



Alliance for Renewable Clean Hydrogen Energy Systems

Frequently Asked Questions

What is hydrogen?

Hydrogen is an important energy carrier that can help transition California's economy away from carbon-emitting sources and reduce our dependence on fossil fuels. Clean hydrogen offers several environmental benefits and can be part of a diverse clean energy portfolio as we work to decarbonize California.

Environmental benefits of hydrogen include:

- 1. Zero Emissions:** When hydrogen is used as fuel, it produces only water and heat, emitting no greenhouse gases, carbon dioxide, or other harmful pollutants.
- 2. Renewable Energy:** Hydrogen can be produced using renewable energy sources like wind, solar, hydro and biomass, making it a sustainable fuel option.
- 3. Energy Generation:** Hydrogen can be used in fuel cells to generate electricity with high efficiency, which can lead to lower energy consumption and reduced emissions compared to conventional centralized fossil fuel-based power generation.
- 4. Energy Storage:** Hydrogen can be used as an energy storage medium, allowing excess renewable energy to be stored as a fuel source and used later when needed.
- 5. Versatility:** Hydrogen can be used in a variety of applications, including transportation, power generation, and industrial processes, providing a versatile and flexible energy option, especially for the hard to decarbonize areas such as shipping, heavy duty trucking and aviation.
- 6. Reduced Dependence on Fossil Fuels:** The use of hydrogen can help reduce our dependence on fossil fuels, which are a finite resource and contribute to climate change through emissions of greenhouse gases.

What is 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 is co-founded by the Governor's Office of Business and Economic Development, the University of California, a statewide labor coalition organized by the State Building and Construction Trades Council of California, and the Renewables 100 Policy Institute.

Serving as a neutral convener on behalf of the U.S. Department of Energy (DOE) and the State, ARCHES is committed to a just and equitable hydrogen energy transition, by prioritizing clean renewable hydrogen projects that displace fossil fuels, reduce greenhouse gas emissions, improve air quality, create new green careers for California workers, and benefit California's disadvantaged communities.

How will ARCHES projects help California?

An H2 hub is an excellent investment of California resources. It will fast-track the development and implementation of H2 infrastructure, 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, 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.

The H2 economy also presents real opportunities to retain and expand California's clean energy workforce, which will build out the vast renewable energy generation needed to implement H2 production, storage, delivery, and end-use technologies. The conversion of significant fossil fuel distribution infrastructure will also allow for sustained employment otherwise be risk in the transition to clean energy.

What kind of projects will ARCHES prioritize?

ARCHES is initially focused on projects supporting three essential end-use sectors: medium- and heavy-duty vehicles, ports, and power plants, that are especially difficult to decarbonize using any other existing technologies. Hydrogen fuel cell technologies are the most promising zero-emissions solution for medium and heavy duty vehicles and port equipment that require long usage cycles, quick refueling, and lightweight, as well as where electric infrastructure upgrades are not feasible to accommodate battery electric technologies. Renewable clean hydrogen is also the most scalable zero-carbon alternative to natural gas for use in gas power plants required by state planning to remain operational to ensure reliability. Hydrogen is an important complement to other carbon free solutions, such as solar, wind, and batteries, that are needed to reach California's clean air, clean energy, and climate goals.

It is the intention of ARCHES to only fund power plants capable of using 100% renewable hydrogen feedstock by the end of the DOE federal funding timeframe.

ARCHES' projects will not include projects that blend hydrogen and natural gas in pipelines, nor dairy-sourced methane, nor will it include projects that use hydrogen in residential homes.

Where will projects likely be located?

ARCHES is anticipated to include major deployment clusters in the Los Angeles Basin and Bay Area and extend into the Central Valley, Inland Empire, and other regions with high renewable resources, geologic storage possibilities, key transportation corridors, and a need for clean energy and reduced pollution.

How is ARCHES prioritizing engaging with critical members of other communities?

ARCHES is committed to establishing and sustaining productive partnerships with community, environmental justice, and environmental advocates.

ARCHES is creating positions for community representatives at multiple levels of the organization to represent the interests of California communities at all aspects and phases of its operation, from project selection to governance. Community interests will be represented on the ARCHES Board and nominated by Advisory Committees representing all aspects of California communities, including organized labor, environmental NGOs, environmental justice and other representatives of impacted communities, cities and local governments, and tribal nations.

ARCHES is creating a Community Benefits and Engagement Plan that will be a required component of all funded ARCHES projects. It will include significant community engagement and partnership components and is continuously evolving with input from diverse community stakeholders.

Additionally, ARCHES has components such as Workforce Development that include outreach and community engagement and support throughout the state. These activities will inform the ARCHES Board and actions.

How will ARCHES help California achieve energy and environmental equity and justice?

From the beginning, ARCHES has invited local community and environmental justice leaders to participate in a series of hybrid multi-stakeholder workshops around the state. Hearing from a diverse and widespread intersection of frontline community voices has been invaluable in shaping the ARCHES governance plan, project vetting criteria, and other key elements as we build out ARCHES. Our outreach efforts to date are just a start; we look forward to a much deeper and mutually beneficial engagement in the months and years ahead.

How can hydrogen help disadvantaged communities?

The most immediate impacts will be found in reductions in air pollution from the transportation sector by getting heavy polluting vehicles off the road and replacing them with hydrogen fuel cell vehicles. When used to produce energy via fuel cells, hydrogen yields zero emissions. Hydrogen fuel cells have greater energy density, lower weight, and faster refueling compared to batteries, which makes hydrogen a better zero emission alternative in applications like long-haul heavy-duty trucks, transit buses, rail and heavy equipment used at ports and warehouses, which are among the leading causes of pollution in neighborhoods where disadvantaged communities often suffer from negative health impacts.

Deploying clean renewable hydrogen at scale will also create many new green careers. ARCHES will ensure that training programs, career development support and high-road career opportunities are available for those in California's disadvantaged communities.

