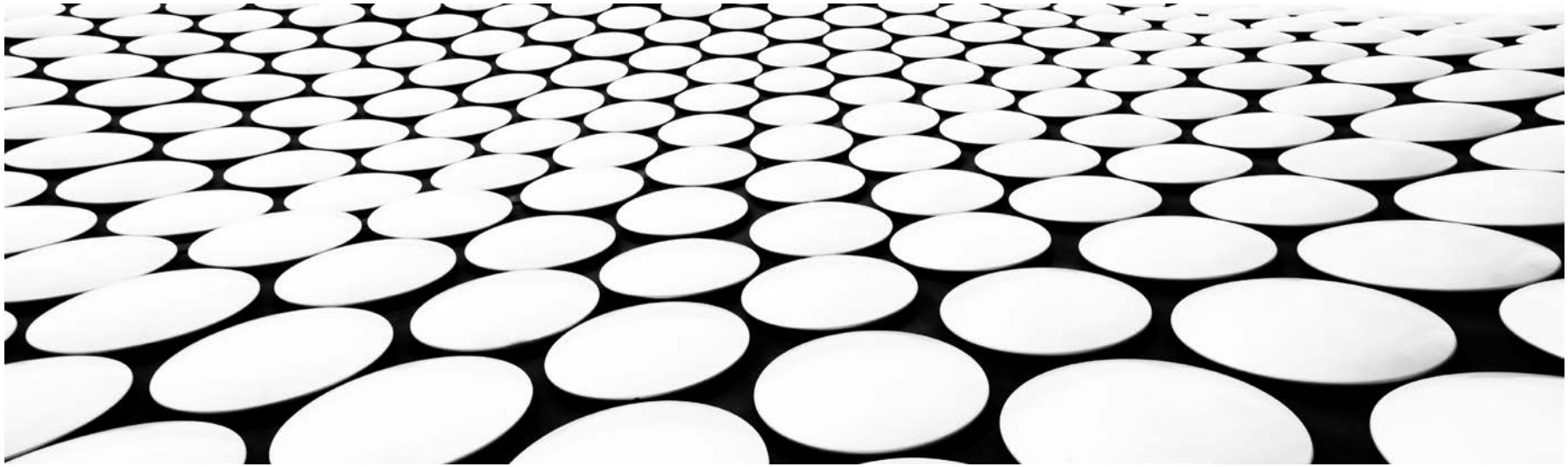


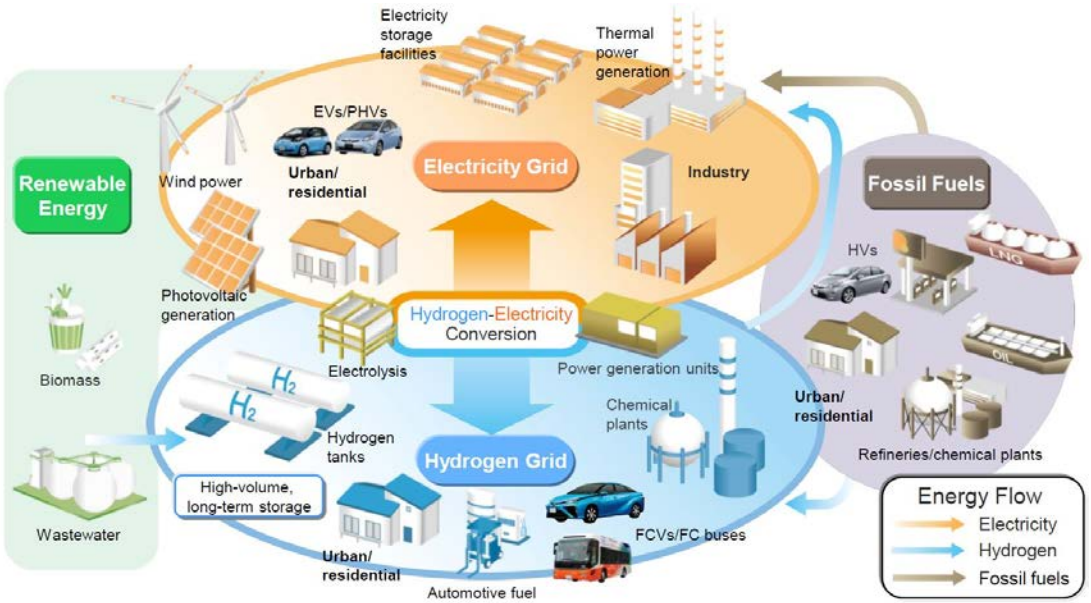
PERSPECTIVES ON HYDROGEN POLICY

BILL ZOBEL | EXECUTIVE DIRECTOR | CALIFORNIA HYDROGEN BUSINESS COUNCIL

SEPTEMBER 22, 2020

THE CALIFORNIA HYDROGEN BUSINESS COUNCIL

- Respected Advocate for Hydrogen and Fuel Cell Technology
- 120+ Members Strong Representing a Broad Cross Section of the Industry
- Growing the Industry through Enabling Policy across Market Segments
- Industry Networking, Education & Collaboration



THE CHBC ADVOCATES ON BEHALF OF OUR MEMBERS IN MOST EVERY SEGMENT OF THE HYDROGEN VALUE CHAIN

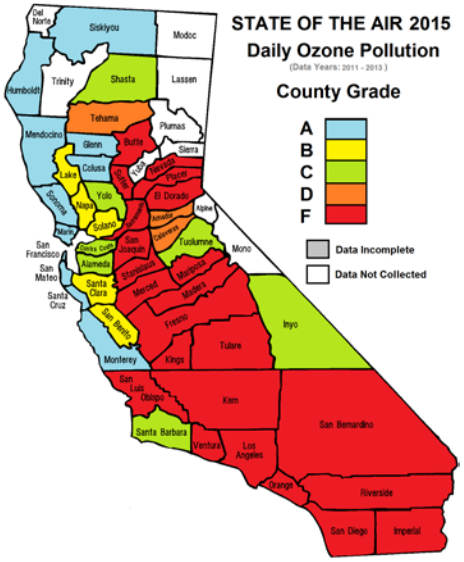
CALIFORNIA HYDROGEN BUSINESS COUNCIL

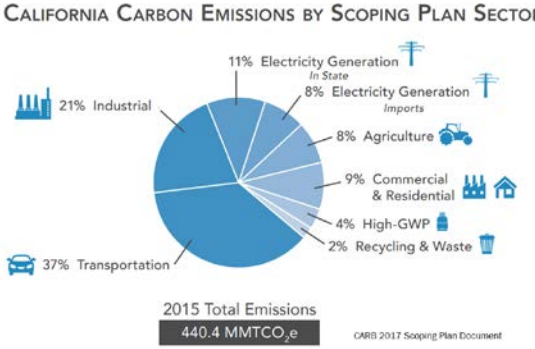
VISION, MISSION, PRINCIPALS AND OBJECTIVES

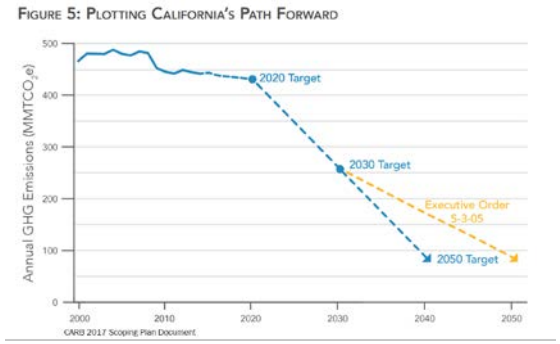
- **Our Vision:**
  - CHBC is committed to advancing the commercialization of hydrogen in the energy and transportation sectors to achieve California's climate, air quality, and decarbonization goals.
- **Our Mission:**
  - Provide clear value to our members and serve as an indispensable and leading voice in promoting the use of hydrogen in the utility and transportation sectors in California and beyond.
- **Our Principals:**
  - Leadership, Integrity, Teamwork and Inclusion.
- **Our Objectives:**
  - Enhance market commercialization through effective advocacy and education of policymakers and policy influencers
  - Be "the" trusted "go to" resource on Hydrogen and Fuel Cell technology for policymakers and policy influencers
  - Accelerate market growth via networking opportunities and information exchange for the industry and its customers

CALIFORNIA CHALLENGES PRESENT OPPORTUNITY

- Air Quality
  - Worst in the Nation
  - Progress has been slow
- Carbon Reduction Goals
  - 80% Reduction from 1990 baseline
  - Aggressive posture across the State's Economy
- Hydrogen Provides Opportunity and will Play a Role in California's Future







ACTIVE CALIFORNIA POLICY VENUES AND PROCEEDINGS

TRANSPORTATION

- Vehicle and Infrastructure Incentives
- Cap and Trade Allocations - Greenhouse Gas Reduction Fund (GGRF)
- Zero Emission Vehicle Regulations
- Low Carbon H2 Pathways for Transportation Fuel
- Optimizing the Low Carbon Fuel Standard (LCFS) for H2

GAS & ELECTRIC MARKET DESIGN

- Grid Modelling
- Integration of Renewable H2 (RH2) into State Resource Planning
- RH2 Generation
- Long-term / Seasonal Energy Storage
- Direct Access for RH2 Production
- RH2 Pipeline Blending
- Building Decarbonization

DECARBONIZATION PLANNING

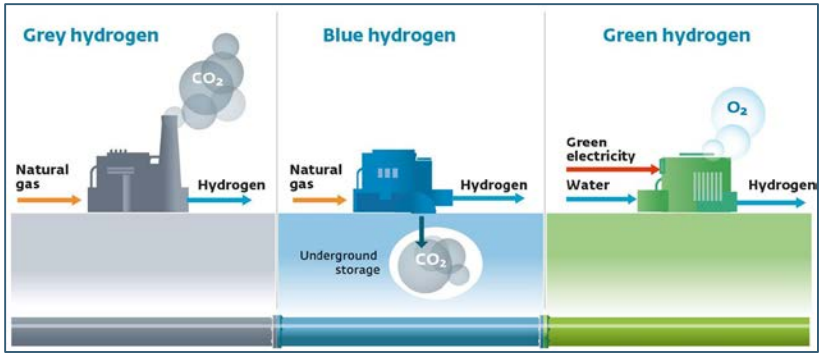
- Legislative Support for Decarbonization Program Funding
- Joint Agency Low/Zero Carbon Power Plan (SB 100)
- CARB Scoping Plan for Point Sources, Vehicles and Infrastructure
- CEC Integrated Energy Policy Report

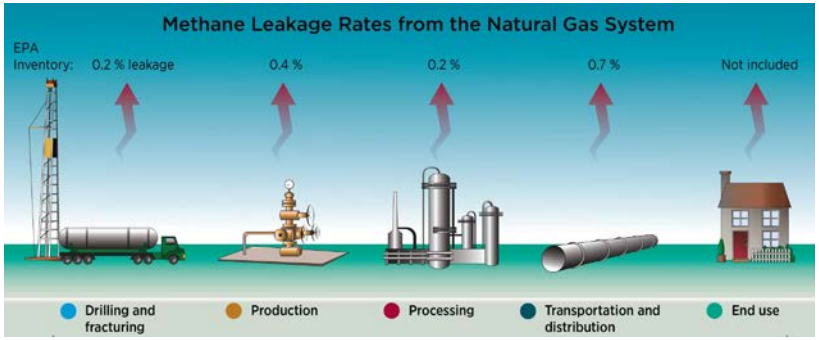
POLICY CHALLENGES

- Green and Renewable Hydrogen
- Coordination Across Sectors and a Path to Scale
- Leveraging Resources
- Coalition Building and Gaining Consensus

GREEN AND RENEWABLE HYDROGEN

- "Green Hydrogen" – defined as Hydrogen produced from "renewable resources" such as Solar and Wind
- "Renewable Hydrogen" has no formally accepted definition
- Hydrogen produced using "RNG" has a relatively low carbon score – how renewable or green is it?
- Policy Challenges of "Renewable Hydrogen"
  - Gas Pipeline and RNG Production Facility Integrity & Leakage
  - RNG as a Feedstock to Produce Renewable Hydrogen
- Environmental NGOs, some California Policy Makers and some Industry Participants are sensitive to these issues
- Policy approach involves coordination, a path to 100% renewable and measurable industry progress on system integrity

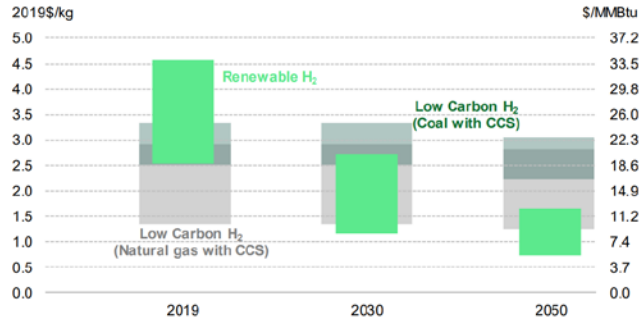




COORDINATION ACROSS SECTORS AND A PATH TO SCALE

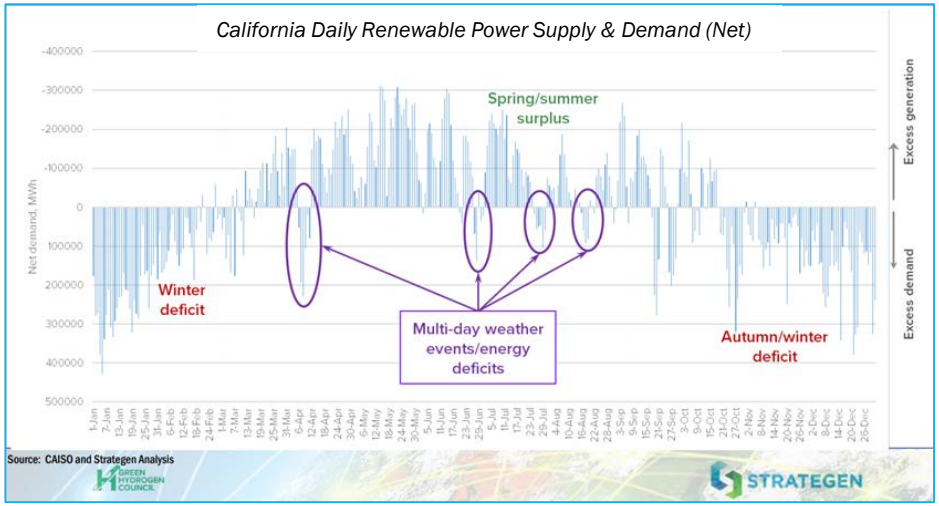
- Scale involves several sectors working together
  - Power Grid
  - Gas Grid
  - Transportation
- Effective Policy brings scale & lowers costs – i.e. Solar, Wind
- Well coordinated approach in California across agencies, in multiple venues and inclusive of multiple market participants

Figure 3: Forecast global range of levelized cost of hydrogen production from large projects



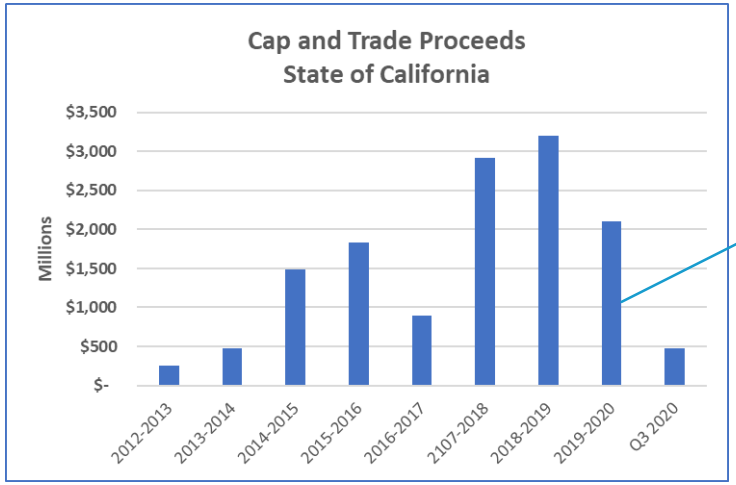
Source: BloombergNEF. Note renewable hydrogen costs based on large projects with optimistic projections for capex. Natural gas prices range from $1.1-10.3/MMBtu, coal from $30-116/t.

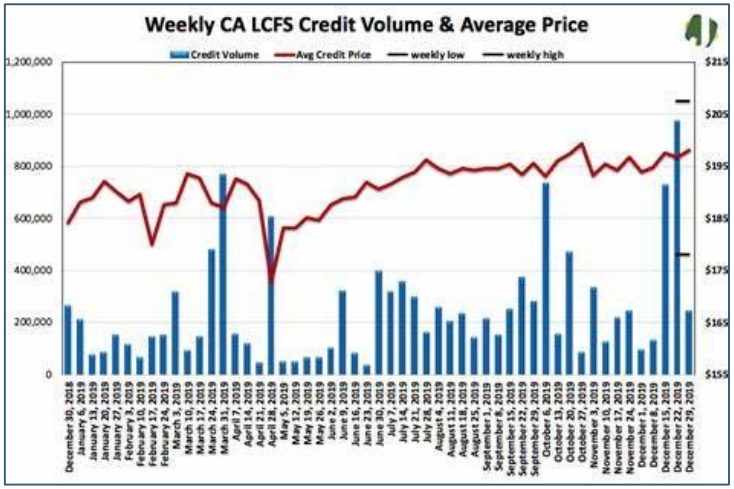
California Daily Renewable Power Supply & Demand (Net)



LEVERAGING RESOURCES

- Effective Policy can Leverage Resources & Market Scale
- California's Approach to Hydrogen to date:
  - Cap and Trade Transportation Funds
  - Low Carbon Fuel Standard (LCFS)
  - Dedicated Funding for Zero Emission Transportation Programs
  - Evaluate Utility Investments
- Zero Emission Transportation has been a success, more is needed
- Ratepayer/Utility Backed Investments has proven successful for RPS, BEVs, RNG





COALITION BUILDING AND GAINING CONSENSUS

- Gas & Electric Utilities
- Ratepayer Advocates
- Industrial Gas Producers
- Vehicle & Truck OEMs
- New Market Entrants
- Environmental NGOs
- Community Organizations
- Policymakers

THANK YOU!

CALIFORNIA HYDROGEN BUSINESS COUNCIL

- Active representation
- Trusted Resource
- Access to Policymakers
- Track Record of Success
- Industry Collaboration

- Bill Zobel | Executive Director
- Learn more: www.californiahydrogen.org