Status and Progress on FCEV Market Launch in California

WHEC 2016

Chris White
California Fuel Cell Partnership
27,000,000 vehicles
No quick trips
It's a huge state

100 stations statewide

- Establish initial network coverage
- Clusters in big cities
- “Connectors” and “destination” stations across the state
- Vision for commercial rollout
Retail station progress

- Pre-permitting: 1
- Permitting: 4
- Planning Approval: 6
- Approval to build: 2
- Approval to build: 2
- Construction: 7
- Construction: 6
- Commissioning: 18
- Open Nonretail
- Open Retail
1. 24-hour, 7-day unattended operation
2. Customers can pay for fuel
3. Stations are reliable
From operational to open

- DMS certification
- Fill protocol confirmed
- SOSS working
DMS certification

- Certify hydrogen dispensers for accuracy
- Required to sell fuel

<table>
<thead>
<tr>
<th>Accuracy Class</th>
<th>Acceptance Tolerance</th>
<th>Maintenance Tolerance</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.0</td>
<td>1.5%</td>
<td>2.0%</td>
</tr>
<tr>
<td>3.0 installed before 2020*</td>
<td>2.0%</td>
<td>3.0%</td>
</tr>
<tr>
<td>5.0 installed before 2020*</td>
<td>4.0%</td>
<td>5.0%</td>
</tr>
<tr>
<td>10.0 installed before 2018*</td>
<td>5.0%</td>
<td>10.0%</td>
</tr>
</tbody>
</table>

* No new installations after the end of the designated calendar year unless regulations are further amended. Existing installations allowed to operate until decommissioned.
Fill protocol confirmed
Main Functions

H2 Receiving System = Receive hydrogen from dispenser
Sequencing System = Direct gas flow
Tank System = Store H2 during fueling tests
Defuel System = Controlled release of stored H2 to atmosphere
Purge System = Introduce inert gas for transportation
Control System = Monitor/record sensors and control valve positions
Data Report = Process data into report format

https://h2tools.org/h2first/HyStEP
Station Operational Status System (SOSS)

HOW IT WORKS

CaFCP's secure server and station database

About every 15 minutes, stations send information to CaFCP's database.

Authorized applications receive data from CaFCP to provide drivers with real-time station information.

www.cafcp.org
# Station Status

<table>
<thead>
<tr>
<th>Public Retail Stations</th>
<th>H70</th>
<th>H35</th>
</tr>
</thead>
<tbody>
<tr>
<td>Costa Mesa (Soft Opening)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diamond Bar</td>
<td></td>
<td></td>
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<tr>
<td>Fairfax-LA (Soft Opening)</td>
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<td></td>
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<tr>
<td>Harris Ranch</td>
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<tr>
<td>Hayward (Soft Opening)</td>
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<td></td>
</tr>
<tr>
<td>La Canada Flintridge (Soft Opening)</td>
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<td></td>
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<tr>
<td>Lake Forest (Soft Opening)</td>
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<td></td>
</tr>
<tr>
<td>Long Beach (Soft Opening)</td>
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<td></td>
</tr>
<tr>
<td>San Jose (Soft Opening)</td>
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</tr>
</tbody>
</table>

**West Sacramento**

This station will be offline for planned maintenance on Friday, June 3 from 9AM-1PM.

Last Updated: 06/08/2016 9:40 am
*H35 = 35 MPa or 5,000 PSI
*H70 = 70 MPa or 10,000 PSI

1515 South River Road, West Sacramento, CA 95691

View in Map
Opening Hours:
www.cafcp.org/stationmap
State support

- $20M annual co-funding through 2023
- Annual survey, evaluation and reporting
- Action plan for all agencies
- Increases certainty that stations will be in place to support early market FCEVs
Government support

- FCEV deployment
  - Planned Station Network
  - Future Network Stations
  - Market Growth

<table>
<thead>
<tr>
<th>Year</th>
<th>FCEVs Supported</th>
<th>Stations</th>
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<tbody>
<tr>
<td>2012</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>2013</td>
<td>8</td>
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<td>2014</td>
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<td>2020</td>
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<td>2021</td>
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<tr>
<td>2022</td>
<td>114</td>
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<tr>
<td>2023</td>
<td>126</td>
<td>126</td>
</tr>
</tbody>
</table>
Fuel cell buses

- AC Transit - 13 FCEBs
  - 15 years of revenue operation
  - 21k continuous operating hours
- SunLine - 5 FCEBs
  - 7 more under construction
  - Center of Excellence
- Orange County
  - First bus on May 25
California FUEL CELL PARTNERSHIP
DRIVING FOR THE FUTURE

Ask me about my fuel cell car.
Chris White

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@cafcp