BOARD MEETING DATE: September 5, 2014 AGENDA NO. 3

PROPOSAL: Execute and Amend Contracts for Hydrogen Fueling Infrastructure, Phase II of Hydrogen Network Investment Plan and Low Cost Safety Sensor Demonstration

SYNOPSIS: On March 7, 2014, the Board awarded three contracts to upgrade and refurbish existing hydrogen fueling infrastructure using funds provided by the CEC. Sufficient funds have become available to fund one additional project as a result of negotiations with awardees. In early 2013 and 2014, the CEC released Notices of Proposed Awards recommending funding for 36 new hydrogen fueling stations, 12 of which are strategically located in Southern California. Additional funds are needed to offset higher than anticipated initial costs to successfully establish these stations. In December 2012, the Board awarded a contract to develop Phase I of the Hydrogen Network Investment Plan (H2NIP), and the cosponsors have requested SCAQMD cofund Phase II. Finally, the SCAQMD has been asked to participate in a demonstration of a low cost hydrogen safety sensor. These actions are to execute and amend contracts for hydrogen fueling infrastructure, Phase II of the H2NIP and a safety sensor demonstration.

COMMITTEE: Technology, July 25, 2014; Less than a quorum was present; the Committee Member present recommended that this item be forwarded to the full Board for consideration.

RECOMMENDED ACTIONS:

1. Authorize the Chairman to execute a contract with Mebtahi Station Services Inc. (Mebtahi) to upgrade the existing hydrogen fueling infrastructure in Torrance in an amount not to exceed $589,661 from the Hydrogen Fueling Infrastructure Network Fund (63) using CEC grant revenue for hydrogen station upgrades.

2. Authorize the Chairman to execute contracts with the following entities from the Clean Fuels Fund (31) to cofund CEC station awards:
   a) First Element Fuel, Inc. for eight new hydrogen fueling stations in an amount not to exceed $1,000,000;

b) ITM Power, Inc. for a new renewable hydrogen fueling station in an amount not to exceed $200,000;
c) Ontario CNG Station Inc. for a new renewable hydrogen fueling station in an amount not to exceed $200,000; and
d) Air Products and Chemical, Inc. (APCI) for two new hydrogen fueling station in amount not to exceed $200,000.

3. Authorize the Chairman to amend contracts with APCI from the Clean Fuels Fund (31):
    a. to cost-share with CARB the operation and maintenance of the Orange County Sanitation District hydrogen fueling station in an amount not to exceed $75,000; and
    b. to offset final production, maintenance, repair services and equipment leases as well as closing costs for the Five Cities Hydrogen Program fueling stations in an amount not to exceed $90,000.

4. Authorize the Chairman to amend contract with Energy Independence Now (EIN) to cost-share Phase II of the H2NIP in an amount not to exceed $125,000 from the Clean Fuels Fund (31).

5. Authorize the Chairman to execute a contract with Lawrence Livermore National Laboratory, LLC (LLNL) to cofund with DOE the demonstration of a prototype, low cost solid-state electrochemical hydrogen safety sensor(s) in an amount not to exceed $175,000 from the Clean Fuels Fund (31).

Barry R. Wallerstein, D.Env.
Executive Officer

MMM:LW

Background

The SCAQMD supports the development and deployment of alternative and renewable fuels for advanced transportation technologies including hydrogen fueling infrastructure. It is necessary to ensure a reliable supply of hydrogen fuel, establish fueling stations to ensure consumers can fuel their vehicles safely, and accurately measure the quantity and quality of hydrogen fuel in order to be able to sell the fuel on a commercial basis.

CEC Grant for Hydrogen Station Upgrades

In June 2013, the Board recognized $6.9 million in revenue from CEC, and, in November 2013, the Board subsequently released RFP #P2014-09 to solicit proposals to upgrade and refurbish existing, publicly accessible hydrogen fueling stations. The intent of the RFP was to upgrade as many stations as possible with the available funds.

In March 2014 the Board awarded three contracts, but sufficient funds have become available to fund one additional project as a result of negotiations with those awardees. Staff proposes to make an award to Mebtahi, one of the remaining highly ranked proposals.

CEC Awards for New Hydrogen Stations

In April 2013 and May 2014, respectively, the CEC released Notices of Proposed Awards for PON-12-606 and PON-13-607 recommending funding for 36 new hydrogen fueling stations, 12 of which are strategically located in the South Coast Air Basin. The proposed locations for these stations will fill significant gaps in the availability of hydrogen in Southern California as part of early market deployment. The stations are in heavily traveled areas close to main corridors and adjacent to key residential areas considered by original equipment manufacturers (OEMs) to be hydrogen technology first-adopters. CEC is providing more than $18 million towards these stations, and staff proposes cofunding the stations located within our Basin to help offset higher than anticipated initial equipment costs and investment for the production and distribution of hydrogen.

APCI

APCI designed and constructed the renewable hydrogen fueling station at the Orange County Sanitation District. For almost four years the station has provided both 350 and 700 bar 100% renewable hydrogen produced from a molten carbonate fuel cell. The original DOE, CARB and SCAQMD funding for construction and initial maintenance for this strategic and important station has been spent. To continue to meet current and near-term fueling demands for an additional one year, however, CARB has agreed to cofund station maintenance and has requested the SCAQMD also support the station.

The Five Cities Hydrogen Program started in March 2004 and has been one of the most significant demonstrations of hydrogen fueling of vehicles and fleets in the U.S. Because of proprietary technology, APCI has been the provider for the operation, repair and maintenance of the Five Cities stations since program inception. The demonstration program has run its useful life and current equipment configurations at the sites are no longer viable. Staff proposes to close out the Five Cities' stations and maintenance contract.

Phase II of H2NIP

In December 2012, the Board awarded a $50,000 contract to EIN to cofund development of Phase 1 of a two-phase effort to develop the H2NIP delineating key actions needed to facilitate a successful market launch of hydrogen fuel cell electric vehicles (FCEVs). The H2NIP allowed stakeholders to identify, demonstrate and justify options to optimize incentives for hydrogen fueling stations and establish network level policies to ensure early stations remain open and growth can be sustained. The results concluded that in order to build marketplace confidence, the state needs to provide stronger leadership with a plan that:

1. Demonstrates secure, long-term funding to complete the network build-out;
2. Details how funding will be invested; and
3. Is supported by up-to-date, credible FCEV projections from automakers.

The follow-on Phase II work will focus on helping stakeholders understand and overcome the challenges associated with developing hydrogen fueling infrastructure.

Low Cost Safety Sensor Demonstration

Hydrogen safety sensors will be crucial for facilitating the development of a hydrogen economy. Three DOE workshops were held to review hydrogen safety sensor requirements, and performance targets have been determined for a variety of applications, with a focus on hydrogen refueling infrastructure and on-board fuel cell vehicles. From these workshops it has become apparent that there are limited commercially available hydrogen sensors that meet sensitivity, durability, reliability and operational (environment) requirements at a low enough cost for wide-scale deployment. LLNL, in conjunction with Los Alamos National Laboratory (LANL), has developed a novel, miniature, solid-state electrochemical sensor with potential to meet these requirements.

Outreach

In accordance with SCAQMD's Procurement Policy and Procedure, a public notice advertising the RFP/RFQ and inviting bids was published in the Los Angeles Times, the Orange County Register, the San Bernardino Sun, and Riverside County's Press Enterprise newspapers to leverage the most cost-effective method of outreach to the South Coast Basin.

Additionally, potential bidders may have been notified utilizing SCAQMD's own electronic listing of certified minority vendors. Notice of the RFP/RFQ has been e-mailed to the Black and Latino Legislative Caucuses and various minority chambers of commerce and business associations, and placed on the Internet at SCAQMD's website (http://www.aqmd.gov).

Bid Evaluation

The bids for RFP #P2014-09 were reviewed by a diverse panel in accordance with criteria contained in the RFP. The panel was composed of two SCAQMD Program Supervisors as well as two CARB and three CEC representatives. The panel breakdown was as follows: six Caucasian, one Hispanic; one female, six male.

Proposal

CEC Grant for Hydrogen Station Upgrades

Using CARB funding, Mebtahi was the first branded, independently owned, full retail gasoline station with a hydrogen dispensing station. They have dispensed hydrogen to the "retail" public for four years, keeping the station in the forefront of hydrogen fueling

technology and serving as a test case for equipment that can successfully provide fuel to new FCEVs. The station is operational but requires a new dispenser that is certified for selling hydrogen fuel on a retail basis using credit cards and providing paper receipts as well as a canopy over the hydrogen dispenser. Although Mebtahi ranked fifth in overall scoring out of eight proposals, they were not given an award due to lack of funds. Based on recent staff negotiations to reduce the scope and cost of previous awards, this action is to award a contract to Mebtahi for installation of a new dispenser and canopy.

CEC Awards for New Hydrogen Stations

The proposed hydrogen fueling stations will be new, publicly accessible, next generation (35 MPa and 70 MPa) hydrogen fueling stations located throughout Southern California, in the cities of Los Angeles, South Pasadena, Long Beach, Costa, La Canada Flintridge, Laguna Niguel, Lake Forest, Riverside, Ontario, Mission Viejo and Woodland Hills. Many of the stations will utilize improved delivery technologies to reduce the cost of transporting hydrogen. The station concepts are simple, modular and designed to easily expand to full-size station capacities. The modular design incorporates a minimized station footprint to utilize existing retail gasoline forecourt locations and can be readily duplicated at a majority of existing gasoline retail stations in a number of markets for the broadest deployment. Additional funds are needed to offset higher than anticipated initial costs to successfully establish these stations and extend reporting for three years. Furthermore, due to the requirements of SB 1505, four of the new hydrogen stations will be made from renewable resources and designed for dispensing on a regular daily schedule. This action is to execute contracts with the entities in the table above to assist in the construction of new, publicly accessible, next generation hydrogen fueling stations using either renewable or delivered hydrogen.

APCI

This action is to amend a contract with APCI to continue operation and maintenance for another one year of Orange County Sanitation District's renewable hydrogen fueling station. As mentioned, CARB is cofunding the maintenance and has requested SCAQMD's assistance. This will provide time for more robust fueling infrastructure to be developed.

This action is also to amend a contract with APCI to complete and close out the Five Cities Hydrogen Program station maintenance contracts. Any maintenance, repairs and costs associated with the two electrolyzers and two mobile fueler stations will be paid and the station equipment dismantled and the stations closed.

Phase II of H2NIP

This action is to amend a contract with EIN to refine the H2NIP, in conjunction with the California Fuel Cell Partnership (CaFCP) and other cost-share partners, and build participation and investment in hydrogen infrastructure. Phase II will achieve the following objectives:

1. Develop recommendations and build support for policy and incentive improvements for hydrogen infrastructure and renewable hydrogen development. This will include improving the availability of and access to environmental credits and renewable hydrogen incentives by assessing alternative hydrogen revenue streams for stations.
2. Propose infrastructure financing structures by developing new approaches and structures for private sector financing of hydrogen infrastructure, in anticipation of when grant funds are limited, and to work with financial and academic partners (Treasury, SCAQMD, NREL, UCD and UCI, among others) and station developers to develop options, priorities and a plan to introduce government-backed debt, leveraging the experience of state programs and other financial structures.
3. Develop pathway for market assurance grants or similar implementation, and with CEC, U.S. Treasury and SCAQMD collaboration, further develop a potential structure for ongoing, network operations support during the market growth stage, possibly using sales-tax exemptions.

Low Cost Safety Sensor Demonstration

LLNL, in conjunction with LANL, has developed a novel, miniature, solid-state electrochemical sensor that prevails over other commercially available hydrogen sensors at a potential lower cost. It can measure very low concentrations of hydrogen, has very low response to potential interferences such as CO_2, CO, CH_4, and NH_3; is immune to humidity and barometric pressure changes and has a fast response time. The prototype sensor has been validated in independent testing at the National Renewable Energy Laboratory's Hydrogen Sensor Test Facility over the past two years. LLNL is nearing completion of an advanced prototype sensor and electronics package, which will be ready for field testing in the near future. This action is to execute a contract with LLNL, which along with LANL and DOE, has requested the SCAQMD's support to demonstrate the prototype solid-state electrochemical hydrogen safety sensor at two hydrogen refueling stations and acquire performance data over a planned a six-month demonstration period. The DOE will cost-share the demonstration project.

Benefits to SCAQMD

The SCAQMD supports hydrogen infrastructure and fuel cell technologies and recognizes that light-, medium- and heavy-duty vehicles must achieve zero or near-zero emissions if the region hopes to meet state and federal air quality attainment standards. These projects will help ensure that sufficient hydrogen infrastructure is available to support the impending OEM roll out of fuel cell vehicles over the next few years and are included in the *2014 Clean Fuels Program Plan Update* under "Develop and Demonstrate Distributed Hydrogen Production and Fueling Stations." SCAQMD's Clean Fuels Program has been active in funding the development and demonstration of low-emission, hydrogen fuel technologies. Hydrogen vehicles and refueling stations are necessary to comply with CARB's ZEV regulation to reduce criteria pollutant emissions and development of an extensive hydrogen fueling

network in Southern California will accelerate the deployment of these cleaner vehicles.

Sole Source Justification

CEC Awards for New Hydrogen Stations

Section VIII.B.2 of the Procurement Policy and Procedure identifies four major provisions under which a sole source award may be justified. For the new hydrogen fueling station projects, the request for a 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 SCAQMD. Specifically, these circumstances are: B.2.d.(1) Project involving cost sharing by multiple sponsors. Significant project funding will be provided by the CEC, First Element Fuel, ITM Power, Ontario CNG and APCI, including in-kind funding to perform the tasks of design, construction, operation and outreach required for completing the hydrogen fueling stations. Furthermore, these stations fill a critical gap within the region for hydrogen fueling and promote utilization of the cleanest passenger vehicles.

APCI

Section VIII.B.2 of the Procurement Policy and Procedures identifies four major provisions under which a sole source award may be justified. The APCI proposed project request for sole source award is made under B.2.c (1): The unique experience and capabilities of the proposed contractor or contractor team. APCI has extensive and unique experience as well as proprietary knowledge in constructing and/or operating the Five Cities Hydrogen Program fueling stations and Orange County Sanitation District's hydrogen fueling station.

Phase II of H2NIP

Section VIII.B.2 of the Procurement Policy and Procedures identifies four major provisions under which a sole source award may be justified. The EIN proposed project request for sole source award is made under B.2.c (1): The unique experience and capabilities of the proposed contractor or contractor team, and B.2.d (1): Projects including cost-sharing by multiple sponsors. The proposed contractor has had a leadership role in working on these challenges and their experience over the past decade includes conducting the Phase I study, coordinating multi-stakeholder input to develop the consensus-based Hydrogen Station Cash Flow Analysis that was used as a key foundation to the CaFCP Roadmap, as well as facilitating key components of the California Hydrogen Highway Blueprint Plan.

Safety Sensor Demonstration

Section VIII.B.2 of the Procurement Policy and Procedures identifies four major provisions under which a sole source award may be justified. The LLNL proposed project request for sole source award is made under B.2.c (1), the unique experience and capabilities of the proposed contractor or contractor team; and B.2.d (1): Projects including cost-sharing by multiple sponsors. LLNL has extensive and unique

experience as well as proprietary knowledge in constructing and/or operating the electrochemical hydrogen sensor and will be providing at least 50 percent cost-share for the demonstration.

Resource Impacts

CEC Grant for Hydrogen Station Upgrades

Of the CEC's $6,690,828 grant, which dedicated $6,446,511 for project funding and $244,317 for administrative costs, more than $1 million remains available for project funding. The contract with Mebtahi shall not exceed $589,661 using this CEC revenue recognized into the Hydrogen Fueling Infrastructure Network Fund (63). Staff may return to the Board for additional awards to utilize all the CEC funding.

CEC Awards for New Hydrogen Stations

The SCAQMD's cost-share to support the new hydrogen stations shall not exceed $1,600,000 from the Clean Fuels Fund (31), comprising the following: 1) a contract with First Element Fuel, Inc. in an amount not to exceed $1,000,000; 2) a contract with ITM Power, Inc. in an amount not to exceed $200,000; 3) a contract with Ontario CNG Station Inc. in an amount not to exceed $200,000; and 4) a contract with APCI in an amount not to exceed $200,000. The table below lists the contractors, station locations, station type, CEC funding amount and requested SCAQMD funding:

Contractor	Station Location	Type	CEC Award ($)	Requested SCAQMD ($)
First Element Fuel	South Pasadena	Delivered	1,451,000	100,000
First Element Fuel	Los Angeles	Renewable	1,451,000	200,000
First Element Fuel	Los Angeles	Renewable	1,451,000	200,000
First Element Fuel	Long Beach	Delivered	1,451,000	100,000
First Element Fuel	Costa Mesa	Delivered	1,451,000	100,000
First Element Fuel	La Canada Flintridge	Delivered	1,451,000	100,000
First Element Fuel	Laguna Niguel	Delivered	1,451,000	100,000
First Element Fuel	Lake Forest	Delivered	1,451,000	100,000
ITM Power	Riverside	Renewable	2,125,000	200,000
Ontario CNG	Ontario	Renewable	2,125,000	200,000
Air Products	Mission Viejo	Delivered	1,499,586	100,000
Air Products	Woodland Hills	Delivered	1,499,586	100,000
Total Funding			**$18,857,172**	**$1,600,000**

APCI

The SCAQMD's cost-share for the APCI contract amendment to provide one additional year of maintenance for the Orange County Sanitation District's hydrogen fueling station shall not exceed $75,000 from the Clean Fuels Fund (31). Total project costs for this amendment is $275,000, consisting of the SCAQMD's requested $75,000 and $200,000 from CARB through a direct contract with APCI. Additionally, the contract

amendment with APCI for the Five Cities Hydrogen Program fueling stations shall not exceed $90,000 from the Clean Fuels Fund (31).

Phase II of the H2NIP

The total cost of Phase II of the H2NIP project with EIN is $233,000, with SCAQMD's cost-share not to exceed $125,000 from the Clean Fuels Fund (31). The table below lists project partner funding for Phase II:

Project Partner Funding for H2NIP Phase II

Partners	Funding	Cost-Share
Emmett Foundation	$20,000	9%
Sabin Foundation	$15,000	6%
Patagonia	$8,000	3%
Toyota	$25,000	11%
Other Foundations	$40,000	17%
SCAQMD *(requested)*	$125,000	54%
Total	**$233,000**	**100%**

Safety Sensor Demonstration

The total project cost for the safety sensor demonstration is $350,000, with the DOE providing $175,000 and the SCAQMD providing an equal cost-share not to exceed $175,000 from the Clean Fuels Fund (31).

Sufficient funds are available in the Clean Fuels Fund (31) for the proposed projects. 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.