CALIFORNIA AIR RESOURCES BOARD
Low Carbon Transportation Investments Fiscal Year 2019-20
Capture and Control System Solicitation For Oil Tankers Project

List of Applications Received and Project Summaries

November 17, 2020

The Capture and Control System Solicitation was released on September 2, 2020 and the submittal deadline was November 6, 2020. Application scoring criteria are described in the Capture and Control System for Oil Tankers Project Grant Solicitation. Solicitation materials are available at: www.arb.ca.gov/msprog/aqip/solicitations.htm

Page	Project Applicant	Project Title	Location	Located in a Disadvantaged Community	Funding Amount Request
1	South Coast Air Quality Management District	California Air Resources Board (CARB) for the Capture and Control System (C&C) for Oil Tankers Project	Port of Long Beach	Yes	$10,000,000
2	Breathe Southern California (Breathe SoCal)	Project: Production of an At-Berth Capture and Control Barge for Tankers	Port of Long Beach	Yes	$10,000,000
3	Solibre – LA	AMECS Zero Emission Hydrogen Fuel Powered Capture, Control and Treatment System For Oil Tanker Ship Pilot Project	Port of Los Angeles	Yes	$5,602,600

Project Applicant: South Coast Air Quality Management District

Project Title: California Air Resources Board (CARB) for the Capture and Control System (C&C) for Oil Tankers Project

The Project Summary for Public Posting

The proposed project (Project) for the oil tankers is expected to demonstrate the expanded technological capability of capture and control systems (C&C) to significantly reduce emissions on the most challenging vessels that have higher exhaust flow rates, including toxic air contaminants (TACs), such as oil tankers and other similar vessels. The Project includes an innovative barge-based C&C design, including a self- propelled spud-barge platform, an exhaust capture system, purification units, carbon-capture, solar, battery storage, and fuel cell/hydrogen storage. The fuel used to power the barge and the C&C will either renewable or zero-carbon fuel, which mitigates greenhouse gas (GHG) emissions from this operation. A safety study will be conducted, and the results will be incorporated into the design of the capture and control system. The Project will address the unique safety requirements of oil tanker vessels and obtain an Executive Order from CARB as an alternative control technology under the Control Measure for Ocean-Going Vessels (OGVs) At Berth. The project will reduce NOx, $PM_{2.5}$, ROG, and DPM emissions from tanker vessels when at berth. The total project cost is $13,349,000, of which the project team will provide $3,349,000 or 25% in cost-share. This project's funding request is $10M, including the administrative cost of $500,000 necessary to implement the project.

The Project includes a team to design, develop and safely demonstrate the C&C for tanker vessels with South Coast AQMD as the lead applicant and STAX Engineering as the lead technology partner responsible for developing, demonstrating, and obtaining CARB approval for the C&C. American Bureau of Shipping (ABS) will conduct a safety study. The demonstration will take place at Tesoro Logistics Operations LLC (TLO) Terminal at Port of Long Beach. TLO will provide access to the terminal, arrival, departure schedule of the vessels, and coordinate vessel testing. College of Engineering - Center for Environmental Research and Technology (CE-CERT) at the University of California, Riverside, will collect and analyze data necessary for CARB's emission verification. San Pedro Bay ports, including Port of Los Angeles (POLA) and Port of Long Beach (POLB), are providing technical and financial support.

The Project will be located in the POLB, a disadvantaged community (DAC). The Project is expected to provide emission reduction benefits to the DACs surrounding the San Pedro Bay Ports in the South Coast Air Basin (SCAB), which is also a designated Clean Air Community under AB 617 – Community Air Protection Program (CAPP). The C&C is expected to reduce at least 90% of overall NOx, PM2.5, ROG, and DPM emissions from oil tankers at berth. Diesel PM and other air toxic emissions from OGVs contribute to air toxics cancer risk. Multiple Air Toxics Exposure study IV conducted in 2012-2013 indicates that POLA, POLB and its surrounding areas have the highest cancer risk in the South Coast Air Basin due to various air pollutants emitted from ships, mobile sources associated with goods movements and nearby facilities.

Project Applicant: Breathe Southern California (Breathe SoCal)

Project Title: Fuel Cell Hybrid Electric Delivery Van Deployment Project

Project Summary for Public Posting

At-Berth Tanker Solutions (ATS) Group is applying for a $10,000,000 grant from CARB to fund their project "Production of an At-Berth Capture and Control Barge for Tankers." The total project cost of $13,400,000 will be acquired through an additional $3.4 million in matching funds. ATS Group is composed of Breathe Southern California (Breathe SoCal), Clean Air Engineering – Maritime, Inc. (CAEM), AECOM, and Tesoro Logistics Operations LLC (TLO). Breathe SoCal will educate and engage Southern California communities on the project's clean air initiatives and impacts. CAEM has developed, built, operated, and maintained capture and controls systems for California ports since 2010 and will work closely with AECOM engineers to deliver a safe and optimized system for this new application. TLO will be the end-user of the new system, providing the terminal at 1300 Pier B Street, Port of Long Beach, for testing.

The objective of the project is to engineer, build, demonstrate, certify, and put into commercial operation a barge-based capture and control system for oil tankers with less than 120K deadweight metric tons (DWT) to meet the Control Measure for Ocean-Going Vessels at Berth as set forth in the California Code of Regulations. The system will reduce up to 137 tons per year (tpy) of NOx, 2.8 tpy of particulate matter (PM), and 6.6 tpy of reactive organic gas (ROG) emissions in the Wilmington Disadvantaged Community (DAC). The project results will not only assure compliance by 2025 for the Ports of Los Angeles and Long Beach but will also enable this DAC to meet ambient national air quality standards. The new system has no impact associated with the safety of vessel crewmembers. From operations experience, we have a track record of receiving USCG certification. Through Breathe SoCal, the project team will share information and progress through community events, workshops, and other communication opportunities throughout Southern California and the impacted DAC.

The self-propelled, hydrogen fuel cell-powered barge will hold a capture system adapted from available, proven technologies while incorporating new technologies that include ROG absorption, zero greenhouse gas power generation, battery power storage, and in-situ optical emissions measurements. The new system will capture exhaust from both boilers and auxiliary engines and from up to four sources simultaneously. The barge system is self-anchoring, can move between multiple berths, and has a turn down ratio of 70%. Long lead time permits (such as CEQA) are not required for a barge (not shore-based) system. All these features maximize both system use and cost-effectiveness. The resulting system requires no re-heat of the captured gas stream, thus eliminating associated greenhouse gas (GHG) generation.

Through the clean transportation incentive funding, the ATS Group will work to develop and document strategies and pathways needed for state-wide compliance. The level of knowledge regarding technology, system design, commercial operations, and safety will be disseminated to all technology advisors, demonstrators, and system end-users identified in our application. Because of their involvement in all phases of project execution, more resources will be available to support additional terminal operators within the regulation's timeline.

Project Applicant: Solibre – LA

Project Title: AMECS Zero Emission Hydrogen Fuel Powered Capture, Control and Treatment System For Oil Tanker Ship Pilot Project

Project Summary

AMECS Zero Emissions Hydrogen Fuel Powered Capture, Control & Treatment System for Oil Tanker Ship Pilot Project

Solibre LA Is a non-profit organization Applicant which was founded by Michael (Mike) Eveloff to support solar energy use in homes, public places, and companies. Mr. Eveloff has worked with AEG/ACTI for over eight years providing IT support in the development of Advanced Maritime Emission Control System (AMECS).

Working in collaboration with Solibre LA, Advanced Environmental Group, LLC (AEG) is the primary technology demonstrator has over 14 years of experience in the design and manufacturing of emissions capture, control, and treatment technologies. The secondary project technology demonstrators are: i) Plug Power, Inc. which is engaged as a fuel cell manufacturer and hydrogen fuel supplier and ii) Ship & Shore Environmental which is responsible for custom designing and building the AMECS ship emissions capture, control and treatment system. The project includes the following key project participants, ExxonMobil, Shell Oil Products Mormon Island, and Nustar Energy Services, Inc. which will provide tanker ships.

For the proposed pilot project, AEG will build and demonstrate the feasibility, safety, and cost- effectiveness of an AMECS SPUD Barge that will be powered with Zero Emission Hydrogen Fuel Cells, thereby eliminating the release of Greenhouse Gases, Criteria Pollutants and Toxic Pollutants from the AMECS Barge operations. AEG has invested five years in pioneering the research and design of the first AMECS Ship Emissions Capture, Control and Treatment System (ECCTS} for the abatement of Greenhouse Gases, Criteria Pollutants and Toxic Pollutants from Petroleum Industry Tanker Ships.

The new design of the AMECS SPUD Barge will be built at the current AEG facility located at Pier 16 at the Port of Long Beach. It will then be demonstrated with three Port of Los Angeles Petroleum Industry partner companies ExxonMobil, Shell Oil Products Mormon Island and Nustar Energy Services, Inc. which will provide tanker ships.

This pilot project will cost $7,315,000, of which $5,602,600 is being requested, while $1,889,100 will be contributed in matching funds.

The proposed pilot project will be located in the disadvantaged community of Wilmington, Los Angeles, which has 9 out of 15 high population census tracts rated in the California EnviroScreen 90%-100% highest scores percentile range. The benefits to Wilmington, Northeast San Pedro and the West Long Beach Environmental Justice communities include: Reduced Local Criteria Air Pollutant Emissions, Reduced Local Toxic Air Pollutant Emissions, Reduced Local Greenhouse Gas Emissions, Reduced Local Public Safety Risk,

Improved Public Health, Lowered Public Health Care Costs and Increased Creation of New Emerging Technology Local Jobs.