

BOARD MEETING DATE: October 2, 2020

AGENDA NO. 3

PROPOSAL: Execute Contract to Develop Model for Connected Network of Microgrids

SYNOPSIS: Microgrids are gaining attention as a means of increasing the resiliency and reliability of the electricity system to support alternative fuel transportation. The University of California Irvine Advanced Power and Energy Program (UCI APEP) proposes a study to assess air quality impacts of connected microgrids by evaluating the fueling and charging options of alternative transportation under microgrid control. This action is to execute a contract with UCI APEP to develop a model for a connected network of microgrids for zero emission transportation in an amount not to exceed \$290,000 from the Clean Fuels Program Fund (31).

COMMITTEE: Technology, September 18, 2020; Recommended for Approval

RECOMMENDED ACTION:

Authorize the Chairman to execute a contract with UCI APEP to develop a model for a connected network of microgrids for zero emission transportation in an amount not to exceed \$290,000 from the Clean Fuels Program Fund (31).

Wayne Natri
Executive Officer

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Background

The University of California Irvine (UCI) through its Advanced Power and Energy Program (APEP) is conducting a \$7.12 million CEC-funded study to demonstrate a microgrid at the Port of Long Beach (POLB) and enhance resiliency for a critical facility at the port. To date, majority of the research into microgrids has been focused on

islanding transition and reliability impacts of a single microgrid, but mass deployment of microgrids in the South Coast Air Basin (Basin) and integration of alternative transportation in a system dominated by microgrids has not been fully analyzed.

Microgrids have also been identified as a grid resource to help increase the reliability of serving loads and resiliency in case of unforeseen occurrences such as public safety power shutoff events. The previous studies, including UCI's assessment conducted under an award by the U.S. Department of Energy, suggested that a microgrid system provides significant emission reductions by increasing the efficiency, shifting loads through energy storage and minimizing electricity delivery losses and providing heating to the community through combined heat and power during both grid connected and islanded modes.

Proposal

The proposed project will develop a model to assess air quality impacts of connected microgrids serving the SCAB by evaluating the use of various power generation technologies in microgrids and alternative transportation (battery electric and fuel cell) vehicles operating under microgrid control. The study will include evaluating air quality impacts during both grids connected and islanded modes, including public safety power shutoff events, and estimating overall NOx benefits by emission reduction factors of microgrids such as system efficiency, energy storage, electricity delivery losses and combined heat and power system.

In the proposed project, university campuses, ports, shopping centers and critical facilities will be modeled. Each representative microgrid system will be evaluated to assess air quality impacts resulting from widespread deployment of microgrids. Based on the modeling and analyses defined above, this project will inform the South Coast AQMD of the required policy and permitting procedures for microgrids in the SCAB, leveraging the CEC project with POLB and assessing mass deployment of microgrids and the interaction of the network of microgrids.

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.(8): Research and development efforts with educational institutions or nonprofit organizations. UCI is an educational institution and APEP is an umbrella organization that 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

The proposed project will provide an implementation roadmap of renewable electrolytic hydrogen production facilities that could be used to further reduce NOx and other criteria pollutant emissions from existing sources within the Basin. Potential aggregated NOx emission reductions using connected and islanded operations may be up to 6 tons per day, comparable to the NOx emission reductions from the recently adopted Omnibus Regulation for heavy-duty engines. The injection of renewable hydrogen into the existing natural gas system represents a key pathway towards reducing GHG emissions by displacing the corresponding volume of fossil-derived natural gas. For mobile sources, electrolysis facilities could allow a more sustainable and economic hydrogen supply for fuel cell electric vehicles. This activity is included in the Technology Advancement Office Clean Fuels Program 2020 Plan Update under “Develop and Demonstrate Microgrids with Photovoltaic/Fuel Cell/Battery Storage/EV Chargers and Energy Management”.

Resource Impacts

The total cost for the proposed project is \$370,000, of which South Coast AQMD’s proposed contribution will not exceed \$290,000 from the Clean Fuels Program Fund (31), as summarized below:

Proposed Partners	Funding Amount	% of Project
UCI (match funding)	\$80,000	21
South Coast AQMD (<i>requested</i>)	\$290,000	79
Total	\$370,000	100

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.