

To: Board of Directors

Date: 04/06/2022

From: Ruby Horta, Assistant General Manager, Administration

Reviewed by: *W.C.*

SUBJECT: Zero Emission Bus Fleet Transition Recommendation

Background:

The California Air Resources Board's (CARB) Innovative Clean Transit (ICT) rule requires all public transit agencies to gradually transition to a 100 percent zero-emission bus (ZEB) fleet. Beginning in 2029, 100% of new purchases by transit agencies must be ZEBs, with a goal for full transition by 2040.

At the March 2022 Board meeting, County Connection and the Center for Transportation and the Environment (CTE) staff provided an overview of the Draft Zero Emission Bus Fleet Transition Study. The approach for the study was based on analysis of four ZEB technology scenarios compared to a baseline scenario. Of the five scenarios, the Board directed the O&S Committee and staff to focus on the following three:

3. Battery Electric Bus (BEB) with Depot and On-Route Charging
4. Mixed Fleet (Battery Electric & Fuel Cell)
5. Fuel Cell Electric Bus (FCEB) Only

Mixed Fleet Selection:

Given the Board's feedback at the March 2022 Board meeting, staff further evaluated the remaining three scenarios recognizing the importance of procuring resilient and malleable fleet than can adapt to both regulatory and mobility demands. After additional discussions with CTE, staff considers the mixed fleet option to be the most advantageous for the development of the ICT rollout plan. A BEB-only scenario, would present operational issues related to range, geography and/or vehicle weight. On the one hand large battery packs would enhance range and overcome some geographical barriers, but would also increase the vehicle weight, which is a concern for local streets and roads maintenance. A FCEB-only scenario would deem unnecessary the investments we have already made in depot and on-route charging infrastructure. However, pursuing a mixed fleet would provide the greatest level of flexibility as the technologies mature and each can be deployed based on their applicability. Attachment 1 provides additional detail on the opportunities of each scenario, based on current technological advancements.

Financial Implications:

A summary of the total cost of ownership (for the three selected scenarios) is presented in the table below, ranging from \$373M to \$386M.

Assessment Type	3. BEB Depot + On-Route	4. Mixed Fleet	5. FCEB Only
Fleet	\$243M	\$253M	\$270M
Additional Labor	\$1M	\$0	\$0
Fuel*	\$32M	\$33M	\$42M
Maintenance	\$62M	\$57M	\$58M
Infrastructure	\$49M**	\$33M	\$14M
Total	\$386M	\$373M	\$384M
% ZEB in 2040	100%	100%	100%

* Near-term costs estimates.

**Excludes the cost of land acquisition for on-route charging stations.

Recommendation:

The O&S Committee and staff recommend Board approval of the mixed fleet scenario. This final recommendation, if approved by the Board will be used to develop the ICT rollout plan due June 30, 2023. This would allow County Connection to retain existing investment in BEBs (depot and on-route chargers) while also incorporating fuel-cell technology that can more adequately cover range requirements not currently available with the battery-electric technology.

Action Requested:

The O&S Committee and staff request Board approval of the mixed fleet scenario of battery and fuel-cell electric buses. All scenarios assume a one-to-one vehicle replacement for the upcoming replacement of forty (40), 40' diesel buses.

Attachments:

Attachment 1: Summary of scenarios 3, 4 and 5.



Considerations for ZEB Transition Selection

	3. BEB Fleet, Depot & On-Route Charge	4. Mixed Fleet, BEBs & FCEBs	5. FCEB-Only Fleet
Service	- Operationally challenging; may require schedule changes due to on-route charging	+ Operationally similar; technology can be matched to service needs	+ Operationally similar; no service changes required due to technology selection
Fleet	+ Single ZEB technology	- Operationally challenging due to creation of sub fleets by technology	+ Single ZEB technology
Fuel	- Requires new on-route chargers; acquisition unaccounted for in Master Plan	+ Two technologies provide greater redundancy and resilience benefits; less reliant on the grid	○ Anticipated fuel price reduction due to regional renewable H ₂ supply developments; current fuel price is costly
Maintenance	- Requires depot chargers and on-route chargers in the field	- Requires expertise and equipment for mixed fleet and infrastructure	+ Single ZEB technology streamlines maintenance
Facilities	- Requires major infrastructure and operations restructuring in the depot	- Two different fueling infrastructures will be required at depot	+ Requires one-time major infrastructure investment & is scalable