

To: Operations & Scheduling Committee

Date: January 27, 2022

From: J. Scott Mitchell, Chief Operating Officer

Reviewed by: *W.C.*

**SUBJECT: Battery Electric Bus (BEB) 2021 Update**

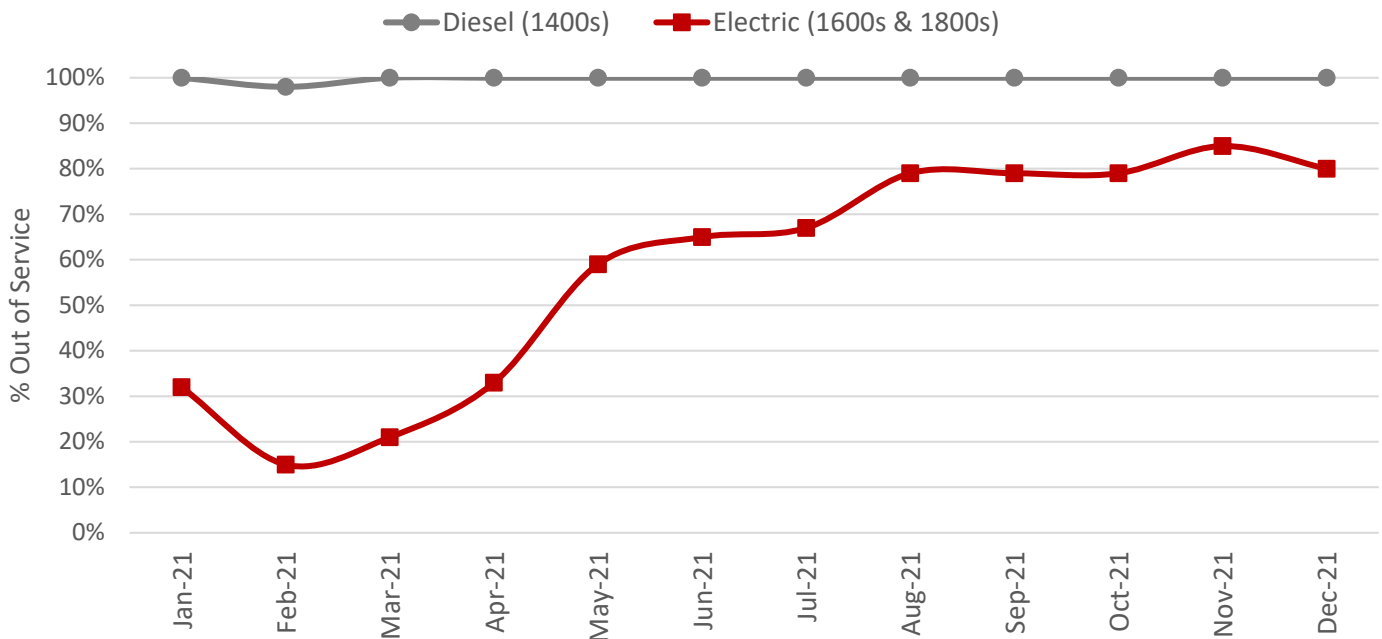
### Background:

County Connection received two federal grants—the 2012 Clean Fuels grant and the 2016 Low/No grant—to purchase eight battery electric buses (BEBs) and the necessary charging infrastructure. All eight BEBs operate in Walnut Creek on Routes 4 and 5, and two inductive chargers were installed at the new Walnut Creek Transit Village to support the continuous operations on these two routes. The BEBs have travelled 298,793 service miles January 2017. This update will compare the electric bus fleet to the 1400 series diesel bus fleet from January 1, 2021, through December 31, 2021.

### Maintenance and Operations:

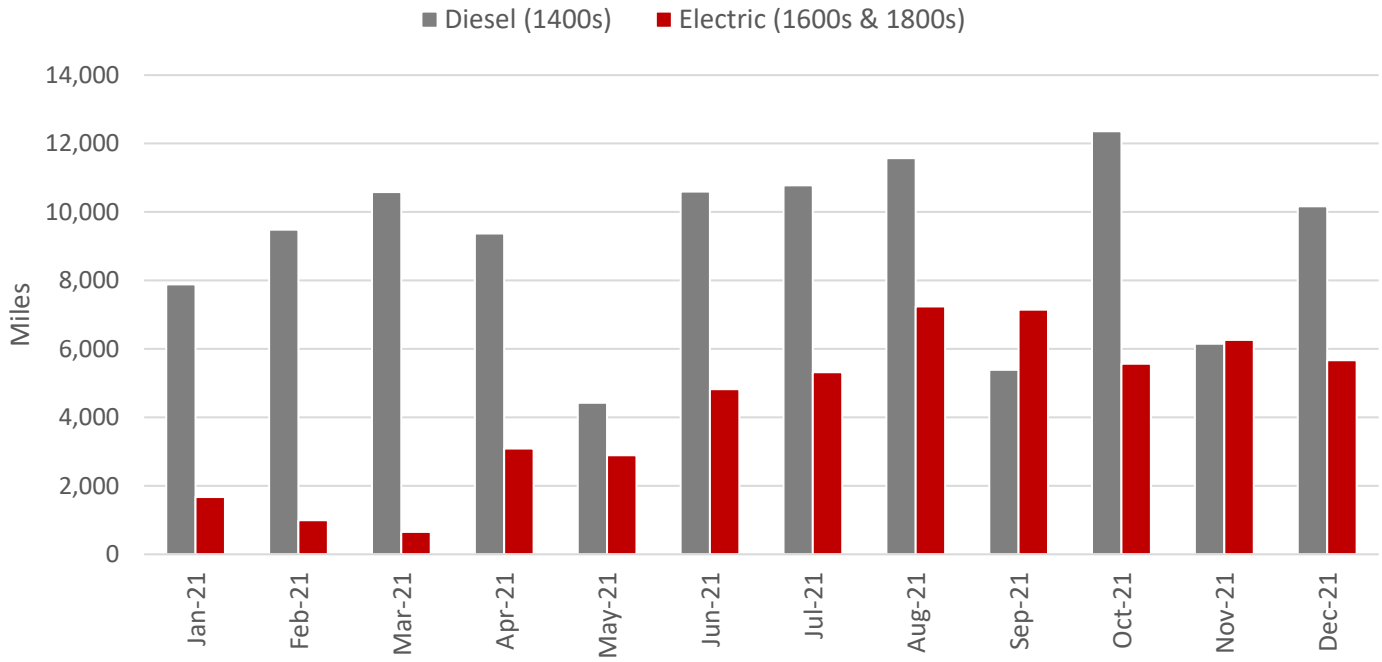
Since January 2021, the electric bus availability averaged 57% compared to 98% for the 1400-series diesel fleet. Most of the reliability issues are due to parts availability and battery issues. Staff continues to work with various partners to resolve these issues. The electric fleet availability has improved greatly over the past six months.

### Vehicle Availability



Another important indicator of reliability is miles between road calls. During the comparison period, miles between mechanical road calls for the diesel fleet averaged 9,060 miles. The miles between road calls for electric fleet averaged 4,776 miles. However, this metric could slightly favor the diesel fleet because of lower total miles traveled by the electric fleet.

### Miles Between Mechanical Road Calls



### Cost to Operate:

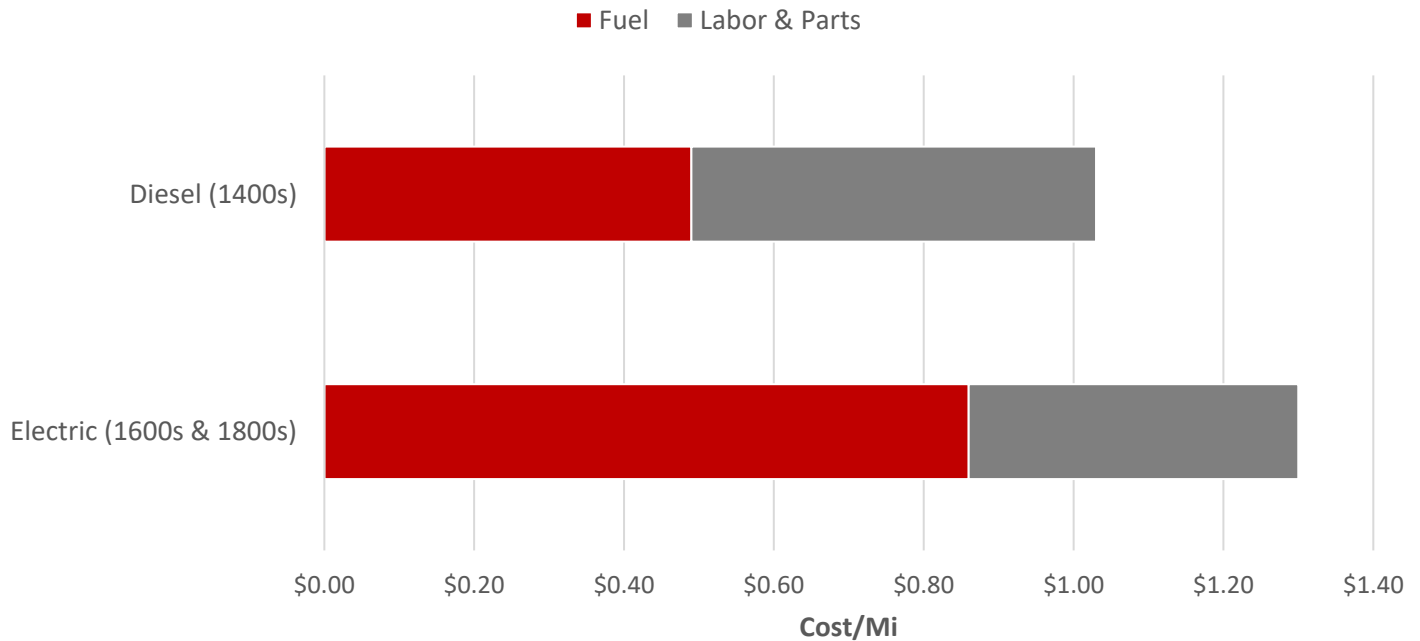
The electricity rates continue to be a concern in the operation of BEBs. Between January 1, 2021 and December 31, 2021, the total electricity cost to operate the eight buses was \$62,088.

The average energy cost per mile for the electric fleet in 2021 was \$0.86 per mile compared to a diesel fuel cost of \$0.49 per mile. The total cost per mile, inclusive of labor and parts, was \$1.30 per mile for the electric fleet and \$1.03 per mile for the diesel fleet. It should be noted that the electric fleet is still under warranty, and all major electrical repair costs have been covered by the manufacturers. If these parts were not covered under warranty, this would increase parts cost per mile considerably for the electric fleet. The electric fleet also continue to need specialty support from the various vendors.

In addition, all of the battery packs and battery management controls for the four 2016 electric trolleys needed to be replaced in September 2019. We have also replaced three battery strings on the 2018 electric buses, which was covered by warranty.

We continue to have major problems with the chargers at the yard in Concord. One of the two Efacec plug-in chargers has been out of service for nineteen months. The manufacturer cannot repair it properly, partly because they are now obsolete. We are currently working with Gillig to find a solution to this problem, which will involve replacing the charge controllers on the eight electric buses and updating the chargers at the facility.

## Vehicle Operating Cost



### Conclusion:

Electricity costs and availability continue to be a problem with the electric buses. The lack of industry standards is also a major issue. We have chargers and parts on buses that are between three and five years old that are obsolete because the technology continues to change at a rapid pace.

The battery charger issue is just one example. To replace the chargers with ones from an alternate manufacturer requires updates and changes to the buses. The bus manufacturers all seem to be using different systems that are not all compatible to a universal charger standard.

As California moves to a Zero Emission Bus (ZEB) future, staff will continue to report to the Board on the progress of electric and fuel cell buses. Although staff recognizes the importance of reducing greenhouse gases, there are a number of considerations that should be further analyzed to ensure systemwide reliability, which ultimately affects overall ridership. Staff has been working with the Center of Transportation and the Environment (CTE) to develop a ZEB Rollout Plan, which will evaluate ZEB options and help determine an appropriate path forward for County Connection. Staff intends to bring a draft of the plan to the O&S Committee for review at a future meeting.

### Financial Implications:

Although this analysis did not focus on a financial perspective, it is clear that under current conditions electricity as a fuel costs \$0.37 per mile more than diesel fuel. The electric bus fleet costs \$0.27 more per mile to maintain than the similar diesel powered fleet. A detailed financial analysis will be included in the ZEB Rollout Plan.

### Recommendation:

Staff recommend that the O&S Committee forward this item to the Board for review.

**Action Requested:**

None, for information only.