BOARD MEETING DATE: May 2, 2014 AGENDA NO. 5

PROPOSAL: Amend Contract to Develop and Demonstrate Battery Electric Drayage Trucks

SYNOPSIS: On October 5, 2012, as part of a DOE grant, the Board approved a $1,142,070 contract with Transportation Power (TransPower) for four battery electric drayage trucks. This action is to amend the contract with TransPower to add $375,000 from the Clean Fuels Fund (31) to cost share the development and demonstration of three additional trucks and related engineering design upgrades. The revised contract award will be $1,517,070, comprised of $1,142,070 from the Advanced Technology Goods Movement Fund (61) and $375,000 from the Clean Fuels Fund (31).

COMMITTEE: Technology, April 18, 2014, Recommended for Approval

RECOMMENDED ACTION:
Authorize the Chairman to amend the contract with TransPower to add $375,000 from the Clean Fuels Fund (31) to develop and demonstrate three additional battery electric drayage trucks, including related engineering design upgrades.

Barry R. Wallerstein, D.Env.
Executive Officer

MMM:BC

Background

Heavy-duty diesel trucks in the South Coast Air Basin (Basin) remain a large source of emissions with adverse health effects, especially in the surrounding communities along the goods movement corridors near the Ports of Los Angeles and Long Beach and next to major freeways. In order to mitigate the impact and attain stringent federal ozone standards, SCAQMD has been strongly promoting and supporting the development and deployment of advanced zero emission cargo transport technologies.

On October 5, 2012, the Board recognized a $4,169,000 grant from the DOE into the Advanced Technology Goods Movement Fund (61) for the development and demonstration of zero emission drayage truck technologies. Concurrently, the Board also approved contracts with four electric vehicle manufacturers to develop these truck technologies, including a $1,142,070 contract with TransPower for four battery electric drayage trucks. Subsequent to the SCAQMD Board award, TransPower received additional funding from CEC and the San Pedro Bay Ports' Technology Advancement Program (TAP) to develop and demonstrate three more electric drayage trucks. During the second half of 2013, TransPower also completed and began testing a prototype electric "Pilot Truck," previously cost shared by the SCAQMD, which provided TransPower with practical experience manufacturing and operating trucks of this type. With an expanded project scope to build seven electric drayage trucks, coupled with an opportunity to improve its electric truck design based on lessons learned from the new Pilot Truck, TransPower elected to invest more resources to improve the drive system. This decision was taken in order to incorporate additional technology advancements and design improvements gained from the completion and initial operations of the Pilot Truck. It is anticipated that updating the design for the demonstration trucks will result in more efficient and cost competitive vehicles well-positioned for commercialization.

Proposal

This action is to amend the contract with TransPower to add $375,000 as cost-share to develop and demonstrate three additional battery electric drayage trucks, including related engineering design upgrades, for a total of seven battery electric drayage trucks. The additional funding will primarily be used for engineering design upgrades to enhance the truck operating efficiency and to reduce vehicle assembly costs.

Some of the key advances to be developed and/or incorporated include the following:

- Automated manual transmission – a new system, not available in any existing electric vehicle, using proprietary software to precisely match powertrain gearing to vehicle torque requirements, enhance performance and operating efficiency, and achieve significant cost savings through the use of a lower-cost electric motor and off-the-shelf manual transmission.
- Advanced energy storage subsystem – numerous technological advances have been incorporated into the energy storage subsystem to improve battery balancing and maintenance and reduce the cost and complexity of integrating large battery systems onto Class 8 trucks. The battery pack design has also been streamlined to require much less wiring and connectors resulting in substantial savings in assembly labor and battery components costs. Finally, a new battery management system will be developed to balance cells faster and more efficiently in order to extend the operating range as well as battery life.

- Power control and accessory subsystem – using an innovative concept, pre-integrated components for vehicle control and electrically driven accessories will be placed onto a specially designed free-standing structure then hoisted into the truck to be connected with minimal additional integration hardware and wiring. This approach is easier and safer than mounting individual components directly onto the truck and will reduce significant time and costs in assembly of production vehicles.

TransPower anticipates these improvements to increase the operating efficiency and reduce vehicle assembly costs by approximately 25 percent, significantly improving the commercial value of the drive system.

Benefits to SCAQMD

This project is included in the *Technology Advancement Office Clean Fuels Program 2014 Plan Update* under "Electric/Hybrid Technologies & Infrastructure." Zero emission transportation and goods movement technologies are also included within SCAG's Regional Transportation Plan, the joint CARB, SCAQMD and San Joaquin Valley APCD *Vision for Clean Air* document and SCAQMD's FY 2013-14 Goals and Objectives. Successful development and demonstration of battery electric drayage trucks will move the technology closer to commercialization for wide-scale market deployment as well as move the region closer to attainment of clean air standards in the Basin by eliminating diesel particulate matter and NO_x emissions. Additionally, since drayage trucks are used to move goods in and around the ports, the application of zero emission technologies will improve the air quality in these disproportionately impacted communities.

Resource Impacts

The SCAQMD's total cost-share shall not exceed $1,517,070, comprised of the original award in the amount of $1,142,070 from the Advanced Technology Goods Movement Fund (61) plus the additional funds in the amount of $375,000 from the Clean Fuels Fund (31). The total estimated cost for this project is $5,122,267, broken down by partner cost-share as follows:

	Cost-Share	**Percentage**
DOE	$1,142,070	22%
CEC	$2,296,617	45%
TransPower	$1,008,580	20%
TAP	$300,000	6%
SCAQMD (requested)	$375,000	7%
Total	**$5,122,267**	**100%**

Sufficient funds are available in the Clean Fuels Fund (31) for this proposed project. The Clean Fuels Fund (31) is established as a special revenue fund resulting from the state-mandated Cleans Fuels Program. The Clean Fuels Program, under Health and Safety Code Sections 40448.5 and 40512 and Vehicle Code Section 9250.11, establishes mechanisms to collect revenues from mobile sources to support projects to increase the utilization of clean fuels, including the development of the necessary advanced enabling technologies. Funds collected from motor vehicles are restricted, by statute, to be used for projects and program activities related to mobile sources that support the objectives of the Clean Fuels Program.