

# Zero-Emission Vehicle (ZEV) Markets in California

## Disadvantaged Communities & the State Overall

EUEC 2016, Session J2, 3 February 2016, San Diego CA

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Thanks to John Anderson, Clair Johnson, Ria Langheim, and others at CSE



Center for  
Sustainable Energy™

# Center for Sustainable Energy (CSE)



Building  
Performance



Clean  
Transportation



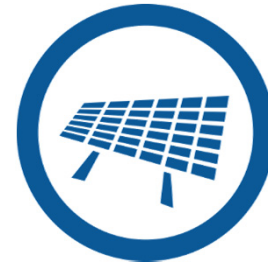
Distributed  
Generation



Energy  
Efficiency



Energy  
Storage



Renewable  
Energy

# CSE's Plug-In & Fuel-Cell Electric Vehicle (EV) Activities



**CLEAN VEHICLE REBATE PROJECT™**

**MOR-EV**  
Massachusetts Offers Rebates for Electric Vehicles

**CHEAPR**  
Connecticut Hydrogen and Electric Automobile Purchase Rebate

## Incentives Design & Administration



**Plug-in Electric Vehicle Benefits**

Environmental benefits: low fuel and maintenance costs, reduced greenhouse gas emissions, reduced dependence on oil.

**Elements of Eligibility for CVRP**

- 1 Individual, business, nonprofit or government entity based in California or has a California-based affiliate
- 2 Purchase or lease a NEW eligible vehicle
- 3 Own/lease the vehicle for at least 30 consecutive months (including CA DMV registration)
- 4 Apply for rebate within 18 months of vehicle purchase or lease date

## Consumer & Dealer Outreach



California Environmental Protection Agency  
**Air Resources Board**



**CALIFORNIA**  
PLUG-IN ELECTRIC VEHICLE COLLABORATIVE

## Stakeholder Engagement

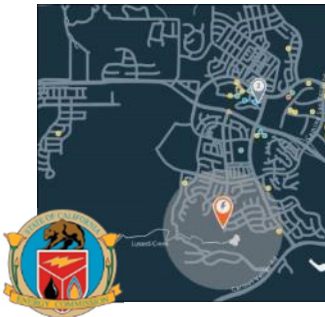


**GREEN FLEET ACTION PLAN**  
A 2013 REPORT

THE HONORABLE  
COMMISSIONER OF SAN DIEGO  
DEPARTMENT OF GENERAL SERVICES

FINANCED BY  
CALIFORNIA CENTER FOR SUSTAINABLE ENERGY  
WITH HEMO CONTRACTING,  
BYE BITE SUSTAINABLE PRACTICES

## Fleet Assistance & Clean Cities








California Center for Sustainable Energy

## PEV, Alt.-Fuel, & ZEV Planning & Implementation



## 2<sup>nd</sup> Life Battery Research & Vehicle-Grid Integration

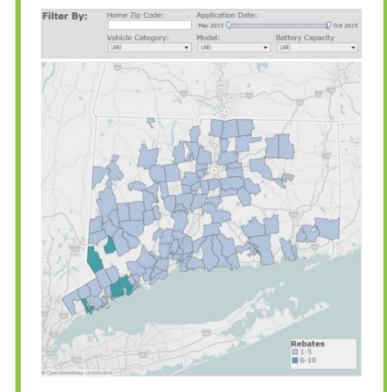
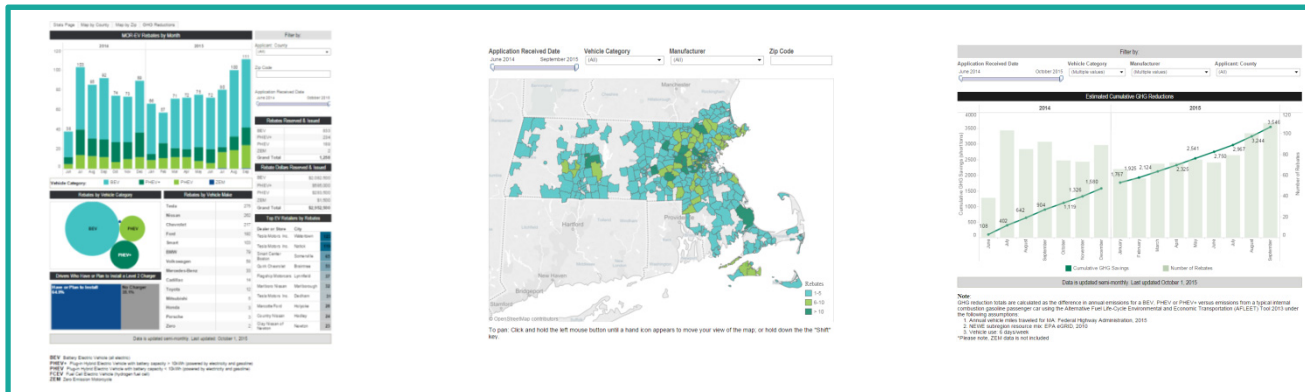
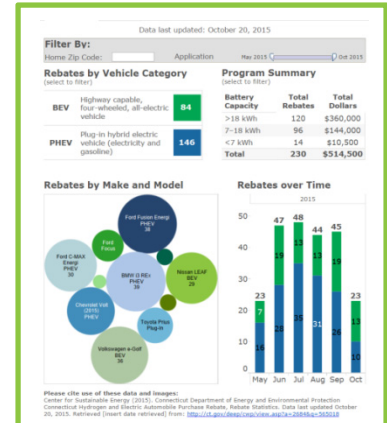
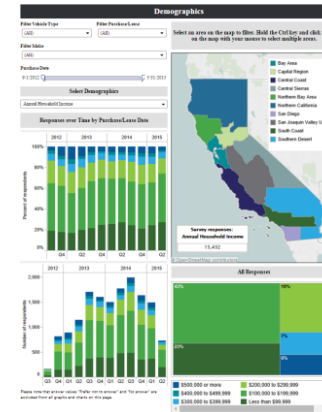
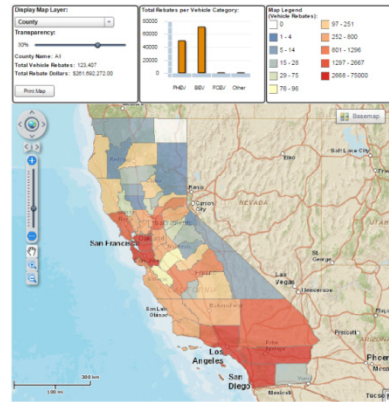
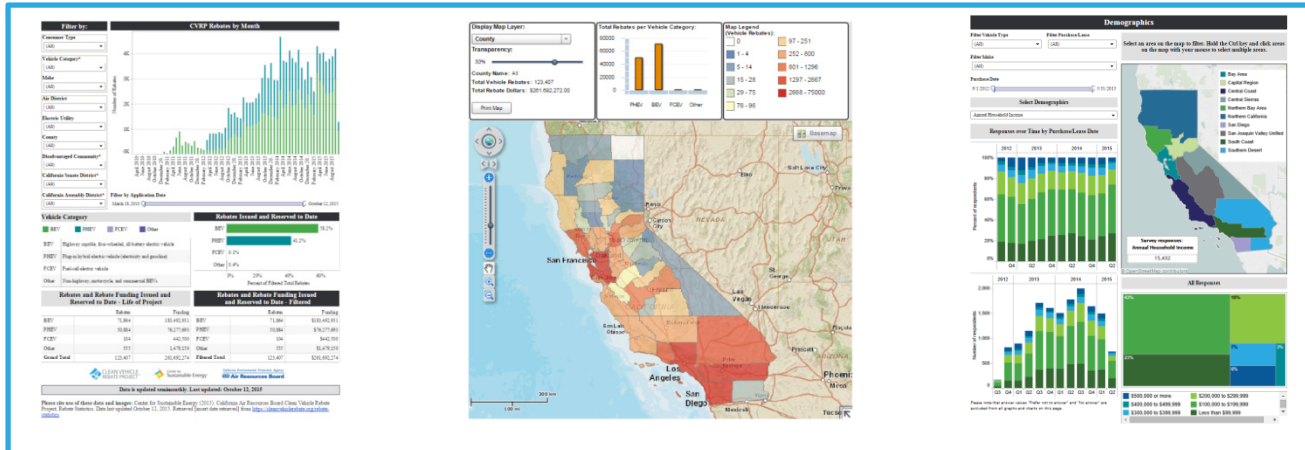
# CSE has processed >137k rebates totaling >\$291M

		CVRP	MOR-EV	CHEAPR*
	<b>Fuel-Cell Electric Vehicles</b>	\$5,000	\$2,500	\$3,000
	<b>All-Battery Electric Vehicles</b>	\$2,500	\$2,500	\$3,000 (>18kWh) \$1,500 (7-18kWh) \$750 (<7kWh)
	<b>Plug-in Hybrid Electric Vehicles</b>	\$2,500 (i3 REx) \$1,500	\$2,500 (>10kWh) \$1,500	
	<b>Neighborhood Electric Vehicles</b>	\$900		*MSRP < \$60k
	<b>Zero-Emission Motorcycles</b>	\$900	\$750	



# CSE Transportation: Transparency Tools

- Public, online, interactive tools
- Rebate-application and participant-survey data



# Outline

- Background
- ZEV Markets
  - Vehicles:
    - How many? What type?
    - Where?
  - Consumers:
    - Who?
    - Why?
- Summary & Parting Thoughts



# Background



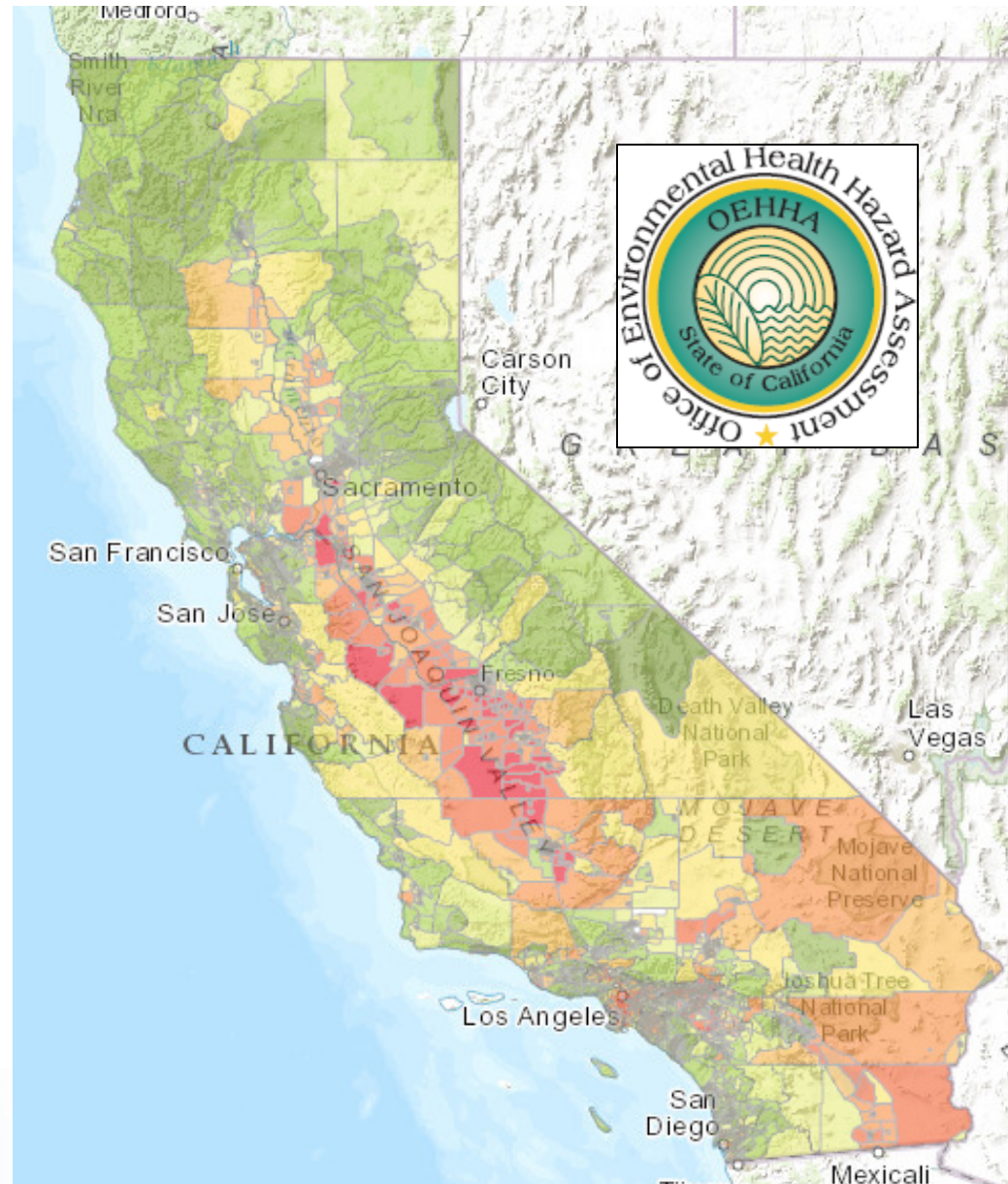
# California ZEV Policy Framework

- ZEV regulations
- Executive Order: 1.5M ZEVs by 2025
- SB 535
  - Introduces focus on “disadvantaged communities”
- SB 1275
  - 1M ZEVs by 2023
  - Strengthens focus on low-income and disadvantaged communities



# Disadvantaged Communities: CalEnviroScreen 2.0 (CES)

- OEHHA scores each Census tract by combining various indicators of:
  1. Exposure to pollution
  2. Socioeconomic vulnerability
- Top scoring tracts are designated “Disadvantaged Communities”





# ZEV Markets

Vehicles



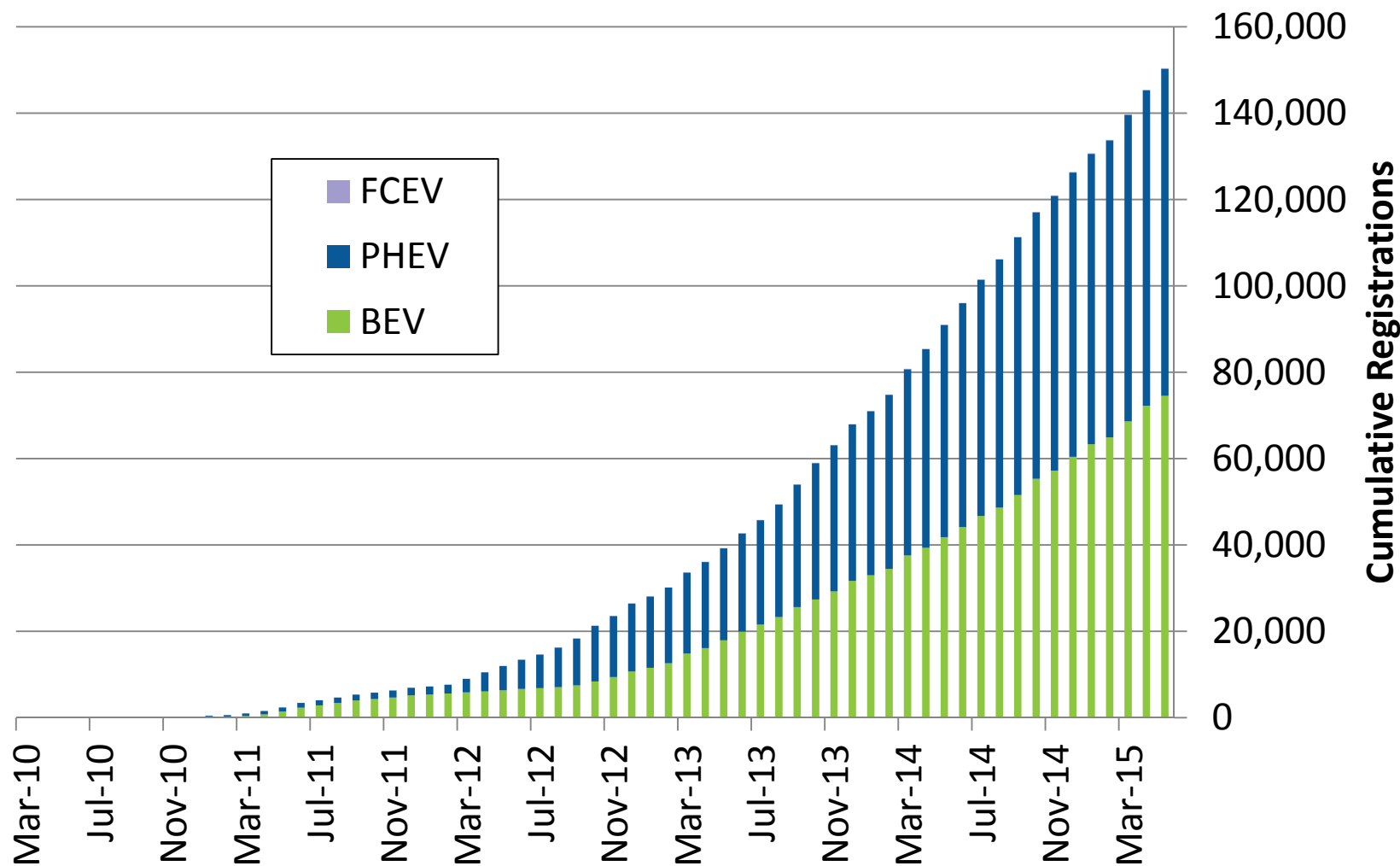




# How many? What type?

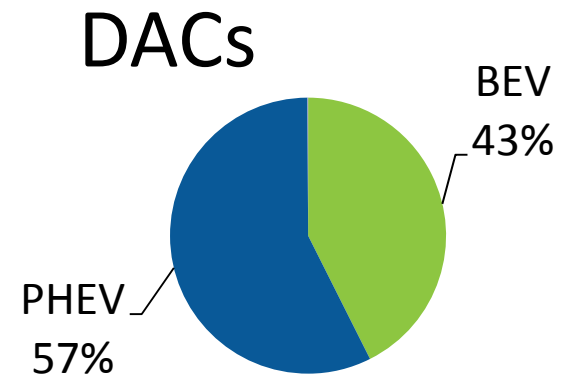
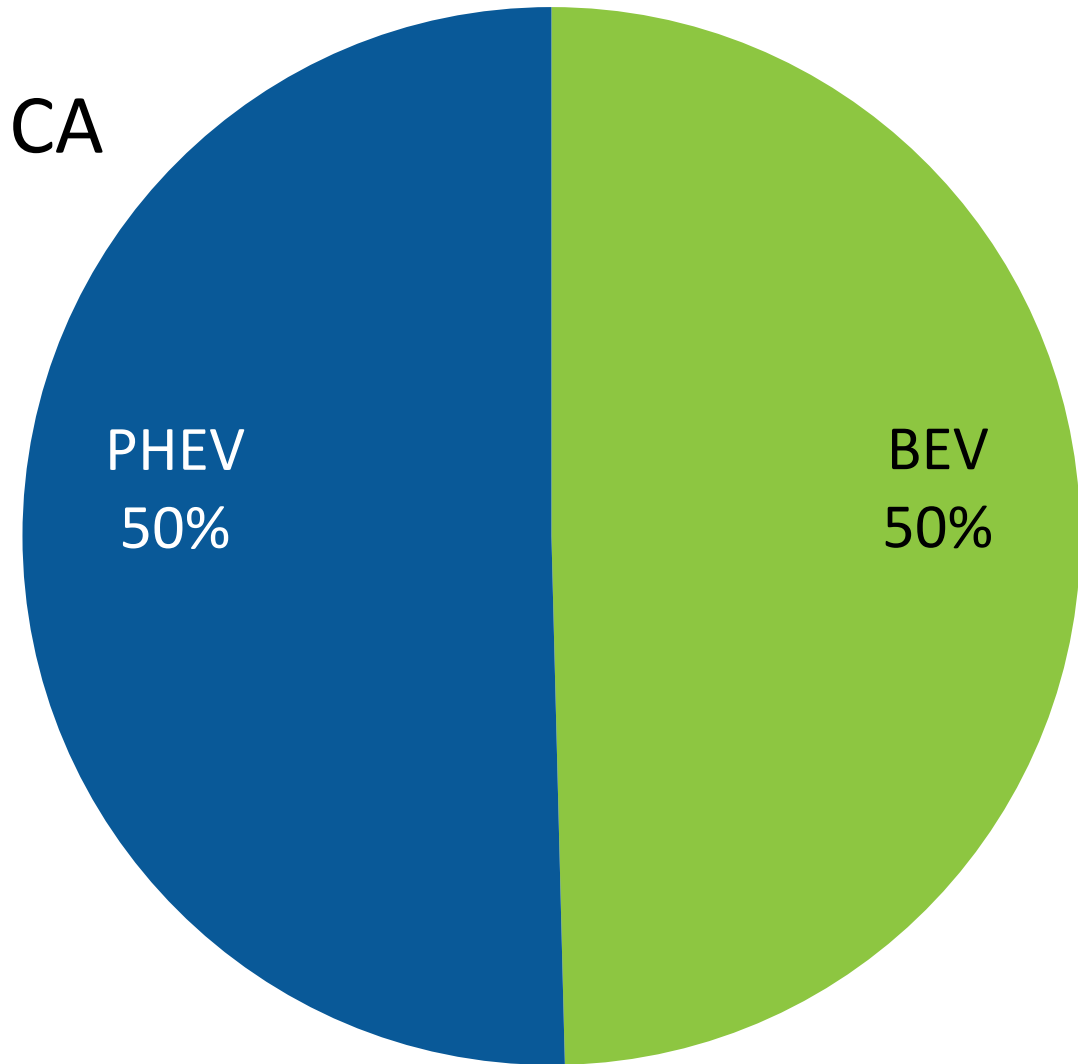
Rebated Vehicles

# Cumulative Registrations by Vehicle Category: CA

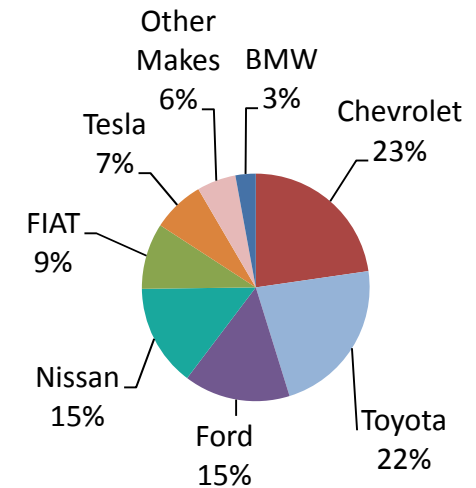
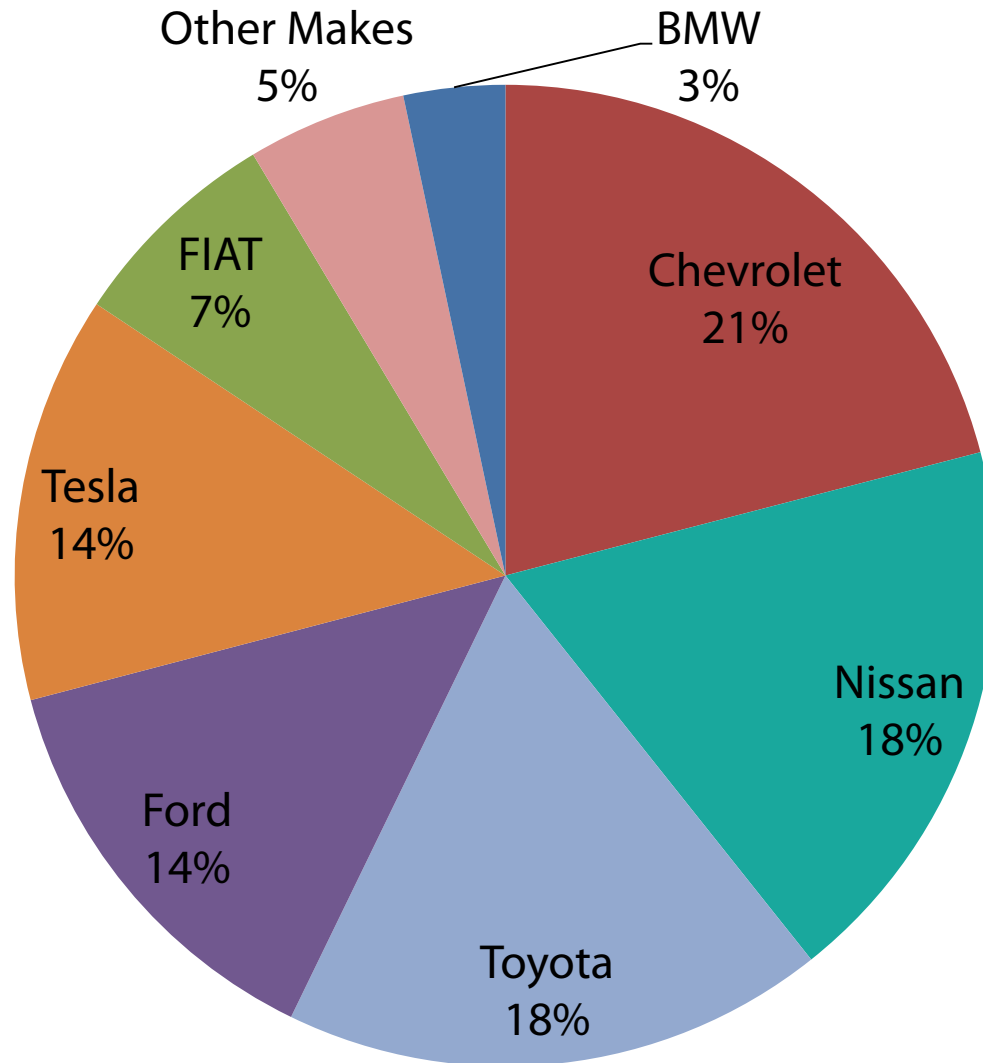




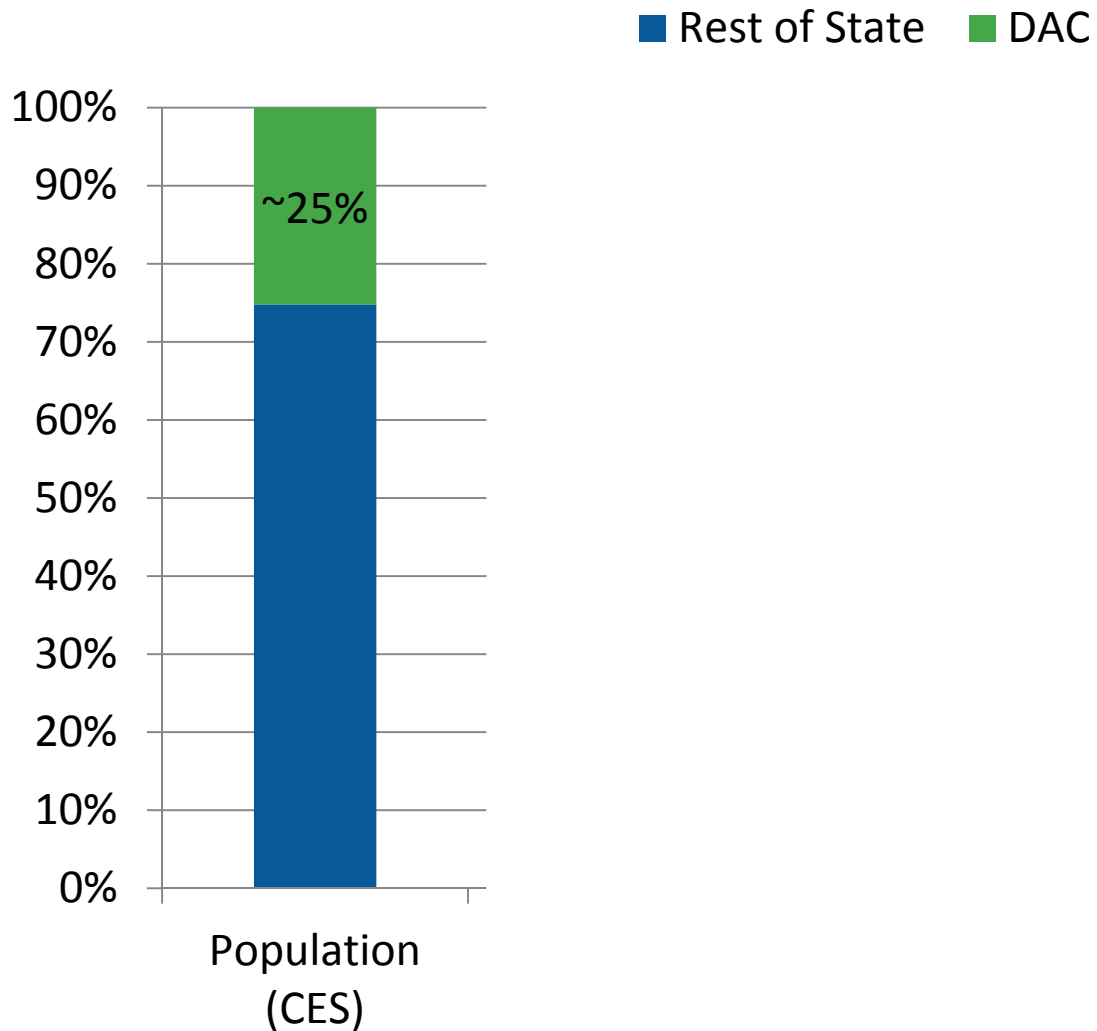
# Registration Share by Vehicle Category



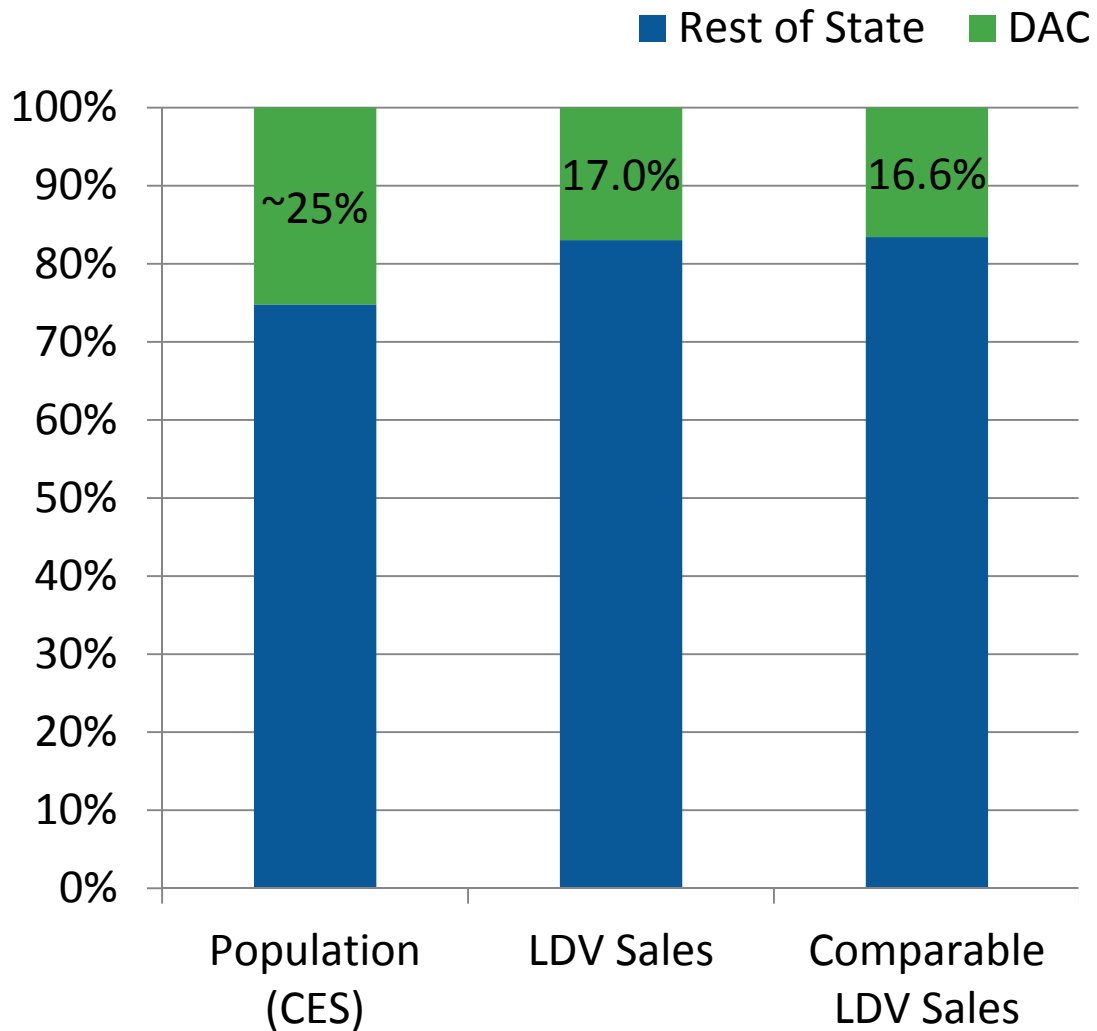
# Registration Share by Major Brand: CA & DACs



# DACs as a Percentage of Entire State (2014)

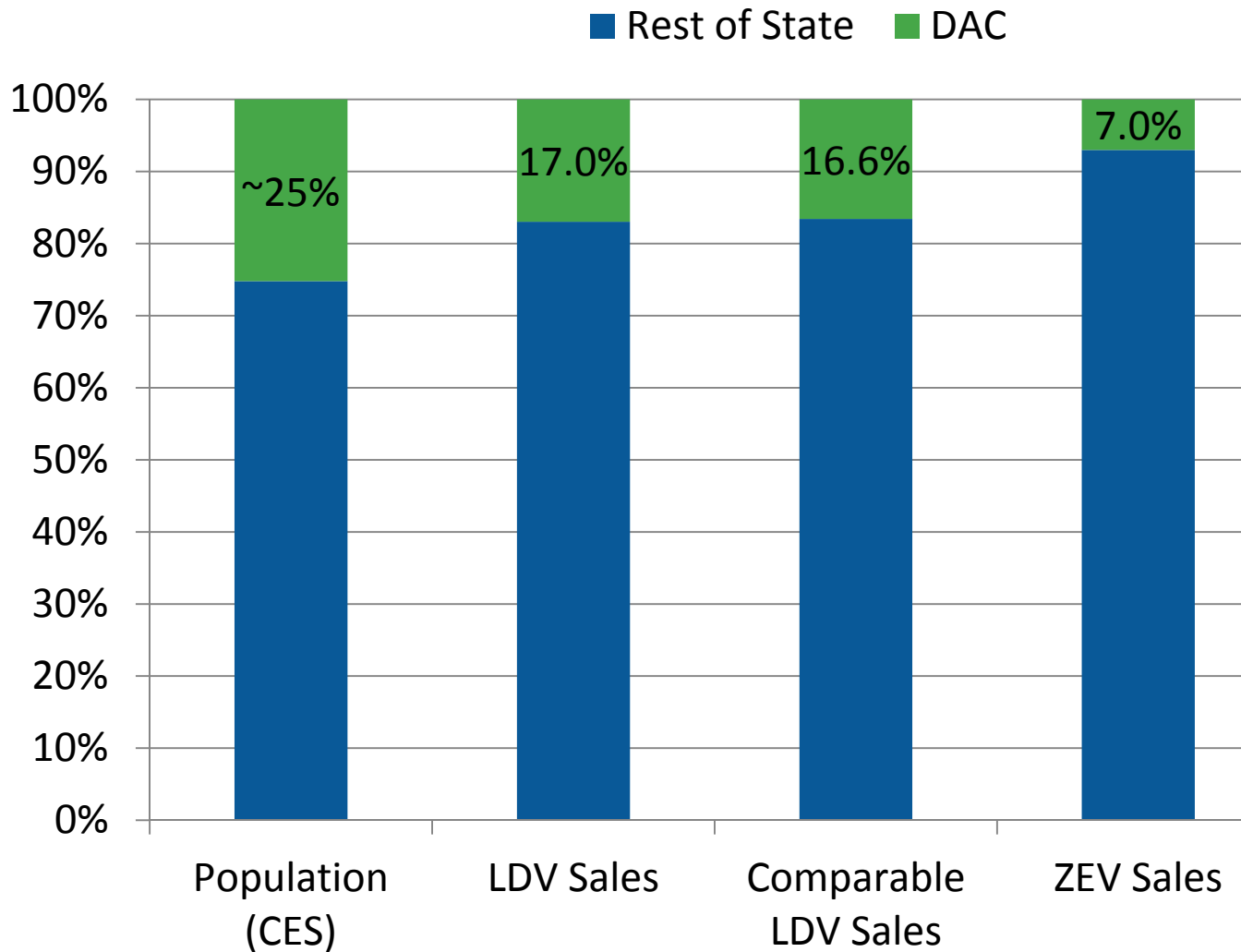


# DACs as a Percentage of Entire State (2014)

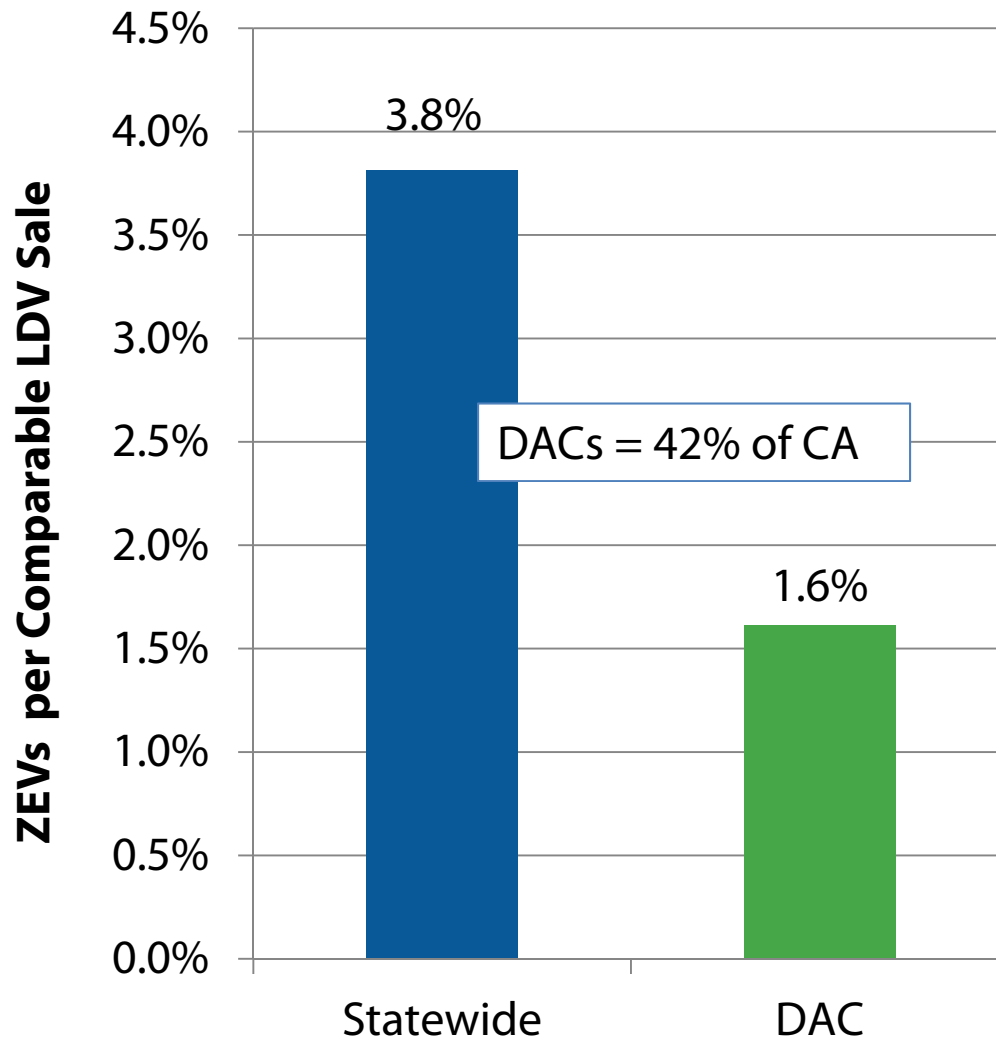




# DACs as a Percentage of Entire State (2014)



# ZEV Registrations as a % of Comparable New Car Sales (2014 calendar year)

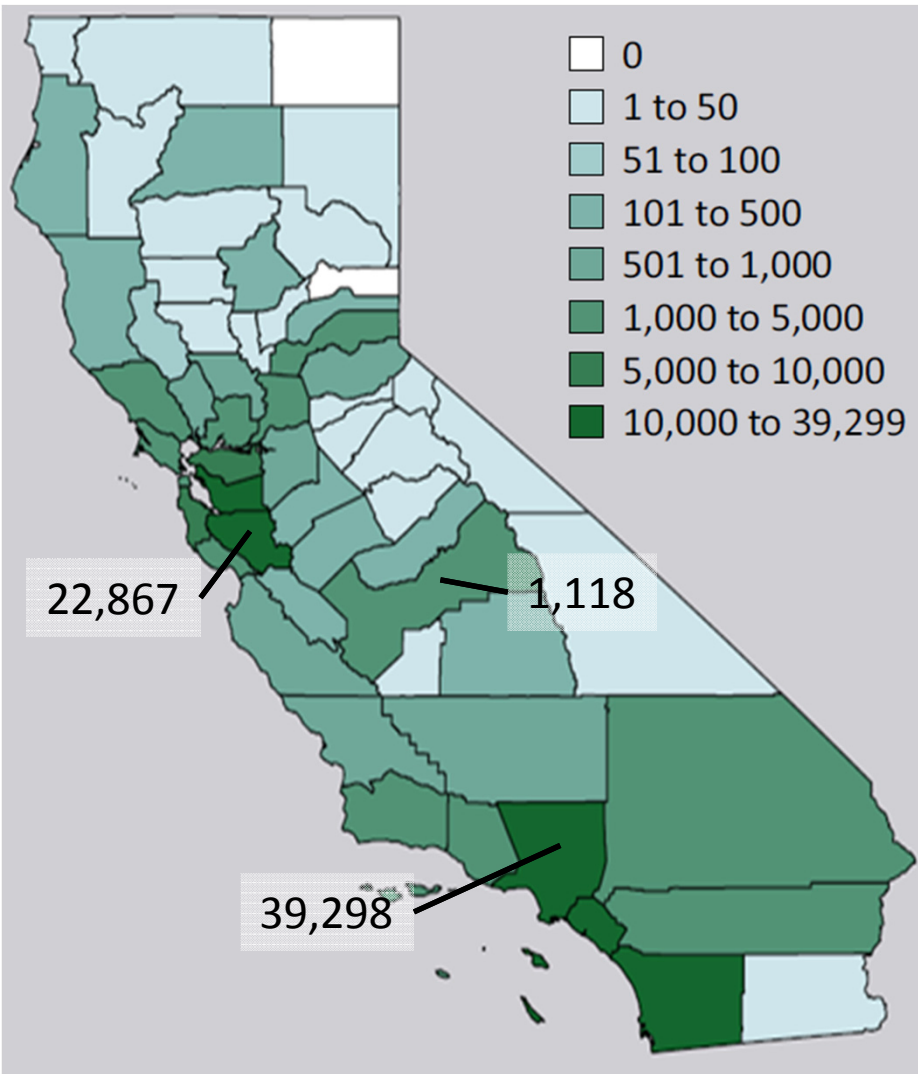




# Where?

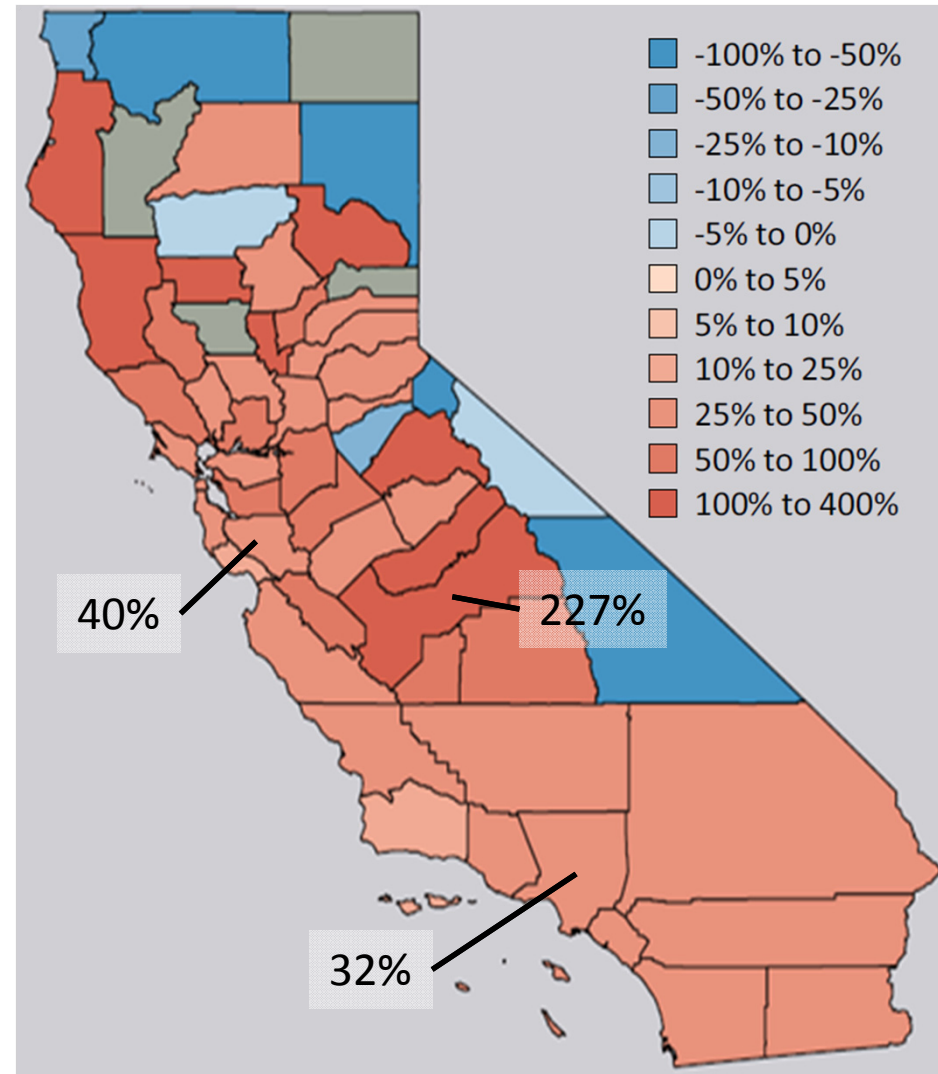
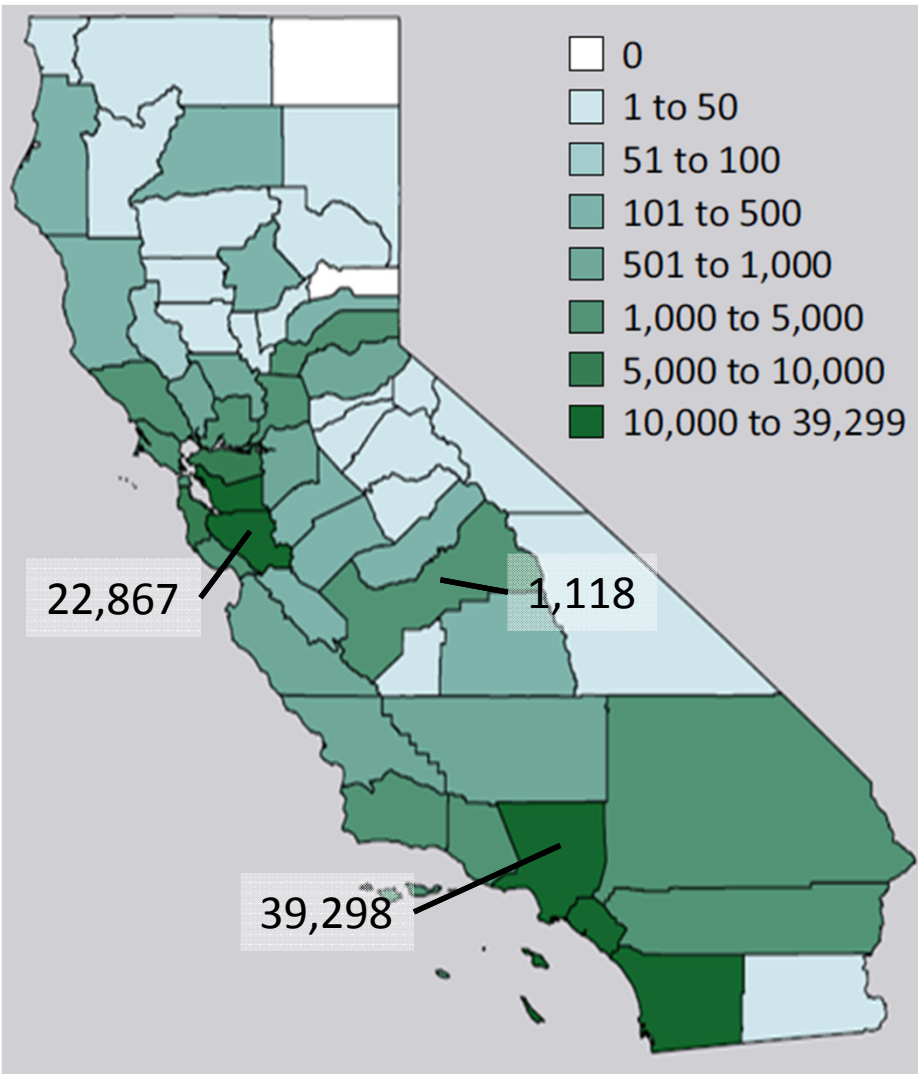
Rebated Vehicles

# ZEV Registrations by County (thru May 2015)

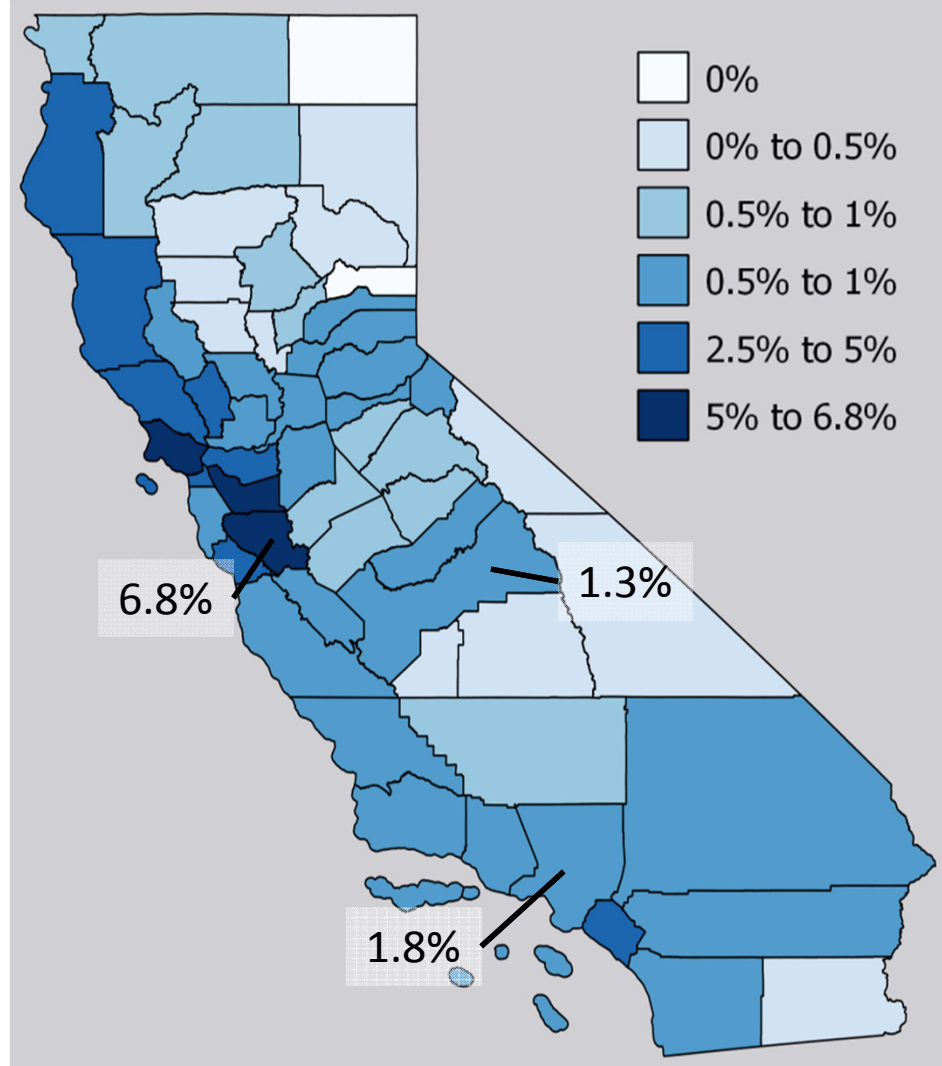
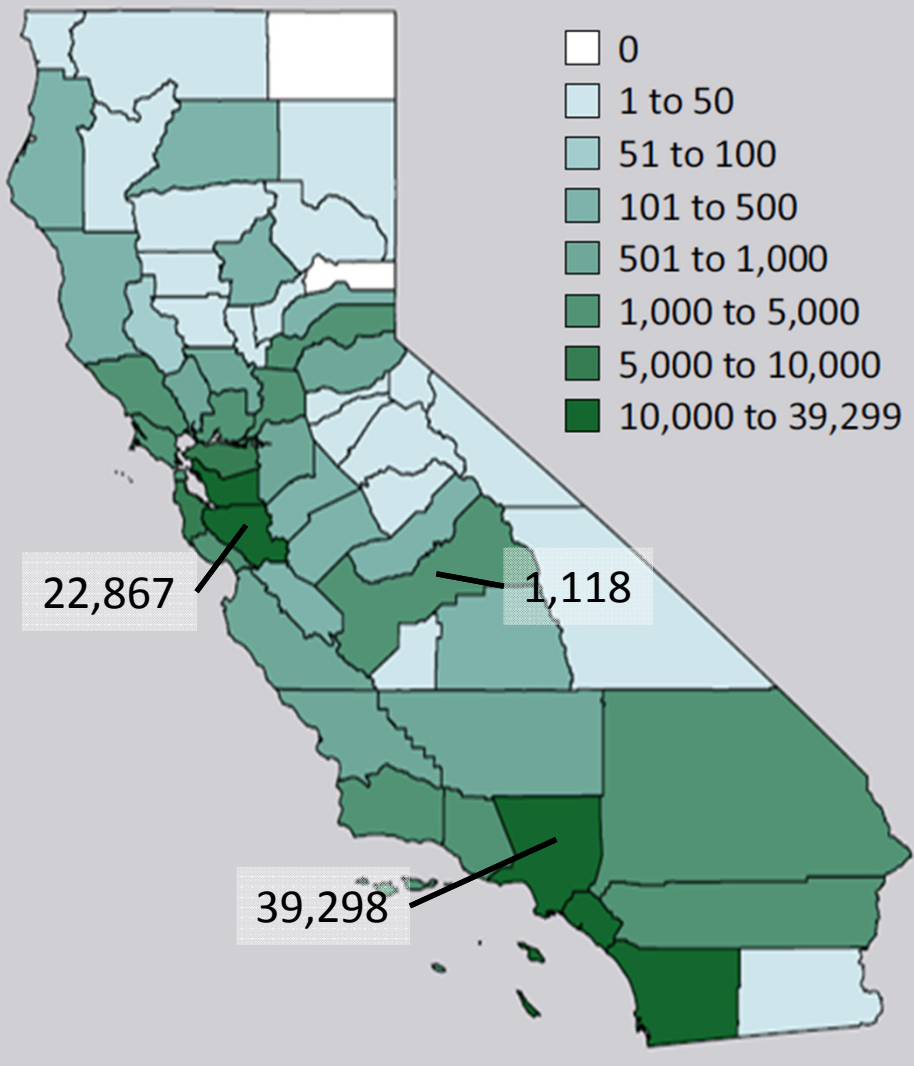




# ZEV Registrations by County (thru May 2015) & Growth (2013 to 2014)



# ZEV Registrations by County & Normalized to Comparable Sales (thru May 2015)





# ZEV Markets

Consumers





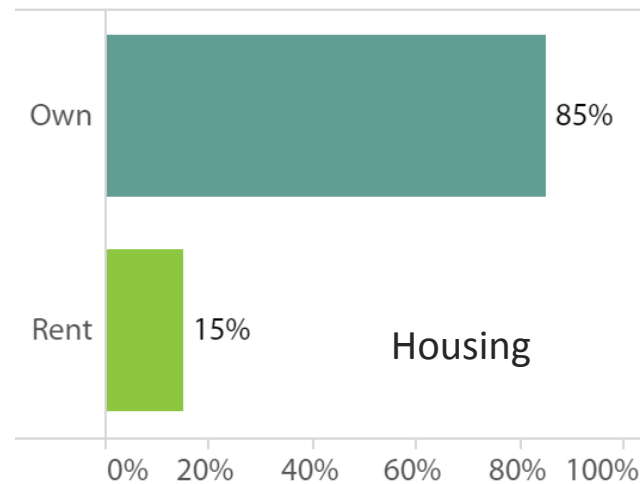
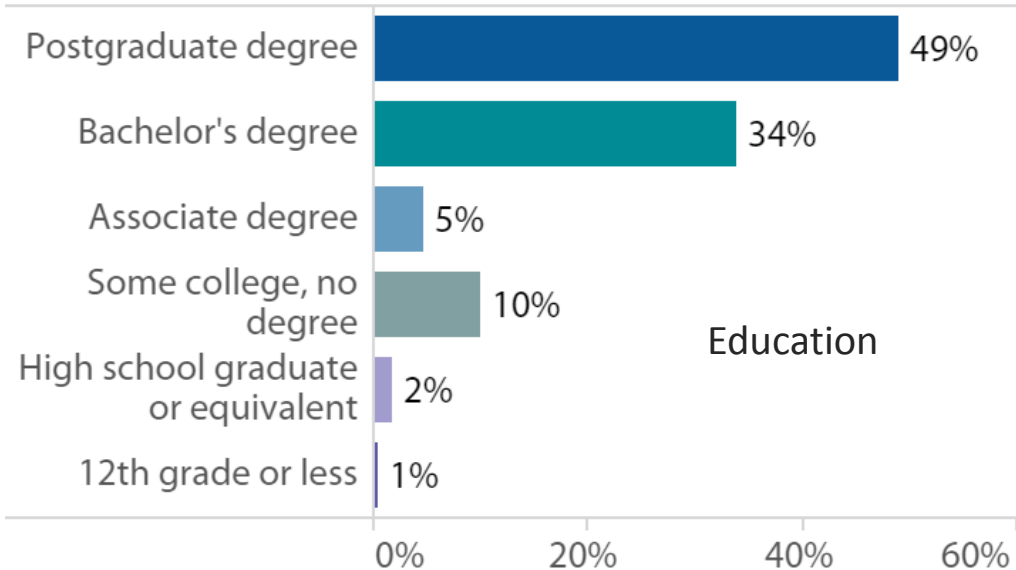
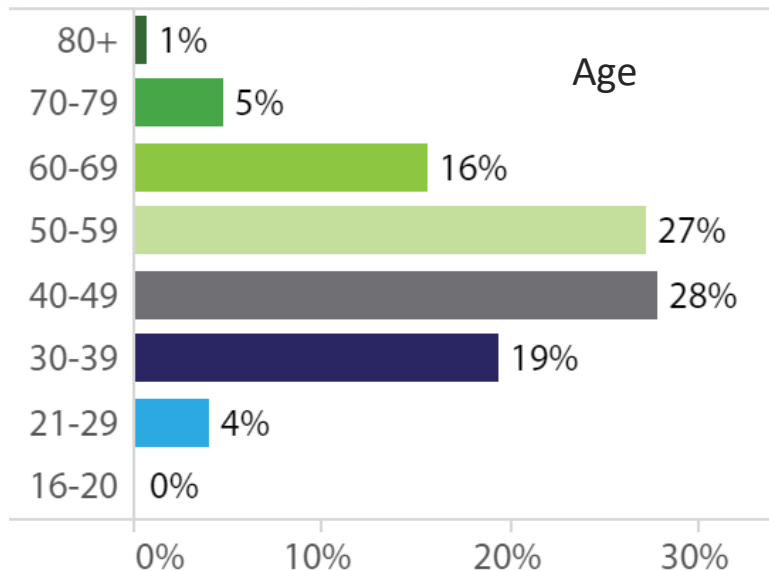
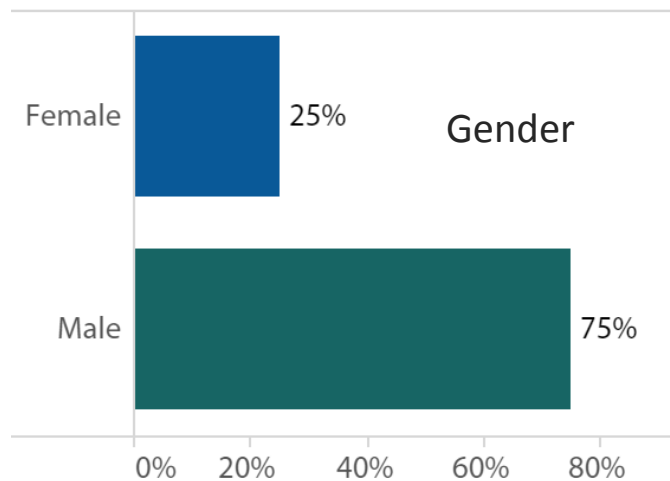


# Who is adopting?

Rebated Consumers



# Rebated Consumer Characteristics

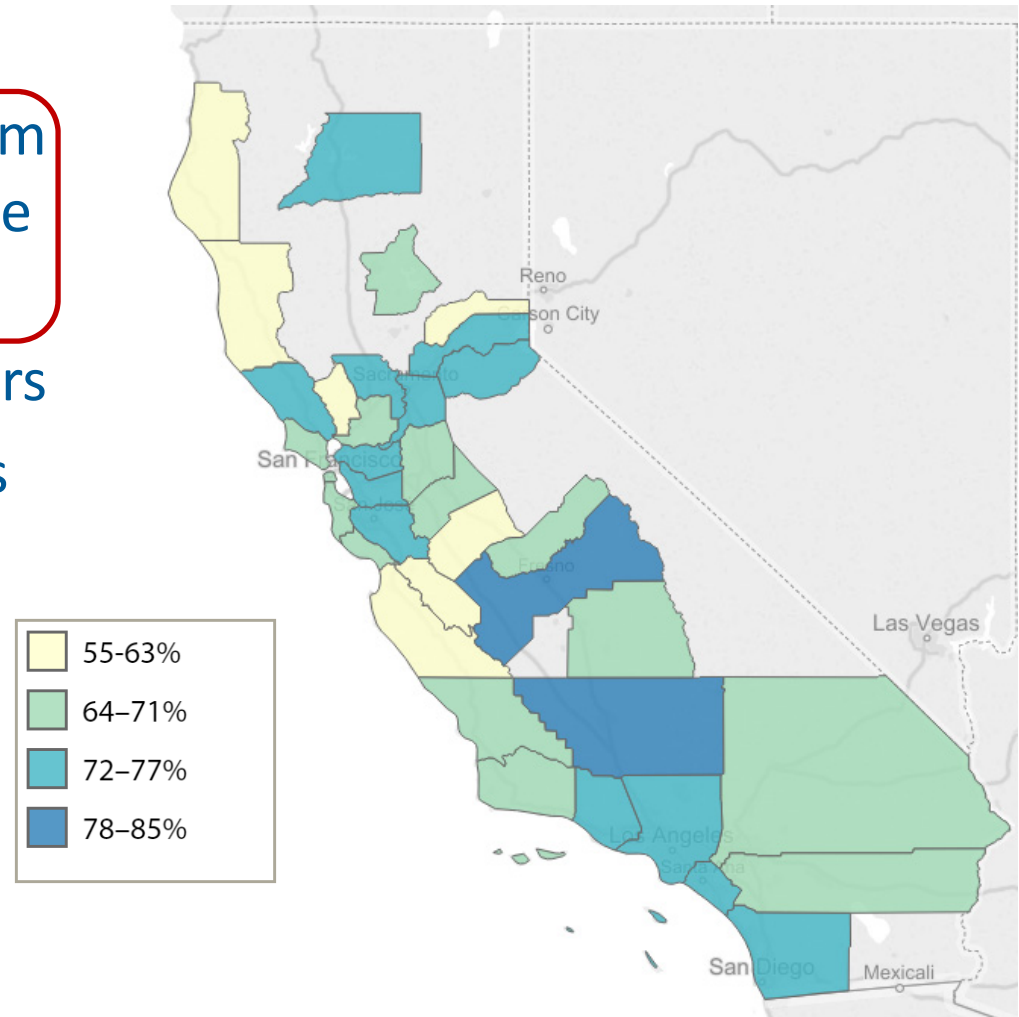


Total Responses: 25,217

Overall Time Frame: 9/1/2012–11/15/2015

# CVRP Participation (March 2010–March 2015) \*

- Statewide, life-of-program average participation rate >74%
- >67% for PHEV consumers
- >81% for BEV consumers



\*Topic brief available for download from the Program Reports page at <https://cleanvehiclerebate.org>

# Majority Characteristics of CVRP Consumers

	<b>CVRP rebate recipients (CVRP 2012–2015)</b>
<b>40–59 years old</b>	55%
<b>Bachelor's</b>	83%
<b>Postgraduate</b>	49%
<b>Male</b>	75%
<b>White/Caucasian</b>	64%
<b>Detached homes</b>	83%
<b>\$50–200k/y household income</b>	61%

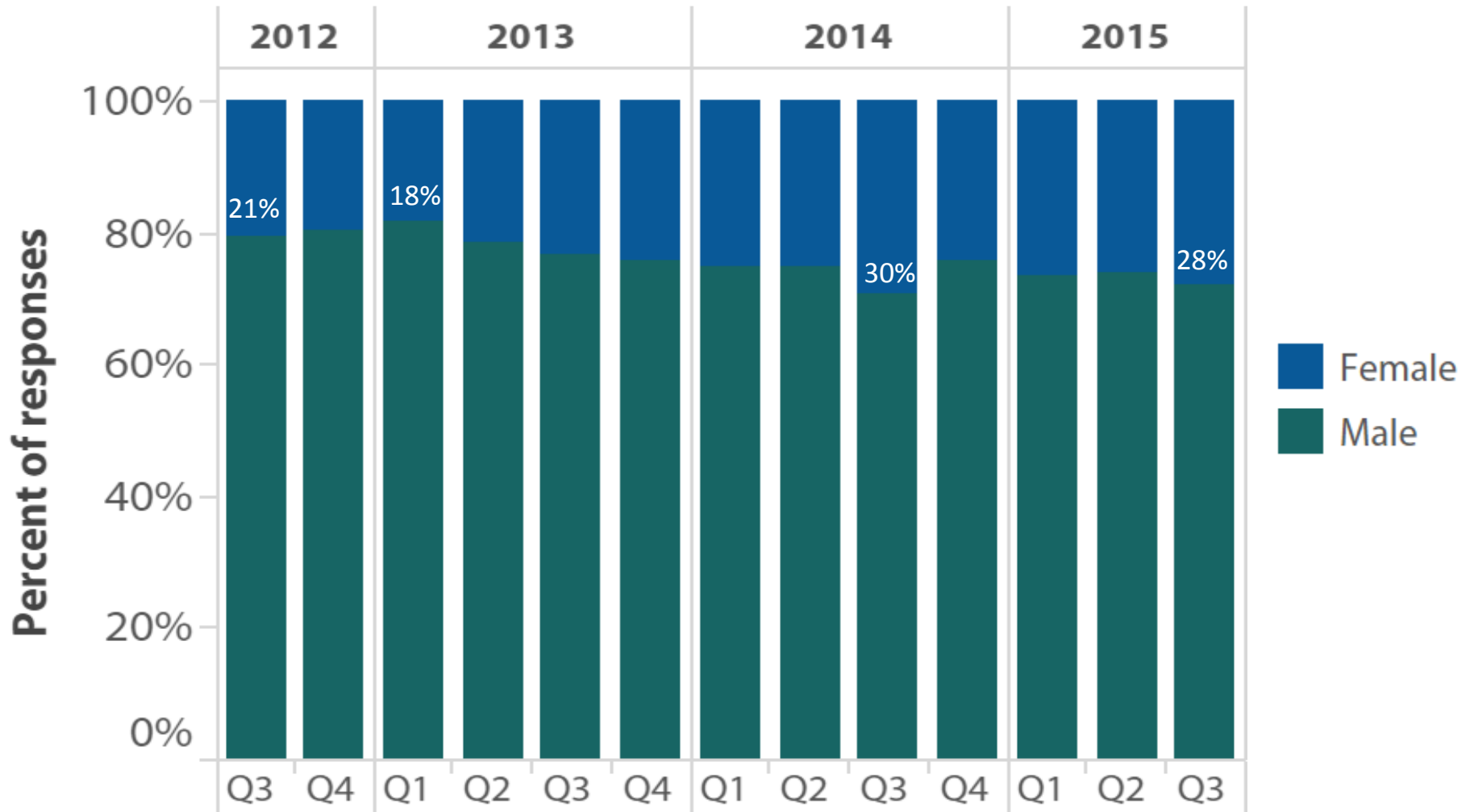
# Majority Characteristics of CVRP Consumers

	<b>CVRP rebate recipients (CVRP 2012–2015)</b>	<b>CA residents (Census 2014)</b>
<b>40–59 years old</b>	55%	27%
<b>Bachelor's</b>	83%	31%
<b>Postgraduate</b>	49%	11%
<b>Male</b>	75%	50%
<b>White/Caucasian</b>	64%	62%
<b>Detached homes</b>	83%	66%
<b>\$50–200k/y household income</b>	61%	51%

# Majority Characteristics of CVRP Consumers

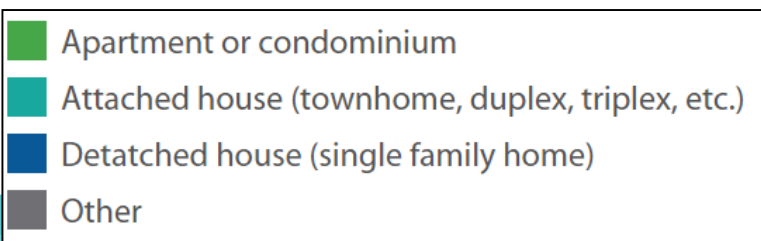
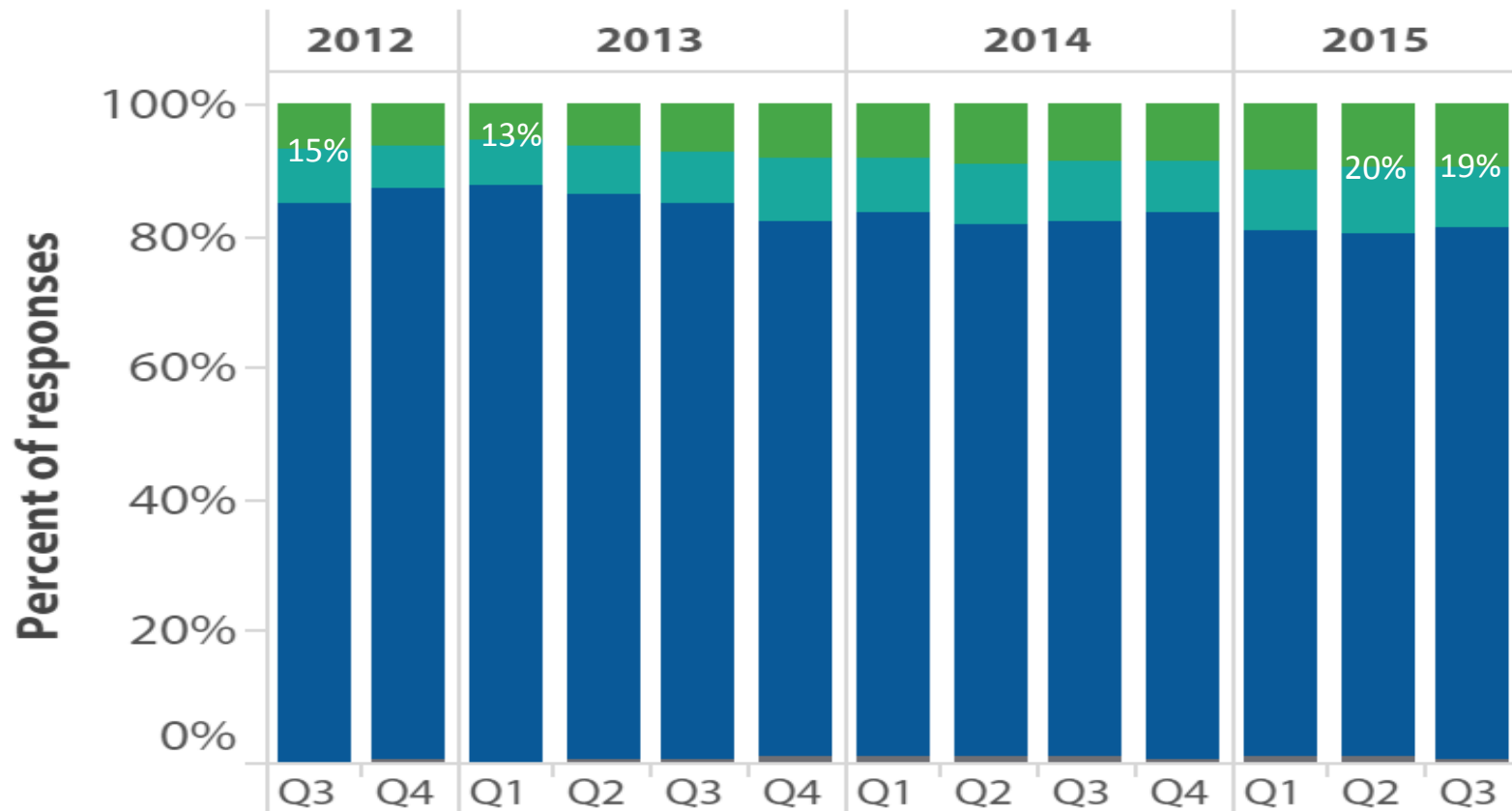
	<b>CVRP rebate recipients</b> (CVRP 2012–2015)	<b>New-vehicle “intenders”</b> (CHTS 2012)	<b>CA residents</b> (Census 2014)
<b>40–59 years old</b>	55%	52%	27%
<b>Bachelor’s</b>	83%	66%	31%
<b>Postgraduate</b>	49%	34%	11%
<b>Male</b>	75%	49%	50%
<b>White/Caucasian</b>	64%	76%	62%
<b>Detached homes</b>	83%	75%	66%
<b>\$50–200k/y household income</b>	61%	58%	51%

# Over Time: Gender





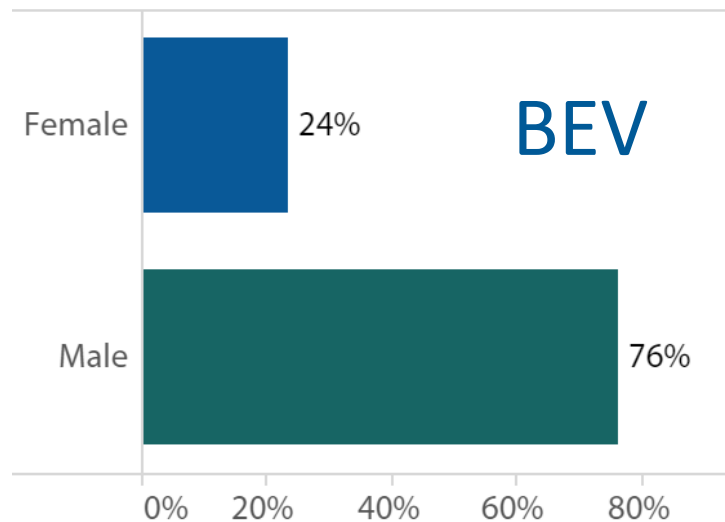
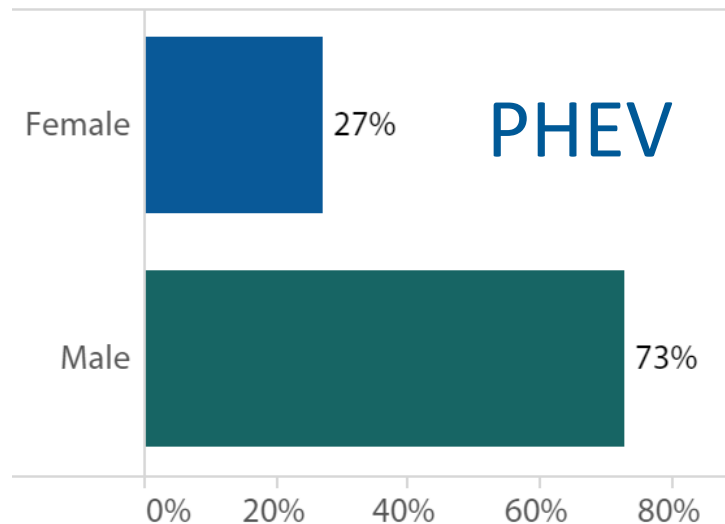
# Over Time: Housing Type



# By Product Type

PHEV consumers tend to more often be:

- Older
- Female
- Renters
- Multi-unit dwellers
- 1-vehicle households
- Lower income
- Motivated by saving on fuel costs and HOV lane access



# CA Median HH Incomes: All vs. DAC

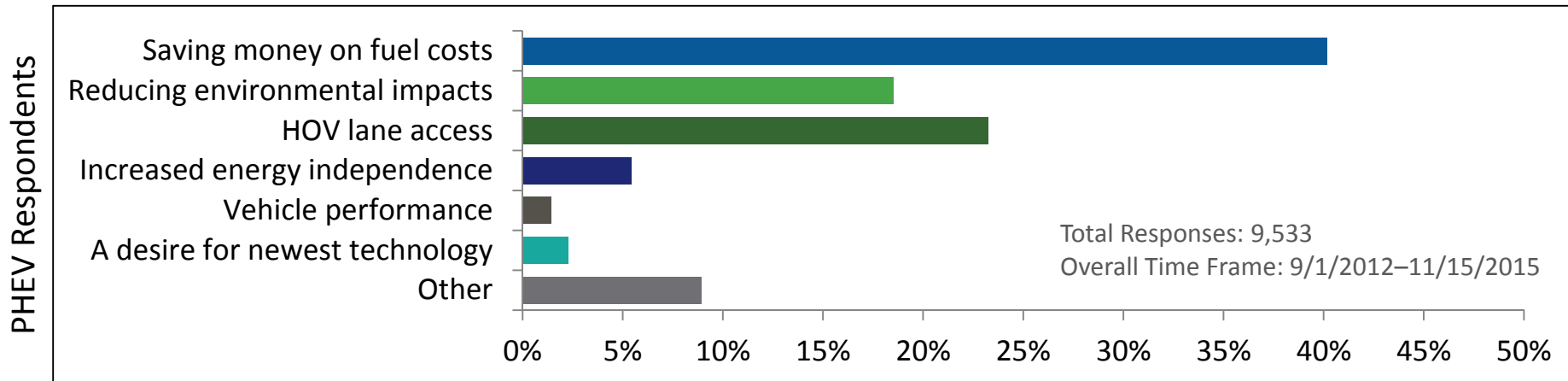
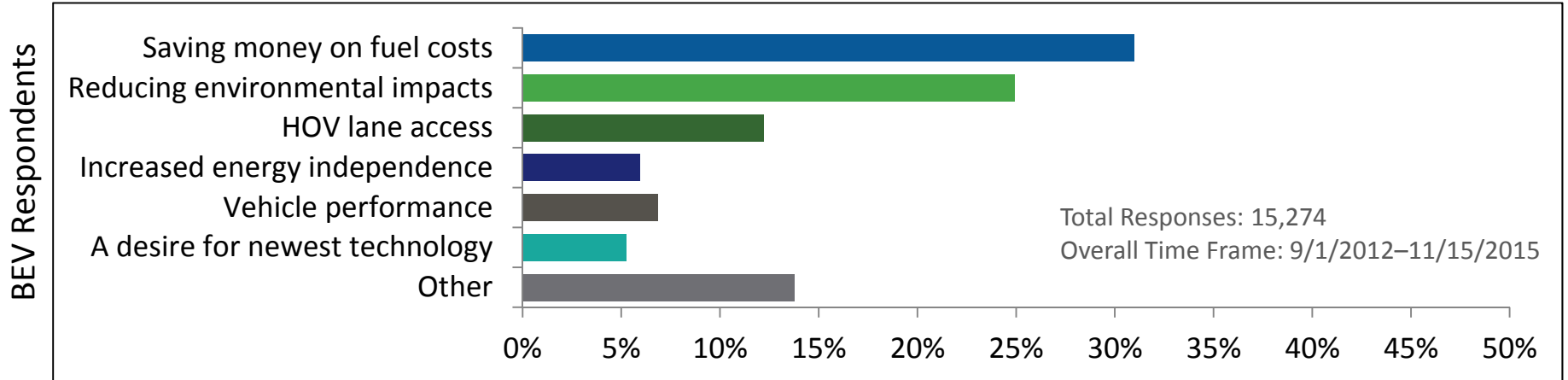
	<b>New-vehicle “intenders” (CHTS 2012)</b>	<b>CVRP rebate recipients (CVRP 2014)</b>
<b>All:</b>	\$75,000-\$99,999	\$150,000-\$174,999
<b>DAC:</b>	\$25,000-\$49,999	\$75,000-\$99,999
<b>DAC/All</b>	25-67%	43-67%



# **Why are they purchasing/leasing?**

Rebated Consumers

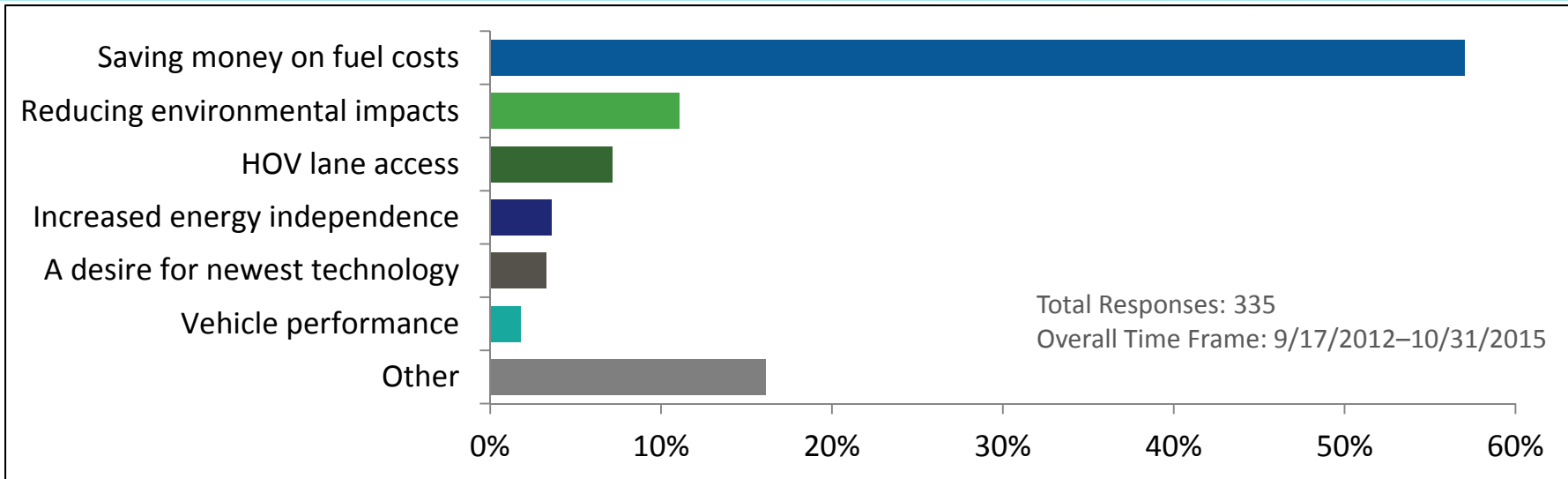
# Primary Purchase Motivations: BEV vs. PHEV



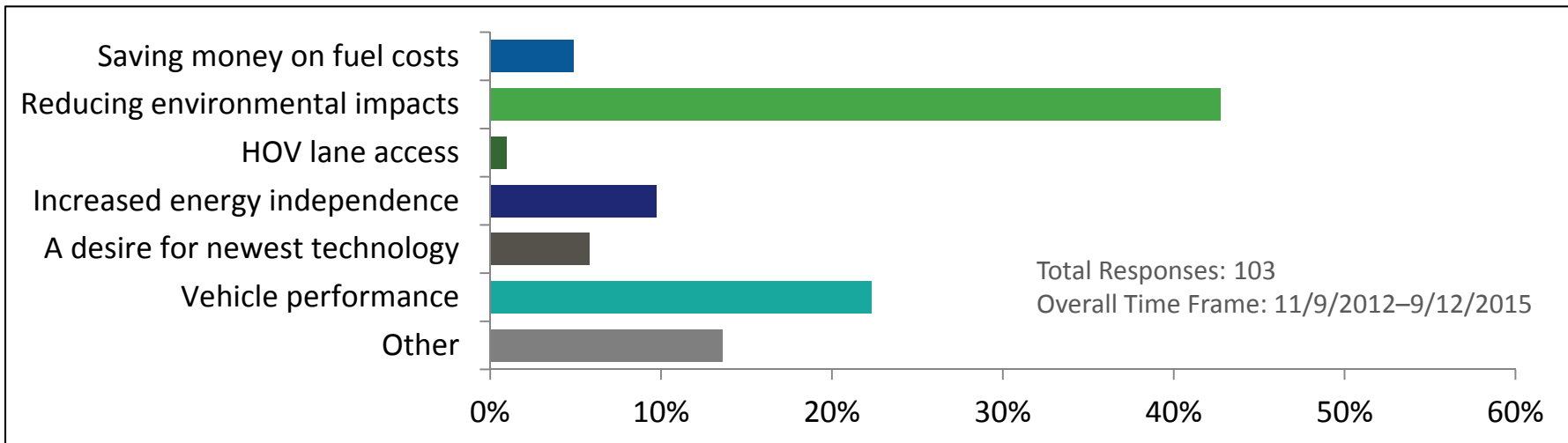


# Primary Purchase Motivations: Non-Tesla vs. Tesla BEV

San Bernardino/Riverside  
BEV Leases



Marin Tesla Purchases





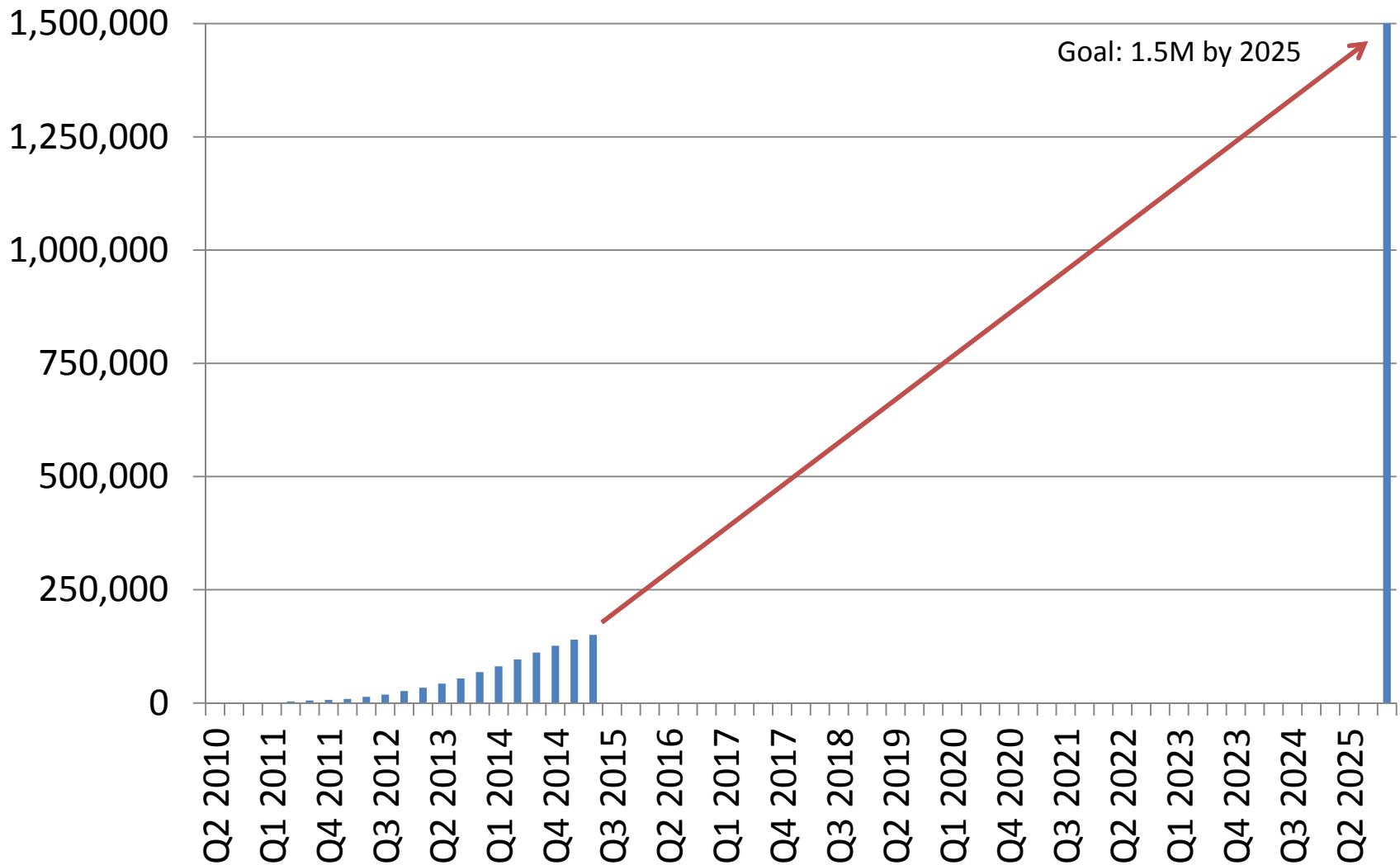
# Summary & Parting Thoughts



# Summary

- >150,000 ZEVs in CA
  - 50% PHEVs (despite lower incentives, less understanding, and lower profile), 57% in DACs
- 7% of ZEVs are in DACs, but
- Normalized to comparable LDV sales, DACs have 40+% the number of ZEVs
- Some “small” ZEV markets show significant growth and roughly similar normalized sales levels
- Signs indicate markets are slowly shifting towards more mainstream consumers
- ZEV consumer differences lessened in comparison to new-vehicle “intenders”
- There are many prominent motivations for adoption (e.g., low fuel costs), but these can vary considerably as consumers are sliced into small segments

# Cumulative CA Zero Tailpipe Emission Vehicles (ZEVs)



Most recent quarter partial (data thru May 2015).

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# Data sources: Vehicles

- **Overall vehicle markets:**

- Polk registration data March 2010–May 2015

- 7.9M LDVs

- 6.1M comparable LDVs

- 150k ZEVs

- ~147k CVRP-eligible “Clean Vehicles”

- **Clean Vehicle Rebate Project (CVRP) :**

- CSE, California Air Resources Board CVRP rebate application data, March 2010–November 2015

- 134k eligible Clean Vehicles

# Thank You

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[john.anderson@energycenter.org](mailto:john.anderson@energycenter.org)

*We work nationally in the clean energy industry and are always open to exploring partnership opportunities.*