Transportation Electrification: Policies and Incentives

• Moderator
  • Matt Rogotzke, Policy Analyst, NGA

• Speakers:
  • Chris Rice, Chief of Staff, Maryland Energy Administration
  • Brett Williams, Senior Principal Advisor, Center for Sustainable Energy
  • Tim Echols, Commissioner, Georgia Public Service Commission
Transportation Electrification: Incentives

National Governors Association Energy Policy Institute

19 July 2019, St. Paul MN

Brett Williams, PhD – Principal Advisor, EV Programs

with thanks to John Anderson, Michelle Jones, Jamie Orose, and others at CSE
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>Category</th>
<th>Fuel-Cell EVs</th>
<th>All-Battery EVs</th>
<th>Plug-in Hybrid EVs</th>
<th>Zero-Emission Motorcycles</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$5,000</td>
<td>$2,500</td>
<td>$2,500 (i3 REx) $1,500</td>
<td>$900</td>
</tr>
<tr>
<td></td>
<td>$1,500</td>
<td>$1,500</td>
<td>BEVx only: $1,500</td>
<td>$450</td>
</tr>
</tbody>
</table>

### e-miles
- \( \geq 120 \): $2,000
- \( \geq 40 \): $1,700
- \( \geq 20 \): $1,100
- \(< 20 \): $500

- Base MSRP \( \leq \$50k \)
- Income cap
- Increased rebates for lower-income households
- BEVs & PHEVs \( \leq \$50k \) base MSRP, FCEVs \( \leq \$60k \)
- Point-of-sale option
- $150 dealer incentive
- Base MSRP > $60k = $500 max.
- Point-of-sale
AA 50-State EV Sales, Market Share, and Goals Dashboard

Linked at zevfacts.com
Outline

• Statewide EV Rebate Program Update
  • Outputs: Vehicles & Consumers Rebated
  • Outcomes: Behaviors Influenced
  • Impacts: Emission & Market

• Design Considerations
  • Rebate Effectiveness
  • Equity: Income caps compared to MSRP caps

• Dealer Incentives

* EVs = light-duty plug-in hybrid, battery, and fuel-cell electric vehicles (PHEVs, BEVx vehicles, BEVs, and FCEVs)
Statewide EV Rebate Program Update

Outputs, Outcomes, and Impacts
**EV Rebate Designs** (as of Sept. 2018), Reflective of most of the data gathered

<table>
<thead>
<tr>
<th>Category</th>
<th>Rebate Amount</th>
<th>e-miles Limits</th>
<th>Rebate Amount</th>
<th>e-miles Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fuel-Cell EVs</strong></td>
<td>$5,000</td>
<td>≥ 120</td>
<td>$2,000</td>
<td>≥ 100</td>
</tr>
<tr>
<td><strong>All-Battery EVs</strong></td>
<td>$2,500</td>
<td>≥ 40</td>
<td>$1,700</td>
<td>≥ 40</td>
</tr>
<tr>
<td><strong>Plug-in Hybrid EVs</strong></td>
<td>$2,500 (i3 REx)</td>
<td>≥ 10 kWh</td>
<td>$2,500</td>
<td>≥ 40</td>
</tr>
<tr>
<td><strong>Zero-Emission Motorcycles</strong></td>
<td>$900</td>
<td>≥ 20 kWh</td>
<td>$1,500</td>
<td>&lt; 20 $500</td>
</tr>
<tr>
<td><strong>e-miles ≥ 20 only</strong></td>
<td>$750</td>
<td>&lt; 10 kWh</td>
<td>$2,000</td>
<td>&lt; 20 $500</td>
</tr>
<tr>
<td><strong>Consumer income cap</strong></td>
<td></td>
<td>≥ 100</td>
<td>$2,000</td>
<td>≥ 100</td>
</tr>
<tr>
<td><strong>increased rebates</strong></td>
<td></td>
<td>&lt; 100</td>
<td>$500</td>
<td>&lt; 100</td>
</tr>
<tr>
<td><strong>lower-income households</strong></td>
<td></td>
<td>≥ 200</td>
<td>$2,000</td>
<td>≥ 200</td>
</tr>
<tr>
<td><strong>Base MSRP ≥ $60k</strong></td>
<td></td>
<td>≥ 100</td>
<td>$2,000</td>
<td>≥ 100</td>
</tr>
<tr>
<td><strong>only</strong></td>
<td></td>
<td>&lt; 100</td>
<td>$500</td>
<td>&lt; 100</td>
</tr>
<tr>
<td><strong>no fleet rebates</strong></td>
<td></td>
<td>≥ 175</td>
<td>$3,000</td>
<td>≥ 175</td>
</tr>
<tr>
<td><strong>Base MSRP ≤ $60k</strong></td>
<td></td>
<td>≥ 100</td>
<td>$2,000</td>
<td>≥ 100</td>
</tr>
<tr>
<td><strong>only</strong></td>
<td></td>
<td>&lt; 100</td>
<td>$500</td>
<td>&lt; 100</td>
</tr>
<tr>
<td><strong>$150 dealer incentive (300 previous)</strong></td>
<td></td>
<td>≥ 100</td>
<td>$2,000</td>
<td>≥ 100</td>
</tr>
<tr>
<td><strong>$500 dealer incentive (300 previous)</strong></td>
<td></td>
<td>≥ 100</td>
<td>$2,000</td>
<td>≥ 100</td>
</tr>
</tbody>
</table>

- Base MSRP > $60k = $500 max.
- point-of-sale via dealer
Outputs: Vehicles Rebated
Public dashboards and data facilitate informed action

- > 320,000 EVs and consumers have received > $720 M in rebates
- > 45,000 survey responses being analyzed so far, statistically represent > 200,000 consumers
- Reports, presentations, and analysis growing

[Image of data dashboards]
Moderately-Priced Vehicles Receive Most Rebates
(Plug-in Vehicles through Aug. 2018)

Through August 2018. ‘Average Base MSRP’ does not reflect actual sale price and excludes typical costs (delivery charges, additional features, etc.). Includes content supplied by R.L. Polk & Co, © 2018. Note: 129 vehicles excluded due to insufficient data.
Outputs: Consumers Rebated
### Consumer Survey Data  (Shows Rebates to Individuals Only)

<table>
<thead>
<tr>
<th>Vehicle Purchase/Lease Dates</th>
<th>Survey Responses (total n)*</th>
<th>Program Population (N)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dec. 2010 – May 2017</td>
<td>40,438</td>
<td>185,367</td>
<td></td>
</tr>
<tr>
<td>June 2014 – October 2017</td>
<td>2,549</td>
<td>5,754</td>
<td></td>
</tr>
<tr>
<td>May 2015 – June 2017</td>
<td>819</td>
<td>1,583</td>
<td></td>
</tr>
<tr>
<td>March 2017 – Nov. 2017</td>
<td>817</td>
<td>3,937</td>
<td></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)
## Setting an Appropriate Baseline: 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>
</table>

* 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

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<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 degree 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>
</tr>
<tr>
<td>≥ 50 years old</td>
<td>32%</td>
<td>31%</td>
<td>50%</td>
</tr>
<tr>
<td>≥ $150k HH Income</td>
<td>18%</td>
<td>21%</td>
<td>40%</td>
</tr>
</tbody>
</table>

* 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
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
Go beyond the enthusiastic core of EV markets in order to expand further into the mainstream

Understand and break down barriers faced by consumers targeted based on policy priorities
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.
Expanding Market Frontiers Through Strategic Segmentation

**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.
“EV Converts”: Low Initial Interest

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

- Only interested: 52%
- Very interested: 25%
- Some interest: 16%
- No interest: 4%
- No knowledge: 2%

EV Converts = 23%

"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
Comparison to Other EV Adopters:
Rebate Essential Explanatory Factors*

X-Standardized Rebate Essentiality **Odds Ratios**

- Central (vs. Bay Area)
- Lower price
- Difficulty finding...
- Younger age
- More importance: save...

*Significantly associated factors in binary logistic regression of data characterizing CA rebate recipients who bought/leased EVs Nov. 2016 thru May 2017

For more info, see:
• 2016 BECC talk
• 2017 TRR [paper](#) and TRB [poster](#)
• 2018 EVS 31 [talk](#)
Outcomes: Behaviors Influenced
Do EVs get used?

Datasets: 44,623 total survey respondents weighted to represent 196,641 participants

Replaced a vehicle with their rebated clean vehicle

<table>
<thead>
<tr>
<th>Program</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVRP (2013–2017)</td>
<td>71%</td>
</tr>
<tr>
<td>MOR-EV (2014–17)</td>
<td>76%</td>
</tr>
<tr>
<td>CHEAPR (2015–17)</td>
<td>79%</td>
</tr>
<tr>
<td>Drive Clean NY</td>
<td>81%</td>
</tr>
</tbody>
</table>
Impacts: Emission
What vehicles types have rebates helped replace?

- Gasoline
- All-battery electric
- Conventional hybrid
- Plug-in hybrid
- Diesel
- Compressed natural gas
- Alternative fuel
- Hydrogen fuel cell

Total

Model Year
- 1999 or earlier
- 2000–2005
- 2006–2011
- 2012–2017

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

Datasets: 44,623 total survey respondents weighted to represent 196,641 participants
Percent Rating the Federal Tax Credit “Extremely Important”

(“in making it possible to acquire” EVs)

Overall datasets: 52,446 total survey respondents weighted to represent 234,562 rebate recipients

Percentages and sample sizes:
- CVRP (2013–2018): 48% (n=41,887)
- MOR-EV (2014–2018): 46% (n=4,555)
- CHEAPR (2015–2018): 64% (n=1,496)
- NYSERDA (2017–2018): 56% (n=1,681)
Would **not** have purchased/leased their EV **without rebate**

Datasets: 44,623 total survey respondents weighted to represent 196,641 participants
Internal vs. External Perspectives

- **Internal (program data):**
  - Rebate Essentiality = 52% (59% for non-Tesla BEVs)

  vs.

- **External (select pertinent literature):**

<table>
<thead>
<tr>
<th>Source</th>
<th>Metric</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jenn et al. (2018)</td>
<td>Increase in CA EV sales due to rebates</td>
<td>62%</td>
</tr>
<tr>
<td>Narassimhan and Johnson (2018)</td>
<td>Increase in BEV sales per ~$2,500 increase in incentives (adapted)</td>
<td>23.5%</td>
</tr>
<tr>
<td>Sheldon et al. (2016)</td>
<td>Increase in CA EV sales due to rebates</td>
<td>7%</td>
</tr>
<tr>
<td>Clinton et al. (2015)</td>
<td>Increase in BEV sales for every ~$2,500 of incentives (adapted)</td>
<td>18% (+/- ~22%)</td>
</tr>
</tbody>
</table>
Rebate Essentiality is increasing over time, contradicting a common paradigm about phasing out incentives.

Rebate Essentiality

<table>
<thead>
<tr>
<th>Year</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013–2015</td>
<td>46%</td>
</tr>
<tr>
<td>2015–2016</td>
<td>56%</td>
</tr>
<tr>
<td>2016–2017</td>
<td>58%</td>
</tr>
</tbody>
</table>

2016–2017 edition: weighted, n=9,261
Additional Design Considerations

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

From [https://ww2.arb.ca.gov/sites/default/files/2019-04/cvrg_workgroup_handout_042319.pdf](https://ww2.arb.ca.gov/sites/default/files/2019-04/cvrg_workgroup_handout_042319.pdf)
Income-Based Eligibility: Implementation Considerations

- Dealer reluctance, fears about liability
- Outreach complexity, consumer confusion
- Application complexity, affects all applicants
- Intrusiveness, tax forms
- Wait times, even for priority applicants
- Investment in processing systems, labor
- Fraud
- Loopholes
- Precludes a point-of-sale rebate, which would benefit those that need the rebate most

MSRP may be a better proxy for income in program eligibility
<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>
<td></td>
<td>Head of Household</td>
<td>300% FPL to $204,000</td>
</tr>
<tr>
<td></td>
<td>Joint</td>
<td>300% FPL to $300,000</td>
</tr>
<tr>
<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>

* Applications are also prioritized
CHEAPR and MOR-EV Respondents by Household Income

CHEAPR Survey (2015–17): n=819 total respondents, weighted to represent N=1,583 participants
MOR-EV Survey (2014–17): n=2,549 total respondents, weighted to represent N=5,754
Dealer Incentives
How is the dealer incentive working?

Evaluating the Connecticut Dealer Incentive for Electric Vehicle Sales

April 2017

Prepared by
Center for Sustainable Energy

To what extent are you motivated by the current dealer incentive to do each of the following?

- **Spend time learning about EVs**:
  - **Have Never Owned...**: 3.20
  - **Have Owned an EV**: 3.75

- **Spend time teaching other staff about EVs**: 3.20

- **Spend time with a customer to teach them about EV ownership and use**:
  - **Have Never Owned...**: 3.24
  - **Have Owned an EV**: 4.38

- **Try to convert customers interested in conventional vehicles to EVs**:
  - **Have Never Owned...**: 3.15
  - **Have Owned an EV**: 3.85

- **In general, try to sell more EVs**: 3.33

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† Fourth and fifth statements only appeared to sales employees; respondents=40

*Statistically significant difference ($p < 0.05$)
Summary: Select Findings

• Some consumer differences, particularly gender, remain
  • Trending in the right direction
  • Segmentation can support market-acceleration, equity, cost-effectiveness, or mainstreaming goals

• \( \approx \frac{4}{5} \) ths of rebated EVs replace older, more polluting vehicles

• Rebate influence on purchase/lease:
  • moderately to extremely important to \( \frac{9}{10} \) ths
  • essential to > half

• Avoiding > 30 tons of GHG emissions per vehicle over \( \approx 12 \)-year vehicle life

• Indicators of impact are increasing over time

• Programs with MSRP caps and cash on the hood may support equity as well as, or better than, programs with income caps

• Dealer sales incentives motivate EV salespeople, particularly those with prior EV ownership experience
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
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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Los Angeles CA • Oakland CA
Sacramento CA • Stony Brook NY

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Topics for Discussion

• EV market dynamics: models, product types, state statistics
• EV incentive design, for
  – Volume benefits
  – Cost effectiveness
  – Emissions reductions
  – Equity
• EV consumer demographics / incentive beneficiaries
• Implementation perspectives
• Pillars of program administration
• Mechanisms for increasing EV demand
  – Awareness, dealer sales incentives, consumer purchase incentives, infrastructure
• Comprehensive and effective EV policy frameworks
  – Vehicle supply, demand, fuel carbon intensity, vehicle use
GOALS:

60,000 EVs by 2020
300,000 ZEVs by 2025

2030: 40% GHG reduction

MD Excise Tax Credit $3,000
EV Service Equipment grant:
$700 - residential
$4,000 – commercial
$5,000 – service station
Increasing Awareness & Education
Live Tweet this session on Twitter
@timechols
Electric Vehicle Revolution
Electric Vehicle sales are rapidly rising in the U.S.
Chargers are everywhere
Lyft Ride-Share EV Experiment (ATL and SEATTLE)

- 50 Chevy Bolts
- $249 Rental (includes insurance and free charging)
- Must give 9 rides per week
- Can use car for personal use
- Facility in low-income blighted area
- Ride-Drive impact on Evs?
- Google “Tim Echols LYFT” to see my experience as driver
Windy Echols and her LEAF

Tim’s Kia Soul
Electric Vehicles will disrupt the market by 2031—UBS Lab Report
Time of Use – Plug-in Electric Vehicle

- 1000 customers studied.
- Their annual electric bills decreased by $180 AFTER getting an electric car.
- Whole house rate
- Uses electricity at the cheapest time.

* Prices are rounded energy only and do not include fuel, ECCR, NCCR, DSM and taxes

* Current Fuel Prices Rounded
GPC PEV Rate - Customer Load Study

- 94% customers are saving on this rate
- 15% increase in energy usage (3,023 kWh)
- PEV customers shifted an additional 10% usage to super off-peak

Top Information Channels
- (44%) Online
- (26%) Dealership
- (16%) Word of Mouth

Reasons For Not Subscribing
(Among non-rate plan customers) (n=16)
- Inconvenient Hourly Rates
- Still Too Expensive
- No Interest

93% PEV Rate Plan Satisfaction
2011

V: Very limited availability
L: High lease rates
C: Almost no charging available

"Other" This Generation Plug-In Vehicles:

Tesla Roadster: 1,900 (e)
Fisker Karma: 1,700 (e)
Ford Transit Connect: 550 (e)
McLaren P1: 124
CODA: 117

Total: 7,671, 9,674, 80, 17,425

Chevrolet Volt, Nissan LEAF, Mitsubishi i-MiEV

Dec 2010: 326, 19, 0, 345
Jan: 321, 87, 0, 408
Feb: 281, 67, 0, 348
Mar: 608, 298, 0, 906
Apr: 493, 573, 0, 1,066
May: 481, 1,142, 0, 1,623
Jun: 561, 1,708, 0, 2,269
Jul: 125, 931, 0, 1,056
Aug: 302, 1,362, 0, 1,664
Sep: 723, 1,031, 0, 1,754
Oct: 1,108, 849, 0, 1,957
Nov: 1,139, 672, 0, 1,811
Dec: 1,529, 954, 80, 2,563

Total: 7,671, 9,674, 80, 17,425

Note: Numbers include those plug-in vehicles that were publically available, sold in the US, and that are not part of the monthly drill-downs (minimum 100 units) *excludes NEVs

Michael Beinenson - 2017 - WECC
2019+

P 48 models with a plug compared to 6 in 2011

C Cox Enterprises launches PIVET

E Electrify America infusion of cash due to cheating scandal

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| Inside EVs | 11,904 | 12,756 | 15,542 | 13,387 | 15,638 | 17,332 | 15,820 | 16,624 | 0 | 0 | 0 | 0 | 121,962 |
| 2017 Results | 6,211 | 7,763 | 8,657 | 10,531 | 11,467 | 14,063 | 13,067 | 14,592 | 17,224 | 11,007 | 13,237 | 24,785 | 158,614 |
| Worldwide* | 41,372 | 53,161 | 94,450 | 71,762 | 91,417 | 102,130 | 92,835 | 547,727 |

Michael Beinenson - 2017 - WEEC
Georgia House Bill 170

Imposes New **UNFAIR** Road Use Tax

**Smart Fortwo ED**
2,100 lbs Curb Weight
$225/yr tax

**Ford F-150**
4,685 to 6,113 lbs Curb Weight
$164/yr tax

Shown to scale,
Both cars driven 12,000 miles per year.

**Which one of these damages the roads more?**
Commercial (2 Broad categories)

Ride Share, Taxi, Autonomous

Fleet, Motor Pool, Delivery, Trucking
Municipal Fleet Charging

Los Angeles Sustainability Plan example

- 80% of new fleet vehicles by 2025.
- LAPD is the largest fleet in the city and the first department to “go electric” with the first 100 of 500 EVs in total.
- The LAPD charging hub will be a part of larger system
- Building on open standards
In California:
The second-life battery system integrates two BMW i3 battery packs into a single housing.

In Alabama (without EV charging):
Being studied here by Southern Research using Nissan Leaf battery sets (10).
Echols amendment on 2nd Life Charging

- I move that the PSC authorize and direct Georgia Power to develop a pilot project utilizing used lithium ion batteries for a grid-connected charging system for electric vehicles.
- The goals of the pilot shall include keeping fast charging of clean electric vehicles affordable and insulating the grid from spikes in electricity demand.
- The cost of the pilot shall not exceed $250,000.
- Georgia Power shall work with the Staff in designing the project to ensure that the project has a public benefit.
“Helping you save money, use technology and be more sustainable.”
Follow me @timechols