

BOARD MEETING DATE: April 3, 2015

AGENDA NO. 3

PROPOSAL: Recognize and Transfer Funds and Execute Contracts to Develop and Demonstrate Warehouse Rooftop Solar Systems, Energy Storage and EV Charging 

SYNOPSIS: The SCAQMD applied for and anticipates receiving a \$500,000 award from U.S. EPA under Section 105 of the Clean Air Act to sponsor Clean Air Technology Initiative projects. Staff proposes to utilize these funds to cosponsor the development and demonstration of advanced warehouse rooftop solar systems with storage and chargers for electric drayage truck operations. This action is to recognize \$500,000 from U.S. EPA and transfer \$598,908 from the Clean Fuels Fund (31), which includes SCAQMD's cost-share of \$98,908 and \$500,000 as a temporary loan, into the Advanced Technology, Outreach and Education Fund (17). This action is also to execute contracts from the Advanced Technology, Outreach and Education Fund (17) with the University of California San Diego to develop and demonstrate warehouse rooftop solar systems in an amount not to exceed \$498,908 and with Transportation Power, Inc. to develop and demonstrate EV charging infrastructure for electric drayage trucks at a cost not to exceed \$100,000.

COMMITTEE: Technology, March 20, 2015; Recommended for Approval

RECOMMENDED ACTIONS:

1. Recognize \$500,000, upon receipt, from the U.S. EPA into the Advanced Technology, Outreach and Education Fund (17);
2. Transfer \$500,000 as a temporary loan and \$98,908 for SCAQMD's cost-share from the Clean Fuels Fund (31) into the Advanced Technology, Outreach and Education Fund (17); and
3. Authorize the Chairman to execute contracts from the Advanced Technology, Outreach and Education Fund (17) with the following:
 - a. University of California San Diego (UCSD) to cosponsor development and demonstration of warehouse rooftop solar systems incorporating storage and EV charging in an amount not to exceed \$498,908; and

- b. Transportation Power, Inc. (TransPower) to cosponsor development and demonstration of EV charging infrastructure to support Class 8 electric drayage trucks in an amount not to exceed \$100,000.

Barry R. Wallerstein, D.Env.
Executive Officer

MMM:FM:AK:BC:DRC

Background

SCAQMD staff anticipates receiving a \$500,000 award from U.S. EPA under Section 105 of the Clean Air Act for Clean Air Technology Initiative (CATI) projects. CATI was established by the U.S. EPA, CARB, San Joaquin Valley Air Pollution Control District and SCAQMD to identify and implement emission reduction projects in San Bernardino and Boyle Heights where residents are disproportionately affected by emissions of diesel exhaust from the goods movement corridors and from diesel activities at the Ports, warehouses and rail yards. Staff proposes to cosponsor development and demonstration of warehouse rooftop solar systems incorporating storage and EV charging as well as EV charging infrastructure to support Class 8 electric drayage trucks.

Warehouse Rooftop Solar Systems

The number of large warehouses, often built as strategic distribution centers for companies that ship and receive goods from the Ports of Long Beach and Los Angeles, has been rapidly increasing in the South Coast Air Basin (Basin), and it is estimated that over a 800 million square feet of warehouse space now exists in this region. Utilizing the rooftops of these warehouses for large solar panel installations can provide new generation capacity within Southern California. However, implementing large solar photovoltaic (PV) systems can create instability on electrical grids by providing intermittent power. This instability is currently addressed by coupling large variable renewable systems with flexible generating resources such as peaker plants. However, by coupling storage, solar forecasting, load managed EV charging and other smart grid technologies, the instability created by large PV systems is mitigated. Combining these technologies with large warehouse rooftop PV systems can create a zero-emission renewable flexible resource that provides utility scale grid services such as added generation capacity, voltage support, load shifting and relief to localized distribution constraints. Additionally, these systems can lower energy costs for warehouse operators along with providing EV workplace charging and electric truck charging opportunities.

EV Charging Infrastructure for Class 8 Electric Drayage Trucks

Since 2013, TransPower has been developing Class 8 electric trucks under two SCAQMD-supported projects. One project is to develop seven battery electric drayage trucks as part of a DOE-funded Zero Emission Cargo Transport (ZECT) program; and the other project, two catenary trucks for a zero-emission goods movement system demonstration using Siemens overhead catenary technology. Four of the seven ZECT trucks have been already manufactured while the remaining three ZECT as well as the two catenary trucks will be completed by summer 2015. For demonstration purposes, the ZECT trucks will be deployed in real-world drayage operations at locations with partnering fleets at the Ports of Los Angeles and Long Beach along with warehouse locations to evaluate their performance and reliability. To support the additional trucks and demonstrations additional charging infrastructure is needed.

Proposal

This action is to recognize CATI funds from U.S. EPA and transfer funds from the Clean Fuels Fund (31) into the Advanced Technology, Outreach and Education Fund (17) to execute contracts for the following projects:

Warehouse Rooftop Solar Systems

The University of California San Diego (UCSD), in conjunction with the University of California Los Angeles (UCLA), will develop and demonstrate a detailed technology and economics-based assessment that can lead to the commercialization and further implementation of warehouse rooftop solar systems. Major tasks under this project will be completed in two phases, which include:

Phase 1:

- Identify size, location, age and spatial clustering of warehouses in the Basin while also considering locations with disadvantaged communities;
- Review the heavy-duty diesel locations and trip lengths serving the warehouses in the Basin and identify trucking patterns that would be suited for electrification and charging at warehouses;
- Design warehouse systems with rooftop PV, storage, electric vehicle chargers, truck chargers, and other warehouse loads;
- Understand emission benefit potential from reduced power plant and transportation emissions from implementation of these systems;
- Deploy nine solar forecasters at nearby warehouse clusters to monitor solar variability and understand stationary storage needs;

Phase 2:

- Develop and test scenarios based on various grid service needs, warehouse loads, and electric transportation charging requirements;

- Demonstrate the warehouse system with storage, PV, and electric truck charging on an inland warehouse;
- Quantify value generated from rooftop solar systems as a flexible grid resource and for ratepayer benefits for warehouse operators;
- Review the cost effectiveness of these systems as both a stationary and transportation energy source.

EV Charging Infrastructure for Class 8 Electric Drayage Trucks

Deployment of the ZECT trucks requires high-powered EV chargers to adequately meet the operational needs of drayage fleets. Two of the four ZECT trucks already manufactured have been deployed with partnering drayage fleets, SA Recycling and Total Transportation Services, Inc. (TTSI), using temporary charging infrastructure that may be able to support up to three trucks. However, the temporary infrastructure has 70-100 amp capacity which is insufficient to maximize the benefits of TransPower’s onboard Inverter-Charger Unit (ICU) which can fully charge one of the trucks in three to four hours with a dedicated 200-amp circuit. To provide adequate charging for these trucks, TransPower plans to build more robust EV charging infrastructure with higher capacity at both SA Recycling and TTSI facilities to help facilitate a successful demonstration of their electric trucks. Major tasks to be completed include:

- Develop and manufacture custom electric vehicle supply equipment (EVSE) consoles used for safe control of electrical power flow between the grid and onboard ICU;
- Procure transformers, cables, connectors and other required components;
- Upgrade electrical service and install EV charging infrastructure at demonstrating fleet operator sites; and
- Develop and demonstrate a mobile charging pallet that can be utilized to charge electric demonstration trucks on a temporary basis when a permanent charging infrastructure is not practical or is pending completion.

Sole Source Justification

Section VIII.B.3 of the Procurement Policy identifies four provisions under which a sole source award may be justified for contracts funded in whole or in part with federal funds. This request for a sole source award is made under provisions B.3a: The item is available from a single source. 1) The solar forecasting systems being deployed by UCSD in this project are proprietary to UCSD. Additionally, this project has been competitively awarded by CEC under PON-13-303 – Advancing Utility-Scale Clean Energy Generation and staff is proposing to cost-share the project with the CEC and CPUC. 2) Development of the proposed EV charging infrastructure for Class 8 electric drayage trucks requires knowledge and access to TransPower’s proprietary technology.

Benefits to SCAQMD

Both projects support implementation of CATI and promote development of zero-emission goods movement equipment, specifically involving ports, warehouses, distribution centers and railyards in the Basin. Zero-emission transportation and goods movement along with low-emission energy generation technologies with storage are included within SCAQMD's FY 2014-15 Goals and Objectives.

Development and demonstration of warehouse solar PV installations coupled with storage and EV charging will move these systems towards commercialization and wider scale deployment. Demonstration and commercial deployment of these systems will provide emission reductions of criteria, toxic and greenhouse gases from both fossil-powered power plants along with light- and heavy-duty transportation.

Furthermore, development of adequate EV charging infrastructure is essential to facilitate a successful demonstration of electric drayage trucks. This will help advance commercialization of these technologies which will lead to wide-scale market deployment and move the region closer to attainment of federal ambient air quality standards by reducing diesel particulate matter and NO_x emissions from goods movement operations. Also, deployment of zero-emission electric trucks will provide significant benefits in air quality and public health for the surrounding communities around the ports and next to major freeways that are disproportionately impacted by goods movement operations.

Both projects are included in the *Technology Advancement Office Clean Fuels Program 2015 Plan Update* under the category of "Electric/Hybrid Technologies and Infrastructure."

Resource Impacts

The total SCAQMD cost-share for both projects shall not exceed \$598,908 from the Advanced Technology, Outreach and Education Fund (17), comprised of \$98,908 transferred from the Clean Fuels Fund (31) and \$500,000 in anticipated revenue from the U.S. EPA, both to be recognized into the Advanced Technology, Outreach and Education Fund (17). A transfer of \$500,000 as a temporary loan from the Clean Fuels Fund (31) to the Advanced Technology, Outreach and Education Fund (17) will be made pending receipt of U.S. EPA funds. Project costs and funding are summarized in the tables below:

| Proposed Project | Funding Partners | Funding Amount |
|---------------------------------|-----------------------------|-----------------------|
| Warehouse Rooftop Solar Systems | U.S. EPA | \$400,000 |
| | SCAQMD (<i>requested</i>) | \$98,908 |
| | CEC | \$999,984 |
| | CPUC | \$156,386 |
| | Total: | \$1,655,278 |

| Proposed Project | Funding Partners | Funding Amount |
|-----------------------------------------------|-------------------------|-----------------------|
| EV Charging Infrastructure for Class 8 Trucks | U.S. EPA | \$100,000 |
| | TransPower | \$200,000 |
| | Total: | \$300,000 |

Sufficient funds are available from the Clean Fuels 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.