



# Retail Hydrogen Fueling Station Network Update

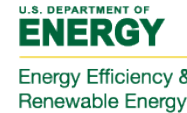
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Ben Xiong, Keith Malone, David Park

04/04/2022



# CaFCP Members



— 20+ years of collaboration —



# New Members





# Hydrogen Village week

Tuesday, April 5,  
9:00am- 4:00pm

Hydrogen Village Education –  
Online Briefings

Wednesday, April 6  
9:00am- 4:00pm

Hydrogen Village

1315 10th St, Sacramento, CA 95814  
(west steps facing the Tower Bridge)

*Help us build the Hydrogen Village!*  
SHOWCASE YOUR TECHNOLOGY, PLANS AND DATA

*Save the Date*  
**HYDROGEN VILLAGE**  
STATE CAPITOL: SACRAMENTO | APRIL 6, 2022 | 9am-4pm

California Hydrogen Coalition  
CALIFORNIA HYDROGEN COUNCIL

*Join us for the largest outreach and public display of hydrogen and fuel cell technologies ever held at the State Capitol.*

SPONSORSHIPS AVAILABLE  
To learn more about sponsorship opportunities, contact Juan Contreras at [jcontreras@calcp.org](mailto:jcontreras@calcp.org) or 916-371-2792  
More information on the next page.

Hydrogen Village and Capitol Day is an opportunity to showcase the value and performance of hydrogen and fuel cell technologies and tell the larger story of how they will help California achieve its climate, equity and economic goals.

Logos for CALIFORNIA HYDROGEN BUSINESS COUNCIL, FCHEA, and SFCC.



# CaFCP Station Map & SOSS

STATIONS BENEFITS BUSES & TRUCKS MEMBERS RESOURCES

Search by Zip Code or Address

- Online
- Limited
- Offline
- Refresh
- Unknown
- Retail: Open
- Retail: Legacy
- Retail: In Construction
- Retail: In Permitting
- Retail: Proposed
- Retail: Unavailable
- Heavy-Duty
  - Bus
  - Truck

Map data ©2022 Google, INEGI Terms of Use

SHIP  
earth™

SOSS | 916.371.2870  
3300 Industrial Blvd, Suite 1000, West Sacramento, CA 95691  
Hydrogen Station Buyer's Guide

California FUEL CELL PARTNERSHIP

LOGIN | SIGN UP

## Station Status

Online  
  Limited  
  Offline  
  Refresh  
  Unknown

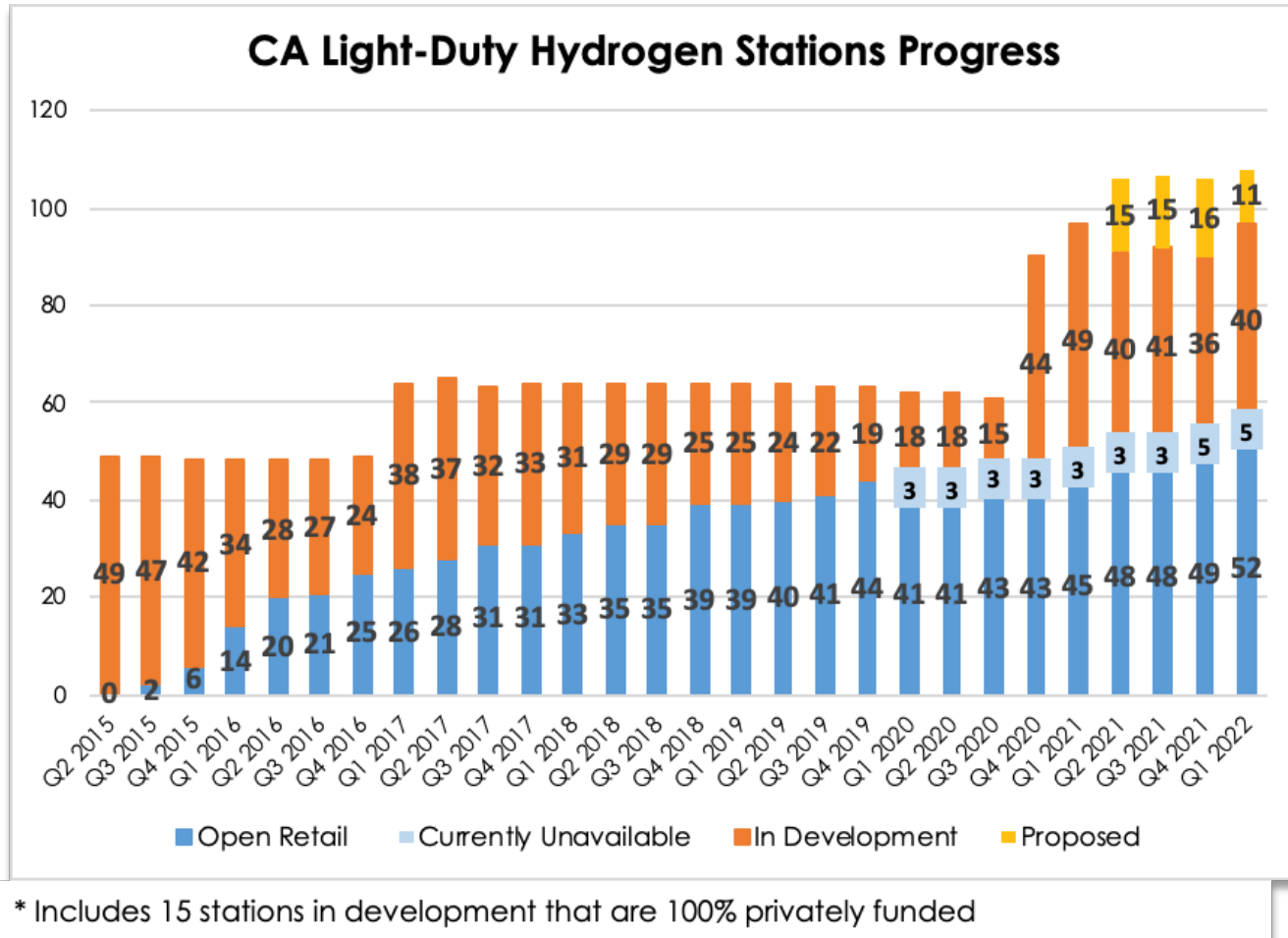
Open Retail Stations	H70	H35	
Aliso Viejo	<input checked="" type="checkbox"/>		TRUE ZERO
<input type="button" value="i"/> Anaheim	<input checked="" type="checkbox"/>		TRUE ZERO
Baldwin Park (New)	<input checked="" type="checkbox"/>		TRUE ZERO
<input type="button" value="i"/> Campbell - East Hamilton Ave	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	TRUE ZERO
Campbell - Winchester		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	TRUE ZERO
<input type="button" value="i"/> Citrus Heights	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/> H2 Hydrogen
<input type="button" value="i"/> Concord	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	TRUE ZERO
Costa Mesa - Bristol St	<input checked="" type="checkbox"/>		TRUE ZERO
Costa Mesa - Harbor Blvd	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	TRUE ZERO
Del Mar	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	TRUE ZERO
<input type="button" value="i"/> Diamond Bar	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	PRODUCTS <input checked="" type="checkbox"/>
Emeryville	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	MESSER <input checked="" type="checkbox"/>
Fairfax-LA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	PRODUCTS <input checked="" type="checkbox"/>
Fountain Valley	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	TRUE ZERO

<http://cafcp.org/stationmap>

<http://m.cafcp.org>



# An Expanding Hydrogen Station Network



Source: Governor's Office of Business and Economic Development



# Retail Hydrogen Stations & Network Health

## Latest Stations to Open

- Sherman Oaks
- Costa Mesa – Bristol
- Baldwin Park
- Hawaiian Gardens
- Orange

## In Commissioning

- Cupertino
- San Jose – Bernal Road
- San Jose – Snell Ave
- Woodside

## Stations Currently Unavailable

- Ontario
- Newport Beach – In Permitting
- Berkeley – Mid 2022
- SF Harrison St – Mid 2022



## Station Improvements are Ongoing

- H2 supply mostly resolved;
- H2 retail deliveries vastly improved;
- Station short fill issues are much improved;
- Durability improvements continue



# By the Numbers (cafcop.org)

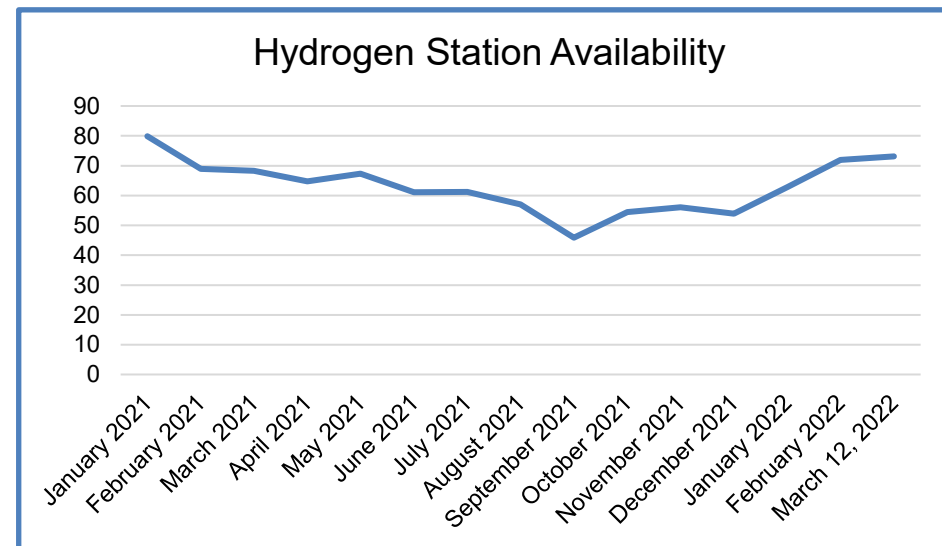
	Numbers as of March 1, 2022	Total
<b>FCEVs—Fuel cell cars sold and leased in US*</b>		<b>12,703</b>
<b>FCEBs—Fuel cell buses in operation in California</b>		<b>76</b>
Fuel cell buses in development in California		76
<b>Hydrogen stations available in California**</b>		<b>52</b>
Retail hydrogen stations in <i>construction</i> in California***		10
Retail hydrogen stations in <i>permitting</i> in California***		29
Retail hydrogen stations <i>proposed</i> in California***		11
Retail hydrogen stations <i>funded</i> , but not in development in California***		71
<b>Total retail hydrogen stations in development in California***</b>		<b>121</b>
Truck hydrogen stations in operation in California		3
Truck hydrogen stations funded in California****		9





# H2 Supply and Distribution

- <https://m.cafc.org/> (SOSS) is your friend
- **New Hydrogen Supplies**
  - Linde 30+ tons/day liquid H2 production facility, La Porte, TX operating today
  - Linde 30+ tons/day liquid H2 production facility, Ontario, CA, serving mobility market, today
- **Future Hydrogen Supply Announcements**
  - Air Liquide Nevada renewable H2 production plant expected- Q2 2022
  - Air Products \$1.3B H2 production complex in Edmonton, Alberta, expected- 2024
  - Air Products 10 tonne/day renewable H2 production in AZ, expected 2023
- **Retail Activity**
  - More H2 stations-publicly and privately funded
  - More H2 delivery trucks, trailers and hubs
  - Stations: Higher capacity, multiple fueling positions
  - Station Growth: Faster station development time





# Hydrogen Fuel Cell Vehicles! (Light-duty)



Honda Clarity



Hyundai NEXO



Toyota Mirai



Toyota Mirai



BMW



Riversimple



Hyperion



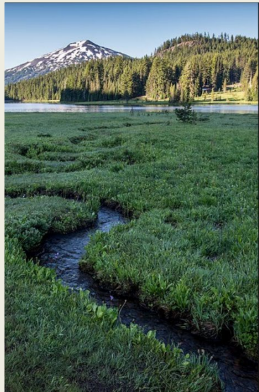
Hopium



# Hydrogen Fuel Cell Vehicles (Heavy-duty)



Decarbonizing Medium- & Heavy-Duty On-Road Vehicles: Zero-Emission Vehicles Cost Analysis

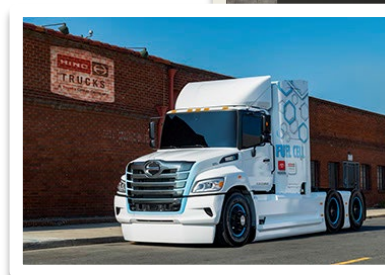


## Every Mile Counts: Alternative Fuels Report

Barriers to Adoption for Medium- and Heavy- Duty Vehicles in Oregon

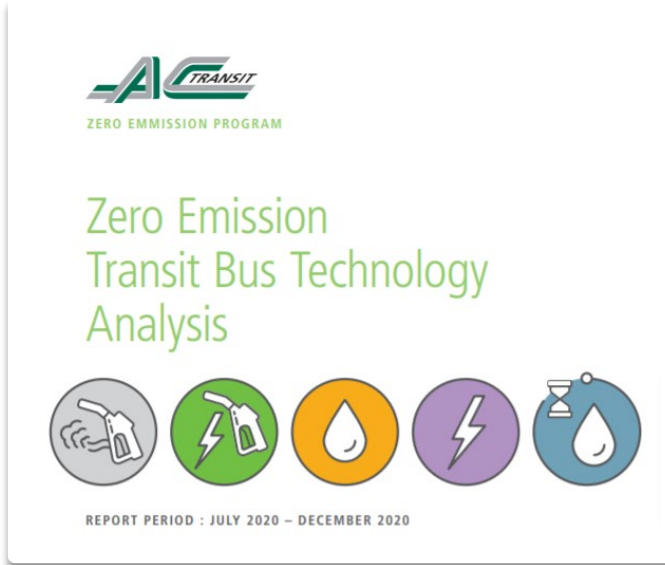
March 2022

- Cellcentric
- Cummins
- Daimler Truck North America
- Hino
- Hyundai
- Hyzon
- Kenworth
- Nikola





# H2 Fuel Cell Bus- The Other Electric Vehicle



## AC Transit 5x5 Study

Five technologies evaluated

1. Fuel cell (legacy)
2. Fuel cell (new buses)
3. Battery electric
4. Hybrid diesel
5. Conventional diesel

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

1. AC Transit (East Bay)
2. Eastern Contra Costa Transit Authority (East Bay)
3. Fresno Area Express
4. Golden Empire Transit (Bakersfield)
5. Montebello Transit\*
6. North County Transit (San Diego)
7. OCTA (Orange County)
8. Riverside Transit Agency
9. SunLine Transit (Coachella Valley)
10. UC Irvine

\*recently noted in a legislative hearing that they are pursuing fuel buses

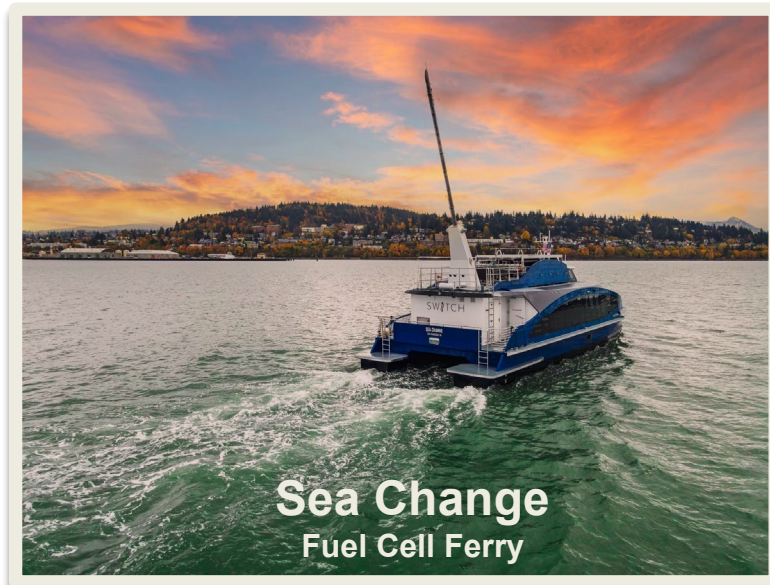


# Hydrogen & Fuel Cell Activity – California



## Likely and Potential Mini-Hubs in California

- Lancaster
- Shasta region
- Fresno and the Central Valley
- Central Sierras
- Coachella
- Victor Valley, Barstow and Mojave
- Redwood Coast (Humboldt)





# Hydrogen hubs hubs hubs

Governors lead the way



**Governor Murphy, Governor Hochul, Governor Baker, and Governor Lamont Announce Multi-State Partnership with Major Hydrogen Ecosystem Partners to Propose a Clean Regional Hydrogen Hub**

**Fast-moving Bill Seeks to Win Hydrogen Hub for Wash.**

**The Lone Star State May Host The World's Next Big Hydrogen Hub**

ENERGY

**Oklahoma joins neighbor states in quest for dollars to prove hydrogen's worth**



**Jack Money**  
Oklahoman

**Leading Companies Launch Initiative to Support Low-Carbon and Hydrogen Industrial Hub in Ohio, Pennsylvania and West Virginia**



# Hydrogen & Fuel Cell Activity – U.S.

## Fed Policymakers Unveil Hydrogen Transportation Bill



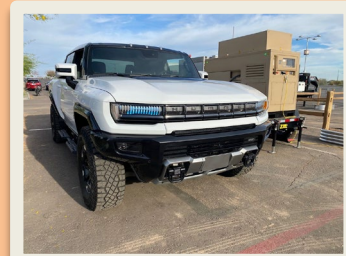
Mercedes-Benz Trucks (Mercedes-Benz AG)

## Hydrogen for Trucks Act



Friday, March 11, 2022 | Staff | [f](#) [t](#) [i](#) [e](#)

Hydrotec Fuel Cells Have 'Several Competitive Advantages'



Honda to Install Stationary Fuel Cell Power Station on California Campus as First Step Toward Commercialization of Zero-Emission Backup Power Generation



# Hydrogen & Fuel Cell Activity - Global



© Shutterstock

'Our switch to renewables and hydrogen will make us truly independent of Russia,' says European Commission President

**REPowerEU: Joint European action for more affordable, secure and sustainable energy**



**Siemens Energy to build 'multi-gigawatt' hydrogen electrolyser factory in Berlin**

The first 1GW of manufacturing capacity is due to come on line next year

## Will Biden And Scholz Unlock Hydrogen's Potential?



**Sverre Alvik** Contributor

Energy

*I write about key developments influencing the energy transition.*





# CaFCP Resources

## • KEY DOCUMENTS

- Truck Vision – <https://cafc.org/truckvision>
- NREL MD/HD Cost Analysis – <https://www.nrel.gov/docs/fy22osti/82081.pdf>
- Japan-California Memorandum of Cooperation - <https://www.gov.ca.gov/wp-content/uploads/2022/03/3.21.22-CA-Japan-MOC-signed.pdf>
- Every Mile Counts Report (Oregon) - <https://www.oregon.gov/deq/ghgp/Documents/ghgpAltFuelsReportF.pdf>
- Legislative hearing on hydrogen hubs - <https://www.senate.ca.gov/media-archive/default>

## • CAFCP PAGES

- Station Map – [www.cafc.org/stationmap](http://www.cafc.org/stationmap)
- SOSS – <http://m.cafc.org>
- Resources – [www.cafc.org/resources](http://www.cafc.org/resources)
- News clips – [www.cafc.org/news](http://www.cafc.org/news)

## • UPCOMING EVENTS

- April 5 - Hydrogen Village Briefings – Sponsored by GTI/HTC <https://re-plus.events/hydrogen-village/virtual-briefings/>
- April 6 - Hydrogen Village at the Capitol – Sponsored by Chevron, Iwatani, Air Liquid, Bloom Energy, Fuel Cell Energy and Hyzon Motors <https://re-plus.events/hydrogen-village/>
- April 5 – 7 World Hydrogen North America - <https://www.worldhydrogennorthamerica.com/>
- April 23 – CEC Santa Barbara Earth Day Celebration - <https://sbearthday.org/>

## • SUMMER EVENTS

- June 6 -7 CHBC – California Hydrogen Leadership Summit - <https://www.cahydrogenleadershipsummit.com/>
- July 14 -15 H2View – Hydrogen Summit 2022 North America - <https://www.h2-viewevents.com/upcoming-events/>
- August 15 – August 18 – Green Transportation Summit & Expo - <https://www.gtsummitexpo.com/about-3>



Keith Malone

[kmalone@cafc.org](mailto:kmalone@cafc.org)

Ben Xiong

[bxiong@cafc.org](mailto:bxiong@cafc.org)

Dave Park

[dpark@cafc.org](mailto:dpark@cafc.org)



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