


BOARD MEETING DATE: December 4, 2015

AGENDA NO. 4

PROPOSAL: Execute Contract to Cosponsor Versatile Plug-In Auxiliary Power System Development and Demonstration 

SYNOPSIS: Conventional diesel work trucks often run their engines to provide off-board power or operate hydraulic equipment such as booms or digger derricks. This additional engine use while at a jobsite has significant emissions and fuel economy impacts. The Electric Power Research Institute (EPRI) has developed a prototype retrofittable auxiliary battery pack called a Versatile Plug-In Auxiliary Power System to provide jobsite electric auxiliary power on various vehicle platforms. This action is to execute a contract with EPRI to demonstrate up to ten units in various fleets to quantify the emissions and fuel usage benefits in an amount not to exceed \$125,000 from the Clean Fuels Fund (31).

COMMITTEE: Technology, November 20, 2015; Less than a quorum was present; the Committee Members concurred that this item be approved by the Board.

RECOMMENDED ACTION:

Authorize the Chairman to execute a contract with EPRI to cosponsor development and demonstration of a Versatile Plug-In Auxiliary Power (VAP) System in an amount not to exceed \$125,000 from the Clean Fuels Fund (31).

Barry R. Wallerstein, D.Env.
Executive Officer

MMM:FM:NB:LHM

Background

Fleets, such as those providing electric, gas, telecom, public works and emergency services, operate work-site vocational equipment that use a large portion of the fleet's fuel and produce significant emissions from stationary operations. More specifically, service crews are dispatched to job sites that may be a relatively short distance away

from the service center, but rely on utility trucks to transport tools and equipment from site to site, and use the trucks' engines to provide electrical power to operate tools and run hydraulically operated booms and digging equipment while stationary. In addition, the trucks run significant house loads on site, which include air conditioning, heating and safety lighting, as well as inverters to run computer equipment. Fleets also need to implement strategies to reduce impacts to crews and adjacent properties from noise and exhaust fumes.

Several vehicle manufacturers are beginning to provide hybrid-electric and electric drive trucks, with and without electric auxiliary power systems. In a recent utility truck program, it was found that two-thirds of the benefit of the trucks' hybrid-electric system was due to the reduced engine work site portion of their duty cycles. However, the upfront incremental cost and slow fleet turnover are barriers to deployment of electric drive trucks with electric auxiliary power systems. The ability to remove the electric auxiliary power system would also allow it to be a stationary power system for emergencies with potential integration to smart-grid infrastructure.

A system that is inexpensive, versatile and easy to install would overcome these hurdles and may have wide potential application. EPRI developed an engineering system specification for a VAP System based on data from field duty cycles and input from participating utility members and contracted development to a system integrator under guidance by a project team. The system integrator provides advanced lithium-ion batteries and battery packs to several major automakers. A full electrical system impact evaluation was conducted in the lab, and the prototype unit completed laboratory evaluation and validation at Southern California Edison's (SCE's) EV Technical Center prior to development of demonstration systems.

Proposal

This action is to execute a contract with EPRI to cosponsor development and demonstration of a VAP System within the SCAQMD. The objective is to understand the emissions and fuel usage benefits and impacts of electric auxiliary power on various platforms (e.g., trucks, trailers or independent.) Baseline tests will be done by SCE on all VAP Systems prior to field demonstrations. The first VAP System will be demonstrated at SCE. The next two units will be demonstrated by Southern Company in their territory covering Alabama, Florida and Georgia.

SCAQMD's funding would be used to demonstrate a VAP System in this region at multiple fleets such as the Los Angeles Department of Water & Power, San Diego Gas & Electric, Verizon Wireless, military, Comcast Cable and the City of Santa Monica. Each participant will integrate the VAP onboard an appropriate vehicle at their own expense; no modification to the vehicle's drivetrain will be required.

The technical, operational and economic characteristics of the VAP System will be demonstrated and evaluated in terms of suitability for fleet applications, estimated fuel reduction, emissions and electrical system impact. The VAP System includes built-in data acquisition systems to record and report via 3G wireless telemetry the usage and event data. VAP System design parameters include:

- 12 V DC system powers lights, IT equipment and radios
- 120 V AC power for tools, battery chargers, pumps and ventilation
- electric air conditioning for cabin work and hydraulic skid powering all fleet hydraulic tools
- 12 kWh usable energy (16 kWh nominal) which lasts one working shift
- Overnight recharging using 120V AC

SCE will support deployment of VAP Systems in participating fleets, which will evaluate the VAP System based on the real-world needs of participating work crews, including feedback regarding ideal sizing of energy storage systems in the most effective manner. Additional VAP Systems may be produced and demonstrated in additional fleet applications, if additional cofunding is provided. Data will be collected from each VAP System for at least 12 months, then compiled and analyzed by EPRI in a publicly available report.

Benefits to SCAQMD

The AQMP relies upon the expedited implementation of advanced technologies in Southern California to achieve air quality standards and to continue reductions in air toxic exposure. This project will apply advanced energy storage technologies in vehicle platforms to identify best fit applications, determine their viability, gauge fleet interest and provide a pathway to commercialization. The proposed project is included in the *Technology Advancement Office Clean Fuels Program 2015 Plan Update* under “Demonstrate Alternative Energy Storage.”

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. These requests for sole source awards are made under provision B.2.d.: Other circumstances exist which in the determination of the Executive Officer require such waiver in the best interest of the SCAQMD. Specifically, these circumstances are B.2.d.(1): Project involving cost-sharing by multiple sponsors and B.2.d.(8): Research and development efforts with educational institutions or nonprofit organizations.

EPRI, founded in 1973 as a non-profit energy research consortium, manages a far-reaching program of scientific research, technology development and product implementation and has a long history of managing and supporting similar projects involving development and commercialization of new technologies. The team brought together by EPRI has significant experience in demonstration support, data acquisition,

system evaluation, emissions and performance assessment and new technology commercialization.

Resource Impacts

Funding from the Clean Fuels Fund (31) shall not exceed \$125,000. Project partners and proposed funding are as follows:

Organization	Cofunding	(In-kind)
EPRI	\$150,000	
SCE	\$300,000	VAP operation in fleet
Southern Company	\$200,000	VAP operation in fleet
LG CNS America		VAP system integration of LG Chem LiIon batteries
SCAQMD (<i>requested</i>)	\$125,000	
Total	\$775,000	

Sufficient funds are available in the Clean Fuels Fund (31), which is established as special revenue 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.