

# Zero-Emission Bus Pilot Update





# OCTA ZEB PILOT DETAILS

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- Fuel Cell Electric Bus (FCEB) Pilot – Initiated February 2020, included ten 40-foot FCEBs, a hydrogen fueling station, shop upgrades
  - Grant Funded \$13.2M - California Air Resources Board and South Coast Air Quality Management District
- Battery-Electric Bus (BEB) Pilot – Partially initiated July 2022 with two BEBs, remaining eight buses arriving by December 2022
  - Grant Funded \$10.3M - California Transportation Commission Solutions for Congested Corridors Program (SCCP) under SB 1 (Chapter 5, Statutes of 2017) and the Low Carbon Transit Operations Program (LCTOP)
- Battery-Electric Cutaway Bus Pilot – Federal Transit Administration awarded \$2.5M for ten battery-electric paratransit buses and infrastructure
  - Grant Funded \$2.5M - FTA's Buses and Bus Facilities, and Low and No Emissions Vehicle programs

# OCTA ZEB PILOT UPDATE - BEB

- The first two BEBs in service July 2022
    - Third bus arrived in October 2022, first BRAVO! branded bus
    - Remaining seven will arrive by the end of December 2022
    - Performance measured against ten compressed natural gas-powered (CNG) buses and ten FCEBs
  - Charging stations have arrived and will be installed in January 2023
    - 10 - 150 kW Chargers
    - Full charge in four hours
- kW – kilowatt



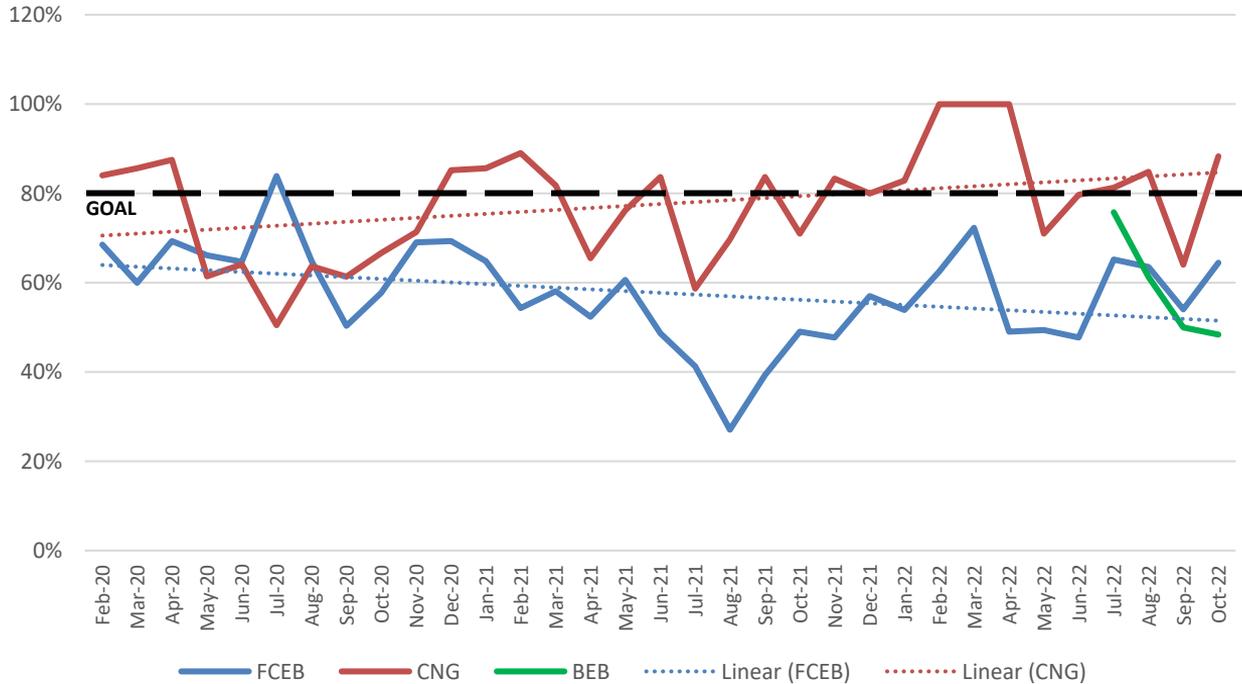
# OCTA ZEB PILOT UPDATE – FCEB

- In Service 33 months
- Performance Data for 32 months  
February 2020 – October 2022
- Performance measured against of ten  
CNG buses and ten BEBs
- Life to Date Miles - 898,964 miles
- Key Performance Indicators
  - Bus Availability
  - Miles Between Road Calls (MBRC)
  - Fuel Economy
  - Cost Per Mile



\* Compressed Natural Gas

# BUS AVAILABILITY



OCTA Standard 80%

**CNG – 77%**

- Skewed Data due to Rotating Fleet

**FCEB – 57%**

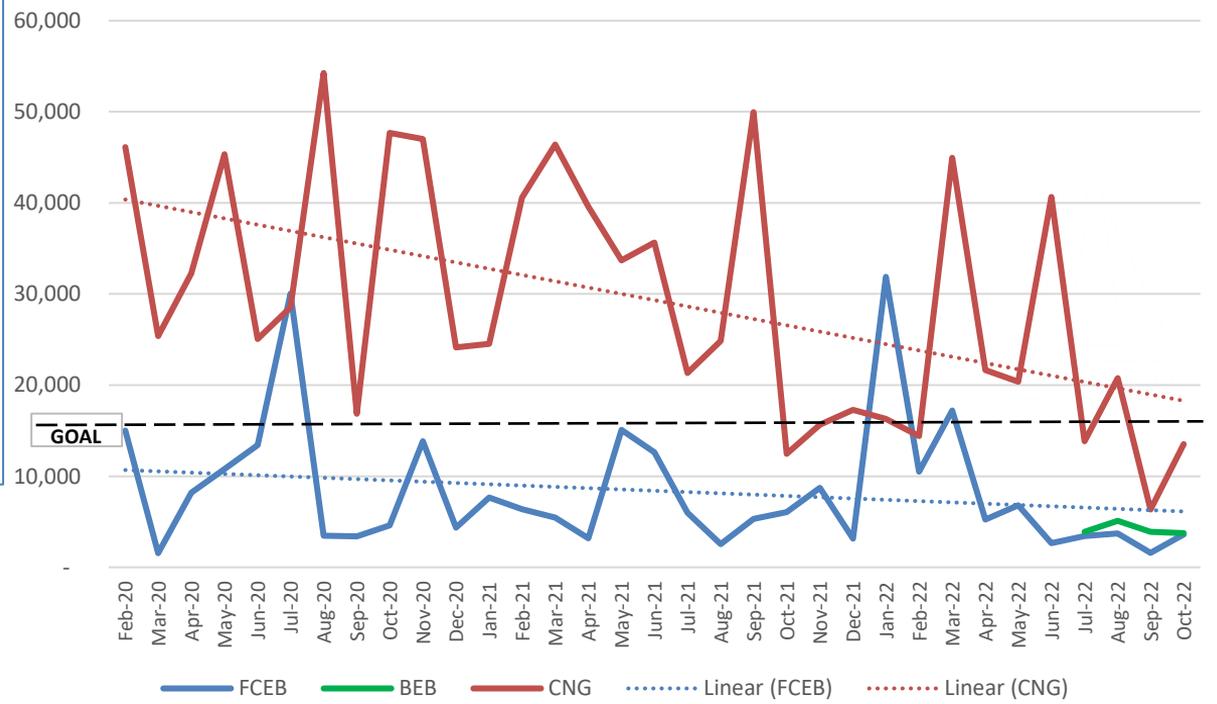
- Supply Chain Issues, long wait time for parts

**BEB – 76%**

- Only two buses, in service July 2022

# MILES BETWEEN ROAD CALLS

- OCTA performance standard is 14,000 MBRC
- CNG: 29,316 MBRC ▲
- FCEB: 5,254 MBRC ▼
- BEB\*: 19,412 MBRC ▲  
\* Only one road call since July 2022



# FUEL ECONOMY

- FCEB fuel economy is 2.3 times greater than the CNG bus
- BEB fuel economy is 3.5 times greater than the CNG bus and 1.5 times greater than the FCEB

## Fuel Cost Per Mile

- FCEB - \$1.14
- CNG - \$0.55
- BEB - \$0.42

Measurement	CNG	FCEB	BEB
Miles per gasoline gallon equivalent	3.70	8.37	13.38
Miles per diesel gallon equivalent	4.14	9.63	14.87
Miles per kilogram equivalent	3.77	8.53	13.63
Miles per kilowatt(kW)	0.11	0.26	0.40

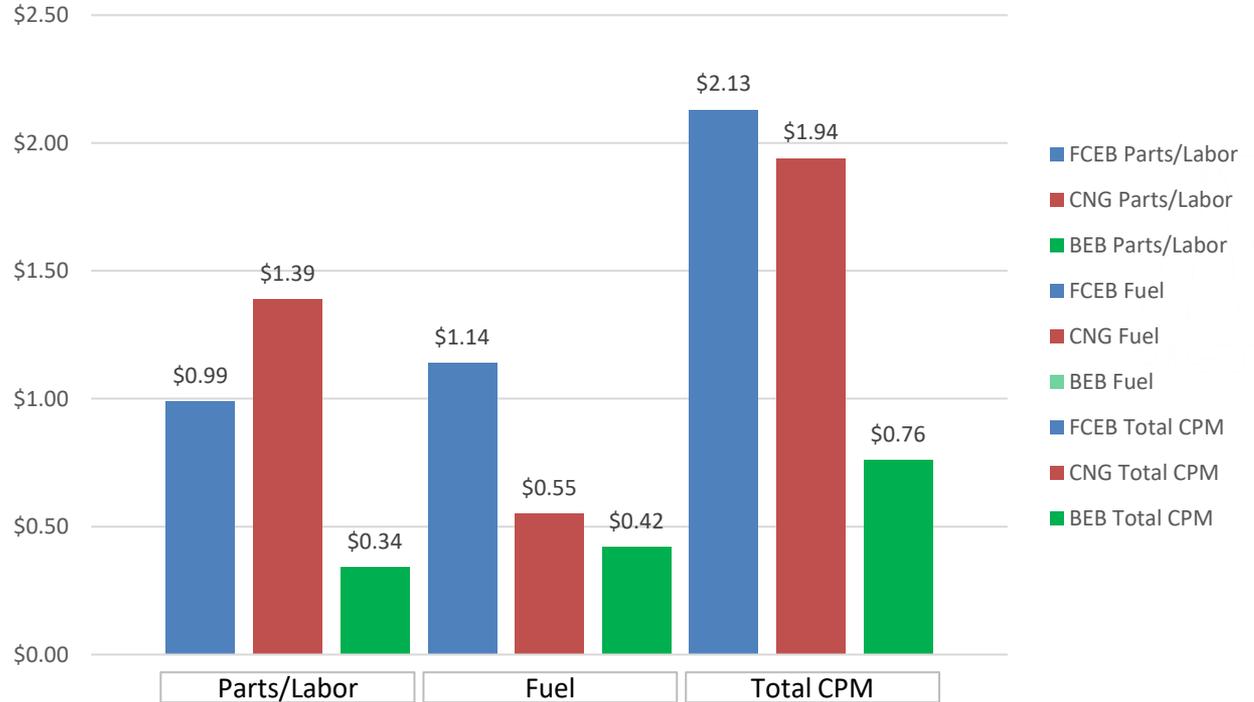
# COST PER MILE (CPM)

Parts and Labor for FCEB is 28 percent lower than CNG

- FCEB = \$0.99
- CNG = \$1.39

Total CPM, includes fuel cost, FCEB is 9% higher than CNG

- FCEB = \$2.13
- CNG = \$1.94



# HYDROGEN FUELING STATION UPDATE



- Early months – variety of issues resulting in station shutdowns. Issues have been resolved
- Availability has improved, matching the performance of the CNG fueling station

## Next Steps

- Deploy Remaining BEBs
- Procure Ten Battery-Electric Cutaway Buses