BOARD MEETING DATE: April 3, 2020 AGENDA NO. 3

PROPOSAL: Recognize Revenue and Execute Contract to Assess Emissions Impacts of Hydrogen-Natural Gas Fuel Blend on Natural Gas Engines

SYNOPSIS: Past studies have shown that the addition of hydrogen in natural gas may result in lower engine emissions when combined with optimized engine calibration. The University of California, Riverside (UCR)/CE-CERT, along with SoCalGas and Cummins Westport Inc., has proposed a research project to assess the criteria pollutant and GHG impacts of hydrogen-natural gas fuel blends on near-zero emissions NOx heavy-duty natural gas engines. These actions are to recognize revenue up to $305,000 from SoCalGas into the Clean Fuels Program Fund (31) and execute a contract with UCR/CE-CERT in an amount not to exceed $535,000 from the Clean Fuels Program Fund (31).

COMMITTEE: No Committee Review

RECOMMENDED ACTIONS:

1. Recognize revenue, upon receipt, up to $305,000 from SoCalGas into the Clean Fuels Program Fund (31); and
2. Authorize the Chairman to execute a contract with UCR/CE-CERT to assess the emissions impacts of hydrogen-natural gas fuel blends on near-zero emissions heavy-duty natural gas engines in an amount not to exceed $535,000 from the Clean Fuels Program Fund (31).

Wayne Nastri
Executive Officer

MMM:NB:JI:TC

Background
Past studies by South Coast AQMD and others have demonstrated that the addition of hydrogen in compressed natural gas (HCNG) could potentially lower emissions with optimal engine calibration and HCNG blend ratio. A 2005 comprehensive study conducted by the National Renewable Energy Laboratory (NREL) showed an HCNG-fueled engine reduced NOx emissions by 50 percent compared with a CNG-fueled engine in a transit bus application. Recent low carbon and renewable fuel initiatives have renewed interest in further decarbonization of natural gas, providing a source of lower carbon content fuel for the transportation sector. The recent rapid commercialization of near-zero emission (NZE) NOx natural gas engines have warranted additional investigation of the effects of HCNG blends on both criteria and GHG emissions for recently certified NZE natural gas engines. There are also concerns that HCNG blends may lead to an increase in toxic air contaminants, ammonia, particulate matter (PM) and particle number (PN) emissions.

Proposal
The University of California, Riverside (UCR)/CE-CERT is partnering with SoCalGas and Cummins Westport Inc. (CWI) to evaluate the impact of different HCNG blends on emissions and performance of the Cummins L9N NZE natural gas engine. UCR/ CE-CERT will design and build an HCNG blending apparatus as part of the study and vary hydrogen content from zero to five percent by volume. The proposed first phase study will be focused on the emissions impacts of HCNG blends compared to the baseline on regulated engine test duty cycles. CWI will provide the test engine and aftertreatment systems, as well as engineering and data analysis support including oil sample analysis. Depending on the outcome of the first phase study, staff may seek Board approval to fund a second phase 500-hour durability study to assess deterioration effects of the HCNG fuel.

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 interest of the South Coast AQMD. 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. The proposed project will include in-kind contributions and cost-share by SoCalGas and CWI. UCR is an educational institution and CE-CERT is their research center with multidisciplinary resources to engage in diverse environmental and transportation research programs.

Benefits to South Coast AQMD
To achieve national ambient air quality standards and protect public health, one of South Cost AQMD's primary priorities is to reduce NOx and PM emissions from

mobile sources, while realizing GHG co-benefits, where possible. The proposed HCNG fuel study will help to better understand the air quality and public health impact of the latest NZE engines, which have been deployed since first commercially available in 2015. Projects to assess emissions of potential advanced engine technologies are included in the *Technology Advancement Office Clean Fuels Program 2020 Plan Update* under the category of "Fuel/Emissions Studies".

Resource Impacts

The total estimated cost for the proposed project is $585,000, of which South Coast AQMD's proposed cost-share will not exceed $230,000 from the Clean Fuels Program Fund (31). SoCalGas's $305,000 in revenue will be received into the Clean Fuels Program Fund (31) and the contract with UCR will not exceed $535,000. Proposed cost-sharing is summarized below:

Proposed Project Cost-Share

Project Partner	Cost-Share	Percent
SoCalGas	$305,000	52
CWI (in-kind)	$50,000	9
South Coast AQMD *(requested)*	$230,000	39
Total Project Cost	**$585,000**	**100**

Sufficient funds are available in 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.