

BOARD MEETING DATE: June 5, 2026

AGENDA NO. 3

**PROPOSAL:** Execute Contract to Evaluate Emissions from Hydrogen-Fueled Internal Combustion Engines

**SYNOPSIS:** Hydrogen-fueled internal combustion engines represent a lower emission alternative to conventional engines and may play an important role in reducing emissions from the transportation sector. Key advantages of hydrogen engine technology include having mechanical similarity to traditional engines, high efficiency, potential to support hydrogen market growth, and ability to reduce criteria pollutants and greenhouse gas emissions. The University of California, Riverside's Center for Environmental Research and Technology (UCR/CE-CERT), together with the Sacramento Metropolitan Air Quality Management District, and PHINIA, Inc. have proposed a comprehensive research project to evaluate emissions from a prototype hydrogen engine vehicle under both laboratory and real-world operating conditions. This action is to execute a contract with UCR/CE-CERT, in an amount not to exceed \$122,000, from the Clean Fuels Program Fund (31) to evaluate the emissions profile of the hydrogen-fueled internal combustion engine vehicle.

**COMMITTEE:** Technology, May 15, 2026; Recommended for Approval

**RECOMMENDED ACTION:**

Authorize the Executive Officer to execute a contract with the University of California, Riverside's Center for Environmental Research and Technology (UCR/CE-CERT) to assess emissions and performance characteristics of a hydrogen-fueled internal combustion engine in an amount not to exceed \$122,000 from the Clean Fuels Program Fund (31).

Wayne Natri.  
Executive Officer

## **Background**

The combustion fossil fuel in conventional engines remains a significant source of criteria pollutants in the South Coast Air Basin. Due to the high cost and complexities associated with the transition of fleets to zero-emissions, the transportation sector still relies heavily on traditional gasoline and diesel-fueled engines. Hydrogen-fueled engines retain the familiarity of conventional engines while offering the potential to achieve ultra-low NO<sub>x</sub> and VOC emissions, with the additional benefit of zero carbon emissions. Their use can also potentially help increase additional demand for hydrogen as transportation fuel, which may in turn support the broader deployment of other hydrogen-dependent applications. The use of hydrogen-fueled engines is not a new concept, as several early studies have demonstrated that a hydrogen-fueled engine can achieve low emissions. Recently, there has been renewed interest in hydrogen-fueled engines with technological advancements that could achieve both ultra-low emissions and high efficiency similar to conventional engines.

PHINIA Inc., a global automotive components provider, is developing a hydrogen fuel injection system to help meet current and future applicable emissions regulations in the automotive industry. PHINIA Inc. engineered a diesel engine to run on hydrogen fuel that can transfer to medium- and heavy-duty applications to meet the most stringent emissions standards while maintaining high efficiency. To better understand its real-world emissions and efficiency, assessing any adverse NO<sub>x</sub> and PM impact in the application of hydrogen-fueled engines is crucial. The proposed study will help to understand the efficiency and emission impacts from a hydrogen-fueled engine. Results from this study will provide an understanding of how recent advancements in hydrogen-fueled engines may benefit the South Coast Air Basin and assist in advancing its clean air goals.

## **Proposal**

UCR/CE-CERT will evaluate emissions on a prototype hydrogen-fueled engine installed in a Stellantis delivery van chassis. The van has been converted by PHINIA to run on hydrogen with a new fueling system and vehicle calibrations to meet the most stringent emissions and efficiency standards. The vehicle will undergo laboratory testing at UCR/CE-CERT's Light-Duty Laboratory Chassis Dynamometer where it will be exercised over the standard certification test cycles under controlled laboratory conditions. In addition to the regulated pollutants, UCR/CE-CERT will investigate driving and engine operating conditions that may potentially affect the formation of particulate emissions.

In addition to the laboratory testing, the vehicle will undergo on-road emissions testing using the latest gaseous and PM portable emissions measurement systems provided in-kind by AVL Test Systems, Inc. and Sensors, Inc. To replicate real-world driving scenarios, the on-road testing will perform routes that will have urban

(city), rural, and highway driving, along with elevation changes throughout the South Coast Air Basin. UCR/CE-CERT will be also working with Sacramento Metropolitan Air Quality Management District to conduct similar on-road testing in the Sacramento area. PHINIA will provide the necessary engineering support as well as the hydrogen fuel required for this study.

**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. This request for sole source award is made under provision B.2.d.: Other circumstances exist which in the determination of the Executive Officer require such waiver in the best interests of the South Coast AQMD. Specifically, these circumstances are B.2.d.(8): Research and development efforts with educational institutions or nonprofit organizations.

**Benefits to South Coast AQMD**

To achieve National Ambient Air Quality Standards and protect public health, NOx and PM emission reductions are needed from mobile sources. This proposed project can also have co-benefits of reducing GHG emissions. The proposed study will help to better understand the air quality and public health impact of the latest hydrogen-fueled internal combustion engine. Supporting the expanded application of hydrogen in the commercial and industrial sector is consistent with the Technology Advancement Office Clean Fuels Program 2026 Plan Update under the category of “Conduct Emission Studies on Biofuels, Alternative Fuels and Other Related Environmental Impacts” and the 2022 AQMP. This study focuses on evaluating the efficiency of a prototype hydrogen-fueled ICE in the transportation sector while investigating air quality and health impacts.

**Resource Impacts**

South Coast AQMD’s support for the evaluation of emissions of hydrogen-fueled engines with UCR/CE-CERT shall not exceed \$122,000 from the Clean Fuels Program Fund (31).

<b>Funding Source</b>	<b>Funding Amount</b>	<b>Percent</b>
PHINIA Inc. (In-Kind)	\$70,000	23%
AVL Test Systems, Inc. (In-Kind)	\$30,000	10%
Sensors, Inc. (In-Kind)	\$30,000	10%
Sacramento Metropolitan AQMD*	\$57,745	18%
South Coast AQMD ( <i>requested</i> )	\$122,000	39%
<b>Total</b>	<b>\$309,745</b>	<b>100%</b>

**\*Pending final approval**

Sufficient funds are available from the Clean Fuels Program Fund (31), 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.