Fuel Cell Vehicles in California: On the Road to Commercial

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Promoting fuel cell vehicle commercialization as a means of moving towards a sustainable energy future, increasing energy efficiency and reducing or eliminating air pollution and greenhouse gas emissions.
Moving forward to real customers!

Will hydrogen fuel stations meet growing demand?
CARB Zero Emission Vehicle Regulation (March 27, 2008)

Requires each major auto to sell market share:

• 2009-2011 – 2,500 “Gold” ZEVs
• 2012-2014 – 25,000 “Gold” ZEVs
  – or fewer, with “Silver+”
• 2015-2017 – 50,000 “Gold” ZEVs
  – or fewer with “Silver+”
  – to be considered further in 2009

Gold = H₂FCV or BEV, Silver+ = PHEV or H₂ICE
### CARB “Gold” ZEV requirements

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<thead>
<tr>
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<tbody>
<tr>
<td>Previous²</td>
<td>2500</td>
<td>25,000</td>
<td>50,000</td>
</tr>
<tr>
<td>New³</td>
<td>NA</td>
<td>25,000 OR 5357 – 9375 PLUS 58,000 silver+</td>
<td>50,000 OR at least 25,000⁴</td>
</tr>
</tbody>
</table>

¹ large-volume automakers required to build their market share
² prior to March 27, 2008 CARB meeting
³ changes based on March 27, 2008 CARB meeting
⁴ 2015 – 2017 requirements to be considered in 2009
## CARB Zero Emission Vehicle Regulation

In 2012-2014, if autos make their market share of the following “Gold” ZEVs:

<table>
<thead>
<tr>
<th>ZEV Vehicle Type</th>
<th>Vehicles Required 2012-2014</th>
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<tbody>
<tr>
<td>Type V – Long-Range (300+ mi) FCV</td>
<td>5,357</td>
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<tr>
<td>Type IV – Mid-Range (200+ mi) FCV</td>
<td>7,500</td>
</tr>
<tr>
<td>Type III – Short-Range (100+ mi) FCV or Longer-Range (200+ mi) BEV</td>
<td>9,375</td>
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<tr>
<td>Type II – Long-Range (100+ mi) BEV</td>
<td>12,500</td>
</tr>
<tr>
<td>Type I.5 – Mid-Range (75+ mi) BEV</td>
<td>15,000</td>
</tr>
<tr>
<td>Type I – Short-Range (50+ mi) BEV</td>
<td>18,750</td>
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They can make up the difference with their market share of approx. 58,000 “Silver+” vehicles (PHEVs, H₂ICEs)
CARB Zero-Emission Bus Regulation

• Beginning in 2011-2012, transit agencies operating more than 200 buses are required make 15% of new bus purchases zero-emission buses
  – 9 FCBs placed, 7 operating today
  – 8 new FCBs for AC Transit in 2009-2010
• Possibly 200+ FCBs in California by 2015
Where should $\text{H}_2$ stations be located?
Additional 750 kg/day $\text{H}_2$ needed by 2010 in LA region for light-duty fuel cell vehicles only!

Fuel stations must be:
1. Focused in early markets
2. Retail-like experience
3. Customer friendly!
4. Plenty of fuel (350 and 700 bar)
Building the Hydrogen Highway Network

- $19 million allocated by California Legislature (2005 through 2008)
- Current RFP for $7.7 million
  - 3 Retail-like stations, 2 upgraded stations
  - Targeted locations, 350 and 700 bar fuel
  - Use 33% renewable, reduce GHGs 30%, reduce criteria pollutants (SB 1505)