

BOARD MEETING DATE: November 5, 2021

AGENDA NO. 5

**PROPOSAL:** Amend Contract for Emission Testing for Near-Zero Emission Opposed Piston Engine

**SYNOPSIS:** In October 2017, CALSTART, Inc. and Achates Power, Inc. were awarded \$7 million under CARB's Low Carbon Transportation Greenhouse Gas Reduction Fund Investments (GGRF) to develop and demonstrate opposed piston engine technology. CARB proposes to reallocate previously recognized unused GGRF funds of \$618,070 from the Zero Emission Drayage Truck Project for emissions testing on the opposed piston engine. This action is to amend a contract with CALSTART in an amount up to \$1,118,070 consisting of \$618,070 from the Zero Emission Drayage Truck Project from the Greenhouse Gas Reduction Projects Special Revenue Fund (67) and up to \$500,000 from the Clean Fuels Fund (31) for emissions testing of the opposed piston engine, contingent upon CARB approval.

**COMMITTEE:** Technology, October 15, 2021; Recommended for Approval

**RECOMMENDED ACTION:**

Authorize the Executive Officer to amend a contract with CALSTART, Inc. in an amount up to \$1,118,070 consisting of \$618,070 from the Greenhouse Gas Reduction Projects Special Revenue Fund (67) and up to \$500,000 from the Clean Fuels Program Fund (31), contingent upon CARB approval.

Wayne Nastri  
Executive Officer

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**Background**

Achates Power, Inc. (API), whose headquarters is in San Diego, is developing an opposed piston engine using traditional diesel fuel. The company supports original

equipment manufacturer (OEM) development and commercialization of opposed piston engines via engineering services and technology licenses and has ten global OEMs among its customers. Opposed piston engines have significant advantages in reducing criteria emissions, in part by addressing critical engine cold-start conditions.

In December 2017, South Coast AQMD joined with CARB, San Joaquin APCD, CALSTART, Inc.'s (CALSTART), and API to further develop the opposed piston engine technology. This project has produced several engines that are currently deployed on an engine dynamometer and integrated into a semi-tractor chassis. Promising results were obtained showing 0.02g/bhp-hr NO<sub>x</sub> performance while meeting future GHG emissions levels. The EPA Clean Trucks Initiative has prompted immediate need for emission test results from low NO<sub>x</sub> engines. The data collected under this project will contribute to building confidence in the emissions performance of the API opposed piston design by testing the full useful life of the aftertreatment components.

### **Proposal**

This proposal is to engage both API and Southwest Research Institute (SwRI) through CALSTART's direction to age and conduct emissions tests with the API aftertreatment system to full useful life using SwRI's CARB approved protocols that rapidly advance the aging process of the catalyst using chemical and thermal methods. API will provide emissions testing before, during, and after the aging process. In addition, API's lab will collect baseline and other test points corresponding to the CARB 2027 and CARB 2030 useful life test protocols. This action is to amend a contract with CALSTART in an amount up to \$1,118,070 consisting of \$618,070 from the Zero Emission Drayage Truck Project from the Greenhouse Gas Reduction Projects Special Revenue Fund (67) and up to \$500,000 from the Clean Fuels Fund (31) for emissions testing of the opposed piston engine, contingent upon CARB approval.

### **Benefits to South Coast AQMD**

EPA is working on developing a heavy-duty on road NO<sub>x</sub> regulation. Additional low NO<sub>x</sub> engine technologies help support development of a national low NO<sub>x</sub> standard. This project is to develop and demonstrate near-zero emission heavy-duty, liquid-fueled engines suitable for Class 8 trucks. Successful demonstration of such projects will contribute to the attainment of clean air standards in the South Coast Air Basin by significantly reducing NO<sub>x</sub> emissions.

### **Resource Impacts**

South Coast AQMD's cost-share will not exceed \$500,000 from the Clean Fuels Program Fund (31). CARB's cost-share of up to \$618,070 of previously recognized unused South Coast AQMD GGRF funds from the Zero Emission Drayage Truck Project will be from the Greenhouse Gas Reduction Projects Special Revenue Fund (67), and API will provide cost-share of \$300,000. The estimated total project cost is \$1,418,070, as follows:

### Proposed Project Cost-Share by Partner

Project Partner	Funding Amount (in millions)	Percent of Project (%)
CARB	\$618,070	44
South Coast AQMD ( <i>requested</i> )	\$500,000	35
Achates Power, Inc. (In-Kind)	\$300,000	21
<b>Total</b>	<b>\$1,418,070</b>	<b>100</b>

Sufficient funds are available from the Clean Fuels Program Fund, 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.