

BOARD MEETING DATE: November 2, 2018

AGENDA NO. 4

PROPOSAL: Develop and Demonstrate Zero Emissions Heavy-Duty Trucks, Freight Handling Equipment, EV Infrastructure and Renewable Energy

SYNOPSIS: SCAQMD received an award of \$44,839,686 to develop and demonstrate zero emissions heavy-duty trucks, freight handling equipment, EV infrastructure and renewable energy under CARB's Low Carbon Transportation Greenhouse Gas Reduction Fund (GGRF) Investments. Volvo Group North America and its project partners are providing \$41,855,308. These actions are to recognize \$44,839,686 and transfer \$14,000,000 (\$4,000,000 for SCAQMD's project cost-share and \$10,000,000 for temporary advance of funds) from the Clean Fuels Program Fund (31) into the GHG Reduction Projects Special Revenue Fund (67). This action is to also execute contracts in an amount not to exceed \$46,688,250 to implement this project. Out of the \$2,151,436 allocated in CARB's grant for administrative expenses, these actions are to reimburse the General Fund up to \$1,972,936 from Fund 67 for administrative costs and transfer \$178,500 from Fund 67 to Fund 31 to execute a contract modification for administrative project implementation support. Finally, these actions are to authorize the Executive Officer to execute a contract modification and redistribute administrative funds to augment project funds on an as-needed basis.

COMMITTEE: Technology, October 19, 2018; Recommend for Approval

RECOMMENDED ACTIONS:

1. Recognize revenue, upon receipt, from CARB up to \$44,839,686 (\$42,688,250 for project costs and \$2,151,436 for administrative costs) into the GHG Reduction Projects Special Revenue Fund (67) for a zero and near-zero emissions freight facilities (ZANZEFF) project to develop and demonstrate zero emissions heavy-duty trucks, freight handling equipment, EV infrastructure and renewable energy.
2. Transfer \$4,000,000 from the Clean Fuels Program Fund (31) into the GHG Reduction Projects Special Revenue Fund (67) for SCAQMD's project cost-share.

3. Authorize the Chairman to execute contracts from the GHG Reduction Projects Special Revenue Fund (67) with the following entities:
 - a. Volvo Group North America, LLC, to develop and demonstrate zero emissions trucks, freight handling equipment, EV infrastructure and renewable energy in an amount not to exceed \$45,591,592; and
 - b. University of California, Riverside (UCR) CE-CERT to perform data collection, analysis and reporting in an amount not to exceed \$1,096,658.
4. Transfer up to \$10,000,000 as a temporary advance of funds, as needed, subject to availability of funds, from the Clean Fuels Program Fund (31) to the GHG Reduction Projects Special Revenue Fund (67).
5. Reimburse the General Fund up to \$1,972,936 from the GHG Reduction Projects Special Revenue Fund (67) for administrative costs necessary to implement the above-referenced project.
6. Authorize the Executive Officer to amend a Clean Fuels Connection, Inc., contract in an amount not to exceed \$178,500 from the GHG Reduction Projects Special Revenue Fund (67) for administrative project implementation support necessary to carry out the above-referenced project.
7. Authorize the Executive Officer to redistribute administrative funds to augment project funds with Volvo Group North America, on an as-needed basis, to meet project goals, contingent upon CARB approval if necessary.

Wayne Natri
Executive Officer

MMM:FM:NB:JI

Background

On July 19, 2018, SCAQMD submitted a proposal in response to CARB's solicitation under the Low Carbon Transportation Greenhouse Gas Reduction Fund (GGRF) Investments for zero and near-zero emissions freight facilities (ZANZEFF) projects. On September 6, 2018, CARB advised that SCAQMD had received a \$44,839,686 ZANZEFF award. SCAQMD has partnered with Volvo Group North America, LLC, (Volvo) to conduct a freight facility project that will realize commercialization and market penetration of heavy-duty battery electric vehicles (HDBEVs) in California and throughout North America. Volvo, a major heavy-duty original equipment manufacturer, will be partnering with some of the top fleet and industry leaders to reduce emissions at warehouses and freight facilities in some of the state's most disadvantaged communities using zero emissions on- and off-road equipment and warehouse energy efficiency improvements. This project is scalable and replicable to reduce emissions throughout the goods movement system. The project seeks to achieve emissions reductions and deploys both pre-commercial and commercial zero emissions technologies, including Volvo's North American market introduction of Class 8 battery electric trucks.

Proposal

These actions are to recognize revenue from CARB up to \$44,839,686 (\$42,688,250 for project costs and \$2,151,436 for administrative costs) for a ZANZEFF award and to transfer \$4,000,000 for SCAQMD's project cost-share from the Clean Fuels Program Fund (31) into the GHG Reduction Projects Special Revenue Fund (67) to develop and demonstrate zero emissions heavy-duty trucks, freight handling equipment, EV infrastructure and renewable energy. This action is to also execute contracts with Volvo and UCR CE-CERT for the following:

Volvo Zero Emissions Truck and Facilities Project

The project described below is based on Volvo's proposal and the specifications as outlined below may change as the designs are finalized. The Volvo Low Impact Green Heavy Transport Solutions (LIGHTS) project will develop and demonstrate the following for deployment at up to five sites, currently being considered within the cities of Chino, Fontana, La Mirada, Ontario and Placentia:

- Up to 23 on-road pre-commercial and commercial HDBEVs operating in and around disadvantaged communities;
- Up to 29 off-road BEVs used to load and unload containers and freight at warehouses and freight facilities;
- Up to 58 nonproprietary chargers both DC fast charging and Level 2 electric vehicle supply equipment (EVSE) with SAE approved connectors; and
- Approximately 1,860,462 watts of solar power.

The LIGHTS project includes a total of up to 23 HDBEVs and will begin with up to 8 multiple-configuration, pre-commercial truck deployments. The first three demonstration trucks will not be fully approved for U.S. operation and will therefore operate under CARB exemption waivers. The subsequent 5 demonstration units as well as up to 15 commercial/pre-commercial vehicles, will be approved for the U.S. market. Volvo will begin commercial introduction of the HDBEV rigid trucks and use mobile fast charging for fleets throughout the state to gain freight experience with battery electric trucks.

Based on Volvo's proposal, the three electric truck configurations delivered are anticipated to be equipped with the following driveline items:

- Two electric motors with 370 kW max power (260 kW continuous power) with a Volvo two-speed transmission.
- Average electric range is 170 miles depending on drive cycle. Throughout the course of this project, vehicles will be able to go 150-350 miles.
- Lithium-ion batteries for energy storage will have a minimum capacity of 200 kWh for the first two demonstrators, later increasing to four and then six battery pack configurations for a capacity of 320 kWh.

Volvo will deliver new lithium-ion battery chemistries for increased electrical energy densities at reduced cost; self-learning control algorithms which optimize energy usage in EVs; smart technologies to improve vehicle uptime and deployment of long-term rentals of HDBEVs to fleets throughout the state to accelerate adoption. Additionally, Volvo will coordinate the development of energy management systems to optimize vehicle charging by balancing the requirements of the vehicle, facility and grid. Vehicle charging will use SAE J1772 connectors for Level 2 charging and SAE J3068 or SAE CCS connectors for fast charging. Charging infrastructure includes 150 kW DC or 22 kW AC for the first two demonstration units and 250kW DC or 44 kW AC for subsequent and commercialized units. The freight facility sites will each feature standards-based, open architecture and interoperable charging infrastructure for off-road electric equipment, on-road electric trucks and employee workplace charging. Two standards-based, open architecture and interoperable charging stations along a key freight corridor for use by project fleets and the public will also be deployed. Up to 58 chargers will be installed ranging from 7.2 kW up to 150 kW.

UCR CE-CERT Data Collection Project

UCR CE-CERT will deploy a multiple-method approach to ensure all project data collection, which includes mobile logging, stationary logging, emissions testing and innovation analysis, is performed to CARB requirements. This will be done via hand recording and photos, data loggers, fleet and vehicle data records, testing results and interviews with end users. UCR CE-CERT will enhance its HDBEV guidance document to include tests targeted for Class 8, 60,000 pound gross vehicle weight rating and heavy-duty trucks utilized for warehouse operations. Performance testing will utilize UCR CE-CERT's heavy-duty chassis dynamometer for evaluation of two test vehicles (Class 8, rigid and tractor). To set a baseline and establish the benefit of the new vehicles, UCR CE-CERT will also collect emissions data from three conventional Volvo heavy-duty diesel trucks during normal in-service operation for up to three months using data loggers and the portable emissions measurement system (PEMS). Similarly, using the heavy-duty Hioki power meter system, UCR CE-CERT will verify power measurement system performance. Other responsibilities include quality assurance and control, secure and sanitize vehicle data, and conduct independent evaluations of truck electric range and battery degradation. UCR CE-CERT will oversee data collection of all other equipment, including off-road equipment, charging infrastructure and solar arrays.

Contract Amendment

Science & Technology Advancement occasionally contracts with experts and in-the field practitioners for technical and project implementation support. One contractor chosen through a competitive process is Clean Fuel Connection, Inc. (CFCI). This action is to authorize the Executive Officer to amend a contract with CFCI for \$178,500 from the GHG Reduction Projects Special Revenue Fund (67) for technical and project implementation support necessary to implement the above-referenced project.

Finally, these actions are to transfer up to \$10 million as a temporary advance of funds from the Clean Fuels Program Fund (31) to the GHG Reduction Projects Special Revenue Fund (67) to provide cash flow for contractor payments given CARB's cost-reimbursement process; to reimburse the General Fund up to \$1,972,936 from the GHG Reduction Projects Special Revenue Fund (67) for administrative costs necessary to implement the above-referenced projects; and to authorize the Executive Officer to redistribute administrative funds to augment project funds with Volvo Group North America, on an as-needed basis, to meet project goals, contingent upon CARB approval if necessary.

Sole Source Justification

Section VIII.B.2. of the Procurement Policy and Procedure identifies four major provisions under which a sole source award may be justified. The request for sole source awards for the Volvo contract is made under the provisions B.2.c.(1): The unique experience and capabilities of the proposed contractor or contractor team; B.2.c.(2): The project involves the use of proprietary technology; and B.2.d.(1): Projects involving cost-sharing by multiple sponsors. Volvo has extensive knowledge and experience in advanced EV technologies that are needed to successfully complete this project. The manufacturer will utilize their proprietary technologies in the development of pre-commercial and commercial heavy-duty trucks to improve system reliability, efficiency and costs over previous generations. This demonstration project will be cost-shared by Volvo and other project partners as discussed in the Resource Impacts section. The request for sole source award for the UCR CE-CERT contract is made under the provisions B.2.d.(6): Projects requiring compatibility with existing specialized equipment; and B.2.d.(8): Research and development efforts with educational institutions or nonprofit organizations. UCR CE-CERT, an educational institution, will utilize its heavy-duty chassis dynamometer for evaluation of test vehicles.

Benefits to SCAQMD

Projects to support development and demonstration of various electric container and freight transport technologies are included in the *Technology Advancement Office Clean Fuels Program 2018 Plan Update* under the categories of "Develop and Demonstrate Electric and Hybrid Vehicles" and "Develop and Demonstrate Electric Container Transport Technologies". This project is to develop and demonstrate zero emissions heavy-duty trucks, freight handling equipment, EV infrastructure and renewable energy. Successful demonstration of such projects will contribute to the attainment of national ambient air quality standards in the South Coast Air Basin by eliminating PM and NOx emissions from replaced diesel heavy-duty trucks, off road freight handling equipment and EV infrastructure powered by renewable energy.

Resource Impacts

CARB's GGRF award to SCAQMD in the amount of \$44,839,686 is broken down into \$42,688,250 for project expenses and \$2,151,436 for administrative expenses.

SCAQMD's project cost-share will not exceed \$4,000,000. Further, SCAQMD's contract with Volvo will not exceed \$45,591,592 and the contract with UCR CE-CERT will not exceed \$1,096,658 from the GHG Reduction Projects Special Revenue Fund (67). Reimbursement of the General Fund for administrative costs will not exceed \$1,972,936. The contract amendment with CFCI will not exceed \$178,500 from Fund 67 and will be taken from the \$2,151,436 for administrative expenses provided under the ZANZEFF Grant.

The funding sources and amounts for each project are detailed in the following table:

Proposed Volvo Project Costs

Source	Amount	Percent
CARB	\$41,591,592	49%
Volvo and partners (cash & in-kind)	\$41,655,308	46%
SCAQMD (<i>requested</i>)*	\$4,000,000	5%
Total	\$87,246,900	100%

*If SCE's Make Ready Project funds are approved by the CPUC, this amount may be reduced.

Proposed UCR CE-CERT Project Costs

Source	Amount	Percent
CARB	\$1,096,658	85%
UCR CE-CERT	\$200,000	15%
Total	\$1,296,658	100%

Sufficient funds are available in the Clean Fuels Program Fund (31). The Clean Fuels Program Fund was established as a special revenue fund resulting from the state-mandated Clean 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.

Sufficient funds will be available in GHG Reduction Projects Special Revenue Fund (67) to execute the Volvo and UCR CE-CERT contracts once the CARB funds in the amount of \$44,839,686 are recognized into Fund 67, along with the transfer of \$4,000,000 from the Clean Fuels Program Fund (31) for SCAQMD's project cost-share. The transfer of up to \$10,000,000 as a temporary advance of funds from the Clean Fuels Program Fund (31) to the GHG Reduction Projects Special Revenue Fund (67) is to provide cash flow due to CARB's cost-reimbursement process.