



**DATE:** June 24, 2021

**TO:** Transportation Advisory Commission

**FROM:** Laura Rubio-Cornejo, Director of Transportation 

**SUBJECT:** **INFORMATION ITEM – UPDATE ON THE 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.

For Pasadena, the initial phase focused on the infrastructure and vehicle needs, followed by coordination with Pasadena Water and Power. Next steps include the public

outreach component that will be conducted this summer. The final report is anticipated by the fall.

### 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 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.

**Vehicle Lifetime Cost Estimates**

<b>Propulsion System</b>	<b>Total</b>
Compressed Natural Gas (CNG)	\$25,900,000
Battery Electric Bus (BEB)*	\$44,900,000
BEB Without City-Owned Facility**	\$48,300,000
Hydrogen Fuel Cell	\$54,400,000

\*Assumes city-owned facility

\*\*Without a city-owned facility charging will need to use off-site alternatives that would likely have higher energy rates; this figure does not include the associated additional operating costs.

A number of operational factors will be considered when assessing the zero emission technology. One of the key factors will be the location and infrastructure capacity at a future undetermined maintenance facility. The preliminary assessment indicated that a city-owned transit operations and maintenance facility is an essential need in the transition to a zero emission fleet. There is significant infrastructure required in order to transition to, maintain and operate a zero emission fleet. Given the level of investment that is required to support a zero emission fleet, owning a facility makes the most sense.

A critical area also identified for further review in the initial needs assessment relative to electrification is the need for resiliency to protect against grid outages. It is not feasible to operate a segment of the fleet or routes if a grid outage were to take place. By way of the coordination with Pasadena Water and Power that has already commenced, the plan will provide recommendations to address system resiliency.

A comprehensive evaluation of the system's daily hours, miles and electrical needs, and infrastructure resiliency needs will continue to be evaluated. This includes identifying the infrastructure needs for a future maintenance facility that is a key factor to transition to a zero emission fleet. The next phase will include an outreach effort that will be an opportunity to inform the community and stakeholders about the plan to transition to zero emission buses.

**NEXT STEPS:**

This technical study is well underway and anticipated to be complete by the fall. Staff will continue to work with the consultant and Pasadena Water and Power on the following next steps that will provide the needs and roadmap to help guide the implementation of a zero emission fleet.

- Continued coordination with Water and Power.
- Outreach phase will be conducted this summer.
- Draft report is anticipated by the end of the summer.
- Final report is anticipated by the fall in time for potential grant applications.