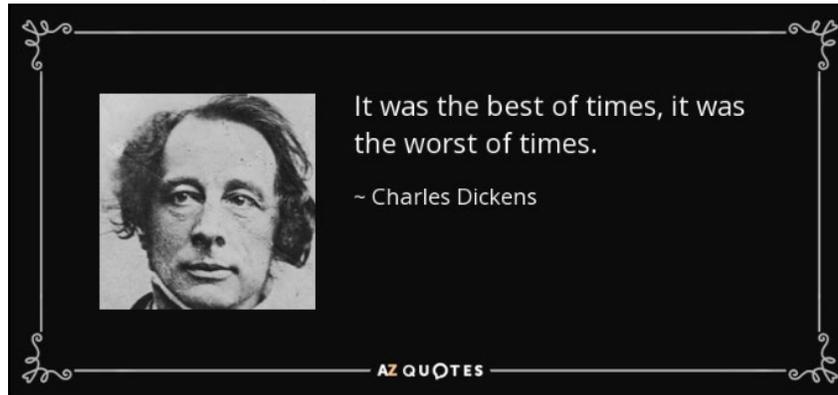


The Station Beat

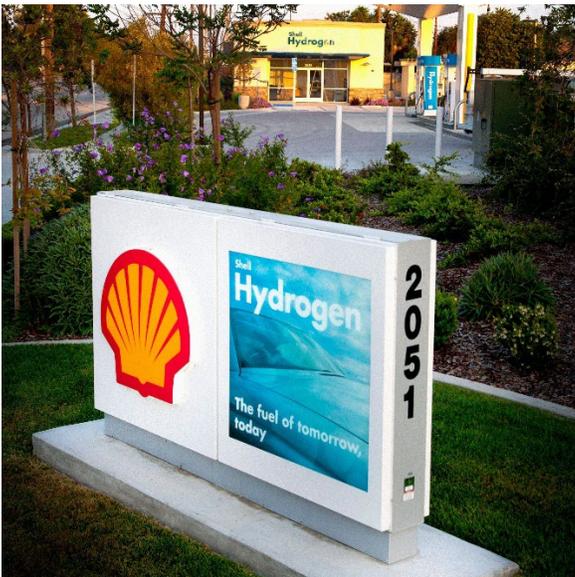
A Review of Hydrogen Refueling Stations in 2025

by Nathan Okawa



2025 began with continuing shortages of hydrogen fuel across California and the spectre of the announcement by Shell Oil in February 2024 that they would be immediately closing seven stations in northern California and cancelling plans to build 48 additional stations, citing supply issues and external factors. A *Wired* article in November 2024 details a lawsuit brought by Iwatani against Nel Hydrogen, alleging the delivery of untested and faulty equipment. After the lawsuit was filed in early 2024, Nel discontinued servicing seven Iwatani HRS and spun off the hydrogen fueling division, renaming it Cavendish Hydrogen. This is in tribute to Henry Cavendish, who is credited with discovering hydrogen in 1766. Shell's departure from HRS ownership and other developments in light duty HRS operations is an example of the constantly evolving landscape and challenges of new technologies, alternative fuel options and the financial realities of investments in this market, as well as demand for returns from institutional investors. The Iwatani lawsuit is still active and is scheduled to go to trial in October 2026.

As 2025 progressed, the supply of gaseous hydrogen markedly improved and previously offline stations reopened, including stations operated by FirstElement Fuel/ True Zero and Iwatani, bringing relief to owners, especially in Southern California.



Reports on social media in mid-2025 reported that Shell had begun removing equipment at their stations, and visits to these stations during that summer confirmed that the equipment was either in the process of being removed or had already been removed. Thus ended the involvement of an early, major player in the light duty Hydrogen Refueling Station business.

In Southern California, Shell closed their pipeline-fed station in Torrance in fall 2024, however, Air Products announced in January that they would be taking over operation of the station and the station reopened in February 2025 to much fanfare by the City of Torrance Chamber of Commerce.

In January 2025, Seifi Ghasemi was ousted as Chairman of the Board of Air Products after a campaign by investment firm Mantle Ridge over strategy. Investors challenged Ghasemi's speculative spending on clean hydrogen products, which were a drag on shareholder returns. Similar to Shell's exit from LD HRS operation, Air Products subsequently closed a number of stations in 2025 in Southern California, including the UCI, Santa Monica, Lawndale, Fairfax and in early 2026 Woodland Hills stations. This leaves Air Products with two operational HRS, the Torrance station and the Diamond Bar station located in the parking lot of the Southern California AQMD. The University of California, Irvine station was recognized as one of the very first public hydrogen fueling stations in the United States and originally opened in January 2003.

Two service station owners elected not to renew their leases in 2025, which affected the Air Products Santa Monica station as well as the True Zero Del Mar station.

Supplies of compressed gaseous hydrogen (CH₂) continued to be supplied to stations in northern and southern California, and in April 2025, Chevron opened its first retail hydrogen refueling station in Moreno Valley, followed by a second station in Vacaville in June 2025 and Chevron also started construction of a stand-alone station in Carson. These stations have equipment installed by Cavendish Hydrogen and the Moreno Valley and Vacaville stations have a storage capacity of 808 kg. of CH₂.

In a blow for California's Alliance for Renewable Clean Hydrogen Energy Systems (ARCHES) hydrogen hub, the federal government cancelled \$1.2 billion in funding in October 2025.

What does 2026 hold in store for H₂ for Mobility in California (Air Product's moniker for hydrogen)? The State of California, along with a coalition of 12 other states, filed suit in early 2026 against the Department of Energy for cancellation of hydrogen hub funding and seek recovery of the lost grants. In addition, in a December 2025 press release Toyota announced a new investment in FirstElement Fuel, the vendor with 38 open locations. Prices for fuel dropped at their stations by \$6 and \$10 for CH₂ and LH₂ fuel respectively, buoying owner's spirits towards the end of 2025.

Transit agencies continue work to comply with California's Innovative Clean Transit regulation, which was adopted in 2018 and requires the gradual phase in of zero-emission vehicles as equipment is replaced. As of 2026, 690 hydrogen fuel cell buses are on order or in operation in California, ensuring growing offtake for renewable and green hydrogen production. Due to changes in the federal government, California elected not to pursue approval of the Advanced Clean Truck regulation from the Environmental Protection Agency, however there are still agencies in California who are promoting decarbonization of transportation, such as the Port of Long Beach, which funded a \$10 million grant to subsidize the cost of hydrogen. Hyroad Energy acquired the assets of Nikola Corporation and announced in late 2025 plans to lease the FCEV trucks to companies transporting goods from the Port.

California politicians have pursued hydrogen for years seeking environmental and economic benefits. Despite the federal cuts leading to an operational pause at ARCHES, Governor Newsom pledged to pursue an "all-of-the-above clean energy strategy" to move forward with the state's hydrogen goals which began in 2004, when Governor Arnold Schwarzenegger rolled out his hydrogen-powered Hummer and ordered the construction of a "Hydrogen Highway" of fueling stations.



Dear Hydrogen Customer,

I am writing to inform you that Equilon Enterprises, LLC (dba Shell Oil Products US) will no longer be operating hydrogen light duty passenger fuelling stations due to hydrogen supply complications and other external market factors. Effective immediately, the following stations will be closed permanently:

- 1250 University Ave, Berkeley CA
- 6141 Greenback Lane, Citrus Heights CA
- 3510 Fair Oaks Blvd, Sacramento CA
- 551 Third Street, San Francisco CA
- 1201 Harrison Street, San Francisco CA
- 3550 Mission Street, San Francisco CA
- 101 Bernal Road, San Jose CA

We understand the inconvenience this presents and encourage you to consult the [California Hydrogen Fuel Cell Partnership website](#) for other fuelling locations.

Sincerely,

Andrew Beard
Vice President, Shell Hydrogen

<https://fuelcellsworks.com/news/shell-ends-hydrogen-refueling-operations-for-passenger-cars-in-california-due-to-supply-issues>

<https://www.wired.com/story/the-norwegian-company-blamed-for-californias-hydrogen-car-woes/>

Air Products Torrance station reopening: <https://fb.watch/FSkGcq-3MM/>

<https://campusobscura.wordpress.com/2025/06/11/the-nations-first-h2-fueling-stations-pumps-are-retiring/>

<https://www.respectmyplanet.org/publications/fuel-cells/usas-public-retail-hydrogen-history-a-view-from-late-2020>

Toyota Aims to Bolster U.S. Hydrogen Infrastructure with Investment in FirstElement Fuel

December 12, 2025



PLANO, Texas (Dec.12, 2025) – Toyota Motor North America (TMNA) today announced a strategic investment in FirstElement Fuel, Inc., (FEF) the largest retail hydrogen fueling infrastructure provider in California, with 92 retail fueling positions across 38 locations. TMNA and FEF aim to strengthen infrastructure for today's fuel cell electric vehicle (FCEV) drivers and bolster the hydrogen fueling network for current and future generations of FCEVs.

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Shell HRS at 1250 University Avenue, Berkeley, open January 2021 to February 2024



Shell Citrus Heights HRS at 6141 Greenback Lane, Citrus Heights, open December 2021 to February 2024



Shell Sacramento HRS 3510 Fair Oaks Blvd., Sacramento, open May 2019 to February 2024



Shell Third Street HRS, 551 Third Street, San Francisco, open November 2019 to February 2024



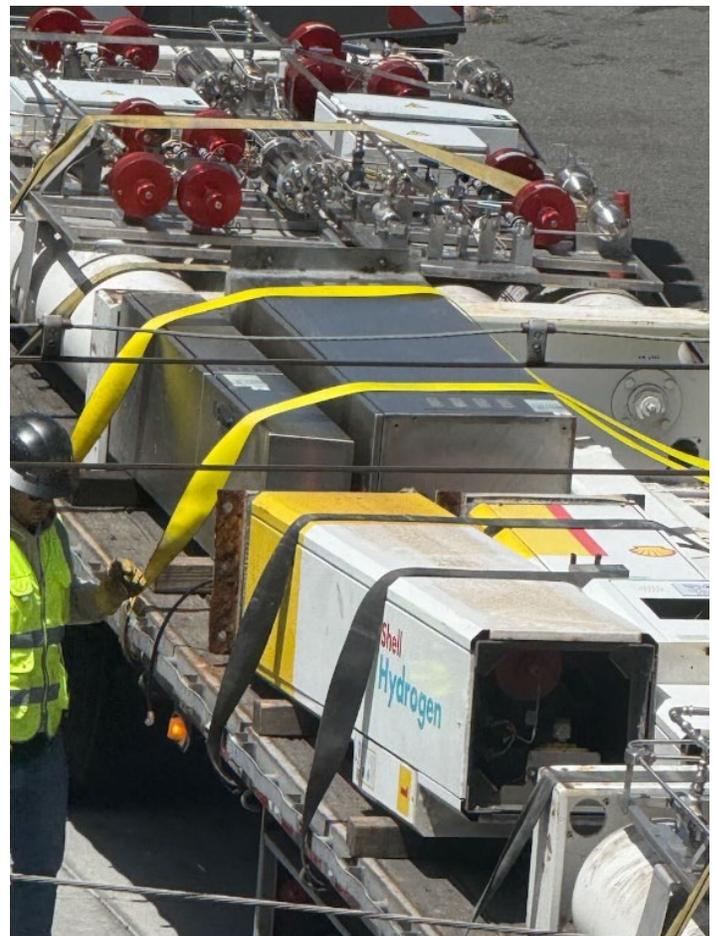
Shell Third Street HRS being decommissioned, July 2025



Shell San Francisco HRS, 1201 Harrison Street, open February 2020 to February 2024



Shell San Francisco HRS, 3550 Mission Street open February 2020 to February 2024



Shell San Francisco Mission Street HRS demolition, June 2025



Shell San Jose HRS, 551 Bernal Road, open June 2022 to February 2024



Air Products Santa Monica HRS, 1819 Cloverfield Blvd.



Air Products Santa Monica HRS, 1819 Cloverfield Blvd. open February 2016, decommissioned July 2025



True Zero Del Mar HRS, opened September 2016. Decommissioning began in December 2025



University of California, Irvine Air Products & Chemicals Station, 19172 Jamboree Road, Irvine

In early January of 2003, an opening ceremony was held for UCI's Hydrogen Fueling Station completed by the National Fuel Cell Research Center (NFCRC) at UCI in collaboration with Air Products (large hydrogen supplier). The Irvine Barclay Theater was where the NFCRC and Toyota introduced the first hydrogen fuel-cell powered vehicle to the U.S. This vehicle had then been made leasable by the end of December. Greg Kelly, the CEO of Orthodyne Electronics, decided to take on a remarkable opportunity to become the lessee of this car. Of course, for a hydrogen car to actually run, it needed its own form of gas. That is when the NFCRC took it upon themselves to build the first Hydrogen Fueling Station in UCI's North Campus. Taken from "The Nation's First H2 Fueling Station's Pumps are Retiring."



University of California, Irvine - Hydrogen Station
Operated by the
National Fuel Cell Research Center

Introduction

2003 State of the Union Address
President George W. Bush

"A single chemical reaction between hydrogen and oxygen generates energy, which can be used to power a car—producing only water, not exhaust fumes. With a new national commitment, our scientists and engineers will overcome obstacles to taking these cars from laboratory to showroom, so that the first car driven by a child born today could be powered by hydrogen, and pollution-free."



California Hydrogen Highway Network Action Plan
Governor Arnold Schwarzenegger

"The goal of the California Hydrogen Highway Network initiative is to support and catalyze a rapid transition to a clean, hydrogen transportation economy in California, thereby reducing our dependence on foreign oil, and protecting our citizens from health harms related to vehicle emissions."



The UC Irvine Hydrogen Fueling Station, established and operated by the National Fuel Cell Research Center (NFCRC) at UC Irvine, is a major step toward bringing these visions to reality. By providing access to fuel for the emerging portfolio of hydrogen-fueled vehicles, the UC Irvine Hydrogen Fueling Station serves as a cornerstone in the California Hydrogen Highway Network.

How It Works

1 kg
The unit of measure for dispensing Hydrogen fuel is the Kilogram (kg) which is a measure of weight. Gasoline is dispensed by the gallon which is a measure of volume.

The UCI Hydrogen Fueling Station is designed to dispense 100 kg per day in a three-stage "cascade fill" process, but is capable of dispensing as much as 180 kg per day as the number of fuel cell vehicles on the road continues to increase.



Hydrogen for the station is produced by steam methane reformation, and is delivered to the station in pressurized tube trailers. Some of the hydrogen from the tube trailer is further compressed by the station's on-site compressor, and stored in on-site high pressure storage tubes.

How is Fuel Dispensed?

H35 (350 Bar Fueling)
For H35 low pressure fueling, the dispenser fills the vehicle directly from the tube trailer. The higher pressure in the tubes transfers the hydrogen into the vehicle being fueled through a three-stage cascade fill process.



H70 (700 Bar Fueling)
H70 high pressure fills begin directly from the tube trailer, but the three-stage cascade fill is completed with hydrogen from the station's on-site high pressure storage tubes.



The Future Is Here

The environmental benefits of hydrogen fuel vary depending on how the hydrogen is generated, delivered, and converted to motive power in a vehicle.



The hydrogen dispensed from this station is generated from natural gas. Despite this use of fossil fuel feedstock, use of hydrogen fuel generated this way can significantly reduce emissions of smog-forming and toxic gases, particulate matter, and greenhouse gases when displacing the use of gasoline and diesel fuel. Ultimately, emissions will be further reduced by replacing natural gas with renewable energy sources for the production of hydrogen including solar, wind, and biomass. Implementation of this station and others like it today, will facilitate the introduction of renewable-based stations tomorrow.



Hydrogen fueled fuel cells achieve efficiencies two to three times greater than internal combustion engines, making significant reductions in greenhouse gas emissions while emitting only water vapor.

This station is part of the State of California's Initiative for placement of the first 68 public hydrogen fueling stations strategically located throughout the state. This network of stations supports the retail sales of hydrogen fuel cell vehicles throughout California.

For additional information on the UC Irvine Hydrogen Station, please visit the National Fuel Cell Research Center website at www.nfrcr.uc.edu



Air Products Torrance HRS, (reopened) February 2025



Chevron Moreno Valley HRS,
12431 Heacock Street, Moreno Valley-
opened in April 2025



Chevron Vacaville HRS, 299 Orange Drive, Vacaville-
opened June 2025