



**February 13, 2020**

**To:** Transit Committee  
**From:** Darrell E. Johnson, Chief Executive Officer  
**Subject:** Zero-Emission Bus Rollout Plan Update

### **Overview**

The Orange County Transportation Authority is developing a plan to comply with the California Air Resources Board's Innovative Clean Transit regulation. The regulation requires transit agencies to begin purchasing zero-emission buses in 2023, with the goal of transitioning all transit buses to zero-emission technology by 2040. The regulation also requires transit agencies to adopt a plan to meet the requirements. The plan must be submitted to the state by July 1, 2020.

### **Recommendation**

Receive and file as an information item.

### **Background**

The California Air Resources Board (CARB) adopted the Innovative Clean Transit (ICT) regulation in December 2018, as part of a long-term goal of transitioning the transportation sector to zero-emission technologies. Under the ICT regulation, a zero-emission bus (ZEB) is defined as a bus without any tailpipe emissions and is either a battery electric or a hydrogen fuel-cell electric bus. The regulation applies to all revenue vehicles operated by a transit agency with a gross vehicle weight rating over 14,000 lbs. This impacts the entire Orange County Transportation Authority (OCTA) fixed-route and paratransit fleet. OCTA and the California Transit Association expressed concerns to CARB during the rule development that the increased cost of ZEB vehicles, fuel, and infrastructure will impact the ability of transit agencies to provide current levels of service without the addition of new funding. At the present, OCTA is seeking grants to offset a portion of the costs and the state is processing back orders of ZEBs to reduce per vehicle costs.

The main provisions of the regulation include:

- Transit agencies which operate a fleet larger than 65 buses must submit a ZEB Rollout Plan (Rollout Plan) by July 1, 2020,

- Transit agencies must purchase a minimum number of ZEBs during future procurements, according to the following schedule:
  - Starting in 2023, 25 percent of new bus purchases must be ZEBs (applies to 40-foot buses only),
  - Starting in 2026, 50 percent of all new bus purchases must be ZEBs (40-foot, 60-foot, and smaller “cutaway” buses),
  - Starting in 2029, 100 percent of all new bus purchases must be ZEBs.
- Transit agencies can earn credits to offset the 2023 and 2026 ZEB purchase requirements by providing zero-emission vehicles not covered by the ICT regulation, and
- The minimum ZEB purchase requirement may be delayed if a certain number of ZEBs are purchased statewide by the end of 2020 and 2021.

OCTA’s current transit service fleet consists of 520 buses for OC Bus (fixed-route) and 248 cutaway buses for ACCESS (paratransit) for a total of 768 buses. The fleet mix is comprised of the following vehicle types:

- 40-foot compressed natural gas (CNG) fixed-route buses = 462 (subject to requirement in 2023),
- 40-foot hydrogen fuel-cell electric fixed-route buses = ten (early ZEB purchase credit),
- 60-foot CNG fixed-route buses = 36 (subject to requirement in 2026),
- 32-foot CNG fixed-route buses = 12 (subject to requirement in 2026), and
- 23-foot gasoline paratransit buses = 248 (subject to requirement in 2026).

The OCTA Fiscal Year 2019-20 Budget includes two procurements for vehicle types which will have met their minimum federal useful life and are not subject to the ICT regulation because they are being purchased prior to 2023. This includes portions of the CNG fixed-route bus fleet and gasoline paratransit bus fleet.

### ***Discussion***

Transitioning to ZEBs will take careful planning and require additional financial resources to implement. OCTA is taking a measured approach to meet the regulation, while prioritizing transit service to our customers.

### **OCTA ZEB Pilots**

OCTA will be testing both types of ZEBs over the next few years. Ten hydrogen fuel-cell electric buses were purchased and put into service in late 2019.

A hydrogen fueling station was also constructed at the Santa Ana Bus Base to fuel the new buses. OCTA received “Early Action Credits” for purchasing fuel-cell buses prior to 2023, which can be used to partially offset future ZEB purchase requirements. Staff will also start procuring ten battery electric buses in 2020. Infrastructure necessary for electric charging will be installed at the Garden Grove Bus Base. External funding from state and federal grants has helped offset the cost differential between the new technologies when compared to the standard CNG bus, which can be 50 percent to 100 percent higher per bus. With a combination of 20 hydrogen fuel-cell electric and battery electric buses, OCTA will gain valuable experience with ZEB technology, which will support an informed decision about a long-term fueling strategy, as well as position OCTA to meet the ICT regulation during each stage.

#### Rollout Plan Development

To successfully transition to an all zero-emission bus fleet by 2040, each transit agency must submit a Rollout Plan demonstrating how it will purchase ZEBs, build all the necessary fueling infrastructure, as well as train coach operators and mechanics to operate and/or maintain the buses. CARB allows transit agencies to update the Rollout Plan as necessary. The Rollout Plan must be approved by the OCTA Board of Directors (Board) prior to submittal to CARB. The Rollout Plan must include the following information to be considered a complete plan:

- Type(s) of ZEB technologies a transit agency is planning to deploy,
- Schedule for all ZEB and conventional bus purchases,
- Schedule for infrastructure upgrades and modifications,
- Identification of costs and potential funding sources,
- Training plan for operators and maintenance staff,
- Plan to deploy ZEBs in disadvantaged communities, and
- Goal of full transition to ZEBs by 2040.

Development of the initial plan requires professional consultant assistance including expertise in vehicle technology, fueling infrastructure, and transit operations. OCTA has procured the necessary expert assistance to develop the Rollout Plan and perform specialized analysis. The consultant team has gathered extensive data from OCTA, ZEB manufacturers, and energy companies to use as input to their sophisticated modeling tool, which simulates bus route operation by ZEB type. Vehicle range and cost are key factors in determining the most appropriate fuel technology. Research indicates that while hydrogen fuel-cell electric buses offer a longer range and better match OCTA’s current operation parameters, they have a higher vehicle and fuel cost than battery electric buses. On the other hand, while battery electric buses may have

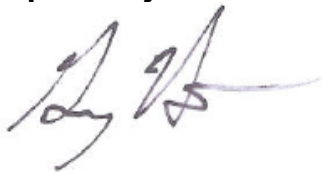
a lower vehicle cost, their limited range may require more vehicles to meet current service levels. The consultant will also assess infrastructure needs by energy type and how feasible it would be to implement at each OCTA bus base. The operational impacts, cost, and feasibility will be considered in determining the preferred path for Board consideration.

***Summary***

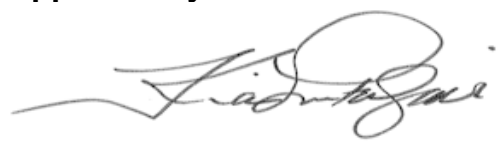
OCTA is planning how to best comply with the CARB ICT regulation. Pilot projects will help inform the decision on which type of ZEBs will work best for our agency. A consultant effort is underway, which will help OCTA develop a Rollout Plan to guide implementation. Staff will return to the Board in May 2020 with a draft plan for consideration, prior to submitting to CARB by July 1, 2020.

***Attachment***

None.

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