



CA's Clean Hydrogen Market Development

SB 1075 Webinar

September 5, 2023

California Governor's Office of Business & Economic Development (GO-Biz)



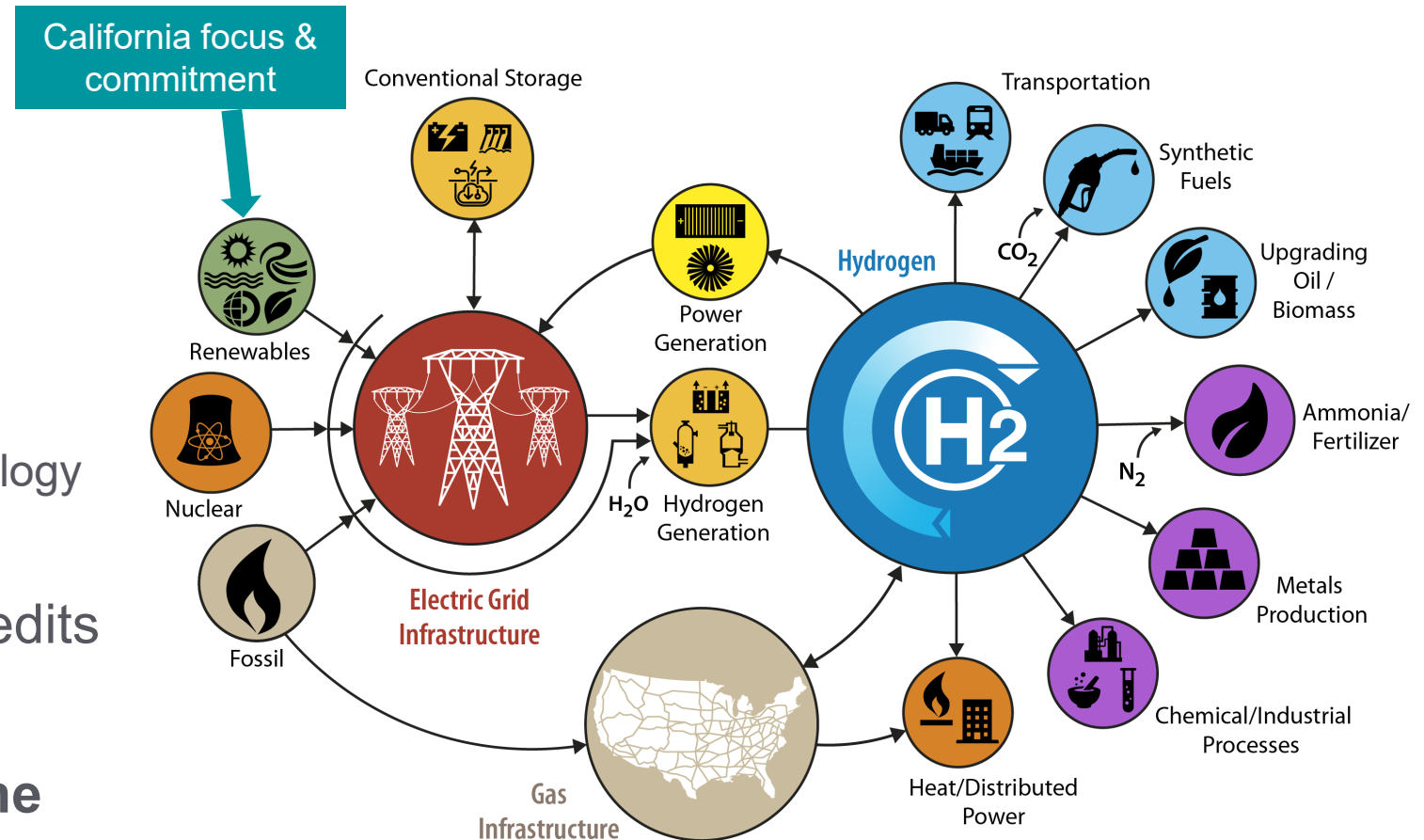


Alliance for Renewable Clean Hydrogen Energy Systems (ARCHES) – California H2Hub

Presentation for CA
September 2023

IIJA and IRA: H2 Highlights

- IIJA includes \$9.5B for clean hydrogen
 - \$8B for at least 4 regional clean hydrogen hubs
 - \$1B for electrolysis research, development, and demonstration
 - \$500M for clean hydrogen technology manufacturing and recycling R&D
- IRA includes up to \$3/kg tax credits for clean hydrogen production
- **Hydrogen can decarbonize the hard to decarbonize sectors**





ARCHES Mission

- **ARCHES** is a **public-private partnership** to create a **sustainable statewide renewable, clean hydrogen (H₂) market and ecosystem** in California and beyond
- **ARCHES** utilizes **renewable resources** to produce hydrogen with the objective to **fully decarbonize the regional economy**
- **ARCHES** prioritizes
 - ❖ Environmental Justice
 - ❖ Equity
 - ❖ Economic Leadership
 - ❖ Workforce Development
 - ❖ Hydrogen Market Viability



ARCHES Goals

- Establish an exemplary **renewable, clean H₂ Hub in California region by 2030**
- Kickstart **commercial viability of H₂**
 - ❑ Focus on hard-to-decarbonize sectors: **Ports, Power, HD Transportation**
 - ❑ Initiate expansion to: **Heavy Industry, Aviation, Maritime, Agriculture, and others**
- Ramp production/offtake of renewable, clean H₂ from **30 tonnes per day (TPD) to 500+ TPD** by 2030
- Produce **measurable benefits** for California communities, with **robust monitoring**, and **strong accountability**
- Develop a **H₂ workforce** for California, and a **H₂ workforce development model** for the nation

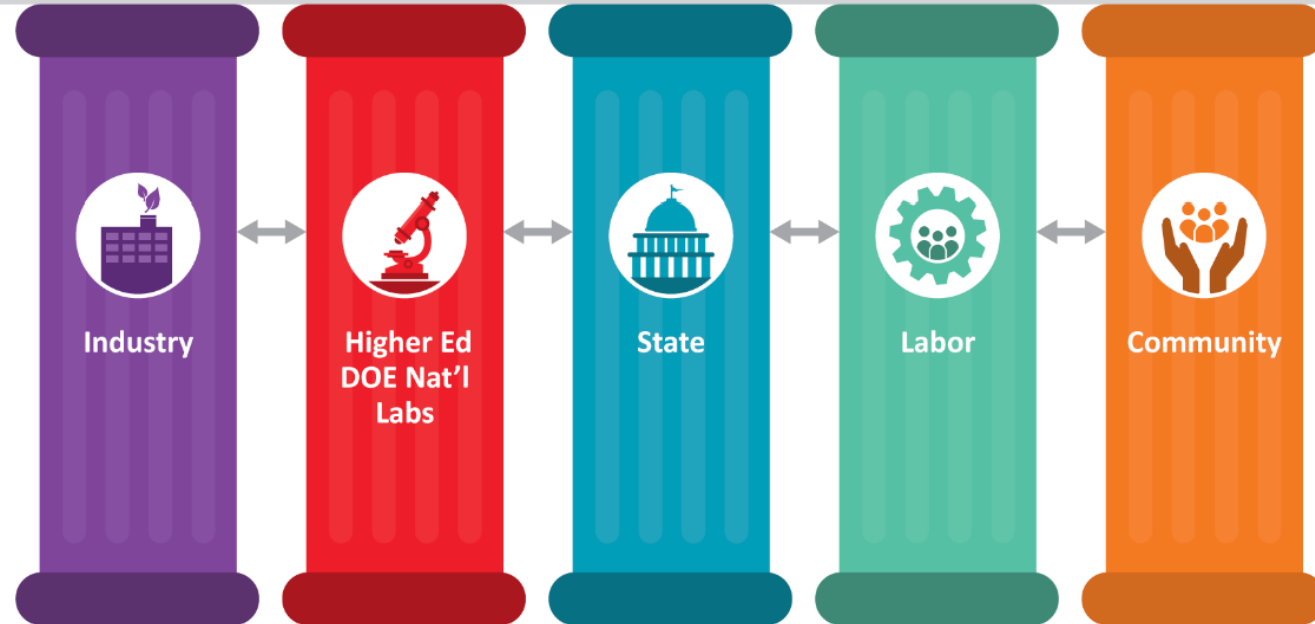
- **Meet CA and National carbon neutrality goals**



ARCHES

ARCHES Key Differentiators

- Infrastructure Availability
- Industry Readiness
- Offtake Resilience
- Market Catalyst
- Community Connectivity
- Delivery Certainty



ARCHES Principles

- Statewide
- Green/Clean
- Stakeholder & Community Engaged
- Equity & Justice Centered
- Aligned with State Interests
- Solution-Oriented
- Objective & Unbiased
- Multi-dimensional
- Connected
- Delivery Certainty



Project Selection

Enables Sustainable H₂ Economy and the ARCHES Ecosystem

Realizes Co-Funding and Market Viability

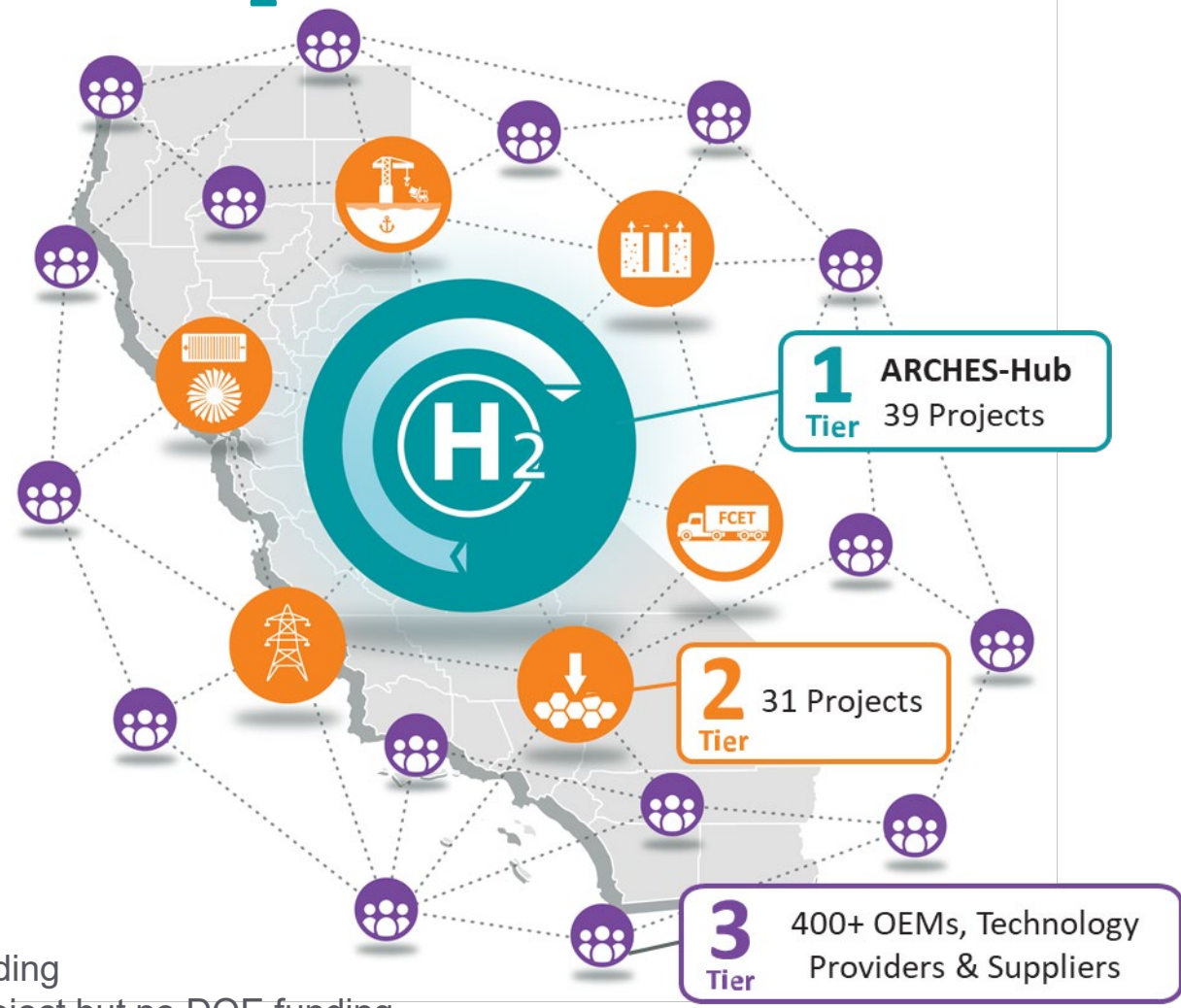
Provides Realizable and Ready Actualization

Provides Strong Community Benefits

- ❑ Chosen from an open RFP followed by in-depth negotiations that went into adoption scenarios and systems analysis
 - Value proposition
 - Market acceptance
 - Resource maturity
 - Community acceptance
 - Project integration



The Resilient H₂ Ecosystem for California



Tier 1 = DOE funding
Tier 2 = viable project but no DOE funding

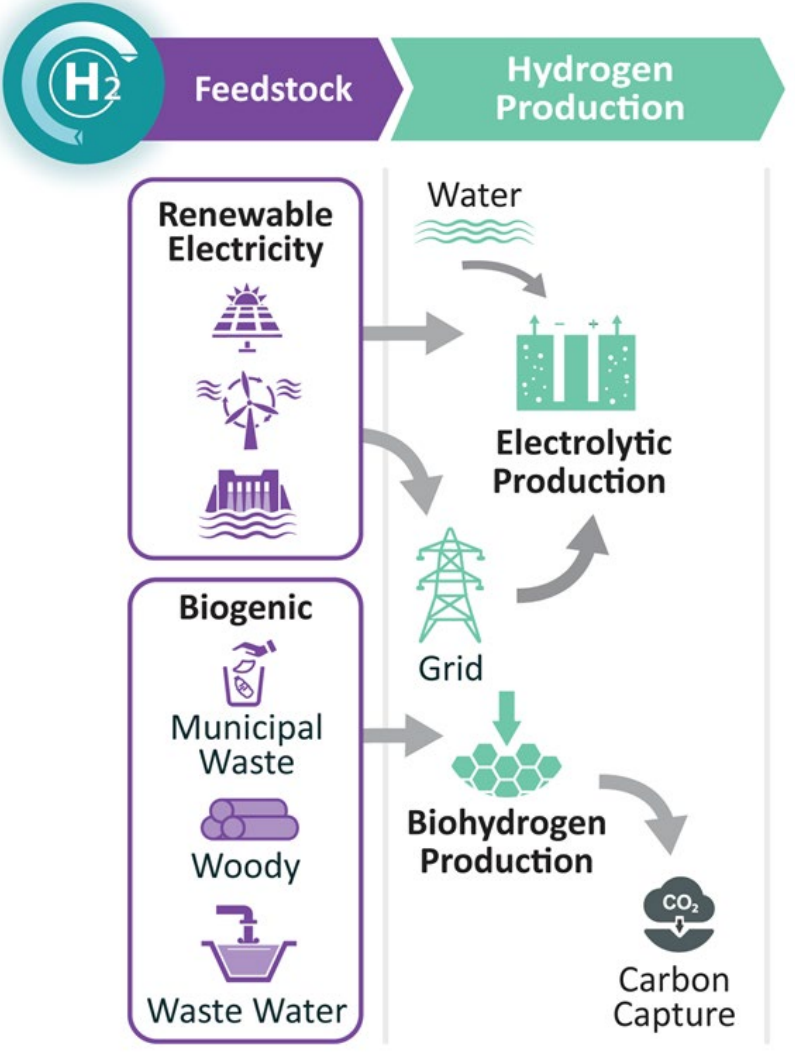


ARCHES Hydrogen Flow



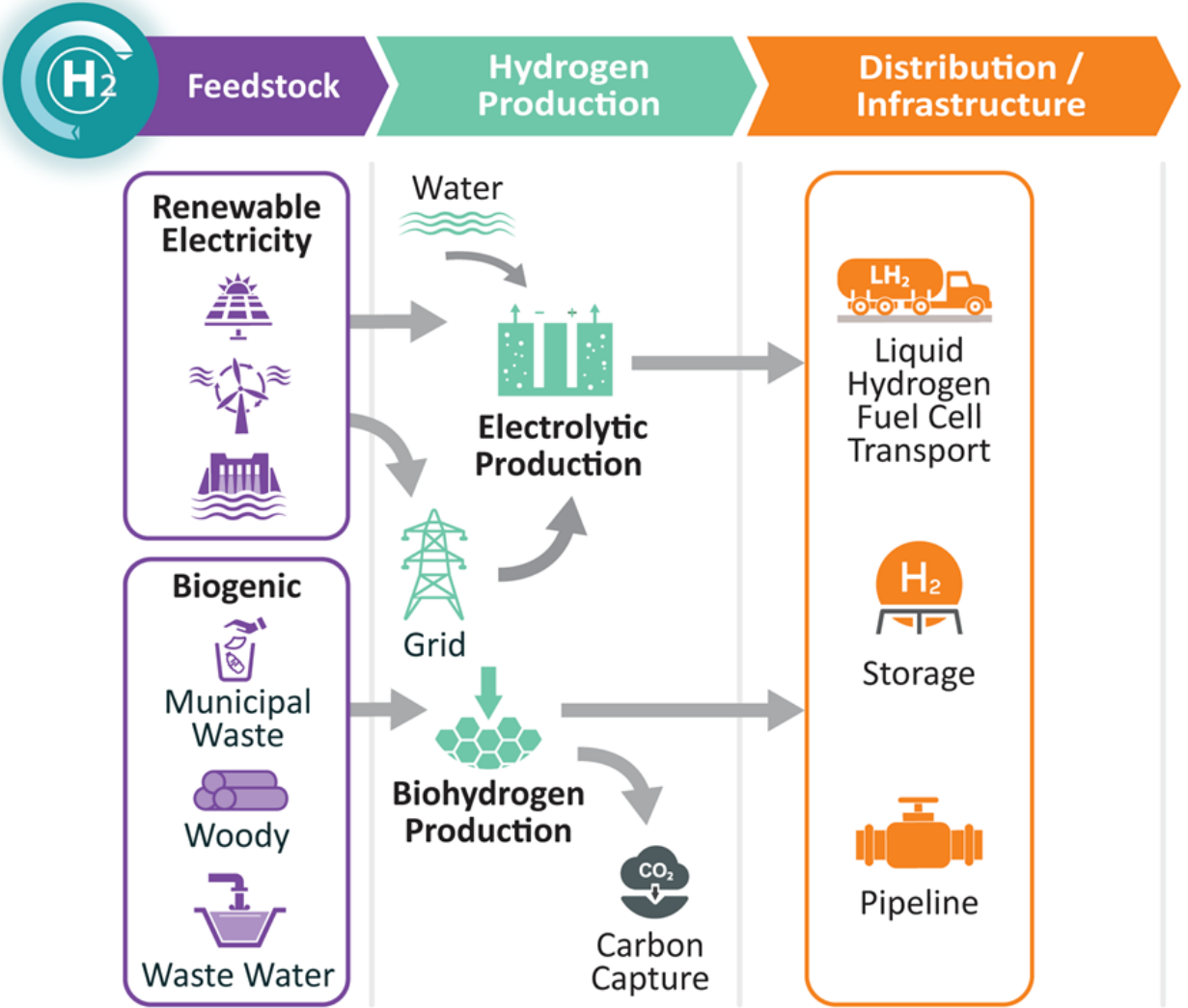


ARCHES Hydrogen Flow



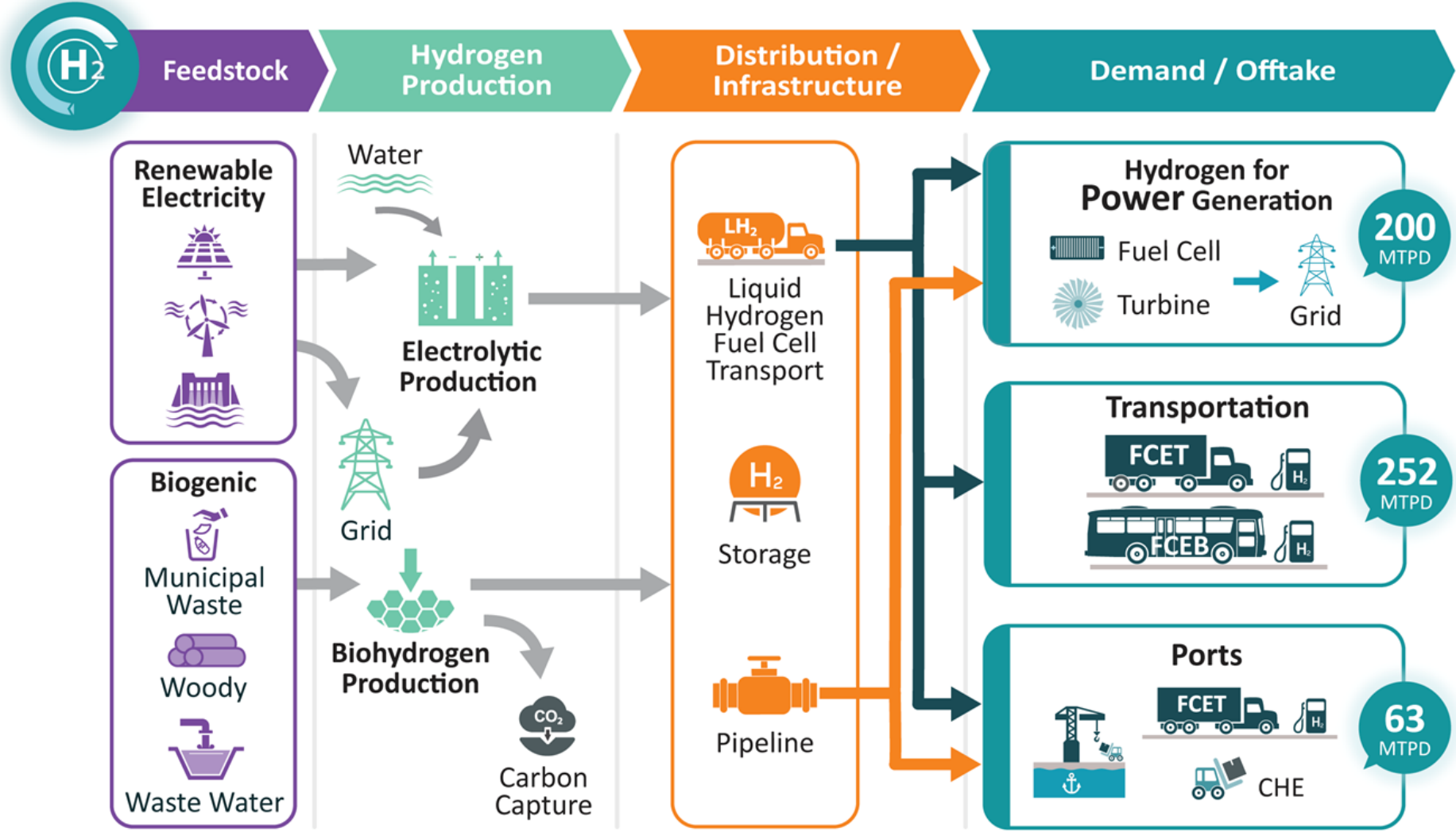


ARCHES Hydrogen Flow





ARCHES Hydrogen Flow





ARCHES Achieves Market Liftoff

DEPLOYMENT

Average delivered H₂ cost to end use kg

\$7.65

w/o any
PTC



\$5.04

with PTC
& LCFS

165



Miles of
new H₂
pipeline
(30 existing)

~5,500



Class
6 & 8
trucks

-0.15

kgCO₂/KgH₂



Average
life-cycle
carbon
intensity

1,080



Transit
buses

Heavy-duty HRS

66

Public



24

Private/
Transit

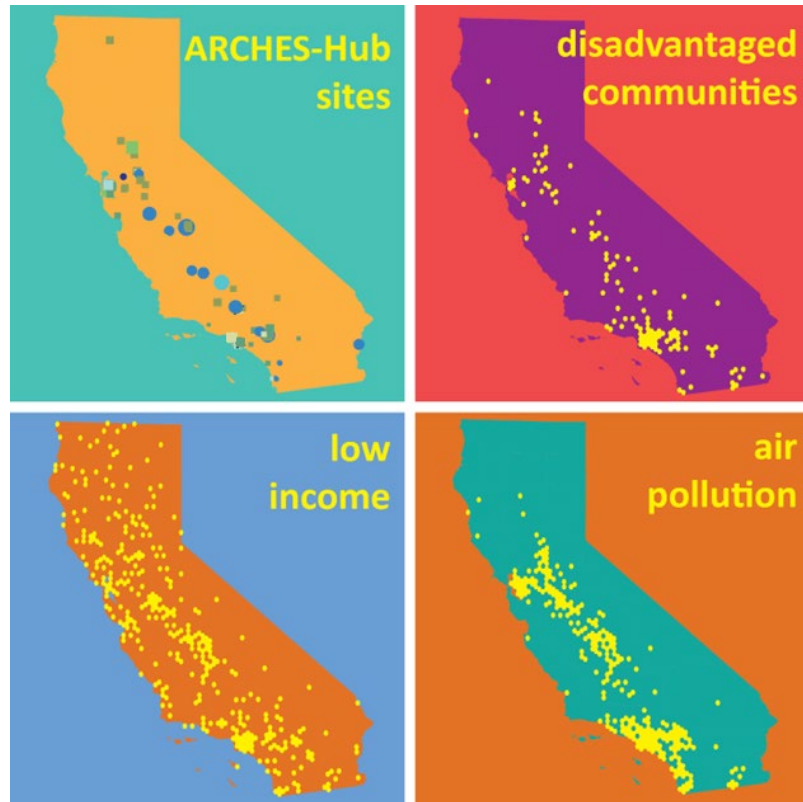
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Port cargo
handling
equipment




Disadvantaged Communities Will Benefit




*EJ40 database and CalEnviroScreen

COMMUNITY


- ▲ \$2.95 billion**




Economic value of increased health* and associated health costs savings per year
- ▲ 222,400**




Number of jobs created per year
- ▼ 2,097**




Fewer hospitalizations for respiratory & cardiac illness per year
- ▼ 13,292**




Fewer work loss days per year
- ▼ 6,900**



Nitrogen oxide net emissions avoided MTPY
- ▼ 239**




Sulfur dioxide net emissions avoided MTPY
- ▼ 326**




PM 2.5, 10

Particulate matter net emissions avoided MTPY
- ▼ 48**



Fewer premature deaths per year
- ▲ \$380 million**



Invested in community benefits & workforce development

*Reduced premature death, asthma, cancer risk, missed work days

Governor Newsom Announces New Strategy to Develop a Hydrogen Economy of the Future

Published: Aug 08, 2023

SACRAMENTO – Governor Gavin Newsom has [directed](#) the Governor’s Office of Business and Economic Development (GO-Biz) to develop California’s Hydrogen Market Development Strategy, employing an all-of-government approach to building up California’s clean, renewable hydrogen market. It will closely resemble the [Zero-Emission Vehicle Market Development Strategy](#) to help California collectively move forward and deliver zero-emission benefits to all Californians.

“California is all in on clean, renewable hydrogen – an essential aspect of how we’ll power our future and cut pollution,” **said Governor Newsom**. “This strategy will lay out the pathway for building a robust hydrogen market to help us fully embrace this source of clean energy.”

WHY IT’S NEEDED:

- Expanding the market for clean, renewable hydrogen is key to achieving California’s climate goals – especially for a clean electric grid, net-zero carbon emissions, and drastically cutting air pollution.
- California is currently competing to become a federally funded [Hydrogen Hub](#), a program that will leverage \$8 billion from the Bipartisan Infrastructure Law to establish at least four Hydrogen Hubs across the United States.

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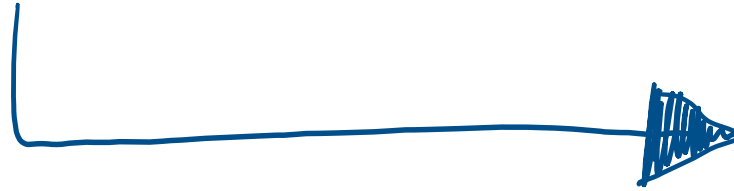
[Governor Newsom](#)

H₂ Market Development Strategy:

Why? When?	C-Neutral by 2045 (AB 1279)
What?	2022 Scoping Plan
How? Who?	H ₂ Market Development Strategy — SB 1075 — SB 643 — — IEPR — SB 671 — — ARCHES White Papers etc.
Model	ZEU Market Development Strategy

Agency Objectives; Stakeholder Roles, etc.

H2 Market Development Survey



For more information:

<https://business.ca.gov/industries/hydrogen/>



[GO-Biz Hydrogen Market Development Strategy Input Form \(smartsheet.com\)](https://business.ca.gov/industries/hydrogen/)

We need partnership to succeed...

