## What Vehicles Are Electric Vehicles Replacing and Why?

BECC Conference, "Charging Into the Future" Session, 19 November 2019, Sacramento CA Nicholas Pallonetti – Research Analyst – CSE Brett Williams, PhD – Principal Advisor, EV Programs – CSE

with thanks to Keir Havel and others at CSE



### CALIFORNIA CLEAN VEHICLE REBATE PROJECT



## CSE Areas of Expertise



#### Clean **Transportation**

Adoption of electric vehicles and deployment of charging infrastructure



Advancing energy efficiency and renewable resources



#### Built Environment

#### Technology Convergence

Interconnecting systems to achieve decarbonization



### State EV Cash Rebate Programs Administered by CSE

(as of 30 Sep. 2019)



	CALIFORNIA CLEAN VEHICLE REBATE PROJECT <sup>M</sup>	MOR-EV Massachusetts Offers Rebates for Electric Vehicles	Connecticut Hydrogen and Electric Automobile Purchase Rebate		Oregon CVRP
Fuel-Cell EVs	\$5,000	\$1,500	\$5,000		
All-Battery EVs	\$2,500	\$1,500	<ul> <li>≥ 200 e-miles \$2,000</li> <li>≥ 120 e-miles \$1,500</li> <li>&lt; 120 e-miles \$500</li> </ul>	$\geq$ 120 e-miles \$2,000 $\geq$ 40 e-miles \$1,700 $\geq$ 20 e-miles \$1,100 < 20 e-miles \$500	≥ 10 kWh \$2,500 < 10 kWh \$1,500
Plug-in Hybrid EVs	\$2,500 (i3 REx) \$1,500	BEVx only: \$1,500	≥ 45 e-miles \$1,000 < 45 e-miles \$500		
Zero-Emission Motorcycles	\$900	\$450			\$750 (and NEVs)
	<ul> <li>≥ 20 UDDS e-miles</li> <li>Income cap</li> <li>Increased rebates for lower-income households</li> </ul>	<ul> <li>Purchase price ≤\$50k</li> <li>No fleet rebates</li> </ul>	<ul> <li>BEVs &amp; PHEVs ≤ \$50k base MSRP, FCEVs ≤ \$60k</li> <li>Point-of-sale option</li> </ul>	<ul> <li>Base MSRP &gt;\$60k = \$500</li> <li>Point-of-sale</li> </ul>	<ul> <li>Base MSRP &lt; \$50k</li> <li>Point-of-sale optic</li> <li>Increased rebates for lower-income households</li> <li>(±\$2,500) used Ex</li> </ul>
	(+\$2,000)	Program ended 9/30/19	<ul> <li>\$150 dealer incentive</li> </ul>		(+\$2,500), used EV also qualify





## **Outline: Vehicle Replacement Over Time**

- Context
- Are EVs\* Replacing Older Vehicles?
- What Vehicles are Plug-in EVs\*\* Replacing?
- What Motivated Vehicle Replacement?
- What Might Have Happened Without the Rebated Plug-in EV?
- Wrap Up

\* EVs = light-duty plug-in hybrid, battery, and fuel-cell electric vehicles (PHEVs, BEVs, and FCEVs) \*\* PEVs = PHEVs and BEVs



## **Outline: Vehicle Replacement Over Time**

- Context Research aims and data (for reference)
- Are EVs\* Replacing Older Vehicles? Replacement rates across states, by tech type What Vehicles are Plug-in EVs\*\* Replacing? - Replaced-vehicle model year, tech type What Motivated Vehicle Replacement? - Replacement decision factors, push vs. pull, and by tech type What Might Have Happened Without the Rebated Plug-in EV?

- Counterfactual behaviors
- Wrap Up – Summary, additional resources, and supplementary details

\* EVs = light-duty plug-in hybrid, battery, and fuel-cell electric vehicles (PHEVs, BEVs, and FCEVs) \*\* PEVs = PHEVs and BEVs





# **Replaced Vehicles**

#### Context, Replacement Rates, Vehicle Details, Decision Factors, Incentive Counterfactuals









## Research Aims, Disclaimer, and Thanks

- This study was conducted to inform the California Clean Vehicle Rebate Project (CVRP) and, in doing so, inform broader assessments
  - It does not necessarily represent the views of the California Air Resources Board
     Nor does it represent a final determination for project-reporting purposes
- We thank CARB staff for the opportunity to contribute to, and foster, the conversation









### 4-State Consumer Survey Data (Shows Rebates to Individuals Only)

	CALIFORNIA CLEAN VEHICLE REBATE PROJECT	Massachusetts Offers Rebates for Electric Vehicles	Connecticut Hydrogen and Electric Automobile Purchase Rebate		Total
Vehicle Purchase/ Lease Dates	Dec. 2010 – Dec. 2018	Jun. 2014 – Oct. 2018	May 2015 – Sep. 2018	Mar. 2017 – Jul. 2018	Dec. 2010 – Dec. 2018
Survey Responses (total n)*	62,092	4,555	1,565	1,808	70,020
Program Population (N)	278,538	10,920	3,510	8,651	301,619

\* Weighted to represent the program population along the dimensions of vehicle category, vehicle model, buy vs. lease, and county (using raking method)



#### CA Consumer Survey Data (Shows Rebates to Individuals Only)

	2013–15 Edition PHEVs, BEVs	2015–16 Edition PHEVs, BEVs	2016–17 Edition PHEVs, BEVs, FCEVs	2017–18 Edition PHEVs, BEVs, FCEVs	Total
Vehicle Purchase/ Lease Dates	Sep. 2012 – May 2015	April 2015 – May 2016	Dec. 2010 – May 2017	June 2017 – Dec. 2018	PHEVs and BEVs: Sep. '12 – Dec. '18 FCEVs: Dec. '10 – Dec. '18
Survey Responses (total n)*	19,460	11,611	9,367	21,654	62,092
Program Population (N)	91,081	45,698	48,588	93,171	278,538

\* Weighted to represent the program population along the dimensions of vehicle category, vehicle model, buy vs. lease, and county (using raking method)





#### CA Consumer Survey Data: Plug-in EVs\* (Shows Rebates to Individuals Only)

	2013–2015 Edition	2015–2016 Edition	2016–2017 Edition	2017–2018 Edition	Total
Vehicle Purchase/ Lease Dates	Sep. 2012 – May 2015	April 2015 – May 2016	May 2016 – May 2017	June 2017 – Dec. 2018	Sep. 2012 – Dec. 2018
Survey Responses (total n)**	19,460	11,611	8,957	20,864	60,892
Program Population (N)	91,081	45,698	46,839	89,944	273,562

\* PHEVs and BEVs \*\* Weighted to represent the program population along the dimensions of vehicle category, vehicle model, buy vs. lease, and county (using raking method)





## EV Rebate Designs (As of Sept. 2018; Reflective of Most of the Data Gathered)



OR-EV achusetts Offers Rebates lectric Vehicles	Connecticut Hydrogen and Elec	tric Automobile Purchase Rebate	2	
,500	\$5,	000	<u>e-miles</u>	5
500	<u>e-miles</u> ≥ 175	\$3,000	≥ 120 > 40	\$2,000 \$1,700
	≥ 100 < 100	\$2,000 \$500	≥ 20	\$1,100
n \$2,500 n \$1,500	≥ 40 < 40	\$2,000 \$500	< 20	\$500
750				
ISRP ≥ \$60k 00 max. t rebates	<ul> <li>Base MSF only</li> <li>dealer as</li> <li>\$150 dealer</li> </ul>	RP ≤ \$60k signment ler incentive	<ul> <li>Base M \$500 m</li> <li>point-o dealer</li> </ul>	ISRP > \$60k = nax. of-sale via
nded 9/30/19	(\$300 pre	evious)	Ce Si	enter for ustainable En



# Are EVs Replacing Older Vehicles? Replacement rates across states, by tech type



### Replaced a vehicle with their rebated clean vehicle



Overall datasets: 70,020 total survey respondents weighted to represent 301,619 rebate recipients

# Do EVs Get Used?



## Vehicle Replacement is Increasing



CVRP Consumer Survey: 2013–2015 edition: weighted, question n=19,247 2015–2016 edition: weighted, question n= 11,583 2016–2017 edition: weighted, question n= 9,006 2017–2018 edition: weighted, question n= 20,847







### Vehicle Replacement is *Increasing* Over Time, Contradicting a Common Paradigm About Phasing Out Incentives



CVRP Consumer Survey: 2013–2015 edition: weighted, question n=19,247 2015–2016 edition: weighted, question n= 11,583 2016–2017 edition: weighted, question n= 9,006 2017–2018 edition: weighted, question n= 20,847





### Vehicle Replacement Has Long Been High for PHEVs, Is Growing for BEVs

### Replaced a vehicle with their rebated *plug-in EV*



CVRP Consumer Survey: 2013–2015 edition: weighted, question n=19,247 2015–2016 edition: weighted, question n= 11,583 2016–2017 edition: weighted, question n= 9,006 2017–2018 edition: weighted, question n= 20,847





# What Vehicles are EV Replacing? Replaced vehicle details



## Replaced Vehicle Age

### Age = Rebated EV model year – Replaced vehicle model year

![](_page_18_Figure_2.jpeg)

CVRP Consumer Survey: 2013– 2015–2016 edition 2016–2017 edition 2017–2018 edition

![](_page_18_Picture_5.jpeg)

- CVRP Consumer Survey: 2013–2015 edition: weighted, question n= 12,252
  - 2015–2016 edition: weighted, question n= 8,627
  - 2016–2017 edition: weighted, question n= 6,933
  - 2017–2018 edition: weighted, question n= 14,696

![](_page_18_Picture_10.jpeg)

## What Vehicle Types Have Rebates Helped Replace?

![](_page_19_Figure_1.jpeg)

CVRP Consumer Survey: 2013–2015 edition: weighted, question n= 12,332 2015–2016 edition: weighted, question n= 8,594 2016–2017 edition: weighted, question n= 6,925 2017–2018 edition: weighted, question n= 17,021

![](_page_19_Picture_4.jpeg)

CEV)	(	Conventio	nal hybri	d	Diese	or other	alternativ	ve fuel
24%								
	14%	10%	10%	11%				
					1%	2%	5%	2%
'17-'18	'13-'15	'15-'16	'16-'17	'17-'18	'13-'15	'15-'16	'16-'17	'17-'18

![](_page_19_Picture_6.jpeg)

## What Vehicle Types Have Rebates Helped Replace?

![](_page_20_Figure_1.jpeg)

CVRP Consumer Survey: 2013–2015 edition: weighted, question n= 12,332 2015–2016 edition: weighted, question n= 8,594 2016–2017 edition: weighted, question n= 6,925 2017–2018 edition: weighted, question n= 17,021

![](_page_20_Picture_4.jpeg)

CEV)	(	Conventio	nal hybri	d	0	the <mark>r</mark> alter	rnative fu	el
24%								
	14%	10%	10%	11%				
					0%	1%	0%	0%
′ ′17–′18	'13-'15	'15-'16	'16-'17	'17-'18	'13-'15	'15-'16	'16-'17	'17-'18

![](_page_20_Picture_6.jpeg)

### Model-Year Distribution of Vehicles Replaced by 2017–18 Edition Survey Respondents

![](_page_21_Figure_1.jpeg)

CVRP Consumer Survey, 2017–2018 edition: weighted, question n= 14,677

![](_page_21_Picture_4.jpeg)

![](_page_21_Picture_5.jpeg)

### Model-Year Distribution of Vehicles Replaced by 2017–18 Edition Survey Respondents

![](_page_22_Figure_1.jpeg)

CVRP Consumer Survey, **2017–2018** edition: weighted, question n= 14,677

![](_page_22_Picture_4.jpeg)

![](_page_22_Picture_5.jpeg)

### Top Replaced-Vehicle Technology Types, by Rebated-Vehicle Technology Type

![](_page_23_Figure_1.jpeg)

BECC 2019

CVRP Consumer Survey: 2013–2 2015–2016 edition 2016–2017 edition 2017–2018 edition

![](_page_23_Picture_4.jpeg)

nybr	rid			Al	l-ba	tter	ry el	ectr	ric				Plu	g-in	hyb	orid			-
															■ P	HE EV	V		
																			-
8%	6%	10%	1%	4%	5%	5%	9%	11%	23%	18%	6%	16%	19%	19%	1%	3%	4%	6%	
'15-'16	'16-'17	'17-'18	'13-'15	'15-'16	'16-'17	,17-,18	'13-'15	'15-'16	'16-'17	'17-'18	'13-'15	'15-'16	'16-'17	'17-'18	'13-'15	'15-'16	'16-'17	'17-'18	-

- CVRP Consumer Survey: 2013–2015 edition: weighted, question n= 12,199
  - 2015–2016 edition: weighted, question n= 8,398
  - 2016–2017 edition: weighted, question n= 6,557
  - 2017–2018 edition: weighted, question n= 16,673

![](_page_23_Picture_10.jpeg)

# What Motivated Vehicle Replacement? Replacement decision factors, push vs. pull, and by tech type

![](_page_24_Picture_1.jpeg)

## Why Now? - Factors Influencing the Decision to Replace

#### Select all that apply:

Current government/employer incentives were appealing (e.g. financial, carpool sticker, parking)

Spending too much on fuel for previous vehicle

Wanted a different vehicle

Previous vehicle was too old/needed costly repairs

Current price or interest/lease rates were appealing

Previous lease expired/was about to expire

New model caught my attention

Other

Previous vehicle no longer fit my (family's) needs

I get a new vehicle on a regular basis

Previous vehicle was damaged/stolen

**Financial situation changed** 

0%

![](_page_25_Picture_17.jpeg)

![](_page_25_Figure_18.jpeg)

![](_page_25_Picture_19.jpeg)

### "Push" vs. "Pull" Factors Influencing the Decision to Replace

#### Select all that apply:

Current government/employer incentives were appealing (e.g. financial, carpool sticker, parking)

Spending too much on fuel for previous vehicle

Wanted a different vehicle

Previous vehicle was too old/needed costly repairs

Current price or interest/lease rates were appealing

Previous lease expired/was about to expire

New model caught my attention

Other

Previous vehicle no longer fit my (family's) needs

I get a new vehicle on a regular basis

Previous vehicle was damaged/stolen

Financial situation changed

0%

![](_page_26_Picture_17.jpeg)

![](_page_26_Figure_18.jpeg)

![](_page_26_Picture_19.jpeg)

## Financial Factors Influencing the Decision to Replace

#### Select all that apply:

Current government/employer incentives were appealing (e.g. financial, carpool sticker, parking)

Spending too much on fuel for previous vehicle

Wanted a different vehicle

Previous vehicle was too old/needed costly repairs

Current price or interest/lease rates were appealing

Previous lease expired/was about to expire

New model caught my attention

Other

Previous vehicle no longer fit my (family's) needs

I get a new vehicle on a regular basis

Previous vehicle was damaged/stolen

![](_page_27_Picture_13.jpeg)

![](_page_27_Picture_16.jpeg)

![](_page_27_Figure_17.jpeg)

![](_page_27_Picture_18.jpeg)

![](_page_27_Picture_19.jpeg)

### Financial lures are important to entice replacement with BEVs

#### Select all that apply:

Current government/employer incentives were appealing (e.g. financial, carpool sticker, parking) Previous lease expired/was about to expire Spending too much on fuel for previous vehicle New model caught my attention Current price or interest/lease rates were appealing Previous vehicle was too old/needed costly repairs Other, please specify: \_\_\_\_ Wanted a different vehicle Previous vehicle no longer fit my (family's) needs Previous vehicle was damaged/stolen I get a new vehicle on a regular basis Financial situation changed

![](_page_28_Picture_5.jpeg)

![](_page_28_Figure_6.jpeg)

![](_page_28_Picture_8.jpeg)

![](_page_29_Picture_0.jpeg)

## What Might Have Happened Without the Rebated EV? Counterfactual behaviors

![](_page_29_Picture_2.jpeg)

## **Counterfactual Alternative Behaviors**

Kept Old

Bought/Leased

#### BECC 2019

![](_page_30_Picture_4.jpeg)

![](_page_30_Figure_5.jpeg)

same new EV

![](_page_30_Picture_7.jpeg)

#### If the state vehicle rebate (CVRP) were not available for a [model] or any other plug-in electric vehicle (PEV), what do you think you would have done?

![](_page_31_Figure_1.jpeg)

![](_page_31_Picture_5.jpeg)

![](_page_31_Picture_7.jpeg)

#### If the state vehicle rebate (CVRP) were not available for a [model] or any other plug-in electric vehicle (PEV), what do you think you would have done?

![](_page_32_Figure_1.jpeg)

![](_page_32_Picture_5.jpeg)

![](_page_32_Picture_7.jpeg)

#### If the state vehicle rebate (CVRP) were not available for a [model] or any other plug-in electric vehicle (PEV), what do you think you would have done?

![](_page_33_Figure_1.jpeg)

![](_page_33_Picture_5.jpeg)

![](_page_33_Picture_7.jpeg)

#### In particular, rebates appear to encourage new BEV purchases/leases

#### Alternative Scenario Without CVRP

Purchased/leased this exact vehicle anyway	
Purchased/leased a new non-PEV instead	
Not made any purchase/lease at all	
Purchased/leased a less expensive version of the same model	
Purchased/leased a different [new] PEV	
Purchased/leased a used PEV	
Purchased/leased a used non-PEV instead	
	0%

BECC 2019

![](_page_34_Picture_5.jpeg)

![](_page_34_Figure_6.jpeg)

![](_page_34_Picture_8.jpeg)

![](_page_34_Picture_9.jpeg)

# Wrap Up Summary, additional resources & supplemental details

![](_page_35_Picture_1.jpeg)

## Select Findings: Vehicle Replacement

- ~4/5<sup>ths</sup> of rebated EVs *replaced* older, more polluting vehicles
- PHEVs produced strong replacement rates early, BEVs catching up
- These and other **impacts tend to be** *increasing* over time
- Replaced vehicles:
  - 1/4<sup>th</sup> are >12 years old, 1/2 are >5 years old
  - 2/3<sup>rds</sup> are gasoline, down from 3/4<sup>ths</sup>, but *stabilized/rebounding*
- In absence of the rebate, 2/3<sup>rds</sup> of consumers may have used a different vehicle than rebated, 40% a non-EV, and 20–25% their old vehicle
- Related research: when compared to buying a *new* non-EV, rebated EVs may be saving >30 tons of GHG emissions per vehicle (12-year life) at costs <\$100/ton

![](_page_36_Picture_11.jpeg)

### Next Steps

- Refine GHG calculations with casespecific data
- Differentiate free riders from influenced consumers
  - characteristics, vehicles, behaviors, and impacts
- Compare to characterization of Rebate Essential consumers (BECC 2016 and subsequent analysis)...

![](_page_37_Picture_5.jpeg)

![](_page_37_Figure_6.jpeg)

![](_page_37_Figure_7.jpeg)

![](_page_37_Picture_8.jpeg)

![](_page_38_Picture_0.jpeg)

# **Additional Resources & Details**

![](_page_38_Picture_2.jpeg)

![](_page_38_Picture_3.jpeg)

## **Evaluation: CVRP Analysis**

## Program reports, fact sheets, infographics & presentations

![](_page_39_Picture_2.jpeg)

![](_page_39_Picture_3.jpeg)

![](_page_39_Picture_4.jpeg)

![](_page_39_Picture_5.jpeg)

![](_page_39_Picture_6.jpeg)

![](_page_39_Picture_7.jpeg)

![](_page_39_Picture_8.jpeg)

![](_page_39_Picture_9.jpeg)

Summary Documentation of the Electric Vehicle Consumer Survey, 2013-2015 Edition

June 15, 2017

Infographic: Characterizing California Electric Vehicle Consumer Segments - TRB Poster

January 16, 2017

![](_page_39_Picture_14.jpeg)

Infographic: Plug-in Electric Vehicle Owners in California's Disadvantaged Communities

January 11, 2017

CVRP Final Report 2014-2015

November 21, 2016

![](_page_39_Picture_19.jpeg)

Characterizing Plug-In Hybrid Electric Vehicle Consumers Most Influenced by CVRP November 15, 2016

![](_page_39_Picture_21.jpeg)

Presentation: "Electric Vehicle Rebates in Disadvantaged Communities: Evaluating Progress with Appropriate Comparisons"

October 26, 2016

![](_page_39_Picture_24.jpeg)

## **CSE Clean Transportation Resources**

![](_page_40_Picture_1.jpeg)

## Reports, analysis, infographics, presentations, ...

Search Term
Presentation: "EN
Provides equity metri
webinar "Expanding a
Summary of CVF
A fact sheet which de

		Expertise	Core Values	Though	Leadership	Abou
тн	OUGHT LEAD	ERSHIP				
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Presentation: "EV Rebates: Demographic Update, Program Design Features, and Paths Forward for Broadening Participation"

Provides equity metrics, demographics, program-design features, and outreach strategies from four state-wide incentive programs. Given to the ZEV Alliance webinar "Expanding Access Listening Series."

( Aug, 2019

#### Summary of CVRP Rebate Eligibility and Funding Availability Over Time (Updated)

A fact sheet which details changes in Clean Vehicle Rebate Project rebate amounts, consumer-income eligibility criteria, and program funding availability over time

![](_page_40_Picture_10.jpeg)

![](_page_40_Picture_11.jpeg)

### Where Are EV Rebates Going? Public Dashboards and Data Facilitate Informed Action

![](_page_41_Figure_1.jpeg)

#### cleanvehiclerebate.org

![](_page_41_Figure_3.jpeg)

#### mor-ev.org

![](_page_41_Figure_5.jpeg)

#### ct.gov/deep

1040	6,580	\$8,473,80		17,344	<b>6,580</b>	\$8,473,800	treat 17,344
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**nyserda.ny.gov** (dashboards done by NYSERDA)

- > 350,000 EVs and consumers have received
   > \$720 M in rebates
- > 70,000 survey
   responses being analyzed
   so far, statistically
   represent > 300,000
   consumers
- Reports, presentations, and analysis growing

![](_page_41_Picture_12.jpeg)

![](_page_41_Picture_13.jpeg)

## Equity Statistics Dashboard

![](_page_42_Figure_1.jpeg)

![](_page_42_Picture_3.jpeg)

![](_page_42_Figure_4.jpeg)

8/5/19 images from <u>https://cleanvehiclerebate.org/eng/rebate-statistics</u>

![](_page_42_Picture_6.jpeg)

## Rebated EV Consumer Characteristics: 2017

	<b>"Buying Age"</b> 21+ Years Old U.S. Population (Census 2017)	New-Vehicle Buyers U.S. MYs 2016–17 (2017 NHTS)	CALIFORNIA CLEAN VEHICLE REBATE PROJECT CY 2017 weighted n = 9,539	Massachusetts Offers Rebates for Electric Vehicles CY 2017 weighted n = 1,285	CY 2017 weighted n = 501	Mar.–Dec. 20 weighted n = 1,
Selected solely White/Caucasian	65%	74%	58%	85%	88%	86%
≥ 50 Years Old	47%	51%	52%	61%	59%	60%
≥ Bachelor's Degree in HH	30%*	56%*	82%	90%	85%	73%
Own Residence	64%	75%	79%	92%	89%	90%
≥ \$150k HH Income	12%	23%	40%	58%	41%	34%
Selected Male	49%	51%	72%**	74%	71%	68%

"Prefer not to answer," "I don't know," and similar responses are excluded throughout.

Census 2017: 2013–2017 American Community Survey, <u>http://factfinder2.census.gov</u>.

NHTS weighted to represent population, not new-vehicle subset. New-vehicle buyers identified based on within-100-mile match between odometer and miles driven while owned.

\* Census & NHTS data characterize individual educational attainment, whereas other data characterize highest household attainment.

\*\* 100% includes non-binary options.

![](_page_43_Picture_7.jpeg)

![](_page_43_Picture_8.jpeg)

## Rebate Influence: Importance

![](_page_44_Figure_2.jpeg)

Overall datasets: 70,020 total survey respondents weighted to represent 301,619 rebate recipients

How important was the state rebate in making it possible for you to acquire your clean vehicle?

![](_page_44_Picture_6.jpeg)

# Rebate Influence: Essentiality

100%

![](_page_45_Figure_3.jpeg)

Overall datasets: 70,020 total survey respondents weighted to represent 301,619 rebate recipients

Would not have purchased/leased their clean vehicle without rebate

![](_page_45_Picture_6.jpeg)

![](_page_45_Picture_7.jpeg)

### Percent Rating the Federal Tax Credit "Extremely Important" ("...in making it possible to acquire" plug-in EVs)

![](_page_46_Figure_1.jpeg)

Overall datasets: 70,020 total survey respondents weighted to represent 301,619 rebate recipients

![](_page_46_Picture_3.jpeg)

# If the state vehicle rebate (CVRP) were not available for a [model] or any other plug-in electric vehicle (PEV), what do you think you would have done?

	Alternative Scenario Without CVRP	Survey Edition
Free riders [		2015-2016
1/2	Purchased/leased this exact vehicle anyway	2016-2017
1/5 <b>(</b>		2017-2018
ſ	Not made any purchase/lease at all	2015-2016
		2016-2017
		2017-2018
	Purchased/leased a new non-PEV instead	2015-2016
σ		2016-2017
C C		2017-2018
	Purchased/leased a less expensive version of the same model	2015-2016
n		2016-2017
<b>1</b> /3		2017-2018
	Purchased/leased a different [new] PEV	2015-2016
t l		2016-2017
e c		2017-2018
e	Purchased/leased a used PEV	2015-2016
		2016-2017
		2017-2018
	Purchased/leased a used non-PEV instead	2015-2016
		2016-2017
l		2017-2018

CVRP Consumer Survey: 2015–2016 edition: weighted, question n= 11,461 2016–2017 edition: weighted, question n= 8,930 2017–2018 edition: weighted, question n= 17,880

![](_page_47_Picture_4.jpeg)

![](_page_47_Figure_5.jpeg)

![](_page_47_Picture_8.jpeg)

# If the state vehicle rebate (CVRP) were not available for a [model] or any other plug-in electric vehicle (PEV), what do you think you would have done?

	Alternative Scenario Without CVRP	Survey Edition
Free riders		2015-2016
1/2	Purchased/leased this exact vehicle anyway	2016-2017
1/3		2017-2018
ſ	Not made any purchase/lease at all	2015-2016
		2016-2017
		2017-2018
	Purchased/leased a new non-PEV instead	2015-2016
σ		2016-2017
e O		2017-2018
C C	Purchased/leased a less expensive version of the same model	2015-2016
ne		2016-2017
		2017-2018
		2015-2016
te	Purchased/leased a different [new] PEV	2016-2017
) a		2017-2018
e V	Purchased/leased a used PEV	2015-2016
		2016-2017
		2017-2018
		2015-2016
	Purchased/leased a used non-PEV instead	2016-2017
l		2017-2018

CVRP Consumer Survey: 2015–2016 edition: weighted, question n= 11,461 2016–2017 edition: weighted, question n= 8,930 2017–2018 edition: weighted, question n= 17,880

![](_page_48_Picture_4.jpeg)

![](_page_48_Figure_5.jpeg)

![](_page_48_Picture_8.jpeg)

# If the state vehicle rebate (CVRP) were not available for a [model] or any other plug-in electric vehicle (PEV), what do you think you would have done?

	Alternative Scenario Without CVRP	Survey Edition
Free riders		2015-2016
1/2	Purchased/leased this exact vehicle anyway	2016-2017
1/3		2017-2018
ſ	Not made any purchase/lease at all	2015-2016
		2016-2017
		2017-2018
	Purchased/leased a new non-PEV instead	2015-2016
σ		2016-2017
e O		2017-2018
C C	Purchased/leased a less expensive version of the same model	2015-2016
ne		2016-2017
		2017-2018
		2015-2016
te	Purchased/leased a different [new] PEV	2016-2017
) a		2017-2018
e V	Purchased/leased a used PEV	2015-2016
		2016-2017
		2017-2018
		2015-2016
	Purchased/leased a used non-PEV instead	2016-2017
l		2017-2018

CVRP Consumer Survey: 2015–2016 edition: weighted, question n= 11,461 2016–2017 edition: weighted, question n= 8,930 2017–2018 edition: weighted, question n= 17,880

![](_page_49_Picture_4.jpeg)

![](_page_49_Figure_5.jpeg)

![](_page_49_Picture_8.jpeg)

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

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![](_page_50_Picture_4.jpeg)

![](_page_50_Picture_5.jpeg)

Cap and Trade Dollars at Work

![](_page_50_Picture_8.jpeg)

Summary Documentation of the EV Consumer Survey, 2013–2015 Edition

 Summary of Disadvantaged Community Responses to the Electric Vehicle Consumer Survey, 2013–2015 Edition

CleanVehicleRebate.org

![](_page_50_Picture_12.jpeg)

![](_page_50_Picture_13.jpeg)