



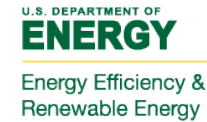
8/03/2021

Retail Hydrogen Fueling Station Network Update

Ben Xiong, Keith Malone, Dave
Park



CaFCP Members



— 20+ years of collaboration —



New members

Bayo@Tech

▪ faurecia
inspiring mobility



CaFCP Station Map & SOSS

California FUEL CELL PARTNERSHIP
 HOME CARS STATIONS BENEFITS BUSES & TRUCKS RESOURCES

Map Satellite
 Download Station List

Search by Zip Code or Address GO

List Stations
 Filter By

© CALIFORNIA FUEL CELL PARTNERSHIP
 Managed by Frontier Energy
 SOSS | 916.371.2870
 3300 Industrial Blvd, Suite 1000, West Sacramento, CA 95691

California FUEL CELL PARTNERSHIP
 HOME CARS STATIONS BENEFITS BUSES & TRUCKS RESOURCES

Map Satellite
 Download Station List

Search by Zip Code or Address GO

Filter By

RETAIL - PROPOSED
 Folsom
 13397 Folsom Boulevard
 Folsom, CA 95630
 Details +

RETAIL - OPEN
 Citrus Heights
 Open - Retail
 6141 Greenback Lane
 Citrus Heights, CA 95621
 Details +

RETAIL - OPEN
 Sacramento
 Open - Retail
 3510 Fair Oaks Boulevard
 Sacramento, CA 95864
 Details +

RETAIL - IN PERMITTING
 San Jose - Bernal Road
 Planning Approval
 101 Bernal Road
 San Jose, CA 95119

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California FUEL CELL PARTNERSHIP
 LOGIN | SIGN UP

Update: Hydrogen Distribution and Supply in California

Station Status

● Online
 ▲ Limited
 ■ Offline
 ⌛ Refresh
 ? Unknown

Open Retail Stations	H70	H35	
Aliso Viejo (New)	●		TRUE ZERO
Anaheim	■		Air Liquide
Campbell	●	●	TRUE ZERO
Campbell - East Hamilton Ave (New)	■	■	TRUE ZERO
Citrus Heights	●		Shell Hydrogen
Concord (New)	■	■	TRUE ZERO
Costa Mesa	■	■	TRUE ZERO
Del Mar	●	●	TRUE ZERO
Diamond Bar	■	■	PRODUCERS
Emeryville	●	●	MESSER
Fairfax-LA	●	●	PRODUCERS
Fountain Valley	●	●	TRUE ZERO
Fremont	⌛	●	TRUE ZERO

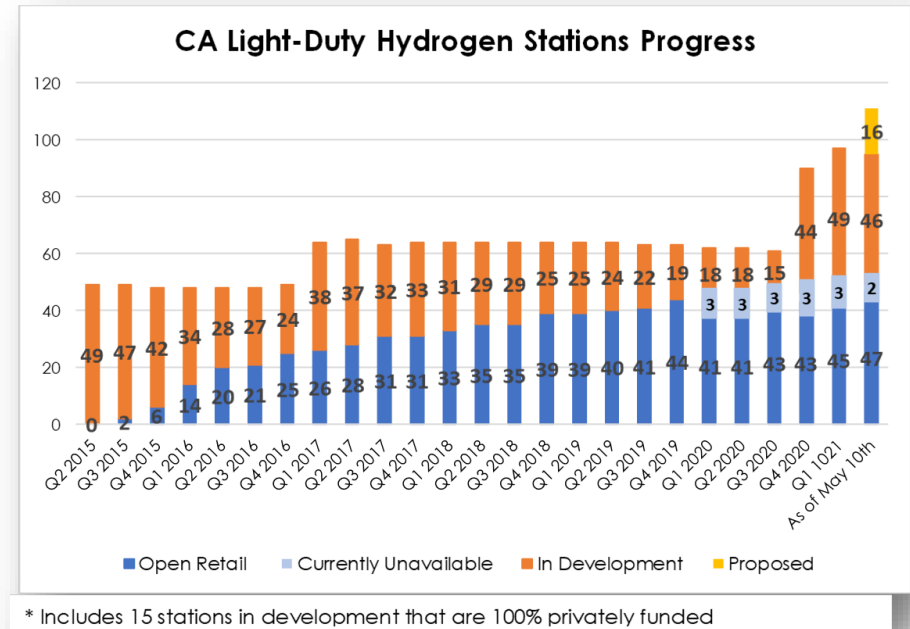
<http://cafcp.org/stationmap>

<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.





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://cafc.org/sites/default/files/h2_station_list.pdf



By the Numbers

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

https://cafcp.org/by_the_numbers



H2 Supply and Distribution

- <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

100 

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

BY 2020

Funded
Light Duty

200 

hydrogen stations by **2025**,
pursuant to the Governor's 2018
ZEV infrastructure Proposal.

BY 2025

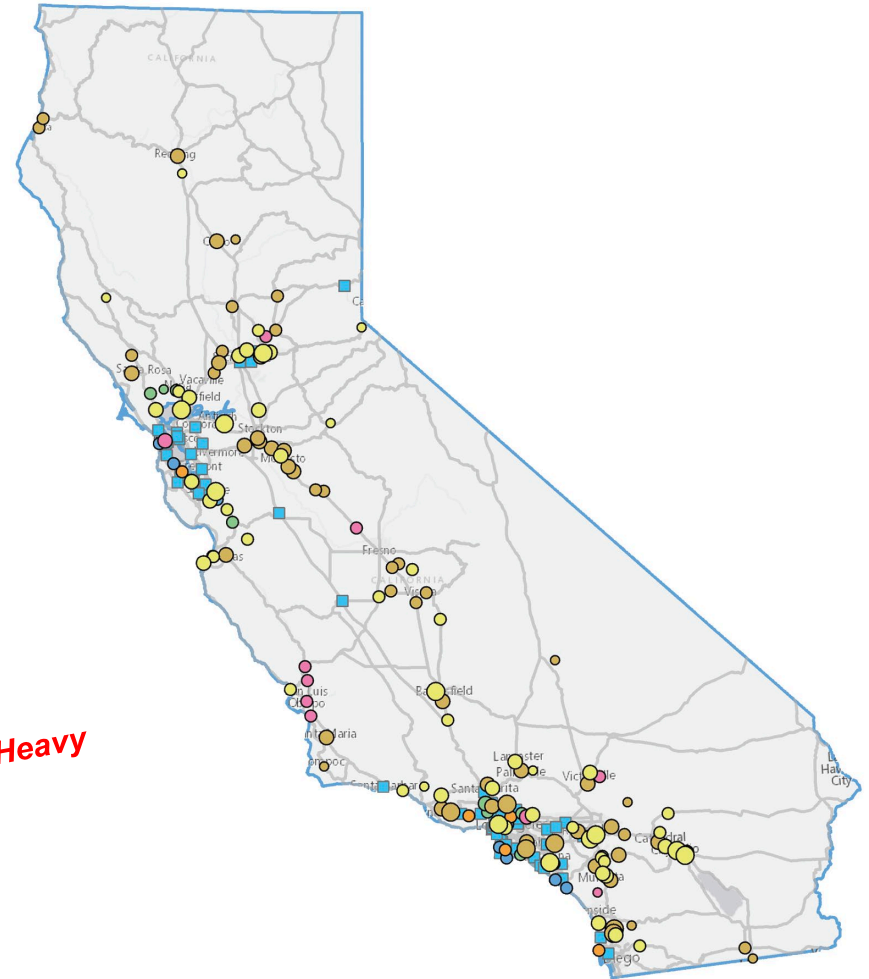
Planned
Light Duty

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.

BY 2030

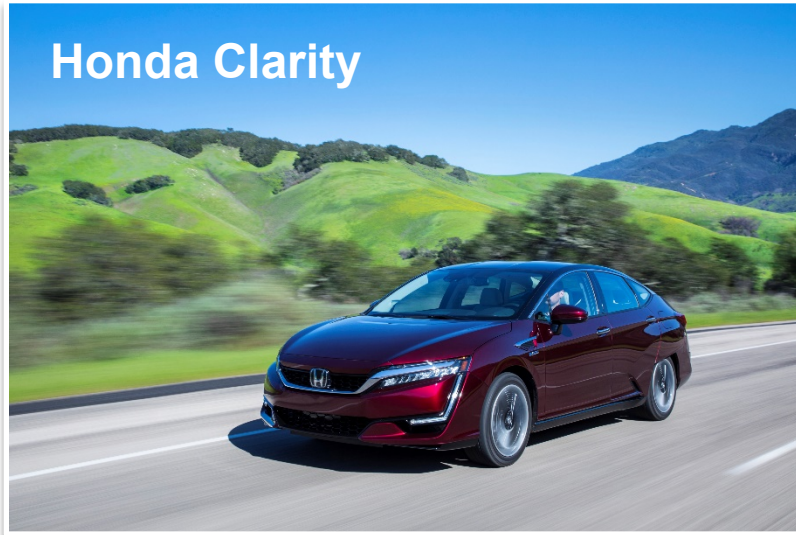
Envisioned
Light, Medium and Heavy



Governor's goal of 5,000,000 zero-emission vehicles by 2030.



Cars!



Honda Clarity

“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...”



AUTOMOBILES

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

Autos & Transportation

Hyundai to invest \$7.4 bln in U.S. by 2025, with electric cars in focus

Reuters

ELECTRIC

A Toyota Mirai just did 623 miles on a single tank of hydrogen

Mirai breaks Hyundai Nexa's record for going furthest on a tank of hydrogen

SUSTAINABLE ENERGY

BMW starts European road tests of hydrogen fuel cell cars

PUBLISHED THU, JUN 17 2021-10:19 AM EDT | UPDATED THU, JUN 17 2021-6:57 PM EDT

Michelin shows off hydrogen endurance racer at Goodwood

3 weeks ago

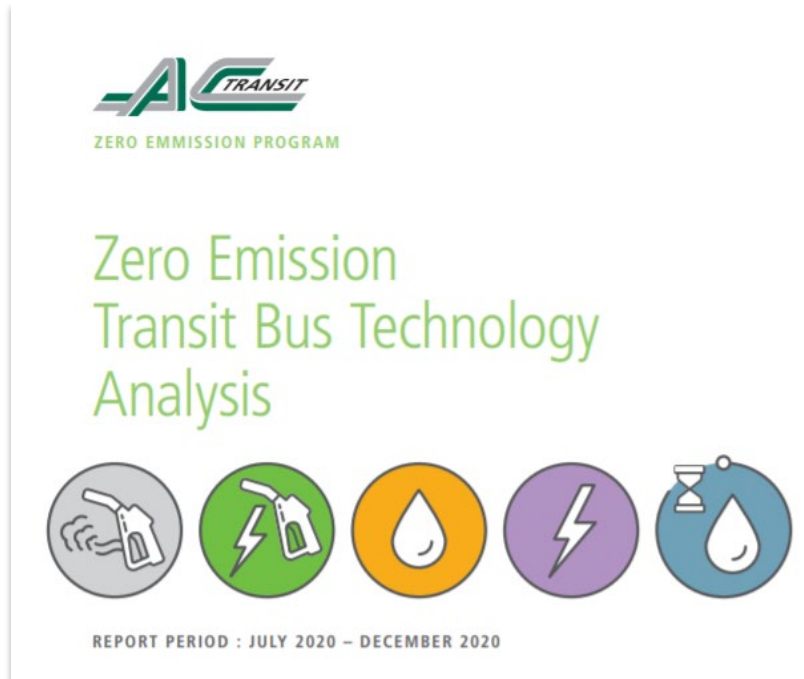


Hydrogen Engine-equipped Corolla to Enter Super Taikyu Race in Autopolis





The Other Electric Bus



Federal Transit Administration

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)

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)



Hydrogen & Fuel Cell Activity – California

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

Erik Kobayashi-Solomon Contributor
Sustainability
Investor in climate change adaptation and mitigation businesses

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An artist's rendering of a Heliogen Sunlight Refinery HELIOGEN

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

Updated Wednesday, 24 March by www.railway-technology.com

USA

Hyundai's Xcient Fuel Cell Hitting the Road in California

Print Email

New Scripps Institution Of Oceanography Research Vessel Runs On Hydrogen

Friday, July 23, 2021
By Erik Anderson

PHOTO CREDIT: SCRIPPS INSTITUTION OF OCEANOGRAPHY
Artist's rendering of the research vessel that will replace a 40 year old ship in the school's fleet.

Lancaster, Japanese city team up for hydrogen pact

By The AP Times Staff - July 26, 2021 - 43 Comments

© The AP Los Angeles County Supervisor Kathryn Barger, Consul General Akira Hatai, Lancaster Mayor R. Rex Perris. Image via Kathryn Barger Twitter



Hydrogen & Fuel Cell Activity – U.S.



Granholm launches 'Earthshot' goal of reducing hydrogen energy cost to \$1

BY RACHEL FRAZIN - 06/07/21 12:33 PM EDT

338 COMMENTS

Department of Energy

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

JULY 14, 2021

Green

Hydrogen Is 'Jump Ball' in Global Clean-Energy Race, Kerry Says

By [Jennifer A. Dlouhy](#) and [Will Wade](#)
March 2, 2021, 8:38 AM PST

- ▶ Climate envoy touts oil-industry opportunity at CERAWeek
- ▶ Says tensions with China won't block aggressive climate action



John Kerry Photographer: Stefani Reynolds/Bloomberg

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Wall Street Bullishness Is Becoming a Contrarian Sell Signal
- BusinessWeek**
Tell Your Boss the Four-Day Week Is Coming Soon



Hydrogen & Fuel Cell Activity - Global

ELECTRIC POWER | PETROCHEMICALS — 14 Jun 2021 | 13:49 UTC

Germany to support 500 MW electrolyzers abroad with \$1.1 billion

Germany and Chile sign accord to boost hydrogen cooperation

Energy



Author **Andreas Franke**
Editor **Henry Edwardes-Evans**
Commodity **Electric Power, Petrochemicals**

\$500 billion in H2 projects

Exhibit 1: Global hydrogen projects and investment across the value chain

359

Announced large-scale projects

~USD 500 bn

investment by 2030, of which USD 150 bn is associated with mature projects

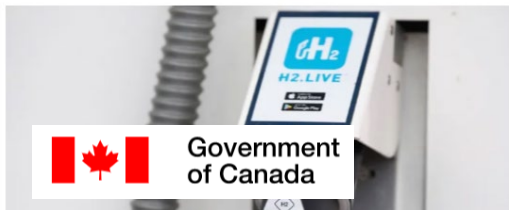


B.C. becomes 1st province to introduce a low-carbon hydrogen strategy



Province aiming to establish regional hydrogen hubs to supply fuel to industries, consumers

The Canadian Press · Posted: Jul 07, 2021 8:05 AM PT | Last Updated: July 7



Government of Canada

Building a green economy: Government of Canada to require 100% of car and passenger truck sales be zero-emission by 2035 in Canada

From: [Transport Canada](#)

News release

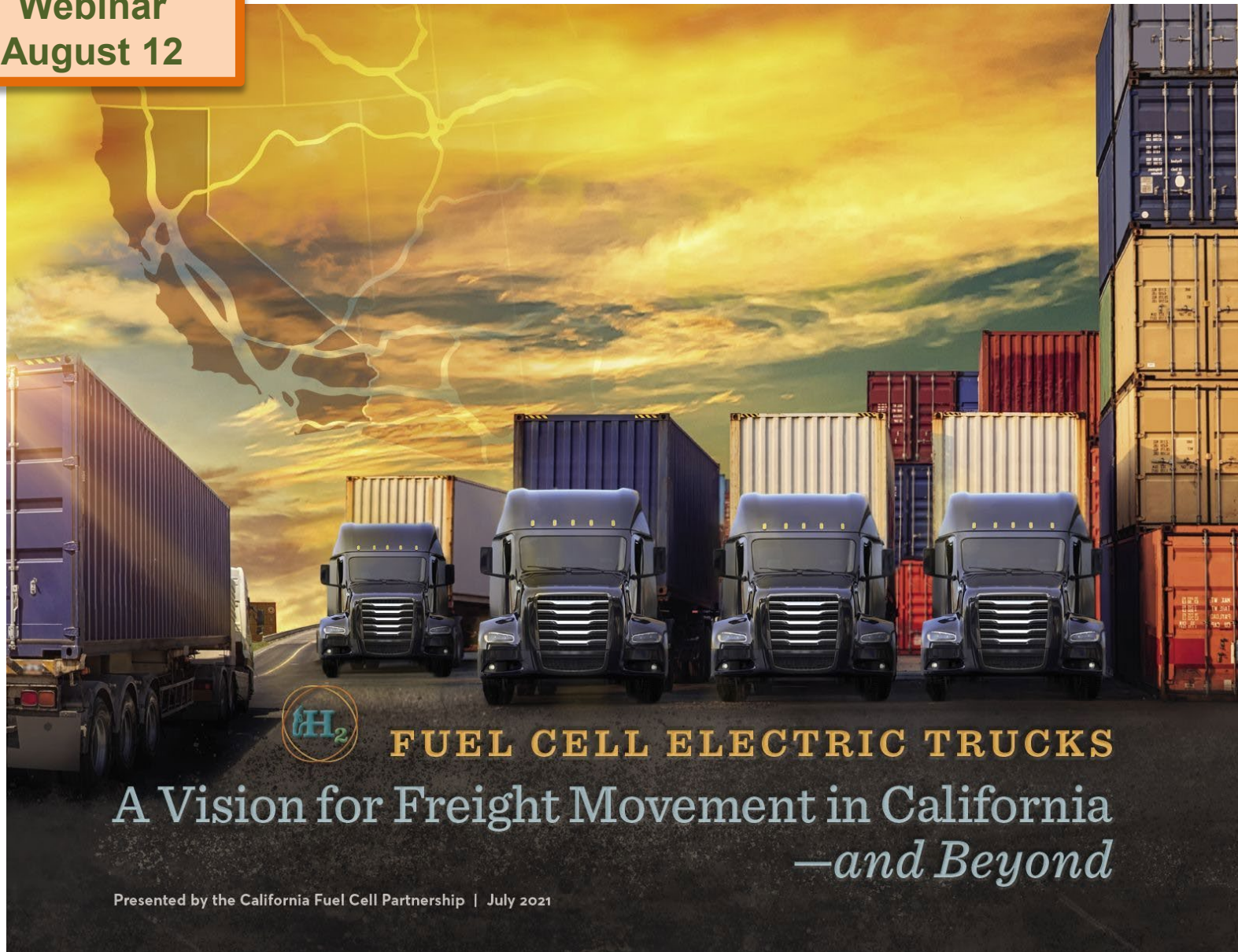
- 359 large-scale projects
- \$500 billion estimated through 2030

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

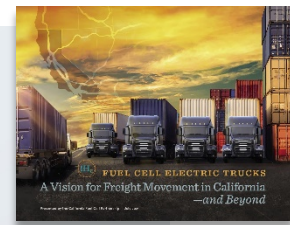


FIGURE 8 | Envisioned station network to support 70,000 hydrogen fuel cell electric trucks

CaFCP envisions 70,000 heavy-duty fuel cell electric trucks supported by 200 hydrogen stations in-state by 2035.

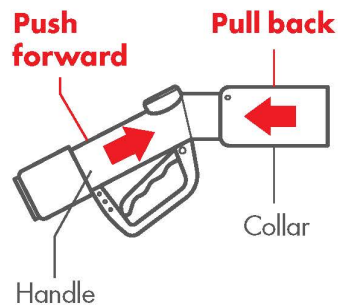


Nozzle Freeze & SOSS

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



SOSS

Station Operational Status System





CaFCP Resources

- **KEY DOCUMENTS**

- Truck Vision – <https://cafc.org/truckvision>

- **CAFCP PAGES**

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



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