Few industries face as complex a challenge in decarbonizing as aviation. While great for decarbonizing on-road transportation, batteries are generally too heavy to power long-distance flights. Low-carbon biofuels blended into fossil jet fuel represent only a partial solution, due to lack of feedstocks and blend limits. Zero-emission hydrogen could represent a solution, either as an ingredient for synthetic jet fuel that can drop in as a replacement for fossil jet fuel or to power fuel cells on redesigned zero-emission aircraft.

To explore the potential for hydrogen to help decarbonize the aviation sector, the state's federally funded hydrogen hub ARCHES (Alliance for Renewable Clean Hydrogen Energy Systems, representing a California-based public-private partnership to develop and deploy renewable, clean hydrogen projects) just released a white paper detailing the opportunities, challenges, and policy needs. Berkeley Law's Center for Law, Energy & the Environment (CLEE) co-chaired the ARCHES Aviation Working Group that produced the report, along with San Francisco International Airport (SFO) and RMI.

Key Recommendations

While hydrogen's promise is substantial, barriers remain. High production costs, limited infrastructure, and fragmented safety and technical standards have slowed adoption. The whitepaper offers a targeted set of recommendations for state leaders, including:

- **Develop Standards and Policy Frameworks:** California state agencies, in collaboration with federal and international partners, could create robust policies and safety standards for hydrogen production, storage, and distribution at airports. This includes infrastructure to support both ground support equipment and hydrogen-powered aircraft.
- **Expand Incentives Through the California Air Resources Board and Energy Commission:** The Board and Energy Commission could incentivize the use of low-carbon hydrogen as a feedstock for sustainable aviation fuel or for direct consumption in hydrogen aircraft. These incentives could mirror existing programs like the Low Carbon Fuel Standard.
- **Integrate Aviation into Clean Transportation Programs:** Including hydrogen aviation projects in state-level clean transportation initiatives—such as the CEC's Clean Transportation Program—would accelerate hydrogen propulsion timelines and de-risk private investment.
- **Enable Airport Leadership:** Airport authorities can lead by empowering staff

to engage with hydrogen producers based on proximity, price, and emissions profile, and by developing plans for future hydrogen fueling needs in coordination with operators.
- **Foster Regional Hydrogen Clusters:** Developing hydrogen “clusters” at airports like Long Beach would create hubs of hydrogen activity, supporting ground equipment, transit systems, and eventually hydrogen aircraft. These clusters could leverage economies of scale to lower costs and build a more resilient supply chain.

With planning and leadership, hydrogen could become a cornerstone of a clean, resilient aviation system in California. While hydrogen won’t be able to solve aviation’s climate challenges overnight, the runway to decarbonization is now open, if policymakers, industry, and airport leaders work to accelerate the takeoff.

Access the whitepaper here: ARCHES Aviation Whitepaper