Target EV Consumer Segments & Incentivizing Dealers (to educate consumers)

EV Roadmap 10, 20 June 2017, Portland
Brett Williams, M.Phil. (cantab), Ph.D. – Principal Advisor, Clean Transportation

Thanks also to Clair Johnson, Georgina Arreola, Colin Santulli, and others at CSE
Center for Sustainable Energy (CSE)

- Building Performance
- Clean Transportation
- Distributed Generation
- Energy Efficiency
- Energy Storage
- Renewable Energy
CSE Electric Vehicle Activities

Incentives Design & Administration

Consumer & Dealer Outreach

Stakeholder Engagement

Fleet Assistance & Clean Cities

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

2nd Life Battery Research & Vehicle-Grid Integration
## EV Incentive Programs: Rebate Amounts

<table>
<thead>
<tr>
<th>Type</th>
<th>Rebate Amounts</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fuel-Cell EVs</strong></td>
<td></td>
</tr>
<tr>
<td>$5,000</td>
<td></td>
</tr>
<tr>
<td>$2,500</td>
<td></td>
</tr>
<tr>
<td>$3,000</td>
<td></td>
</tr>
<tr>
<td><strong>All-Battery EVs</strong></td>
<td></td>
</tr>
<tr>
<td>$2,500</td>
<td></td>
</tr>
<tr>
<td>$2,500</td>
<td></td>
</tr>
<tr>
<td>$3,000</td>
<td></td>
</tr>
<tr>
<td><strong>Plug-in Hybrid EVs</strong></td>
<td></td>
</tr>
<tr>
<td>$2,500 (i3 REx)</td>
<td>$2,500</td>
</tr>
<tr>
<td>$1,500</td>
<td>$1,500</td>
</tr>
<tr>
<td><strong>Zero-Emission Motorcycles</strong></td>
<td></td>
</tr>
<tr>
<td>$900</td>
<td>$750</td>
</tr>
</tbody>
</table>

**Rebate Calculations:**
- **e-miles ≥ 20 only:** Consumer income cap and increased rebates
- **MSRP ≥ $60k:**
  - only; dealer assignment; $300 dealer incentive
  - $1,000 max.
- **MSRP $60k**: $500 max.; point-of-sale

<table>
<thead>
<tr>
<th>e-miles</th>
<th>Rebate</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥ 120</td>
<td>$2,000</td>
</tr>
<tr>
<td>≥ 40</td>
<td>$1,700</td>
</tr>
<tr>
<td>≥ 20</td>
<td>$1,100</td>
</tr>
<tr>
<td>&lt; 20</td>
<td>$500</td>
</tr>
</tbody>
</table>
How can consumer research help us grow markets for electric vehicles?

1. “Adding fuel to the fire”: understand existing, generally enthusiastic adopters to target similar consumers
   - Segment: all-battery vs. plug-in hybrid EVs
   - Characteristics, motivations, and trends
   - Who is “pre-adapted” to adopt? (e.g., Williams and Kurani 2006)

2. “Tough nuts to crack”: understand and break down barriers faced by consumers targeted based on policy priorities
   - Multi-unit dwellers
   - Disadvantaged Communities
   - Low-to-moderate income consumers

3. “Expand market frontiers”: understand the margins of the market to target consumers who can be induced to join
   - Adopters most influenced by incentives ("rebate essentials")
   - Adopters with low initial interest in EVs ("converts")
Weighted EV Consumer Survey
(CVRP vehicles acquired Sep 2012 thru May 2015)

Survey sample
19,460 individuals responded to the survey**

Vehicles driven by respondents

- Nissan LEAF: 24%
- Chevrolet Volt: 20%
- Tesla Model S: 19%
- Toyota Prius Plug-in: 15%
- FIAT 500e: 13%
- Other: 9%

* Through May 2015, 159,287 new PEs were adopted in California, 75,748 PHEVs and 74,539 BEVs.
** Results have been weighted to be representative of the entire program with respect to county, vehicle mode

The Clean Vehicle Rebate Project

June 2017
Prepared for
California Air Resources Board
Prepared by
Center for Sustainable Energy*

https://cleanvehiclerebate.org/eng/program-reports
Adding Fuel to the Fire: Who is participating in the market?
## Majority Characteristics of CVRP Consumers

<table>
<thead>
<tr>
<th>CVRP-All</th>
<th>(EV Consumer Survey 2014)</th>
</tr>
</thead>
<tbody>
<tr>
<td>40–59 years old</td>
<td>55%</td>
</tr>
<tr>
<td>≥ Bachelor’s Postgraduate</td>
<td>82%</td>
</tr>
<tr>
<td>Male</td>
<td>74%</td>
</tr>
<tr>
<td>White/Caucasian</td>
<td>63%</td>
</tr>
<tr>
<td>Detached homes</td>
<td>80%</td>
</tr>
<tr>
<td>$50–200k/y household income</td>
<td>62%</td>
</tr>
</tbody>
</table>

Weighted CVRP data
## Majority Characteristics of CVRP Consumers

<table>
<thead>
<tr>
<th>CVRP-All (EV Consumer Survey 2014)</th>
<th>New-vehicle “intenders” (CHTS 2012)</th>
</tr>
</thead>
<tbody>
<tr>
<td>40–59 years old</td>
<td>55%</td>
</tr>
<tr>
<td>≥ Bachelor’s</td>
<td>82%</td>
</tr>
<tr>
<td>Postgraduate</td>
<td>49%</td>
</tr>
<tr>
<td>Male</td>
<td><strong>74%</strong></td>
</tr>
<tr>
<td>White/Caucasian</td>
<td><strong>63%</strong></td>
</tr>
<tr>
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</tr>
</tbody>
</table>

*Weighted CHTS and CVRP data*
How can the program *expand* the market for EVs through targeted outreach?
Characterizing Consumers Highly Influenced by Supportive Resources
Percent that state they would not have purchased/leased without the rebate

California Clean Vehicle Rebate Project

Source: EV Consumer Survey
Respondents: 19,460
Purchase dates 9/1/12-5/31/15
Sampling weights applied
Characterizing Low-Initial-Interest “Converts”
How important was information from the following sources in your decision to acquire (purchase/lease) a PEV?

- PEV Manufacturer website
- A family member, friend, or colleague
- Online discussion forums
- Blogs (non-manufacturer sites)
- PEV ride and drive event/expo
- A story in the media (print, radio, television)
- Electric utility
- Government agency
- Non-profit organization (e.g., CCSE, Plug-In America, etc.)
- A new car sales person
- Neighbor who drives a PEV
- Paid advertisement (print, radio, television)

Source: EV Consumer Survey
Respondents: 18,434
Purchase dates 9/1/12-5/31/15
Sampling weights applied

*statistically significant difference
# Common Characteristics Across All Segments

<table>
<thead>
<tr>
<th></th>
<th>PHEV consumers</th>
<th>BEV consumers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rebate Essential</td>
<td>Converts</td>
</tr>
<tr>
<td><strong>Consumer demographics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethnicity is other than white</td>
<td>1.25</td>
<td>1.35</td>
</tr>
<tr>
<td><strong>Reasons, interest, and enablers</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>More motivated by saving money on fuel</td>
<td>1.24</td>
<td>1.10</td>
</tr>
<tr>
<td>Less motivated by reducing enviro impacts</td>
<td>1.08</td>
<td>1.21</td>
</tr>
<tr>
<td>More rebate essential</td>
<td>Y</td>
<td>1.73</td>
</tr>
<tr>
<td>Lower initial interest in EVs</td>
<td>1.41</td>
<td>Y</td>
</tr>
<tr>
<td><strong>Information gathering</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Found it more difficult to find info on EVs</td>
<td>1.22</td>
<td>1.21</td>
</tr>
</tbody>
</table>

PHEV n = 7,711; BEV n=11,478
All factors significant with p < 0.05
Target Consumers: “Rebate Essential” Segment

Characteristics statistically associated with being rebate essential:

- **Vehicle characteristics**: lower price, bought (vs. lease)
- **Demographics**: younger, male, non-white, lower HH income, higher education
- **Motivations and interest**: less motivated by environmental impacts, more motivated by saving money on fuel and energy independence, lower initial interest in EVs
- **Information gathering**: found it more difficult to find info on EVs, spent more time researching online, learned about the rebate before going to the dealership
Summary “Profiles”
The rebate is more essential to consumers:

- focused on "financial and practical" aspects of adoption
- who face "greater contextual constraints" or are otherwise less easily able to adopt
- whose adoption is driven less by "green enthusiasm" than other values
- with "challenging informational environments"
The rebate is more essential to consumers:

- focused on “financial and practical” aspects of adoption
  - saving money on vehicle price and fuel costs, being fully exposed to a purchase rather than a lease, being constrained by lower household income, carpool lane access
- who face “greater contextual constraints” or are otherwise less easily able to adopt
  - lower household income, perhaps younger and less established, perhaps more risk adverse and thus looking to an established hybrid brand, perhaps with less cultural exposure to EVs
- whose adoption is driven less by “green enthusiasm” than other values
  - less motivated by reducing environmental impact and more motivated by increased energy independence and saving money on fuel costs; and
- with “challenging informational environments”
  - low initial interest in EVs, greater difficulty finding information on EVs, who did more research online, but who perhaps benefitted from higher education to navigate these complex informational environments and have found out about the rebate before showing up at the dealership for their acquisition
The convert is more likely:

- less demographically specific/constrained
- driven less by “energy and the environment” than traditional vehicle-operation reasons
- with “challenging informational environments”
- “switching from old to new”
The convert is more likely:

• **less demographically specific/constrained**  
  – May or may not be constrained by income, have postgraduate degrees, or be male

• **driven less by “energy and the environment” than traditional vehicle-operation reasons**  
  – less motivated by the environment, energy independence, even carpool lane access  
  – more by saving money and perhaps vehicle performance  
  – no solar, perhaps no workplace charging

• **with “challenging informational environments”**  
  – low initial interest in EVs, perhaps with less cultural exposure to EVs, greater difficulty finding information on EVs, who did less research online, and may learn about the rebate from the dealer

• **“switching from old to new”**  
  – leasing their first EV as a replacement vehicle
Incentivizing Dealers (to educate consumers)
The Role of Dealerships in EV Market Development

Of the visits to dealerships with at least one EV on the lot, volunteers indicated that only about 50% of the salespeople they spoke with provided information on how to fuel the EV while traveling.

Buyer satisfaction with the new vehicle purchase experience

- Plug-in Vehicle Buyer (non-premium segment, N=768)
- Conventional Vehicle Buyer (non-premium segment, N=4,658)
- Conventional Vehicle Buyer (premium segment, N=8,807)
- Tesla (premium segment, N=168; California data unavailable)

Buyer Satisfaction Index Score (maximum possible = 1,000 points)

Many who work at dealerships may not have much experience in dealing with EVs.

(Sierra Club, 2016)¹

(Cahill & Davies, 2014)³

¹ http://www.sierraclub.org/
How is the dealer incentive working?

Evaluating the Connecticut Dealer Incentive for Electric Vehicle Sales

June 2017

Prepared by
Center for Sustainable Energy

What is CHEAPR?

- The Connecticut Hydrogen and Electric Automobile Purchase Rebate (CHEAPR) program offers rebates for new, eligible electric vehicles purchased since May 2015.

- The CHEAPR program includes two types of incentives for each eligible vehicle:
  - Vehicle Rebate (up to $5,000)
  - Dealer Incentive ($300)
Evaluation Questions

1. How is the dealer incentive being distributed within dealerships?
2. How and to what extent does the incentive motivate dealership employees to increase EV sales?
3. What behaviors do dealership employees change in response to the dealer incentive? How strong is the effect?
4. To what extent does the dealer incentive affect EV sales?
5. At what level might the dealer incentive be set to balance cost and effectiveness?
Please indicate how effective you think each of the following types of consumer incentives is in advancing the sale of EVs.

<table>
<thead>
<tr>
<th>Incentive</th>
<th>Not at all effective</th>
<th>Slightly effective</th>
<th>Moderately effective</th>
<th>Very effective</th>
<th>Extremely effective</th>
</tr>
</thead>
<tbody>
<tr>
<td>State rebate applied at the point of sale by the dealer</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4.49</td>
</tr>
<tr>
<td>State rebate applied for by the consumer and received after the sale</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2.96</td>
</tr>
<tr>
<td>Federal tax credit</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4.35</td>
</tr>
<tr>
<td>Parking incentives</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3.99</td>
</tr>
<tr>
<td>Free charging/fueling</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4.31</td>
</tr>
<tr>
<td>Carpool or HOV lane access</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3.99</td>
</tr>
<tr>
<td>Toll discount program</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4.08</td>
</tr>
</tbody>
</table>

Respondents=80
1 = Not at all effective, 5 = Extremely effective
Percentage of Vehicle Rebates Assigned to the Dealership

Rebate assignment

- Consumer: 19%
- Dealer: 81%

Who will receive the rebate?
- Consumer
- Dealer
How important is the dealer incentive in making it possible for your dealership to do each of the following?

<table>
<thead>
<tr>
<th>Task</th>
<th>Not at all important</th>
<th>Slightly important</th>
<th>Moderately important</th>
<th>Very important</th>
<th>Extremely important</th>
</tr>
</thead>
<tbody>
<tr>
<td>Make a reasonable profit on EV sales</td>
<td></td>
<td></td>
<td></td>
<td>3.63</td>
<td></td>
</tr>
<tr>
<td>Provide EV-related services to customers</td>
<td></td>
<td></td>
<td></td>
<td>3.56</td>
<td></td>
</tr>
<tr>
<td>Spend time preparing and submitting CHEAPR applications</td>
<td></td>
<td></td>
<td></td>
<td>3.95</td>
<td></td>
</tr>
<tr>
<td>Motivate sales staff to sell EVs</td>
<td></td>
<td></td>
<td></td>
<td>3.61</td>
<td></td>
</tr>
</tbody>
</table>

Question only asked of respondents who said they were aware of the dealer incentive
Respondents = 59
1 = Not at all important, 5 = Extremely important
To what extent are you motivated by the current dealer incentive to do each of the following?

<table>
<thead>
<tr>
<th>Activity</th>
<th>Not at all motivated</th>
<th>Slightly motivated</th>
<th>Moderately motivated</th>
<th>Very motivated</th>
<th>Extremely motivated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spend time learning about EVs</td>
<td></td>
<td></td>
<td></td>
<td>3.37</td>
<td></td>
</tr>
<tr>
<td>Spend time teaching other staff about EVs</td>
<td></td>
<td></td>
<td></td>
<td>3.40</td>
<td></td>
</tr>
<tr>
<td>Spend time with a customer to teach them about EV ownership and use†</td>
<td></td>
<td></td>
<td></td>
<td>3.67</td>
<td></td>
</tr>
<tr>
<td>Try to convert customers interested in conventional vehicles to EVs†</td>
<td></td>
<td></td>
<td></td>
<td>3.40</td>
<td></td>
</tr>
<tr>
<td>In general, try to sell more EVs</td>
<td></td>
<td></td>
<td></td>
<td>3.54</td>
<td></td>
</tr>
</tbody>
</table>

*Question only asked of respondents who said they were aware of the dealer incentive; Respondents=57
† Third and fourth statements only appeared to sales employees; Respondents=40
1 = Not at all motivated, 5 = Extremely motivated
Additional information...

Data Dashboards and Program Evaluation
Where can I get the data?: CSE Transparency Tools

- Public, online, interactive dashboards facilitate informed action
  - Data characterizing >200,000 EVs and consumers
  - >$430M in rebates processed
  - >19,000 survey responses statistically represent >90,000 consumers

Also: zevfacts.com
cleanvehiclerebate.org
ct.gov/deep
mor-ev.org
Participant Evaluation Examples

- Evaluation of the **CT Dealer Incentive** *(Report)*
- **Target Consumer Segments**: Converts, Rebate Essentials *(BECC pres 2016 and TRR 2017 journal article)*
- Results of 19,460 survey responses representing 91,085 rebated consumers *(survey summary document)*
- Progress in **Disadvantaged Communities** *(AEA pres 2016)*
- **Information Channels** *(EV Roadmap pres, 2016)*
  - Exposure & importance of various channels, consumer time spent researching various topics
- **Infographics**
  - Overall *(CVRP infographic, 2016)*
  - Disadvantaged Communities *(CVRP DAC infographic, 2017)*
- Characterization of **Participating Vehicles and Consumers** *(CVRP research workshop pres, 2015)*
- **Program Participation** by Vehicle Type and County *(CVRP brief 2015)*
- **Dealer services**: Importance and Prevalence *(EF pres 2015)*
Thank You for Your Attention

What would you like to know more about?
What decisions are you facing?
brett.williams@energycenter.org

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