BOARD MEETING DATE: September 4, 2026 AGENDA NO. 3

PROPOSAL: Execute Contract to Study Durable Fuel Cell Membrane Electrode Assemblies for Heavy-Duty Vehicles

SYNOPSIS: The University of California, Irvine (UCI) proposes to develop, integrate, and validate an advanced fuel cell membrane to improve the durability, efficiency, and operational life of fuel cell stacks for heavy-duty truck applications. Fuel cell membranes are critical components that enable the electrochemical conversion of hydrogen to electricity, and improvements in membrane materials can reduce fuel cell costs as well as increase performance. This action is to execute a contract with UCI to develop and study durable fuel cell membrane electrode assemblies for heavy-duty vehicles in an amount not to exceed $125,000 from the Clean Fuels Program Fund (31).

COMMITTEE: Technology, August 21, 2026; Recommended for Approval

RECOMMENDED ACTION:
Authorize the Executive Officer to execute a contract with the University of California, Irvine (UCI) to study durable fuel cell membrane electrode assemblies (MEAs) for heavy-duty vehicle applications in an amount not to exceed $125,000 from the Clean Fuels Program Fund (31).

Wayne Nastri
Executive Officer

AK:MW:VP:MH

Background
The membrane electrode assembly is the core component of a proton exchange membrane (PEM) fuel cell and plays a critical role in determining fuel cell performance, efficiency, durability, and power output. Consisting of the membrane, catalyst layers, and gas diffusion layers, the MEA is where the electrochemical reaction that converts hydrogen to electricity occurs. Improvements in MEA technology can increase fuel cell

efficiency, reduce hydrogen consumption, extend system lifetime, and enable higher power density thus resulting in smaller, and lighter fuel cell systems for transportation applications.

The MEA is also one of the most significant contributors to the fuel cells cost due to its reliance on advanced materials and precious metal catalysts. As a result, MEA cost remains an important factor affecting commercial competitiveness and broader adoption of fuel cell technologies. Continued advancements in fuel cell membrane technology that reduce catalyst loading, improve durability, and lower manufacturing costs can help reduce overall fuel cell system costs, supporting wider deployment of zero-emission fuel cell applications, including light- to heavy-duty vehicles and equipment, as well as stationary power systems. The cost reductions are considered important to advancing hydrogen fuel cell commercialization and supporting regional and state air quality goals.

Proposal
UCI, and the National Fuel Cell Research Center is proposing to develop, integrate, and validate durable MEAs for heavy-duty vehicle applications that exceed the end-of-life targets. The heavy-duty fuel cell trucks are designed to operate much longer than passenger vehicles and at overall higher voltages and temperatures. Under these conditions, catalyst degradation, including carbon corrosion, becomes more pronounced, leading to substantial loss of fuel cell performance. With this development, UCI is aiming to down-select and modify the catalyst carbon support and deposit precious metals or alloys onto carbon supports to improve catalyst durability and recyclability by developing ink recipes, engineering the electrode, integrating the catalyst and carbon supports, and conducting tests to evaluate the activity and durability of the new catalyst.

Sole Source Justification
Section VIII.B.2. of the Procurement Policy and Procedure identifies provisions under which a sole source award may be justified. The request for sole source award is made under provision B.2.d.(8): Research and development efforts with educational institutions or nonprofit organizations. UCI is an educational institution, and the National Fuel Cell Research Center, which belongs to UCI and operates as an official department within the university is equipped with three PEM fuel cell test stations, and two custom-built PEM test stations. In addition, the laboratory has the equipment needed for ink processing. The project team has extensive experience and track record in the field of fuel cells and MEA development, integration and testing.

Benefits to South Coast AQMD
Supporting the expanded application of hydrogen fuel cell technologies for transportation and stationary power generation applications is consistent with the Technology Advancement Office Clean Fuels Program 2026 Plan Update under the category of “Hydrogen / Mobile Fuel Cell Technologies” and the 2022 AQMP.

South Coast AQMD supports studies that expand the use of zero-emission fuel cell technologies in heavy-duty vehicles. Improving the durability, efficiency, and cost of the fuel cell stack can significantly reduce the overall cost of fuel cell trucks and help increase their market demand.

Resource Impacts
South Coast AQMD's support to develop, integrate and validate durable fuel cell MEAs for heavy-duty vehicles, shall not exceed $125,000 from the Clean Fuels Program Fund (31). Project partners and proposed funding are as follows:

Project Partners	**Funding**	**Percentage**
Toyota	$100,000	44%
South Coast AQMD (*requested)*	$125,000	56%
Total (not to exceed)	**$225,000**	100%

Sufficient funds are available from the Clean Fuels Program Fund (31) for this proposed project. The Clean Fuels Program 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.