



Metro

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JUNE 10, 2016

TO: BOARD OF DIRECTORS

THROUGH: PHILLIP A. WASHINGTON ^{PAW}
CHIEF EXECUTIVE OFFICER

FROM: JAMES T. GALLAGHER ^{JTG}
CHIEF OPERATIONS OFFICER

SUBJECT: ZERO EMISSION BUS PROGRAM UPDATE

ISSUE

This update is provided in response to a request at the System Safety Security and Operations Committee meeting for staff to provide periodic updates on the BYD Battery Electric Bus Demonstration Project and other Zero Emission Bus (ZEB) activities.

BACKGROUND

ATVC and Metro remain committed to operating one of the cleanest transit bus fleets in the nation. Metro was the first transit agency to adopt an Alternative Fuel Initiative (AFI Policy) in 1993, and is the largest operator of CNG buses in North America. As Metro transitions to a zero-emission bus fleet, Metro will continue to look for opportunities to capitalize on state and federal grant programs designed to promote the migration to Zero Emission Buses (ZEB's).

In March 2011, Metro's Board directed staff to develop a program to demonstrate up to 30 ZEB's in revenue service.

In June 2011, Metro's Board approved a plan to purchase up to thirty (30) zero emission or near zero emission buses. As part of this action, \$30 million of Measure R funding was set aside to support the ZEB program. Metro's Advanced Transit Vehicle Consortium (ATVC) partnership was authorized to oversee ZEB program.

Current Activities:

BYD Contract: In June 2013, ATVC awarded a contract for up to 25 ZEB's to BYD Motors (contract OP33202790). BYD was authorized to proceed with building and delivering five buses. These buses were delivered in June 2015, and put into revenue service at Division 1 in Downtown Los Angeles.

Although BYD has been working hard to support this project, full integration of the ZEB's into Metro's operating environment has not been fully successful. Over the last 12 months, Metro accumulated a total of 36,000 miles in operation from Metro's Division



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1 in Downtown Los Angeles. Limited range between charges and poor hill-climbing ability of these buses severely limits the lines on which they may be operated. Additionally, the buses have experienced low reliability. Though these challenges are typical when introducing a new product in a new environment, they have significantly impacted these buses availability for service.

Given these challenges, operation of these buses was suspended April 2016 at the request of BYD. Metro and BYD are currently discussing options for BYD to buy-back these buses and to offer a credit for future ZEB buses.

Expansion of Electric Bus Program: In addition to reviewing the option to purchase additional BYD buses, Metro and ATVC have applied for both FTA and CARB funding to support expansion of Metro's electric bus program. Staff has determined that among the leading candidate lines for electric vehicle operation, Metro's Orange Line service is particularly well suited due to viability for en-route opportunity charging. For these applications Metro has partnered with New Flyer given their past experience with similar applications and intent to use service-proven systems.

In April 2016 Metro was awarded a federal 2015 Low or No Emission Vehicle Deployment Program ("LoNo Program") in the amount of \$4.275 million for the purchase of five ZE New Flyer 60' articulated battery electric vehicles and chargers for deployment on the Metro Orange Line. As part of this grant, Metro has committed to using \$5.825 of Measure R funding that was programmed for zero emission buses as a local match. Buses and equipment funded by this grant are planned for delivery in Fall 2017, with operation planned to start in late 2017.

New Grant Funding Opportunities: Metro continues to pursue competitive grant funding opportunities for both federal and state funding. Metro's Orange Line BRT service (MOL) has been identified as a top candidate corridor for ZE electric bus operations. Metro currently operates 43 buses on this corridor, and owns both the right-of-way and terminals at each end of this line which can be potential locations for en-route charging.

In April 2016 Metro applied for a state Transit and Intercity Rail Capital Program (TIRCP) grant in the amount of \$25 million for up to 25 new Flyer 60' articulated battery electric vehicles and chargers for deployment on the Metro Orange Line. In May 2016 Metro applied for the federal 2016 LoNo grant in the amount of \$19.1 million for the purchase of up to 20 New Flyer 60' articulated battery electric vehicles and chargers, also for deployment on the Metro Orange Line.

Gasoline-Electric Hybrid Conversion Project: Metro has six "legacy" gasoline electric hybrid buses that were purchased from NABI and ISE Research in 2008-2009. Both



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are now out of business; ISE went bankrupt in 2010 and NABI was sold in 2013. Due to unavailability of replacement parts and obsolete sub-systems, these buses are not currently operational.

In 2014 ATVC requested proposals to retrofit these buses to zero or near-zero emission configurations. A contract award recommendation was approved by ATVC in 2015 to have BYD retrofit these buses with electric propulsion systems. Upon staff's review of this approach with BYD it was determined that given the age, design and weight of these buses, there is significant risk with converting them to full battery electric configuration. A better and lower risk alternative option is to convert these buses to a more conventional Near-Zero emission, CNG configuration using new "Low NOx" Cummins-Westport ISL-G engines.

FINANCIAL IMPACT

\$30 million in Measure R funding was set aside in 2013 to support zero emission bus demonstration programs. To date, \$5.0 million of this funding has been used on five zero emission electric buses with BYD Motors. \$5.9 million is programmed to provide the local match on the 2015 LoNo grant award.

NEXT STEPS:

BYD Contract: Staff is reviewing an offer from BYD to buy back the original five 40' BYD buses, and to offer Metro/ATVC a credit toward the purchase of up to five new 60' articulated battery electric buses. Staff will present the proposal from BYD and recommendations at the ATVC Board meeting on June 22, 2016.

2015 LoNo Grant Award: Staff is working with New Flyer to establish a new contract that defines specific project deliverables, schedules, and other requirements for delivery of five 60' articulated battery electric vehicles. This project also includes installation of shop chargers at Division 8 in Chatsworth, and three en-route chargers that will be installed at the North Hollywood and Chatsworth Stations on the Metro Orange Line.

Alternative Configurations: Staff is currently investigating opportunities to demonstrate one or more 80' double articulated buses on Metro Orange Line as allowed under the newly passed state legislation (AB726 allows for vehicles up to 82' in length for use on the Metro Orange Line). There are no 80' bi-articulated buses in North America currently, and no North American manufacturers for these buses. Staff is exploring whether there are feasible options to bring in one or more 80' buses into the US for testing and demonstration purposes.

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