Motivations

- Zero Emission Vehicles vital to addressing air quality & climate change
- Goal to enable industry to scale up a sustainable market
- MD/HDV and LDV Synergies
  - LDV: FC system economy of scale
  - MD/HDV: H2 fuel economy of scale
California’s Light-Duty FCEV Progress

2018 Year in Review

Network Summary
- Number of Stations: 39 Open + 25 Coming Soon
- Total Open Capacity: 7,890 kg/day
  - Fuel for Approx. 1,800 FCEVs per day
  - Enables Deployment of Approx. 10,400 FCEVs

FCEV Deployment Status
- Oct 2018 DMV Registrations: 5,014
- Dec 2018 Fuel Cell Partnership Sales: 5,658

Graph showing the progress of FCEV deployment in California, with data points from 2014 to 2024.
Hydrogen Program Portfolio

- Network Funding, Analysis, and Reporting
- Fuel Incentives
- Station Evaluation
- Economic Evaluations
- Profitable Station Metrics

**Network-Building Cash Flows**
- CAFR with LCFS HRI, B5% Max U

**Profitable Station Metrics**
- Total Capital Cost
- Hydrogen Procurement Cost

**Fuel Incentives**
- GHG Reduction Credits
- Infrastructure Credits
- Infrastructure Credit Eligibility Period

**Economic Evaluations**
- Capital Costs
- Procurement and O&M Costs
- Sales Revenue

**Station Evaluation**
- Coverage Need
- Capacity Need
- Current Network

**Network Funding, Analysis, and Reporting**
- Funding Reqs
• Evaluate dispensing according to SAE J2601 and ANSI/CSA HGV 4.3

• CARB lead on implementation
  - Testing, Analysis, Review

• Shaping future SAE standards

• Inform future standardization & verification of industry-led testing

• Partners: DOE, NREL, SNL, Powertech, DMS, CaFCP, Energy Commission, SCAQMD
HySCapE

• First-of-its-kind tool to provide a “standard ruler” to evaluate station capacity based on limited set of equipment specifications

• Used in Low Carbon Fuel Standard infrastructure credit evaluations and future Energy Commission grant program

• Developed in partnership with NREL, Energy Commission, and CARB with public and industry review
Optimizing an Integrated Solar-Electrolysis System

- Exploring system design and operation implications on the business case for solar-sourced hydrogen in California
- Partners: PG&E, DOE, NREL, CARB, GO-Biz

California Hydrogen Research Consortium

- Addressing several early-market infrastructure development and analysis needs
- Partners: NREL, DOE, CARB, Energy Commission, GO-Biz, SCAQMD
- Poster H2041 (April 30, 6:30PM)
Paths Forward

**Paths Forward**

**H₂@Scale!**

**1,000 H₂ Station Proj. (2030)**

- **High Density**
- **Low Density**

**Benefits by the Numbers**

- **BY 2030**
  - **1,000 Stations**
  - **1,000,000 Cars**

- **693.5 million gallons** per year of gasoline displaced
- **2.7 million metric tons** per year GHG avoided*
- **3,900 metric tons** per year NOₓ avoided
- **97%** of disadvantaged communities within the station network coverage

*while today’s energy mix of 32 percent renewable hydrogues
www.arb.ca.gov/hydrogen

www.energy.ca.gov/transportation/report_ab8.html

www.businessportal.ca.gov/zero-emission-vehicle-program/zev-resources/

www.cafcp.org

www.business.ca.gov/ZEV-Action-Plan