

The Path to a Carbon-Neutral California

Central Coast Sustainability Summit



CALIFORNIA

Governor's Office of Business and Economic Development

October 18, 2023



24.3%

1.5M (1.623M)

10,000 (10,248)

50%

700,000



Our Newest North Star(s)

- Carbon Neutrality (AB 1279) legally binding carbon neutrality by 2045
- 100% Clean Electric Grid (SB 1020) 100% clean electricity retail sales by 2045
- Capture and Remove Carbon Pollution (SB 905) establishes regulatory framework & excludes using tech to recover more oil



September 16, 2022: Governor Newsom signs sweeping legislative package

So, what do we need to do?

2022 Climate Scoping Plan

Unprecedented Deployment of Clean Technology and Nature-Based Climate Solutions



37x total on-road ZEVs



6x electric appliances in residences



1700x hydrogen supply



4x installed wind/solar generation capacity



> 2.5 Million acres of NWL climate action per year

Significant GHG Reductions



94% decrease in liquid petroleum fuel demand



91% decrease in fossil gas used in buildings



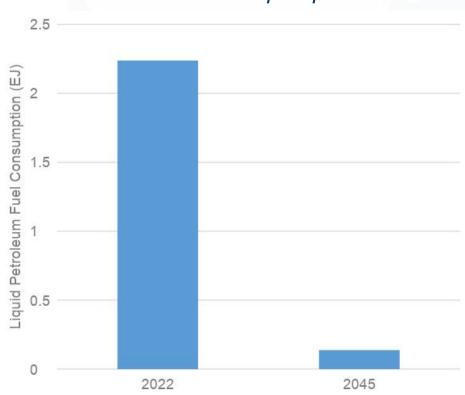
66% decrease in methane emissions from agriculture

10% reduction in wildfire emissions

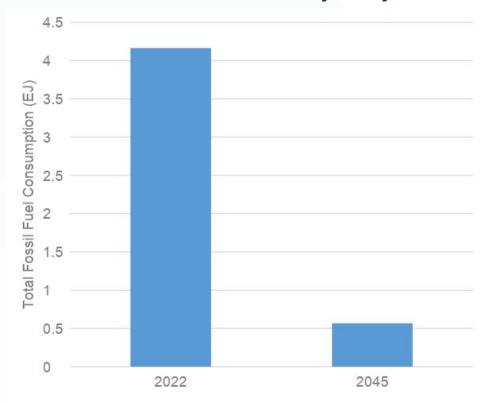


Dramatic Reductions in Fossil Fuel Demand

94% reduction in liquid petroleum



86% reduction in total fossil fuel





Scale.

Implementation.

Learn

Leven - Adjort

Centering Equity: A Multipronged Approach



- 1. High-level Direction & Focus
- 2. Funding: Largest investment in low-income and disproportionally affected populations in CA history
- 3. Research & Analysis to Understand Barriers/Opportunities
- 4. Awareness Building & Assistance Tools/Programs
- Workforce & Just Transition

Investment

2023-24 Budget



Leveraging Federal Funding

Magnitude of Funding

Infrastructure Investments and Jobs Act (IIJA)

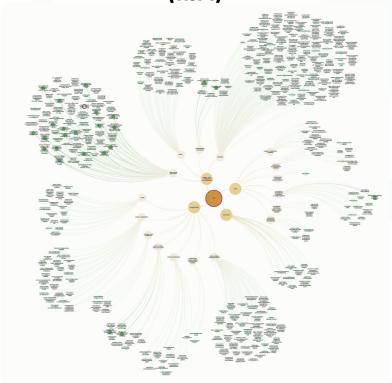
- \$1.2 trillion of investments
- 365 programs in legislation
- Funding Categories:
 - Transportation
 - Climate, Energy, and the Environment
 - Broadband
 - Other

Inflation Reduction Act (IRA)

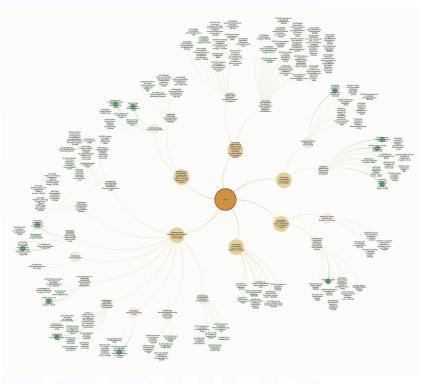
- \$437 billion of investments
- 125 programs in legislation
- Funding Categories:
 - Clean Energy Technology
 - Air Pollution
 - Building Energy Efficiency
 - Low Carbon Federal Operations
 - Climate Smart Agriculture
 - Community Resilience

Magnitude of Funding

Infrastructure Investments and Jobs Act
(IIJA)



Inflation Reduction Act (IRA)



GO-Biz Website: Climate and Energy Federal Funding Opportunities

• https://business.ca.gov/industries/climate-and-clean-energy/federal-funding-opportunities/

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	Advantages ▼	Industries ▼	Newsroom	About ▼	Apps	Search
Jobs Act (IIJA) and the Inflation Reduc	Federal Funding Op onent for state economic development. Funding op tion Act (IRA) offer a once-in-a-generation opportur ces can help California leaders and stakeholders nav here.	oportunities such a hity to transition ou	as the historic In Ir nation's econo	my to a clima	ate frienc	lly, clean
	Available Opportur	nities				
Climate Program Portal: Atlas Publ	ic Policy					•
IIJA and IRA White House Tools						•
Federal Agency Tools						•

GO-Biz Website: Inflation Reduction Act Tax Credits

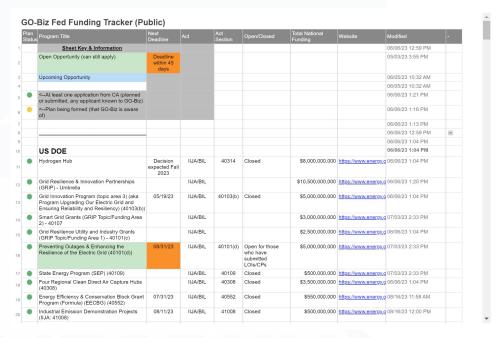
 https://business.ca.gov/industries/climate-and-clean-energy/inflation -reduction-act-tax-credit/



GO-Biz Website: Federal Program Details and Crowdsource Form

• https://business.ca.gov/industries/climate-and-clean-energy/federal-funding-program-details-climate-and-energy/





CA = #1 by total dollars



\$28bn **Funding Awarded**

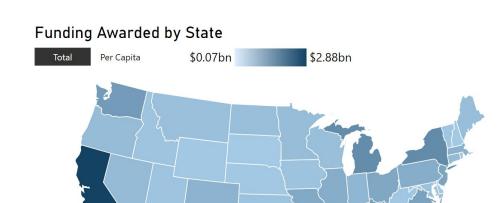
56 Programs With Awarded **Funding**

72 **Awards** 4,983

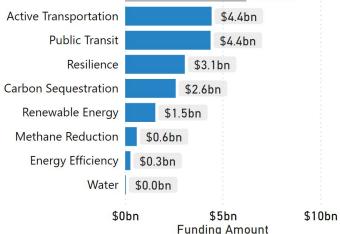
Projects

\$8.2bn

\$6.2bn



Funding Awarded by Climate Elements Projects can address multiple climate elements in which case the entire project funding is counted for each element. Electrification None **Active Transportation**



<u>Outcomes Dashboard - Climate Program Portal</u>

But 28th per capita



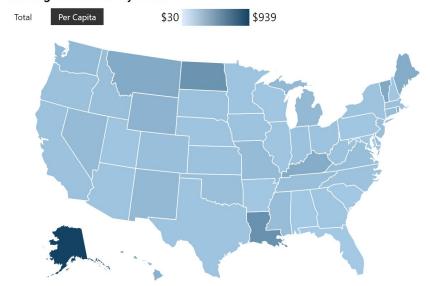
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Funding Awarded

56
Programs With Awarded Funding

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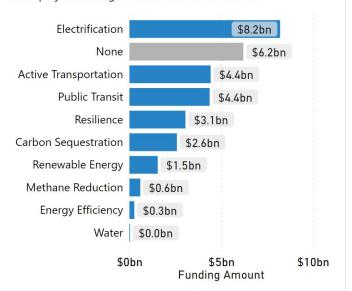
Projects

Funding Awarded by State



Funding Awarded by Climate Elements

Projects can address multiple climate elements in which case the entire project funding is counted for each element.



Let us know if you are applying – we can often help with Letters of Support

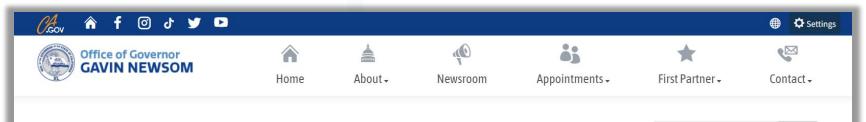
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Alliance for Renewable Clean Hydrogen Energy Systems (ARCHES) – California H2Hub

ARCHES Awarded Up to \$1.2 Billion



California Selected as a National Hydrogen Hub

Published: Oct 13, 2023

SACRAMENTO – California will receive up to \$1.2 billion from the U.S. Department of Energy to accelerate the development and deployment of clean renewable hydrogen, critical to cutting pollution and expanding the clean energy economy statewide.

What it means:

- Up to \$1.2 billion to build or expand hydrogen projects that will power public transportation, heavyduty trucks, port operations, and more;
- Will leverage the state's leadership in clean energy technology to produce hydrogen exclusively from renewable energy and biomass.

Why it's important:

- Cuts up to 2 million metric tons of carbon emissions every year equivalent to the pollution of 445,000 gasoline-powered cars annually;
- Creates an estimated 220,000 new jobs, including 130,000 in construction and 90,000 permanent jobs;
- Estimated \$2.95 billion per year in economic value from better health and health cost savings;
- 40% of the benefits from projects will flow to disadvantaged communities.

Recent News

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Progress to Boost Water

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Resilience Amid Extreme

Weather

Governor Newsom

<u>Issues Legislative</u>

<u>Update 10.13.23</u>

Governor Newsom

Announces

Appointments 10.13.23

California Selected as a

National Hydrogen Hub

Governor Newsom

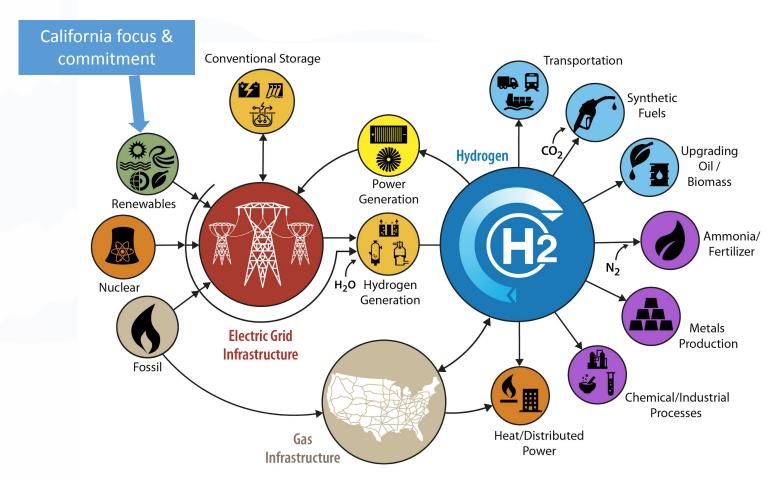
Announces

Appointments 10.12.23



IIJA and IRA: H2 Highlights

- IIJA includes \$9.5B for clean hydrogen (organize)
 - \$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 (scale)
- Hydrogen can decarbonize the hard to decarbonize sectors





ARCHES Mission & Goals

ARCHES is a public-private partnership to create a sustainable statewide renewable, clean hydrogen market and ecosystem in California and beyond. ARCHES utilizes renewable resources to produce hydrogen with the objective to fully decarbonize the regional economy

- Ø Establish an exemplary renewable, clean H₂ Hub in California by 2030
- Ø Kickstart commercial viability of H₂
 - q Focus on hard-to-decarbonize sectors: Ports, Power, HD Transportation
 - q Initiate expansion to: Heavy Industry, Aviation, Maritime, Agriculture, and others
- Ø Meet CA and National carbon neutrality goals



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

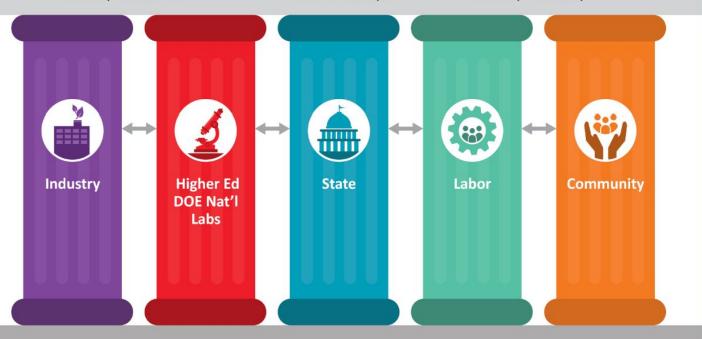


ARCHES

ARCHES Key Differentiators

- Infrastructure Availability
- Industry Readiness

- Offtake Resilience
- Market Catalyst
- Community Connectivity
- Delivery Certainty



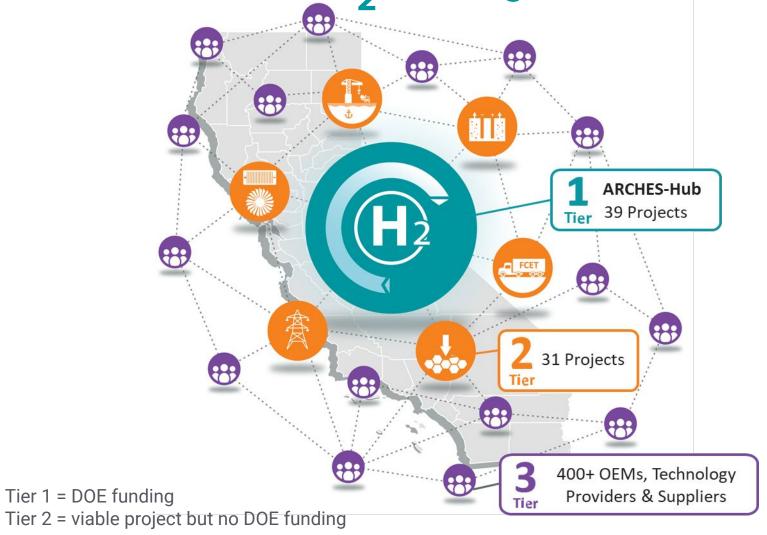
ARCHES Principles

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

- Multi-dimensional
- Connected
- Delivery Certainty



The Resilient H, Ecosystem for California



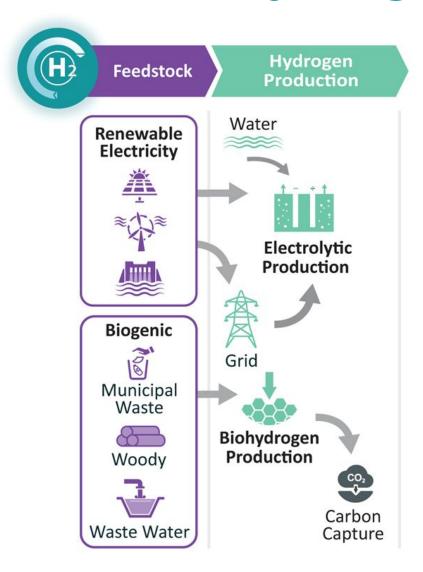




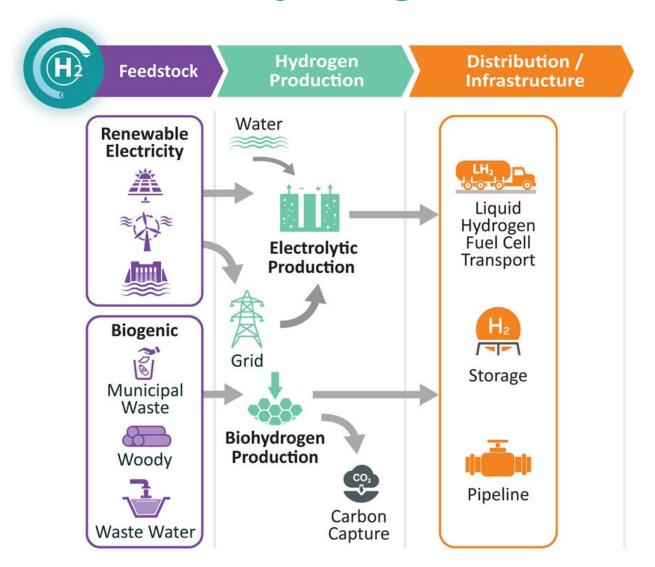




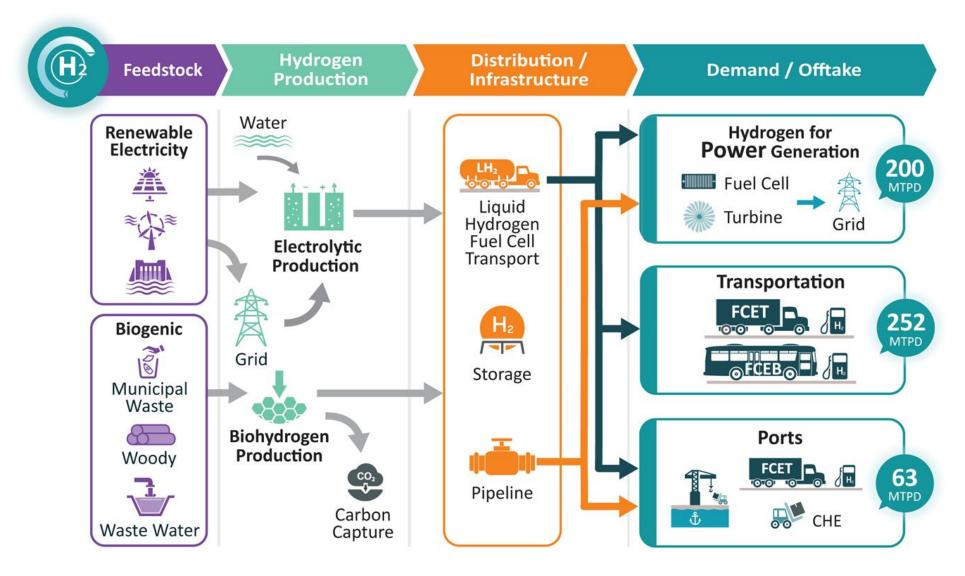














ARCHES Achieves Market Liftoff

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

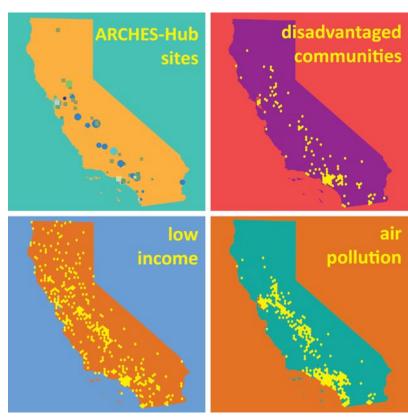
232



Port cargo handling equipment



Communities Will Benefit



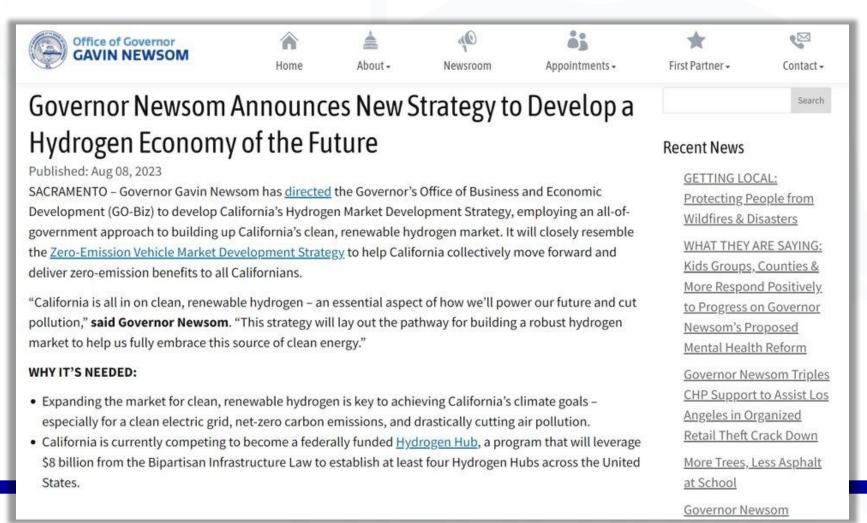
*EJ40 database and CalEnviroScreen

COMMUNITY Economic value of increased health* and associated health costs savings per year Number of **222,400** jobs created per year Fewer hospitalizations for respiratory & **2,097** cardiac illness per year Fewer work loss **13,292** days per year Nitrogen oxide **▼** 6,900 net emissions avoided MTPY Sulfer dioxide **▼ 239** net emissions avoided MTPY Particulate matter 326 net emissions avoided MTPY PM 2.5, 10 Fewer premature deaths per year Invested in **\$380** community benefits & million workforce development

^{*} Reduced premature death, asthma, cancer risk, missed work days

H2 Market Development Strategy

Leverage hydrogen to accelerate clean energy deployment and decarbonize our transportation and industrial sectors



GO-Biz H2 Page

Get Involved



California's Hydrogen Market Development Strategy

Renewable hydrogen will play a pivotal role in achieving California's climate goals by cutting emissions in difficult to decarbonize sectors. California's Hydrogen Market Development Strategy will engage stakeholders and all segments of government in close partnership with the Alliance for Renewable Clean Hydrogen Energy Systems (ARCHES), to jump start the budding clean hydrogen economy. CO-Biz is encouraging stakeholders to provide input that will inform and improve the development of the strategy.

Strategy Feedback Form



Join California's H2 Hub Development Effort

GO-Biz, the University of California, Renewables 100, and the State Building Trades Council of California, with support from hundreds of partners, launched the Alliance for Renewable Clean Hydrogen Energy Systems (ARCHES) as a non-profit public private partnership dedicated to accelerating the development and deployment of California's renewable hydrogen market. ARCHES' first task is to lead California's effort to secure federal funding under the DOE's <u>Regional Clean Hydrogen Hub Program</u>. If you are interested in learning more and contributing, please visit <u>ARCHES</u>.

Join ARCHES



Keep in Touch

GO-Biz is actively organizing market participants around accelerating the development of a renewable clean hydrogen market. If you are interested in staying engaged and learning about the state's ongoing efforts, use the links below to sign up for our H2 On the Move newsletter or request a GO-Biz speaker at your upcoming event.

GO-Biz H2 on the Move Newsletter Request an Event Speaker

Feedback Form for California's Hydrogen Market Development Strategy

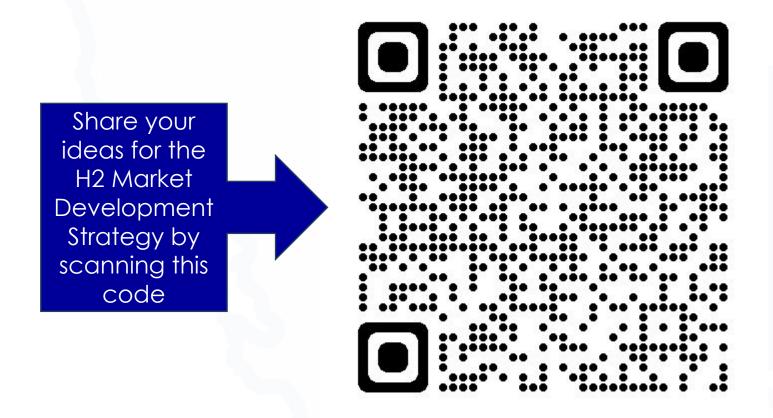
You can assist GO-Biz with the California Hydrogen Market Development Strategy by helping us further understand the hydrogen topics that matter to stakeholders. Use the following form to identify strategy elements that are important to you.

Select or enter value	
Are you developing an H2 project?	
○ Yes	
○ No	
O Unsure	
Which sector(s) are you involved with or most interested in?	
(check all that apply)	
☐ Electricity Generation	
☐ Emerging Opportunities (Airports, Trains, Maritime, etc.)	
Hydrogen Supply	
☐ Industrial Processes	
☐ Ports/Goods Movement	
☐ Transportation	
☐ Other	
What suggestions do you have for the strategy?	
What concerns do you have about the development or implementation of the strategy?	
Other comments regarding the development of the hydrogen strategy?	
Please provide an email or other contact information if you would be open to follow-up discussion regarding your comments	

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



H2 Market Development Survey



For more information:

https://business.ca.gov/industries/hydrogen/ https://business.ca.gov/h2-on-the-move-sign-up/

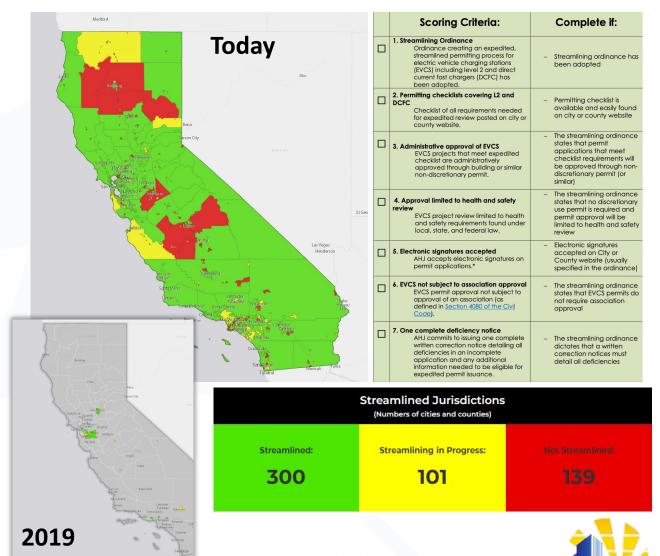


Getting Projects in the Ground (or Water, or Sky...)

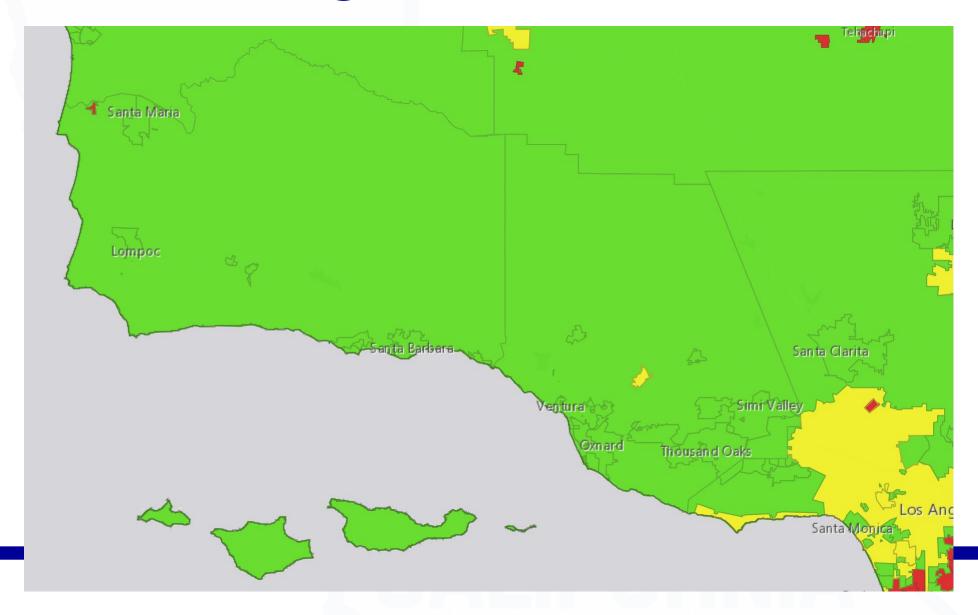
Infrastructure Strike Team EO N-8-23 (May 2023)

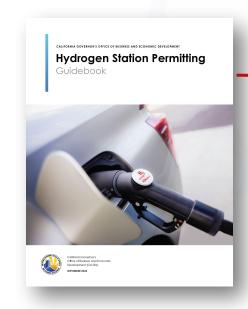
Permit Streamlining

- Streamlining legislation
 - AB 1236 & AB 970 administrative approval for EV charging stations and timeline for issuing a permit
 - SB 1291 extends approval process to hydrogen stations
- Support for local jurisdictions and project developers
 - Resources: Permit Streamlining Guidebooks, fact sheets, model ordinances, etc.
 - Direct assistance



Thanks for being awesome!





Streamlining Map

<u>Hydrogen Readiness - California</u> <u>Governor's Office of Business and</u> <u>Economic Development</u>

Hydrogen Fueling Station Readiness Hydrogen fueling stations are becoming increasingly common in California, serving both passenger and commercial vehicles. They operate under robust codes and standards, with approval from local building, planning and fire officials. Please refer to our Hydrogen Station Permitting Guidebook for information and best practices for hydrogen station development. The Hydrogen Fuel Cell Partnership also has a Hydrogen Refueling Station Buyer's Guide. The Hydrogen Fueling Station Permit Streamlining Map is a living companion to the Hydrogen Fueling Station Permitting Guidebook. Its purpose is to create a shared understanding of Hydrogen Fueling Station permit streamlining across the state, and track compliance with California law SB-1291 Hydrogen-fueling stations. We hope communities use this tool, and the others linked below, to easily replicate success, leverage lessons learned, and save time as we all work to aggressively build out California's zero-emission vehicle infrastructure network. Hydrogen Permitting Guidebook Hydrogen Permitting Scorecard Join California's H2 Hub Effort Through ARCHES Best Practices and Resources Hydrogen Permitting Fact Sheets Hydrogen Salt Lak 6 PUBLIC - Hydrogen Compliance Streamline Status Feature Layer Las Vegas Not Streamlined Streamlining In Progress Phoenix

"If a city or county determines it is unable to accept electronic signatures on all forms, the permit streamlining ordinance shall state the reasons.



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Hydrogen Permitting Resources For resources on how to become a stream

for to the Hydrogen Facting Station Benderm we Hydrogen Station Permitting Guidence or conditions of the permitting and development process indebtook will be updated in 2024 to include SBI 17.

Connecting to the Orid and Operation
Utility approach to hopin the grid connection process
superate and detinet approval process from the city
county bedroping permitting process. Project apple
abould involve their local static, or edy in the plan

process to understand the function for introconnection definionation of responsibilities, which vary by a territory.

Before a station can be used, it must pass final impect by the local permitting principline and utility. The irradiction and utility moreouses should be coordinated

y the total permitting personation and unany jurisdiction and affing processes absoluble conmitting the delays and expedito site energial commissioning.

Commissioning.

reconstitute of the plant and apoint on Not Subject to Association

To Microbia if Application is reported and conforms via regioneses. Once that he provide one complete set of will subside feed in apportant of the Not Subside of the Not Subside on the Not Subside of Subsideration of the Not Subside

needs detailing all application deficiencies, which the focus should address in a stocardined and complete manner ough modifications to the crising application. avoid the need for corrections, project applicants should

demandre with social generating parameterism to enume distinct complication with healthy electrical, accombility, d any health and safety requirements.



State, Regional, and Local Roles

Regional collaboration key for implementing impactful projects

- Work across industry silos
- Integrate emerging sectors (ag tech, manufacturing, hydrogen, and more)
- Bring solutions to scale
- Ensure community members are at the table

Innovation and entrepreneurship support at state AND local level

- Incubators and accelerators
- Small business support
- Workforce development

We need partnership to succeed...



Contact

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916-322-0563

Sign Up for GO-Biz's H2 on the Move email list: https://business.ca.gov/h2-on-the-move-sign-up/