

Hydrogen Fuel Cell Electric Bus Update

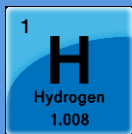




Air Resources Board Requirements



- ☐ Air Resources Board (ARB) Zero Emission Path
- ☐ December 14, 2018: California ARB passed the Innovative Clean Transit Rule (ICT) requiring that transit agencies transition to a 100 percent zero-emission bus fleet by 2040, with purchase mandates beginning in 2023
- ☐ July 2020: The Orange County Transportation Authority (OCTA) required to submit an initial plan for compliance to ARB
- ☐ OCTA currently exploring both hydrogen fuel-cell and battery-electric buses
- ☐ Hydrogen fuel-cell bus technology testing now underway at OCTA

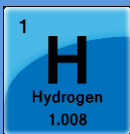


Background



❑ Opportunity

- ❑ The Fuel Cell Electric Bus Commercialization Consortium (FCEBCC) consists of CTE, Alameda-Contra Costa Transit, New Flyer Bus, and Linde Fuel (later changed to Trillium)
- ❑ November 23, 2015: OCTA Board of Directors (Board) approved joining consortium and submitting a grant application to ARB
- ❑ October 20, 2016: Grant awarded by ARB
- ❑ February 13, 2017: Board approved cooperative agreement to accept grant
- ❑ November 13, 2017: Board approved Trillium for the fueling station and New Flyer of America for the ten H2 buses



Fuel-Cell Electric Bus Testing



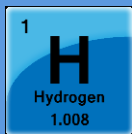
☐ Hydrogen (H₂) Fuel-Cell Project

- ☐ Ten fuel-cell electric buses
- ☐ One H₂ fueling station
- ☐ Grant funded

☐ Demo H₂ Fuel-Cell Electric Bus

- ☐ Center for Transportation and the Environment (CTE)
- ☐ Two-year demo at no cost to OCTA
- ☐ Grant funded





Current Status

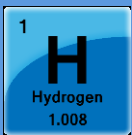


H2 Buses

- ☐ First bus was received September 25, 2018
- ☐ Rejected due to various discrepancies
- ☐ Production buses to be delivered shortly after first bus is accepted
- ☐ Estimated to receive all buses by the end of March 2019

H2 Fuel Station

- ☐ Currently under construction
- ☐ Various contractor delays
- ☐ Major equipment scheduled to be installed early March 2019
- ☐ Estimated time of completion set for late March 2019

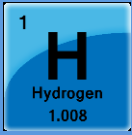


H2 Bus Configuration



- ❑ Meets all operational requirements
- ❑ New Flyer Excelsior platform
- ❑ All-electric drive
- ❑ Warranty: Two year, 100,000-mile bumper-to-bumper
- ❑ Bus range: 300 miles
- ❑ Refueling time: Six to ten minutes



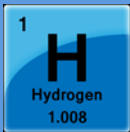


Fuel Station Configuration



- ☐ Located at the Santa Ana Bus Base
- ☐ Liquid H₂ station
- ☐ Capacity for 40-50 buses
- ☐ Scalable to 100 buses
- ☐ Two fueling dispensers





Funding Breakdown



ARB grant \$12.2 million

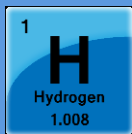
**South Coast Air Quality Management
District grant \$1 million**

- ☐ Provides for the incremental capital cost difference
- ☐ \$4.8 million – fueling station
- ☐ \$710,000 – utility upgrades
- ☐ \$7.3 million – ten H2 buses
- ☐ \$414,000 - facility upgrades for H2 detection

OCTA Cost Share \$9.4 million

- ☐ \$5.6 million – ten H2 buses
- ☐ \$3.8 million – in-kind contribution

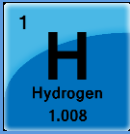
Project Total Cost \$22.6 million



Next Steps



- ☐ Monitor and review the performance
- ☐ Report back to the Board
- ☐ Continue efforts to test other technologies



Questions?

