Retail Hydrogen Fueling Station Network Update

Ben Xiong, Keith Malone, Dave Park

8/03/2021
CaFCP Members

— 20+ years of collaboration —
New members
CaFCP Station Map & SOSS

http://cafcp.org/stationmap  |  http://m.cafcp.org
An Expanding Hydrogen Station Network

- California Energy Commission hydrogen station funding (GFO 19-602)
- 114 stations funded over several years
  - 30 stations funded in first batch
- Breakdown of all stations funded
  - Shell - 51
  - First Element - 49
  - Iwatani - 14
- Iwatani will also build six additional stations not funded by this GFO.

Source: Governor’s Office of Business and Economic Development
Retail Hydrogen Stations & Network Health

New Stations Opened
• Aliso Viejo
• Campbell
• Concord
• Placentia
• Studio City

Commissioning Schedule
• Sherman Oaks

Stations Currently Unavailable
• Ontario
• Riverside
• Newport Beach – In Permitting
• Berkeley- Q1 2022
• SF Harrison St- Q1 2022

High Capacity Station Performance Improvements
• Station short fills and durability vastly improved and proven at Aliso Viejo, Fountain Valley, Placentia, Mission hills. Countermeasure team now in No Cal beginning with Campbell/ Hamilton. Expected completion this week.

H2 stations list - https://cafcp.org/sites/default/files/h2_station_list.pdf
## By the Numbers

<table>
<thead>
<tr>
<th>Asset Classification</th>
<th>Numbers as of July 1, 2021</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>FCEVs—Fuel cell cars sold and leased in US*</td>
<td></td>
<td>10,803</td>
</tr>
<tr>
<td>FCEBs—Fuel cell buses in operation in California</td>
<td></td>
<td>48</td>
</tr>
<tr>
<td>Fuel cell buses in development in California</td>
<td></td>
<td>38</td>
</tr>
<tr>
<td>Hydrogen stations available in California**</td>
<td></td>
<td>48</td>
</tr>
<tr>
<td>Retail hydrogen stations in <em>construction</em> in California***</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Retail hydrogen stations in <em>permitting</em> in California***</td>
<td></td>
<td>32</td>
</tr>
<tr>
<td>Retail hydrogen stations <em>proposed</em> in California***</td>
<td></td>
<td>16</td>
</tr>
<tr>
<td>Retail hydrogen stations <em>funded</em>, but not in development in California***</td>
<td></td>
<td>72</td>
</tr>
<tr>
<td><strong>Total retail hydrogen stations in development in California</strong>*</td>
<td></td>
<td>129</td>
</tr>
<tr>
<td>Retail truck hydrogen stations in construction in California</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Retail truck hydrogen stations <em>funded</em>, but not in development in California****</td>
<td></td>
<td>5</td>
</tr>
</tbody>
</table>

[https://cafcp.org/by_the_numbers](https://cafcp.org/by_the_numbers)
H2 Supply and Distribution

• [https://m.cafcp.org/](https://m.cafcp.org/) (SOSS) is your friend
• Hydrogen supply is and has been challenging
  • Wholesale hydrogen supply constraints
  • Capital equipment technical challenges (compressors, POS, distribution trailers)
  • High demand for licensed carriers
• Wholesale Activity
  • Linde 30+ tons per day liquid hydrogen production facility, La Porte, Texas (July 2021)
  • Air Liquide Nevada hydrogen production plants coming online in early 2022
  • Air Products announced a $1.3B hydrogen production complex in Edmonton, Alberta, expected onstream in 2024
• Retail Activity
  • More stations- both publicly and privately funded
  • Higher capacity, multiple fueling position stations
  • Faster station development time, ala GoBiz *Hydrogen Station Permitting Guidebook*

https://www.reddit.com/user/toyotausa/comments/mnnglh/were_jackie_saeed_and_daniel_from_the_toyota/
California H2 stations in 2020, 2025 and 2030

**BY 2020**
Funded
Light Duty

- 100 hydrogen stations by 2020.
  Funded by Assembly Bill 8 (2013).

**BY 2025**
Planned
Light Duty

- 200 hydrogen stations by 2025,
pursuant to the Governor’s 2018 ZEV infrastructure Proposal.

**BY 2030**
Envisioned
*Light, Medium and Heavy*

- 1000 hydrogen stations by 2030 with favorable market conditions and state policies pursuant to the CAFCP 2030 vision. Will support 1,000,000 fuel cell electric vehicles.

Governor’s goal of 5,000,000 zero-emission vehicles by 2030.
“FCEVs will play a key role in our zero-emissions strategy, which is being advanced by our joint manufacturing and development agreements. We continue to make significant investments...”

Honda ready for quicker shift to all-electrified lineup, CEO hints

2040 goal poised to move up five years with proposed EU ban on gasoline autos
The Other Electric Bus

California Transit Agencies with fuel cell electric buses on the road and in the pipeline

1. AC Transit (Oakland/East Bay)
2. Fresno Area Express
3. Golden Empire Transit (Bakersfield)
4. OCTA (Orange County)
5. North County Transit (San Diego)
6. SunLine Transit (Coachella Valley)

Low or No Emission Vehicle Program funding for vehicles and facilities
Golden Empire Transit (Bakersfield, CA), Central Midlands Regional Transit Authority (So. Carolina), Fresno Area Express (CA), Regional Transportation Commission of Washoe County (Reno, NV)
Hydrogen & Fuel Cell Activity – California

Heliogen And Bloom Energy Agreement Signals The Start Of The Hydrogen Age

Sierra Northern Railway and GTI receive $4m for hydrogen switcher locomotive

Hyundai’s XCIENT Fuel Cell Hitting the Road in California

Lancaster, Japanese city team up for hydrogen pact

New Scripps Institution Of Oceanography Research Vessel Runs On Hydrogen
Granholm launches 'Earthshot' goal of reducing hydrogen energy cost to $1

Secretary Granholm Announces New Goal to Cut Costs of Long Duration Energy Storage by 90 Percent

Hydrogen Is 'Jump Ball' in Global Clean-Energy Race, Kerry Says
Hydrogen & Fuel Cell Activity - Global

$500 billion in H2 projects

- 359 large-scale projects
- $500 billion estimated through 2030

International Facts
- 30 countries with hydrogen roadmaps
- 123+ members in Hydrogen Council
Webinar
August 12

FUEL CELL ELECTRIC TRUCKS
A Vision for Freight Movement in California—and Beyond

Presented by the California Fuel Cell Partnership | July 2021
CaFCP envisions 70,000 heavy-duty fuel cell electric trucks supported by 200 hydrogen stations in-state by 2035.
Nozzle Freeze & SOSS

**NOTICE:** During periods of high humidity or increased use, the nozzle may become frozen and difficult to disconnect from the vehicle. If this occurs, **DO NOT POUR WATER OR SPRAY ANY CHEMICALS ON THE NOZZLE** as this may damage it.

Prior to fueling, wipe down the nozzle with a lint-free cloth.

If the nozzle becomes frozen, pull the collar back with one hand while pushing forward on the handle. This may help release the nozzle locking mechanism and aid removal.

Placing the nozzle back in the dispenser holster will start an air dryer mechanism, which assists in drying the nozzle. The sound of the air dryer is normal.

SAVE TIME! Check station availability status

![m.cafcp.org](m.cafcp.org)

**SOSS**
Station Operational Status System
CaFCP Resources

• **KEY DOCUMENTS**
  • Truck Vision – [https://cafcp.org/truckvision](https://cafcp.org/truckvision)

• **CAFCP PAGES**
  • Station Map – [www.cafcp.org/stationmap](http://www.cafcp.org/stationmap)
  • SOSS – [http://m.cafcp.org](http://m.cafcp.org)
  • Resources – [www.cafcp.org/resources](http://www.cafcp.org/resources)
  • News clips – [www.cafcp.org/news](http://www.cafcp.org/news)
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