

2022 ANNUAL EVALUATION OF FUEL CELL ELECTRIC VEHICLE DEPLOYMENT AND HYDROGEN FUEL STATION NETWORK DEVELOPMENT

Hydrogen Fuel Cell Partnership Webinar

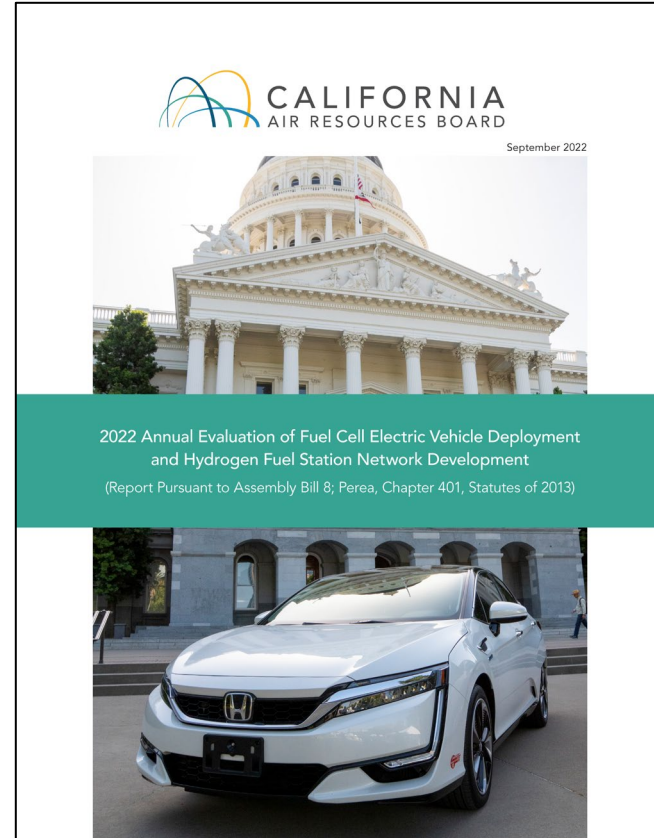
Andrew Martinez, PhD



Annual Evaluation Published by CARB

- AB 8 signed by Governor Brown in 2013
- Allocates up to \$20M annually for hydrogen infrastructure investment

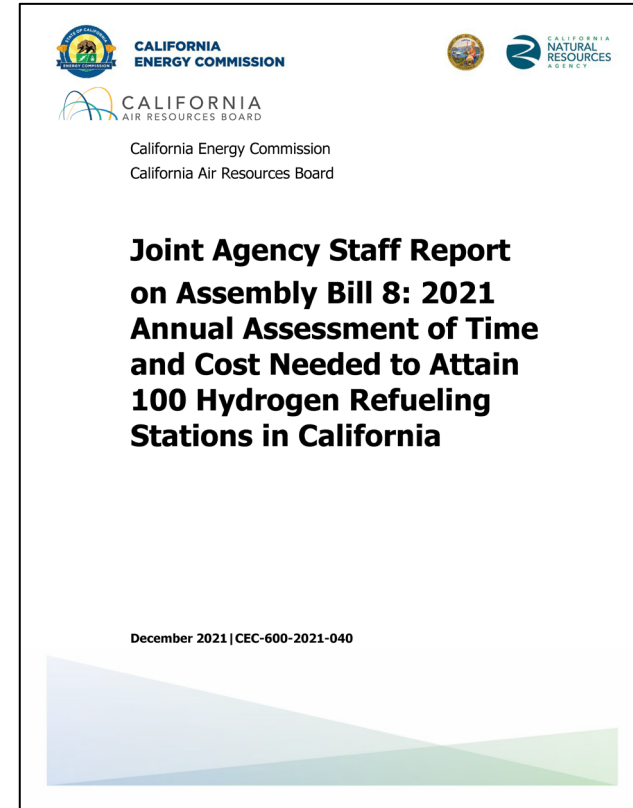
- CARB annually reports to Energy Commission
 - Current and projected FCEV fleet and station progress
 - Assessment of coverage and capacity
 - Recommended station placement
 - Recommended funding level
 - Recommended station technical specifications



Annual Joint Agency Staff Report Published by CEC

- AB 8 signed by Governor Brown in 2013
- Allocates up to \$20M annually for hydrogen infrastructure investment

- Energy Commission and CARB annually report on station network development
 - Current and projected station progress
 - Assessment of trends in cost to build stations
 - Assessment of trends in timing to build stations
 - Evaluation of in-operation stations reporting data
 - Estimates of emissions savings



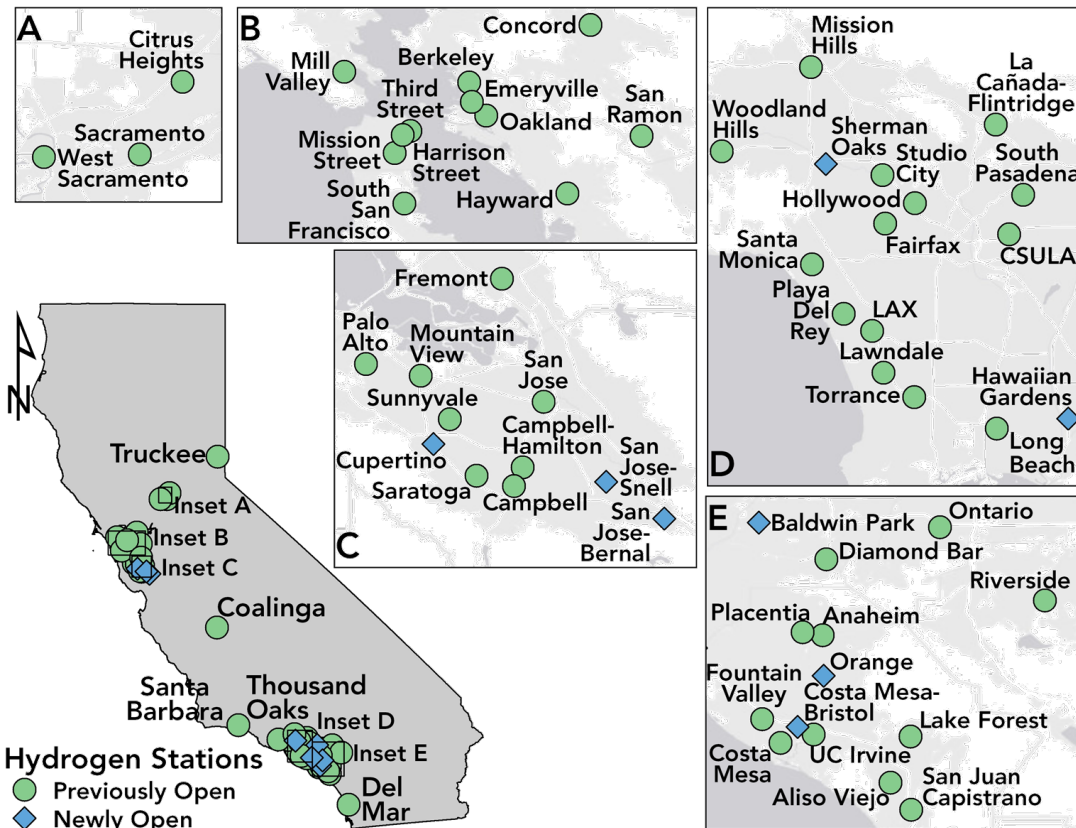
Today's Webinar

- Major Findings
- Select Analysis Details
- Ties to Station Funding
- Conclusions and Recommendations



Finding 1: Open Stations

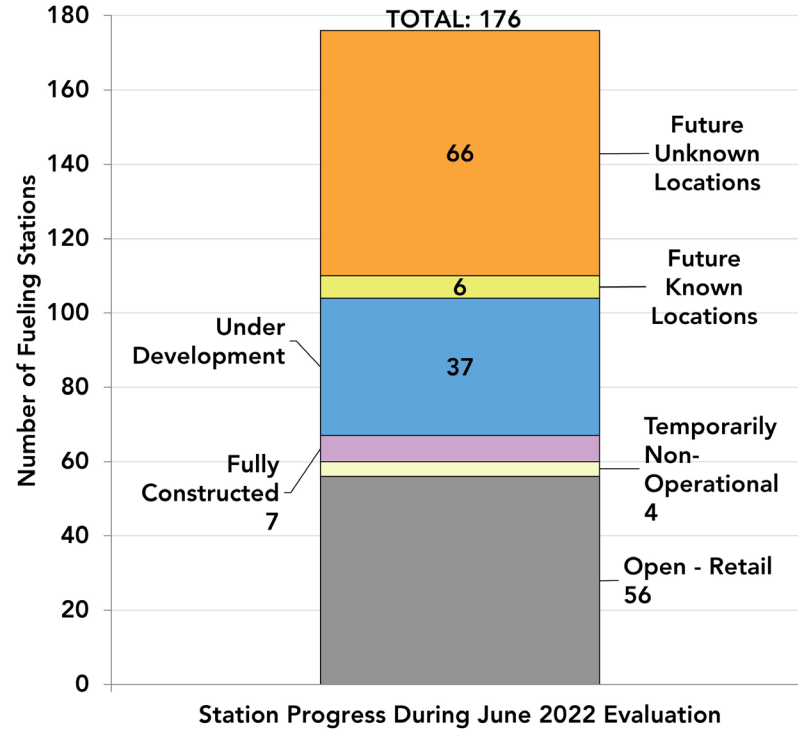
California's hydrogen fueling network has grown to 60 stations, with 56 Open-Retail stations available for customer fueling as of June 30, 2022



Note: Two additional stations (Seal Beach and Burbank-N. Hollywood) have opened since report was published

Hydrogen Network Status

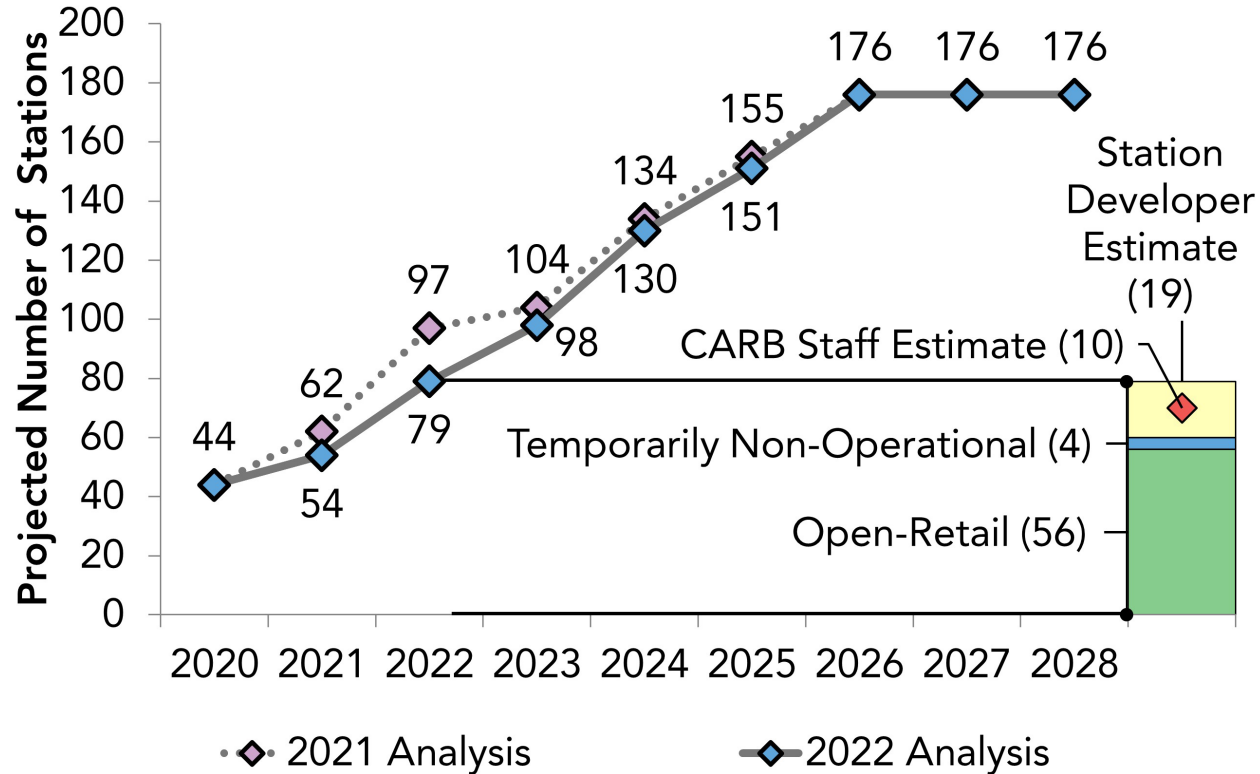
CARB and CEC are tracking a total of 176 station projects from a combination of public and private funding efforts



- Open - Retail
- Fully Constructed
- Future Known Locations
- Temporarily Non-Operational
- Under Development
- Future Unknown Locations

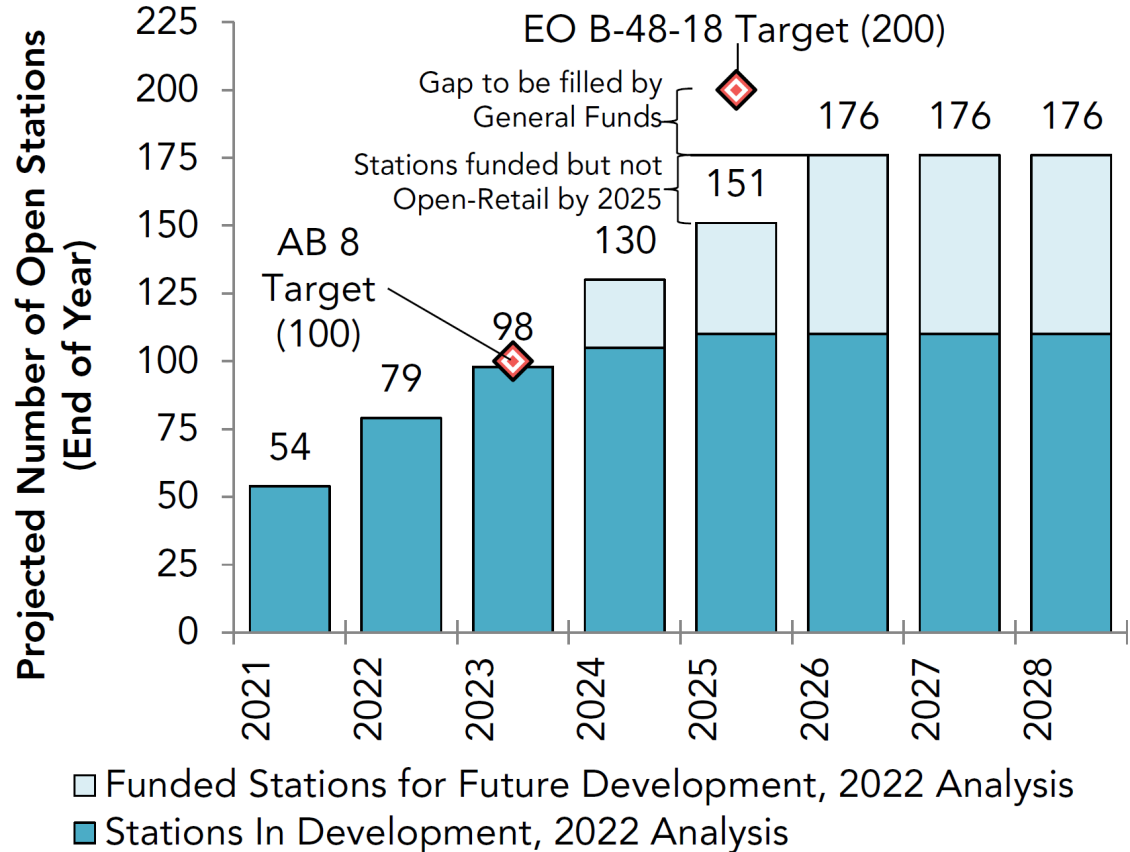
Finding 2: Network Pace

Station development will be slower in 2022 than previously projected, but station developer projections are relatively unchanged for 2023 and later years



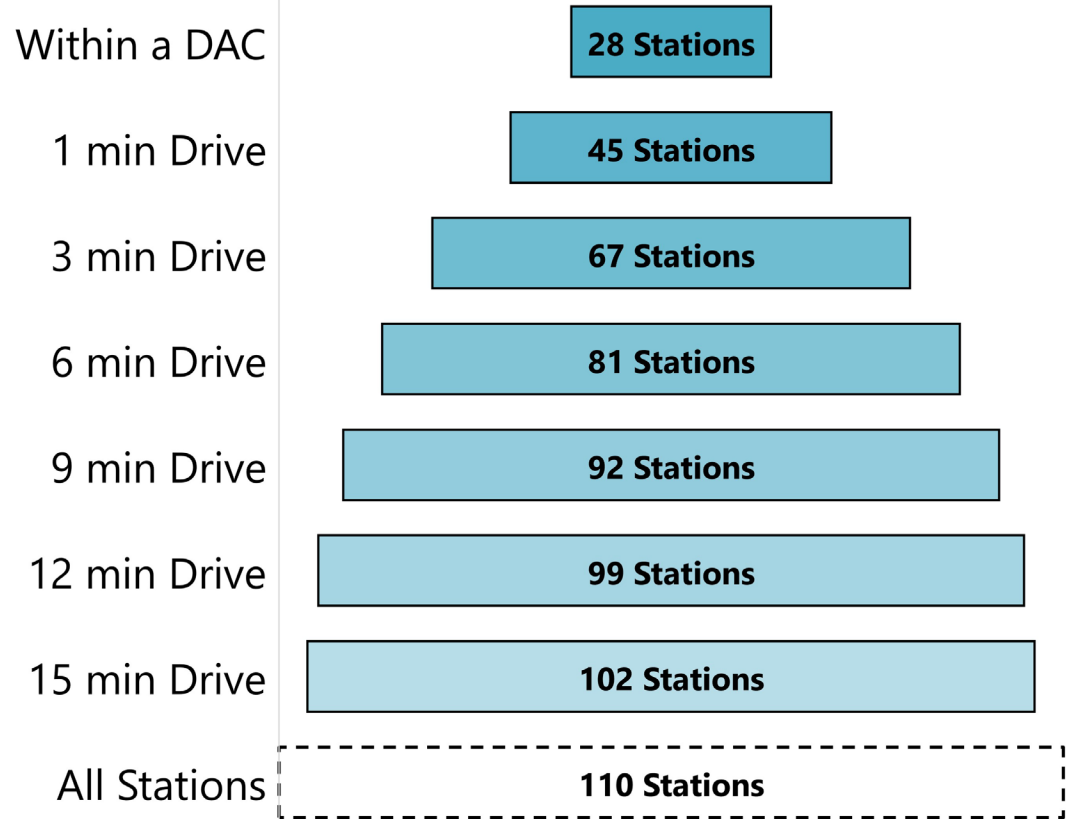
Finding 3: Station Targets

Extended station development timelines appear to have shifted projections for the 100th Open-Retail station to 2024



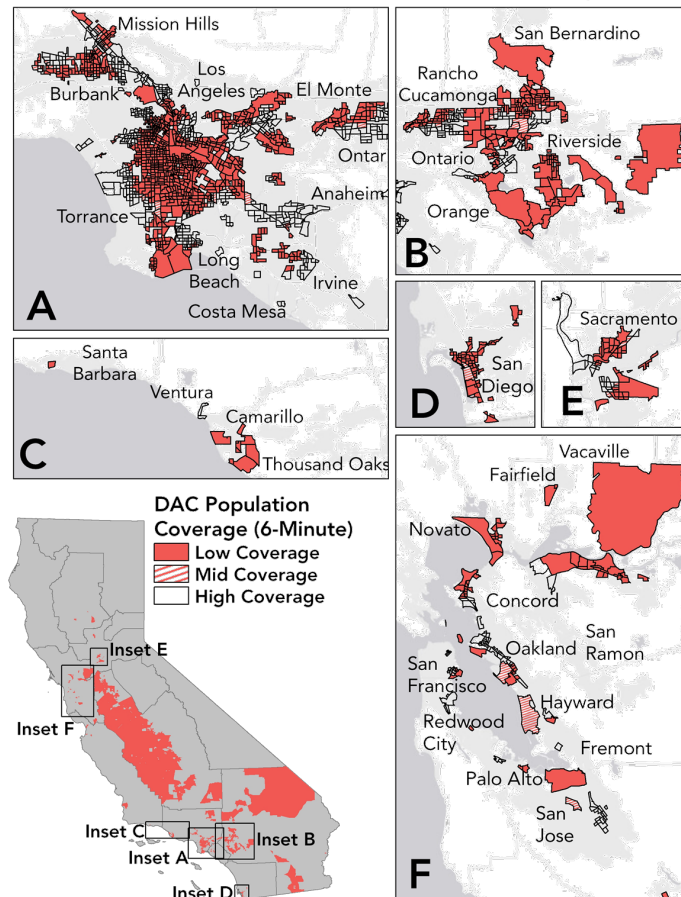
Finding 4: Disadvantaged Communities

Updated coverage analyses continue to demonstrate that California's expanding hydrogen fueling network is conveniently located for some disadvantaged communities though gaps remain in many communities across the state



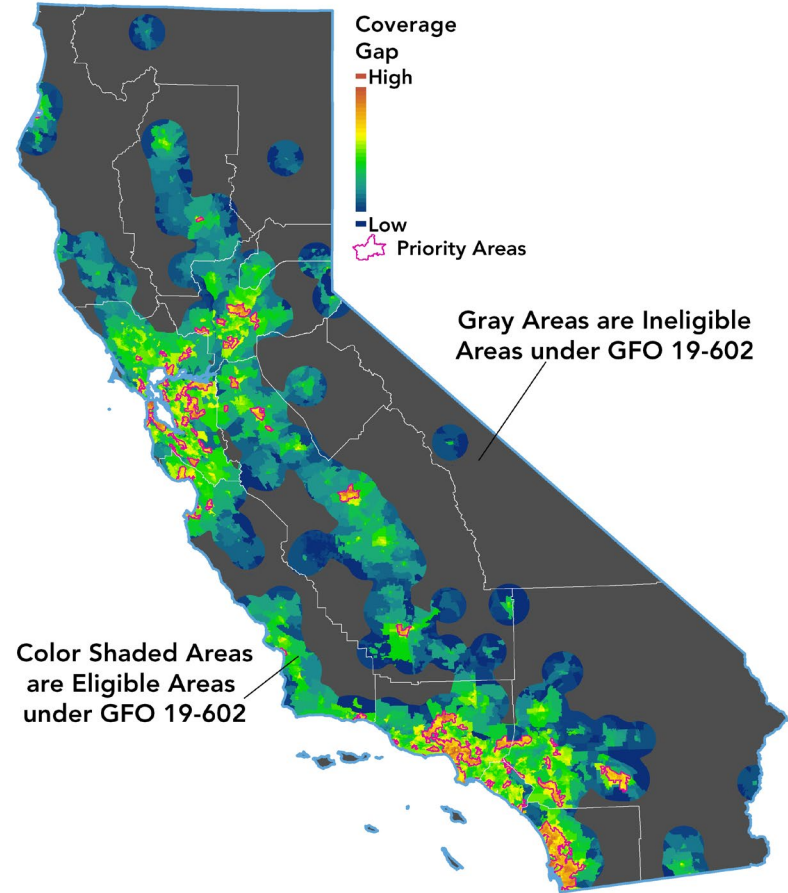
Disadvantaged Communities Analysis

- Analyzed the coverage provided by 110 known hydrogen station locations (open and/or under development)
- Assessed percentage of population in disadvantaged communities within coverage
- Communities with low percentage of covered population indicated as higher need for new station development
- Most high-need communities more rural and/or lower population density than communities with existing or planned coverage



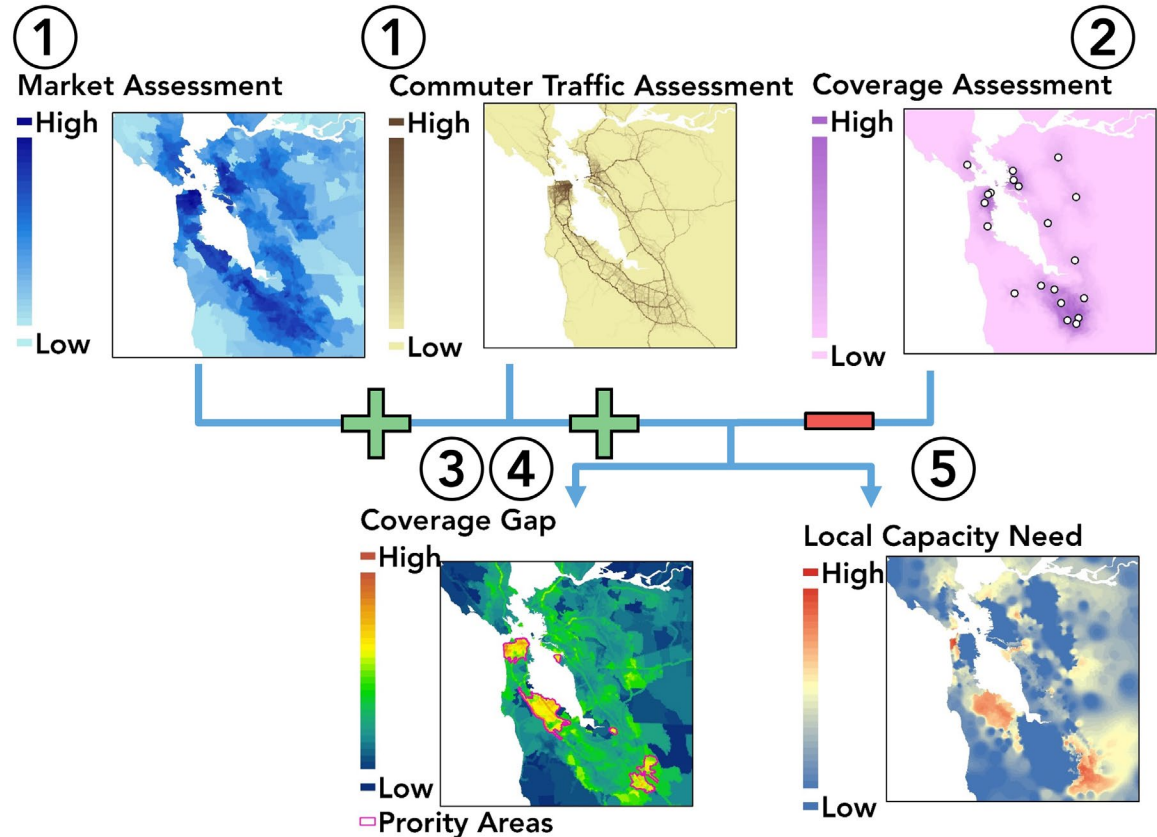
Finding 5: Coverage Gaps

Analysis of hydrogen station network coverage gaps reveals opportunity for new station development remains strong in developed hydrogen fueling markets and untapped markets across the state

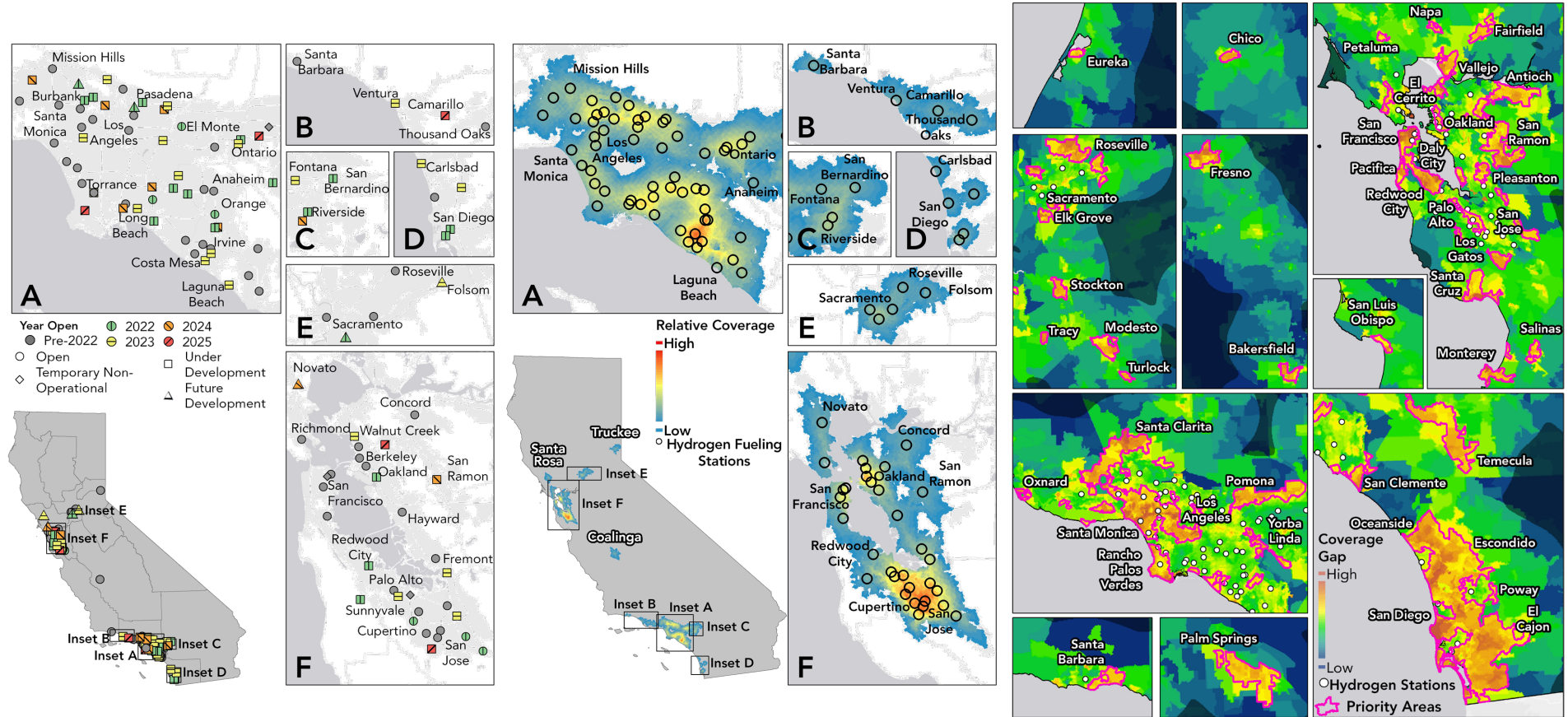


Station Network Evaluation

CARB developed California Hydrogen Infrastructure Tool (CHIT) to inform analysis of hydrogen station network coverage and capacity needs




Finding 5: Coverage Gaps



New Funding Opportunity: GFO-22-607

- The California Energy Commission launched GFO-22-607 on October 21, 2022 with \$27 million available
- Two pathways for location eligibility:
 - Either on-site or adjacent to a property with a fleet of fuel cell vehicles (of any classification) that will be fueled by the proposed station
 - Location eligibility without a supporting fleet under one of two considerations:
 - New markets for hydrogen station development
 - High-need disadvantaged communities identified in CARB's 2022 Annual Evaluation
- Applications due February 3, 2023

Online GFO-22-607 Eligibility Map Viewer

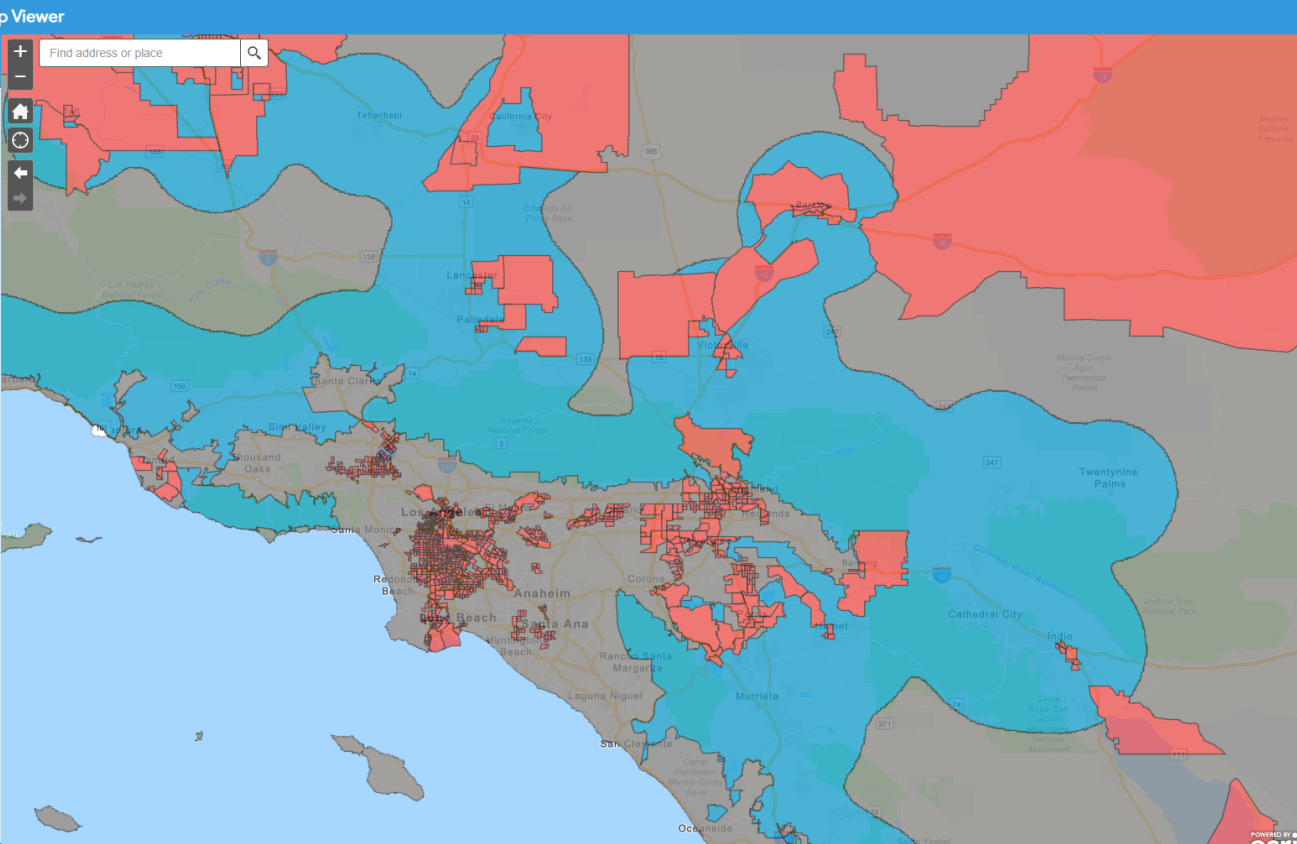
 CARB GFO-22-607 Eligibility Map Viewer


Find address or place

About

This map displays eligibility criteria to be used for proposed hydrogen fueling station locations in the California Energy Commission's Grant Funding Opportunity, GFO-22-607, "Light-Duty Vehicle and Multi-Use Hydrogen Refueling Infrastructure." Applicants should fully review the GFO's solicitation manual for all eligibility requirements and application instructions. This map was developed considering several sources, including: the network of hydrogen fueling stations presented in the former California Fuel Cell Partnership's (now the Hydrogen Fuel Cell Partnership) [The California Fuel Cell Revolution](#), stakeholder and public feedback to the California Energy Commission's [Hydrogen Refueling Concept](#) presented at the February 2022 Staff Workshop, analysis of disadvantaged community access to hydrogen fueling stations presented in the California Air Resources Board's [2022 Annual Evaluation](#), and the known locations of hydrogen fueling stations currently open and under development.

There are two main goals represented by the eligibility criteria in this map. First, as discussed in the Energy Commission's initial concept, more than 170 hydrogen fueling station projects are currently open or under development through a combination of public and private funding. The majority of the known locations are concentrated in urban areas in and around Los Angeles County, Orange County, San Diego, Sacramento, and the San Francisco Bay Area. There are also approximately 60 additional station locations funded under the previous grant solicitation GFO-19-602 that currently have no location set and may be proposed to be located in these areas that have high potential for developing the earliest fuel cell electric vehicle markets in California. As



California State Parks, Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, Bureau of Land Management, EPA, 

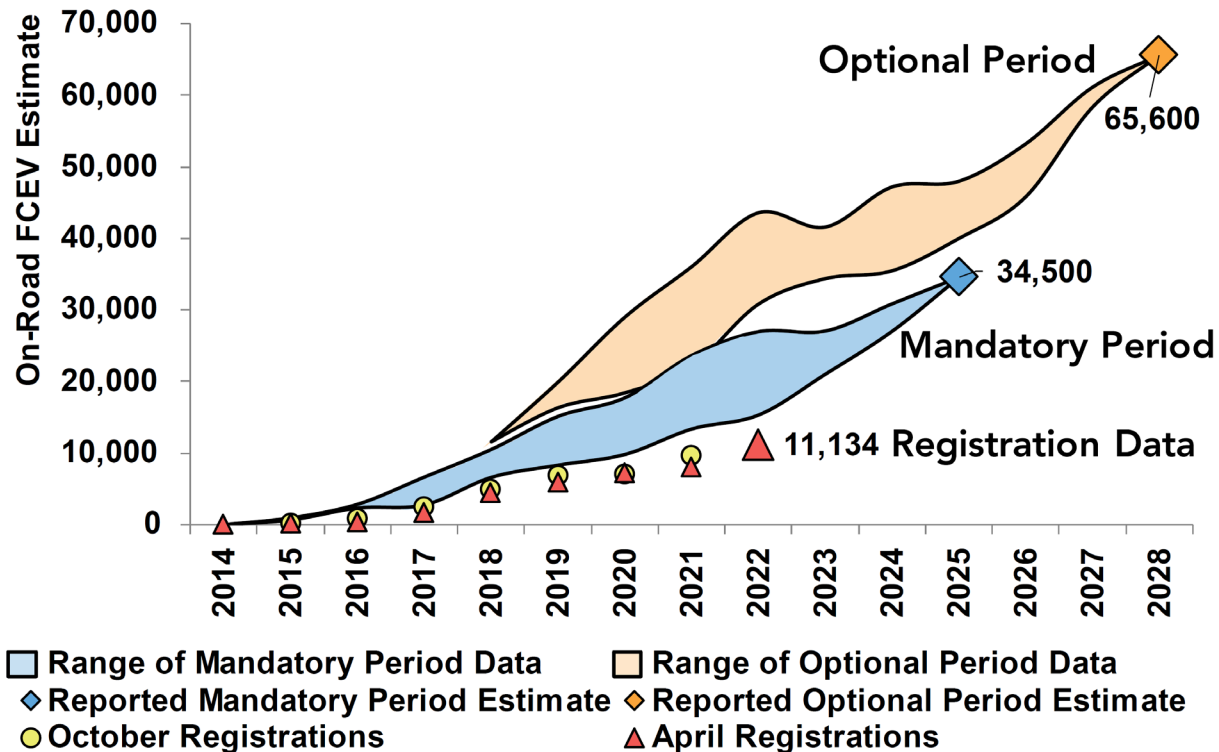
All rights reserved

Future Funding Opportunity TBD

- Funds for GFO-22-607 were provided by the California 2021 Budget ZEV Package
- The California 2022 Budget provided additional funds for ZEV infrastructure
- The California Energy Commission has indicated \$60 million of additional funds in fiscal years 23/24, 24/25, and 25/26
 - See the Revised Staff Report for the 2022-23 Investment Plan Update for the Clean Transportation Program:
<https://efiling.energy.ca.gov/GetDocument.aspx?tn=246271>

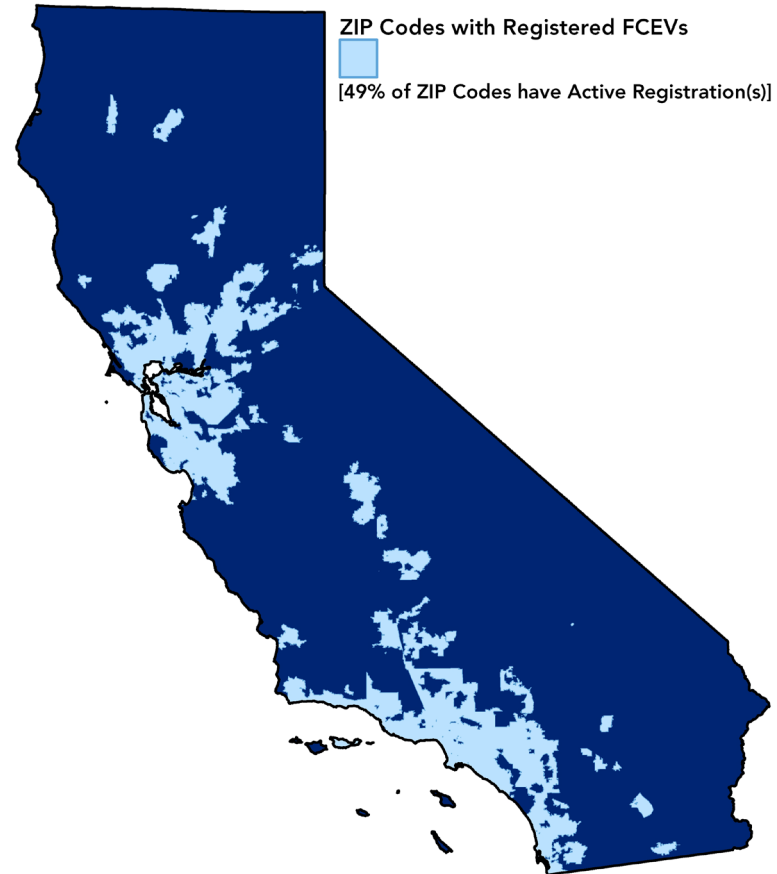
Finding 6: FCEV Populations

FCEV sales increased in 2021, and auto manufacturer projections for future FCEV deployment show incremental growth at rates similar to prior projections



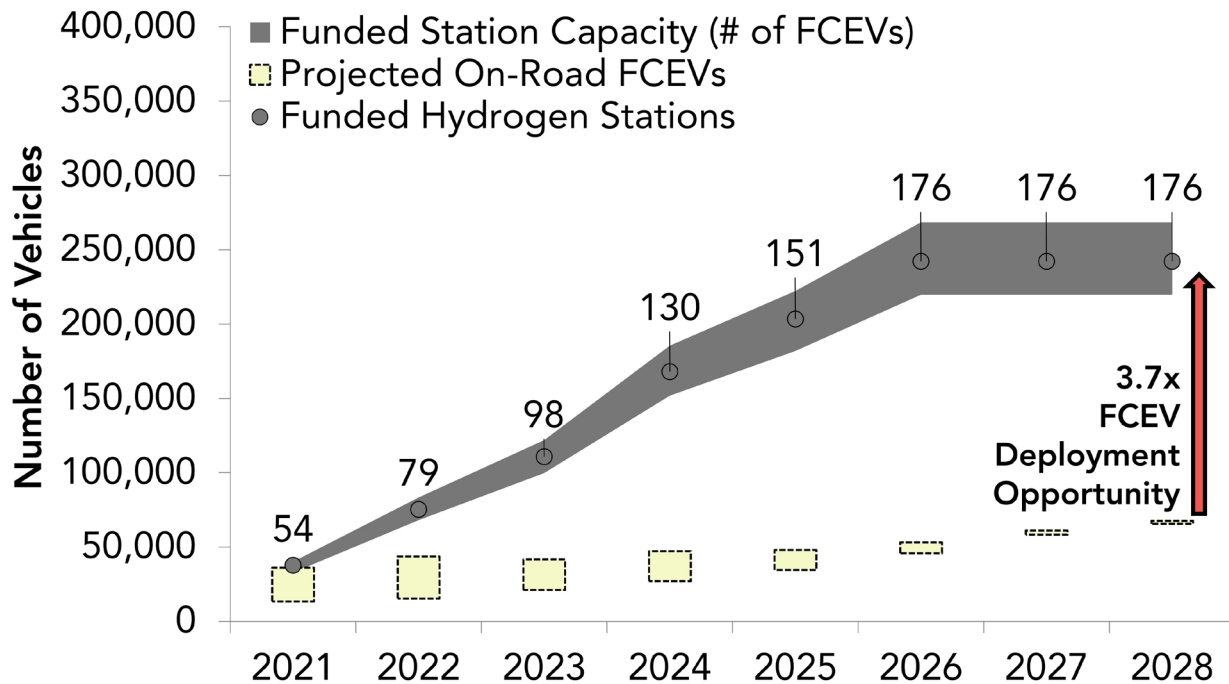
Fuel Cell Electric Vehicles Across California

Fuel cell electric vehicles tend to be registered near the open and planned hydrogen fueling network, but there are many exceptions



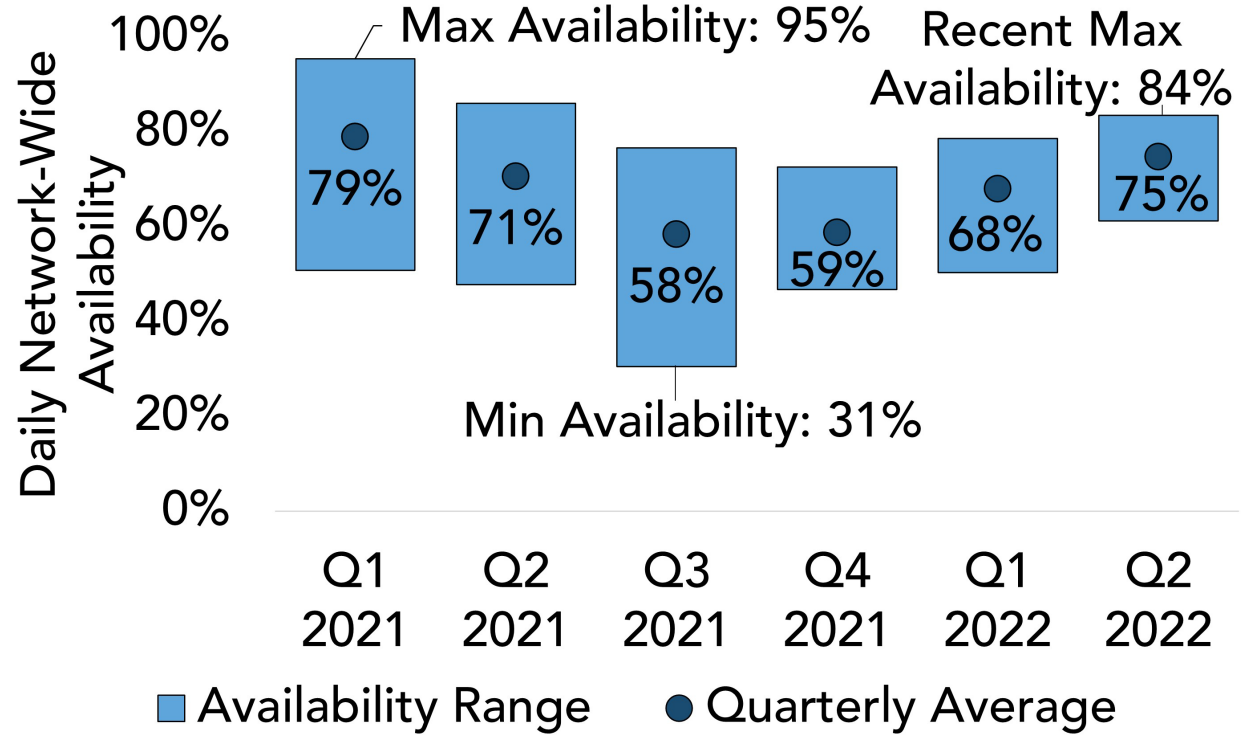
Finding 7: Station Supply and Demand

Auto manufacturer survey responses show network daily fueling capacity will lead FCEV sales by a significant margin through 2028



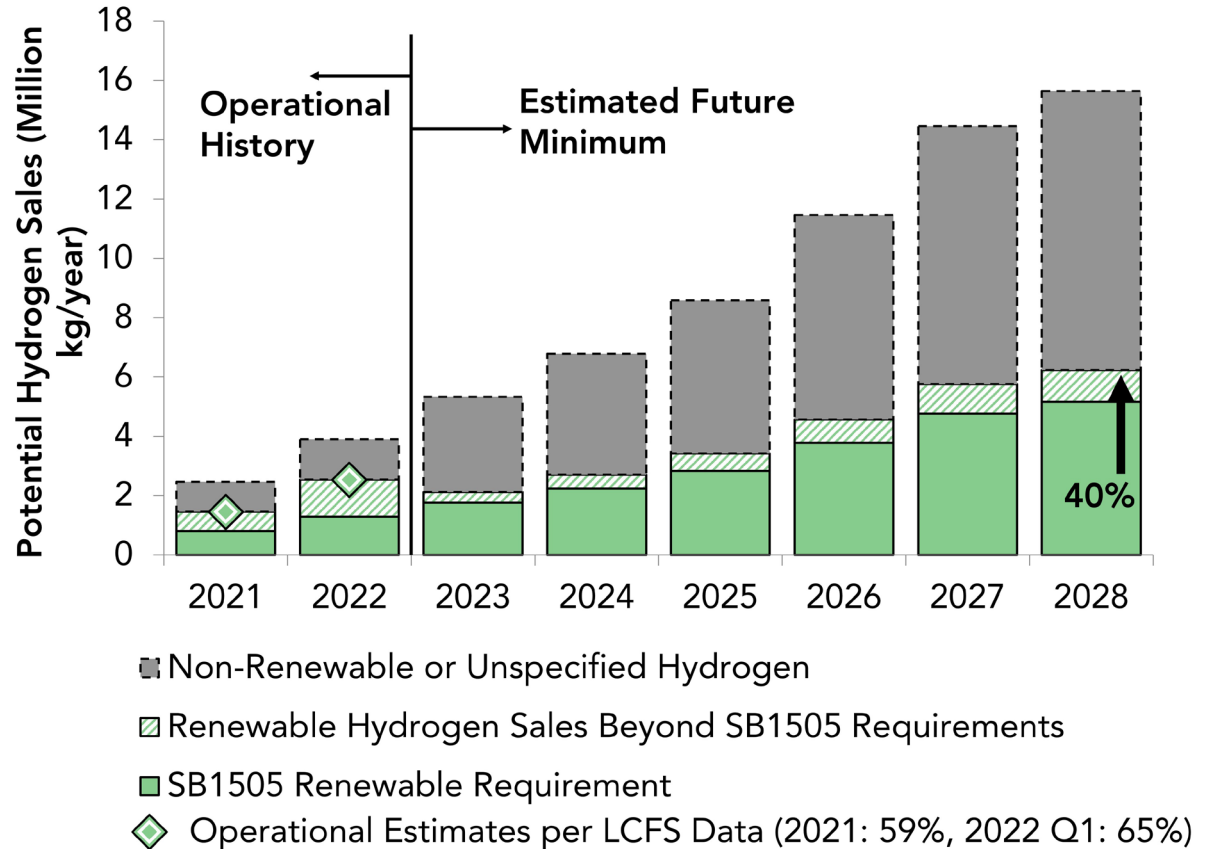
Station Availability Improving

Recent actions by hydrogen providers and station operators have resulted in improved station availability and uptime over the past six months



Finding 8: Renewable Hydrogen

Updated data and analysis continue to show that renewable assets contribute to hydrogen production at a higher rate than SB 1505 and incentive program requirements



Conclusions and Recommendations

- Work to accelerate station development timelines
 - ✓ SB 1291 brings expedited permitting to hydrogen stations
- Emphasize development of hydrogen fueling stations in new markets
 - ✓ GFO-22-607 directly incorporates
- Ensure new market development also addresses disadvantaged communities
 - ✓ GFO-22-607 directly incorporates
- Encourage auto manufacturers to embrace a more expansive vision of FCEVs in California
 - ✓ Advanced Clean Cars II Regulation establishes high-ZEV future trajectory
- Continue to emphasize clean hydrogen production and distribution
 - ✓ Planned in California's ARCHES proposal for federal Hydrogen Hub funding

Discussion

2022 Annual Report:

<https://ww2.arb.ca.gov/resources/documents/annual-hydrogen-evaluation>

GFO-22-607 Map Viewer:

<https://californiaarb.maps.arcgis.com/apps/webappviewer/index.html?id=20eaf894ac074849ac21aebec5a71934>

Contact for Questions:

Andrew.Martinez@arb.ca.gov



September 2022



2022 Annual Evaluation of Fuel Cell Electric Vehicle Deployment
and Hydrogen Fuel Station Network Development
(Report Pursuant to Assembly Bill 8; Perea, Chapter 401, Statutes of 2013)

