Proposed FY 2019–20 Funding Plan: Final CVRP Supporting Analysis

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with thanks to Jonathan Changus, Keir Havel,
Amy Lastuka, Michelle Jones, and others at CSE and CARB

CALIFORNIA CLEAN VEHICLE REBATE PROJECT℠

Outline

I. Method for the Proposed Funding Plan

II. Proposed FY 2019–20 Funding Need (including FY 18–19 waitlist)

III. Proposed Three-Year Funding Need (SB 1275)

IV. Proposed Funding Need for 5M EVs ('18–'19 Budget Act)

- Context: Private-investment Estimates
- Trajectories Toward State Goals

V. Program-Change Methodology and Data Inputs

VI. Program-Change Estimates

VII. Next Steps

Appendix

- Major models available, program design comparison, MA vs. CT income distributions, public data resources, CVRP lease data, modeling alternatives and sensitivities considered

CALIFORNIA CLIMATE INVESTMENTS
Cap and Trade Dollars at Work

CALIFORNIA AIR RESOURCES BOARD

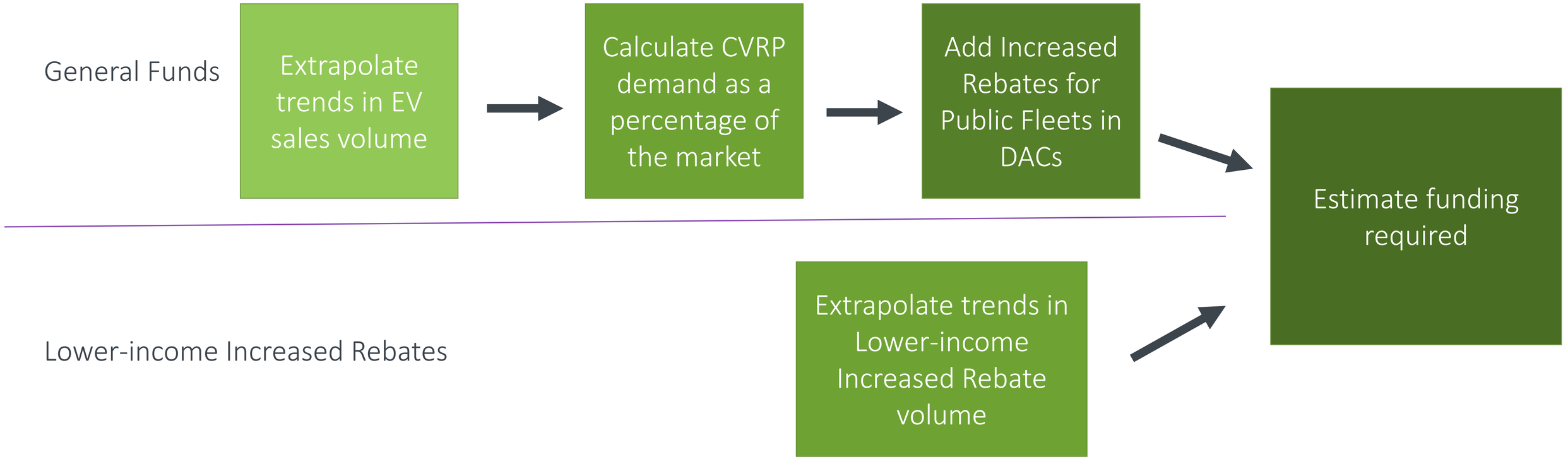
CLEAN VEHICLE REBATE PROJECT℠

Method for the Proposed FY 19–20 Funding Plan

Supplements and updates presentations from:
Workgroup 4, Workgroup 3, Workgroup 2, December 2018 Workshop

Proposed Method

"…all models are wrong; some are useful" – George Box



Extrapolate trends in EV sales volume

General Funds: Extrapolations

- Monthly sales data:
  - March 2010 – December 2018: New-vehicle registrations (IHS)*
  - January 2019 – June 2019: Estimated using CVRP rebates
- Assembled into Vehicle categories:
  1. Plug-in hybrid electric vehicles (PHEVs)
  2. Range-extended battery electric vehicles (BEVx vehicles)**
  3. Battery electric vehicles (BEVs)
     - Tesla separate category in Middle scenario
     - Model 3, Model S, Model X, and Bolt separate in High scenario
  4. Fuel-cell electric vehicles (FCEVs)
  5. Zero-emission motorcycles (ZEMs)
- General funds:
  - Low scenario: Average of most-recent 12 months (July 2018 – June 2019)
  - Middle scenario: Extrapolated from all data except: Tesla = extrapolated from April 2018 – June 2019
  - High scenario: Extrapolate from all data

* Data may underestimate PHEVs.

** Receives a BEV rebate. See CleanVehicleRebate.org for more detail. To date = BMW i3 REx.

Calculate CVRP demand as a percentage of the market

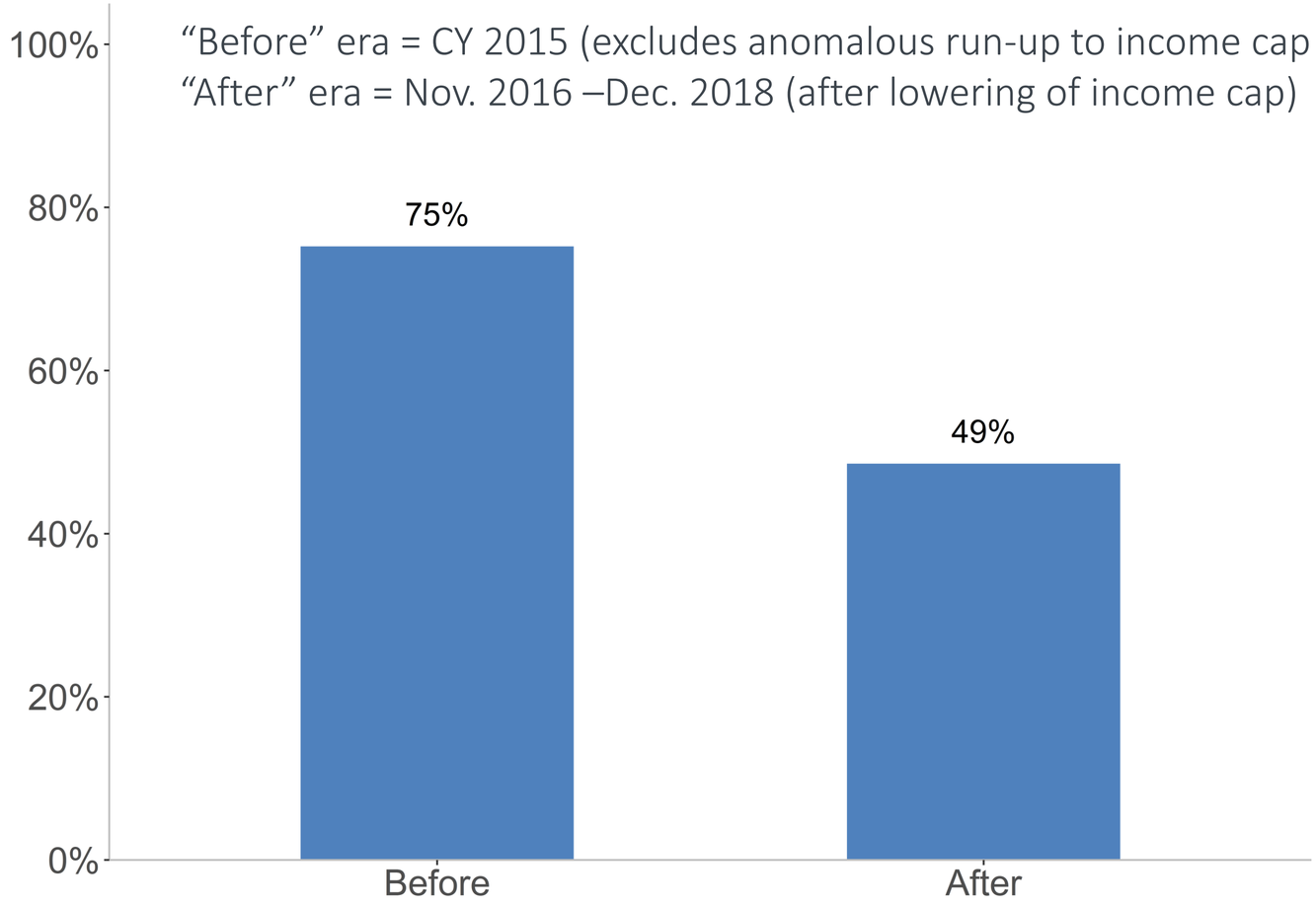
Percent of market rebated

During “current program” (after lowering of income cap) = Nov. 2016 – Dec. 2018

<table>
<tr><th>Low</th><th>Middle</th><th>High</th></tr>
<tr><td>PHEV: 44%</td><td>PHEV: 44%</td><td>PHEV: 44%</td></tr>
<tr><td>BEVx: 43%</td><td>BEVx: 43%</td><td>BEVx: 43%</td></tr>
<tr><td rowspan="5">BEV: 51%</td><td rowspan="3">Tesla: 45%*</td><td>Tesla Model 3: 51%</td></tr>
<tr><td>Tesla Model S: 31%</td></tr>
<tr><td>Tesla Model X: 31%</td></tr>
<tr><td rowspan="2">Other BEV: 64%</td><td>Chevrolet Bolt: 54%</td></tr>
<tr><td>Other BEV: 71%</td></tr>
<tr><td>FCEV: 89%</td><td>FCEV: 89%</td><td>FCEV: 89%</td></tr>
<tr><td>ZEM: 51%**</td><td>ZEM: 51%**</td><td>ZEM: 51%**</td></tr>
</table>

* Limited to Apr. 2018 – Dec. 2018 to exclude months the Tesla Model 3 was not available. See slide 5 for details.
** Data not available to calculate a percentage for the ZEM category;
the overall BEV percentage is assumed for the ZEM category in the projections.

Illustrative Eras: Percent of Market Rebated Before and After the Income Cap



Includes all PHEV, BEVx, BEV, and FCEV rebates

Increased Rebate for Public Fleets in Disadvantaged Communities

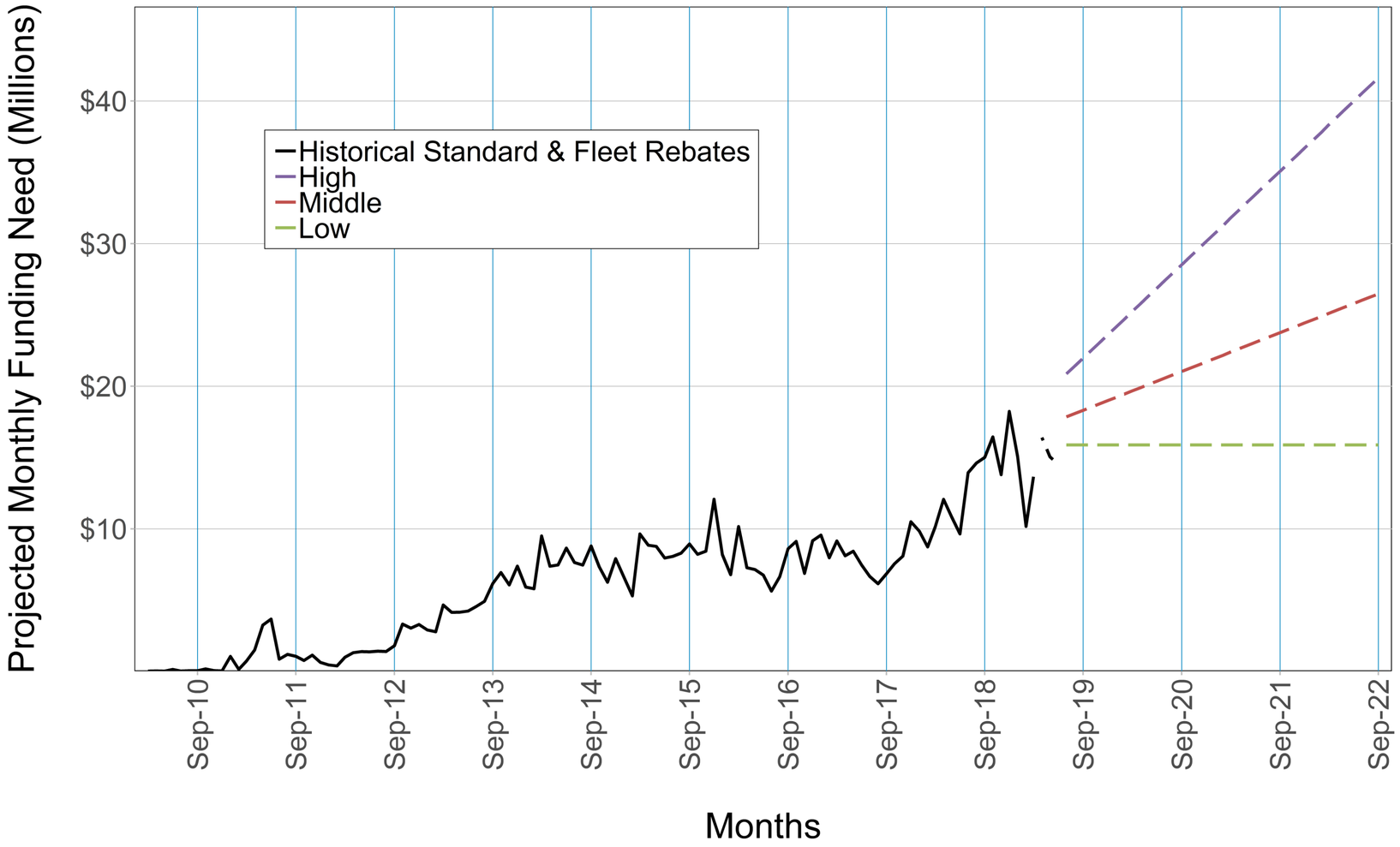
Add Increased Rebates for Public Fleets in DACs

Public Fleet Pilot Project monthly avg.
Jan. 2017 – Oct. 2017

PHEV	~10
BEVx	0
BEV	~21
FCEV	~1
ZEM	not eligible

Estimate funding required

Proposed Scenarios: General Funds

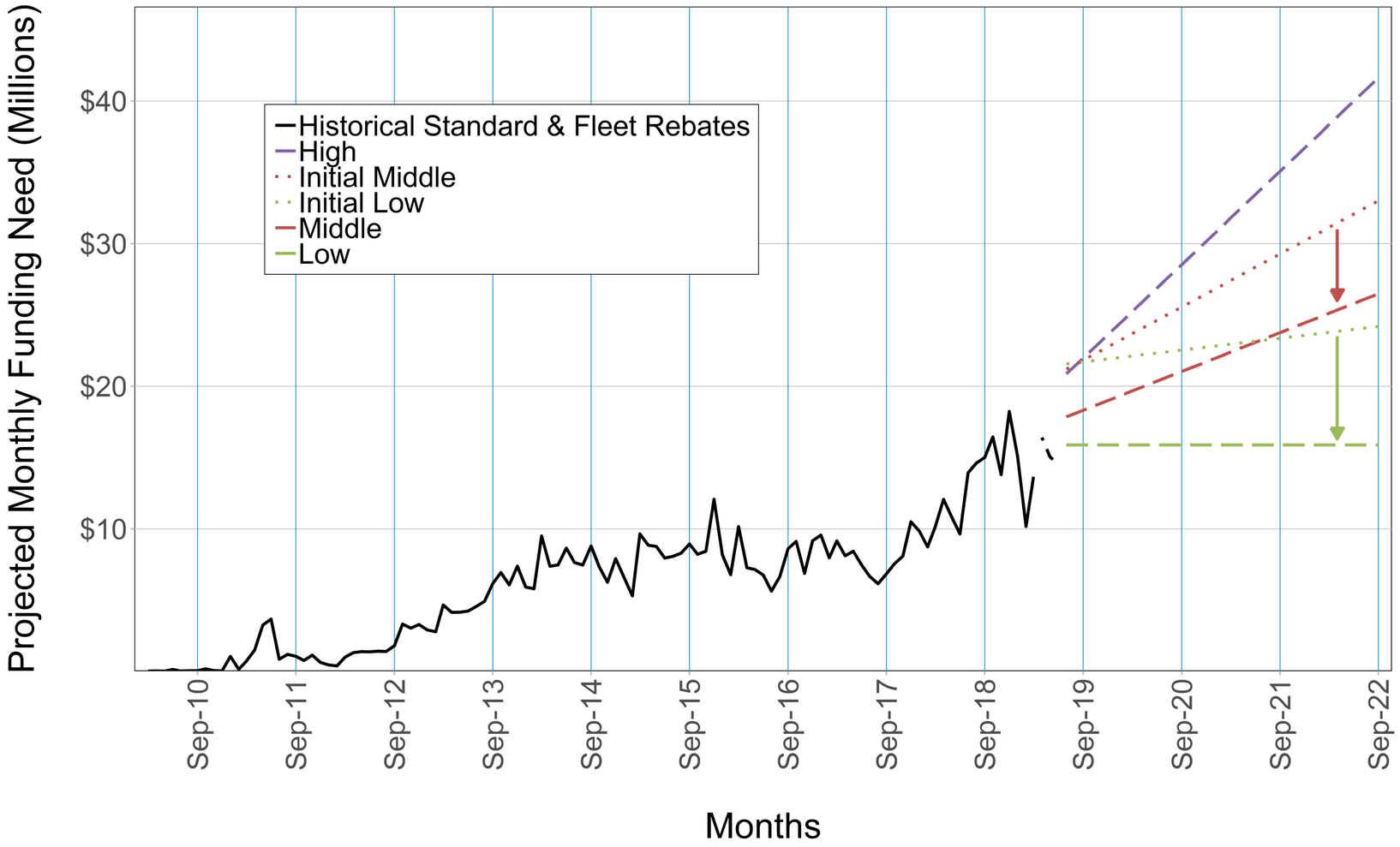


Historical = rebate funds only

Administration costs included in projections

Estimate funding required

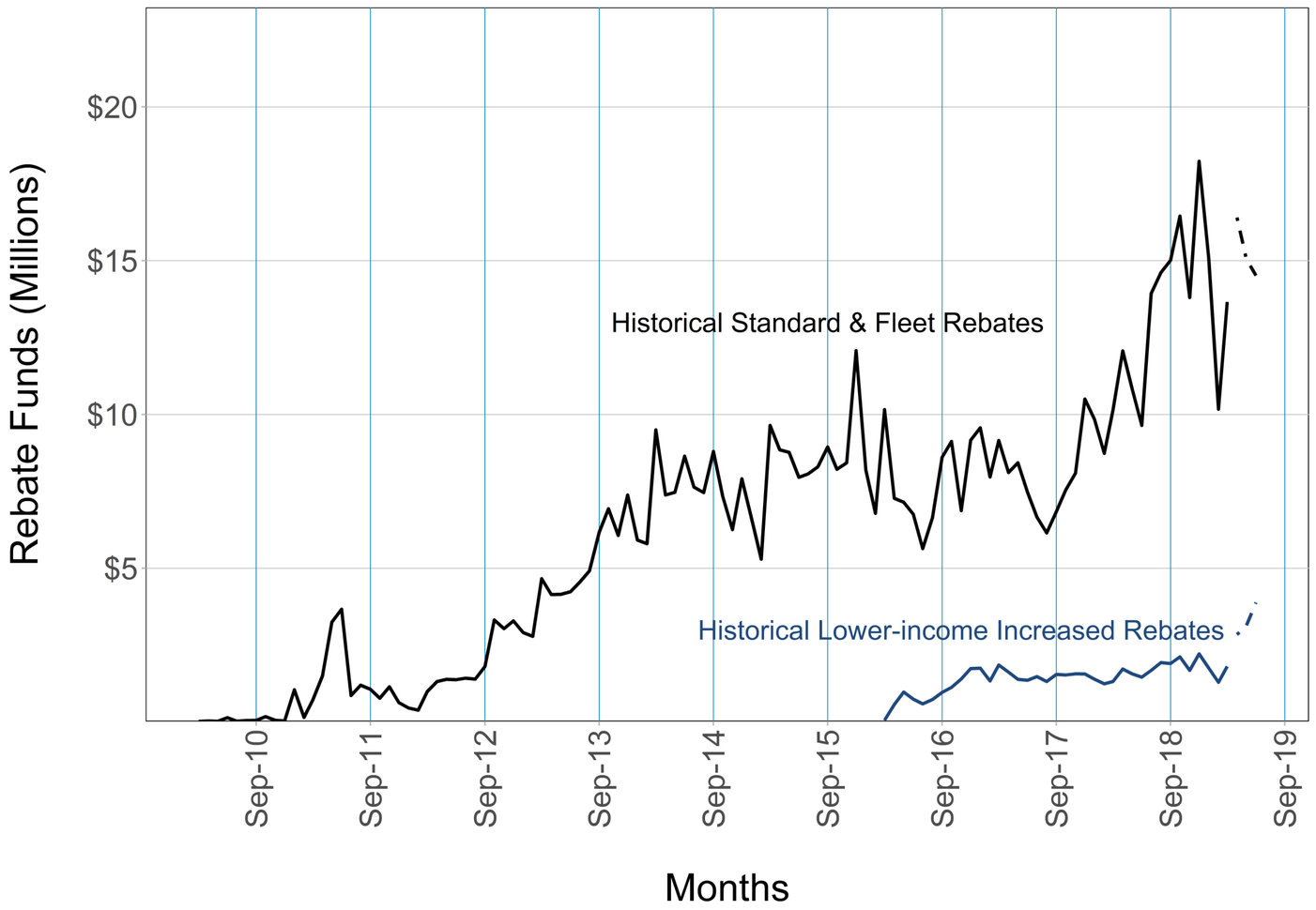
Initial vs. Final Method: General Funds



Historical = rebate funds only

Administration costs included in projections

Increased Rebates: Updated Method



- Previously projected as a percentage of standard rebates, Standard-Rebate growth is diverging from Increased-Rebate growth
- Increased Rebates are now projected separately.

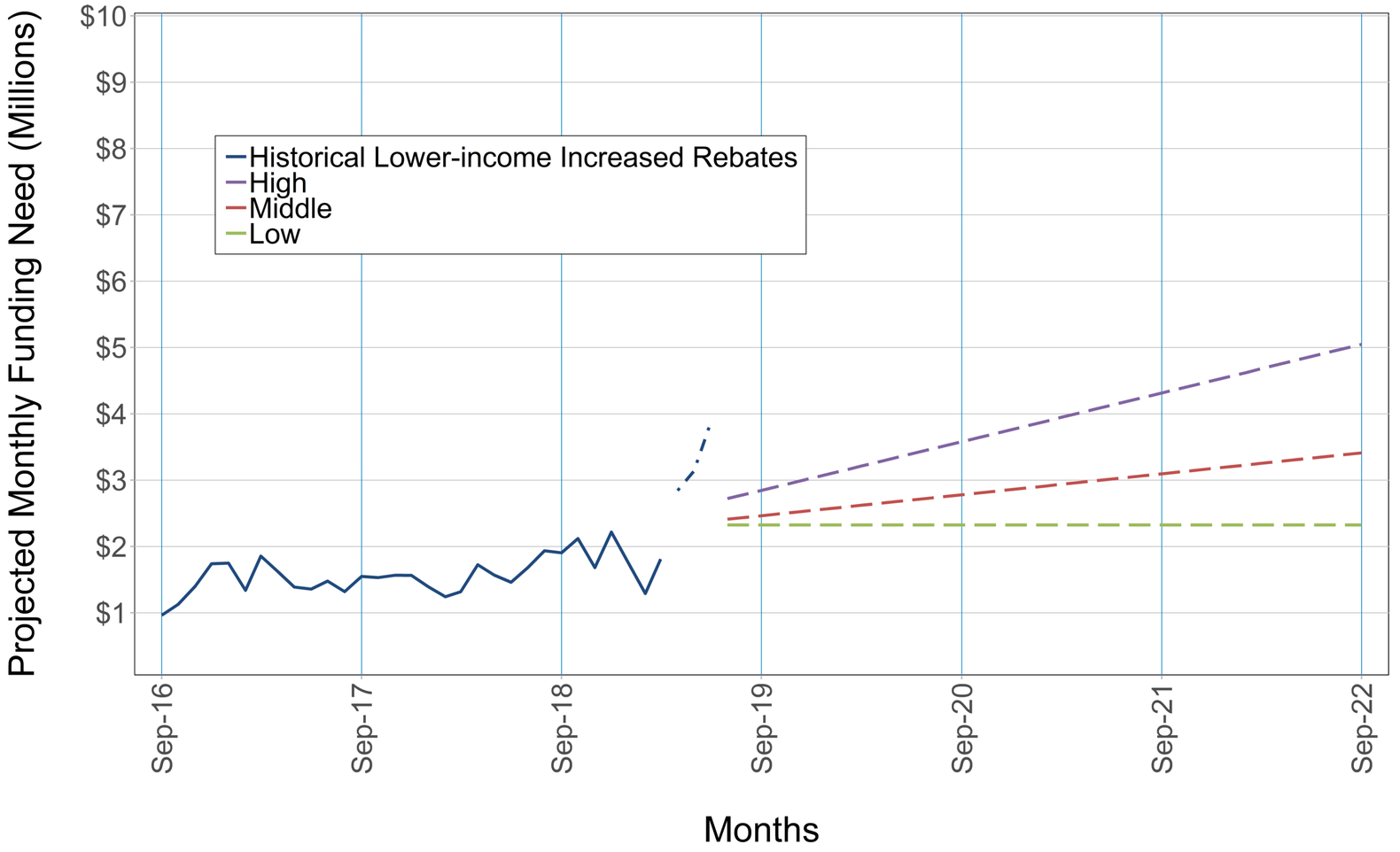
Lower-income Increased Rebates: Extrapolations

Extrapolate trends in Lower-income Increased Rebate volume

- CVRP Lower-income Increased Rebates:
  - Low scenario: Average of most-recent 12 months (July 2018 – June 2019)
  - Middle scenario: Extrapolate all data (March 2016 – June 2019)
  - High scenario: Extrapolate most-recent 12 months (July 2018 – June 2019)
- Vehicle categories
  - Low and Middle:
    1. Plug-in hybrid electric vehicles (PHEV)
    2. Range-extended battery electric vehicles (BEVx)*
    3. Battery-electric vehicles (BEV)
    4. Fuel-cell electric vehicles (FCEV)
  - High: All Lower-income Increased Rebates as a single category

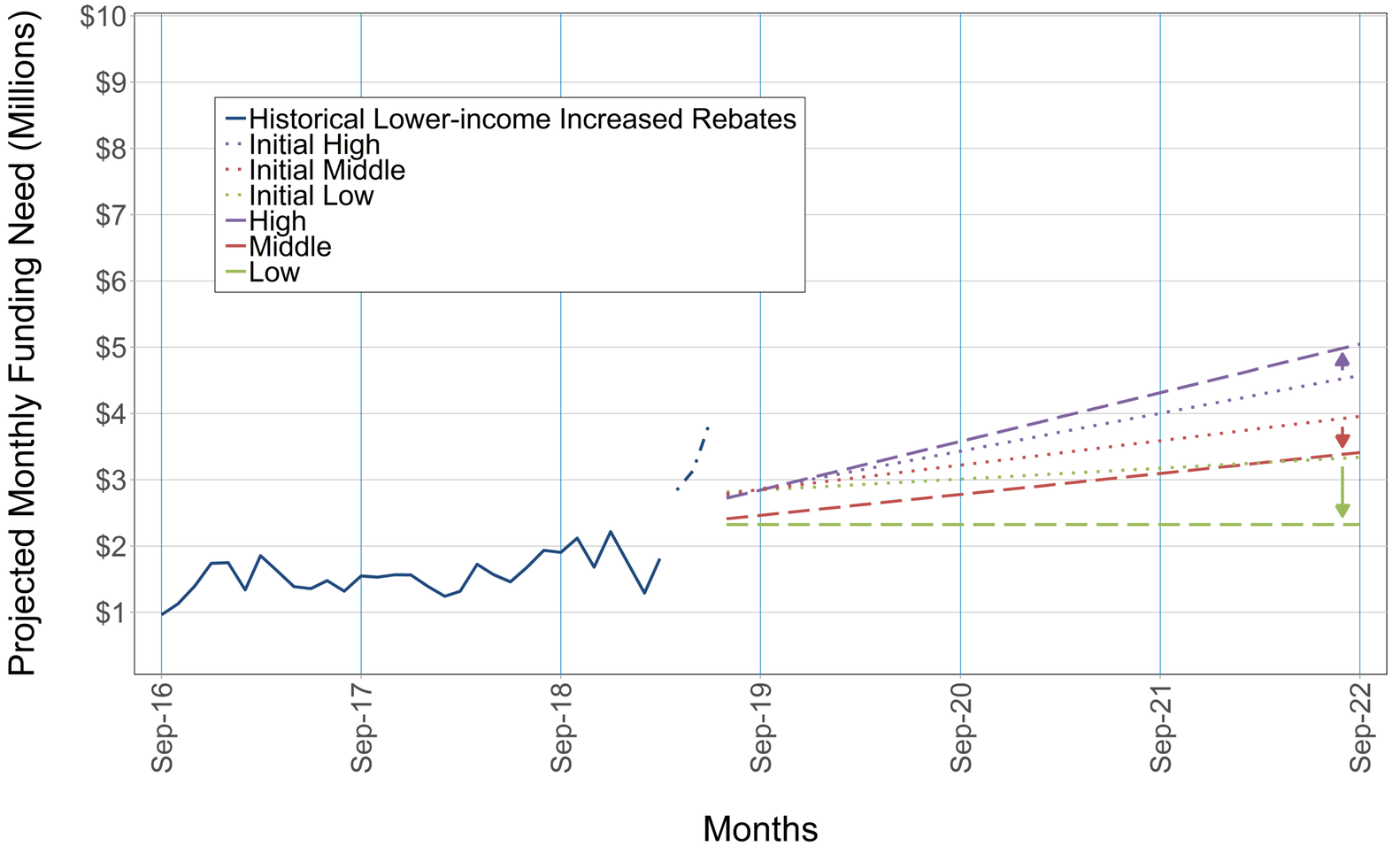
Proposed Scenarios: Lower-Income Increased Rebates

Estimate funding required



Initial vs. Final Method: Lower-Income Increased Rebates

Estimate funding required



Scenarios Recap

General Funds	Low	Middle	High
Data	Registration data and sales estimates based on rebates		
Date ranges	Jul. ’18 – Jun. ’19	Tesla: Apr. ’18 – Jun. ’19 Others: All data	All data
Category grouping	Vehicle category	Vehicle category, Tesla separate	Vehicle category, Models 3, S, X, Bolt
Method	Average	Linear	Linear
% Rebated	Nov. ‘16 – Dec. ‘18	Tesla: Apr. ‘18 – Dec. ‘18 Others: Nov. ‘16 – Dec. ‘18	Nov. ‘16 – Dec. ‘18

Increased Rebates	Low	Middle	High
Data	Rebate data		
Date ranges	Jul. ’18 – Jun. ’19	All data: Mar. ’16 – Jun. ‘19	Jul. ‘18 – Jun. ’19
Category grouping	Vehicle category	Vehicle category	All
Method	Average	Linear	Linear

Estimate funding required

Factors Not Addressed

- Disruptive future EV releases ($35k Model 3, pickups, etc.)
- Federal Tax Credit phase out (reduced after 200,000 vehicles)
  - Tesla phased out by 2020
  - General Motors phase out by Q2 2020
- Rebate Now
  - Greater reservation funding requirements, and uncertain market impact
- Other incentives and supportive policies
  - E.g., ZEV regulations, Low Carbon Fuel Standard Point-of-purchase Incentive (LCFS POP), Clean Cars 4 All
- New public-fleet features
  - Access to procurement-friendly application/reservation
- Choice: HOV or rebate [AB 544 (Bloom, Stats. 2017, Ch 630)]

Proposed FY 2019–20 Funding Need

Including FY 2018–19 Waitlist

FY 2019–20 Funding Need

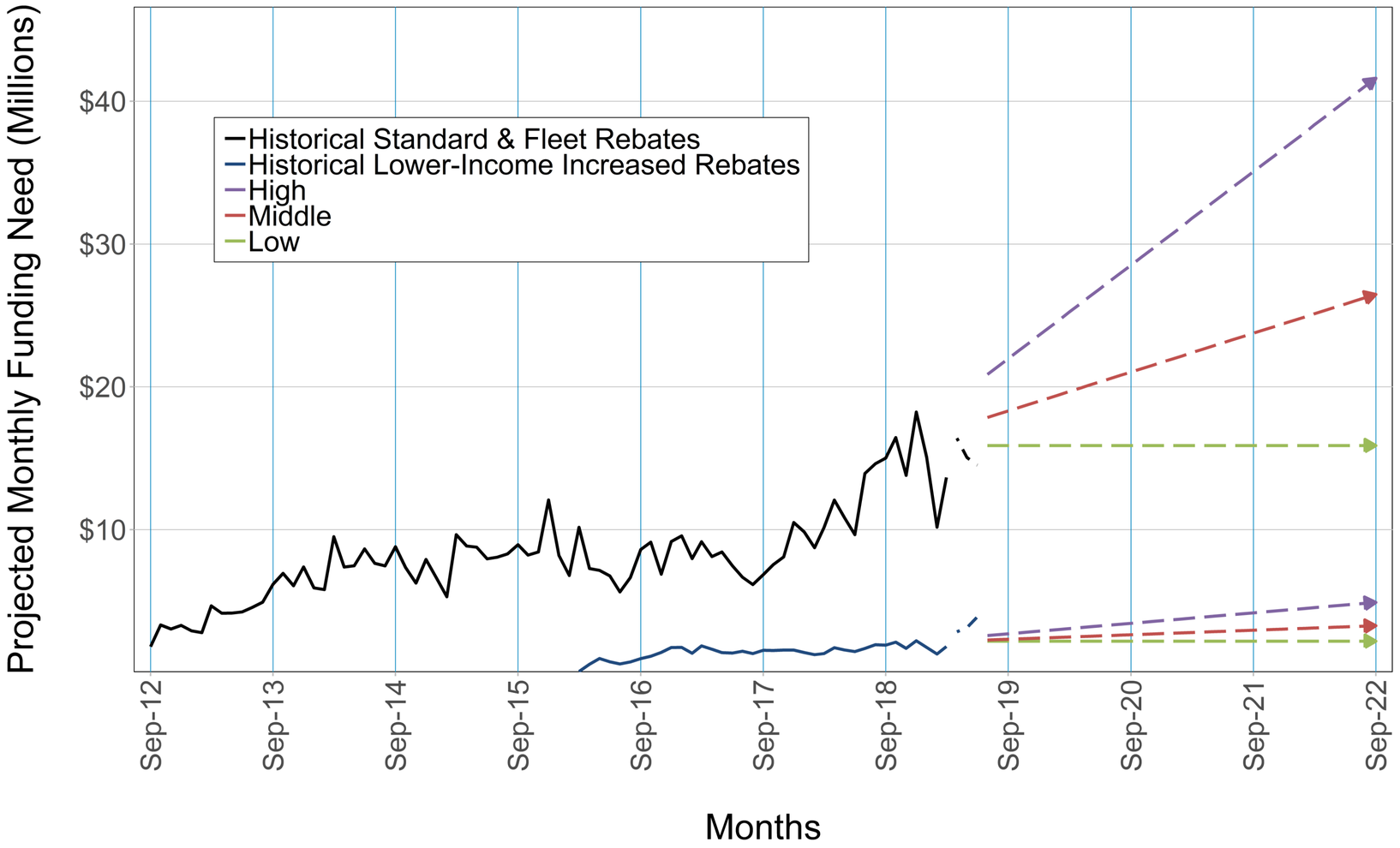
(as of 7/22/2019)

Funding Cycle (Sep thru Aug)	Rebate Type (All = Standard + Increased)	Funding Requirements (millions)			Rebates (thousands)		
		Low	Middle	High	Low	Middle	High
FY 2018–19 (Jul thru Aug 2019)	*Standard and DAC-Fleet Increased Waitlist*	$26	$29	$33			
	Lower-Income Increased Rebates Surplus	(-$10)	(-$10)	(-$10)			
FY 2019–20 (Sep 2019 thru Aug 2020)	*Standard and DAC-Fleet Increased*	$191	$235	$300	78	94	118
	Lower-Income Increased Rebates	$26	$30	$36	6	7	8
	Total Need	**$217**	**$264**	**$336**	**84**	**101**	**127**
	Grand total need thru Sep. 2020:	$242	$293	$369			
	FY 19–20 Budget:		$238				

Proposed Three-Year Funding Need

(SB 1275)

Three-Cycle* Funding Need Summary



* Funding Cycles = September–August

Three-Year Funding Need

(as of 7/22/2019)

Funding Cycle (Sep thru Aug)	Rebate Type (All = Standard + Increased)	Funding Requirements (millions)			Rebates (thousands)		
		Low	Middle	High	Low	Middle	High
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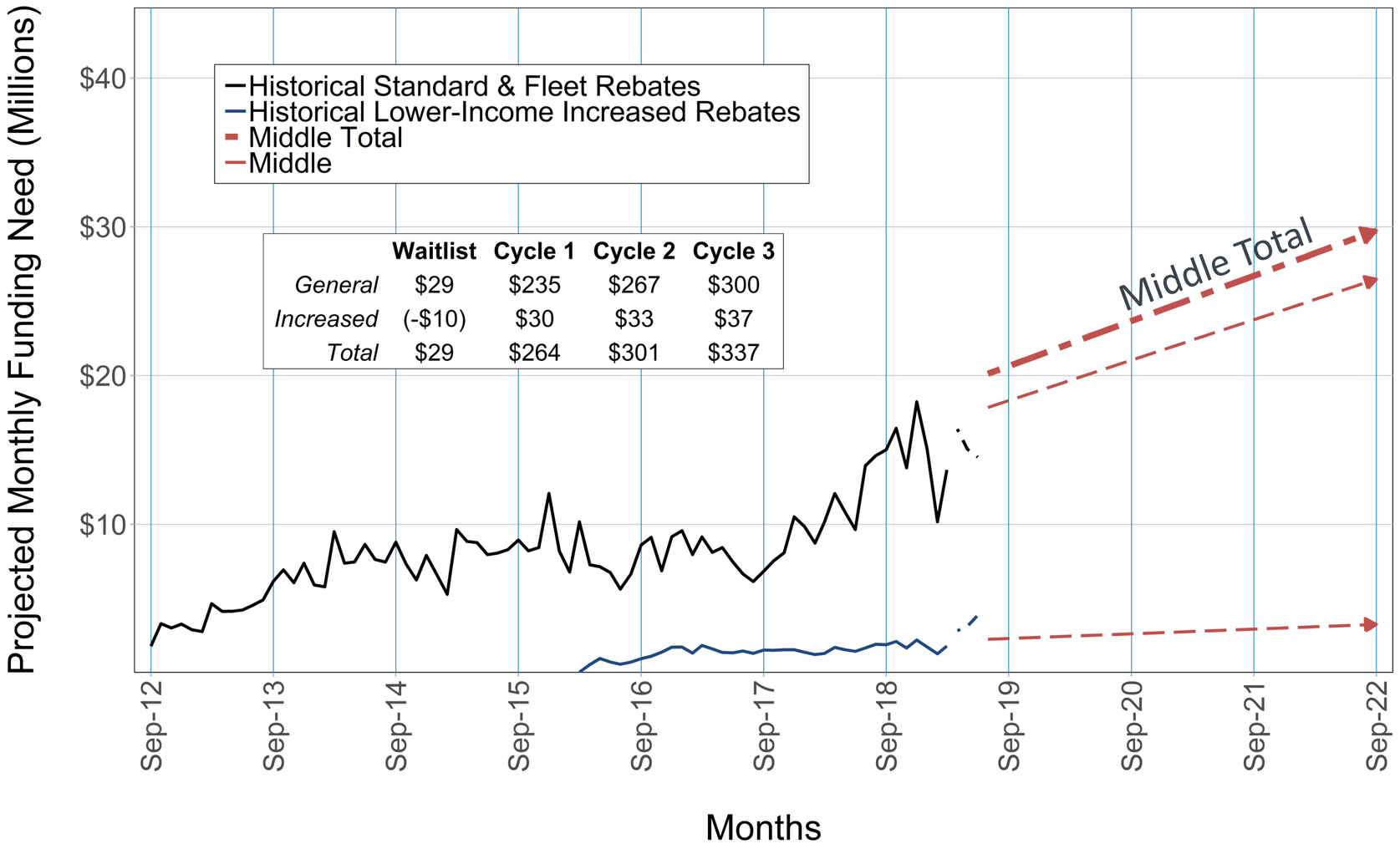
	Lower-Income Increased Rebates	$26	$30	$36	6	7	8
	Total Need	**$217**	**$264**	**$336**	**84**	**101**	**127**
FY 2020–21 (Sep 2020 thru Aug 2021)	*Standard and DAC-Fleet Increased*	$191	$267	$378	78	107	148
	Lower-Income Increased Rebates	$26	$33	$45	6	8	10
	Total Need	**$217**	**$301**	**$423**	**84**	**115**	**158**
FY 2021–22 (Sep 2021 thru Aug 2022)	*Standard and DAC-Fleet Increased*	$191	$300	$457	78	120	178
	Lower-Income Increased Rebates	$26	$37	$54	6	8	12
	Total Need	**$217**	**$337**	**$511**	**84**	**128**	**190**
3-Year Average (Middle Scenario; excl. waitlist, surplus)			**$301**			**115**	
Grand Total Need thru Aug. 2022 (excl. waitlist, surplus)			**$650 M – $1.27 B**			**251–475**	

Three-Cycle* Funding Need: Middle Scenario



	Waitlist	Cycle 1	Cycle 2	Cycle 3
General	$29	$235	$267	$300
Increased	(-$10)	$30	$33	$37
Total	$29	$264	$301	$337

* Funding Cycles = September–August

Proposed Funding Need for 5M EVs ('18–19 Budget Act) & Trajectory Relative to State Goals

Continuing the Trajectory

(caution: assumes recent trends continue “as are”)

Estimates as required by ’18–’19 Budget Act, based on current program design and market conditions	**Middle Scenario**	
	Funding Need	Additional Vehicles Rebated
3-year Total	$921 M	354,000
1 Million	$505 M	195,000
1.5 Million	$1.1 B	435,000
5 Million	$5.6 B	2.1 M

Compare to: >$205 B in private investment (=sum of base MSRPs of forecasted EV sales)

$5.6 B << 3% of total transition costs (vehicles only, no infra., etc.)

Estimating Total Private Investment (Vehicle Price × Quantity)

- Vehicle prices
  - Use 2018 vehicle sales proportions to create weighted average base MSRPs for each vehicle category
  - Assume most base MSRPs stay constant
    - Downward pressure on price: battery technology is getting cheaper
    - Upward pressure on price:
      - Vehicles becoming more fully featured over time
      - Inflation
  - Consider three scenarios for Tesla Model 3 base MSRP
    - Low: $35k
    - Middle: $40k
    - High: $45k
- Vehicle quantities
  - Use vehicle volumes by category from projections middle scenario
  - Sum vehicle base MSRP × quantity from June 2019 through August 2031 (5M vehicles)

Private Investment Estimates

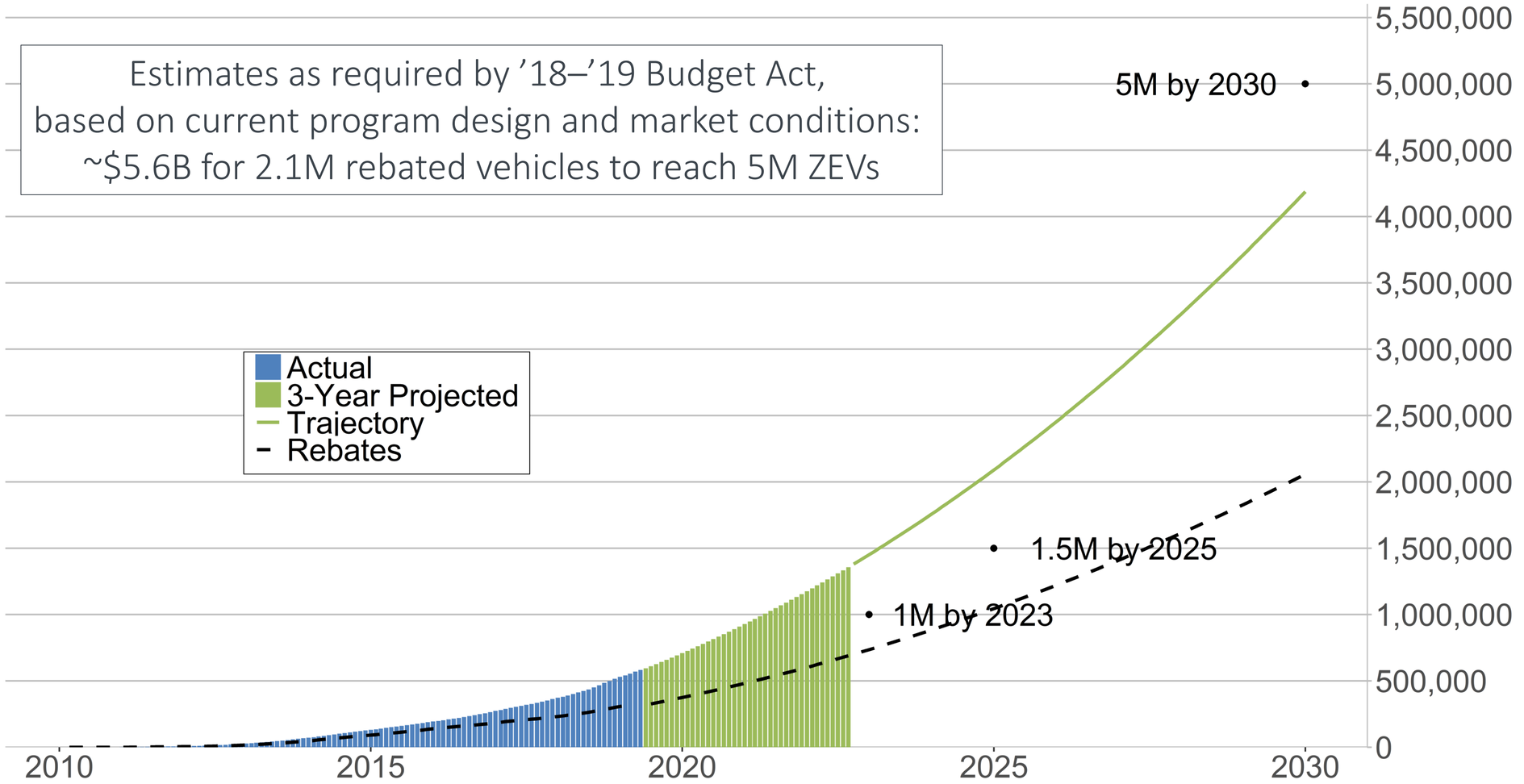
Not accounted for:

- Changing vehicle mix, e.g. light duty trucks
- Vehicle Trim levels—base MSRP is used for all cars
- Inflation
  - Nominal vehicle prices in CVRP Application Data (excluding Tesla vehicles) appear to be flat since 2011

Total vehicle costs for projected vehicles added to reach 5 million ZEV goal:

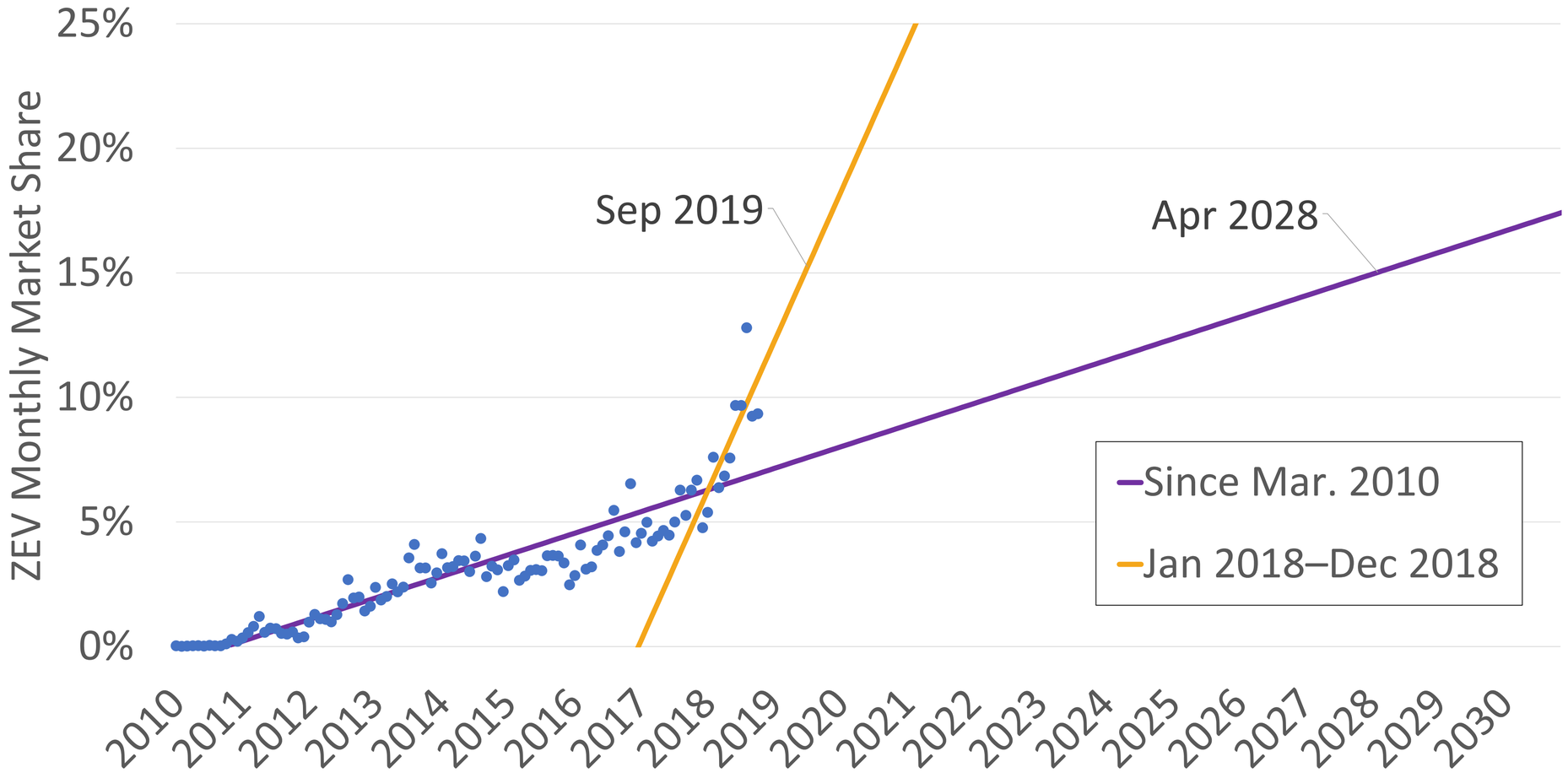
	Low	Middle	High
Market value	$196 B	$205 B	$215 B

Cumulative EV Sales Relative to State Goals: Actual, 3-Year Projected, and Current Trajectory



Includes content supplied by R.L. Polk & Co, © 2018;
Projections may underestimate PHEVs.

Time to Get to 15% Monthly Market Share : Recent vs. Long-Term Trends



Program-Change Estimates: Methodology and Data Inputs

Program-Change Methodology

- Percent of 2018 program that would have been excluded under new program design calculated by rebate type (standard/fleet and Lower-Income-Increased Rebates)
- Percent excluded removed from projected rebates
- Rebate essentiality calculated for excluded participants
- Rebate essential percentages used to calculate market losses based on future excluded rebates

Not addressed:

- Market-loss rebound effect due to increased resources subsequently available due to program changes for remaining, more-rebate-essential consumers

Program-Change Levels Explored

- MSRP Cap (FCEV exempt)
  $60k, $50k, $40k
- UDDS All-Electric Range (AER) Minimum
  >25, >30, >40, >50, >100
- Income Cap (FCEV exempt)
  Tax-filing status: $250k, $204k, $150k
- Application limitations
  Limit one per person, limit three months to apply
- Rebate amounts
  -$500 for standard rebates, no Standard Rebates, no PHEV rebates, no Standard PHEV rebates

Supporting Data

- MSRP Cap (FCEV exempt)
  $60k, $50k, $40k
- UDDS All-Electric Range (AER) Minimum
  >25, >30, >40, >50, >100
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  Limit one per person, limit three months to apply
- Rebate amounts
  -$500 for standard rebates, no Standard Rebates, no PHEV rebates, no Standard PHEV rebates

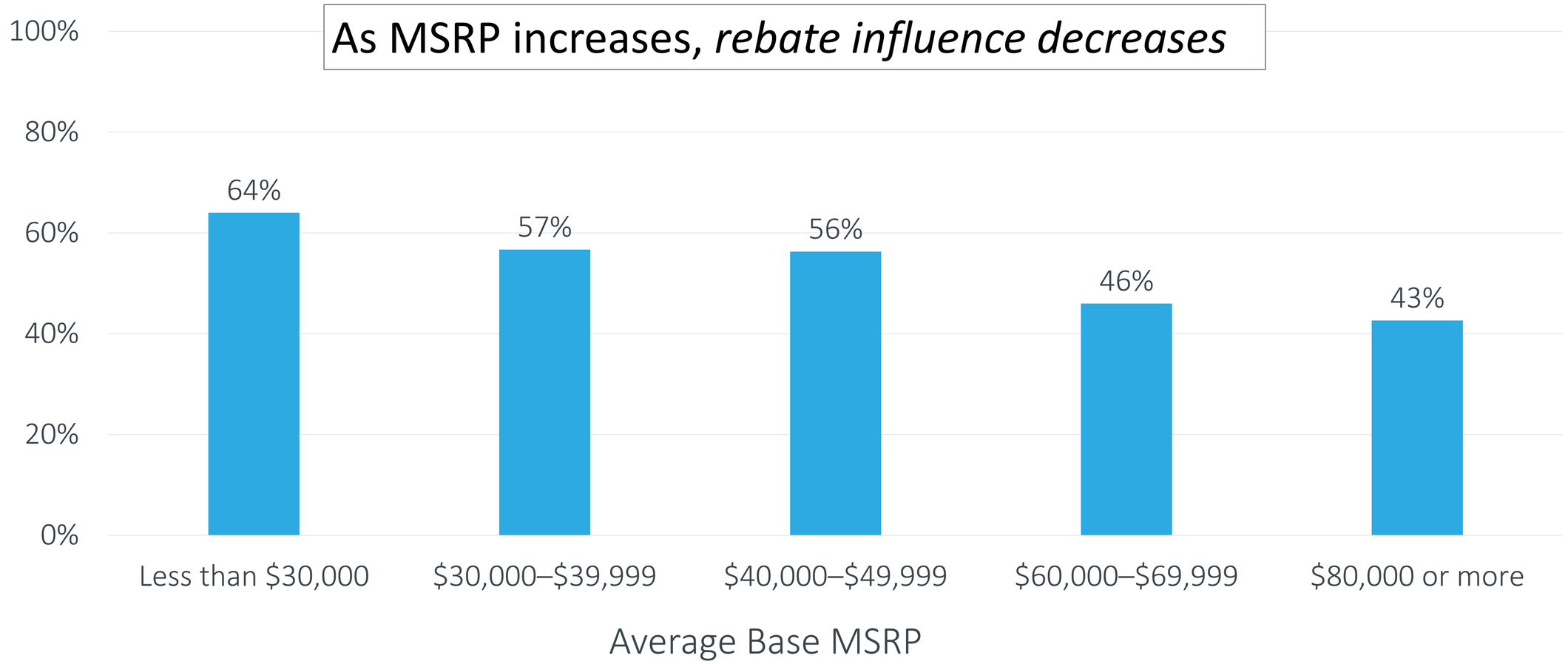
Electric Vehicles by Base MSRP

Key
> $60,000
$50,000–$59,999
$40,000–$49,999

Vehicle Make and Model	Base MSRP
BMW 530e xDrive iPerformance	55700
Audi A3 e-tron	39500
BMW 530e iPerformance	53400
Volvo XC60 T8	55300
Volvo XC90 T8	67000
Volvo S90 T8	63900
Mitsubishi Outlander PHEV	34595
Toyota Prius Prime	27350
Ford Fusion Energi	34595
Kia Niro Plug-in Hybrid	28500
Hyundai Sonata Plug-in Hybrid	32400
Hyundai Ioniq PHEV	25350
Kia Optima Plug-in Hybrid	35390
Chrysler Pacifica	39995
Honda Clarity Plug-In Hybrid	33400
smart Electric Fortwo Cabriolet	28100
smart Electric Fortwo Coupe	23900
FIAT 500e	32995
Honda Clarity Electric	37540
BMW i3 REx	48300
Kia Soul EV	33950
Ford Focus Electric	29120
Hyundai Ioniq Electric	30315
Volkswagen e-Golf	30495
BMW i3s REx	51500
Nissan LEAF	29990
BMW i3	44450
BMW i3s	47650
Nissan LEAF Plus	36550
Jaguar I-PACE	69500
Chevrolet Bolt	36620
Tesla Model X	88000
Hyundai Kona Electric	36450
Tesla Model 3 (Medium-range)	47990
Tesla Model S	85000

Base MSRP sources: Manufacturer websites, FuelEconomy.gov, Kelley Blue Book
Note: ZEMs, FCEVs, and discontinued PEVs not included.

Rebate Essentiality Reflects Interesting Trends

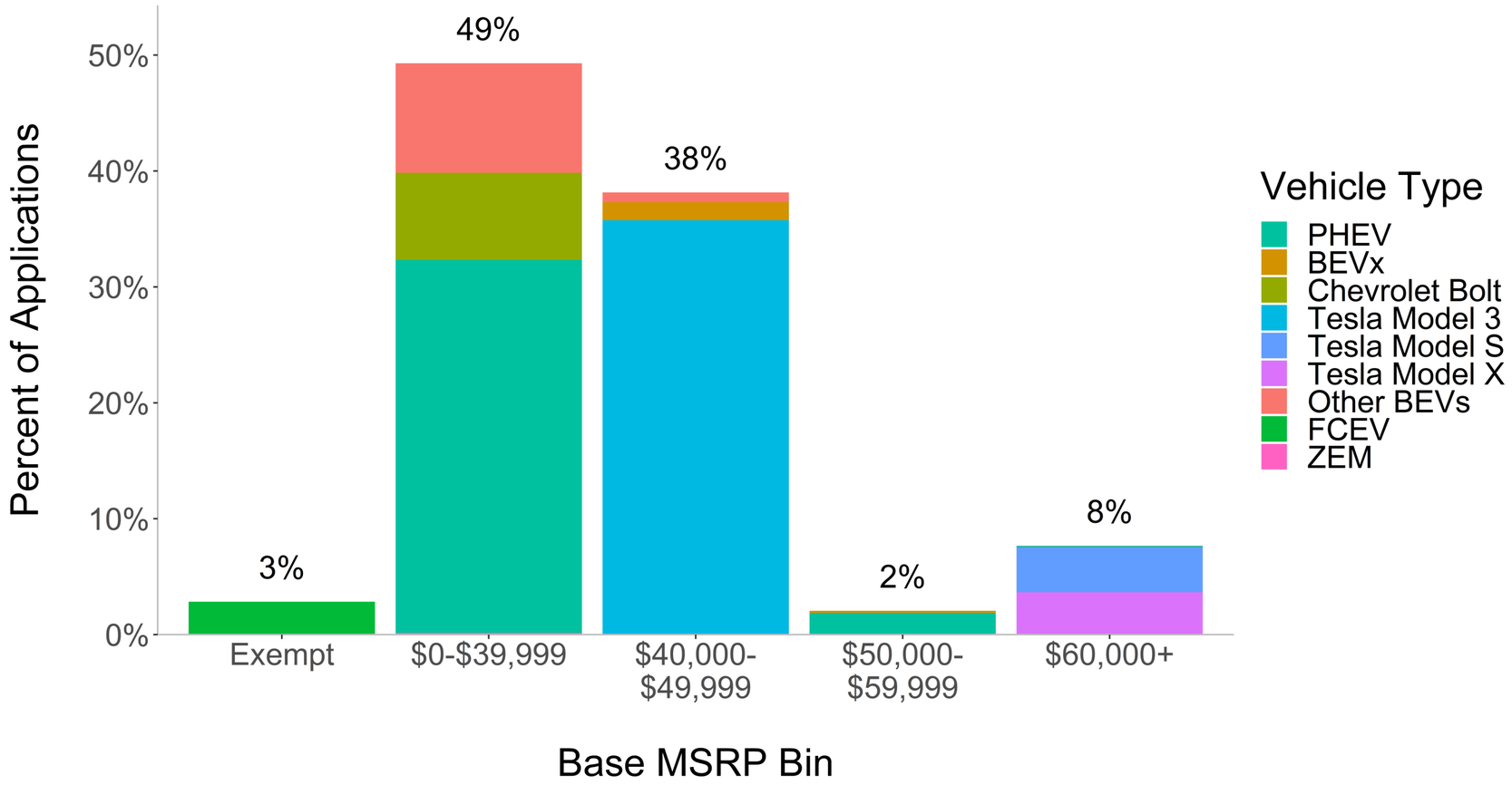


CVRP Consumer Survey: 2016–17 edition, weighted, n = 8,927

Rebate Importance by Vehicle Price

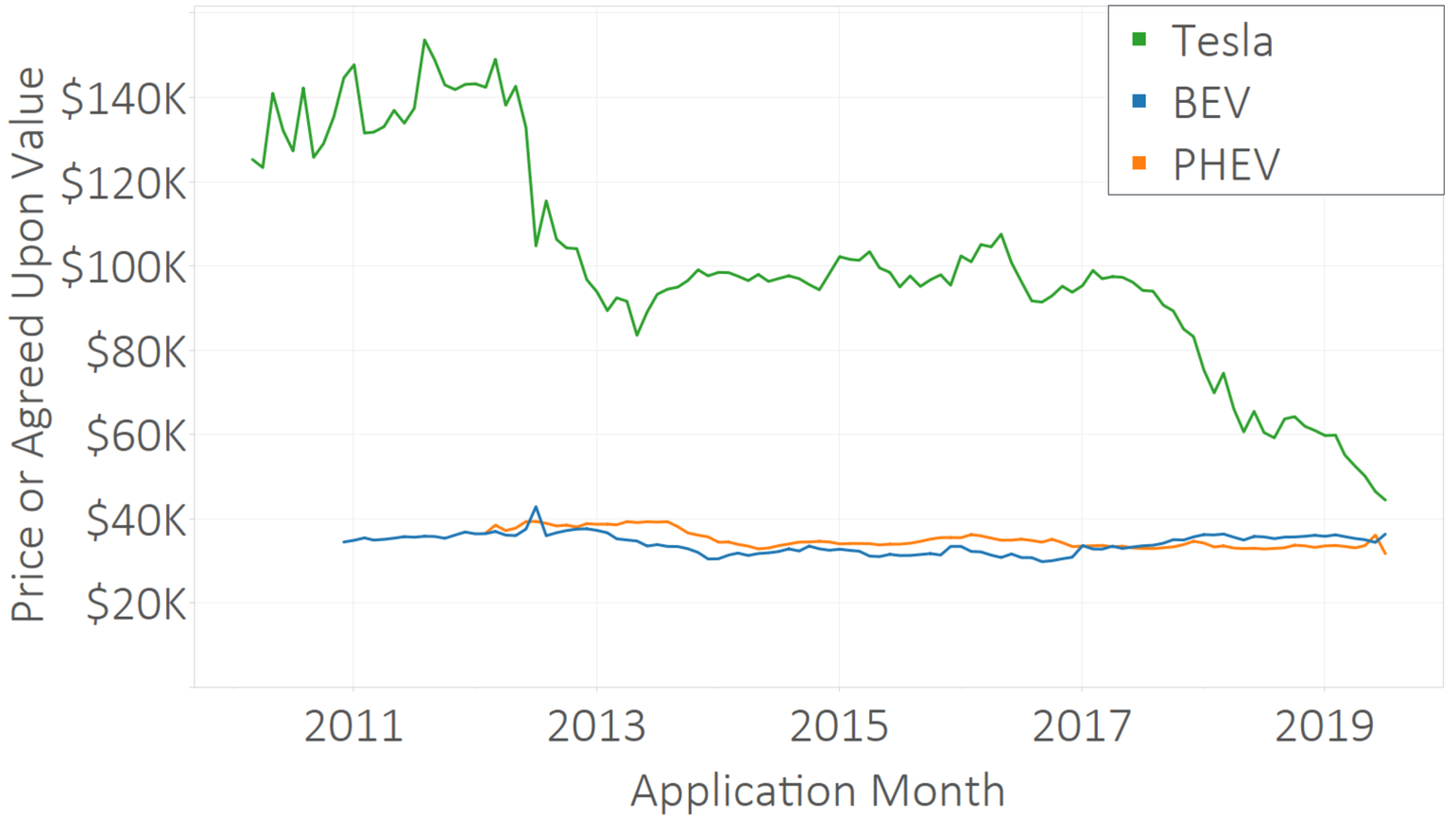
MOR-EV Survey, 2014–17: n = 2,549 total respondents
weighted to represent N = 5,754 participants
Excludes one response missing price data.

Recent Distribution of Rebates by Base MSRP level



Approved applications received during 2018, purchase dates ≥ November 2016 (“current program”).
All Model 3 vehicles assigned $40–50k base MSRP

Average Rebated-Vehicle Purchase Price Remains Steady for non-Tesla Vehicles



As of 7/12/2019

Supporting Data

- MSRP Cap (FCEV exempt)
  $60k, $50k, $40k
- UDDS All-Electric Range (AER) Minimum
  >25, >30, >40, >50, >100
- Income Cap (FCEV exempt)
  Tax-filing status: $250k, $204k, $150k
- Application limitations
  Limit one per person, limit three months to apply
- Rebate amounts
  -$500 for standard rebates, no Standard Rebates, no PHEV rebates, no Standard PHEV rebates

Electric Vehicle Models by Base MSRP & All-Electric Range

Key	
Base MSRP	**AER (UDDS)**
> $60,000	< 25 miles
$50,000–$59,999	
$40,000–$49,999	

Sources:

Base Manufacturer's Suggested Retail Price (MSRP):

- Manufacturer websites, FuelEconomy.gov, Kelley Blue Book

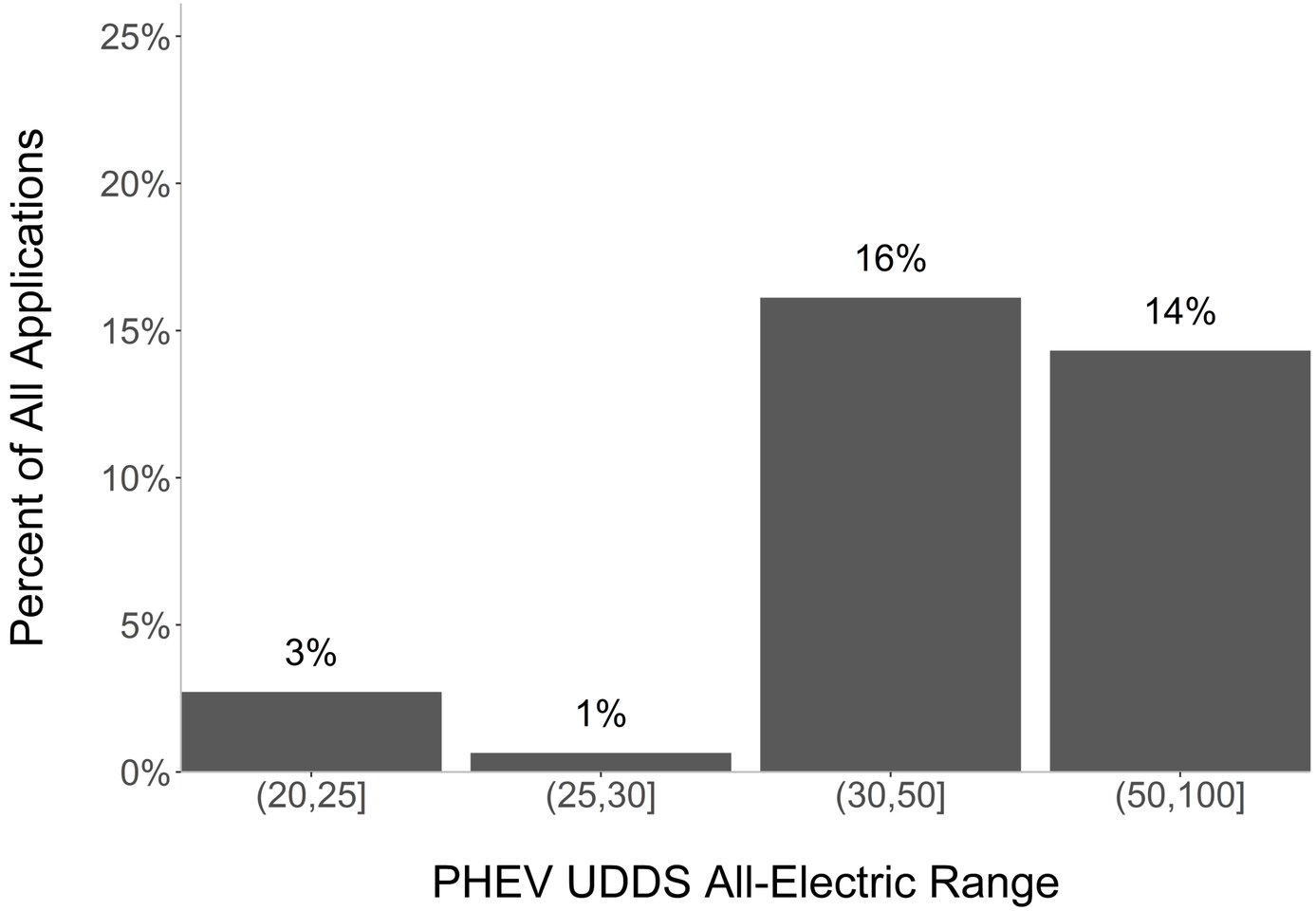
All-electric range (AER):

- UDDS: CARB
- Most recent model year

Note: ZEMs, FCEVs, and discontinued PEVs not shown in table and may use EPA or manufacturer range estimates

Vehicle Make and Model	Base MSRP	AER (UDDS)
BMW 530e xDrive iPerformance	55700	21.7
Audi A3 e-tron	39500	22.9
BMW 530e iPerformance	53400	21.7
Volvo XC60 T8	55300	24.5
Volvo XC90 T8	67000	23.8
Volvo S90 T8	63900	29.7
Mitsubishi Outlander PHEV	34595	30
Toyota Prius Prime	27350	38.5
Ford Fusion Energi	34595	35.8
Kia Niro Plug-in Hybrid	28500	39.9
Hyundai Sonata Plug-in Hybrid	32400	39.6
Hyundai Ioniq PHEV	25350	43.2
Kia Optima Plug-in Hybrid	35390	40.6
Chrysler Pacifica	39995	48.2
Honda Clarity Plug-In Hybrid	33400	61
smart Electric Fortwo Cabriolet	28100	100
smart Electric Fortwo Coupe	23900	106
FIAT 500e	32995	127
Honda Clarity Electric	37540	138
BMW i3 REx	48300	146
Kia Soul EV	33950	179
Ford Focus Electric	29120	180
Hyundai Ioniq Electric	30315	197
Volkswagen e-Golf	30495	184
BMW i3s REx	51500	187
Nissan LEAF	29990	231
BMW i3	44450	238
BMW i3s	47650	238
Nissan LEAF Plus	36550	364
Jaguar I-PACE	69500	334
Chevrolet Bolt	36620	364
Tesla Model X	88000	318
Hyundai Kona Electric	36450	414
Tesla Model 3 (Medium-range)	47990	392
Tesla Model S Standard Range	85000	346

Recent Distribution of PHEV Rebates by UDDS Electric Range



Approved applications received during 2018, purchase dates ≥ November 2016, PHEVs only.

Supporting Data

- MSRP Cap (FCEV exempt)
  $60k, $50k, $40k
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  Limit one per person, limit three months to apply
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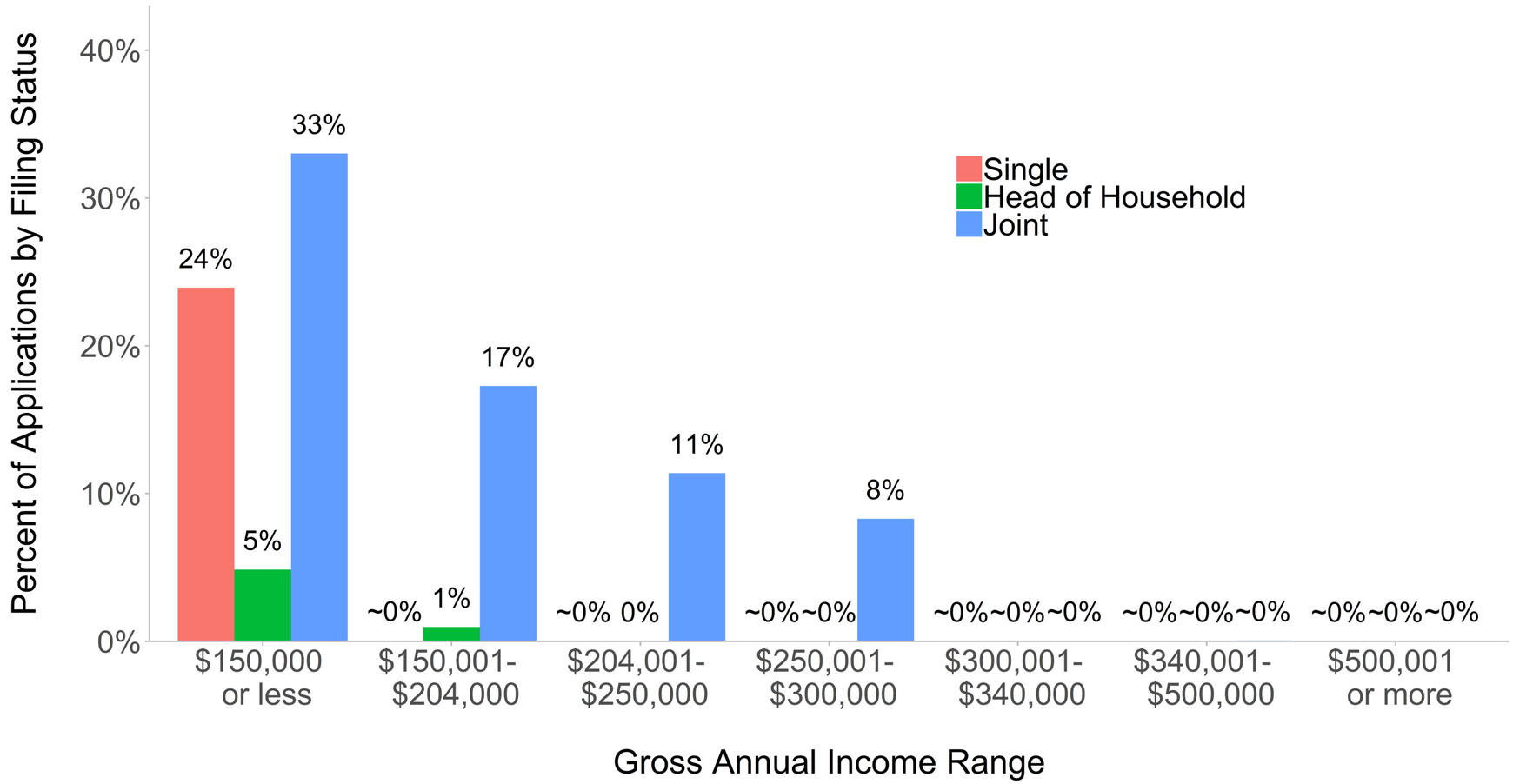
Recent Income Distribution



Approved applications received during 2018, purchase dates ≥ November 2016, individuals only (no fleets), excluding non-responses.
Includes FCEV, which are exempt from income caps

Supporting Data

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  $60k, $50k, $40k
- UDDS All-Electric Range (AER) Minimum
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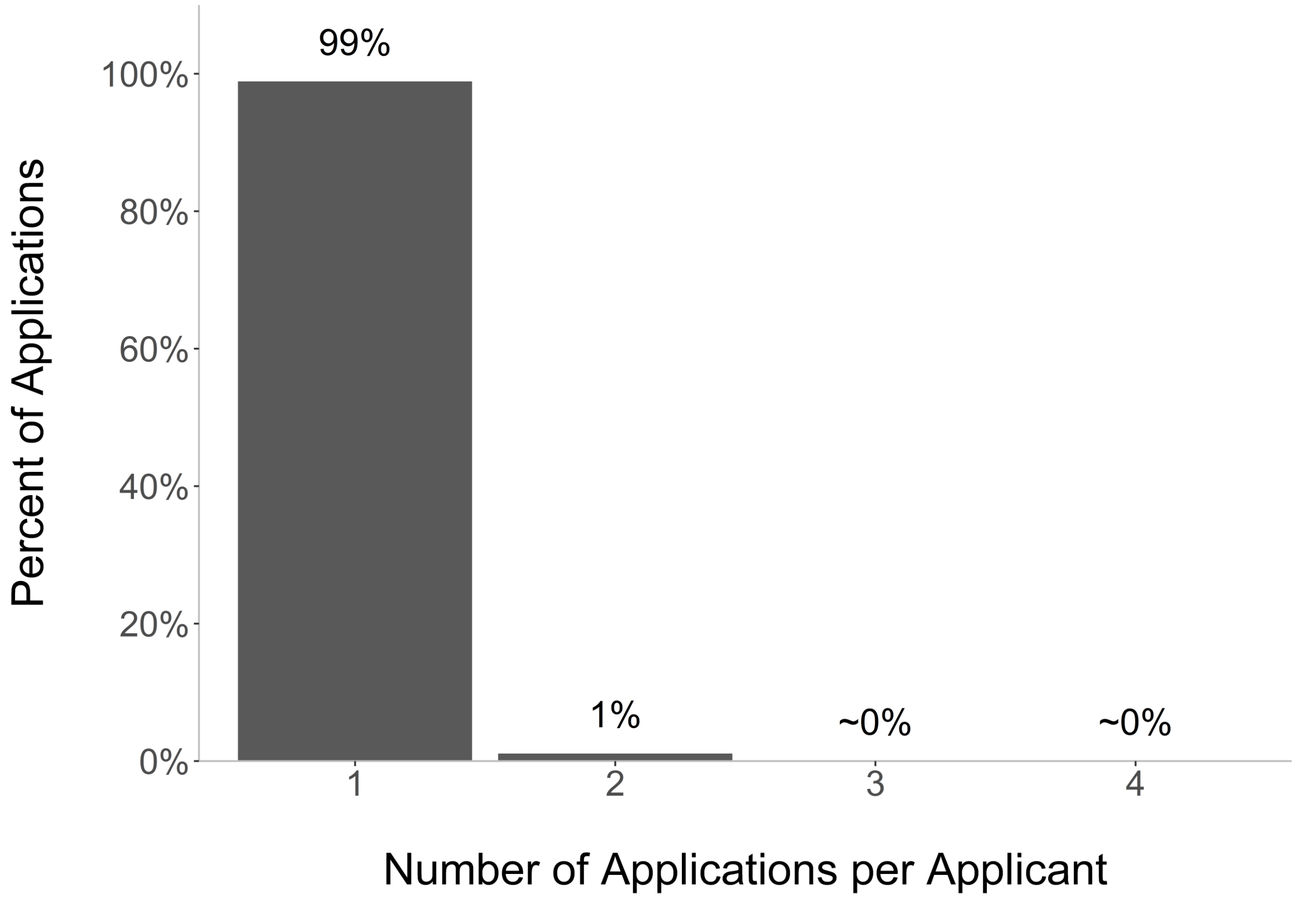
Recent Number of Applications Per Applicant (Individuals Only)



Approved applications received during 2018, purchase dates ≥ November 2016, individual applicants only (no fleets).

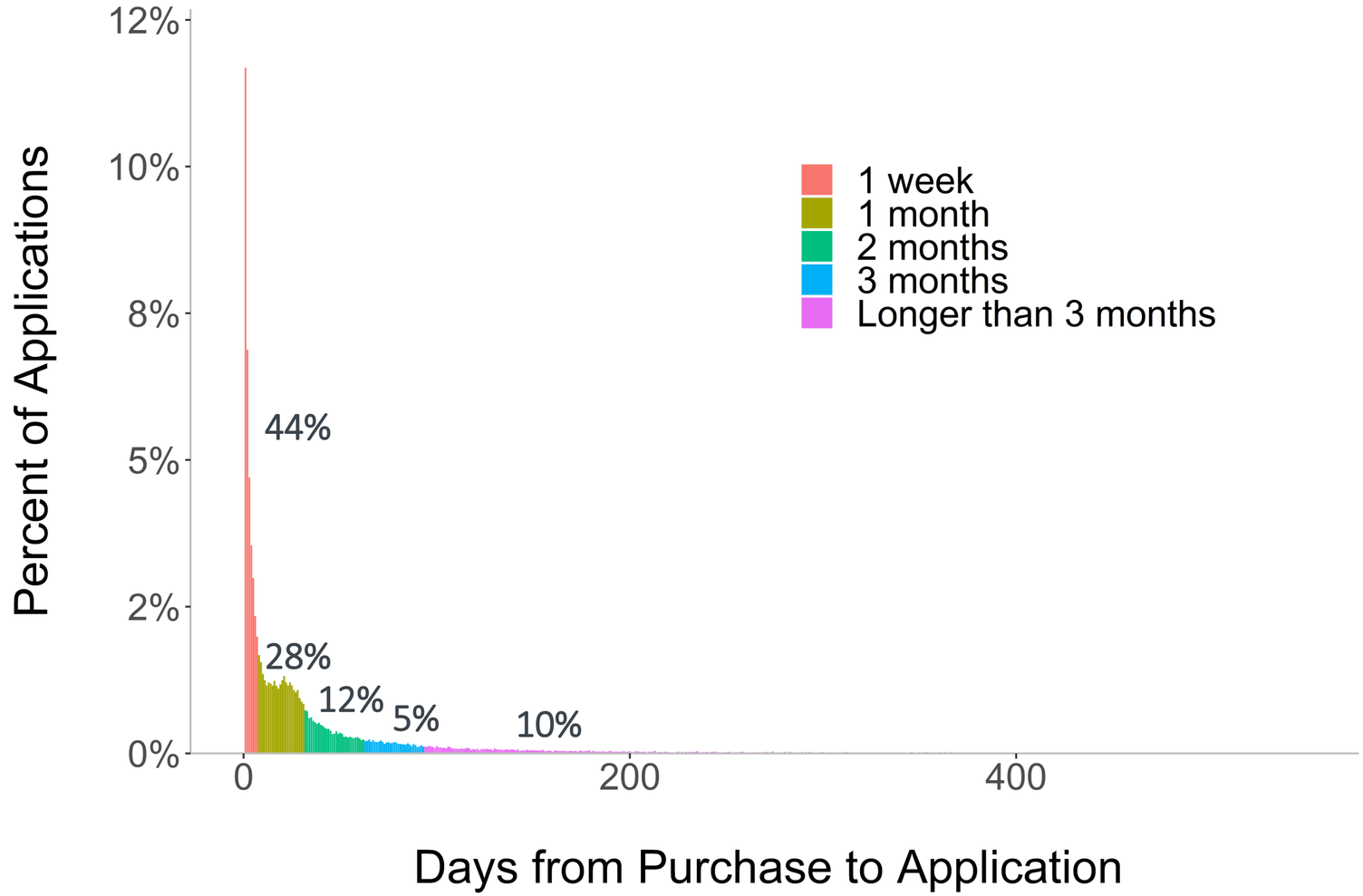
Recent Rebate Essentiality for Recent Repeat Participants

Would have purchased without state rebate	One Application (n = 69,008)	More than One Application (n = 805)
No	67%	71%
Yes	33%	29%

Differences significant (p = 0.0000)

Approved applications received during 2018, purchase dates ≥ November 2016, individual applicants only (no fleets), non-responses to rebate essentiality question removed.

Recent Time from Purchase to Application



Approved applications received during 2018, purchase dates ≥ November 2016, excluding public fleets and days from purchase to application < 0.

Program-Change Estimates

Program-Change Levels Explored

- MSRP Cap (FCEV exempt)
  $60k, $50k, $40k
- UDDS All-Electric Range (AER) Minimum
  >25, >30, >40, >50, >100
- Income Cap (FCEV exempt)
  Tax-filing status: $250k, $204k, $150k
- Application limitations
  Limit one per person, limit three months to apply
- Rebate amounts
  -$500 for standard rebates, no Standard Rebates, no PHEV rebates, no Standard PHEV rebates

Assessment of Individual Measures

Ranked from most cost-effective to least cost-effective [$ saved/vehicles lost]

#	Scenario	Savings, % of Middle	First-cycle cost (excl. waitlist)	% of first-cycle vehicles lost	$ saved per vehicle lost ↑
1	Middle (baseline)	0% (baseline)	$264 M	0% (baseline)	(baseline)
2	< $60k MSRP	-6%	$246 M	2%	-$4,453
3	< $50k MSRP	-7%	$244 M	2%	-$4,219
4	Limit one per person (not retroactive)	0%	$263 M	0%	-$4,085
5	< $40k MSRP	-37%	$156 M	13%	-$3,973
6	Income cap—single filers: ≤ $150k, other filers: ≤ $250k	-6%	$248 M	2%	-$3,712
7	Income cap—single filers: ≤ $150k, other filers: ≤ $204k	-13%	$227 M	5%	-$3,616
8	Reduce standard rebate $500 ($150 for ZEM)	-13%	$226 M	5%	-$3,538
9	> 40-mi UDDS all-electric range	-6%	$246 M	3%	-$3,147
10	PHEV/BEVx: > 50-mi BEV/FCEV/ZEM: > 100 UDDS all-electric range	-7%	$242 M	3%	-$3,136
11	> 50-mi UDDS all-electric range	-7%	$243 M	3%	-$3,119
12	PHEV/BEVx: > 25-mi BEV/FCEV/ZEM: > 100 UDDS all-electric range	-1%	$260 M	1%	-$3,004
13	PHEV/BEVx: > 30-mi BEV/FCEV/ZEM: > 100 UDDS all-electric range	-2%	$260 M	1%	-$2,994
14	> 30-mi UDDS all-electric range	-1%	$260 M	1%	-$2,894
15	> 25-mi UDDS all-electric range	-1%	$261 M	1%	-$2,886
16	Limit 3 months between purchase and application*				

Assumes changes effective 1 December 2019. Note, first-cycle costs do not include an estimated $29 M waitlist.

* 3-month time limit assumed to produce no long-term savings or market losses (based on implementation of similar time limits in other states)

CARB Proposed Measures: Combined

Scenario	Middle	Proposed Changes
Income Cap - General Rebates	$150/$204/$300	$150/$204/$300
Income Cap - Increased Rebates	300% FPL	300% FPL
Base MSRP	None	< $60,000
OEM Standard-Rebate Limit	None	None
Rebate/Person	2	1
Application Window	18 months	3 months
UDDS All-Electric Range	> 20 miles	> 25 miles
FY18-19 Waitlist	Funded	Funded
Funding Duration	Full-Cycle	No waitlist
Standard PHEV $	$1,500	$1,000
Standard BEV $	$2,500	$2,000
Standard FCEV $	$5,000	$4,500
Standard ZEM $	$900	$750
Increased PHEV $	$3,500	$3,500
Increased BEV $	$4,500	$4,500
Increased FCEV $	$7,000	$7,000

Changes proposed to be implemented as of 1 December 2019.

Program-Change Funding Estimates

Scenario	Waitlist	First-cycle cost	Savings	Total first-cycle need	Cycle 2 need	Cycle 3 need	Three-cycle average need
Middle (baseline)	$29 M	$264 M	$0 M	$293 M	$301 M	$337 M	$301 M
Reduced standard rebate, limit 1, 3 months to apply* > 25-mi UDDS range for PHEV, < $60k base MSRP	$29 M	$208 M	-$56 M	$237 M	$217 M	$243 M	$223 M

* 3-month time limit modeled as having no effect (based on implementation of the same or shorter time limits in other states)

Funding-Cycle Details

Scenario	Cycle 0	Cycle 1			Cycle 2			Cycle 3		
	Estimated Cost	Estimated Budget		End of $238M	Estimated Budget		End of $200M	Estimated Budget		End of $200M
	Waitlist	LMI Increased	General		LMI Increased	General		LMI Increased	General	
Middle	$29 M	$25 M	$213 M	06/17/20	$33 M	$167 M	03/16/21	$37 M	$163 M	12/25/21
w/ Changes	$29 M	$25 M	$208 M	08/31/20	$32 M	$168 M	08/10/21	$36 M	$164 M	06/19/22

Assumes program changes implemented 1 December 2019, no waitlist, and 58% of potential rebates during waitlist are deferred to the first month of the next funding cycle (based on program percentages of participants reporting the rebate as essential to their purchase/lease).

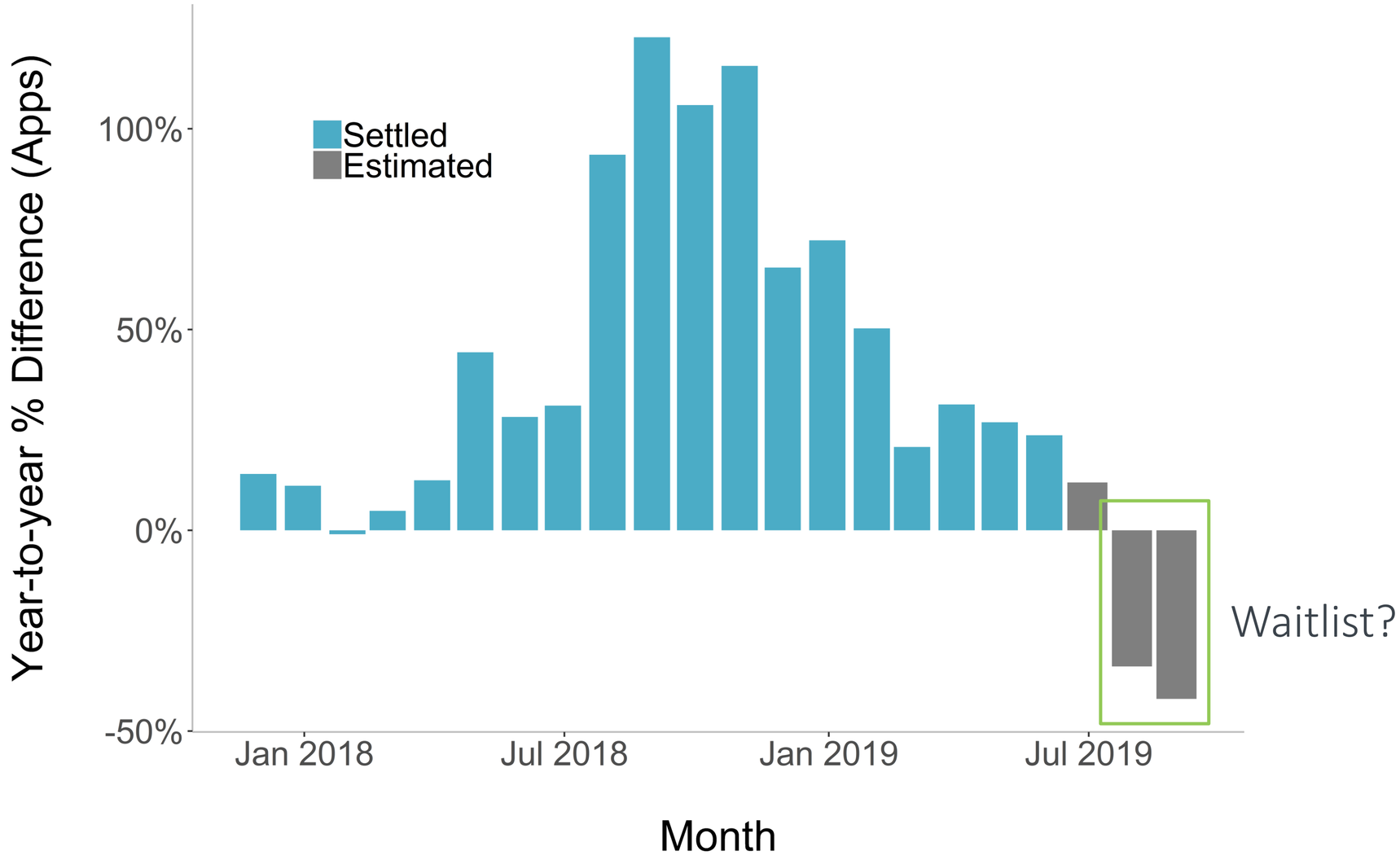
Timelines

				Cycle 1										
SCENARIO	**Jun'19**	**Jul'19**	**Aug'19**	**Sep'19**	**Oct'19**	**Nov'19**	**Dec'19**	**Jan'20**	**Feb'20**	**Mar'20**	**Apr'20**	**May'20**	**Jun'20**	**Jul'20**	**Aug'20**
Middle	Waitlist ($29M)			Cycle 1											
w/ Changes	Waitlist ($29M)			Cycle 1											
				Cycle 2											
		SCENARIO		**Sep'20**	**Oct'20**	**Nov'20**	**Dec'20**	**Jan'21**	**Feb'21**	**Mar'21**	**Apr'21**	**May'21**	**Jun'21**	**Jul'21**	**Aug'21**
		Middle		Cycle 2											
		w/ Changes		Cycle 2											
				Cycle 3											
		SCENARIO		**Sep'21**	**Oct'21**	**Nov'21**	**Dec'21**	**Jan'22**	**Feb'22**	**Mar'22**	**Apr'22**	**May'22**	**Jun'22**	**Jul'22**	**Aug'22**
		Middle		Cycle 3											
		w/ Changes		Cycle 3											

Assumes program changes implemented 1 December 2019.

Next Steps

Is this the calm after the storm, or before the $35k Model 3 and other disruptions?



Discussion Questions: Projections Modeling

- How best to treat?:
  - Tesla Model 3 / future disruptions
    - Near term ok?
    - Long-term maturation/limits of production?
  - Lower-price long-range BEVs generally?
  - New releases?
    - Additions (evolutionary) vs. cannibalization ?
    - Market saturation?
  - Phase-out of federal tax credit?
  - Other policies/programs?
  - Other “not addressed” items of policy priority?

Appendix

Caveats

- Data include
  - Lease-only vehicles
    - Honda Clarity Fuel Cell
    - Honda Clarity Electric
  - Fleet-only vehicles
    - Bolloré Blue Car
  - Out-of-production vehicle models
    - Chevrolet Volt
    - Ford C-MAX Energi
    - Hyundai Tucson Fuel Cell (also lease only)
    - Mercedes-Benz B250e
- Market-loss estimates utilize rebate essentiality data from the time of application and excludes non-responses, which may overestimate market impacts

Electric Vehicle Choices: Major 2019 Models

Plug-in hybrid EVs












All-battery EVs













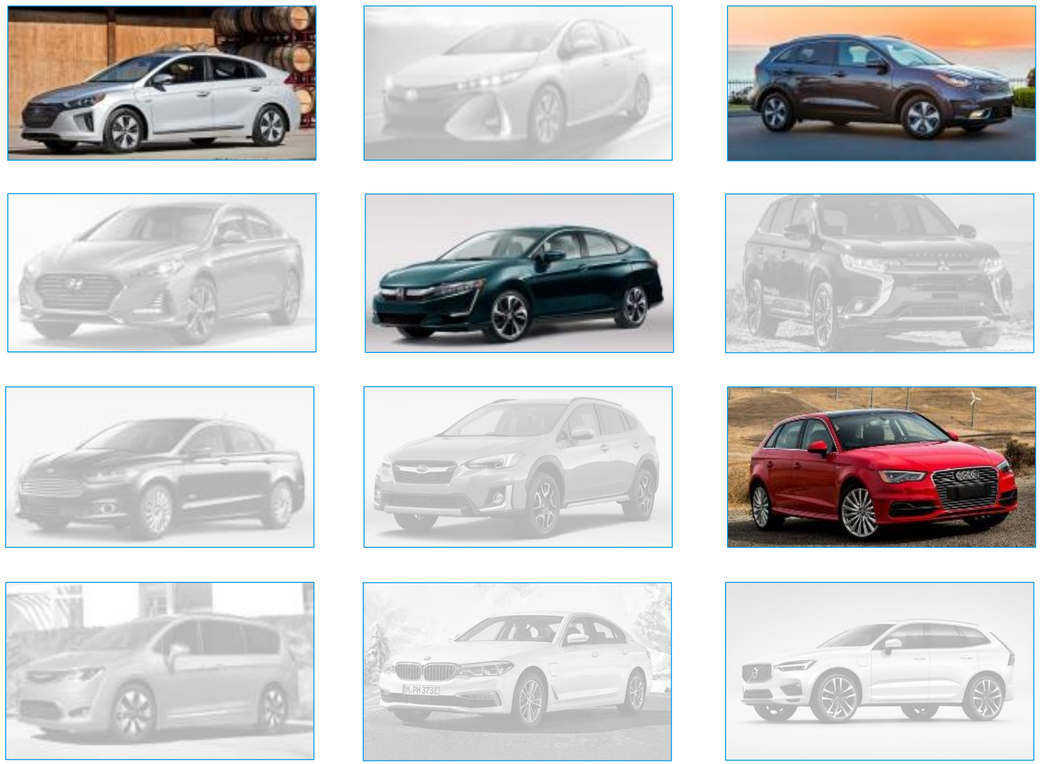


Hydrogen Fuel-Cell EVs

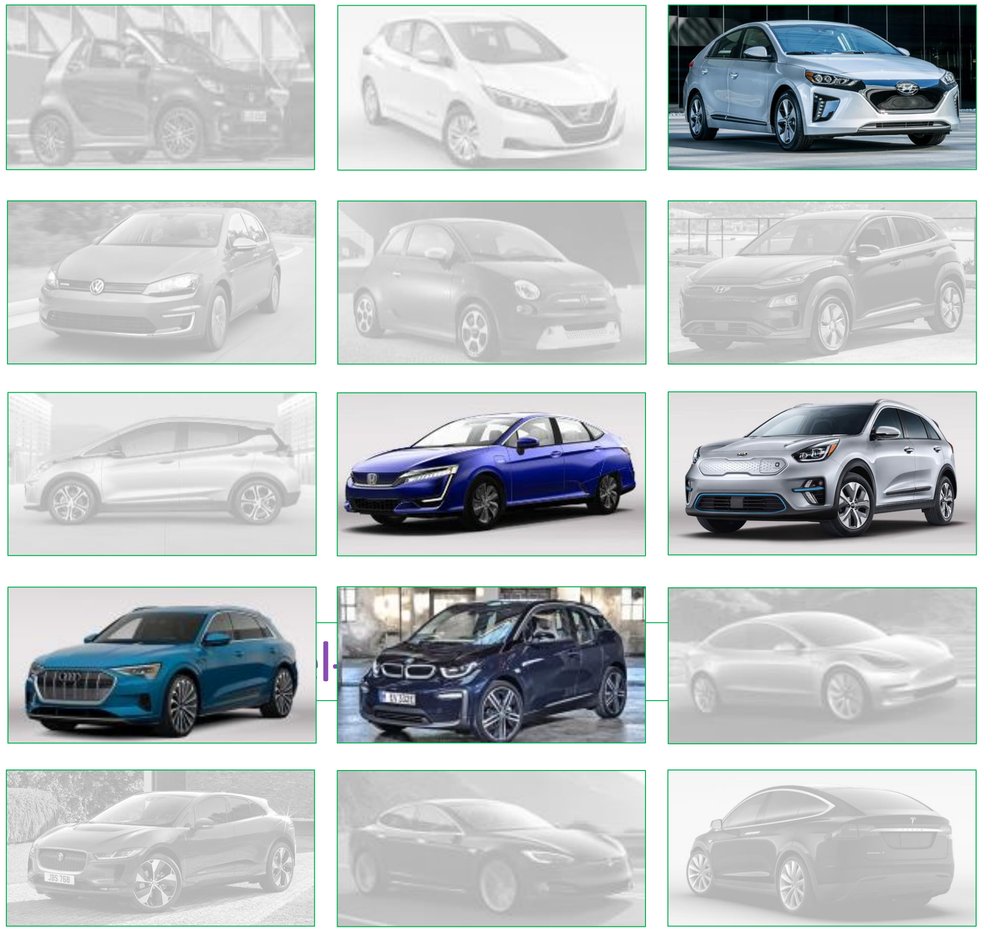


Major 2019 Models with Multiple Drive Train Technologies

Plug-in hybrid EVs



All-battery EVs



Hydrogen Fuel-Cell EVs

State EV Rebate Programs Administered by CSE

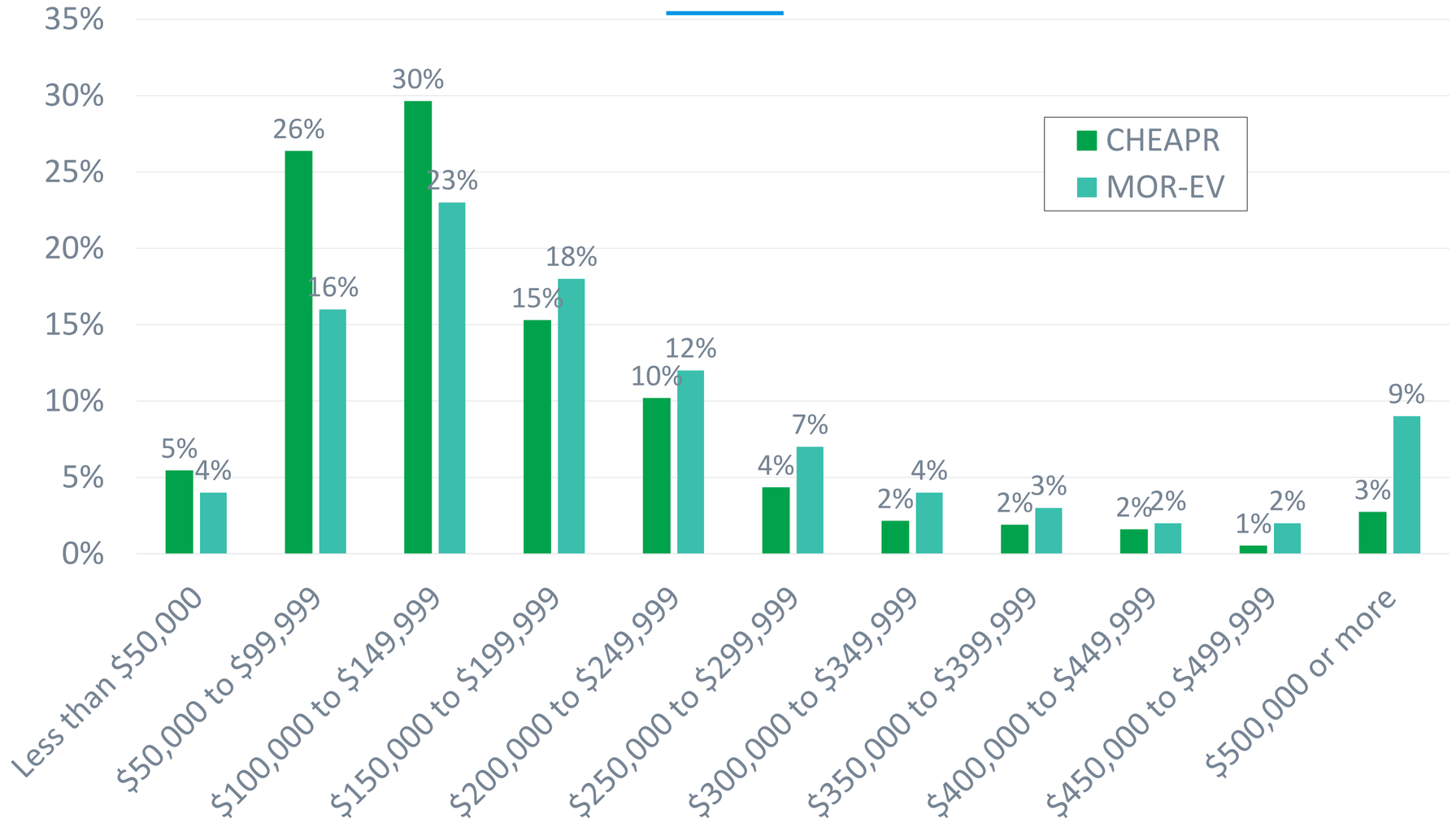
(as of Jan. 2019; Oregon pending)

	CALIFORNIA CLEAN VEHICLE REBATE PROJECT™	MOR-EV Massachusetts Offers Rebates for Electric Vehicles	CHEAPR Connecticut Hydrogen and Electric Automobile Purchase Rebate	NEW YORK STATE
Fuel-Cell EVs 	$5,000	$1,500	$5,000	e-miles ≥ 120 $2,000 ≥ 40 $1,700 ≥ 20 $1,100 < 20 $500
All-Battery EVs 	$2,500	$1,500	e-miles ≥ 200 $2,000 ≥ 120 $1,500 < 120 $500	
Plug-in Hybrid EVs 	$2,500 (i3 REx) $1,500	BEVx only: $1,500	≥ 45 $1,000 < 45 $500	
Zero-Emission Motorcycles 	$900	$450		
	• ≥ 20 e-miles only • Income cap • Increased rebates for lower-income households	• Base MSRP ≤ $50k • No fleet rebates Program ended 9/30/19	• BEVs & PHEVs ≤ $50k base MSRP, FCEVs ≤ $60k • Point-of-sale option • $150 dealer incentive	• Base MSRP > $60k = $500 max.; • Point-of-sale

EV Incentive Programs: Previous Rebate Designs

	CALIFORNIA CLEAN VEHICLE REBATE PROJECT™	MOR-EV Massachusetts Offers Rebates for Electric Vehicles	CHEAPR Connecticut Hydrogen and Electric Automobile Purchase Rebate	NEW YORK STATE
Fuel-Cell EVs 	$5,000	$2,500	$5,000	e-miles ≥ 120 — $2,000 ≥ 40 — $1,700 ≥ 20 — $1,100 < 20 — $500
All-Battery EVs 	$2,500	$2,500	e-miles ≥ 175 — $3,000 ≥ 100 — $2,000 < 100 — $500	
Plug-in Hybrid EVs 	$2,500 (i3 REx) $1,500	≥10 kWh — $2,500 <10 kWh — $1,500	≥ 40 — $2,000 < 40 — $500	
Zero-Emission Motorcycles 	$900	$750		
	• ≥ 20 e-miles only • Income cap • Increased rebates for lower-income households	• MSRP ≥ $60k = $1,000 max. • No fleet rebates	• MSRP ≤ $60k only • Dealer assignment • $150 dealer incentive ($300 previous)	• MSRP > $60k = $500 max. • Point-of-sale via dealer

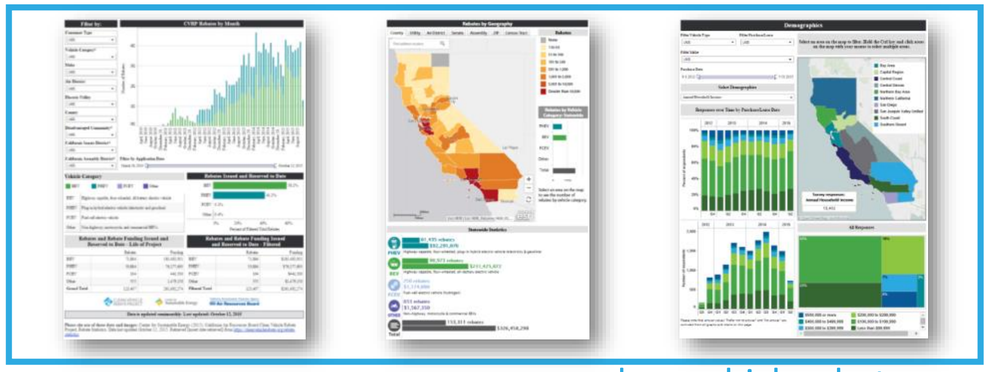
CHEAPR and MOR-EV Respondents by Household Income



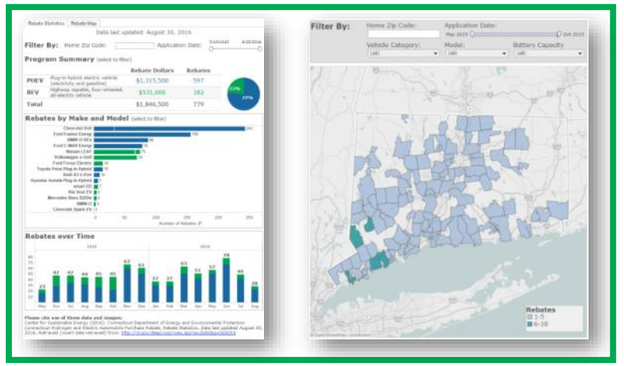
CHEAPR Survey (2015–17): n=819 total respondents, weighted to represent N=1,583 participants
MOR-EV Survey (2014–17): n=2,549 total respondents, weighted to represent N=5,754

Public dashboards and data facilitate informed action

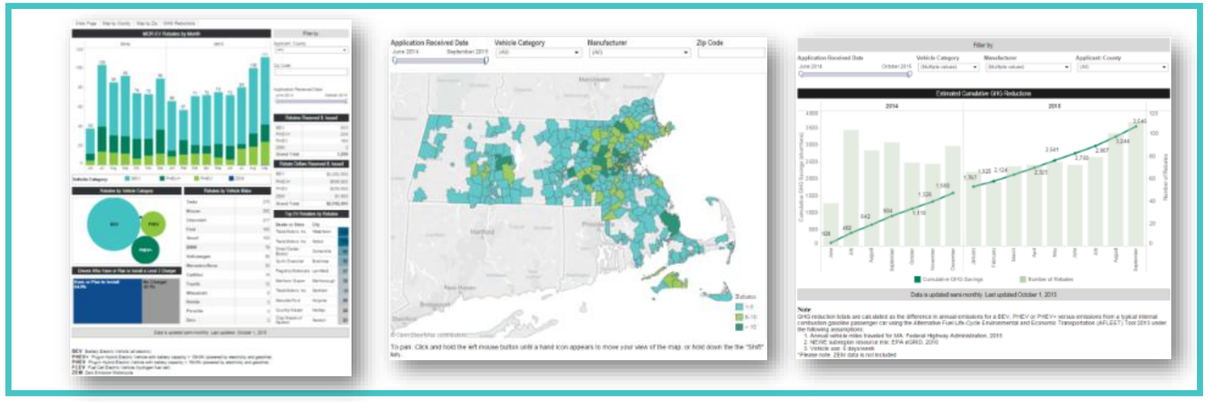
- > 320,000 EVs and consumers have received > $720 M in rebates
- > 45,000 survey responses being analyzed so far, statistically represent > 200,000 consumers
- Reports, presentations, and analysis growing



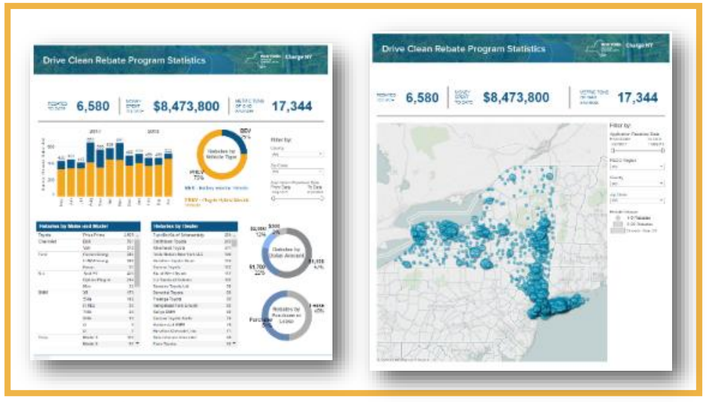
cleanvehiclerebate.org



ct.gov/deep

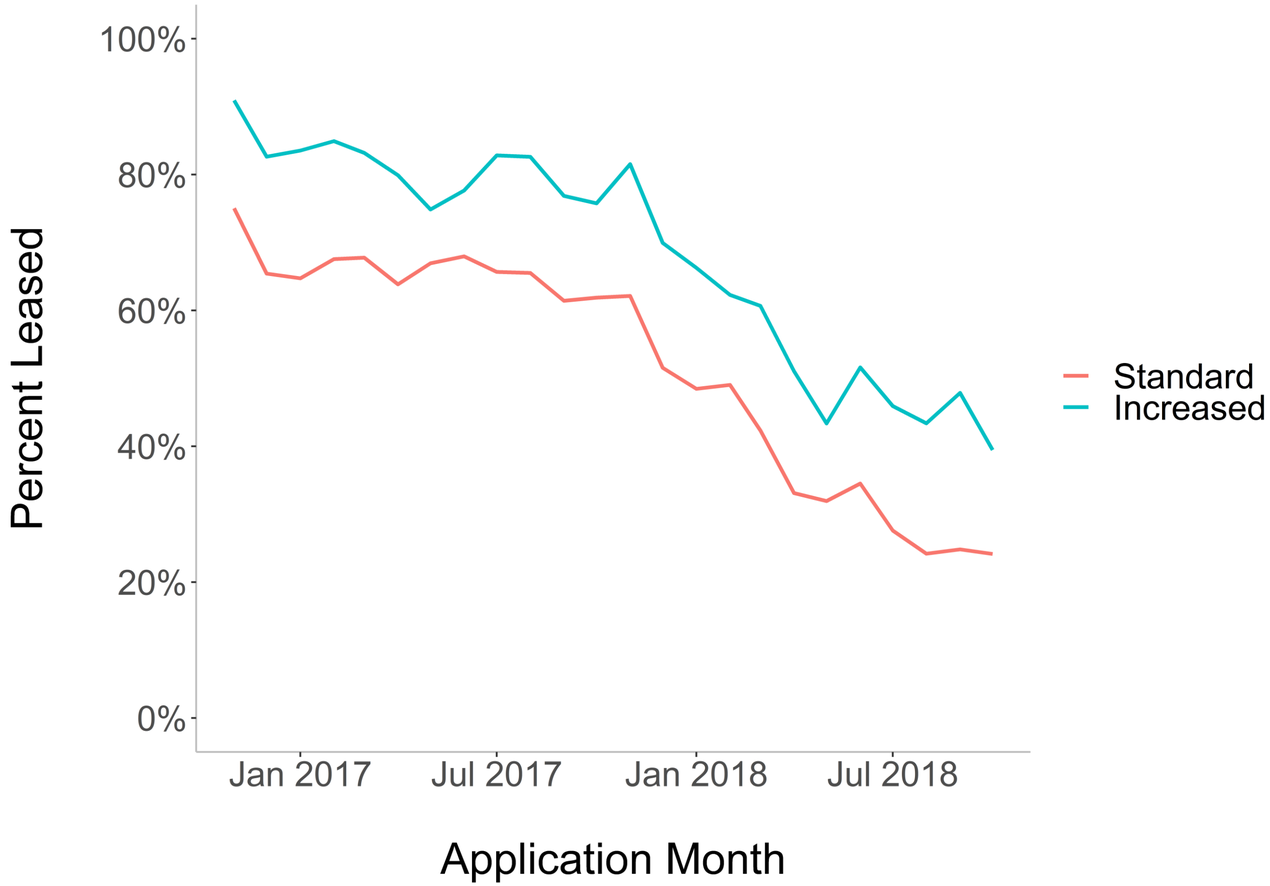


mor-ev.org



nyserda.ny.gov

CVRP Lease Percentage by Rebate Type and Time



Applications from individuals: 11/1/2016 – 10/31/2018

CVRP Lease Rates by Rebate Type

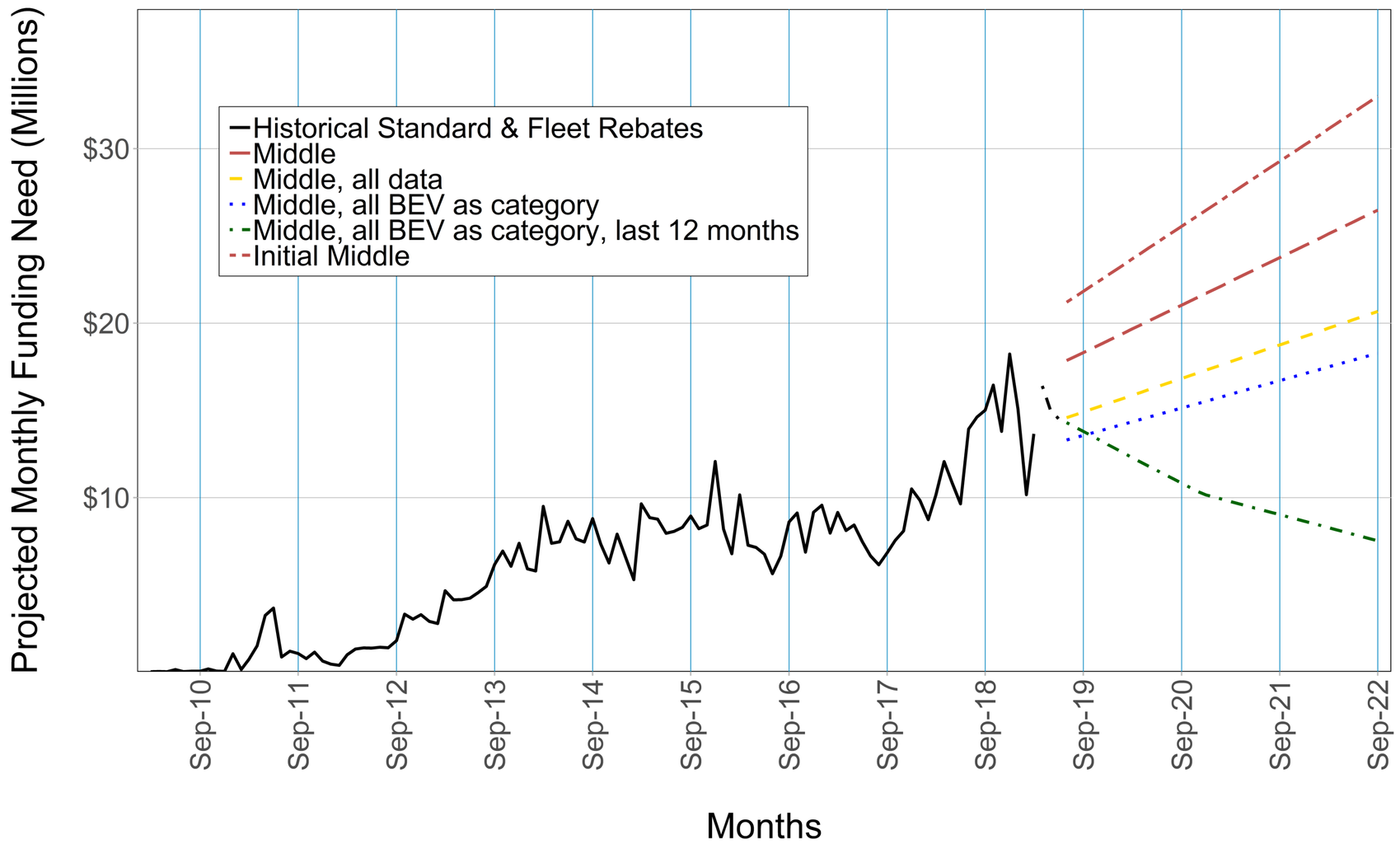
Lease Rates by Rebate Type

	Standard Rebate	LMI Increased Rebate
Lease	48%	67%
Purchase	52%	33%

Differences significant (p = 0.000)

Applications from individuals: 11/1/2016 – 10/31/2018

Middle Scenario: Alternative Methods Explored



Alternative Tesla Model 3 Extrapolations Considered

- Data date ranges
  - All data
  - 3 months
  - 6 months
  - 9 months
  - 12 months
  - 15 months
- Projection methods
  - Constant
  - Average
  - Linear extrapolation
  - Second-order polynomial
  - Third-order polynomial

Compared with 15-month average (⚓)

	Data frame (months)					
	3	6	9	12	15	23
Average	↑	↑	↑	↑	⚓	↓
Linear	↓	↑	↓	↑	↑	↑
2nd order	↑	↓	↑	↓	↓	↓
3rd order	n.a.	↓	↓	↑	↑	↓

Sensitivity Testing (version: February 2018)

% of Middle Scenario	Name	Scenario	First-cycle total need
138%	Curve fit	All categories: polynomial growth, 2nd order	$734 M
123%	Main-streaming	Percent of market rebated +10 points	$655 M
120%	Increased access	LMI increased rebates = 25% of total for each eligible vehicle type	$636 M
103%	High	Tesla Model 3 extrapolated from rebate data	$548 M
100%	**Middle**	**Middle (baseline)**	**$531 M**
95%	Recent trends	All categories: linear growth based on latest 12 months	$506 M
89%	Not-as-recent trends	All categories: linear growth based on latest 36 months	$473 M
77%	Left behind	Percent of market rebated -10 points	$407 M
74%	Low	Tesla Model 3 based on high sales month	$391 M

Stakeholder Preferences & Analytical Wish List

- Numeric optimization of cost-effectiveness metrics associated with potential changes
- GHG metrics
- LMI vs. standard lease metrics for
- One-per-person every ~three years
- Incorporating federal tax phase down

This presentation supplements/updates the following linked resources, which contain additional content:

- April 23rd CVRP Workgroup #4
- April 4th CVRP Workgroup #3
- March 22nd CVRP Workgroup #2
- December 4th CVRP Workshop
- FY 2018–19 Funding Plan Appendix C
- August 2016 Income Cap Analysis

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CleanVehicleRebate.org

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