



DATE: November 9, 2021

TO: Environmental Advisory Commission

FROM: Laura Rubio-Cornejo, Director of Transportation

**SUBJECT: INFORMATION ITEM – SEEKING INPUT ON THE DRAFT
TRANSIT FLEET ELECTRIFICATION FEASIBILITY STUDY FOR
THE ARROYO VERDUGO REGION TRANSIT OPERATORS**

BACKGROUND:

December 2018, the California Air Resources Board (CARB) approved a rule that would go into effect October 2019 that requires all public transit operators in California to transition to 100 percent zero emission bus (ZEB) fleets by 2040. For Pasadena's transit fleet, the required transition begins with a deadline to provide a "ZEB Rollout Plan" by July 1, 2023. Per CARB's rule, the phased transition to ZEB requires that 25 percent of new bus purchases be a ZEB beginning in 2026, increasing to 100 percent of new bus purchases in 2029 with a full ZEB operating fleet in place by 2040.

Prior to December 2018, staff had attended numerous zero emission bus (ZEB) presentations at conferences, attended demonstrations with ZEB manufacturers and participated in regional zero emission bus working groups. In preparation for the anticipated CARB rule, Pasadena staff led the successful joint application effort with Burbank and Glendale, collectively known as the Arroyo Verdugo Regional Transit Operators, to apply for the 2018-2019 Caltrans Sustainable Communities Grant Program to conduct three separate transit fleet vehicle electrification feasibility plans.

The feasibility study will provide the needs and roadmap to help guide the implementation of a zero emission fleet. The scope of work included the following:

- Evaluate current market to determine vehicle and charging options.
- Identify infrastructure needs and, if applicable, determine best location for charging infrastructure.
- Develop a timeline for bus replacement/purchases and infrastructure development.
- Work with power supplier to identify infrastructure needs for supply.
- Conduct stakeholder outreach with relevant City departments and external partners including each respective municipal power company.
- Develop a funding plan.
- Meet the CARB ZEB Rollout Plan requirement.

For Pasadena, the initial phase focused on the infrastructure and vehicle needs, followed by coordination with Pasadena Water and Power. This provided initial study

findings. Input received as part of our stakeholder meetings will help inform the final report. The final report is anticipated to be complete by the end of the year.

Preliminary Assessment

The system review includes a comprehensive evaluation of the miles and hours traveled by the city’s transit fleet as well as electrical power projected to be consumed, to provide initial vehicle need estimates for both battery electric buses (BEB) and hydrogen fuel cell (FCEB) buses. Currently, the twenty-nine active Pasadena Transit vehicles are fueled with Compressed Natural Gas (CNG) and the fifteen Pasadena Dial-A-Ride vehicles use unleaded fuel. A conservative estimate from the consultant identified an anticipated significant increase in vehicle lifetime costs due to transitioning to a zero emission fleet. The table below depicts the initial estimated cost comparison for a full fleet replacement based on propulsion type (based on current costs). For an electric fleet, the cost increase is primarily due to the increased number of vehicles that will be required to operate current service levels due to the limited range of BEB’s. Hydrogen fuel cell buses could replace CNG buses one-for-one; however, the cost of each bus purchase is significantly higher.

Total Cost to Transition to a ZEB Fleet

Propulsion System	Total
Compressed Natural Gas (CNG)	\$29,982,281
Battery Electric Bus (BEB)*	\$59,978,313
Hydrogen Fuel Cell (FCEB)	\$61,762,767

The primary barrier to deploying a BEB or FCEB fleet is the provision of a City-owned transit facility to store and maintain the Pasadena Transit and Pasadena Dial-A-Ride fleet. A BEB and FCEB fleet cannot be deployed without a permanent site because significant infrastructure is required for the recommended technology. The Pasadena Transit and Pasadena Dial-A-Ride fleet is primarily parked and maintained at a leased maintenance facility. This leased maintenance facility is also substantially limited in size and would not be able to accommodate BEB fleet infrastructure. In addition, due to the high costs associated with construction, it would not be financially viable to upgrade a leased transit facility, as any improvements to the site would effectively be left behind if the City were to move facilities. As a result, building a permanent transit facility is recommended prior to deploying a zero emission fleet.


NEXT STEPS:

Staff will continue to meet with stakeholders to solicit input. The technical study is anticipated to be complete by the end of calendar year 2021.

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