Growing the Electric Vehicle Market: 
EV Adopters, “Rebate Essentials,” and “EV Converts”

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John Anderson – Research Analyst; and Keir Havel – Research Assistant

with thanks to Michelle Jones, Jamie Orose, and Laura Parsons
CSE Areas of Expertise

Clean Transportation
Adoption of electric vehicles and deployment of charging infrastructure

Built Environment
Advancing energy efficiency and renewable resources

Technology Convergence
Interconnecting systems to achieve decarbonization
State EV Rebate Programs Administered by CSE
(as of Jan. 2019; Oregon pending)

<table>
<thead>
<tr>
<th>Fuel-Cell EVs</th>
<th>$5,000</th>
<th>$1,500</th>
<th>$5,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>All-Battery EVs</td>
<td>$2,500</td>
<td>$1,500</td>
<td>$5,000</td>
</tr>
<tr>
<td>Plug-in Hybrid EVs</td>
<td>$2,500 (i3 REx)</td>
<td>BEVx only: $1,500</td>
<td></td>
</tr>
<tr>
<td>Base MSRP ≤ $50k; no fleet rebates</td>
<td></td>
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<tr>
<td>Zero-Emission Motorcycles</td>
<td>$900</td>
<td>$450</td>
<td></td>
</tr>
<tr>
<td>≥ 20 e-miles only; consumer income cap; and increased rebates for lower-income households</td>
<td></td>
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<tr>
<td>BEVs &amp; PHEVs ≤ $50k base MSRP, FCEVs ≤ $60k; dealer assignment; $150 dealer incentive</td>
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<td></td>
<td></td>
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<tr>
<td>Base MSRP &gt; $60k = $500 max.; point-of-sale via dealer</td>
<td></td>
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</tbody>
</table>

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

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<tr>
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</thead>
<tbody>
<tr>
<td>Survey Responses (total n)*</td>
<td>40,438</td>
<td>2,549</td>
<td>819</td>
<td>817</td>
<td>44,623</td>
</tr>
<tr>
<td>Program Population (N)</td>
<td>185,367</td>
<td>5,754</td>
<td>1,583</td>
<td>3,937</td>
<td>196,641</td>
</tr>
</tbody>
</table>

* Weighted to represent the program population along the dimensions of vehicle category, vehicle model, buy vs. lease, and county (using raking method)
How can research help us grow markets for electric vehicles?

**Low-Hanging Fruit**
Understand existing adopters to reinforce and scale what is already working.

**Tough Nuts to Crack**
Understand and break down barriers faced by consumers targeted based on policy priorities.

**Expanding Market Frontiers**
Go beyond the enthusiastic core of EV markets in order to expand further into the mainstream.
Characterizing (Rebated) EV Market Segments

**Existing Adopters: Market Acceleration**
Characterize existing, generally enthusiastic and pre-adapted consumers, to target similar consumers who have the highest likelihood of adoption.

**“Rebate Essential” Consumers: Minimizing Free Ridership**
Characterize adopters most highly influenced by supportive resources to join the EV market, to improve the cost-effectiveness of outreach and program design.

**“EV Converts”: Moving Mainstream**
Characterize EV consumers with low initial interest in EVs, to look for additional opportunities to expand into the mainstream.
Data used:
• CA’s CVRP Consumer Survey, 2016–2017 edition

Subgroup examined:
• Individual consumers
• Purchased/leased PEVs between Nov 2016–May 2017
  – after most recent change to CVRP on Nov. 1st, 2016
• Received $1,500–$4,500 rebates

Additional details are available in the appendix slides
“Rebate Essentials”: Highly Influenced

Would not have purchased/leased their EV without rebate

2015–2016 edition: weighted, question n=11,457;
2016–2017 edition: weighted, question n=9,261
“EV Converts”: Low Initial Interest

Interest in acquiring a plug-in electric vehicle when started searching for a new vehicle

EV Converts = 23%

Analysis: Description
Setting an Appropriate Baseline: CA Car Buyers Are Different Than the Population

<table>
<thead>
<tr>
<th></th>
<th>California Population (Census 2018)</th>
<th>Vehicle purchase “intenders” (CHTS 2012)</th>
</tr>
</thead>
<tbody>
<tr>
<td>White/Caucasian</td>
<td>65%</td>
<td>76%</td>
</tr>
<tr>
<td>Male</td>
<td>50%</td>
<td>49%</td>
</tr>
<tr>
<td>≥ Bachelor’s degree in HH</td>
<td>33%*</td>
<td>66%</td>
</tr>
<tr>
<td>Detached homes</td>
<td>58%</td>
<td>75%</td>
</tr>
<tr>
<td>≥ 50 years old</td>
<td>32%</td>
<td>31%</td>
</tr>
<tr>
<td>≥ $150k HH Income</td>
<td>18%</td>
<td>21%</td>
</tr>
</tbody>
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*Census data characterize individual educational attainment for population 25 or older, whereas other data characterize highest household attainment.

California Household Travel Survey, 2012: weighted, n = 42,431
# EV Consumer Characteristics

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<tr>
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<tbody>
<tr>
<td></td>
<td>All</td>
<td>PHEV</td>
</tr>
<tr>
<td>White/Caucasian</td>
<td>65%</td>
<td>76%</td>
</tr>
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<td>Male</td>
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<td>49%</td>
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California Household Travel Survey, 2012: weighted, n = 42,431
## Target Segment Comparisons to Car Buyers

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<td></td>
<td></td>
<td>All</td>
</tr>
<tr>
<td>White/Caucasian</td>
<td>65%</td>
<td>76%</td>
<td>62%</td>
</tr>
<tr>
<td>Male</td>
<td>50%</td>
<td>49%</td>
<td>72%</td>
</tr>
<tr>
<td>≥ Bachelor’s in HH</td>
<td>33%*</td>
<td>66%</td>
<td>81%</td>
</tr>
<tr>
<td>Detached homes</td>
<td>58%</td>
<td>75%</td>
<td>77%</td>
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<td>50%</td>
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<td>21%</td>
<td>40%</td>
</tr>
</tbody>
</table>

California Household Travel Survey, 2012: weighted, n = 42,431
Analysis: Explanation
Factors that Increase the Odds of Being an EV Convert*  
(Relative to Other EV Adopters)

EV consumers (both PHEV and BEV) are more likely converts if they:
- are younger, do not have solar
- are not highly motivated by reducing environmental impacts or HOV lane access
- do not spend time researching EVs online

Additionally:
- **PHEV** consumers are more likely converts if they chose PHEVs other than the Volt
- **BEV** consumers are more likely converts if they:
  - are women, do not identify as white/Caucasian, live in the Central Valley or LA/SoCal area, or have lower income
  - are moderately motivated by energy independence
  - Have no workplace charging
  - choose BEVs other than Bolt or Tesla (long-range BEVs?)
  - find the rebate essential to purchase/lease

* Significantly associated factors in binary logistic regression
Analysis: Prioritization
Comparison to Other EV Adopters: 
Rebate Essential Explanatory Factors*

* Significantly associated factors in binary logistic regression
How can we help?

We work with governments, regulators, utilities, CCAs, businesses, property owners and consumers as a trusted and objective implementation partner.

For more information:

https://cleanvehiclerebate.org/eng/program-reports
https://energycenter.org/thought-leadership/research-and-reports
brett.williams@energycenter.org
Public dashboards and data facilitate informed action

- >300,000 EVs and consumers have received >$675 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
Responses from individual PEV consumers

- Weighted to represent applicant population

N=46,839

After filtering
- current program era: purchase dates Nov 2016–May 2017
- other analytical factors

weighted n=5,327


<table>
<thead>
<tr>
<th>CVRP</th>
<th>Eligibility</th>
<th>Rebate Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Filing Status</td>
<td>Gross Annual Income</td>
</tr>
<tr>
<td>Income Cap</td>
<td>Individual</td>
<td>&gt; $150,000</td>
</tr>
<tr>
<td></td>
<td>Head of Household</td>
<td>&gt; $204,000</td>
</tr>
<tr>
<td></td>
<td>Joint</td>
<td>&gt; $300,000</td>
</tr>
<tr>
<td>Standard Rebate</td>
<td>Individual</td>
<td>300% FPL to $150,000</td>
</tr>
<tr>
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</tr>
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<td>Increased Rebate for Low-Income Applicants*</td>
<td>Household Income ≤ 300 percent of the federal poverty level (FPL)</td>
<td>$7,000</td>
</tr>
</tbody>
</table>
CSE: A Nonprofit With Billion Dollar Program Management Experience

- **Five Statewide Electric Vehicle Rebate Programs**
  - > $700 million
  - > 300,000 rebated vehicles
  - > 200,000 consumers characterized

- **Statewide EV Charging Incentives**
  - > $100 million
  - 367 DC fast chargers, 211 Level 2 chargers and growing
  - Diverse: urban, rural, mountains, deserts, plains

- **Solar On Multifamily Affordable Housing Program**
  - $1 billion
  - 300 MW + virtual net energy metering
Contact Us

EnergyCenter.org

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