Hydrogen Fuel Cell Electric Bus Update

OCBUS

Air Resources Board Requirements

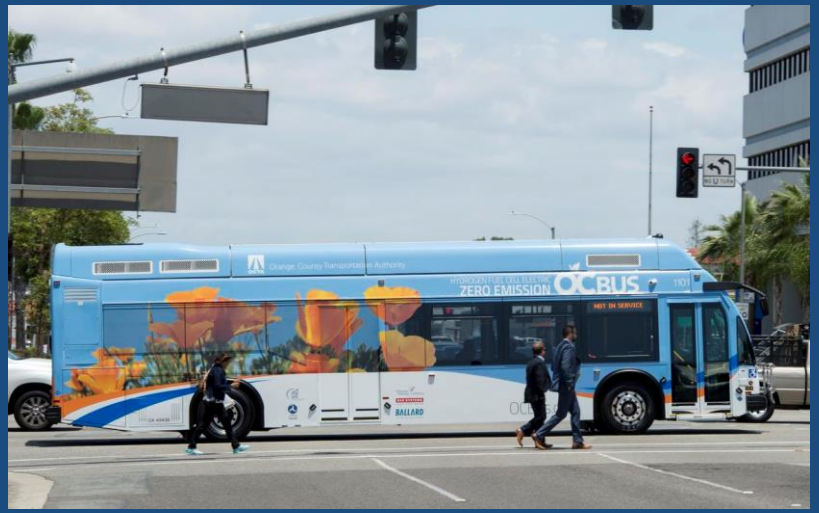
- Air Resources Board (ARB) Zero Emission Path
- December 14, 2018: California ARB passed the Innovative Clean Transit Rule (ICT) requiring that transit agencies transition to a 100 percent zero-emission bus fleet by 2040, with purchase mandates beginning in 2023
- July 2020: The Orange County Transportation 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

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H2 Buses

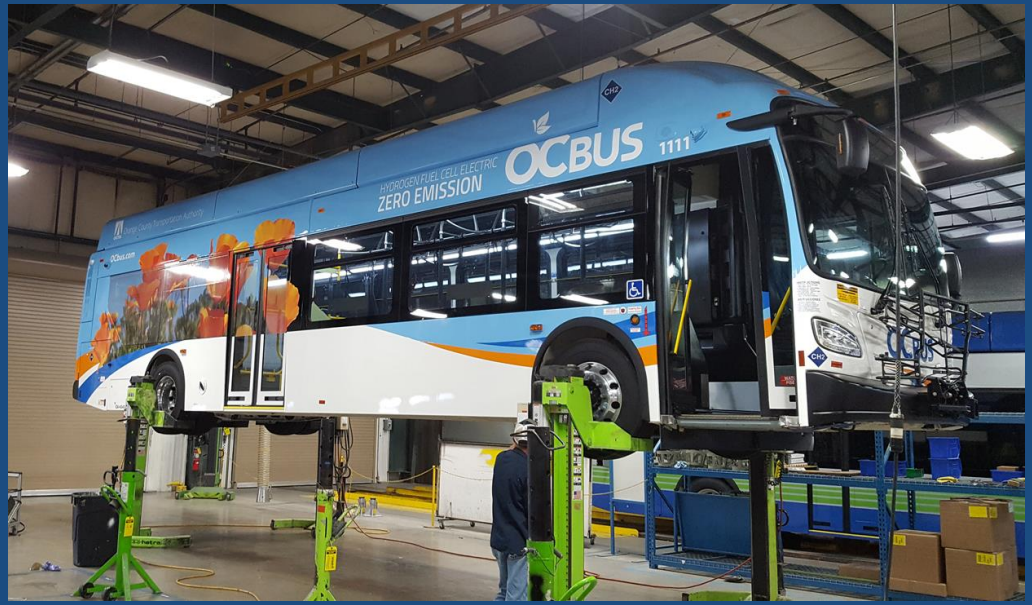
- First bus was received September 25, 2018
- Rejected due to various discrepancies
- Production buses to be delivered shortly after first bus is accepted
- Estimated to receive all buses by the end of March 2019

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?