

Vehicle Affordability and Incentive Amounts

Public Work Group for Clean Transportation Equity and Light-Duty Vehicle Investments

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With thanks to Christian Sheja, Janet Bowers, Keir Havel, Stephanie Wilson, Ben MacNeille and others at CSE



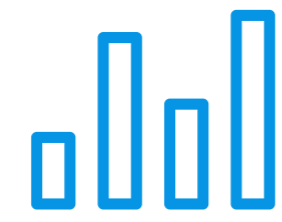
CALIFORNIA
**CLEAN VEHICLE
REBATE PROJECT**SM

Affordability calculation purposes

Does a given incentive mix enable meaningful vehicle choice for consumers?



Outline



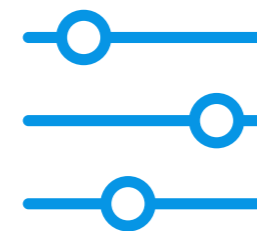
Cost Calculations



Affordability calculations overview

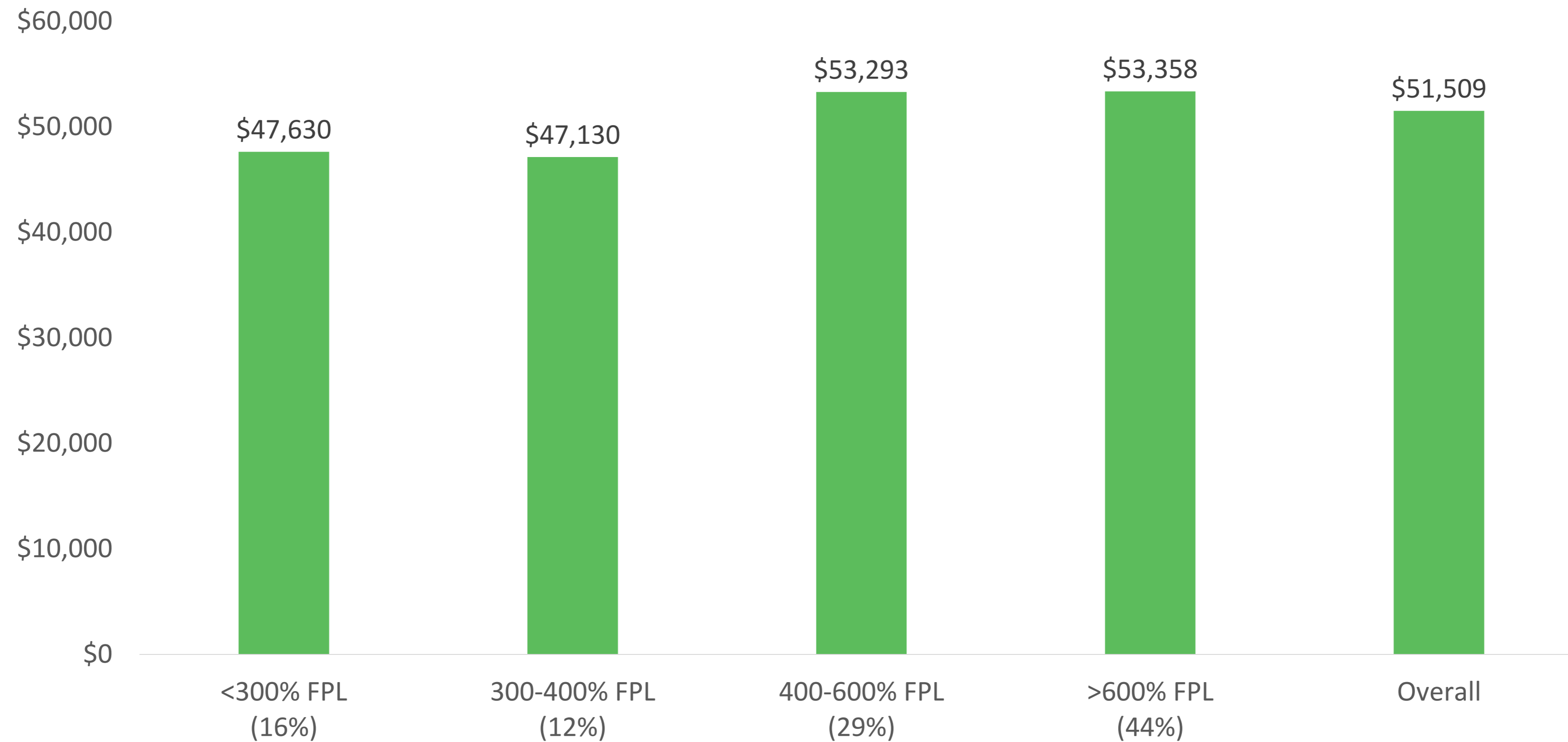


Results



Cost assumptions, inputs, and sensitivities

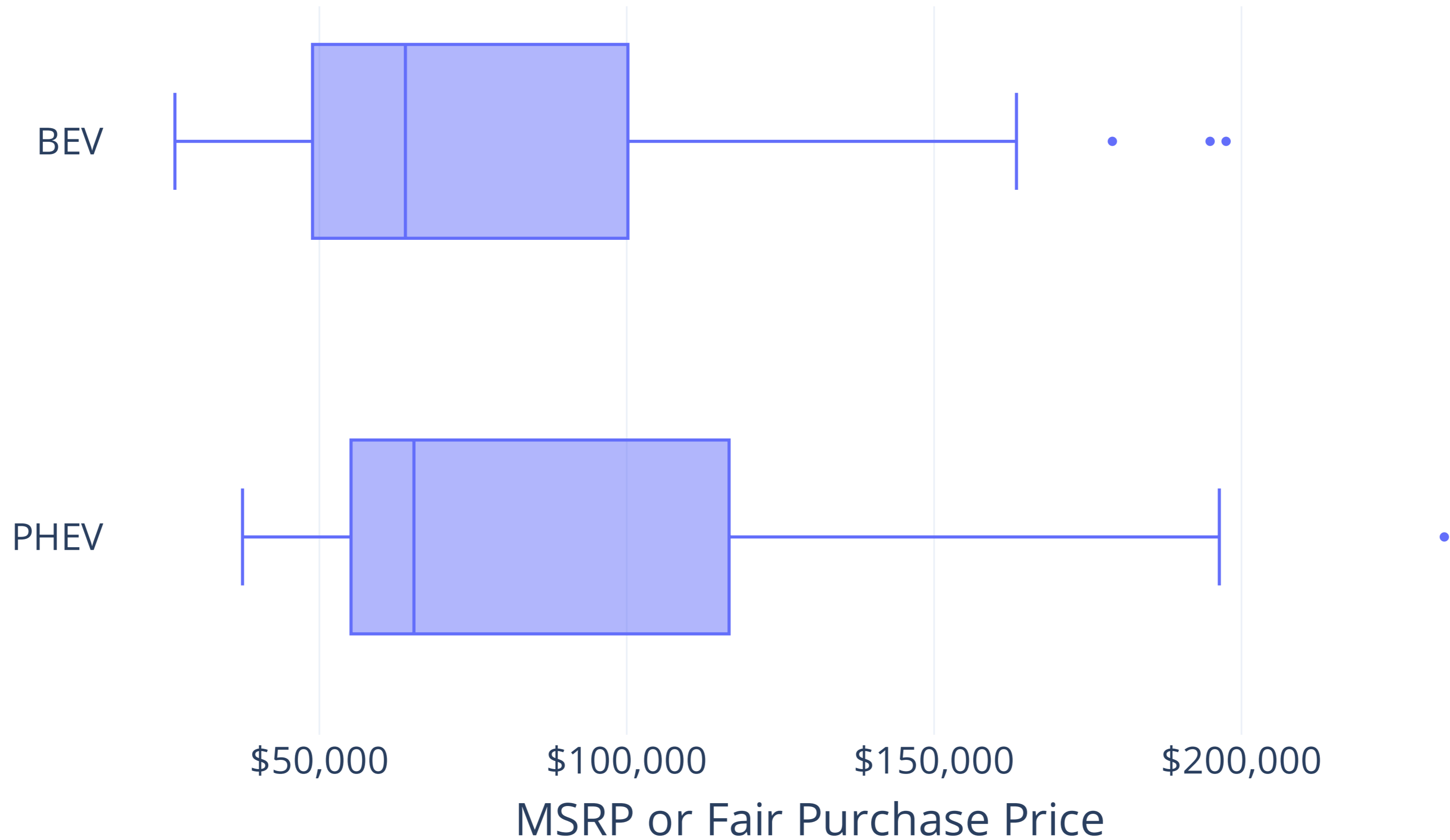
2023 median CVRP rebated vehicle purchase price for households with < 300% FPL income: \$47,630



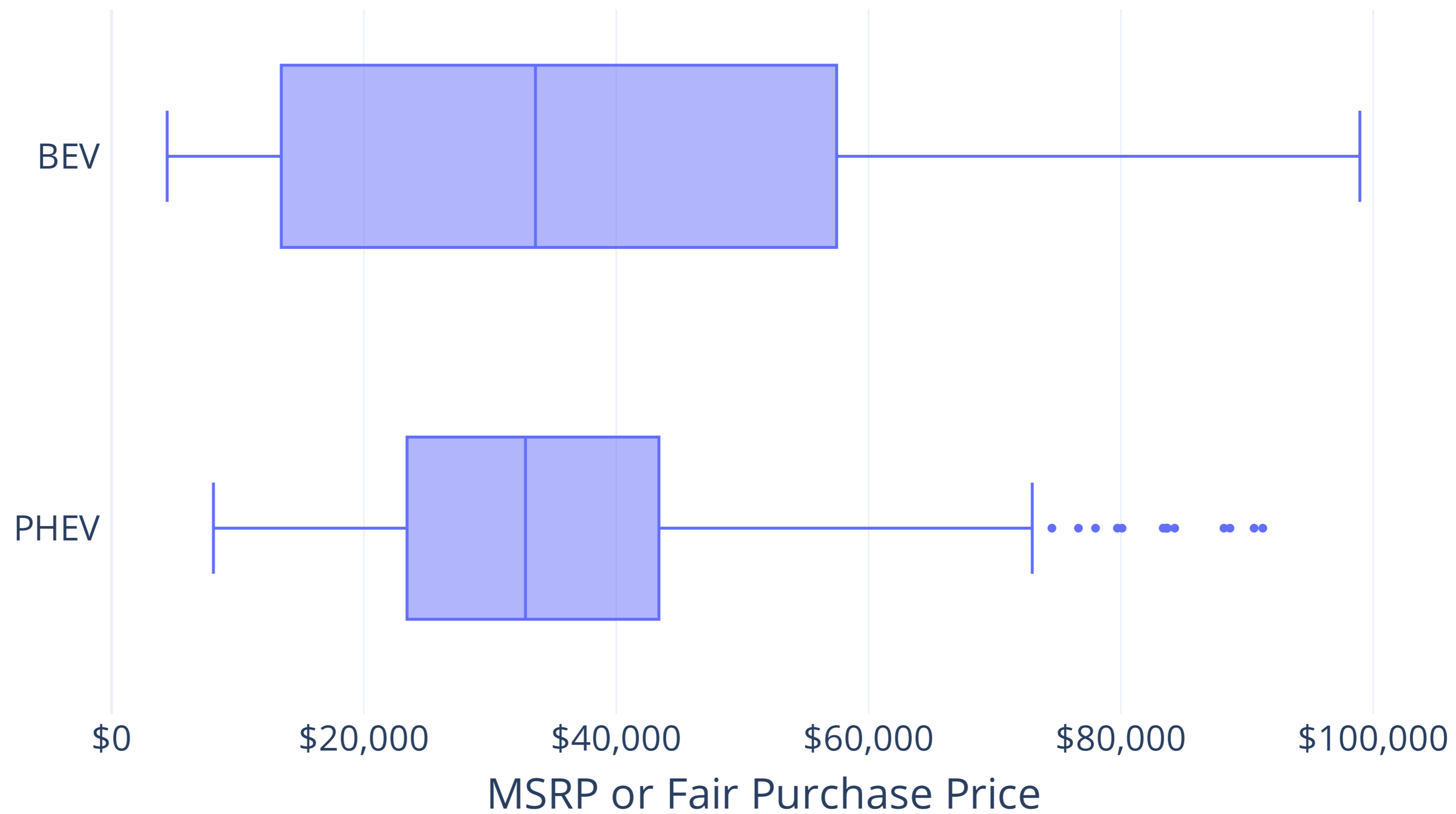
Data Source: Clean Vehicle Rebate Project application data
Applications received in 2023 and processed as of June 2023.
Application Status = Application Approved, Check Sent



Median examined new 2023 BEV MSRP: \$63,995



Median examined used BEV prices: \$33,600



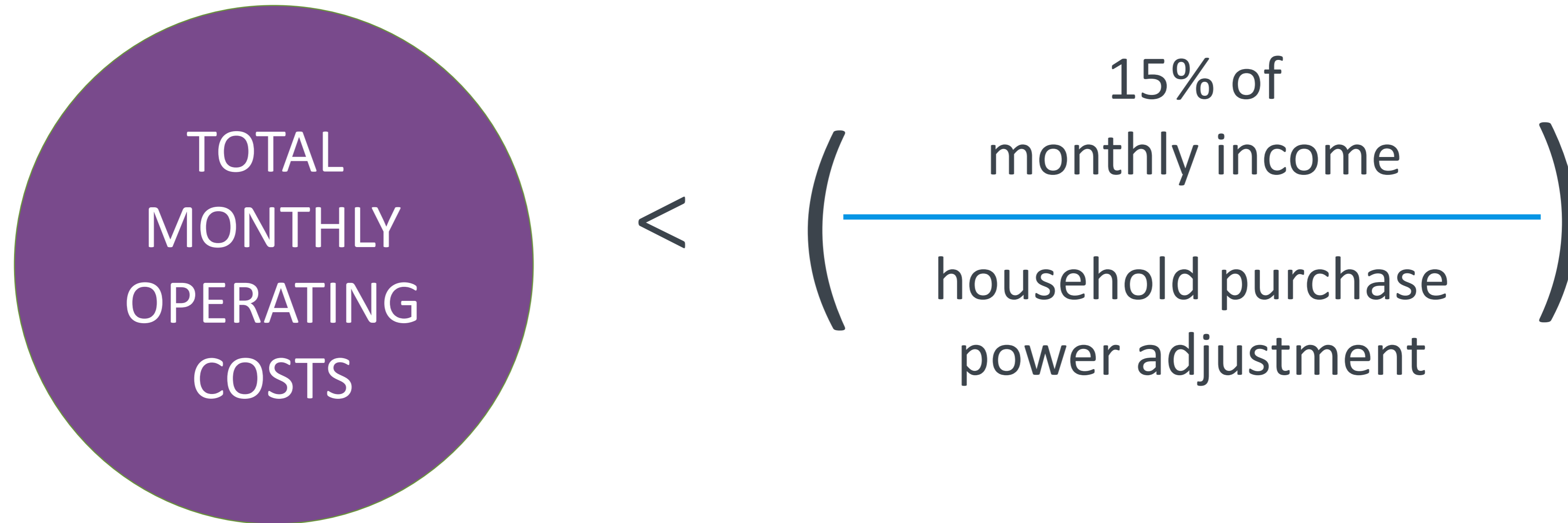
Market context important to affordability conversation

- New vehicles are more expensive nominally and relative to income than years past
 - Prices may be stabilizing
- Reports that used vehicle inventory is building and prices are falling
- EVs generally remain more expensive than conventional vehicles
- New EV incentive programs aimed at lower-income consumers must overcome EV cost premium AND higher new vehicle costs to make vehicles affordable



What do we mean by
“affordable”?

Affordability calculations



- 10% down payment
- 5-year (60-month) loan

Cost calculations

Loan Costs

- Principal (incl. tax & fees)
- Interest

+

Operating Costs

- Insurance
- Fuel
- Avg. other maintenance

=

TOTAL
MONTHLY
OPERATING
COSTS

Maximum monthly cost

Including interest, insurance, fuel, and lifetime-average maintenance costs

Three-person household / Joint-filers		
Income Level	Income	Max Monthly Cost
225% of FPL	\$55,935	\$404
300% of FPL	\$74,580	\$528
400% of FPL	\$99,440	\$718
600% of FPL	\$149,160	\$1076

Vehicle inputs

New

- 2023 model year vehicles from FuelEconomy.gov
- Make, model, and trim combinations where trim is related to electric range
- Where price information is available

Used

- 2021 and earlier model year vehicles
- Where vehicle is present in the fueleconomy.gov database
- Make, model, and trim combinations where trim is related to electric range
- Where price information is available



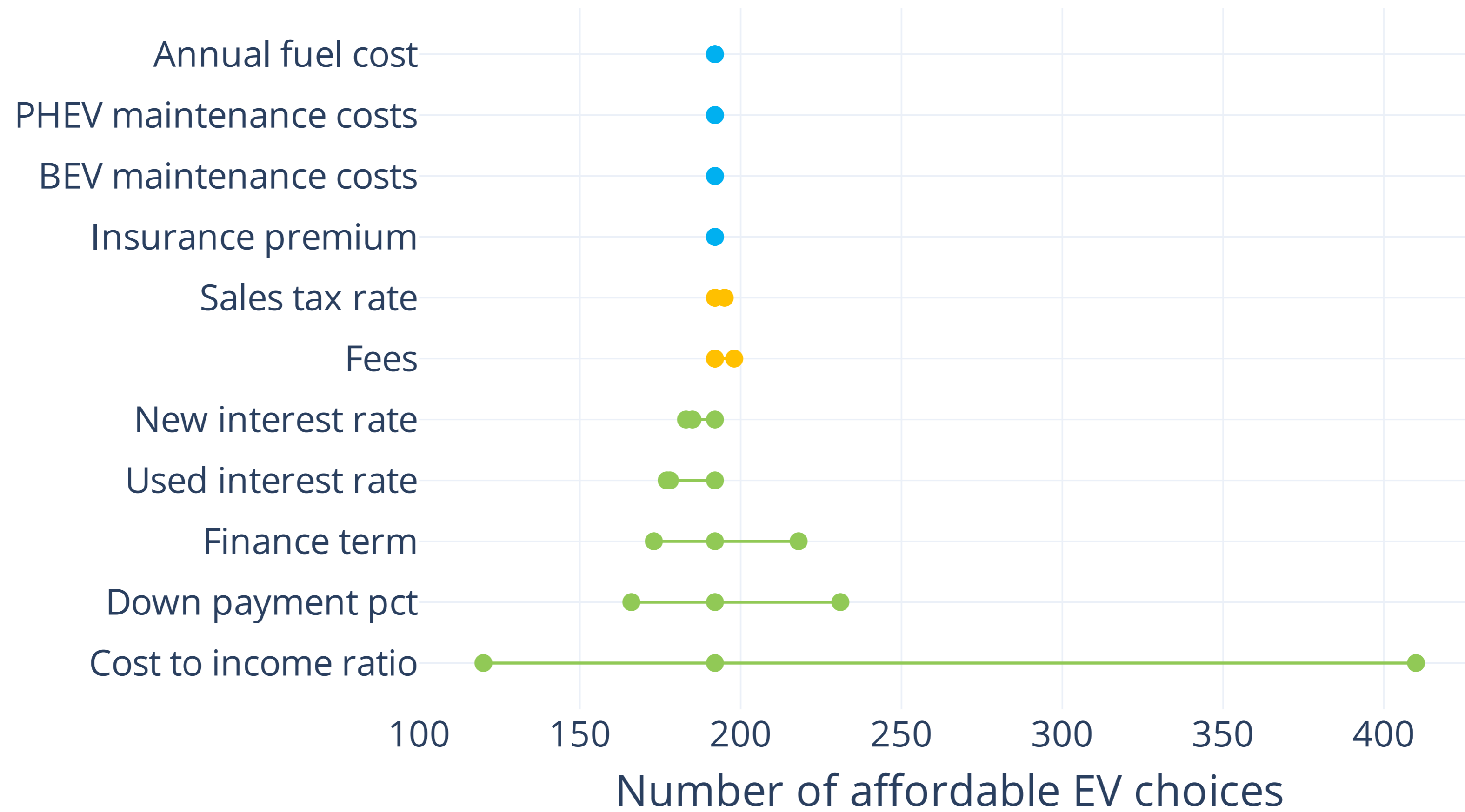
Photos from Kelley Blue Book

Vehicle cost assumptions

- Vehicle cost: MSRP or KBB Fair Purchase Price without options
- Interest rate: avg. for new and used (~17%)
- Insurance premium: \$251/month
- Maintenance: \$65/month (lifetime average)
- DMV and doc fees: \$762
- Sales tax rate: 8.82% (average via taxfoundation.org)
- Fuel costs: varies by vehicle, based on FuelEconomy.gov (electricity and gas)
- Purchasing power adjustment for larger households



Most sensitive input: cost to income ratio



Not accounted for

- Cost of installing vehicle charging infrastructure at home, if applicable
- Financial flexibility to make a cash down payment or sufficient trade value from other vehicles
- Access to credit assumed regardless of credit score



Affordable New Vehicles

Cash incentives and 8% interest cap reduces cost, but does not enable affordable choices

- Three-person household
- \$74,580 income (300% FPL)
- \$9,500 PHEV and \$10,000 BEV CC4A incentive applied to down payment
- 8% interest rate cap applied through Finance Assistance

New 2023 Model Year Options = 0

	Vehicle Technology	
Vehicle Size	BEV	PHEV
Small	0	0
Large	0	0

FTC enables four choices, two eligible for FTC

- Three-person household
- \$74,580 income (300% FPL)
- \$9,500 PHEV and \$10,000 BEV CC4A incentive applied to down payment
- 8% interest rate cap applied through Finance Assistance
- \$7,500 FTC applied to down payment

New 2023 Model Year Options = 2

- Chevrolet Bolt EV
- Chevrolet Bolt EUV

	Vehicle Technology	
Vehicle Size	BEV	PHEV
Small	2	0
Large	0	0

Affordable Used Vehicles

Many affordable used small EV options even without incentives

- Three-person household
- \$74,580 income (300% FPL)

Used EV Options = 39

	Vehicle Technology	
Vehicle Size	BEV	PHEV
Small	34	5
Large	0	0

Addition of CC4A incentive more than doubles choice

- Three-person household
- \$74,580 income (300% FPL)
- \$9,500 PHEV and \$10,000 BEV CC4A incentive applied to down payment

Used EV Options = 103

	Vehicle Technology	
Vehicle Size	BEV	PHEV
Small	69	33
Large	1	0

Interest rate cap enables 18 additional choices

- Three-person household
- \$74,580 income (300% FPL)
- \$9,500 PHEV and \$10,000 BEV CC4A incentive applied to down payment
- Interest capped at 8% through Finance Assistance

Used EV Options = 121

	Vehicle Technology	
Vehicle Size	BEV	PHEV
Small	76	44
Large	1	0

Additional \$4,000 FTC enables 22 more choices

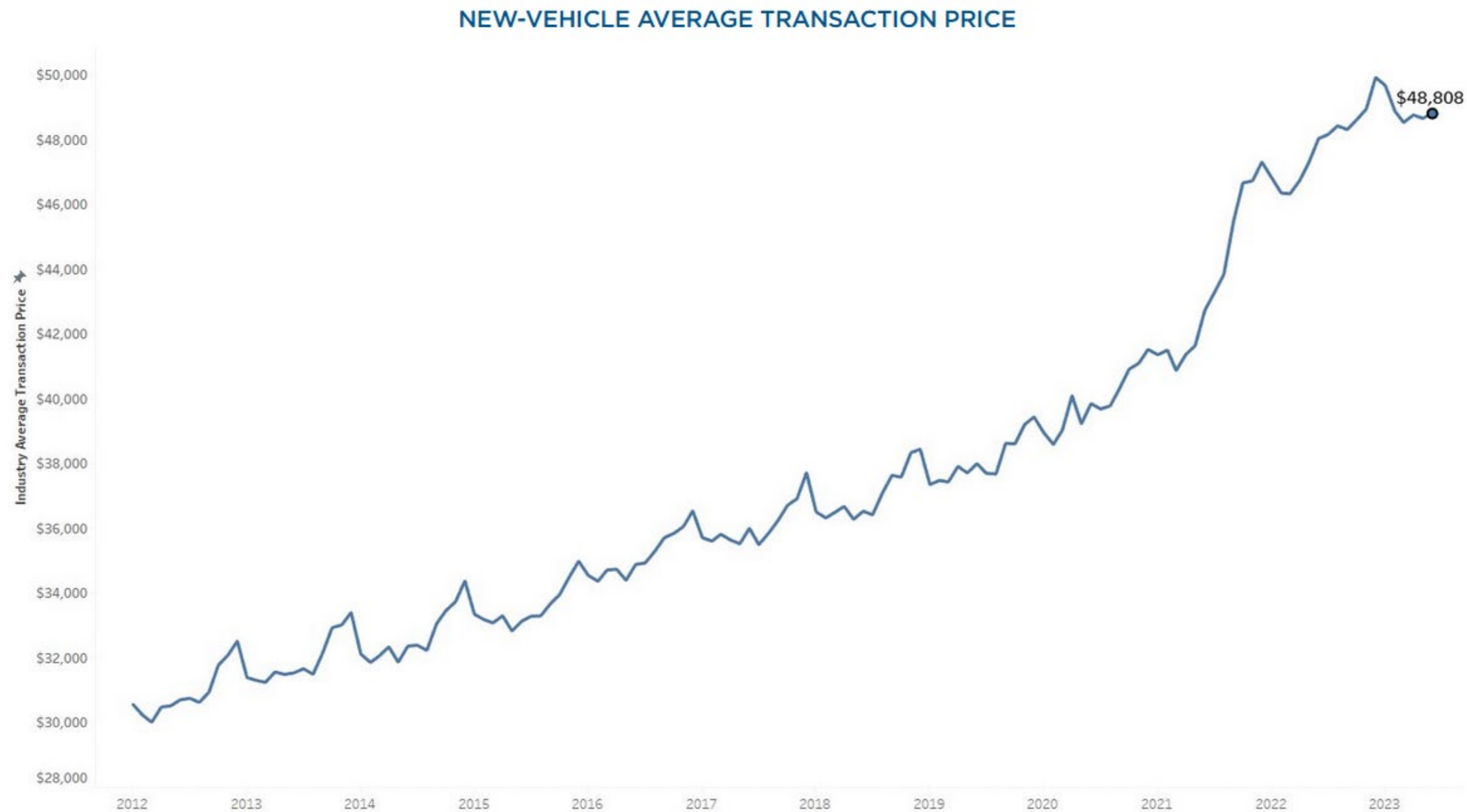
- Three-person household
- \$74,580 income (300% FPL)
- \$9,500 PHEV and \$10,000 BEV CC4A incentive applied to down payment
- Interest capped at 8% through Finance Assistance
- \$4,000 FTC applied to down payment

Used EV Options = 147

	Vehicle Technology	
Vehicle Size	BEV	PHEV
Small	85	57
Large	3	2

Appendix

Cox Auto: June average new car transaction price \$48,808



Graph and June average from:
(July 11, 2023). “Kelley Blue Book Analysis: New-Vehicle Transaction Prices in June Post Smallest Annual Gain in Nearly 4 Years.” Cox Automotive.

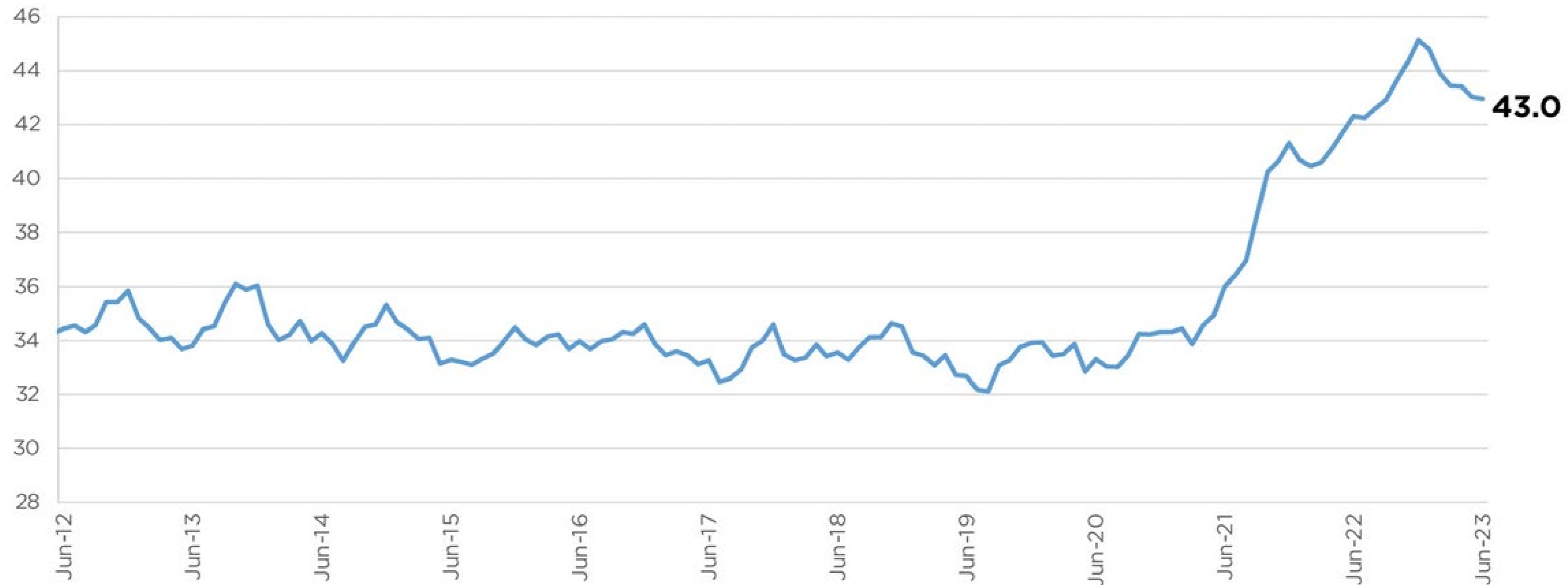
<https://www.coxautoinc.com/market-insights/kbb-atp-june-2023/>

Cox Auto, Moody's: Vehicle prices relative to income high, declining?

COX AUTOMOTIVE/MOODY'S ANALYTICS VEHICLE AFFORDABILITY INDEX

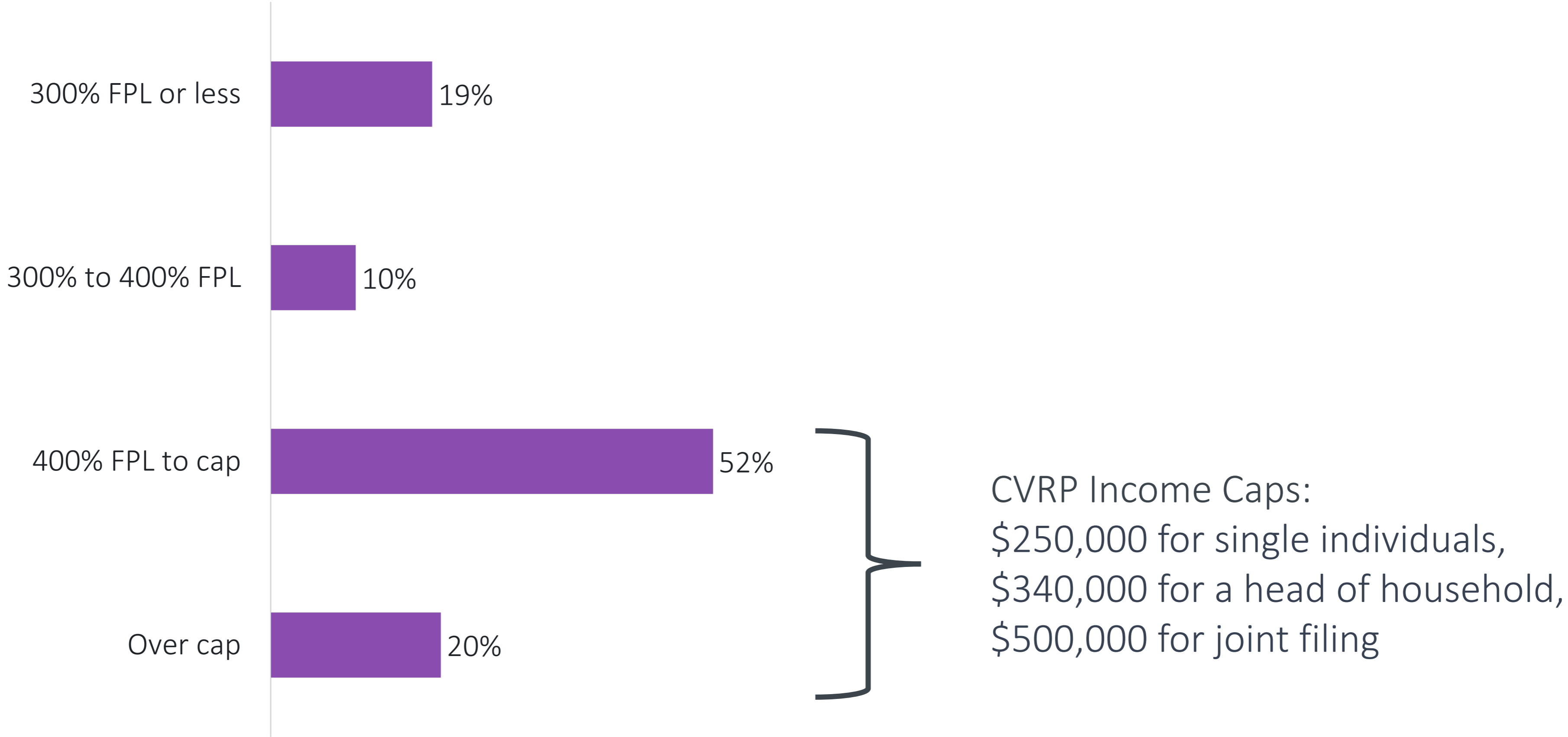
JUNE 2023

Weeks of Income Needed to Purchase a New Light Vehicle

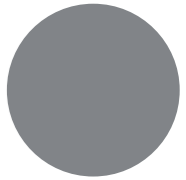


Graph from:
(July 14, 2023). "New-Vehicle Affordability Stable in June." Cox Automotive.
<https://www.coxautoinc.com/market-insights/june-2023-vai/>

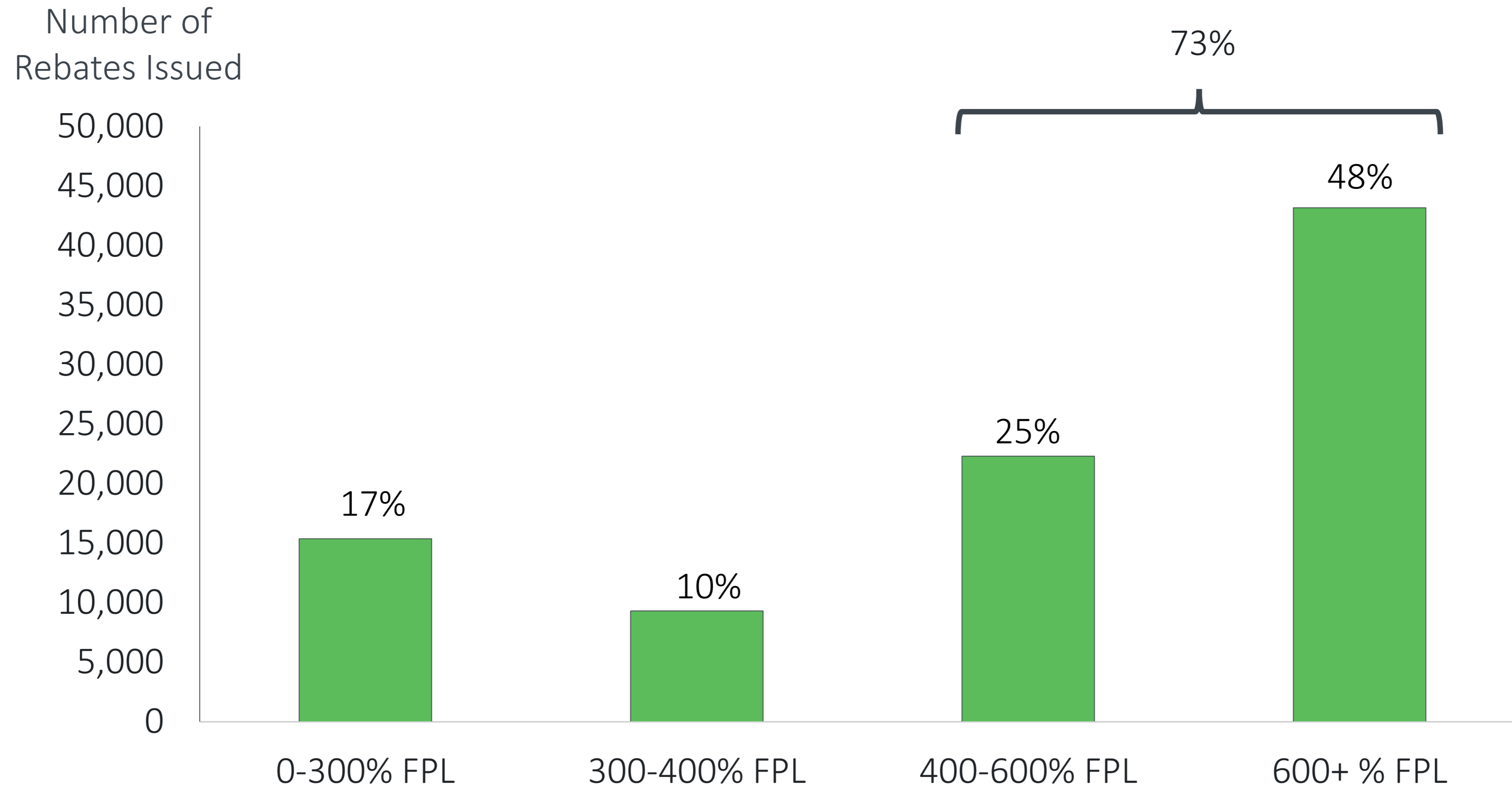
Most of the new car market has household income > 400% FPL



Data source: Strategic Vision's New Vehicle Experience Survey.
California new vehicles purchased in calendar year 2019.
Weighted to new vehicle registrations from S&P Global Mobility.
Contains data from S&P Global Mobility ©2020.

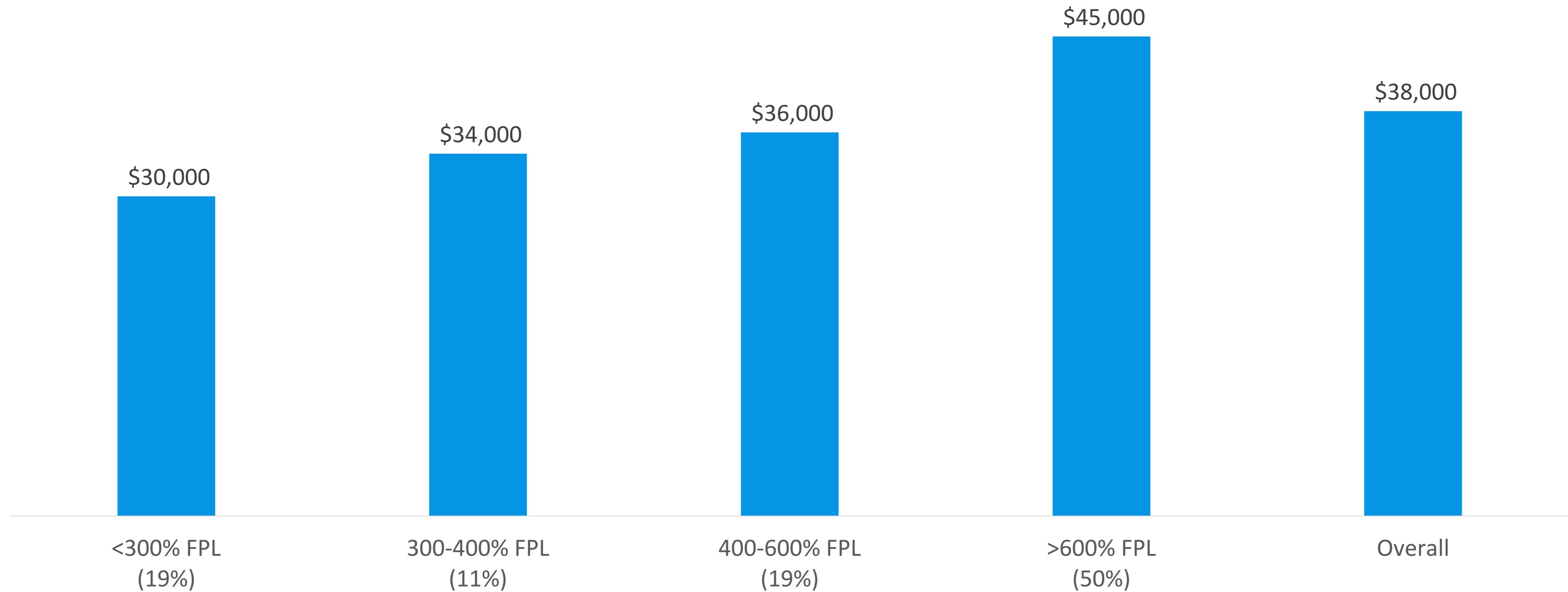


17% of CVRP participants have household income \leq 300%



Data Source: Clean Vehicle Rebate Project application data
Applications received between Jan 1, 2021 and March 1, 2023
Application Status = Application Approved, Check Sent;
Application Type = Individual; n = 90,149

2019: Median new car price for households with income < 300% FPL: \$30,000



Data source: Strategic Vision's New Vehicle Experience Survey.
California new vehicles purchased in calendar year 2019.
FPL percentages weighted to new vehicle registrations from S&P Global Mobility.
Contains data from S&P Global Mobility ©2020.



2019 median CVRP rebated vehicle purchase price for households with income < 300% FPL: \$38,200



Data Source: Clean Vehicle Rebate Project application data
Applications received in 2019 and processed as of June 2023.
Application Status = Application Approved, Check Sent

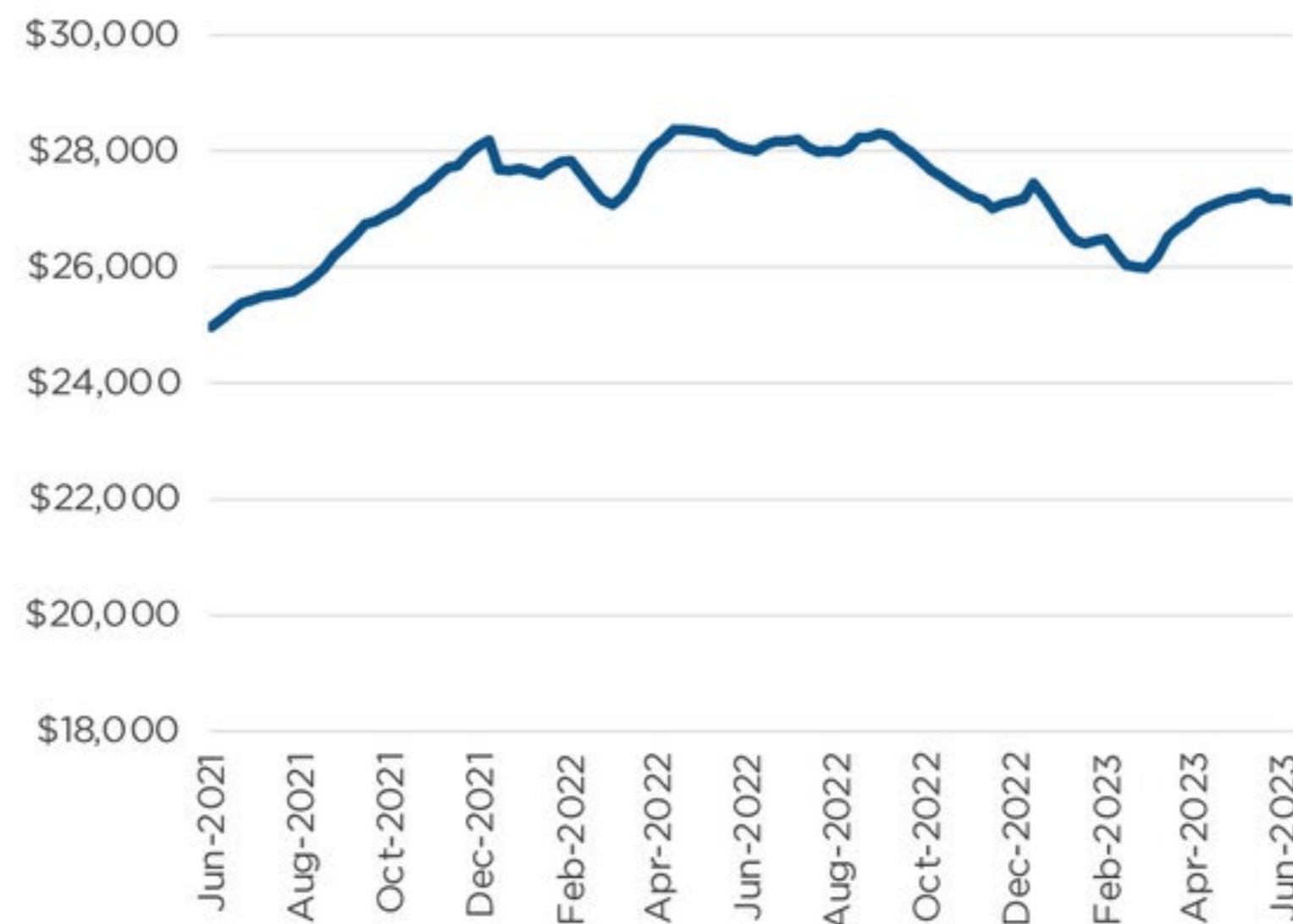


Cox Auto: June average used vehicle price \$27,147

JUNE 2023 AVERAGE USED-VEHICLE LISTING PRICE

Prices still falling - on average - but rate of decline slowing.

Average Listing Price last 24 months



Annual Change last 12 months



Source: Cox Automotive and vAuto

Graph and June average from:

(July 14, 2023). "Used-Vehicle Inventory, Prices Hold Steady as Sales Edge Higher." Cox Automotive.

<https://www.coxautoinc.com/market-insights/used-vehicle-inventory-june-2023/>

Challenges accessing full tax credit at lower income levels

- Households with income 300% FPL or less may be unable to use the entire federal tax credit for a new vehicle.
- Households at the federal poverty level may not be able to access the full used vehicle tax credit

FPL Bin	Average Tax Liability
0 - 100% FPL	\$2,293
100% - 200% FPL	\$4,301
200% - 300% FPL	\$6,214
300% - 400% FPL	\$7,200
400% - 500% FPL	\$7,500
500% - 600% FPL	\$7,500
600% - 700% FPL	\$7,500
700% - 800% FPL	\$7,500
800% - 900% FPL	\$7,500
900% - 1000% FPL	\$7,500
1000% - 1100% FPL	\$7,500
1100% - 1200% FPL	\$7,500
1200% - 1300% FPL	\$7,500
1300% - 1400% FPL	\$7,500
1400% - 1500% FPL	\$7,500
1500% - 1600% FPL	\$7,500
1600% - 1700% FPL	\$7,500

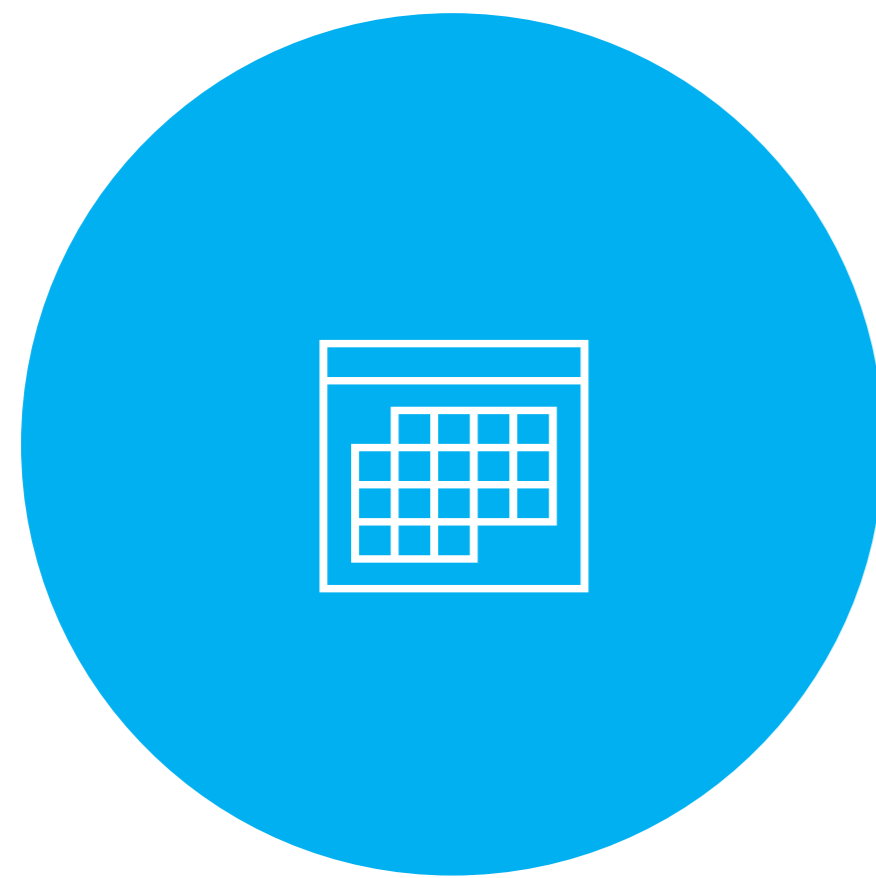
Maintenance cost inputs insignificant to affordable choices



Maintenance

- Value chosen: \$65 per month
- Why this was chosen: Maintenance cost per mile of BEV \$0.06 at 13,000 miles a year
- Source: Cost per mile from [DOE](#), annual mileage from [Forbes](#)
- Possible alternative: \$33 per month (Consumer Reports), \$97.50 per month (PHEV via April 2021 DOE report)

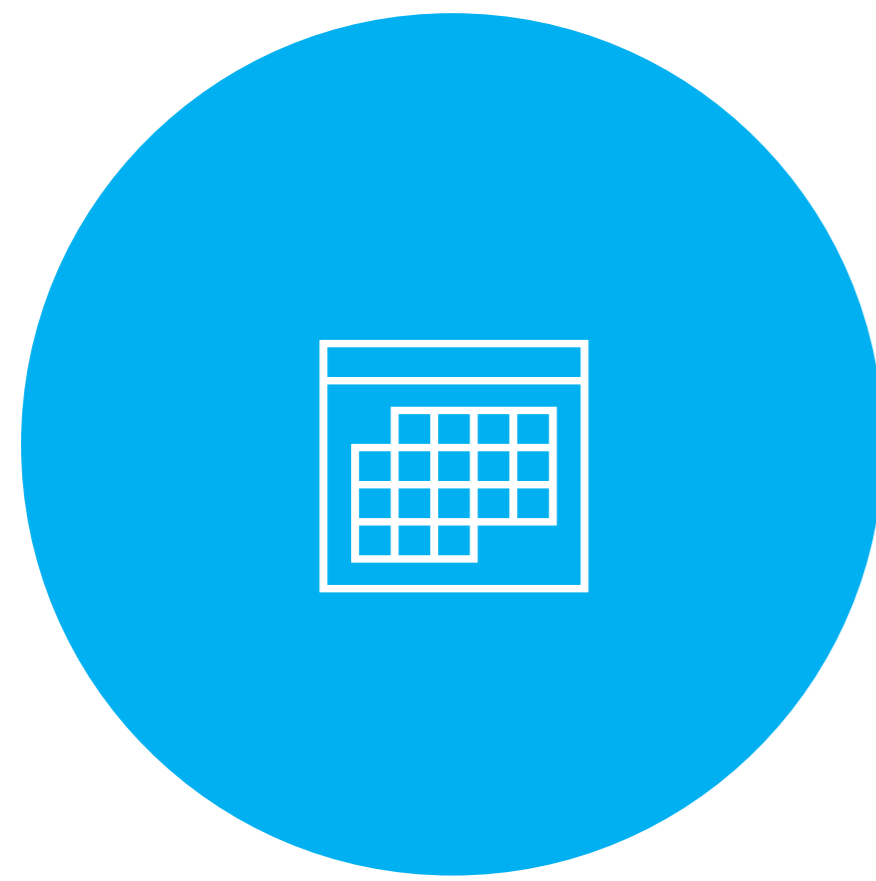
Insurance cost inputs insignificant



Insurance

- Best guess: \$251 per month
- Why this was chosen: \$3,012 per year National EV average
- Source: [Value Penguin](#)
- Possible alternatives: \$179 per month (Hyundai Kona); \$394 (Porsche Taycan)

Fuel costs not significant



Fuel Costs

- Best guess: Varies by vehicle
- Why this was chosen: Default values from FuelEconomy.gov
- Source: [FuelEconomy.gov](https://www.fueleconomy.gov)
- Possible alternatives: \$400 (lowest EV default value), \$1,500 (double highest EV default value)

Sales tax assumptions insignificant



Sales/Use Tax

- Value chosen: 8.82% tax rate
- Why this was chosen: California average sales tax rate
- Source: [Tax Foundation](#) and [CA DTF](#)
- Other options: 7.25% (minimum CA sales tax rate via CA DTF), 10.75% (highest CA sales tax rate via CA DTF)

High markups and optional extras have small impact



DMV and Document
Fees, Dealership
Markups and Extras

- Value chosen: \$762
- Why this was chosen: Highest DMV fee for a new EV
- Source: DMV.ca.gov
- Other options: \$410 (lowest DMV fee for a new EV), \$4,421 (average Feb. 2023 cost over MSRP via iseecars.com plus assumed fees)

Interest rate assumptions modestly impactful



Interest Rates

- Values chosen:
 - 16.89% for new
 - 17.14% for used
- Why this was chosen: Average interest rate during the first quarter of 2023 assuming credit score from 600–699.
- Sources: [US News](#), [Lending Tree](#)
- Possible alternatives:
 - 11.96–21.53% for new (credit scores 700–750 or 451–560, respectively)
 - 12.21–21.78% for used (assuming same credit scores)

Spreading loan over more time increases monthly affordability, debt



Finance Term

- Value chosen: 5 years
- Why this was chosen: average loan term for used vehicles rounded to nearest year
- Sources: [Lending Tree](#)
- Possible alternatives: 48 months (financial health recommendation), 74 months (new car average)

Increasing down payment increases monthly affordability, but may be inaccessible to many households



Downpayment

- Value chosen: 10%
- Why this was chosen: Typical Finance Assistance program down payment level
- Sources: CARB Finance Assistance programs
- Possible alternatives: 0% (lowest barrier to entry), 20% (financial health recommendation)

Transportation spending relative to income the highest impact input



Cost to income
ratio

- Value chosen: 15%
- Why this was chosen: Between financial health literature recommendation of 10% and actual average US household spend of 16.4% (2021 via US BTS)
- Sources: [US BTS](#)
- Possible alternatives: 10% (financial health recommendation), 26.9% (average for lowest income quintile via US BTS)