Advancing Plug-In Electric Vehicle (PEV) Rollout
These figures double the adoption rate of the Hybrids in the early 2000’s.
# PEV Sales

## 2013

<table>
<thead>
<tr>
<th>Month</th>
<th>Hybrids (HEVs)</th>
<th>Plug-In Hybrid (PHEVs) and Extended Range (EREVs)</th>
<th>Battery (BEVs)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>34,611</td>
<td>2,354</td>
<td>2,022</td>
<td>38,987</td>
</tr>
<tr>
<td>February</td>
<td>40,173</td>
<td>2,789</td>
<td>2,616</td>
<td>45,578</td>
</tr>
<tr>
<td>March</td>
<td>46,327</td>
<td>3,079</td>
<td>4,553</td>
<td>53,959</td>
</tr>
<tr>
<td>April</td>
<td>42,804</td>
<td>2,735</td>
<td>4,403</td>
<td>49,942</td>
</tr>
<tr>
<td>May</td>
<td>48,796</td>
<td>3,209</td>
<td>4,545</td>
<td>56,550</td>
</tr>
<tr>
<td>June</td>
<td>44,924</td>
<td>4,169</td>
<td>4,573</td>
<td>53,666</td>
</tr>
<tr>
<td>July</td>
<td>45,494</td>
<td>3,499</td>
<td>3,943</td>
<td>52,936</td>
</tr>
<tr>
<td>August</td>
<td>53,020</td>
<td>6,407</td>
<td>4,956</td>
<td>64,383</td>
</tr>
<tr>
<td>September</td>
<td>33,576</td>
<td>4,477</td>
<td>3,650</td>
<td>41,703</td>
</tr>
<tr>
<td>October</td>
<td>33,565</td>
<td>6,367</td>
<td>3,733</td>
<td>43,625</td>
</tr>
<tr>
<td>November</td>
<td>36,085</td>
<td>4,903</td>
<td>3,930</td>
<td>44,918</td>
</tr>
<tr>
<td>December</td>
<td>36,155</td>
<td>5,020</td>
<td>4,770</td>
<td>49,945</td>
</tr>
<tr>
<td></td>
<td>495,530</td>
<td>111,702</td>
<td>61,702</td>
<td>592,232</td>
</tr>
</tbody>
</table>

**All plug-in cars:**

| All Vehicle Sales YTD 2013 | 15,531,609 |
| Total Electric Drive Market Share | 3.81% |

Reprinted from: electricdrive.org
# PEV Sales State Market

<table>
<thead>
<tr>
<th>Rank</th>
<th>State</th>
<th>EV Market Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Washington</td>
<td>1.6%</td>
</tr>
<tr>
<td>2</td>
<td>Hawaii</td>
<td>1.6%</td>
</tr>
<tr>
<td>3</td>
<td>California</td>
<td>1.4%</td>
</tr>
<tr>
<td>4</td>
<td>Georgia</td>
<td>1.1%</td>
</tr>
<tr>
<td>5</td>
<td>Oregon</td>
<td>1.1%</td>
</tr>
<tr>
<td>6</td>
<td>District Of Columbia</td>
<td>0.6%</td>
</tr>
<tr>
<td>7</td>
<td>Utah</td>
<td>0.4%</td>
</tr>
<tr>
<td>8</td>
<td>Colorado</td>
<td>0.4%</td>
</tr>
<tr>
<td>9</td>
<td>Tennessee</td>
<td>0.3%</td>
</tr>
<tr>
<td>10</td>
<td>Illinois</td>
<td>0.3%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rank</th>
<th>State</th>
<th>EV Market Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>42</td>
<td>Oklahoma</td>
<td>0.1%</td>
</tr>
<tr>
<td>43</td>
<td>Alabama</td>
<td>0.1%</td>
</tr>
<tr>
<td>44</td>
<td>Louisiana</td>
<td>0.0%</td>
</tr>
<tr>
<td>45</td>
<td>Wyoming</td>
<td>0.0%</td>
</tr>
<tr>
<td>46</td>
<td>Kentucky</td>
<td>0.0%</td>
</tr>
<tr>
<td>47</td>
<td>West Virginia</td>
<td>0.0%</td>
</tr>
<tr>
<td>48</td>
<td>Arkansas</td>
<td>0.0%</td>
</tr>
<tr>
<td>49</td>
<td>North Dakota</td>
<td>0.0%</td>
</tr>
<tr>
<td>50</td>
<td>South Dakota</td>
<td>0.0%</td>
</tr>
<tr>
<td>51</td>
<td>Mississippi</td>
<td>0.0%</td>
</tr>
</tbody>
</table>

Source: Polk, Edmunds.com
Every major manufacturer has plans for a Plug-In Electric Vehicle by 2015

PEV’s available today

<table>
<thead>
<tr>
<th>All Electric PEV</th>
<th>PEV with Internal Combustion Engine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nissan LEAF</td>
<td>Porsche Panamera S e-Hybrid</td>
</tr>
<tr>
<td>Chevrolet Spark</td>
<td>Chevy Volt</td>
</tr>
<tr>
<td>Ford Focus</td>
<td>Prius PEV</td>
</tr>
<tr>
<td>Tesla</td>
<td>Ford Fusion Energi</td>
</tr>
<tr>
<td></td>
<td>Ford C-Max Energi</td>
</tr>
<tr>
<td></td>
<td>Volvo V60 PEV</td>
</tr>
</tbody>
</table>
PEV Vehicle Types

**BEV**
- Battery Electric Vehicle
- All Electric – All the Time
- Low maintenance
- Low operating cost
- More expensive
- Range limitations

**PHEV**
- Plug-In Hybrid EV
- Traditional Hybrid – w/ a Plug
  - Great mpg
  - Unlimited range
  - Limited battery-only range

**EREV**
- Extended Range EV
- All Electric Drive – All the time
  - Gas engine drives a generator
  - Greater battery-only range
  - Excellent mpg
  - Unlimited range
  - Lower mileage in gasoline mode

Graphics reprinted from: electricdrive.org

February 26, 2014
Why Drive a PEV?

Economics

• 3.5 cents / mile ($.12 kWh)
  • Special power rate -> 1 cent / mile
• Stable fuel costs
• Greatly reduced maintenance costs
  • No, or fewer, oil changes, etc.

Philosophy

• Environment
• Energy independence
• You’re a Gear/Tech Head
• Convenience

Incentives

• Federal: Up to $7,500 in income tax credit for the purchase of a PEV.

• State*: Up to $5,000 in income tax credit for the purchase or lease of a BEV.
  * As of February 24, 2014

Whatever the reason – Driving a PEV Will Change Your Mindset

February 26, 2014
Electric Vehicle Charging Stations
(Also known as EVSEs – Electric Vehicle Supply Equipment)

**Level 1** – 120V, 8 - 12A:
- Plugs into standard home outlet
- Charging time: 10 - 24 hours
- Cost: Included with car

**Level 2** – 208/240V, 15 - 80A:
- Charging time: 2 - 7 hours
- $500 - $7,000: depending on model and features
- $2,300: basic commercial unit on pedestal

Level 2 EV charging (208/240V - 40A) is the primary choice for:
- Residential
- Workplace
- Retail
- Commercial

**DC Quick Charger**
480V, 100A, 3Ø
- Charging time: 15-45 minutes
- Cost: $15,000 - $60,000

Note: Above figures do not include the cost of installation.
Electric Vehicle Charging Station

Locations

(Within 25 miles of Atlanta – August 2011)
Electric Vehicle Charging Station Locations
(Current)

February 26, 2014

Photo Credit: www.plugshare.com

MetroPlug-In®
Level 2 EVSE Installation

- Dedicated circuit required for EACH charging station (sometimes two in the case of a dual unit).

- Electrical load must be calculated at full continuous load and must assume all EVSEs will be in use at the same time.

- NEC 625
  - Defines EVSE Electrical Requirements

Other Considerations:

- ADA Requirements: Currently none; but worth keeping in mind. Some states following California standard.

- Signage & Markings: No standard, but green seems to be color of choice.

- Cables: Tripping hazard

- Lighting around charging stations

- Installation of Level 1 outlet for other charging (scooters, EV conversions, etc.).

- Install extra conduit for future expansion, including networking.

- Consider a tire stop or bollard in some cases.
Infrastructure Obstacles

Cost

- Largest cost is usually installation, not equipment
  - Distance = $$’s

  - Locate as close to Electrical Room / Load Panel as possible

  - Plan ahead – put in extra conduit

  - Incentives :
    - Federal: gone in 2014
    - GA: 10%, up to $2,500, in some commercial locations
Infrastructure Obstacles

Capacity

Local / Site
- Panel Load
- Transformer Load
- Subpanel
- Transformer Upgrade
- Upgrade lighting to LED
- Level 1 or smaller Level 2 EVSE
- New construction requirements

Regional
- GA has a very robust grid
- Neighborhood transformers replaced by GA Power – Rebate program would help track

National
- 3 – 10 million EVs without impact
- Education:
  - Charge during off-peak hours
  - Equivalent of an extra 160 power plants at night
  - Use “End Time” to help randomize charging
- SmartGrid
Infrastructure Obstacles

Bureaucratic / Logistical

- Homes without garages
- Multi-dwelling buildings
- HOA’s
- Permitting

- Each situation is unique – not always an easy answer
- HOA’s starting to use agreements for “Premium Parking Spots”
- Dedicate Level 1 circuits
- Permitting getting easier as electric divisions get educated
Resources

PlugInAmerica.org

PlugInGeorgia.com

GreenCarReports.com

InsideEVs.com

www.PluginInCars.com

www.PluginShare.com

MetroPlugIn.com

www.afdc.energy.gov

www.CarStations.com

www.evea.org

www.evclubsouth.org

www.electrifyatlanta.com

February 26, 2014
Thank You
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