



Board Report

File #: 2016-0881, File Type: Contract

Agenda Number: 21.

EXECUTIVE MANAGEMENT COMMITTEE
MARCH 16, 2017

SUBJECT: CONTRACT OP29199, BYD BATTERY ELECTRIC ARTICULATED TRANSIT BUSES AND CHARGING EQUIPMENT FOR DEPLOYMENT ON THE METRO ORANGE LINE

ACTION: APPROVE CONTRACT OP29199 WITH BYD MOTORS FOR FIVE ARTICULATED BATTERY ELECTRIC BUSES

RECOMMENDATION

CONSIDER:

- A. FINDING that compliance with PUC sections 130232 and 130233 does not constitute a method of procurement adequate for the operation of prototype equipment and herewith approves the procurement of prototype buses under PUC section 130236 without further observance of any provisions regarding contracts, bids, advertisement or notice;
- B. APPROVING the **Advanced Transit Vehicle Consortium's (ATVC) Award and Execution of a non-competitive Contract No.OP29199 with BYD Motors, Inc. (BYD), for the purchase of five (5) prototype 60 foot articulated battery electric vehicles and charging equipment at a firm fixed price of \$6,594,771, including applicable taxes;**
- C. AUTHORIZING the Contract Modification credit in the amount of \$3,000,000 under Contract No. OP33202790, with BYD, resulting from the buy-back of five (5) battery electric 40 foot vehicles delivered to Metro to be expended on the five prototype articulated battery electric vehicles in recommendation B; and
- D. CLOSING project 201071 Bus Acquisition 30 Zero Emission/Super Low Emission and utilize unused funds from this project to establish a Life-of-Project (LOP) Budget of \$8,109,500 for project 201074, BYD 60 foot Articulated Zero Emission Bus.

(REQUIRES TWO-THIRDS VOTE)

ISSUE

ATVC and Metro are committed to deploying zero emission vehicles and transitioning the Metro bus fleet to zero emissions as vehicle capabilities and fiscal capacity allow.

In October 2016, Metro's Board of Directors directed staff to develop an implementation plan to use all electric buses on the Metro Orange Line (MOL) Bus Rapid Transit (BRT) by 2020 (Attachment C - Motion by Directors Garcetti, Krekorian and Antonovich, October 27, 2016). Metro staff intends to present the requested implementation plan to the Board in April 2017.

To address the Board's directive, Metro plans to test various Zero Emission Bus (ZEB) technologies and charging strategies to determine which technology best suit Metro's operational environments and needs. To maximize the evaluation of emerging technologies, Metro has developed a strategy to procure prototype vehicles under four separate contract awards; two procurements on a single source basis, and two competitively awarded procurements. This approval for a non-competitive procurement to BYD will address the first of the four contract actions.

The second prototype contract will be a single source to New Flyer for five 60' articulated ZEBs and en-route charging equipment utilizing a recently awarded FTA LoNo grant. The third and fourth prototype contract awards will be competitively procured under RFP No. OP28367 Forty-Foot (40') and Sixty-Foot (60') Low Floor CNG or Zero Emission Bus Procurement. These other awards will be brought to the Board for consideration in Spring 2017.

DISCUSSION

Metro Strategic ZEB Program

Metro is working to transform what is already one of the cleanest CNG transit fleets in the nation to an entirely zero emission fleet as quickly as technologically and fiscally possible.

Metro's strategic plans include transforming the Metro Orange Line (MOL) into a 100% ZEB line by 2020 followed by the Metro Silver line shortly thereafter. The MOL BRT has been identified as the top candidate line to be converted to electric ZEB operation. The MOL operates on a 19 mile dedicated right-of-way, that utilizes platform fare collection, and operates at a higher average speed with less frequent stops. The operating profile of battery electric vehicles is well suited for this type of duty cycle. Passengers and residents along the line will benefit from the inherent quietness and zero emission aspects of these battery electric vehicles. Staff believes that placing BYD 60' articulated battery electric buses into service on the MOL will provide an ideal environment for demonstrating the capabilities of these zero emission electric vehicles.

Once the Orange and Silver lines have begun ZEB service, staff will continue to identify lines suitable for ZEB operation and implement those conversions. Eventually as the technical capabilities of vehicles advance and become more mature, a full conversion to ZEB will occur. Metro intends to only procure ZEB vehicles in the near future.

Approval of recommendation B ratifies the ATVC contract award action taken in March 2017 and will provide the first vehicles necessary to convert the MOL to ZEB operation.

Background: Metro's ZEB Experience

Under a contract with BYD that was competitively awarded in June 2013, Metro tested five BYD 40' ZEBs. These buses were deployed at Metro Division 1 (Downtown Los Angeles) in April 2015. The operating performance of these initial 40' prototype buses did not meet Metro's daily operational requirements, and after a full year of operation, were removed from active revenue service at BYD's request.

In February 2016, BYD presented ATVC and Metro with an unsolicited proposal to repurchase the five 40' ZEBs in exchange for a \$3,000,000 credit towards the non-competitive purchase of five new 60' ZEB's that utilize BYD's latest generation technology and are manufactured to BYD's improved quality standards.

Staff's recommendation requests approval of the expenditure of the Contract Modification credit amount of \$3,000,000 to be used toward the purchase of five new, 60' battery electric buses that will be deployed on MOL BRT corridor.

Procurement Process

To procure the five 60' prototype ZEB's under a non-competitive procurement and to apply the proposed \$3 million credit, the Board must first find that the normal competitive methods of procuring these ZEB's are inadequate and that staff is directed to procure these prototype vehicles without observance of the normal competitive means. It is important to note that Metro is currently conducting two procurements for 40' and 60' ZEB's that are following normal competitive methods. Those two competitive procurements are for five (5) 40' and five (5) 60' ZEB vehicles, with options that could total up to 100 40' ZEBs and 100 60' ZEBs.

Technical Improvements at BYD

To address the original quality and reliability issues experienced at startup in April 2014, BYD has undergone a transformation at their Lancaster, CA facility. BYD has added quality engineers and inspectors and implemented a quality assurance program that tracks each vehicle as it moves through the assembly process. BYD is also pursuing ISO 9001:2008 certification, which is expected to be complete by mid-2017. The five 60' articulated buses proposed for Metro would be built in Lancaster and would meet BYD's updated quality assurance requirements.

BYD has also gained significant experience manufacturing buses locally. They are currently manufacturing 31 60' articulated buses at this facility for commercial orders with Antelope Valley Transit Authority and Albuquerque Rapid Transit, all of which are scheduled for delivery in 2017.

To address the suitability of their buses for Metro's operating environment, recent technological advances in battery capacity (range), and improvements in engineering and manufacturing capabilities at BYD are expected to provide next generation BYD articulated buses that are suitable for operation on high capacity BRT lines like Metro's Orange Line. The first of the 60' articulated electric buses will be delivered to Metro seven months after award of the contract and the fifth bus

twelve months after award of the contract.

BYD Battery Technology | Safety

BYD's 60' articulated buses are equipped with proprietary Lithium Iron Phosphate (LiFe PO₄) batteries that offer a higher degree of safety over conventional Lithium Ion batteries. The BYD LiFe battery chemistry is not susceptible to thermal events (such as with the Samsung Galaxy 7 cell phone batteries). BYD batteries are non-flammable, non-combustible, and don't overheat. BYD's batteries offer a wide thermal operating range of -20°F through 140°F. Because they contain no caustic materials, heavy metals, or toxic electrolytes, they are also considered more environmentally friendly than most other Lithium Ion battery chemistries.

BYD Prototype Experience

The bus type being proposed will be a prototype, but will have previous test and service experience. BYD demonstrated an early 60' battery electric prototype on Metro's Orange Line in December 2014. During the demonstration the bus was positively received by the operators, maintenance personnel, and passengers. In service vehicle performance was good, particularly in areas of acceleration and top speed. The bus also provided a smooth and very quiet ride. This bus has now accumulated 40,000 miles in demonstrations across North America. BYD has built two additional units in their Lancaster facility. One of these 60' buses was deployed to Altoona, PA for FTA's mandatory new bus testing. The second 60' bus was deployed to the Brazilian market. The new 60' BYD prototype bus proposed for Metro will have a new, more powerful rear axle drive motor assembly.

Metro Operating Environment

While Metro learned a great deal about ZEB technology while testing the BYD's 40' ZEBs, the technology has advanced rapidly. Now, 21 months after those vehicles went into service it makes good business sense to test the latest generation of ZEB vehicles to fully assess the technologies against our operational environment and requirements.

Cost/Price

The purchase price, per vehicle, for the original 40' BYD buses was \$756,316. The average net cost per vehicle was reduced to \$640,316 when Metro/ATVC received California Hybrid and Zero-Emission Truck and Bus Voucher credits. On June 2, 2016, BYD submitted an unsolicited offer to repurchase the 40' BYD vehicles and give the ATVC a credit of \$600,000 per vehicle to be used for the purchase of new BYD battery electric vehicles of ATVC's choice.

DETERMINATION OF SAFETY IMPACT

There is no anticipated safety impact for operating zero emission electric buses on MOL. BYD is expected to utilize components and sub-systems that have been proven in heavy duty applications and have been mass produced, and used in buses currently in transit service.

Zero emission buses use high voltage electrical systems. While these systems are isolated from operator and passenger compartments, maintenance personnel will be provided with additional

specialized training to ensure that they are prepared to maintain these higher voltage propulsion systems.

FINANCIAL IMPACT

Upon Board approval, this action will establish an LOP budget of \$8,109,500 for the procurement of 5 BYD Articulated 60' battery electric buses. Unused funding from project 201071 will be transferred to cover expenses for the procurement of these buses starting in FY17. This funding is programmed in Cost Center 3320 - Vehicle Technology. Because this is a multi-year contract, the Cost Center Manager will be responsible for ensuring that future year funding is programmed.

Impact to Budget

The source of funds for this action is Measure R 35% which is eligible for clean fuel bus procurements. This funding source will maximize the use of funds for this activity. There is no anticipated impact to the FY17 budget.

ALTERNATIVES CONSIDERED

Staff considered postponing this BYD project to purchase 60' ZE buses currently being solicited under RFP No. OP37267. This alternative is not recommended as it would delay the introduction of battery electric articulated buses into MOL. Further, it would limit Metro's ability to evaluate different technologies to determine which are the best fit for Metro's diverse operating environment. Metro does expect to purchase additional ZEB 60' buses under this solicitation, but there is no guarantee that BYD would prevail in this solicitation. If another vendor is selected for RFP No. OP38267, Metro would not be able to use the \$3,000,000 buy back credit offered by BYD. Given the significant value of the buy-back credit, staff recommends buying these five articulated buses from BYD.

NEXT STEPS

When the Metro Board approves that ratification request, staff will obtain the \$3 million credit, execute the new contract with BYD and issue a Notice to Proceed.


In the Spring 2017, staff will return to the Board with a request for a another non-competitive award to New Flyer for five prototype 60' articulated ZEBs and en-route charging equipment partially funded with a FTA LoNo grant award. Staff will return again with recommendations for additional prototype ZEB contract awards under a competitive procurement.

ATTACHMENTS

- Attachment A - Procurement Summary
- Attachment B - ATVC BR BYD Electric Bus Buy Back Proposal Dated, June 22, 2016
- Attachment C - Motion by Directors Garcetti, Krekorian and Antonovich, Oct. 27, 2016
- Attachment D - DEOD Summary

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