

# Additional Analysis of CVRP Funding Need and Program-Change Scenarios

CVRP Work Group #4 (23 Apr. 2019, Sacramento CA)

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With thanks to Jonathan Changus, Amy Lastuka, Michelle Jones, and others at CSE and CARB



# Outline

- I. Recap
- II. Updated Funding Need
  - New “Middle” projection
  - September thru August funding cycle
- III. Additional Program-Change Scenarios
  - Reference slides
  - Additional scenario analysis: estimates and timelines

## Extra Slides



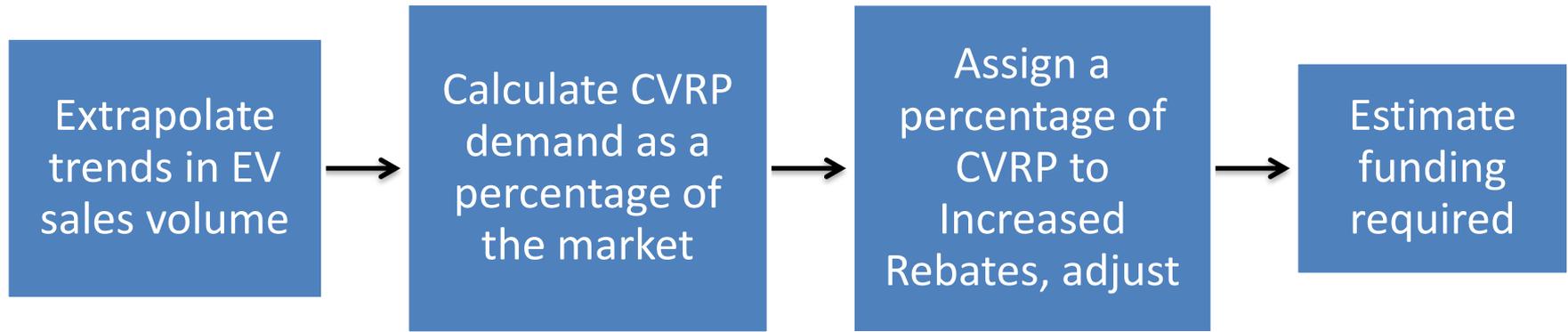


# Recap



# Method

“...all models are wrong; some are useful” –George Box



For more detail, please see:

- [September 2018 FY 2018–19 Funding Plan, Appendix C](#)
- [December 4<sup>th</sup> 2018 CVRP Workshop presentation](#)
- [March 22<sup>nd</sup> CVRP Workgroup #2 presentation](#)
- [April 4<sup>th</sup> CVRP Workgroup #3 \*corrected\* presentation](#)

# Previous Funding Need Estimate (as of 4/2/19)

Funding Cycle (Oct.– Sep.)	Rebate Type (All = Standard + Increased)	Funding Requirements (millions)			Rebates (thousands)		
		Low	Middle	High	Low	Middle	High
FY 2018–19	<i>Standard and DAC-Fleet Increased</i>	\$84	\$97	\$99	31	77	78
	<i>Lower-Income Increased Rebates (surplus)</i>	(\$8)	(\$7)	(\$5)	0	0	0
	<b>Net Shortfall</b>	<b>\$76</b>	<b>\$90</b>	<b>\$94</b>	<b>31</b>	<b>77</b>	<b>78</b>
FY 2019–20	<i>Standard and DAC-Fleet Increased</i>	\$275	\$371	\$382	109	145	149
	<i>Lower-Income Increased Rebates</i>	\$35	\$43	\$48	8	9	10
	<b>Total Need</b>	<b>\$310</b>	<b>\$414</b>	<b>\$429</b>	<b>117</b>	<b>155</b>	<b>160</b>

**Grand total need thru Sep. 2020: \$386    \$505    \$523**

**Budget: \$200**

# Levels previously explored

- MSRP Cap (FCEV exempt)  
\$60k, \$50k, \$40k
- EPA 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, -20% for standard rebates,  
no Standard Rebates, no PHEV rebates, no Standard  
PHEV rebates

# Program-Change Scenarios: Individual Measures

#	Scenario	Savings, % of Middle	First-cycle cost	% of first-cycle vehicles lost	\$ saved per vehicle lost
1	Middle (baseline)	0%	\$505 M	-	-
2	Limit one per person	-2%	\$494 M	1%	\$3,820
3	Limit 3 months between purchase and application	-3%	\$488 M	1%	\$3,961
4	<\$60k MSRP	-3%	\$487 M	1%	\$4,232
5	<\$50k MSRP	-4%	\$486 M	1%	\$4,021
6	>30-mi EPA all-electric range (AER)	-4%	\$484 M	2%	\$3,092
7	>40-mi AER	-4%	\$482 M	2%	\$3,040
8	<\$40k MSRP	-5%	\$481 M	2%	\$3,953
9	>50-mi AER	-5%	\$479 M	2%	\$2,947
10	Income cap—single filers: ≤\$150k, other filers: ≤\$250k	-5%	\$479 M	2%	\$3,832
11	>30-mi AER for PHEV/BEVx, >100-mi for others	-7%	\$467 M	3%	\$3,477
12	>50-mi AER for PHEV/BEVx, >100-mi for others	-8%	\$463 M	3%	\$3,326
13	>100-mi AER	-11%	\$447 M	4%	\$3,269
14	Standard rebates lowered \$500	-12%	\$444 M	NA	NA
15	Income cap—single filers: ≤\$150k, other filers: ≤\$204k	-12%	\$445 M	4%	\$3,737
16	Income cap—all filers: ≤\$150k	-22%	\$392 M	8%	\$3,718

# Program-Change Scenarios: Combos

## CORRECTED

#	Scenario	Savings, % of Middle	First-cycle cost	% lost	\$ saved / vehicle lost
1	Middle (baseline)	0%	\$505 M	-	-
K1	Three months to apply; <\$50k MSRP; inc. cap—single filers: ≤\$150k, other filers: ≤\$204k; >25-mile AER	-19%	\$408 M	7%	\$3,747
K2	Three months to apply; <\$40k MSRP; inc. cap—single filers: ≤\$150k, other filers: ≤\$204k; PHEVs >25-mile AER, others: >100-mile AER	-28%	\$363 M	8%	\$4,273

# Program-Change Scenarios: Aggressive Combos

## CORRECTED

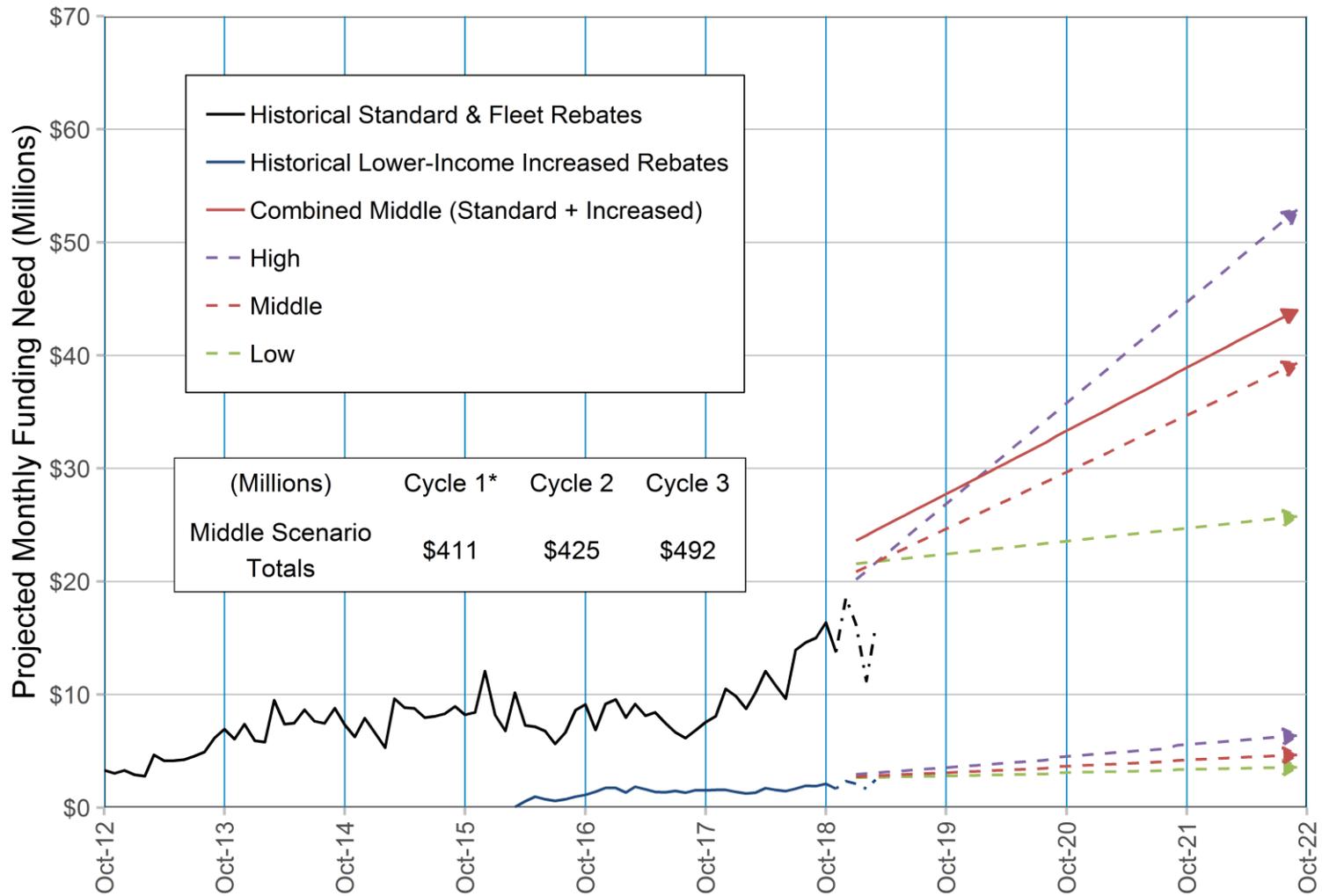
#	Scenario	Savings (% of Middle)	First-cycle cost
1	Middle (baseline)	0%	\$505 M
K3	Three months to apply; <\$40k MSRP; PHEVs >50-mile AER, others: >100-mile AER inc. cap—single filers: ≤\$150k, other filers: ≤\$204k;	-24%	\$382 M
K3a	Three months to apply; <\$40k MSRP; PHEVs >50-mile AER, others: >100-mile AER LMI-only program (300% FPL)	-59%	\$204 M
K4	Three months to apply; <\$40k MSRP; >25-mile AER LMI-only program (300% FPL);	-58%	\$211 M



## Updated Funding Need Estimates:

- New “Middle” Scenario
- September–August Funding Cycle

# New Middle



# New-Middle Funding Need (as of 4/22/19)

Funding Cycle <b>(Sep.– Aug.)</b>	Rebate Type <b>(All = Standard + Increased)</b>	Funding Requirements <b>(millions)</b>			Rebates <b>(thousands)</b>		
		Low	Middle	High	Low	Middle	High
FY 2018–19	<i>Standard and DAC-Fleet Increased</i>	\$59	\$63	\$68	65	66	67
	<i>Lower-Income Increased Rebates (surplus)</i>	(\$11)	(\$10)	(\$9)	0	0	0
	<b>Net Shortfall</b>	<b>\$48</b>	<b>\$53</b>	<b>\$59</b>	<b>65</b>	<b>66</b>	<b>67</b>
FY 2019–20	<i>Standard and DAC-Fleet Increased</i>	\$274	\$318	\$362	109	126	142
	<i>Lower-Income Increased Rebates</i>	\$35	\$39	\$46	8	9	10
	<b>Total Need</b>	<b>\$309</b>	<b>\$358</b>	<b>\$409</b>	<b>117</b>	<b>134</b>	<b>152</b>

**Grand total need thru Sep. 2020: \$357    \$411    \$468**

**Budget: \$200**

\*Note: \$60 M of FY 2018–19 funding was needed to fund FY 2017–18 rebates.

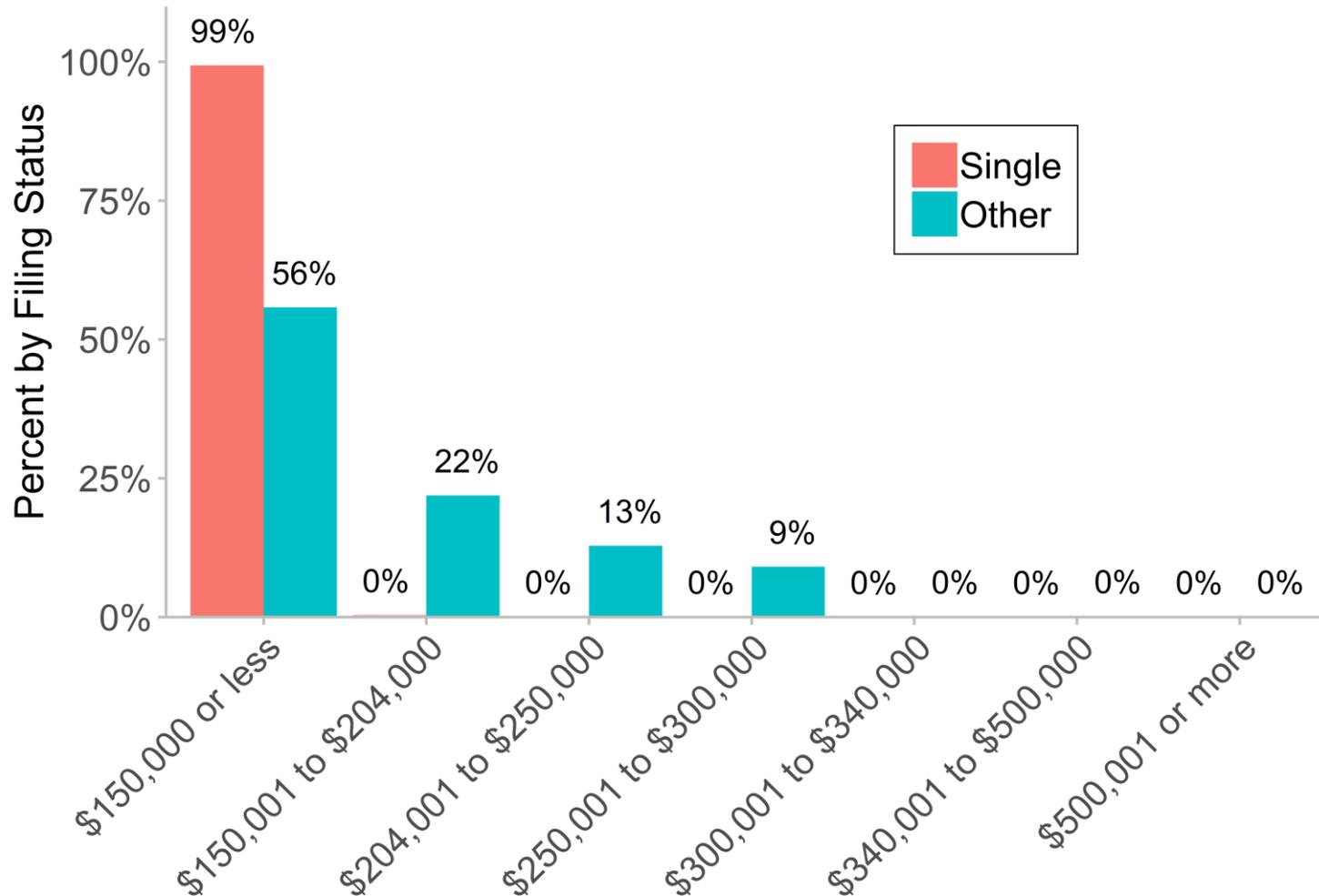


# Program-Change Scenarios

A close-up photograph of a person's hand holding a charging cable connected to a white electric car. 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. The overall atmosphere is warm and modern.

# Reference Slides

# Current Program Income Distribution



# Electric Vehicles by Electric Range & Base MSRP

Vehicle Make and Model	Base MSRP	AER (EPA)
BMW 530e xDrive iPerformance	55700	14
Audi A3 e-tron	39500	16
BMW 530e iPerformance	53400	16
Volvo XC60 T8	55300	17
Volvo XC90 T8	67000	17
Volvo S90 T8	63900	21
Mitsubishi Outlander PHEV	34595	22
Toyota Prius Prime	27350	25
Ford Fusion Energi	34595	26
Kia Niro Plug-in Hybrid	28500	26
Hyundai Sonata Plug-in Hybrid	32400	28
Hyundai Ioniq PHEV	25350	29
Kia Optima Plug-in Hybrid	35390	29
Chrysler Pacifica	39995	32
Honda Clarity Plug-In Hybrid	33400	47
smart Electric Fortwo Cabriolet	28100	57
smart Electric Fortwo Coupe	23900	58
FIAT 500e	32995	84
Honda Clarity Electric	37540	89
BMW i3 REx	48300	97
Kia Soul EV	33950	111
Ford Focus Electric	29120	115
Hyundai Ioniq Electric	30315	124
Volkswagen e-Golf	30495	125
BMW i3s REx	51500	126
Nissan LEAF	29990	150
BMW i3	44450	153
BMW i3s	47650	153
Tesla Model 3	35000	215
<b>Jaguar I-PACE</b>	<b>69500</b>	<b>234</b>
Chevrolet Bolt	36620	238
Tesla Model X	88000	238
<b>Hyundai Kona Electric</b>	<b>36540</b>	<b>258</b>
Tesla Model S	85000	310

## Sources:

### MSRP:

- Manufacturer websites, FuelEconomy.gov, Kelley Blue Book

### EPA all-electric range:

- FuelEconomy.gov, manufacturer websites
- Most recent model year

Note: ZEMs, FCEVs, and discontinued PEVs not included.

# EV Incentive Programs: Previous Rebate Designs



**Fuel-Cell EVs**



\$5,000

\$2,500

\$5,000

e-miles

**All-Battery EVs**



\$2,500

\$2,500

e-miles

≥ 175      \$3,000  
 ≥ 100      \$2,000  
 < 100      \$500

≥ 120      \$2,000

≥ 40      \$1,700

**Plug-in Hybrid EVs**



\$2,500 (i3 REx)  
 \$1,500

≥10 kWh      \$2,500  
 <10 kWh      \$1,500

≥ 40      \$2,000  
 < 40      \$500

≥ 20      \$1,100

< 20      \$500

**Zero-Emission Motorcycles**



\$900

\$750

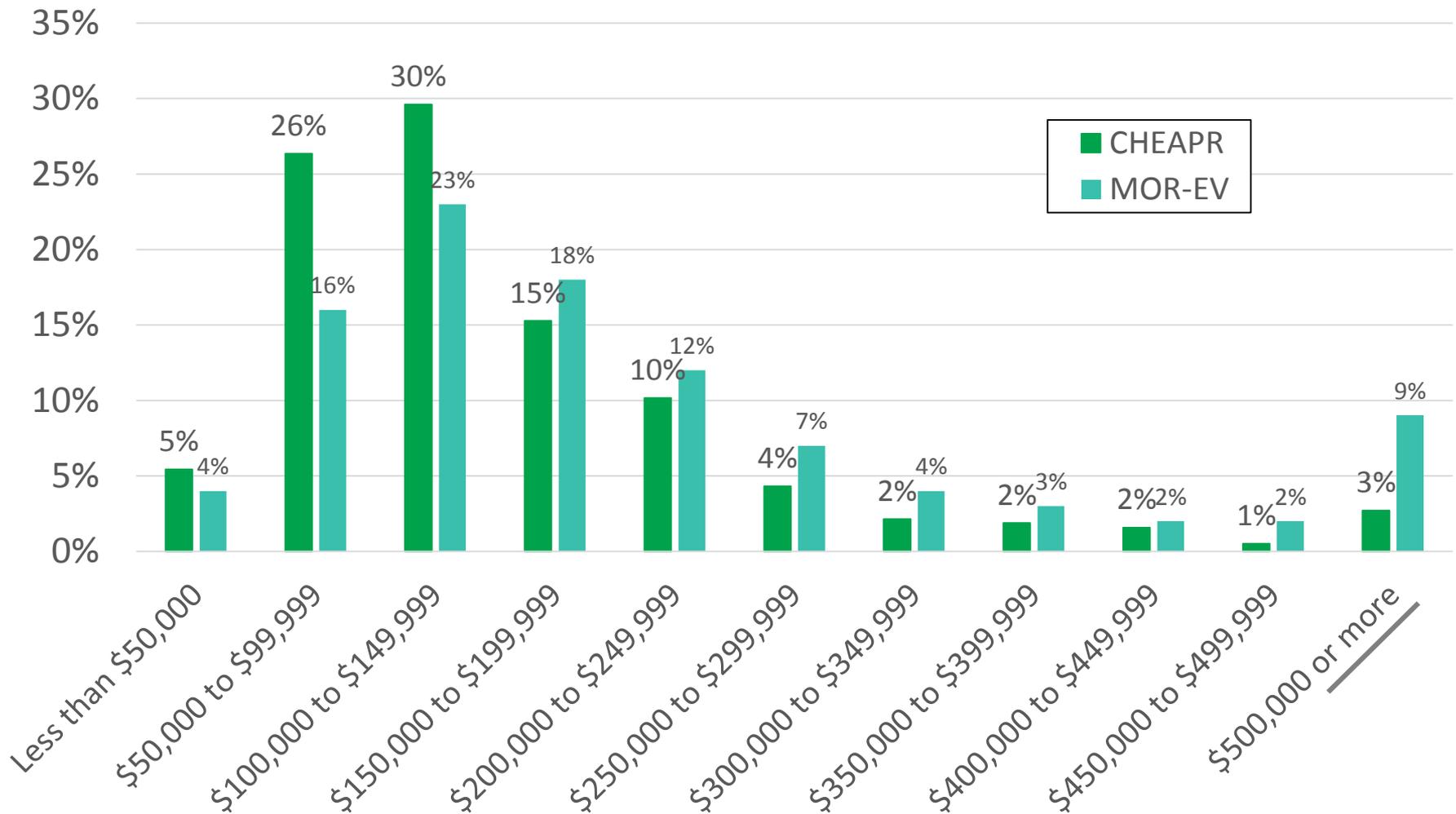
e-miles ≥ 20 only;  
 Consumer income cap and increased rebates for lower-income households

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

# CHEAPR and MOR-EV Respondents by Household Income



# Statewide Electric Vehicle Rebates (as of Jan. 2019)



	CALIFORNIA	MOR-EV	CHEAPR	NEW YORK STATE
<b>Fuel-Cell EVs</b> 	\$5,000	\$1,500	\$5,000	<u>e-miles</u> ≥ 120    \$2,000 ≥ 40     \$1,700 ≥ 20     \$1,100 < 20     \$500
<b>All-Battery EVs</b> 	\$2,500	\$1,500	<u>e-miles</u> ≥ 200    \$2,000 ≥ 120    \$1,500 < 120    \$500	
<b>Plug-in Hybrid EVs</b> 	\$2,500 (i3 REx) \$1,500	BEVx only: \$1,500	≥ 45     \$1,000 < 45     \$500	
<b>Zero-Emission Motorcycles</b> 	\$900	\$450		
	e-miles ≥ 20; Consumer income cap; Increased rebates for lower-income	MSRP ≤ \$50k, no fleet rebates	MSRP ≤ \$50k (PHEV & BEVs), MSRP ≤ \$60k (FCEVs); dealer assignment; \$150 dealer incentive	MSRP > \$60k = \$500 max.; point-of-sale via dealer

A close-up photograph of a person's hand plugging a charging cable into a car's charging port. The scene is set outdoors during 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.

## **Additional Scenario Analysis: What if?**

# Additional Illustrative Scenarios

<b><u>Scenario</u></b>	<b><u>1 - "CARB"</u></b>	<b><u>2 - "CalETC"</u></b>	<b><u>3 - Hybrid</u></b>
<b><i>Income Cap - General Rebates</i></b>	\$150/\$200	\$150/\$204/\$300	\$150/\$200
<b><i>Income Cap - Increased Rebates</i></b>	300% FPL	300% FPL	300% FPL
<b><i>MSRP Cap</i></b>	< \$40,000	none	< \$40,000
<b><i>Rebate/Person</i></b>	1	2	1
<b><i>Application Window</i></b>	3 months	18 months	3 months
<b><i>UDDS AER</i></b>	> 25 miles	> 20 miles	> 25 miles
<b><i>FY18-19 Waitlist</i></b>	funded	unfunded	funded
<b><i>Funding Duration</i></b>	Full-Cycle	Limited-Time	Limited-Time
<b><i>Standard PHEV \$</i></b>	\$1,200	\$1,500	\$1,200
<b><i>Standard BEV \$</i></b>	\$2,000	\$2,500	\$2,000
<b><i>Standard FCEV \$</i></b>	\$4,000	\$5,000	\$4,000
<b><i>Standard ZEM \$</i></b>	\$720	\$900	\$720
<b><i>Increased PHEV \$</i></b>	\$3,500	\$3,500	\$3,500
<b><i>Increased BEV \$</i></b>	\$4,500	\$4,500	\$4,500
<b><i>Increased FCEV \$</i></b>	\$7,000	\$7,000	\$7,000
<b><i>Waitlist ~Start Date</i></b>	1-Jun-19	1-Jun-19	1-Jun-19
<b><i>Cycle 1 Start Date</i></b>	1-Sep-19	1-Sep-19	1-Sep-19
<b><i>Cycle 2 Start Date</i></b>	1-Sep-20	1-Sep-20	1-Sep-20
<b><i>Cycle 3 Start Date</i></b>	1-Sep-21	1-Sep-21	1-Sep-21

# Scenario Timelines (New Middle, Sept. 1st Implement.)

				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
S1 (CARB)	Waitlist (\$63M)			Cycle 1									Waitlist (\$60M)		
S2 (CalETC)	No Waitlist			Cycle 1						No Waitlist					
S3 (Hybrid)	Waitlist (\$63M)			Cycle 1									No Waitlist		
				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			
S1 (CARB)	Cycle 2						Waitlist (\$44)								
S2 (CalETC)	Cycle 2		No Waitlist				No Waitlist								
S3 (Hybrid)	Cycle 2									No Waitlist					
				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			
S1 (CARB)	Cycle 3			Waitlist (\$83)											
S2 (CalETC)	C3	No Waitlist													
S3 (Hybrid)	Cycle 3								No Waitlist						

# Scenario Summary Tables (New Middle, Sept. 1st Implement.)

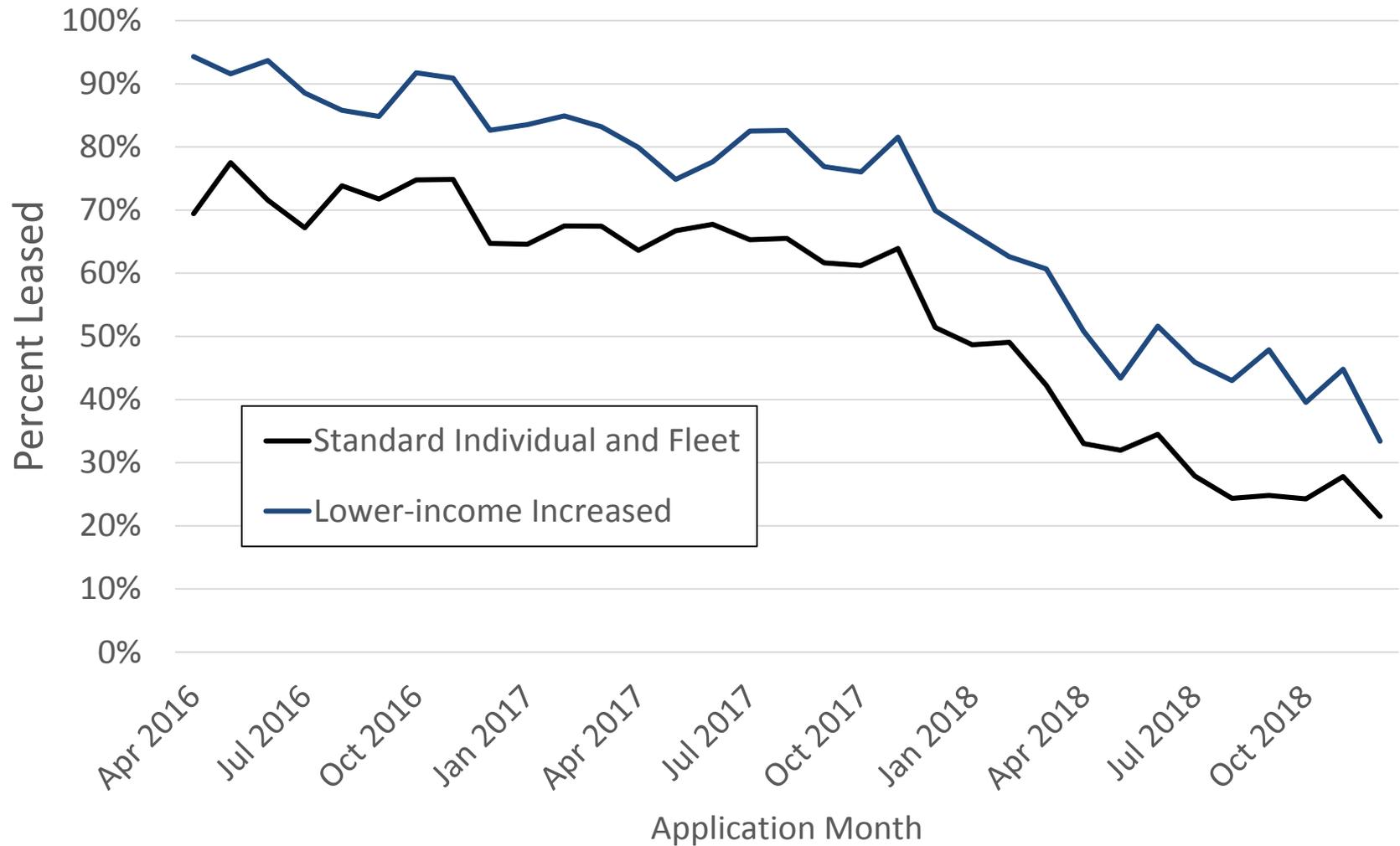
Scenario	Cycle 0	Cycle 1			Cycle 2			Cycle 3		
	Estimated Cost	Estimated Cost		End of \$200M	Estimated Cost		End of \$200M	Estimated Cost		End of \$200M
	Waitlist	LMI Increased	General		LMI Increased	General		LMI Increased	General	
Scenario 1	\$63 M	\$25 M	\$171 M	05/03/20	\$39 M	\$205 M	03/07/21	\$45 M	\$238 M	11/24/21
Scenario 2	-	\$29 M	\$171 M	02/16/20	\$46 M	\$154 M	11/06/20	\$53 M	\$147 M	09/01/21
Scenario 3	\$63 M	\$25 M	\$112 M	05/03/20	\$39 M	\$161 M	05/07/21	\$45 M	\$155 M	03/18/22



## Extra Slides



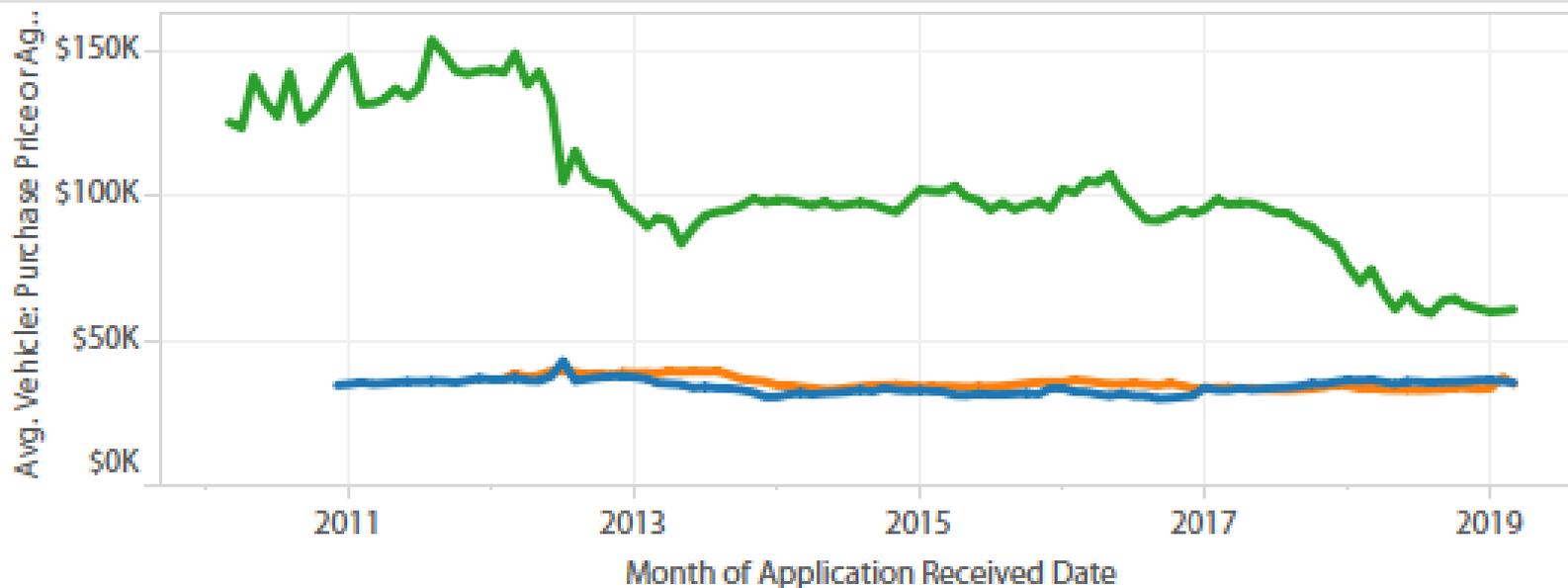
# Lease Percentage by Rebate Type



# Average Rebated-Vehicle Purchase Price

DRAFT, for illustrative use only

**Average Recorded Purchase Price over Time**



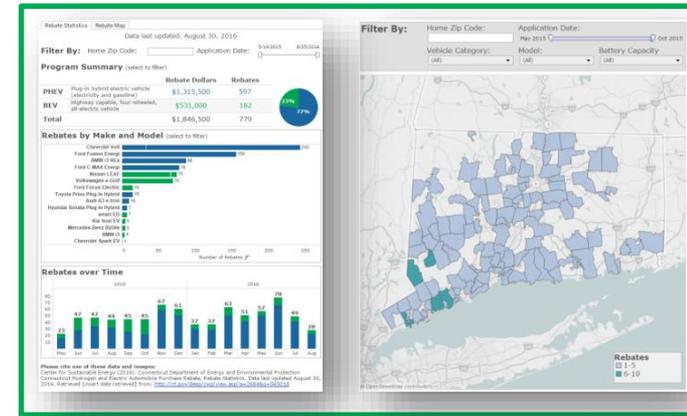
Green (top) line = Tesla, blue = other BEVs, orange = PHEVs

# Public dashboards and data facilitate informed action

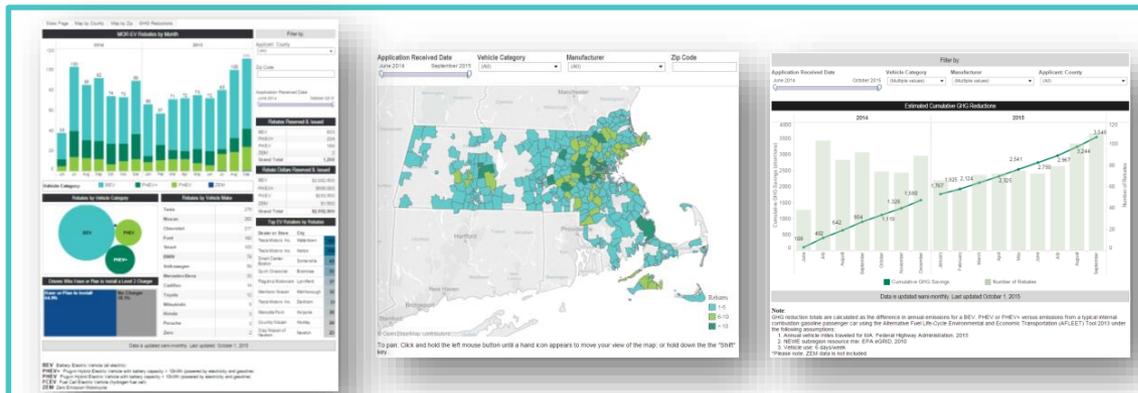
- >285,000 EVs and consumers have received >\$630 M in rebates
- >19,000 survey responses online, statistically represent >91,000 consumers
- Reports, presentations, and analysis growing



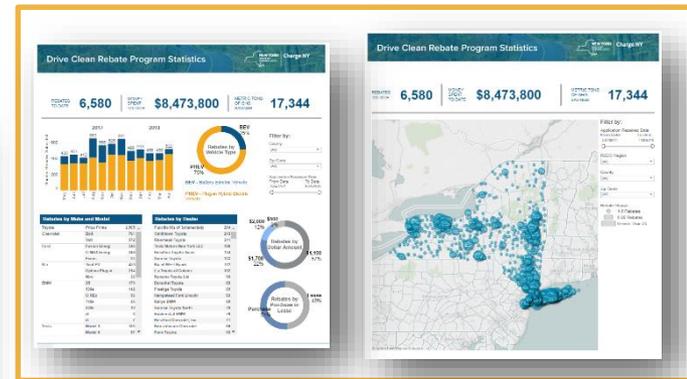
cleanvehiclerebate.org



ct.gov/deep



mor-ev.org



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



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

[April 4<sup>th</sup> CVRP Workgroup #3](#)  
[March 22<sup>nd</sup> CVRP Workgroup,](#)  
[December 4th CVRP Workshop](#) and  
[FY 2018–19 Funding Plan Appendix C](#)

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 [CleanVehicleRebate.org](https://CleanVehicleRebate.org)

