

Revolutionizing the US Hydrogen Economy: Unprecedented Investments and Emerging Long-Duration Energy Storage Technology

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Following the implementation of the Hydrogen Shot program by the Department of Energy (DOE) and concurrent investments from other federal agencies such as the Department of Transportation (DOT) and the Environmental Protection Agency (EPA), along with substantial investments in California, the prospect of a hydrogen revolution is on the horizon. In 2021, DOE unveiled the Hydrogen Shot program, which seeks to produce hydrogen at a cost of \$1 per kilogram within a decade. The bipartisan Infrastructure Investment and Jobs Act (IIJA), totaling \$1.2 trillion, includes billions of dollars earmarked for climate, energy, and clean technology initiatives, including \$7 billion allocated for the development of seven regional clean Hydrogen Hubs. One of these hubs, ARCHES, serving California, will receive substantial private and state funding, with a primary focus on the ports of Los Angeles and Long Beach serving as its anchors, with plans to expand outward. As projects within the hub are expected to be announced in the summer of 2024, there will be an opportunity for further analysis of the technology and its deployment in California. Moreover, high-temperature Proton Exchange Membrane (HTPEM) fuel cells could play a significant role in Long Duration Energy Storage (LDES) systems, enabling the decentralized deployment of intermittent renewable energy sources. Developed by various companies utilizing BASF and proprietary membranes, including HyWatts, HTPEM LDES has the potential to offer reliable, resilient, and cost-effective zero-emission renewable power solutions.