



Alliance for Renewable Clean Hydrogen Energy Systems



California is a leader in advancing innovative policies and game changing technologies that improve our environment, air quality and quality of life. The State has set ambitious pollution reduction goals to reduce greenhouse gas emissions to at least 40 percent below 1990 levels by 2030, 80 percent by 2050, achieve net zero greenhouse gas emissions no later than 2045, and reduce NOx emissions by approximately 80% in 2031. To hit these goals, California must dramatically reduce its reliance on carbon-based fuels.

To achieve these goals, the Governor is establishing a hydrogen workgroup as part of his cabinet level infrastructure strike team to streamline hydrogen project approval and completion. Cutting red tape will greatly enhance the state's efforts to build clean energy projects—projects that will create hundreds of thousands of jobs. Additionally, the Governor has directed the Office of Business and Economic Development (GO-Biz) to develop California's Hydrogen Market Development Strategy, doubling down on an all-hands-on-deck approach to build a robust hydrogen market in California.

Developing a diverse portfolio of clean energy solutions is the responsible approach to help California achieve these goals.

Renewable sources such as wind, solar, hydro power, geothermal and biomass are all critical components as we move away from non-renewable options and develop a renewable, clean economy.

Renewable clean hydrogen (H2) will be an integral part of California's clean energy future and will play an important role in decarbonizing California – particularly for hard-to-abate sectors such as heavy-duty transportation, ports and goods movement, and energy storage and resilience.

Powering California Forward

An H2 hub will:

- ✓ **fast-track** the development and implementation of **H2 infrastructure** in California,
- ✓ **grow California's clean energy economy**,
- ✓ **advance environmental justice** goals by accelerating the transition to zero-emissions technologies in polluted communities,
- ✓ **provide good high-road union careers** and clean energy job training to California's workforce,
- ✓ **provide R&D funding** to develop the technological innovations needed to advance clean H2 technology, and
- ✓ **kickstart California's H2 marketplace**, maintaining California's competitive edge as the new H2 economy emerges.

“ ARCHES is California's lead applicant for our bid to win federal funding for a hydrogen hub for DOE's H2Hubs program and it's a powerhouse, a powerhouse collaboration between the state, between our cities, organized labor, industry and NGOs, the University of California and of course their three extraordinary national labs.

Gavin Newsom, Governor of California





Meet ARCHES

ARCHES is a public-private partnership to create a sustainable, statewide, clean hydrogen hub in California utilizing local renewable resources to produce hydrogen with the objective to fully decarbonize the regional economy, while prioritizing environmental justice, equity, economic leadership and workforce development. ARCHES will accelerate the development and deployment of clean, renewable H₂ projects and infrastructure across the state to reduce greenhouse gas emissions and advance a zero-carbon economy.

The Governor's Office of Business and Economic Development (GO-Biz) has joined with other State agencies, the legislature, local governments, and the State's institutions of higher education, including the University of California and two of its affiliated national laboratories—to provide vision, leadership, oversight, and accountability. To date, nearly 300 groups (and growing) representing industry, labor, local government and community interests have committed to collaborating and supporting ARCHES.

The Federal Hydrogen Hub Program

The Biden Administration's Hydrogen Earth Shot Challenge aims to reduce the cost of H₂ by 80% within one decade, from the current ~\$5 per kilogram (kg) down to \$1 per kg. In support of this goal, the Infrastructure Investment and Jobs Act (IIJA) aims to establish a network of regional hubs across the country that will deploy clean H₂ technologies at scale.

California's leadership, and early efforts on transitioning to 100% renewable, zero-carbon electricity, and developing H₂ infrastructure makes the State well positioned to win a renewable clean H₂ hub award which is why ARCHES is serving as California's hub applicant. California's extensive renewables portfolio will be essential to help power hard to electrify sectors, and develop long-duration energy storage solutions. The expansion of this infrastructure will bring thousands of jobs for California's trained and skilled labor workforce.

ARCHES By the Numbers



222,400
jobs created per
year



\$2.95 billion
economic value of
increased health
and health cost
savings per year



1,705
fewer
hospitalizations
for respiratory and
cardiac illness per
year



300+
active supporters
representing civic,
business, labor,
transportation, and
communities across
California



At least 40%
of the benefits from
ARCHES' projects
flow to California's
disadvantaged
communities

Benefits

OF CLEAN HYDROGEN FOR CALIFORNIA

Hydrogen is key in helping decarbonize hard to electrify industries

- ✓ Hydrogen can help decarbonize hard to electrify heavy transportation sectors like medium-to-heavy commercial vehicles and buses and railways and shipping, taking advantage of quick-refueling, long-range, and light-weight systems..
- ✓ Hydrogen fuel cell vehicles are a clean alternative to gasoline-powered vehicles as they produce no emissions other than water vapor, making them a perfect complimentary technology to battery electric vehicles.
- ✓ Having other clean technologies alongside battery electric enables California to have diverse clean fuel options and system resiliency based on a variety of clean solutions.

Hydrogen is a catalyst for California's green economy and green jobs

- ✓ Hydrogen presents real opportunities to retain and expand California's clean energy workforce, which will build out the vast renewable energy generation needed to power and implement H2 production, storage, delivery, and end-use technologies.

Hydrogen will help ensure and protect California's energy resilience

- ✓ California is prone to the drastic impacts of climate change: drought, flooding, wildfires, and more can take a toll on our energy system. Ensuring we have diverse energy sources and clean fuels will help keep our communities and economy running.
- ✓ As we continue to transition to more electric technologies, the demand on electricity will only continue to increase. Supplementing our existing power portfolio with clean hydrogen will ensure that the grid will continue to operate efficiently, even at the peak of electric demand.

