FCEVs and H\textsubscript{2} in California

Catherine Dunwoody
June 2014
Here come the FCEVs....
Stations must come first

- 68 stations provide coverage to enable market launch
  - Supports customer convenient fueling in early markets
  - Enables travel throughout early market regions and state
- 100 stations to support market growth
H₂ station funding

• AB 8 signed into law by Gov. Brown
  » Extends funding for important air quality and alternative fuel programs
  » Guarantees $20M annually through 2023 to achieve 100 hydrogen stations in California
  » Annual survey, evaluation and reporting

• H₂ funding provision increases certainty that stations will be in place to support early market FCEVs
H$_2$ station progress

- 9 stations open
- 19 stations in development, construction or commissioning
- 28 stations plus mobile fueler recently proposed for funding
- [http://cafcp.org/stationmap](http://cafcp.org/stationmap)
Hydrogen Infrastructure
Funding to Date = $90 million

- 45 new stations ($72.7 million)
- 3 station upgrades ($6.7 million)
- 4 O&M grants ($1.2 million)
- 1 mobile fueler ($0.9 million)

Other funding support
- AC Transit Oakland station ($3 million)
- CDFA DMS retail dispensing ($4 million)
- UC Irvine STREET model ($1.5 million)
- GO-Biz ZEV infrastructure project manager support
# H₂ Station Grant Summary

<table>
<thead>
<tr>
<th>Developer</th>
<th>No. of Stations</th>
<th>Technology and Type</th>
<th>Capacity (kg/day)</th>
<th>100% Renewable H₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Element</td>
<td>17</td>
<td>Delivered H₂</td>
<td>180</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Delivered H₂</td>
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</tr>
<tr>
<td>Air Products</td>
<td>10</td>
<td>Delivered H₂</td>
<td>180</td>
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<tr>
<td>Linde</td>
<td>7</td>
<td>Delivered Liquid H₂</td>
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<tr>
<td>Air Liquide</td>
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<td>Delivered H₂</td>
<td>180</td>
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<tr>
<td></td>
<td>1</td>
<td>Delivered H₂</td>
<td>180</td>
<td>Yes</td>
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<tr>
<td>HyGen</td>
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<td>On-Site Electrolyzer</td>
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<td>Yes</td>
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<tr>
<td>ITM</td>
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<td>Electrolyzer + Delivery</td>
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<tr>
<td>Ontario CNG</td>
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<tr>
<td>HTEC</td>
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<td>Electrolyzer + Delivery</td>
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</tr>
</tbody>
</table>
Northern CA Hydrogen Stations

Open
Emeryville - AC Transit

In Development
Cupertino
Foster City
Mountain View
*West Sacramento

Announced
Campbell
Hayward
Mill Valley
Oakland
Palo Alto
Redwood City
*Rohnert Park
San Jose
San Ramon
Saratoga
South San Francisco
*Truckee
Woodside

*Not shown on map
State agency actions

- California ZEV Action Plan
- ZEV Infrastructure project manager in GO-Biz
- Hydrogen policy group
  - Governor’s Office, ARB, CEC, GO-Biz
- Interagency H₂ station workgroup
- H₂ Station “Green Team”
- H2USA member
- 8-State ZEV Action Plan
Selling hydrogen as fuel

• Field testing to determine practical meter accuracy
• Adopt additional accuracy classes that sunset over time
• Enable legal commercial sale of $H_2$ by the kg
  » Temporary use permit
  » Certificate of approval
Beginning the Commercialization of Hydrogen Fuel Cell Electric Vehicles

By Joe Gagliano, California Fuel Cell Partnership You may have recently seen a spike in media stories regarding hydrogen fuel cell electric vehicles (FCEV). Toyota announced its next-generation fuel-cell vehicle at the November 2013 Tokyo Auto Show and in the US at the 2014 Consumer Electronics Show this past January. Honda and Hyundai introduced their ....

CaFCP support

June 2014 Fuel Marketer News
Fuel cell buses and trucks

- 16 fuel cell buses
- >1.5M miles in service
- >2.5M passengers carried
- FCEB roadmap
  - 40 bus fleets
  - 12-year operation
  - <$1M per bus
- MD/HD roadmap
  - In process
CaFCP members

Air Liquide
Air Products
Alameda-Contra Costa Transit District (AC Transit)
Automotive Fuel Cell Cooperation
BAE Systems
Ballard Power Systems
California Air Resources Board
California Energy Commission
California Department of Food and Agriculture
California State University-Los Angeles
The Center for Energy Efficiency and Renewable Technologies (CEERT)
Chrysler
Daimler
Energy Independence Now
General Motors
Honda
Hydrogenics
Hyundai
ITM Power
Institute of Transportation Studies, UC Davis
Linde North America, Inc.
National Fuel Cell Research Center, UC Irvine
National Renewable Energy Laboratory (NREL)
Nissan
Powertech Labs
Proton OnSite
Sandia National Laboratories
South Coast Air Quality Management District
Southern California Gas Company
SunLine Transit Agency
Toyota
U.S. Department of Energy
U.S. Environmental Protection Agency
University of California, Berkeley
US Hybrid
Volkswagen