

BOARD MEETING DATE: May 5, 2023

AGENDA NO. 5

PROPOSAL: Execute Contract to Study Regional Air Quality and Health Impacts of Utilizing Hydrogen Blends in Commercial Buildings and Industrial Applications

SYNOPSIS: The University of California, Irvine (UCI) has been awarded \$1.7 million by the CEC to lead a technical study to assess hydrogen's decarbonization potential in California's large commercial and industrial sectors. UCI is proposing to assess the regional air quality impacts of hydrogen in end-use appliances within Commercial and Industrial applications. This action is to execute a contract with UCI in an amount not to exceed \$150,000 consisting of up to \$80,000 from Clean Fuels Program Fund (31) and up to \$70,000 from the Air Quality Investment Program Fund (27) EO Mitigation Fund.

COMMITTEE: Technology, April 21, 2023; Recommended for Approval

RECOMMENDED ACTION:

Authorize the Executive Officer to execute a contract with the University of California, Irvine (UCI) to conduct a study of air quality impacts of hydrogen in end-use appliances for commercial buildings and industrial applications in an amount not to exceed \$150,000 consisting of up to \$80,000 from the Clean Fuels Program Fund (31) and up to \$70,000 from the Air Quality Investment Program Fund (27) EO Mitigation Fund.

Wayne Natri
Executive Officer

AK:MW:MH

Background

The combustion of conventional natural gas is a significant source of energy use in California that releases GHG emissions and criteria pollutants such as NO_x and PM. Hydrogen blended with natural gas is being considered to mitigate the climate impact of conventional natural gas consumption. Hydrogen is a low-carbon energy carrier and has the potential to be a scalable, long-term store of renewable energy. To meet the South

Coast Air Basin’s attainment goals, assessing any adverse NOx or PM emissions impact in the application of hydrogen blends for commercial building and industrial processes is crucial.

The proposed study will help understand emission impacts from the use of hydrogen in combustion equipment within large commercial buildings and industries. This study will review the blending tiers as a function of percentage volume hydrogen in natural gas, and the retrofit technologies and operational changes of using hydrogen in existing equipment. The results from this study will provide an understanding of how renewable hydrogen can best be utilized to reduce GHG emissions in California and mitigate any NOx emission impact in the South Coast Air Basin and assist in advancing its clean air goals.

Proposal

UCI was awarded \$1.7 million by the CEC to investigate the impacts of utilizing hydrogen as a delivered fuel, blended with natural gas or 100 percent hydrogen, to equipment as a decarbonization strategy for the diversity of large commercial buildings and industrial processes in California. This proposal will expand the scope of the CEC award to include air quality modeling, allowing for a more comprehensive understanding of the direct air emissions impacts of hydrogen blending scenarios, including NOx, ground-level ozone, and PM2.5 along with public health impacts of air quality changes specifically within disadvantaged communities, and providing a roadmap for hydrogen blending in the South Coast Air Basin towards achieving and advancing clean air goals.

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 Advanced Power and Energy Program (APEP) at UCI addresses the broad utilization of energy resources and the emerging nexus of electric power generation, infrastructure, transportation, water resources and the environment. Built on a foundation established in 1970 with the creation of the UCI Combustion Laboratory and the 1998 dedication of the National Fuel Cell Research Center, APEP focuses on education and research on clean and efficient distributed power generation and integration.

Benefits to South Coast AQMD

Supporting the expanded application of hydrogen in the commercial and industrial sector is consistent with the Technology Advancement Office Clean Fuels Program 2023 Plan Update under the category of “Conduct Emission Studies on Biofuels, Alternative Fuels and Other Related Environmental Impacts” and the 2022 AQMP.

South Coast AQMD supports studies to expand the use of renewable fuels in power generation to reduce fossil fuel dependency and GHG emissions if there are no adverse regional air quality and health impacts. This study focuses on assessing the application of hydrogen blends in commercial and industrial sectors while investigating the air quality and health impacts.

Resource Impacts

South Coast AQMD’s support of the air quality impacts assessment of hydrogen in end-use appliances, provided through an agreement with UCI, shall not exceed \$150,000 consisting of up to \$80,000 from the Clean Fuels Program Fund (31) and up to \$70,000 from the Air Quality Investment Program Fund (27) EO Mitigation Fund. Project partners and proposed funding are as follows:

Project Partners	Funding*	Percentage
California Energy Commission	\$1,770,000	52%
SoCalGas	\$700,000	21%
GTI Energy Utilization Development (UTD) and EPRI	\$785,000	23%
South Coast AQMD (<i>requested</i>)	\$150,000	4%
Total (not to exceed)	\$3,405,000	100%

Sufficient funds are available from the Clean Fuels Program Fund (31) and the Air Quality Investment Program Fund (27) EO Mitigation Fund for this proposed project. The Clean Fuels Program Fund (31) is 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. The Air Quality Investment Program Fund (27) EO Mitigation Fund is established to account for mitigation fee payments made by power generators in lieu of emission offsets. Proceeds are used to generate RECLAIM Trading Credits (RTCs) to offset excess emissions.