

California Regional Clean Hydrogen Hubs San Pedro Bay Ports Proposed Project



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Clean Air Action Plan

- Planning document that outlines a series of strategies and goals for reducing air emissions from Port operations
- Primary Carbon Reduction goals:
 - All terminal equipment to be zero emissions by 2030
 - All on-road trucks to be zero emissions by 2035
 - Reduce GHG emissions to 40% and 80% below 1990 levels by 2030 and 2050, respectively

US DOE H2 Hubs Grant



- Bipartisan Infrastructure Law (IIJA) directs US Department of Energy to issue \$10 Billion in regional grants to develop Clean Hydrogen Hubs
- Notice of Funding Opportunity released on September 22, 2022.
 - Maximum Award: \$1.25 Billion
 - Projects expected to showcase entire hydrogen supply chain, from production, storage, distribution to end use, as a pathway towards widespread decarbonization in various market sectors.

Benefits of Hydrogen Fuel Cell Technology

- Potential capability for Long Haul freight movement (potentially up to 400 miles) for trucks and longer duty cycles for Cargo Handling Equipment
- Hydrogen offers a comparable driver experience compared to diesel for all equipment types (fueling time and range)
- Fueling infrastructure efficient at large scale
- Vehicle weight comparable to current options



Hydrogen Fuel Cell Applications at the Port



- Shore to Store Project
 - 10 on-road trucks, 2 fueling stations
- Yard Tractor Demonstration
 - TraPac Terminal, 2 Yard Tractor demo in 2022
- Fenix Marine Services Top Handler Demonstrations
 - New-built top handler, hydrogen fuel cell used as a range-extender
 - Repowered top handler, hydrogen fuel cell is primary power source
- YTI Cargo Handling Equipment Demonstration
 - Sponsored by Japanese Energy Development Administration
 - Yard Tractor, Top Handler, and RTG deployment
- HyZET Design Project – CEC Funded Grant
 - Awarded to CALSTART, working with Crowley to design/scope a hydrogen tug boat

Need to Develop Market Confidence in Hydrogen

- Demonstrations of the Port's freight moving equipment (ships, trucks, cargo handling equipment, locomotives and harbor craft) provide opportunity to prove the technology's viability in the heavy-duty sector
- Need to bring overall costs down for freight moving equipment and H2
- Creating large scale open market for green hydrogen generation, storage and distribution network to and within market area is critical to expedited implementation
- Consumer confidence on the equipment and Hydrogen supply side must be addressed to encourage widespread adoption
- State policies to decarbonize the Hydrogen supply will be critical

ARCHES Overview



- “Alliance for Renewable Clean Hydrogen Energy Systems” (ARCHES)
 - GO-Biz, State Building Trades, Renewables 100 Policy Institute
 - University of California, Office of the President
 - Public and Private Sector Partners
- ARCHES, as the lead applicant to the DOE, will coordinate hydrogen development efforts across the state and formulate the statewide proposal
- Concept Paper submitted November 2022, encouraged by DOE to proceed
- Partners interested in participating in the ARCHES grant proposal were required to submit proposed projects in December 2022
- POLA partnered with POLB to present one project for funding consideration
- Staff have been notified of ARCHES intent to include our proposed project

SPBP Proposed Project

- Overall budget \$600 Million – 50% match required
 - Joint POLA and POLB Project
- Stage 1: Deploy H2 equipment at all participating terminals
 - 2 UTR
 - 1 Top Handler
 - 1 RTG
 - Fueling Solution per terminal preference
- Stage 2: Scaled-up deployment, more units and wider-scale fueling solution
- On-Road Trucking –deployment(s) of heavy-duty trucks, details TBD



SPBP Proposed Project



Ports are central to driving the transition to hydrogen, achieving California clean air initiatives, and supporting local labor and EJ communities

Drivers of Port Hydrogen Adoption

- 1. Hydrogen supply will follow the demand, and Ports are going to be early adopters of hydrogen to prove the technology**
 >30% of US cargo transits through the port of San Pedro.
- 2. The biggest hydrogen demand from ports is around cargo handling equipment (CHE) and on-road traffic (drayage trucks)**
 CA Executive Order N-79-20 states that “100 percent of medium- and heavy-duty vehicles in the State be zero-emission by 2045 for all operations where feasible and by 2035 for drayage trucks.”
- 3. The local communities by ports will benefit directly from conversion to hydrogen from (a) cleaner air (b) continued growth of job opportunities**

POLA/POLB propose a 2-stage approach to drive hydrogen adoption at ports

Prove the Technology

Deployment Stage 1

\$100M
2024-2025

\$90M ARCHES
\$10M Match

Goal

Prove the technology and build port operator confidence for larger-scale adoption.

Description

Pilot projects with OEMs to show H2 CHE operates the same or better than current technology (same or similar capability; easy to use and maintain).

Commercialize the Technology & Scale

Deployment Stage 2

\$500M
2027-2028

\$210M ARCHES
\$290M Match

Goal

Scale commercialization and adoption of H2 technology to hit port emissions targets.

Description

Port terminal operators will indicate to OEMs that they have confidence in H2 technology and are looking to purchase large orders to replace drayage and CHE. OEMs will scale production, driving unit-costs down, and port terminal operators will purchase. They will also work to develop a more robust hydrogen refueling infrastructure.

Project Timeline

- Proposal due to DOE: April 7, 2023
- Initial award 12-18 month planning phase
- Work for SPBP Project to be done in Planning Phase:
 - Confirm terminal participation and exact equipment to be deployed at each terminal
 - Select equipment manufacturer(s) for Stage 1 deployment
 - Determine fueling solutions
 - ARCHES to provide details on green hydrogen source
 - Finalize budgets and cost-share amounts
 - Contract all project elements

Questions?

