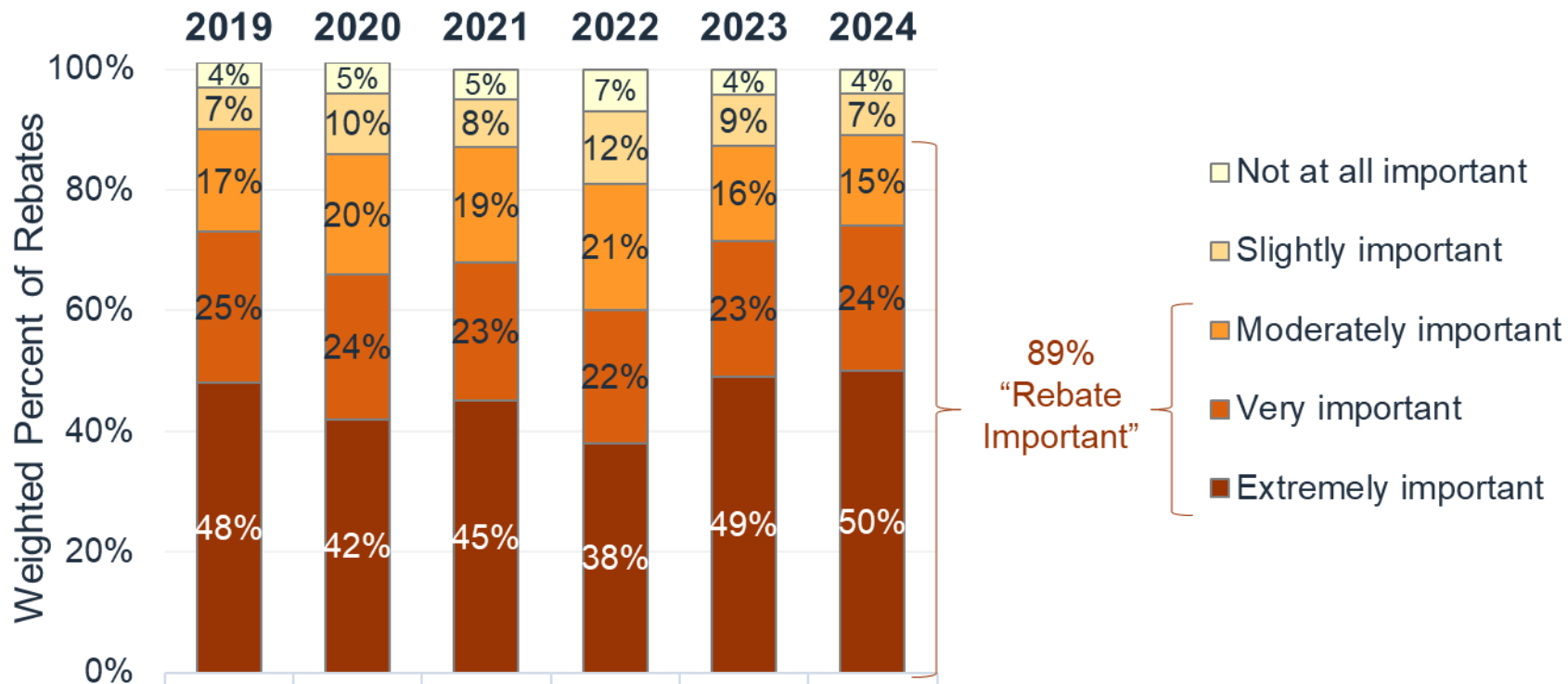
*Each vehicle was assigned the minimum Manufacturer's Suggested Retail Price (MSRP) for that model on fueleconomy.gov and does not reflect sale price. Where model year (MY) 2024 MSRPs were unavailable, MY 2023 MSRPs or MY 2025 MSRPs were used. Tesla MSRPs frequently changed within MY 2024 and were assigned as follows: Model 3 = \$30–39k, Model Y= \$40–49k, Models S & X = \$60k or more.

Are rebates effective?

- **Rebate Importance**
- **Rebate Essentiality**

Rebate Importance returned to pre-COVID level of 89%

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



However, *Rebate Importance* can mean different things to different consumers and can be confounded by the influence of other factors.

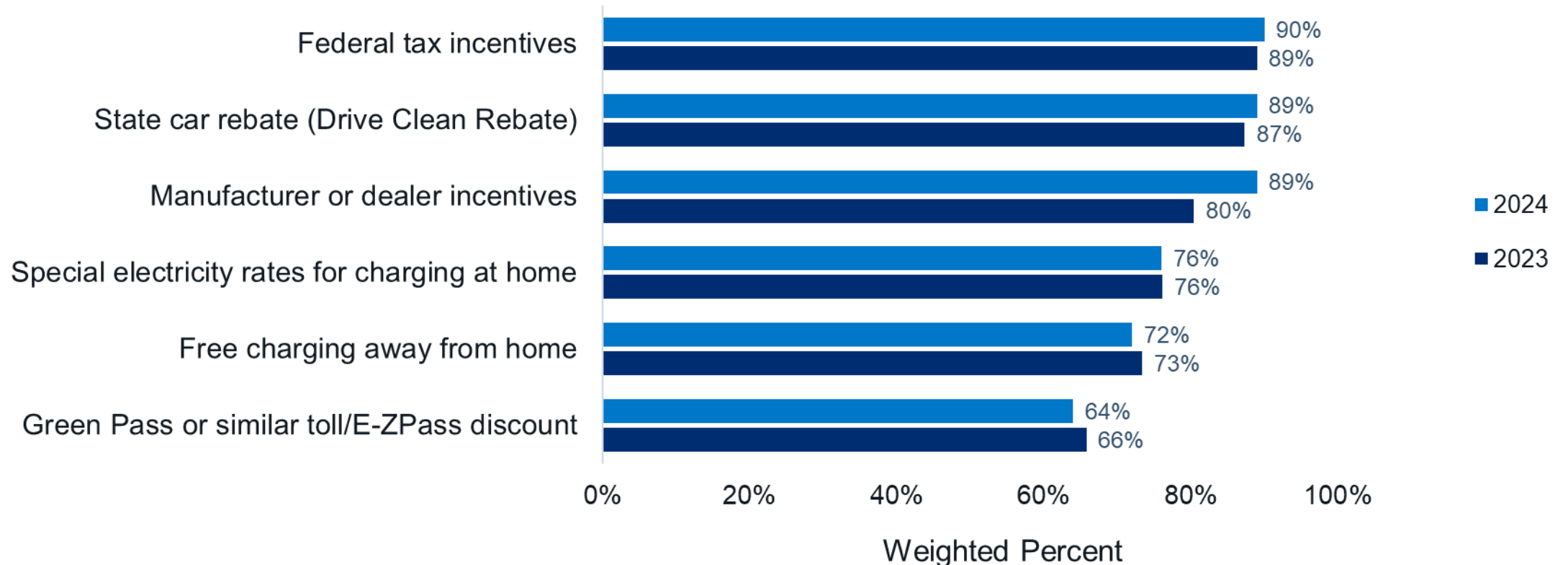
This is why we focus on the more direct and counterfactual "*Rebate Essentiality*" [next slides]...

NY DCRP Adoption Survey. 2019 $n = 2,175$; 2020 $n = 4,269$; 2021 $n = 4,881$; 2022 $n = 5,274$; 2023 $n = 6,981$; 2024 $n = 5,383$.
 n -values are filtered and question-specific. 2020–2024 weights specific to 2020–2024 purchases/leases, respectively.

Importance of rebate among highest of all factors examined

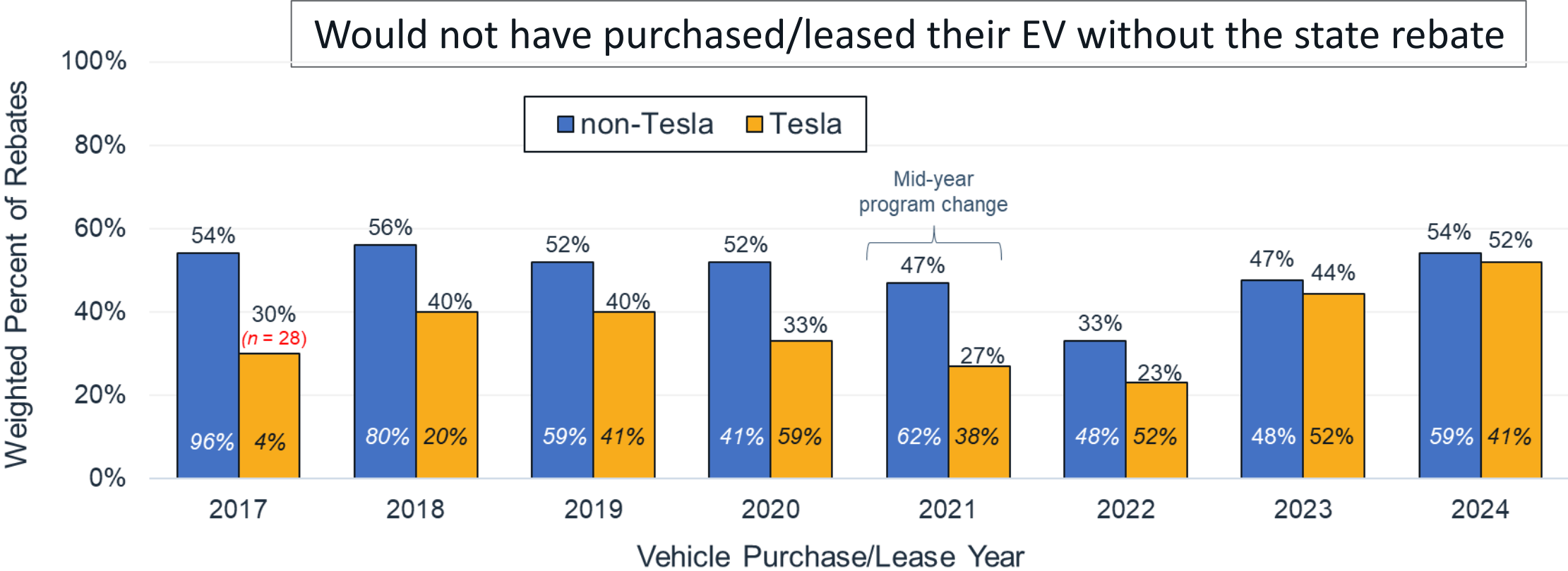
Purchase incentives rated important most frequently, by a substantial margin

Percent **Extremely**, **Very**, or **Moderately** important in “**making it possible** for you to acquire your electric car”?



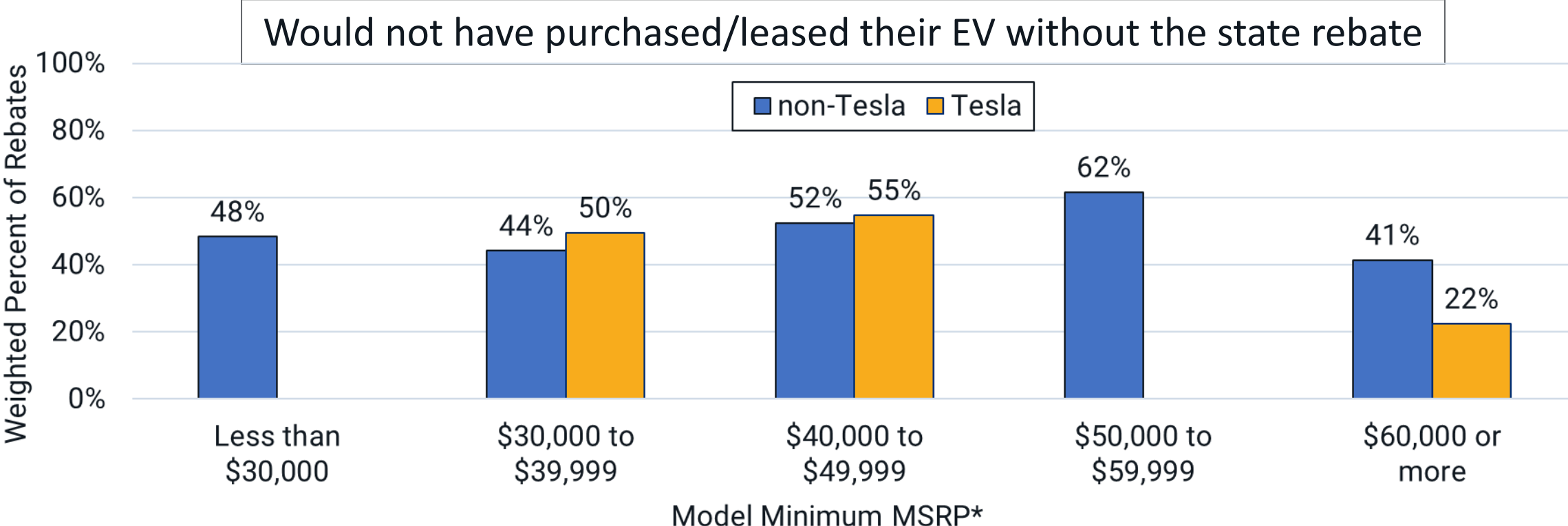
Rebate Essentiality continued increasing

All-time high for **Tesla**



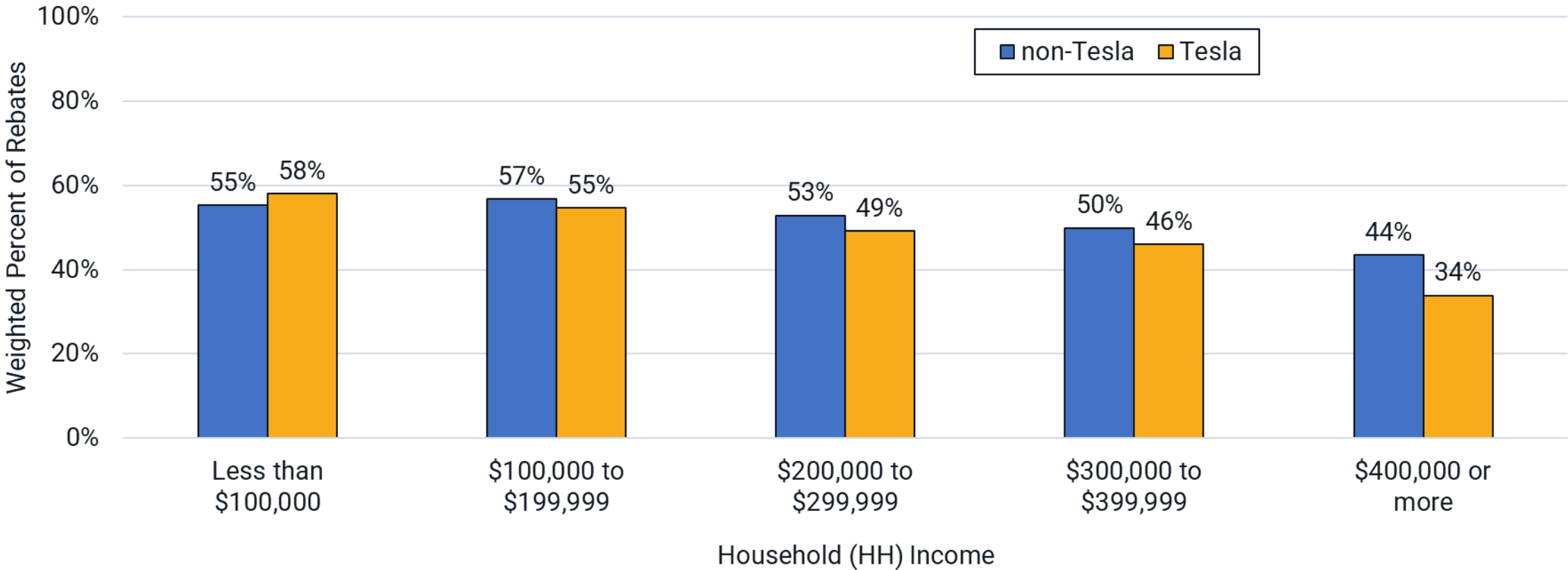
Italicized percentages inside columns are the percent of total rebates given to individual consumers.
 NY DCRP Adoption Survey. 2017 n = 1,012; 2018 n = 2,201; 2019 n = 2,245; 2020 n = 3,401; 2021 n = 5,081; 2022 n = 5,454; 2023 n = 7,212; 2024 n = 5,581.
 n-values are filtered and question-specific. 2020–2024 weights specific to 2020–2024 purchases/leases, respectively.

Rebate Essentiality low above \$60k MSRP*; surprisingly high \$50–60k
 2024 purchases/leases



*Each vehicle was assigned the minimum 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 change mid-MY and were assigned as follows: Model 3 = \$30–39k, Model Y = \$40–49k, Models S and X = \$60k or more. *Rebate Essentiality* from NY DCRP Adoption Survey. Filtered, question-specific $n = 5,581$. $n > 100$ for all columns.

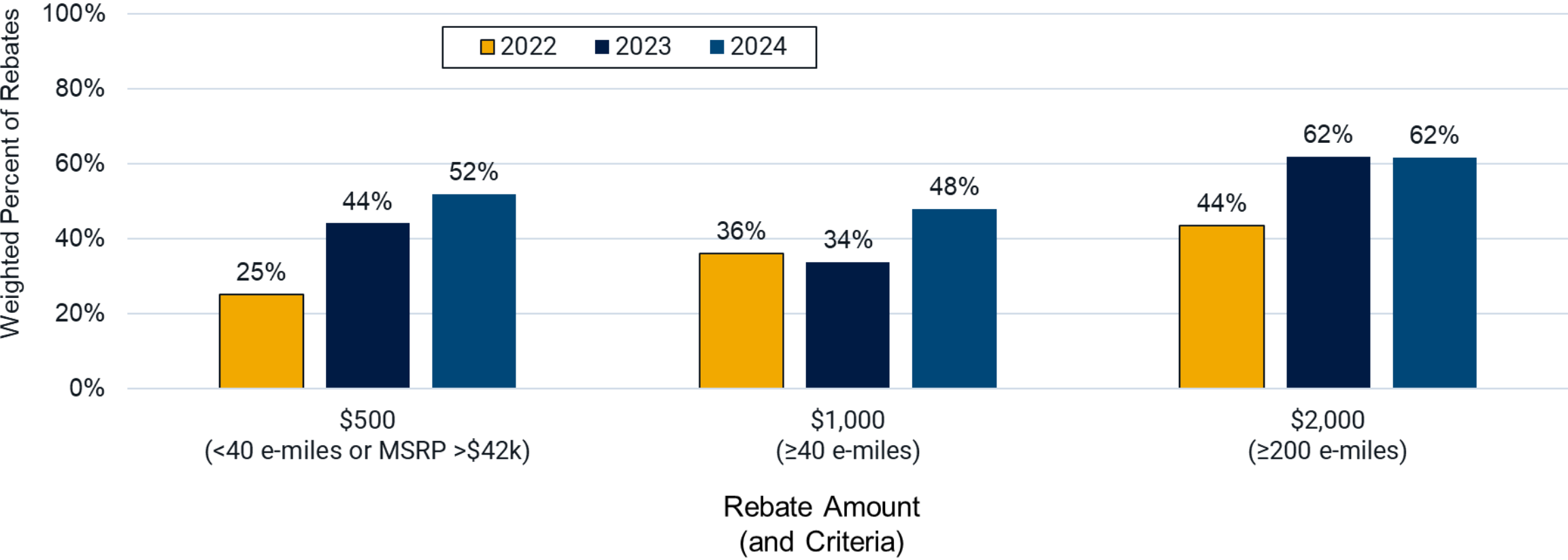
Rebate Essentiality surprisingly high up to household incomes of \$400k/year 2024 purchases/leases



NY DCRP Adoption Survey. Filtered, question-specific $n = 4,741$.

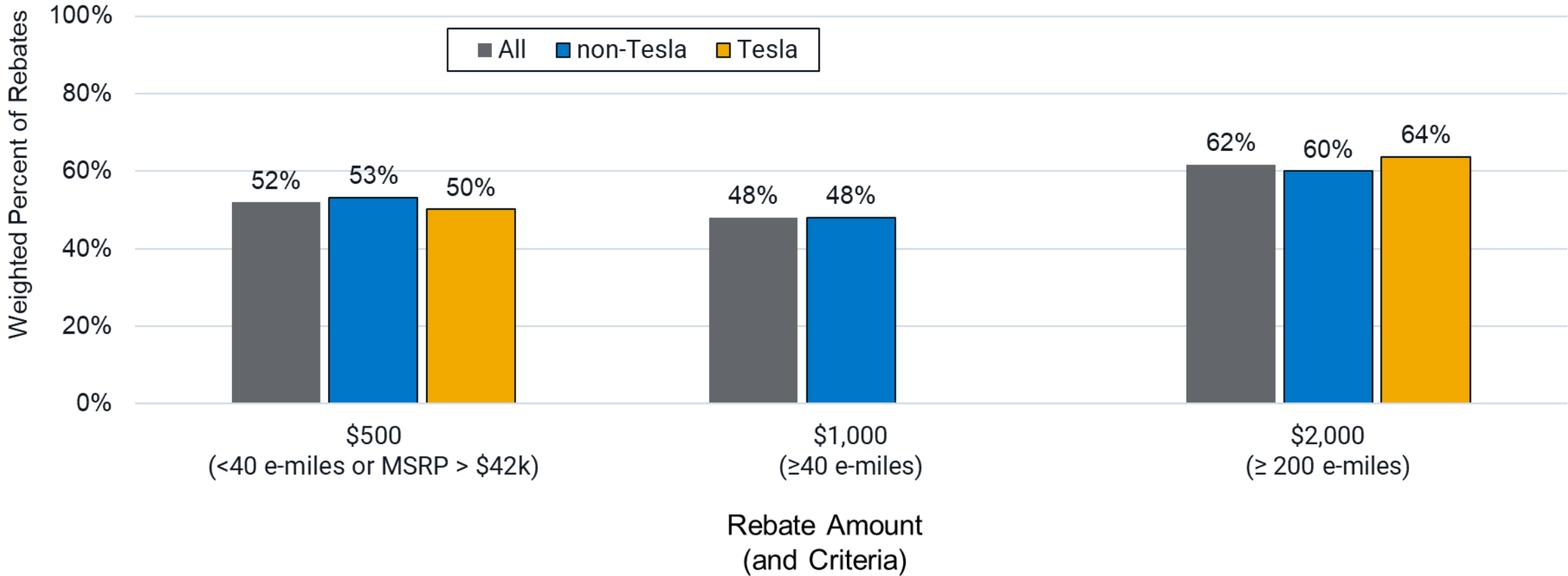
Rebate Essentiality has increased for all rebate amounts

2022 through 2024 purchases/leases



NY DCRP Adoption Survey. 2022 n = 5,454; 2023 n = 7,212; 2024 n = 5,581. n-values are filtered and question-specific.

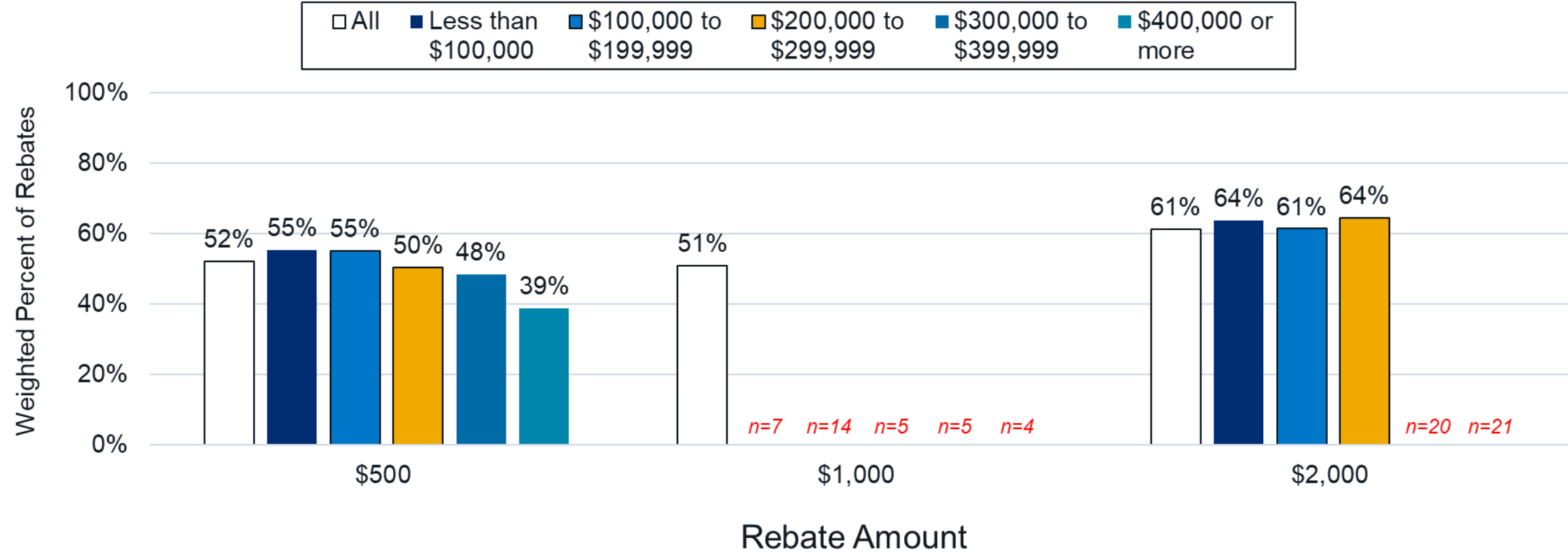
Rebate Essentiality now high across rebate amounts; still highest for \$2,000 2024 purchases/leases



NY DCRP Adoption Survey. Filtered, question-specific n = 5,581.

Rebate Essentiality high across a wide income range

2024 purchases/leases



NY DCRP Adoption Survey. Filtered, question-specific $n = 4,741$.
 Results based on n -values < 30 are omitted and/or highlighted in red throughout.

**How can
rebate
influence
inform cost-
effective
program
design?**

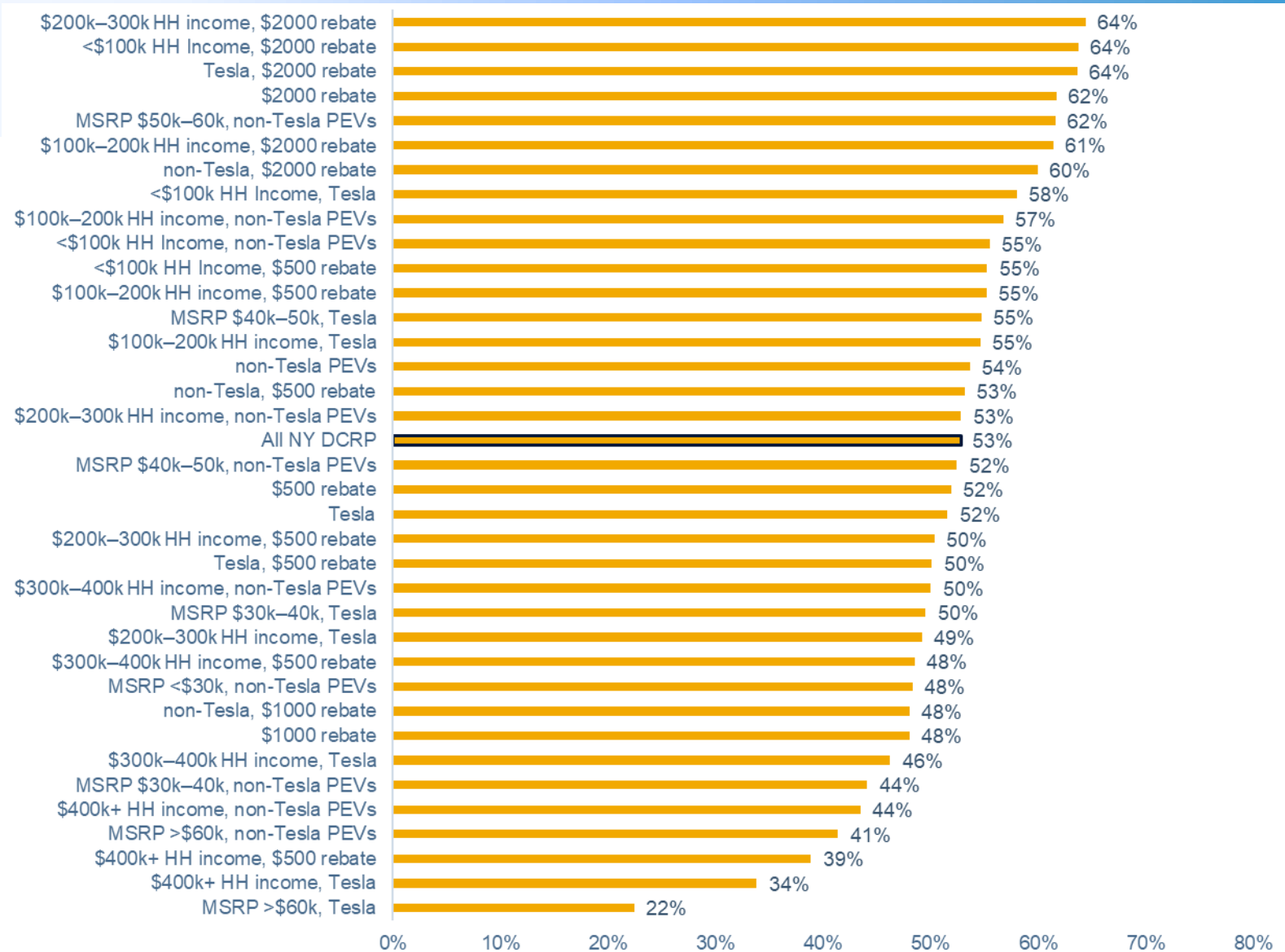
Free-Rider Abatement Curve
(Proposed Tool & Next Step)

Free-Rider* Abatement Curve

- This section proposes developing a “Free-Rider Abatement Curve” (FRAC) tool and process to iteratively inform program design for cost-effectiveness and equity within a given budget constraint or other goal.
- Constructing a Free-Rider Abatement Curve starts by compiling the *Rebate Essentiality* percentages from the slides above and rank ordering them to sequence recommendations for program-design. This compilation is shown next. Additional steps and data visualization tools are in development for other programs and can be described upon request. Public precursor work includes:
 - Presentation: “CVRP 2022 Data Summary: Rebate Influence & MSRP Considerations” (2025, Mar.). [Posting](#).
 - Presentation: “NY Drive Clean Rebate: Vehicle Replacement & Rebate Influence thru 2022” (2024, Dec.). [Posting](#).
 - *CVRP Greenhouse Gas Emission Reductions and Cost-Effectiveness: 2022 Purchases/Leases* (2024, Dec.). [Posting](#).
 - *Rebate Influence on Electric Vehicle Adoption in California* (2023, Mar.). [Posting](#). Conference [slides with updates](#).

* Note: this section focuses on groups with low *Rebate Essentiality* as a proxy for groups with many program “free riders” (consumers not influenced by the rebate who nevertheless claim it). However, it is not necessarily the case that all non-*Rebate Essential* participants are free riders. Evidence for this can be found in the metric of *Rebate Importance*: While 53% were *Rebate Essential*, many more (89%) were *Rebate Important*, whose ability to acquire an EV was at least moderately influenced by the rebate, albeit in a less straightforward way. 4% confessed true free-ridership (rebate not at all important) and 7% admitted only slight importance.

DCRP 2024 *Rebate Essentiality* Compilation



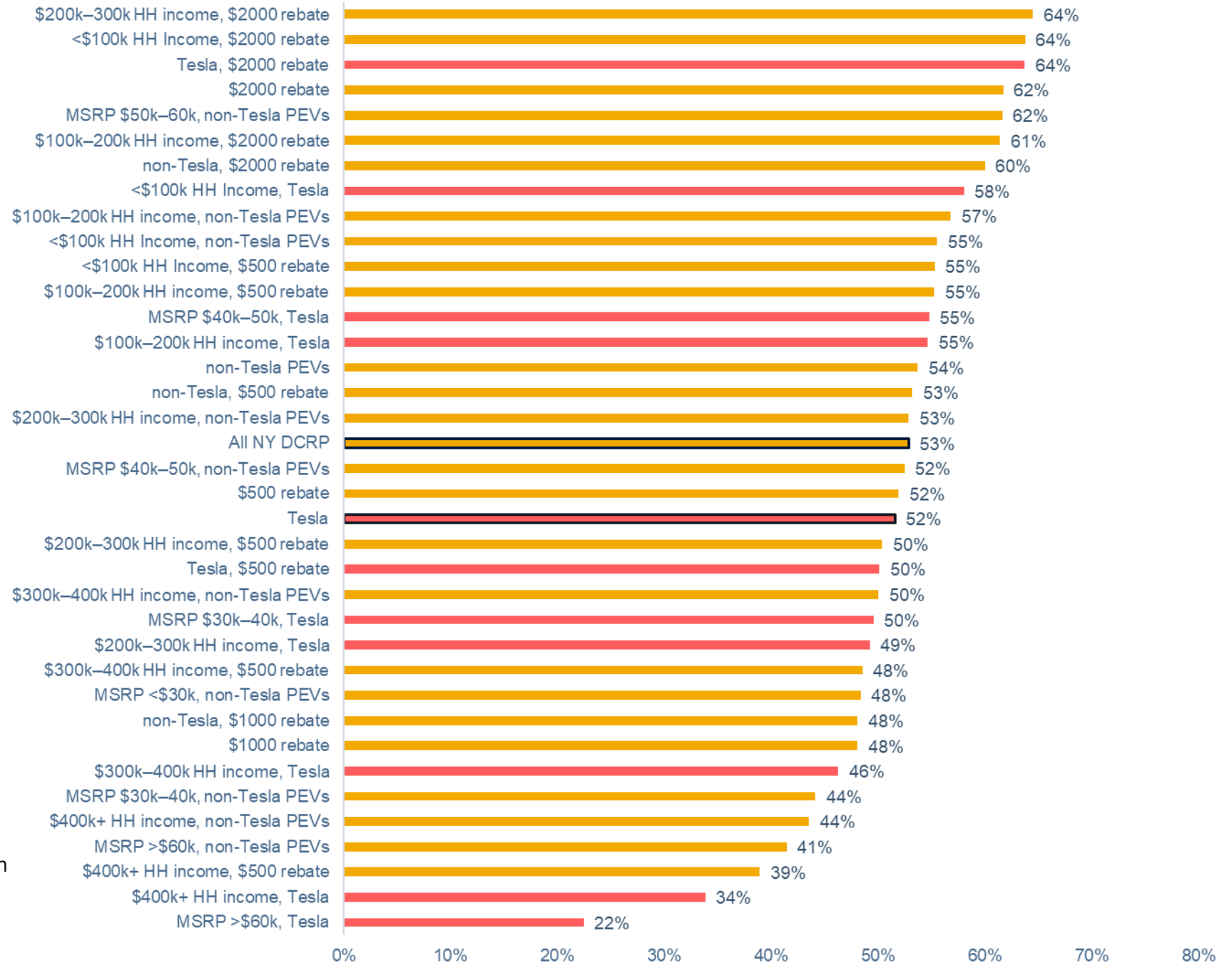
Program average is outlined in black.
Groups with n ≥ 30 shown.

Free-Rider Hunting

2024 example 1: What about Tesla?

Tesla Dilemma: 2024 Tesla consumers among least and most frequently influenced

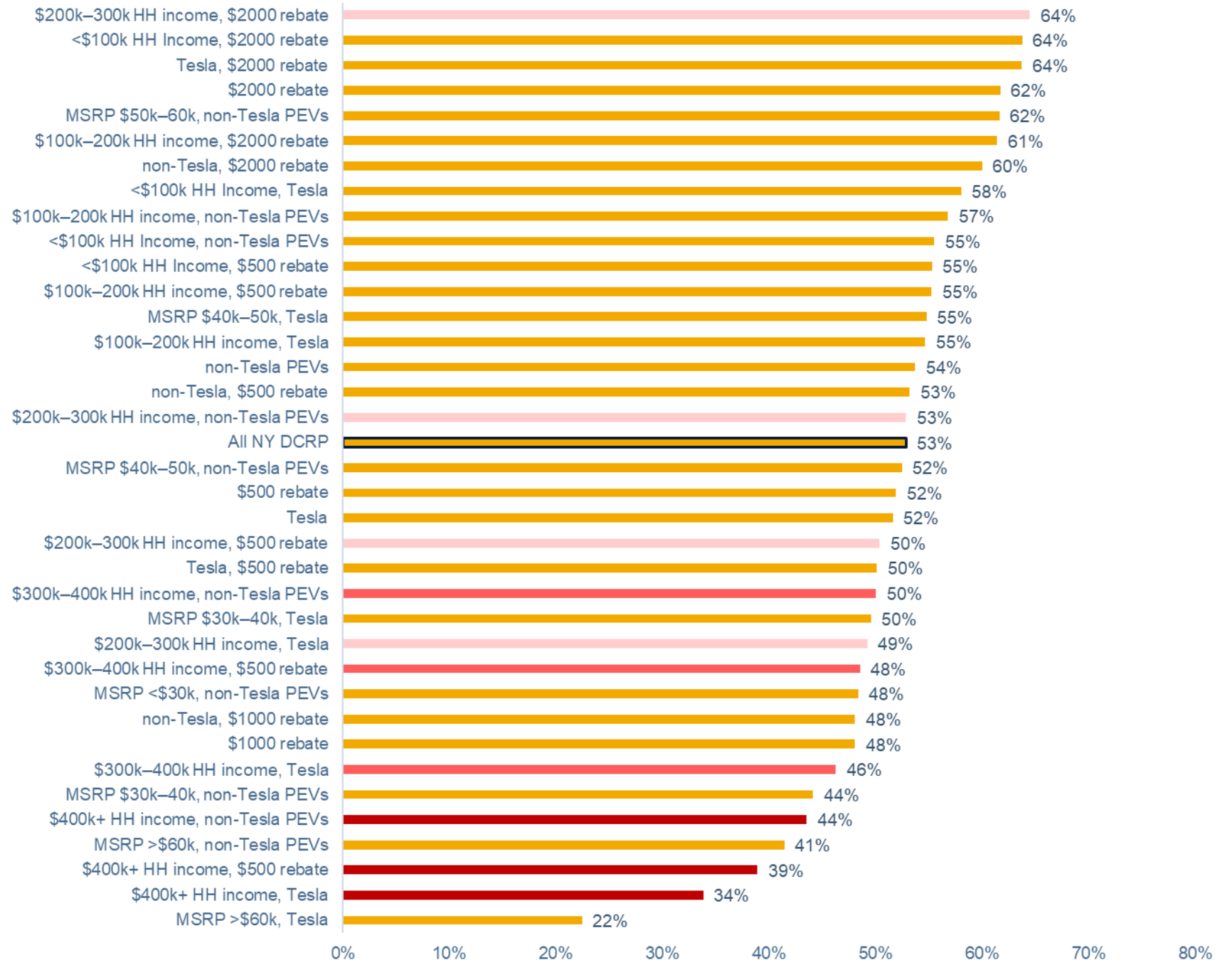
Tesla groups are shaded pink.
Program average and Tesla average are outlined in black.
Groups with n ≥ 30 shown.



Free-Rider Hunting 2024 example 2: What about Income?

- **\$400k+** (dark pink)
among **least influenced**
 - particularly by \$500 rebate and for Tesla products
- **\$300–400k** (pink) more **mixed**
 - overlaps with \$200–300k group (light pink)

Income groups are shaded pink (darker = higher).
Program average is outlined in black.
Groups with $n \geq 30$ shown.



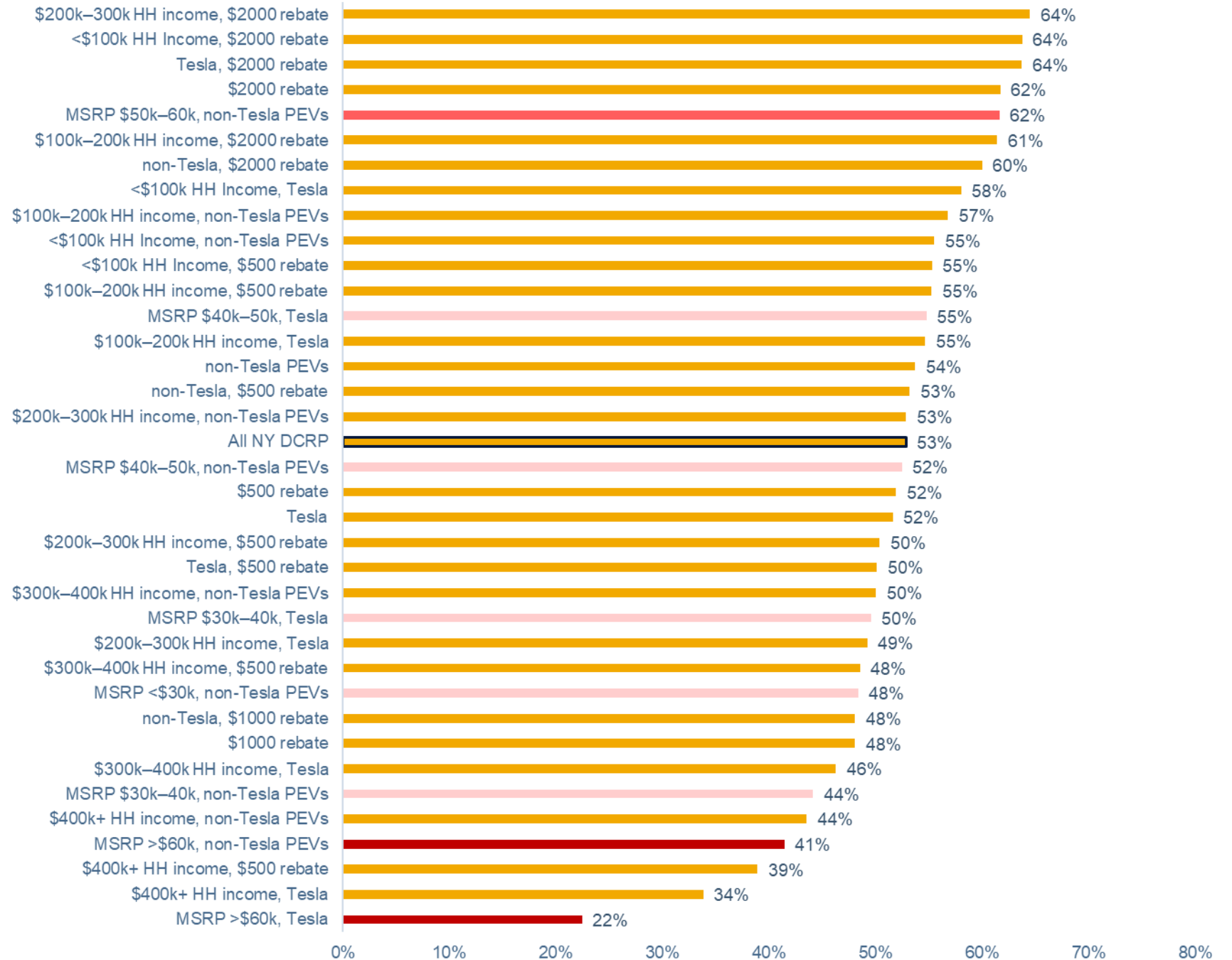
Free-Rider Hunting 2024 example 3: What about MSRP?

>\$60k (dark pink)
\$50–60k (pink)
<\$50k (light pink)

High influence on \$50–60k non-Tesla group (62%) complicates lowering the MSRP cap and begs follow-on questions about who/what is in that group, etc. (i.e., a process of running each issue to ground).

...and so on, until the
all questions have been
worked through.

MSRP groups are shaded pink (darker = higher).
Program average is outlined in black.
Groups with n ≥ 30 shown.



The Second Dimension of the FRAC: Impacts on Project Goals

Designing to meet a budget constraint or cost-effectiveness threshold

- Pick constraint/goal (e.g., budget)
- Based on the above, pick an initial set of eligibility criteria/guidelines to evaluate
- Assess set of criteria for changes in goal metric (e.g., estimated budget reduction or cost-effectiveness increase)
- Keep free-rider hunting until “Catch Meets Quota”
- Assemble FRAC with both dimensions (rebate influence and impact toward goal)
- Operationalize recommendations
 - E.g., implementing income caps can be complicated: HH income or tax-filing status? FPL equivalent or \$ threshold? IRS-verified or point-of-sale?
- ...resulting in a data-based, rank-ordered options to discuss with execs/stakeholders!

Wrap Up

- **Summary of Select Findings & Recommendations**

Summary of Select Findings & Recommendations

2024 Purchases/Leases

Context

- \$500 rebates continued to dominate (90%). Prices more evenly spread as Model 3 prices and Tesla share decreased.

DCRP Rebate Influence Continued *Increasing*

- **89%** of consumers rated rebate at least moderately **important** to enabling purchase/lease (back to pre-COVID level)
- **53%** rated rebate **essential** (up from 46% in 2023 and all-time low in 2022)
- Influence still highest for \$2,000 rebates, households (HHs) with income <\$300k, and EVs with MSRP < \$60k
- Surprisingly high for Tesla, \$500 rebates, HH income \$300–400k, and MSRP \$50–60k
- Unambiguously **lower influence for HHs with income >\$400k/year, EVs with MSRP >\$60k.**

Recommendations

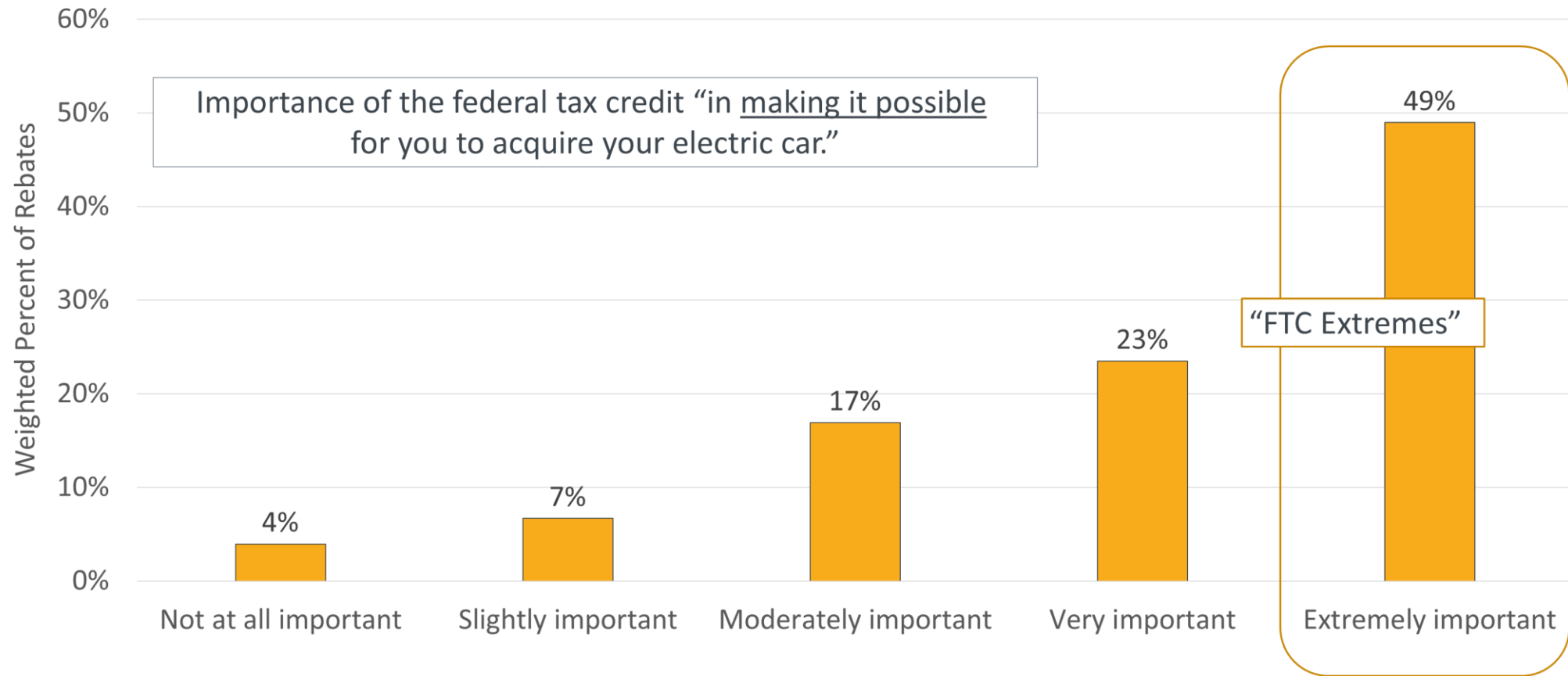
- **Target away from lowest categories** to improve cost-effectiveness and equity
 - e.g., hard MSRP cap, soft income cap, funding restrictions, outreach & messaging
- **Consider a focus on larger rebate amounts** to increase equity
- **Develop and use a “Free-Rider Abatement Curve” tool and process** to iteratively inform designing for program cost-effectiveness and equity within a given budget constraint or other goal.

Appendix

- **Federal Tax Credit Importance**
- **Acronyms**
- **Additional Details**
- **Resources**

Importance of Federal Tax Credit for Plug-in EVs

2019* purchases/leases [previously analyzed; can update]



* 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. Filtered, question-specific $n = 2,151$

Acronyms

- **BEV – Battery Electric Vehicle**
- **DCRP – Drive Clean Rebate Program (NY statewide)**
- **e-mile – EPA-rated all-electric mile of driving range**
- **EPA – U.S. Environmental Protection Agency**
- **EV – Electric Vehicle (including PHEVs and BEVs; FCEVs not in the NY data)**
- **FCEV – Fuel-Cell Electric Vehicle**
- **FRAC – Free-Rider Abatement Curve**
- **FPL – Federal Poverty Level**
- **HH – Household**
- **IRS – Internal Revenue Service**
- **MSRP – Manufacturer's Suggested Retail Price**
- **MY – Model Year**
- **N.A. – Not Applicable**
- **NY – New York State**
- **PEV – Plug-in Electric Vehicle (including PHEVs and BEVs)**
- **PHEV – Plug-in Hybrid Electric Vehicle**

Rebate design shapes outcomes

Program design changed mid-2021

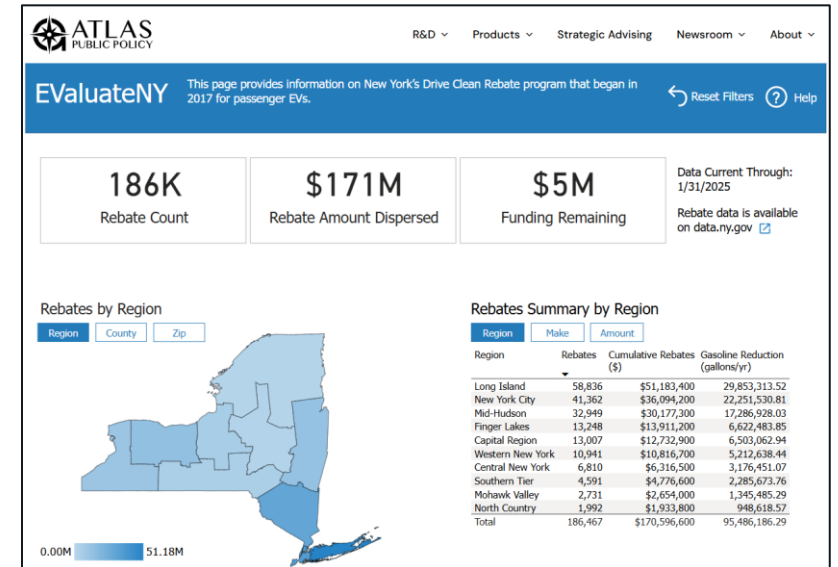
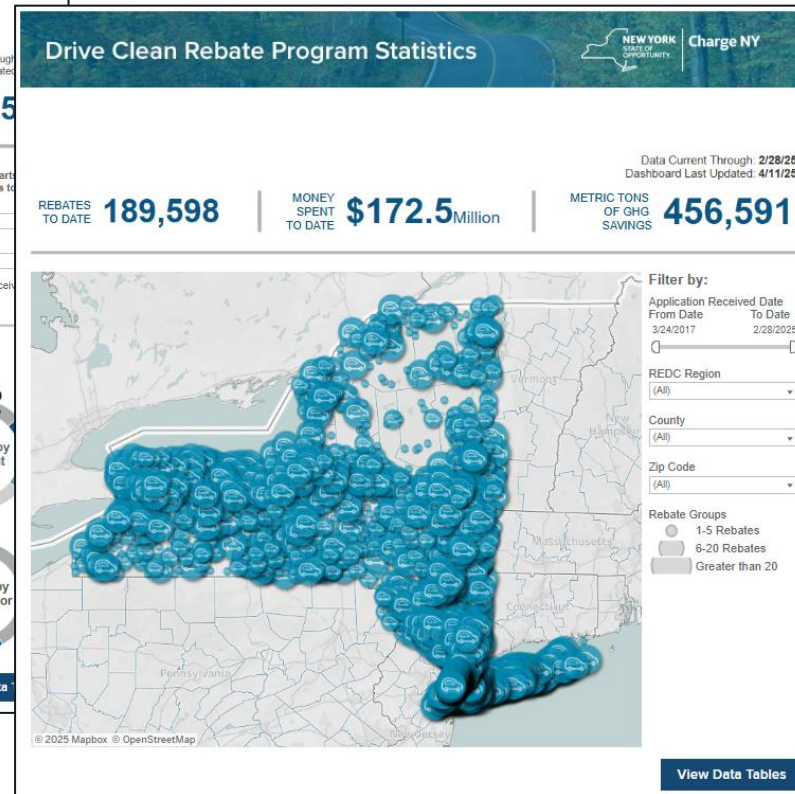
Category	Purchase/lease dates <u>through</u> June 30, 2021	Purchase/lease dates <u>after</u> June 30, 2021
Fuel-Cell EVs*, All-Battery EVs (BEVs), and Plug-in Hybrid EVs (PHEVs)	≥ 120 e-miles [†] : \$2,000 ≥ 40 e-miles: \$1,700 ≥ 20 e-miles: \$1,100 < 20 e-miles: \$500	≥ 200 e-miles: \$2,000 ≥ 40 e-miles: \$1,000 < 40 e-miles: \$500
Additional Elements	MSRP > \$60,000 = \$500 Point-of-sale	MSRP > \$42,000 = \$500 Point-of-sale

* FCEVs eligible but unavailable in NY; none rebated. † Electric miles (e-miles) are U.S.-EPA-rated all-electric miles.

For additional, up-to-date program data (images as of 4/11/2025)



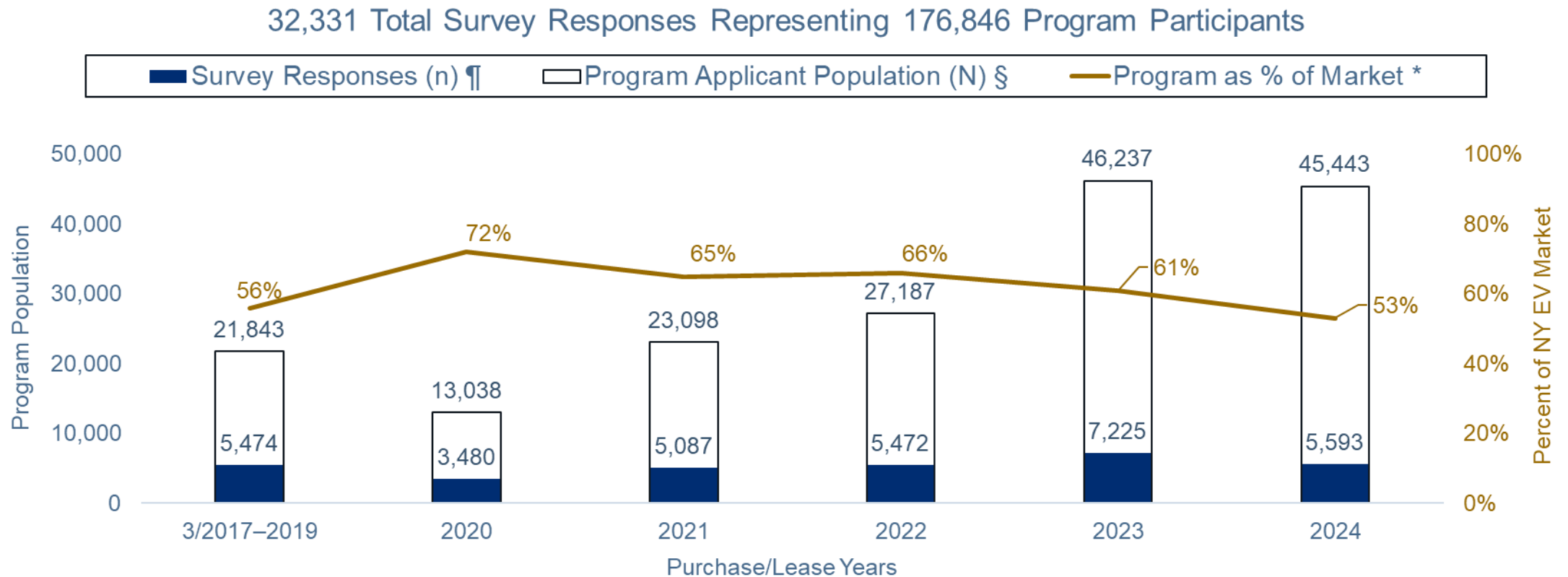
[Drive Clean Rebate Program Statistics Dashboard](#)



[EValueNY Dashboard](#)

Program data: a large number of applications and surveys

Survey data statistically represent all participants, but participants are a decreasing portion of EV sales



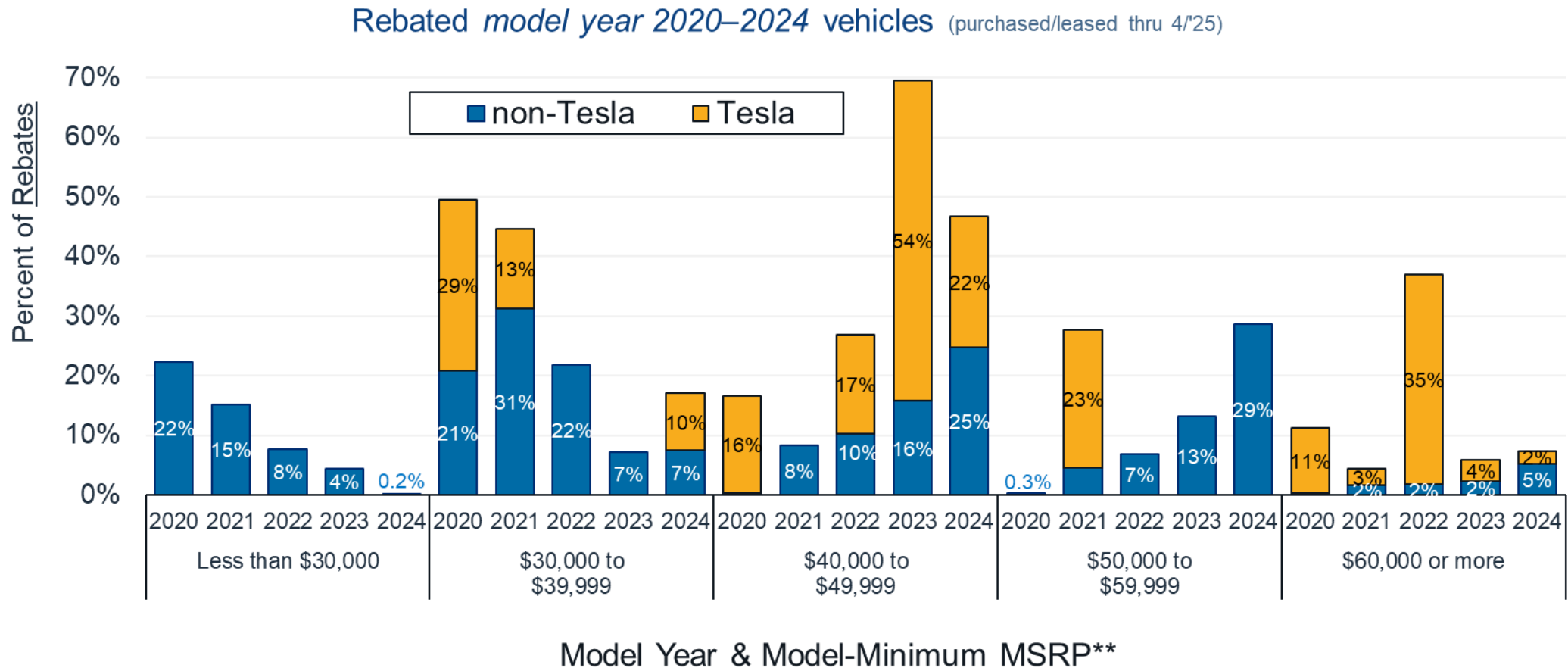
¶ Subsequently weighted to represent the program population along the dimensions of vehicle technology (PHEV vs. BEV), model, buy vs. lease, and county.

§ Small numbers of rebated vehicles are not represented in the time frames due to application lags.

* Based on approximate comparisons to total NY EV sales from [Autos Innovate EV Dashboard](#) (AAI & CSE 2025).

Prices became more evenly spread in 2024 as Model 3 prices decreased and Tesla lost share

Decreasing manufacturing costs don't always mean decreasing retail prices, incentives remain important*



* See slide 12 from [Presentation: "CVRP 2020 Data Brief: MSRP Considerations"](#).

**Assigned as described on MSRP slides in body of presentation.

For More Information on DCRP

Rebate Impacts

- Presentation: “NY Drive Clean Rebate: Vehicle Replacement & Rebate Influence thru 2022.” [Slides](#).
- New York State’s Drive Clean Rebate for Electric Vehicles: Measures of Impact. [Paper](#). [Slides](#).

Consumer Segmentation

- Expanding Electric Vehicle Adoption in Disadvantaged Communities. [Paper](#). [Appendix](#). [Slides](#).
- Presentation: “Amplifying Electric Vehicle Adoption in Disadvantaged Communities, Consumer Segmentation Roadmaps, and Additional Equity Considerations.” [Slides](#). [TRB posting](#).
- From Low Initial Interest to Electric Vehicle Adoption: “EV Converts” in New York State’s Rebate Program. [Paper](#). [Data-summary supplement](#).
- Targeting Incentives Cost Effectively: “*Rebate Essential*” Consumers in the New York State Electric Vehicle Rebate Program. [Paper](#). [Slides](#).
- An Electric-Vehicle Consumer Segmentation Roadmap: Strategically Amplifying Participation in the New York Drive Clean Rebate Program. [Clean Transportation Reports](#). [RG posting](#).

Select Multi-state Analysis

- Presentation: “Data from Statewide Electric Vehicle Rebate Programs: Vehicles, Consumers, Impacts, and Effectiveness.” [Slides](#).
- Presentation: “EV Purchase Incentives: Program Design, Outputs, and Outcomes of Four Statewide Programs with a Focus on Massachusetts.” [Slides](#).

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Recommended citation:

B.D.H. Williams and N. Pallonetti (2025, June), Presentation: “Rebate Influence through 2024 and Designing for Cost-Effectiveness,” prepared by the Center for Sustainable Energy for NYSERDA.