Overview

• Introduction
• Financial incentives
• Fuel and maintenance savings
• Charging stations
• Other tips, tricks, and factoids
• Q&A
Disclaimer/Note

• Unless otherwise noted, information about vehicles was obtained from Kelly Blue Book, Edmunds, and/or EV Insider magazine.

• The electric vehicle market changes rapidly. Values/information listed herein are representative of the most recent information as of June 2019. Individuals are encouraged to use the resources described in these slides to verify the currency of this information.

• Individuals are encouraged to view these slides in tandem with the video recording. These information on these slides are not comprehensive; the audio in the video provides additional details on each slide.
What is a ZEV?
2016 Kia Soul EV

Battery Electric Vehicle (BEV)

2019 Hyundai Kona
Plug-in Hybrid Electric Vehicle (PHEV)

2019 Subaru Crosstrek Plug-In Hybrid
Standard Hybrid

2011 Toyota Prius

2019 Ram 1500
RCEA Advanced Fuels and Transportation Program
On-Road Passenger Vehicles 48.1%
Retail and Commercial Trucks 34.8%
Off-Road Vehicles and Equipment 15.6%
Air 0.5%
Marine 0.9%
Zero Emissions Vehicle Executive Order

By 2030
5 million ZEVs on California roads

By 2025
240,000 L2 charging stations
10,000 L3 charging stations
200 hydrogen fueling stations
## Battery Electric Vehicles (BEV)

<table>
<thead>
<tr>
<th>Year</th>
<th>Model</th>
<th>MSRP/Lease</th>
<th>Battery (kWh)</th>
<th>Range (miles)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>Nissan Leaf (used)</td>
<td>$10,459</td>
<td>24</td>
<td>84</td>
</tr>
<tr>
<td>2019</td>
<td>Hyundai Kona</td>
<td>$37,495</td>
<td>64</td>
<td>258</td>
</tr>
<tr>
<td>2018 (used)</td>
<td>Chevy Bolt (used)</td>
<td>$28,867</td>
<td>60</td>
<td>238</td>
</tr>
</tbody>
</table>
## Plug-in Hybrid Electric Vehicles (PHEV)

<table>
<thead>
<tr>
<th>Year</th>
<th>Make</th>
<th>Model</th>
<th>MSRP</th>
<th>Battery Capacity</th>
<th>Gas Consumption</th>
<th>Electric Range</th>
<th>Total Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>Kia</td>
<td>Niro</td>
<td>$27,900-</td>
<td>8.9 kWh</td>
<td>11.3 gallons</td>
<td>26 (electric)</td>
<td>535 (total)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>$29,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2018</td>
<td>Mitsubishi</td>
<td>AWD</td>
<td>$34,595</td>
<td>12 kWh</td>
<td>11.3 gal</td>
<td>22</td>
<td>288</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2019</td>
<td>Subaru</td>
<td>Crosstrek AWD</td>
<td>$35,970</td>
<td>8.8 kWh</td>
<td>13.2 gal</td>
<td>17</td>
<td>480</td>
</tr>
</tbody>
</table>
## PHEV Cont’d

<table>
<thead>
<tr>
<th></th>
<th>MSRP</th>
<th>Battery</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Gas</td>
<td>(miles)</td>
</tr>
<tr>
<td><strong>2017 Chevy Volt</strong> (used)</td>
<td>$17,896</td>
<td>18.4 kWh, 8.9 gallons</td>
<td>53 (electric), 420 (total)</td>
</tr>
<tr>
<td><strong>2018 Toyota Prius Prime</strong></td>
<td>$27,077</td>
<td>9 kWh, 11.3 gal</td>
<td>25, 640</td>
</tr>
</tbody>
</table>
Financial Incentives
Federal Tax Credit Amount

• EV/PHEV
• $2,500 - $7,500
• Price changes depending on vehicle

Eligibility

• Minimum tax liability of
• $2,500 - $7,500
Rebate Amount

- EV: $2,500 - $3,500
- PHEV: $1,500 - $3,500

Eligibility

- New EV/PHEV
- Purchase or lease

Income Eligibility

- $150,000 for single filers
- $204,000 for head-of-household filers
- $300,000 for joint filers

2018 Increased Rebate Income Limits

<table>
<thead>
<tr>
<th>Household Size</th>
<th>Combined Household Income must be less than*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$36,420</td>
</tr>
<tr>
<td>2</td>
<td>$49,380</td>
</tr>
<tr>
<td>3</td>
<td>$62,340</td>
</tr>
<tr>
<td>4</td>
<td>$75,300</td>
</tr>
<tr>
<td>5</td>
<td>$88,260</td>
</tr>
<tr>
<td>6</td>
<td>$101,220</td>
</tr>
<tr>
<td>7</td>
<td>$114,180</td>
</tr>
</tbody>
</table>
Grant Amounts

- HEV: $2500
- PHEV: $5000
- BEV: $5000

Financing

- $1000 buyer contribution
- $< or = 8% interest rate loans

Vehicle eligibility

- New
- If used, must have less than 75,000 miles or be at least 8 years old

Income Eligibility

<table>
<thead>
<tr>
<th>Number of People</th>
<th>Annual Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$48,560</td>
</tr>
<tr>
<td>2</td>
<td>$65,840</td>
</tr>
<tr>
<td>3</td>
<td>$83,120</td>
</tr>
<tr>
<td>4</td>
<td>$100,400</td>
</tr>
<tr>
<td>5</td>
<td>$117,680</td>
</tr>
<tr>
<td>6</td>
<td>$134,960</td>
</tr>
<tr>
<td>7</td>
<td>$152,240</td>
</tr>
<tr>
<td>8</td>
<td>$169,520</td>
</tr>
</tbody>
</table>
PG&E Rebate Amount
$800

Vehicle Eligibility
New or used EV only
If used cannot be the third owner

Income Eligibility
No income requirements
Estimated Capital Savings

- $5000 (CVAP)
- $800 (PG&E)

$2515

2015 Used Fiat 500e
(80-90 mile range)

$8,315
Estimated Capital Savings

2017 Chevy Bolt
(238 mile range)

$11,500

-$2500 (CVRP)

-$500 (PG&E)

$8500
Insurance Incentives

TRAVELERS

FARMERS INSURANCE
HOV Access

Active: January 1, 2018 – 2022
Maintenance and Fuel Savings
Gas Car
~2,000 moving parts

Electric Car
~20 moving parts
### How Do Maintenance Costs Vary With Mileage?

Based on Maintenance Performed by YourMechanic

<table>
<thead>
<tr>
<th>Mileage</th>
<th>Total Maintenance Costs per 25k Miles</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 25,000</td>
<td>$1,400</td>
</tr>
<tr>
<td>25,000 - 50,000</td>
<td>$2,200</td>
</tr>
<tr>
<td>50,000 - 75,000</td>
<td>$3,000</td>
</tr>
<tr>
<td>75,000 - 100,000</td>
<td>$3,900</td>
</tr>
<tr>
<td>100,000 - 125,000</td>
<td>$4,100</td>
</tr>
<tr>
<td>125,000 - 150,000</td>
<td>$4,400</td>
</tr>
<tr>
<td>150,000 - 175,000</td>
<td>$4,800</td>
</tr>
<tr>
<td>175,000 - 200,000</td>
<td>$5,000</td>
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**Average New Car Maintenance and Repairs (AAA)**

- **Gas:** $1186/year
- **Electric:** $982/year
Battery Replacement???
Fuel Savings

Chevy 2017 Bolt

$0.18 \times 60 \text{ kWh} \times 15,000 \text{ miles} = \$680.67 \text{ Per year}

64 \% \text{ Savings} = \$1,219

2006 Honda Accord

$3.80 \times 15.3 \text{ gallons} \times 15,000 \text{ miles} = \$1,900 \text{ Per year}
60% Savings = $1,048

$0.18
1 kWh
× 60 kWh
× 15,000 miles
= $680 Per year

$3.80
1 Gallon
× 15.8 gallons
× 15,000 miles
= $1,728 Per year
## Overall Savings

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<th>Cost</th>
<th>Average 2019 EV</th>
<th>Average 2019 Gas</th>
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<td>Capital Costs</td>
<td>$30,419</td>
<td>$16,485</td>
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<tr>
<td>Maintenance</td>
<td>$982</td>
<td>$1186</td>
</tr>
<tr>
<td>Fuel</td>
<td>$680</td>
<td>$1,728</td>
</tr>
<tr>
<td>One year</td>
<td>$32081</td>
<td>$19399</td>
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<tr>
<td>Incremental Cost (NPV, 8 years)</td>
<td></td>
<td>$4740</td>
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Average new light-duty car price (December 2018)
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Incremental Cost (NPV, 8 years): $4740
Incremental Cost (NPV, 10 years): $2848
Incremental Cost (NPV, 14 years): $615
Charging Stations
Types of Charging Stations

- **Travel**: 1 to 1.5 hours
- **Public or Home**: 4 to 8 hours
- **Residential**: 10 to 40 hours to recharge
EV Charging Stations in Our Region
70 miles
149 miles
139 miles
Future Fast Charge Network:

Leaf the range anxiety behind!
Average daily trip is 30 miles!
Other Tips and Tricks
Dealer Tips

• Sometimes its better to lease than buy, due to obsolescence and faster-than-usual depreciation.
• If secondary car, buying may be more feasible.
• Check for overall battery capacity when buying used (dealers often won’t know).
• Single pay up front for lease is cheaper.
Dealer Tips Cont’d

• Get quotes via e-mail from out of area first, then use to negotiate with local dealers

• **Tips for getting the best deal on a lease** (for all cars and includes math that will be the key to great negotiation skills; especially relevant to an EV)

• **Tips from a Driver Who has Leased 4 Evs**

• **Consumer Reports tips**
Get the Most Out of Your Battery

1) Speed
Get the Most Out of Your Battery

1) Speed
2) Charge to 80%
Get the Most Out of Your Battery

1) Speed
2) Charge to 80%
3) Park in the shade
Get the Most Out of Your Battery

1) Speed
2) Charge to 80%
3) Park in the shade
4) Heating and AC
Get the Most Out of Your Battery

1) Speed
2) Charge to 80%
3) Park in the shade
4) Heating and AC
5) Tires
Get the Most Out of Your Battery

1) Speed
2) Charge to 80%
3) Park in the shade
4) Heating and AC
5) Tires
6) Travel light
Get the Most Out of Your Battery

1) Speed
2) Charge to 80%
3) Park in the shade
4) Heating and AC
5) Tires
6) Travel light
7) Recharge at 30%
Get the Most Out of Your Battery

1) Speed
2) Charge to 80%
3) Park in the shade
4) Heating and AC
5) Tires
6) Travel light
7) Recharge at 30%
8) Use a charging timer
Get the Most Out of Your Battery

1) Speed
2) Charge to 80%
3) Park in the shade
4) Heating and AC
5) Tires
6) Travel light
7) Recharge at 30%
8) Use a charging timer
9) Temper fast charging
Greenhouse Gas Emissions

EV long-range (265 miles)
Manufacturing emissions $\uparrow$ 68%
Overall emissions $\downarrow$ 53%

Pay back = 19,000 miles
EV Midrange (84 miles)
Manufacturing emissions $\uparrow$ 15 %
Overall emissions $\downarrow$ 51 %

pay back = 4,900 miles
Thank You

Aisha Cissna
acissna@redwoodenergy.org
Q&A
Extra Slides
Performance

*Instant* peak torque

*GREAT* handling
Types of Zero Emission Vehicles (ZEV)

Fuel Cell Electric Vehicle

A hydrogen fuel cell (FCEV) runs on an electric motor that is powered through a chemical reaction between hydrogen and oxygen. This car must be refueled with liquid hydrogen.