

CVRP: Market Projections and Funding Needs

Public Workshop: Update to the 3-Year Plan for LDV & Transportation Equity Investments (4 Dec. 2018, El Monte CA)

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With thanks to:

CARB staff

John Anderson and others at CSE



- I. Three-Year Funding-Need Forecast (SB 1275)
 - Overview
 - Approach: Data and Methods
 - Results & Sensitivity
- II. Trajectory Relative to State Goals
- III. Funding Need for 5M-by-2030 Goal ('18–'19 Budget Act)
- IV. Discussion Questions





Three-Year Funding Need

Updates [FY 2018–19 Funding Plan Appendix C](#)

A close-up photograph of a person's hand holding a charging cable connected to an electric vehicle. The scene is set in a city street during sunset, with warm, golden light and lens flare effects. In the background, a bicycle is parked on the sidewalk, and a building is visible. A semi-transparent white banner is overlaid across the middle of the image.

Overview

Overview

Total CVRP Demand Over the Next Three Cycles

Funding	\$620–841 million
Rebates	237,000–314,000 vehicles

Projections Process

Extrapolate trends in EV sales volume



Make adjustments for Model 3



Calculate CVRP demand as a percentage of the market



Make adjustments for Increased Rebates



Estimate funding required

A photograph of a person charging an electric car in a city street at sunset. The person's hand is visible, holding a charging cable that is plugged into the car's charging port. The background shows a city street with buildings, a bicycle, and a person walking, all bathed in the warm, golden light of the setting sun. The sun is positioned in the upper right corner, creating a strong lens flare effect.

Approach: Data

Data

- Date ranges:
 - March 2010 – September 2018
- Sources (monthly):
 - New-vehicle registrations (IHS)
 - CVRP rebates ([public dashboard](#))
- Vehicle Categories:
 - Plug-in hybrid electric vehicle (PHEV)
 - Range-extended battery electric vehicle (BEVx)*
 - Battery electric vehicle (BEV)
 - Fuel-cell electric vehicle (FCEV)
 - ZEM**



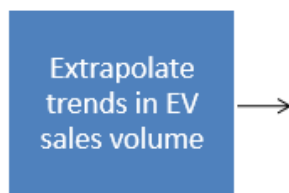
A close-up photograph of a person's hand plugging a charging cable into the charging port of a car. The scene is set outdoors at sunset, with a bright sun in the upper right corner creating a lens flare effect. The background is slightly blurred, showing a city street with buildings and a bicycle. The overall color palette is warm, dominated by oranges, yellows, and browns.

Approach: Methods

Extrapolate trends in EV sales volumes

For each vehicle category (technology type):

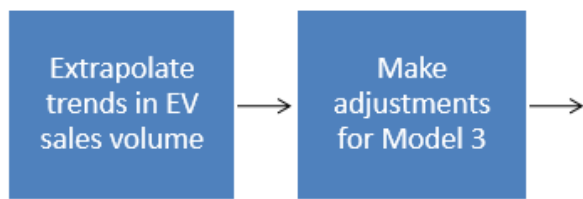
- **Linear extrapolations**
(chosen over curve-fitting and ARIMA)
- **Data range: “Life” of each vehicle category**
(chosen over most recent 12 months)
- **Sensitivity tested** ([see below](#))



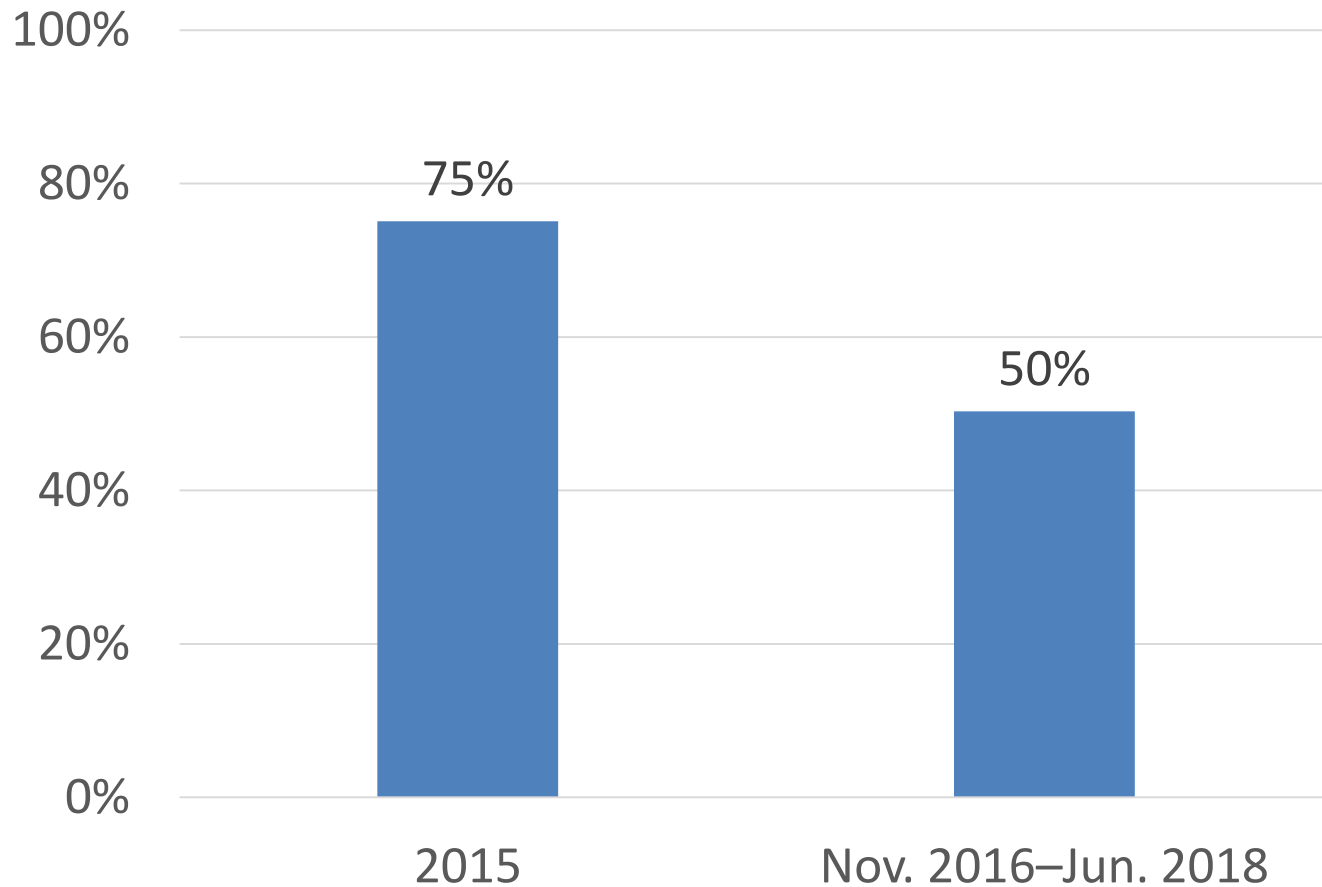
Make adjustments for Tesla Model 3

Additional BEVs assumed to be rebated due to Tesla Model 3 expansion

	Low	Middle	High
Added monthly in cycle 1	0	600	1,500
Added monthly in cycle 2	0	1,500	2,000
Added monthly in cycle 3	0	1,500	2,500



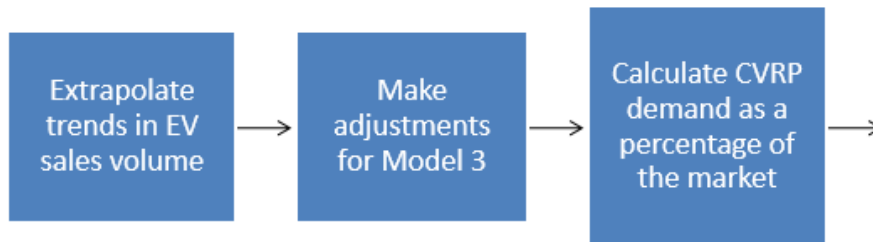
Percent of Market Rebated Before and After the Income Cap (illustrative eras)



Calculate CVRP demand as a percentage of the market

Percentage of the EV market rebated:
November 2016 – June 2017

PHEV	48%
BEVx	44%
BEV	58%
FCEV	92%
ZEM	n.a.*

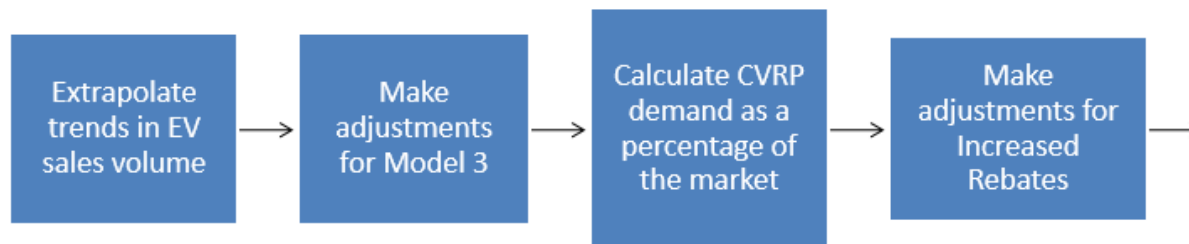


* Data not available to calculate a percentage for the ZEM category; the BEV percentage is assumed for the ZEM category in the projections

Increased Rebates

Participants that received an *Increased Rebate*: Nov. 2016 – Jun. 2017

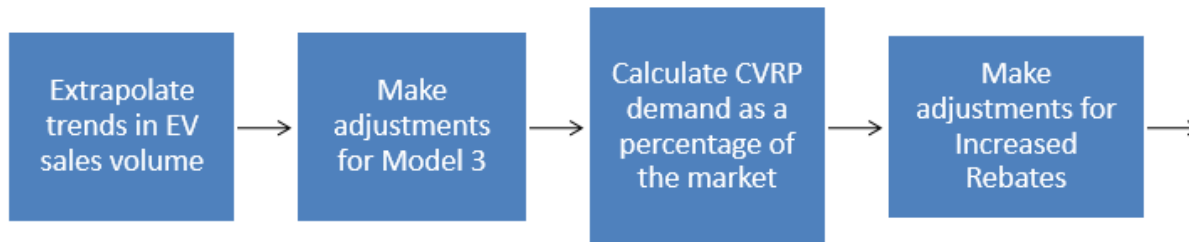
	Increased Rebate Percentage
PHEV	8.8%
BEVx	6.1%
BEV	9.3%
Additional (Model 3) BEV	7.2%
FCEV	3.6%
ZEM	<i>Not eligible for increased rebates</i>



Make adjustments for Increased Rebates

Assumed growth rate in Increased Rebates

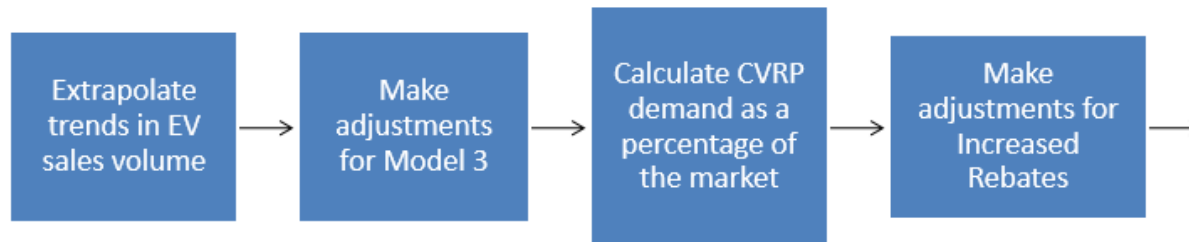
	Low	Middle	High
Year 1	0%	5%	15%
Year 2	3%	8%	20%
Year 3	5%	10%	25%



Increased Rebate for Public Fleets in DACs

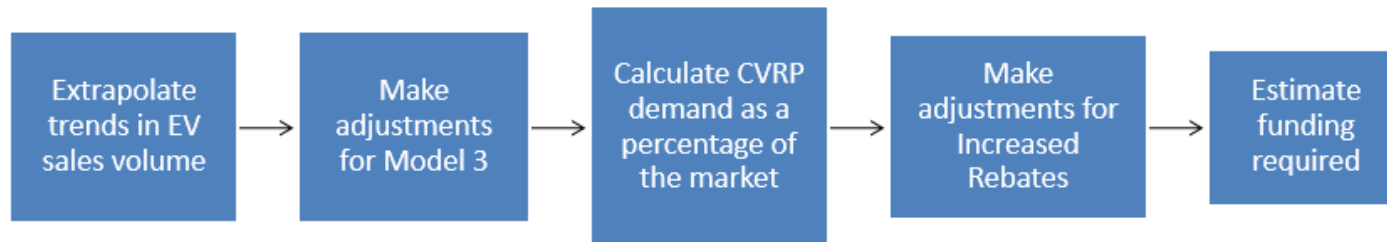
Public Fleet Pilot Project monthly average:
January 2017 – October 2017

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



Factors Not Addressed

- Rebate Now
 - Consumer preapproval, time-of-sale discount, dealer reimbursement
 - Pilot in San Diego County
- Federal Tax Credit Threshold (200,000 vehicles)
 - Tesla
 - General Motors
- Additional public-fleet-friendly program features
- California Department of General Services (DGS)
- Choice: HOV or rebate [AB 544 (Bloom, Stats. 2017, Ch 630)]
- Other incentives and supportive policies



A close-up photograph of a person's hand holding a charging cable connected to an electric vehicle. The scene is set in a city street during sunset, with warm, golden light and lens flare effects. In the background, a bicycle is parked on the sidewalk, and a building is visible. The overall atmosphere is bright and modern.

Results & Sensitivity

Results: Totals and Lower-Income Increased Rebate Portion

		Funding Need			Vehicles Rebated		
		Low	Middle	High	Low	Middle	High
FY 2018-19 (Sep 2018–Aug 2019) + FY 2017-18 bal.	Total	\$179 M	\$201 M	\$235 M	70,261	77,830	89,444
	<i>Lower-income Increased Rebate Portion</i>	<i>\$13 M</i>	<i>\$17 M</i>	<i>\$25 M</i>	<i>6,160</i>	<i>7,046</i>	<i>8,636</i>
FY 2019-20 (Sep 2019–Aug 2020)	Total	\$209 M	\$258 M	\$281 M	79,035	96,815	104,331
	<i>Lower-income Increased Rebate Portion</i>	<i>\$32 M</i>	<i>\$40 M</i>	<i>\$47 M</i>	<i>6,919</i>	<i>8,827</i>	<i>10,402</i>
FY 2020-21 (Sep 2020–Aug 2021)	Total	\$233 M	\$285 M	\$324 M	87,808	106,705	119,757
	<i>Lower-income Increased Rebate Portion</i>	<i>\$36 M</i>	<i>\$45 M</i>	<i>\$56 M</i>	<i>7,677</i>	<i>9,867</i>	<i>12,245</i>
	<i>Average Middle Scenario</i>		<i>\$248 M</i>			<i>93,800</i>	

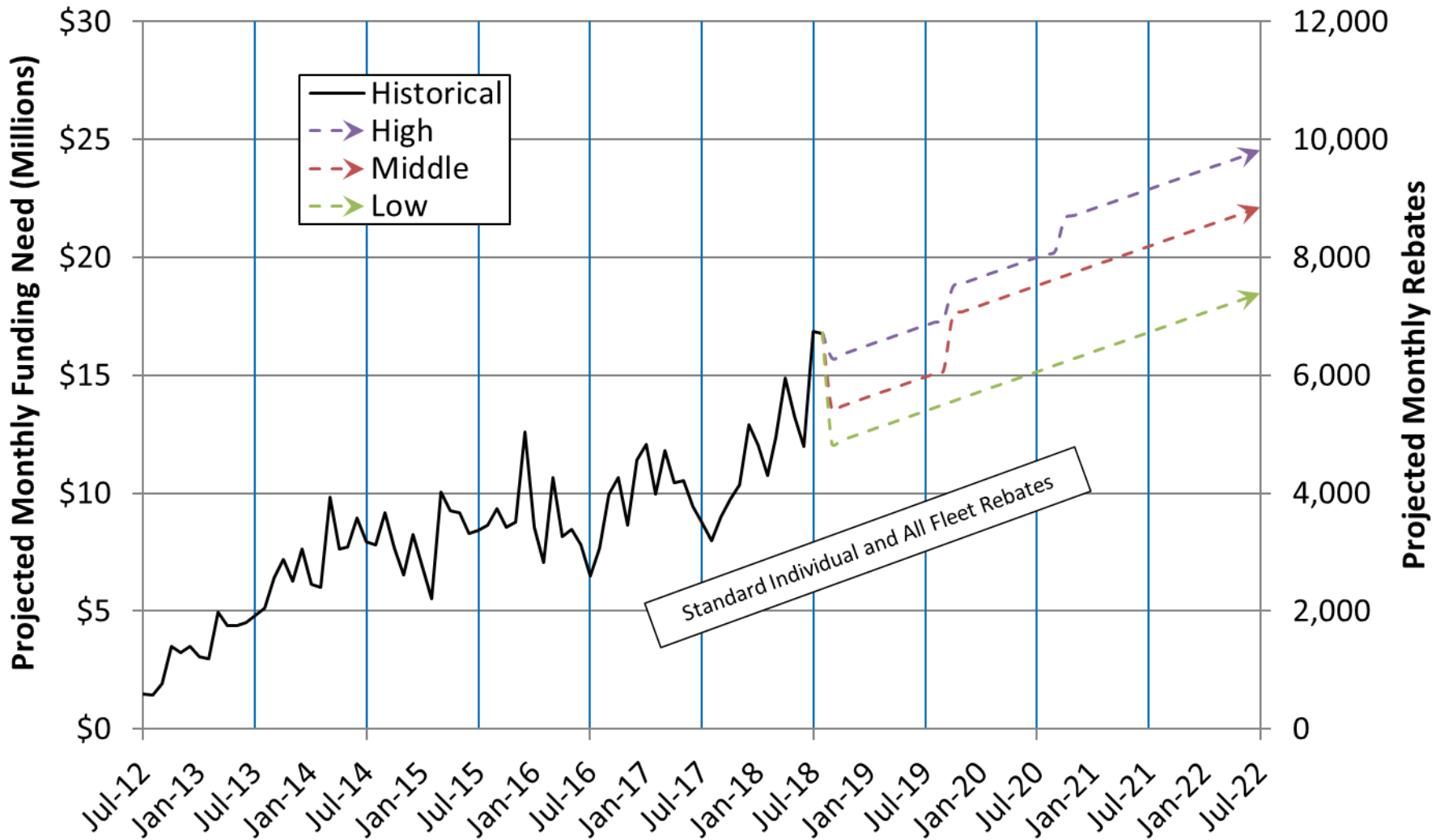
Results: Funding and Rebated Vehicle Projections

	Funding Need			Vehicles Rebated		
	Low	Middle	High	Low	Middle	High
FY 2018-19 (Sep 2018–Aug 2019) + FY 2017-18 bal. Total	\$179 M	\$201 M	\$235 M	70,261	77,830	89,444
<i>Standard Rebates: Individual and Fleet</i>	<i>\$175 M</i>	<i>\$217 M</i>	<i>\$232 M</i>	<i>71,739</i>	<i>87,611</i>	<i>93,552</i>
<i>Lower-income Increased Rebates</i>	<i>\$13 M</i>	<i>\$17 M</i>	<i>\$25 M</i>	<i>6,160</i>	<i>7,046</i>	<i>8,636</i>
<i>DAC Increased Public Fleet Rebates</i>	<i>\$2 M</i>	<i>\$2 M</i>	<i>\$2 M</i>	<i>377</i>	<i>377</i>	<i>377</i>
FY 2019-20 (Sep 2019–Aug 2020) Total	\$209 M	\$258 M	\$281 M	79,035	96,815	104,331
<i>Standard Rebates: Individual and Fleet</i>	<i>\$195 M</i>	<i>\$239 M</i>	<i>\$267 M</i>	<i>79,754</i>	<i>96,461</i>	<i>107,136</i>
<i>Lower-income Increased Rebates</i>	<i>\$32 M</i>	<i>\$40 M</i>	<i>\$47 M</i>	<i>6,919</i>	<i>8,827</i>	<i>10,402</i>
<i>DAC Increased Public Fleet Rebates</i>	<i>\$2 M</i>	<i>\$2 M</i>	<i>\$2 M</i>	<i>377</i>	<i>377</i>	<i>377</i>
FY 2020-21 (Sep 2020–Aug 2021) Total	\$233 M	\$285 M	\$324 M	87,808	106,705	119,757
<i>Standard Rebates: Individual and Fleet</i>	<i>\$217 M</i>	<i>\$261 M</i>	<i>\$290 M</i>	<i>88,425</i>	<i>105,132</i>	<i>116,271</i>
<i>Lower-income Increased Rebates</i>	<i>\$36 M</i>	<i>\$45 M</i>	<i>\$56 M</i>	<i>7,677</i>	<i>9,867</i>	<i>12,245</i>
<i>DAC Increased Public Fleet Rebates</i>	<i>\$2 M</i>	<i>\$2 M</i>	<i>\$2 M</i>	<i>377</i>	<i>377</i>	<i>377</i>
<i>Average Middle Scenario</i>	<i>\$248 M</i>			<i>93,800</i>		

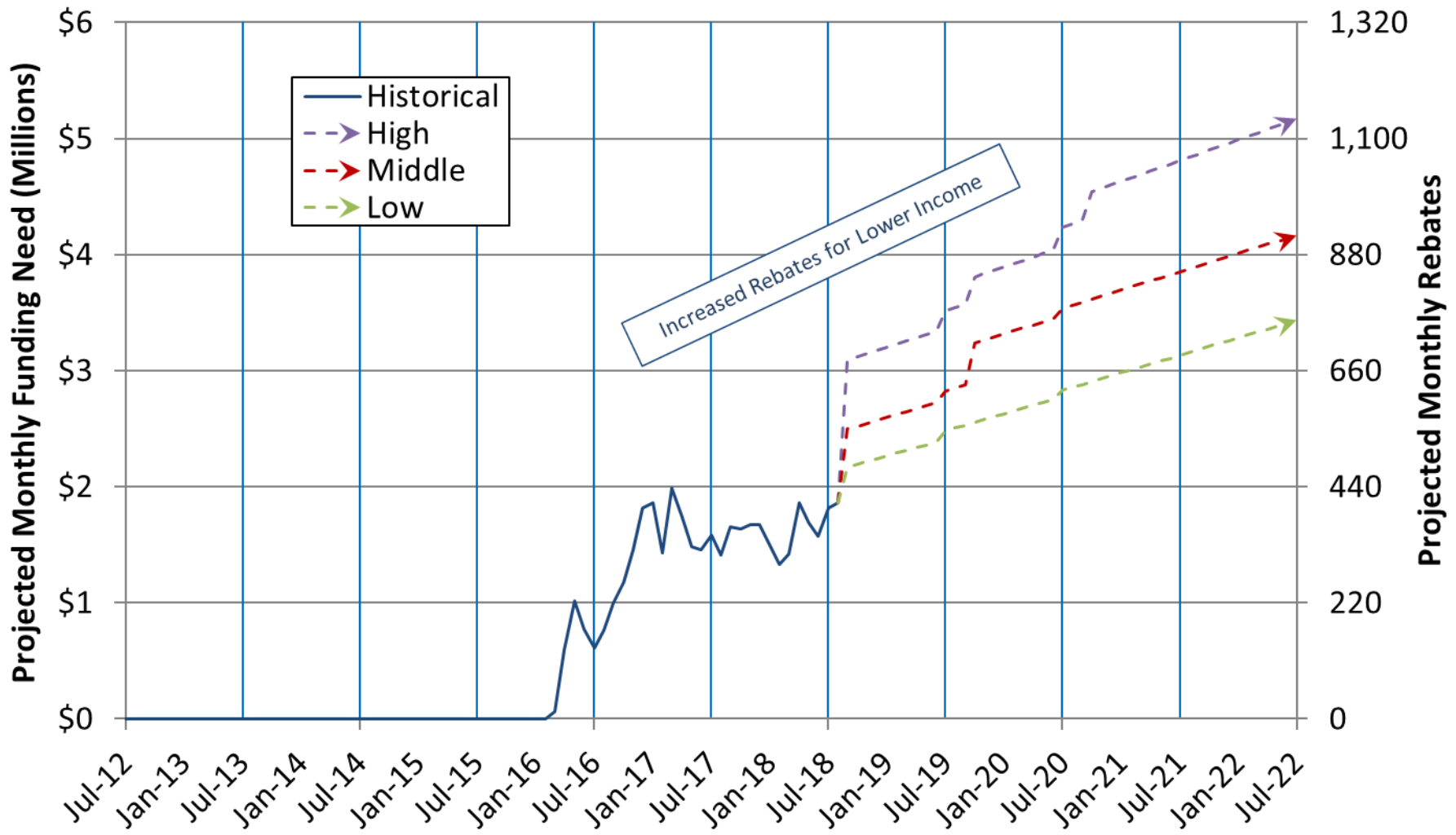
Results: Funding and Rebated Vehicle Projections

	Low	Middle	High	Low	Middle	High
FY 2018-19 (Sep 2018–Aug 2019) + FY 2017-18 bal. Total	\$179 M	\$201 M	\$235 M	70,261	77,830	89,444
<i>Standard Individual & Non-Public Fleet Rebates</i>	<i>\$163 M</i>	<i>\$181 M</i>	<i>\$208 M</i>	<i>63,486</i>	<i>70,146</i>	<i>80,153</i>
<i>Lower-income Increased Rebates</i>	<i>\$13 M</i>	<i>\$17 M</i>	<i>\$25 M</i>	<i>6,160</i>	<i>7,046</i>	<i>8,636</i>
<i>Standard Public Fleet Rebates</i>	<i>\$0.6 M</i>	<i>\$0.6 M</i>	<i>\$0.7 M</i>	<i>238</i>	<i>262</i>	<i>279</i>
<i>DAC Increased Public Fleet Rebates</i>	<i>\$2 M</i>	<i>\$2 M</i>	<i>\$2 M</i>	<i>377</i>	<i>377</i>	<i>377</i>
FY 2019-20 (Sep 2019–Aug 2020) Total	\$209 M	\$258 M	\$281 M	79,035	96,815	104,331
<i>Standard Individual & Non-Public Fleet Rebates</i>	<i>\$174 M</i>	<i>\$216 M</i>	<i>\$231 M</i>	<i>71,471</i>	<i>87,317</i>	<i>93,238</i>
<i>Lower-income Increased Rebates</i>	<i>\$32 M</i>	<i>\$40 M</i>	<i>\$47 M</i>	<i>6,919</i>	<i>8,827</i>	<i>10,402</i>
<i>Standard Public Fleet Rebates</i>	<i>\$1 M</i>	<i>\$1 M</i>	<i>\$1 M</i>	<i>268</i>	<i>294</i>	<i>314</i>
<i>DAC Increased Public Fleet Rebates</i>	<i>\$2 M</i>	<i>\$2 M</i>	<i>\$2 M</i>	<i>377</i>	<i>377</i>	<i>377</i>
FY 2020-21 (Sep 2020–Aug 2021) Total	\$233 M	\$285 M	\$324 M	87,808	106,705	119,757
<i>Standard Individual & Non-Public Fleet Rebates</i>	<i>\$194 M</i>	<i>\$238 M</i>	<i>\$266 M</i>	<i>79,456</i>	<i>96,134</i>	<i>106,787</i>
<i>Lower-income Increased Rebates</i>	<i>\$36 M</i>	<i>\$45 M</i>	<i>\$56 M</i>	<i>7,677</i>	<i>9,867</i>	<i>12,245</i>
<i>Standard Public Fleet Rebates</i>	<i>\$1 M</i>	<i>\$1 M</i>	<i>\$1 M</i>	<i>297</i>	<i>327</i>	<i>349</i>
<i>DAC Increased Public Fleet Rebates</i>	<i>\$2 M</i>	<i>\$2 M</i>	<i>\$2 M</i>	<i>377</i>	<i>377</i>	<i>377</i>
<i>Average Middle Scenario</i>	<i>\$248 M</i>			<i>93,800</i>		

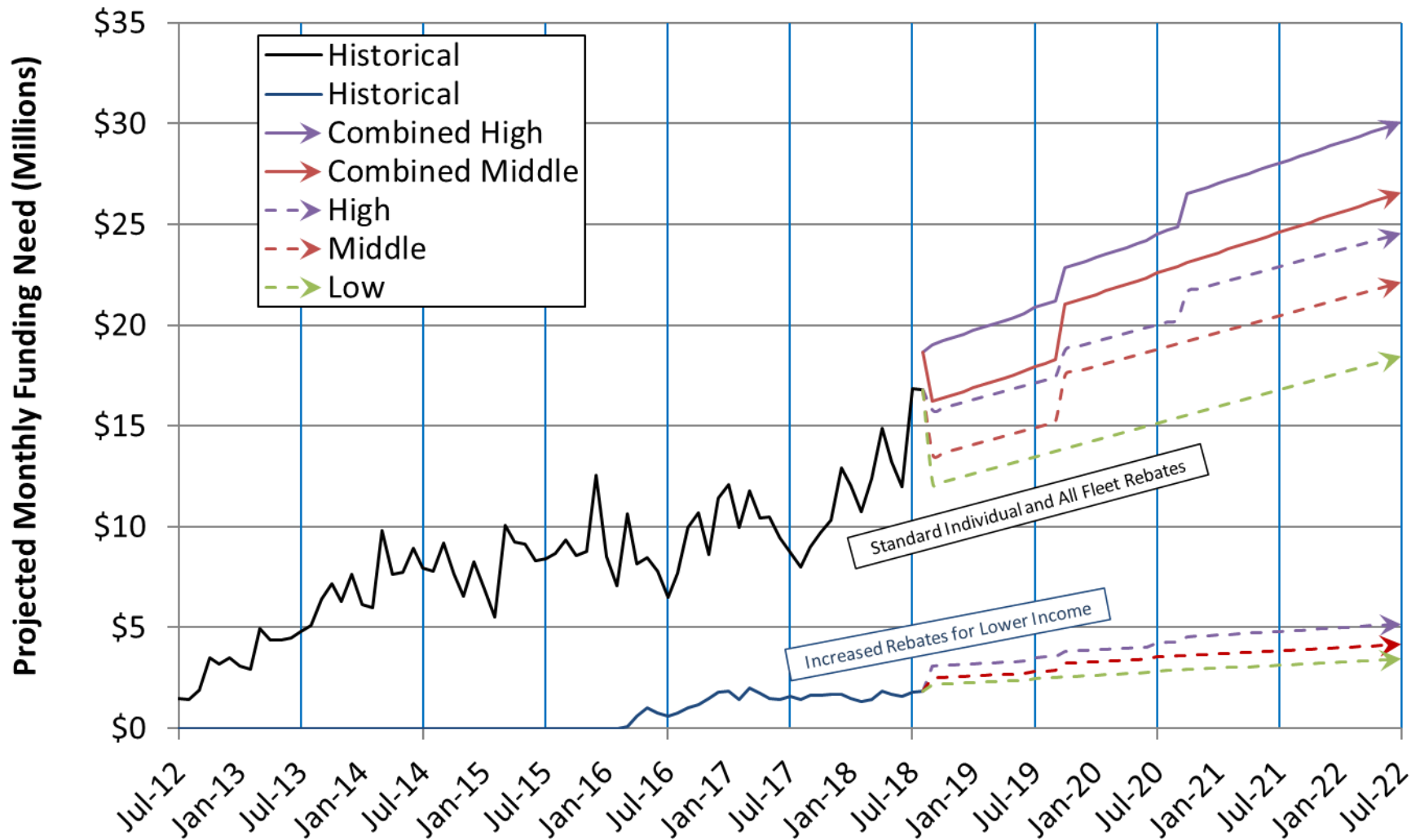
Standard Individual and All Fleet Rebates



Increased Rebates for Lower-Income Consumers



Results: 3-Year Funding Projections



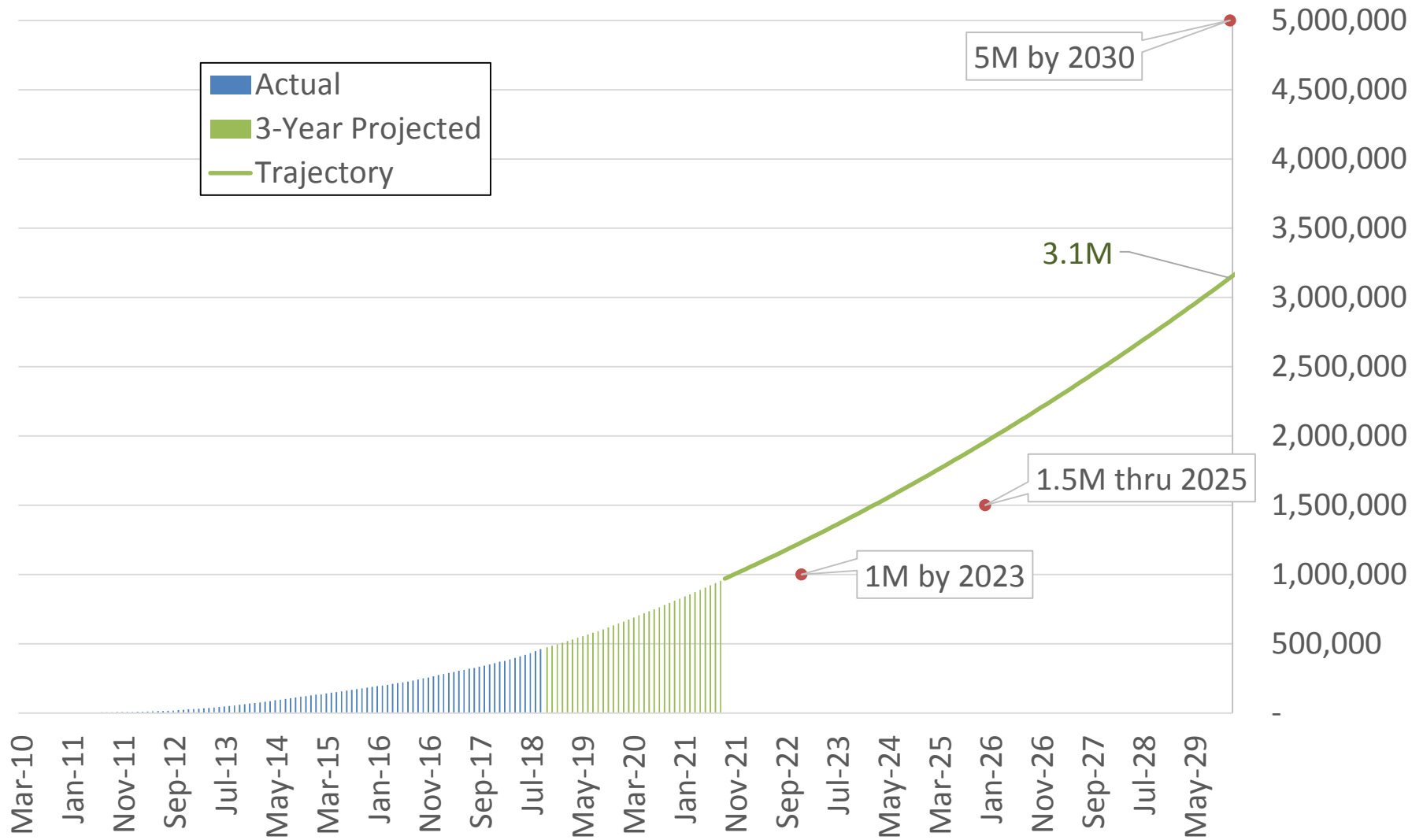
Sensitivity Testing

% of Middle Scenario	Name	Scenario	Three-cycle total need
202%	New normal??	PHEV and BEV: <u>linear</u> growth based on latest <u>12 months</u>	\$1,504 M
133%	No cap	Percent of market rebated: reverts to 2015 level (<u>pre-income-cap</u>)	\$992 M
125%	Recent trends	PHEV and BEV: <u>linear</u> growth based up latest <u>36 months</u>	\$930 M
116%	Curve fit	PHEV and BEV: <u>polynomial</u> growth, 2 nd order	\$865 M
114%	Main-streaming	Percent of market rebated <u>+10 points</u>	\$852 M
113%	Increased access	LMI Increased Rebates = 25% of total for each eligible vehicle type	\$844 M
100%	LMI priority	Increased rebate qualification: Nov. 2016–Oct. 2017	\$747 M
100%		Middle (baseline)	\$745 M
90%	Disruptions	Percent of market rebated: Nov. 2016–Oct. 2017 (incl. waitlist)	\$671 M
85%	Left behind	Percent of market rebated: -10 points	\$636 M



Trajectory Relative to State Goals

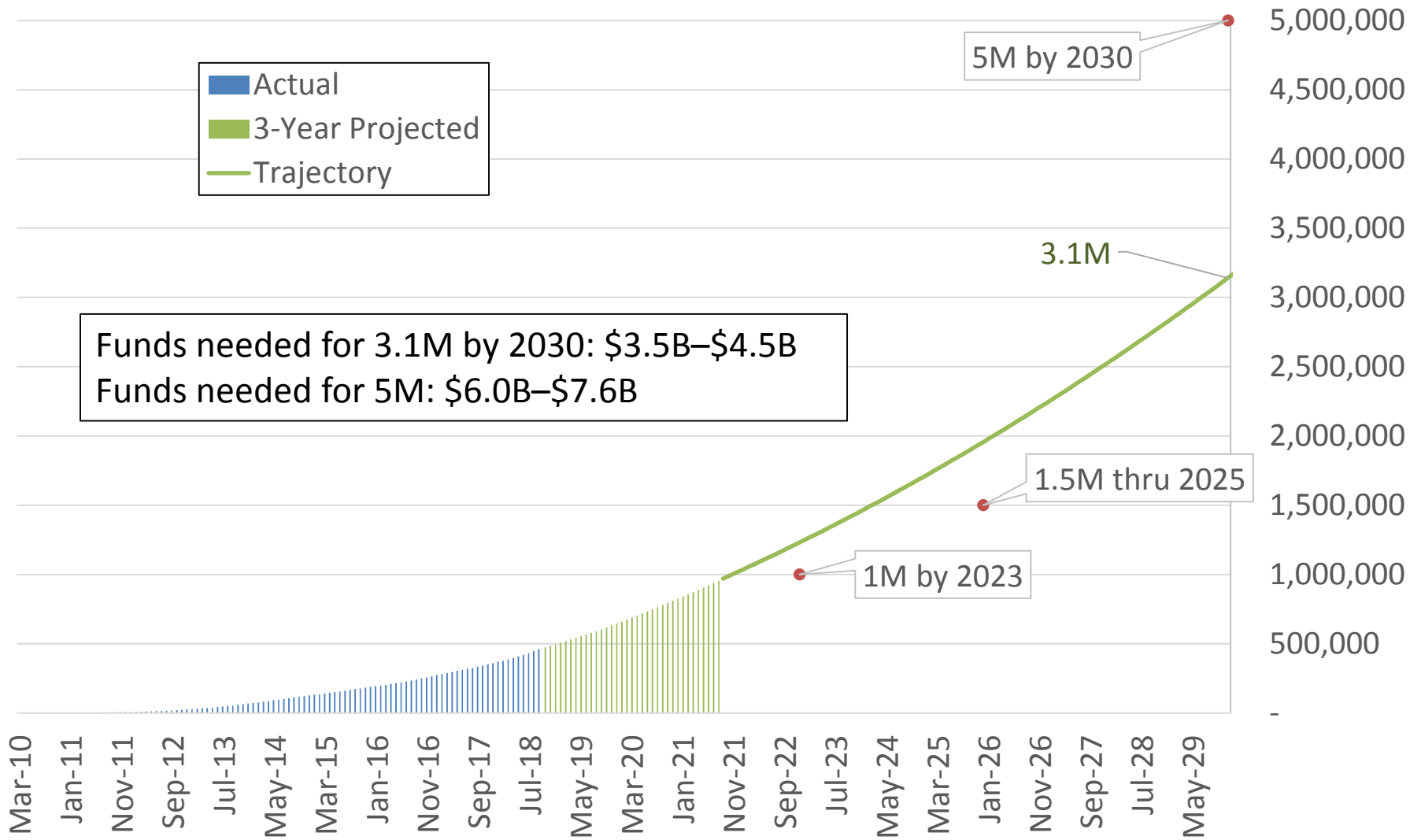
Cumulative EV Sales Relative to State Goals: Actual, 3-Year Projected, and Trajectory





Funding Need for 5M-by-2030 Goal

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

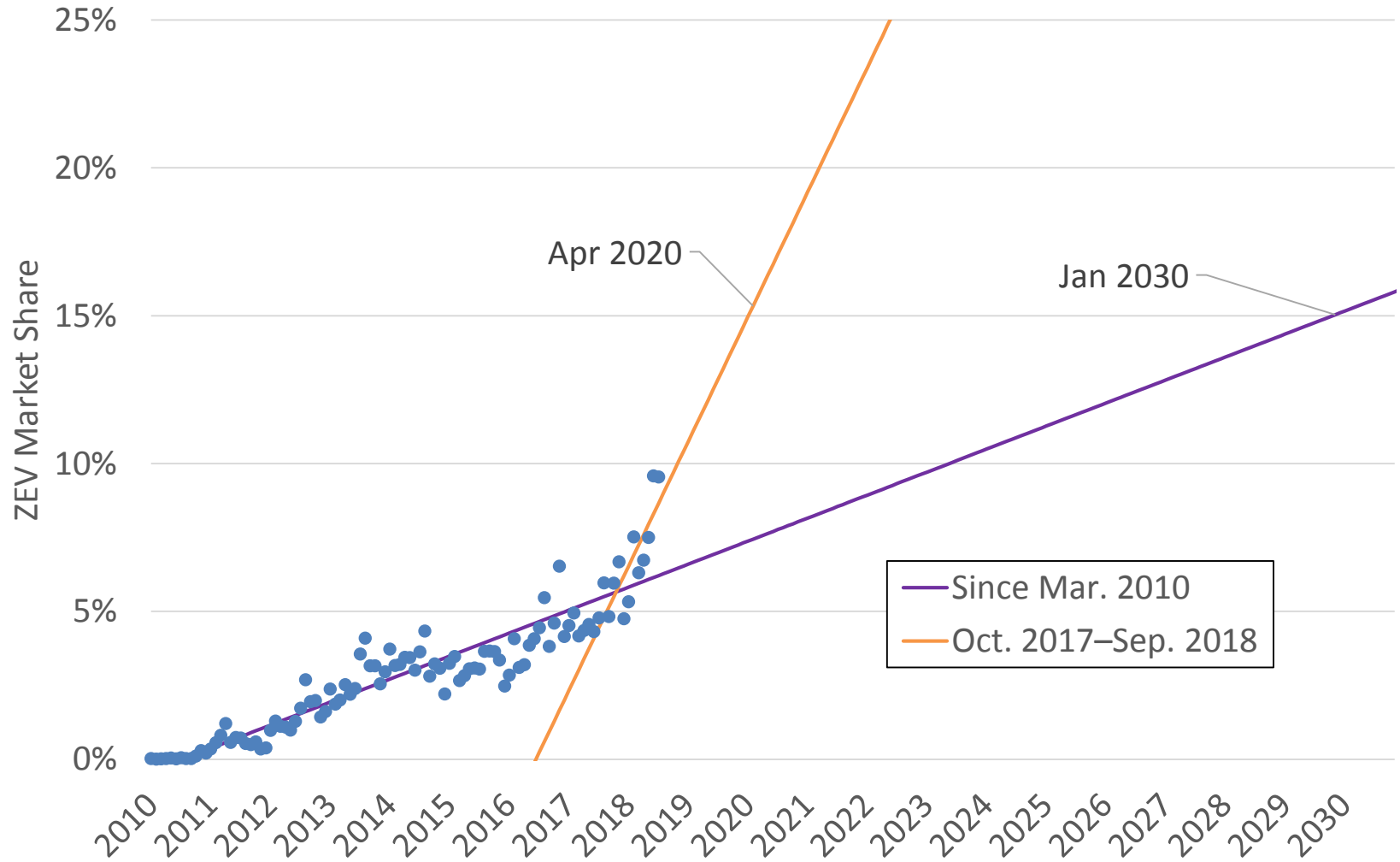


Funds needed for 3.1M by 2030: \$3.5B–\$4.5B
 Funds needed for 5M: \$6.0B–\$7.6B

Projected Funding Requirements

	Funding Need			Vehicles Rebated		
	Low	Middle	High	Low	Middle	High
3-year Total	\$620 M	\$745 M	\$841 M	237,104	281,350	313,532
5-year Total*	\$1.2 B	\$1.4 B	\$1.6 B	448,179	532,037	592,835
Thru 2025 Total	\$2.2 B	\$2.6 B	\$2.9 B	818,992	960,469	1.1 M
By 2030 Total	\$3.5 B	\$4.1 B	\$4.5 B	1.3 M	1.5 M	1.7 M
5M ZEVs by 2030	\$6.0 B – \$7.6 B			2.3 M – 2.8 M		

EV Market Share Extrapolation





Discussion Questions

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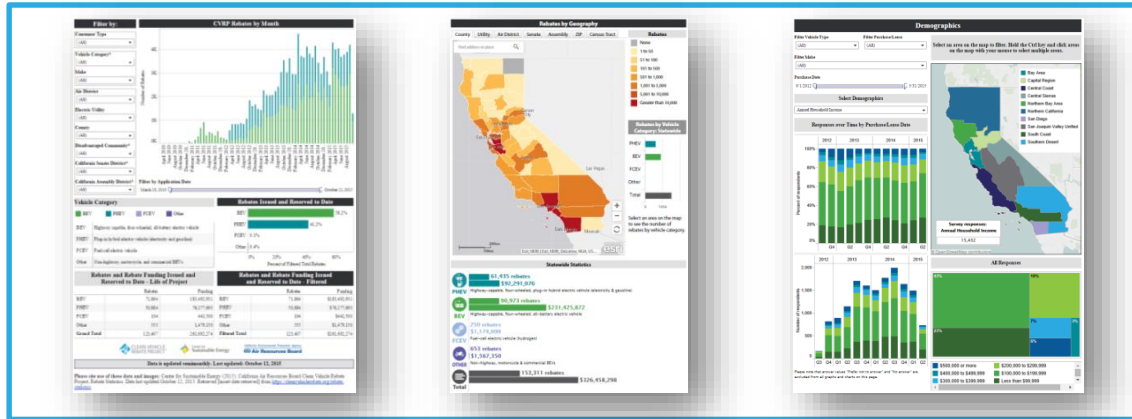
- How best to treat:
 - Tesla specifically?
 - Lower-price long-range BEVs generally?
 - New releases?
 - Additions (evolutionary) vs. cannibalization ?
 - Market saturation?
 - Phase-out of federal tax credit?
- What implications do you see for program design?
 - Rebate amounts?
 - Rebate structure?

A close-up photograph of a person's hand holding a charging cable connected to a white electric vehicle. The scene is set in a city street during sunset, with a bright sun in the upper right corner creating a lens flare. In the background, a bicycle is parked on the sidewalk, and a building is visible. A semi-transparent white banner is overlaid across the middle of the image, containing the text.

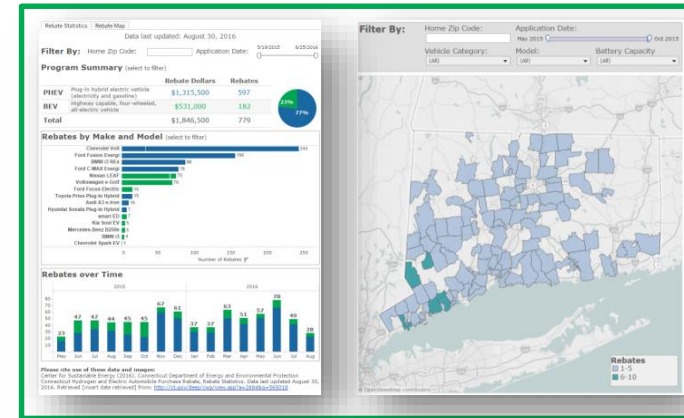
Additional Online Resources & Extra Slides

Public dashboards and data facilitate informed action

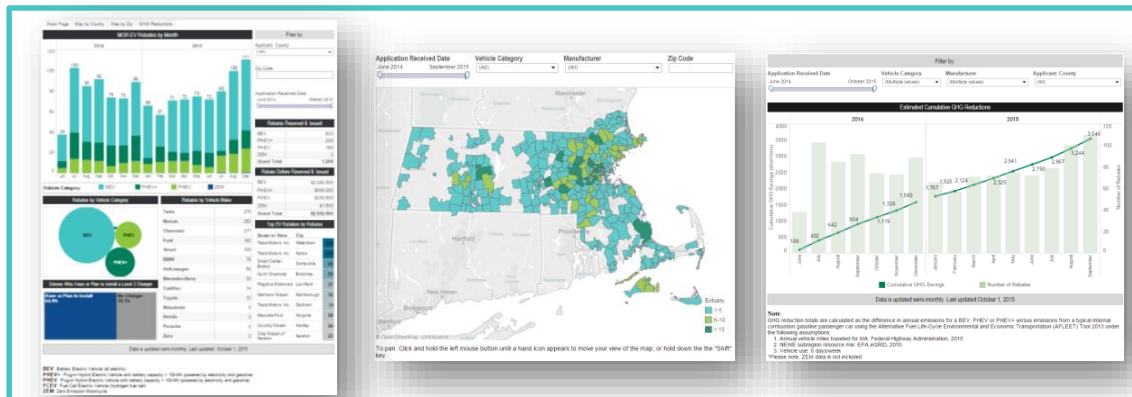
- >250,000 EVs and consumers have received >\$570 M in rebates
- >19,000 survey responses online, statistically represent >91,000 consumers
- Reports, presentations, and analysis growing



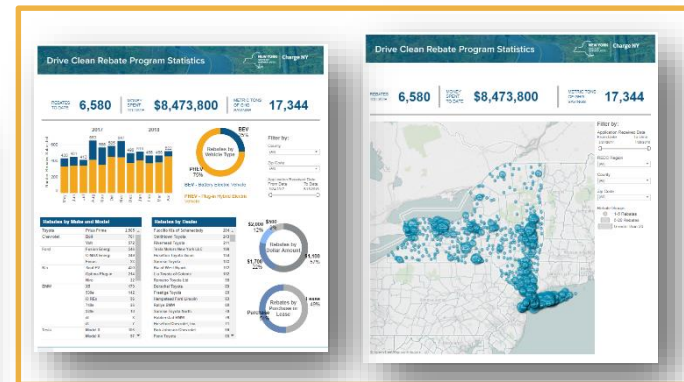
cleanvehiclerebate.org



ct.gov/deep



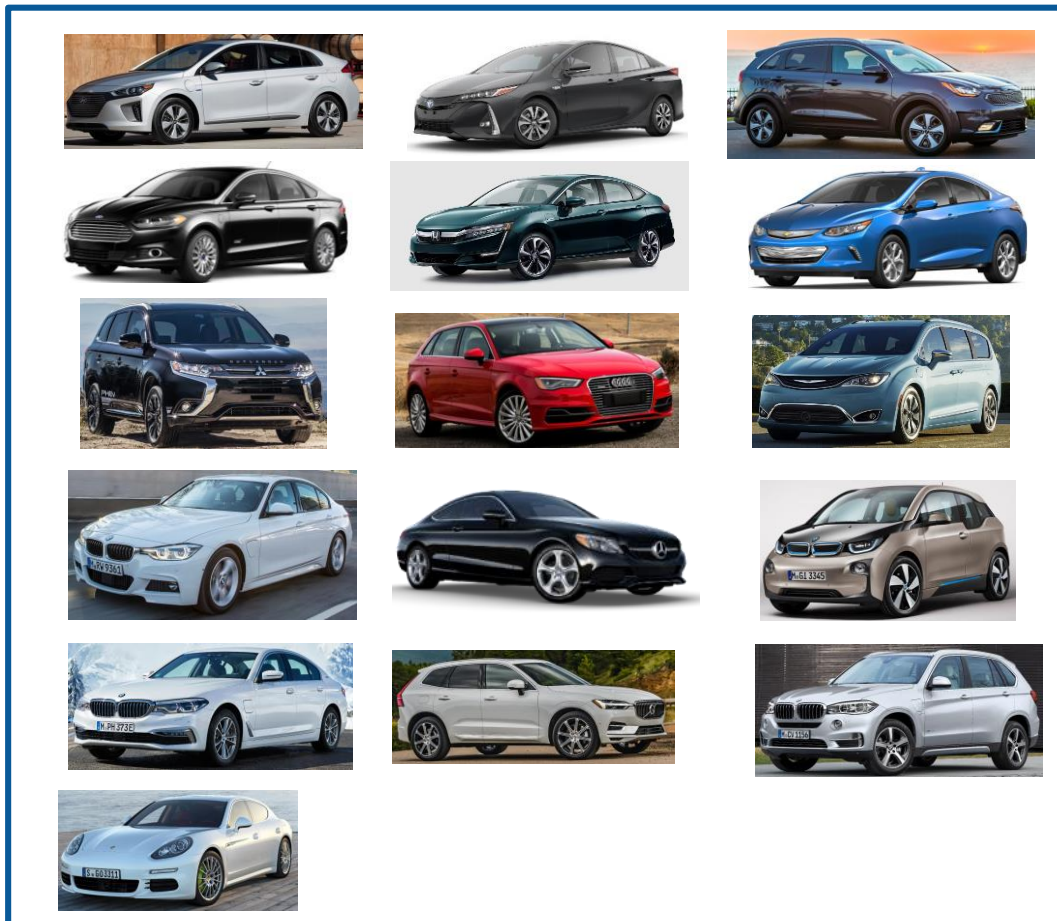
mor-ev.org



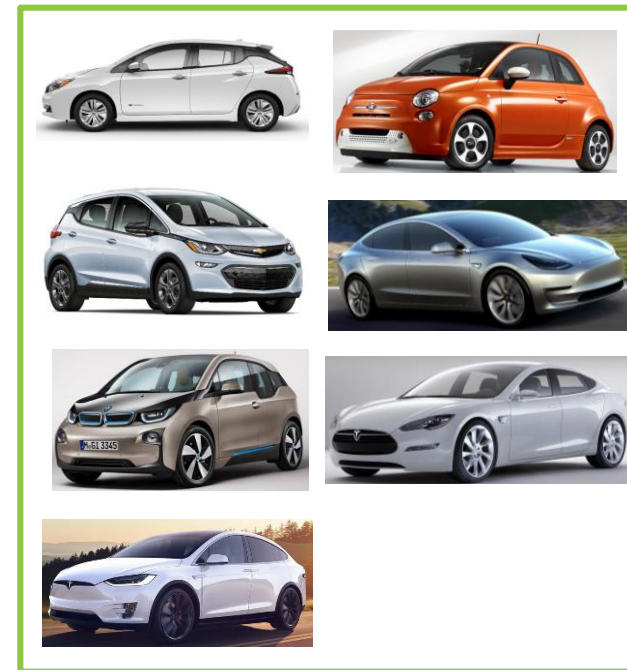
nyscrda.ny.gov/All-Programs/Programs/Drive-Clean-Rebate

Electric Vehicle Choices: Major 2018 Models

Plug-in hybrid EVs



All-battery EVs



Fuel-cell EVs

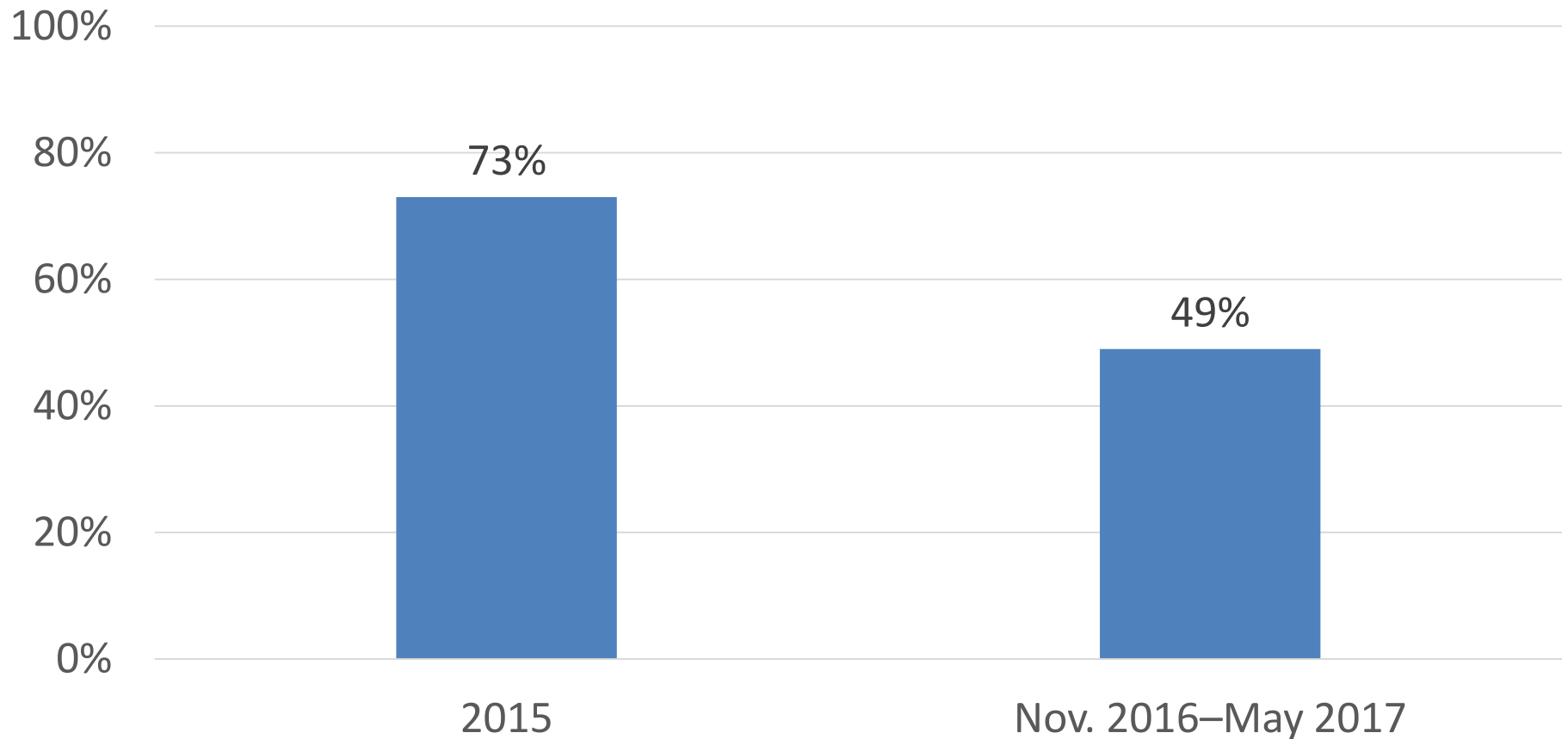


EV Incentive Programs: Rebate Design



	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	<u>e-miles</u> ≥ 120 \$2,000 ≥ 40 \$1,700 ≥ 20 \$1,100 < 20 \$500
All-Battery EVs 	\$2,500	\$2,500	<u>e-miles</u> ≥ 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		
	e-miles ≥ 20 only; Consumer income cap and 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

Appendix C: Percent of Market Rebated (individuals only): Before and After the Income Cap (illustrative eras)



Appendix C: Results: Projected funding requirements and rebated vehicle totals by rebate subtype and fiscal year

FY 2018-19 (Sep 2018–Aug 2019) + FY 2017-18 bal.	Total	\$174 M	\$196 M	\$230 M	68,251	75,808	87,400
	<i>Standard Individual & Non-Public Fleet Rebates</i>	<i>\$159 M</i>	<i>\$177 M</i>	<i>\$204 M</i>	<i>61,690</i>	<i>68,350</i>	<i>78,358</i>
	<i>Lower-income Increased Rebates</i>	<i>\$12 M</i>	<i>\$16 M</i>	<i>\$24 M</i>	<i>5,952</i>	<i>6,827</i>	<i>8,394</i>
	<i>Standard Public Fleet Rebates</i>	<i>\$0.6 M</i>	<i>\$0.6 M</i>	<i>\$0.7 M</i>	<i>231</i>	<i>255</i>	<i>271</i>
	<i>DAC Increased Public Fleet Rebates</i>	<i>\$2 M</i>	<i>\$2 M</i>	<i>\$2 M</i>	<i>377</i>	<i>377</i>	<i>377</i>
FY 2019-20 (Sep 2019–Aug 2020)	Total	\$203 M	\$253 M	\$276 M	76,843	94,603	102,089
	<i>Standard Individual & Non-Public Fleet Rebates</i>	<i>\$170 M</i>	<i>\$212 M</i>	<i>\$227 M</i>	<i>69,522</i>	<i>85,368</i>	<i>91,290</i>
	<i>Lower-income Increased Rebates</i>	<i>\$31 M</i>	<i>\$39 M</i>	<i>\$46 M</i>	<i>6,683</i>	<i>8,572</i>	<i>10,118</i>
	<i>Standard Public Fleet Rebates</i>	<i>\$1 M</i>	<i>\$1 M</i>	<i>\$1 M</i>	<i>261</i>	<i>287</i>	<i>305</i>
	<i>DAC Increased Public Fleet Rebates</i>	<i>\$2 M</i>	<i>\$2 M</i>	<i>\$2 M</i>	<i>377</i>	<i>377</i>	<i>377</i>
FY 2020-21 (Sep 2020–Aug 2021)	Total	\$227 M	\$280 M	\$319 M	85,435	104,306	117,318
	<i>Standard Individual & Non-Public Fleet Rebates</i>	<i>\$190 M</i>	<i>\$234 M</i>	<i>\$262 M</i>	<i>77,354</i>	<i>94,032</i>	<i>104,686</i>
	<i>Lower-income Increased Rebates</i>	<i>\$35 M</i>	<i>\$43 M</i>	<i>\$54 M</i>	<i>7,414</i>	<i>9,578</i>	<i>11,916</i>
	<i>Standard Public Fleet Rebates</i>	<i>\$1 M</i>	<i>\$1 M</i>	<i>\$1 M</i>	<i>290</i>	<i>319</i>	<i>340</i>
	<i>DAC Increased Public Fleet Rebates</i>	<i>\$2 M</i>	<i>\$2 M</i>	<i>\$2 M</i>	<i>377</i>	<i>377</i>	<i>377</i>

How can we help?

brett.williams@energycenter.org

 CleanVehicleRebate.org

