

BOARD MEETING DATE: April 3, 2015

AGENDA NO. 4

PROPOSAL: Cosponsor Regional Universities for U.S. DOE EcoCAR 3 Competition and Solar Decathlon 

SYNOPSIS: EcoCAR 3 is an advanced plug-in hybrid passenger vehicle design-and-build competition sponsored by U.S. DOE and General Motors and managed by Argonne National Laboratory. California State University Los Angeles (CSULA) is the only competitor in California of 16 North American universities chosen to redesign a stock 2016 gasoline Chevrolet Camaro into a hybrid vehicle. The 2015 U.S. DOE Solar Decathlon challenges 17 U.S. and international university teams to create solar-powered houses that are cost-effective, energy efficient, attractive and incorporate EV charging into their energy use profile. This year's event will be held at the Great Park in Irvine and Team OC is the only Southern California competitor consisting of students from University of California Irvine (UCI) plus three local colleges. These actions are to execute agreements from the Clean Fuels Fund (31) with CSULA to enter the DOE EcoCAR 3 competition in an amount not to exceed \$100,000 over four years and UCI to compete in the 2015 DOE Solar Decathlon in an amount not to exceed \$50,000.

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

RECOMMENDED ACTION:

1. Authorize the Executive Officer to execute the following agreements from the Clean Fuels Fund (31):
  - a. A Memorandum of Agreement with California State University Los Angeles (CSULA) to cofund the DOE EcoCAR 3 development and demonstration project in an amount not to exceed \$100,000 (\$25,000 annually); and

- b. A Memorandum of Agreement with University of California Irvine (UCI) Foundation to cofund the development and demonstration of a solar-powered house at the 2015 DOE Solar Decathlon in an amount not to exceed \$50,000.

Barry R. Wallerstein, D.Env.  
Executive Officer

MMM:FM:LM:AK

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## **Background**

Achieving federal and state clean air standards in Southern California will require emission reductions from both mobile and stationary sources beyond those expected using current technologies and strategies, and advanced education and training.

### *DOE EcoCAR 3 Competition*

The EcoCAR series of programs are advanced design-and-build vehicle competitions sponsored by the DOE and General Motors (GM) and managed by Argonne National Laboratory. The cornerstone goal is the preparation of the next generation of engineers who gain real-world research experience in the development of extremely complex advanced vehicle technologies. For the 2011-2014 EcoCAR 2 competition, CSULA students designed and built a modified 2013 Chevrolet Malibu that burns E85 fuel and gets up to 35 miles in the EV-mode. Five of the team members are now engineers at GM and several more are also working in the industry. The team achieved second place overall in the 2013 competition and the Green Leadership Award by Los Angeles County the same year.

DOE EcoCAR 3 is a four-year advanced plug-in hybrid vehicle design-and-build competition which began in fall 2014. EcoCAR 3 challenges 16 North American universities to redesign a stock 2016 gasoline Chevrolet Camaro into a hybrid vehicle that will reduce the environmental impact of vehicles, minimize fuel consumption, retain performance, safety and consumer appeal, and provide research and innovation opportunities to students.

### *DOE Solar Decathlon Competition*

The DOE Solar Decathlon is held biennially and brings together university teams from the U.S. and internationally to design, construct and build solar-powered houses. Each university solar-powered home must compete against measures that include energy and water efficiency, livability, attractiveness, and cost. Additionally, each house entering the competition must produce more energy than it consumes. The overall goal of the competition is to prepare the next generation of engineers, architects, computer scientists, scientists and graphic designers by affording them an opportunity to gain real-world experience in building design, function and sustainability. A new requirement for this

year's competition (the seventh one since its inception in 2002) is for each house to generate enough energy to charge and operate an electric vehicle. This year's event will be held in October at the Great Park in Irvine with 17 university teams expected to participate in the competition with an expected attendance of 100,000 visitors.

## **Proposal**

### *DOE EcoCAR 3 Competition*

Plug-in hybrid vehicles utilize advanced power plant architectures that combine internal combustion engines, electric motors and batteries that enable vehicles to drive on sustainable electricity and clean alternative fuels. For EcoCAR 3, the CSULA team has selected a police theme with pursuit capability. Switching to alternative fuels, enabling electric air conditioning, powering energy intensive loads from the battery pack and EV patrol modes will allow CSULA's vehicle to provide appreciable fuel economy along with substantial pollution and GHG reductions.

In addition to vehicles provided by GM, sponsorship training is provided by MathWorks, Siemens NX and Autonomie. Teams also have a chance to learn about the components being offered for EcoCAR 3, including components and software provided by GM, MathWorks, Freescale, BOSCH, ETAS, Siemens, GKN Driveline, Woodward, EnerDel, Ricardo, New Eagle and A123 Systems.

Each year the EcoCAR competition builds on the previous years' activities, resulting in an operational vehicle competition. Besides the engineering effort, EcoCAR includes communications/outreach and business students to mirror a real-world company model in which many disciplines collaborate to form a successful business. The communications-related deliverables include youth outreach, community engagement, public relations and marketing. Currently, the multidisciplinary team consists of 80 students representing mechanical engineering, electrical engineering, computer science, technology, communications, business, accounting and marketing. The team is open to participating in SCAQMD events.

This action would be to execute a \$100,000 contract with CSULA (\$25,000 annually, renewable for three additional years) to support team training, software, hardware, outreach, travel to competition, student stipends, taxes and overhead. Future renewals are conditional, based on continued team participation and Executive Officer approval. At this level, team sponsors are recognized on the team website, on the vehicle body, in their outreach materials and provided direct access for recruitment.

### *DOE Solar Decathlon Competition*

For the 2015 Solar Decathlon, the participating Southern California team is entitled TeamOC and is comprised of over a hundred students from UCI, Chapman College, Irvine Valley College and Saddleback College. Their house design entitled Casa Del Sol will be a net zero energy home that incorporates design inspiration from the California

Poppy. The house will be just under a 1,000 sq. ft. and will regulate the interior space temperature through radiant heating and cooling that is coupled with rooftop solar thermal. To maximize the output of the solar photovoltaic system, the house will incorporate the use of both alternating current (AC) and direct current (DC) to minimize electrical losses through inverters. Part of the competitive edge Team OC claims they have for this year is incorporating the electric vehicle's energy usage through a DC only charging system.

Some sponsors for Team OC include the City of Irvine, Southern California Edison (SCE), Irvine Company, Fivepoint Communities and LPA, Inc. Additionally, professional mentors from over 14 companies are helping Team OC students with resources and expertise in the design and construction of their house.

This action is to execute a contract with UCI Foundation for \$50,000 to support the development of their house and integration of an electric vehicle into the building's energy management. At this level, team sponsors are recognized on the team website, their outreach materials and on their house during the competition.

### **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 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.(8) Research and development efforts with educational institutions or nonprofit organizations. The EcoCAR 3 project will be conducted and managed by CSULA staff and students. TeamOC is being jointly managed by UCI, Chapman College, Irvine Valley College and Saddleback College. UCI Foundation is managing the fundraising for Team OC.

### **Benefits to SCAQMD**

The proposed projects are included in the *Technology Advancement Office Clean Fuels Program 2015 Plan Update* under "Assessment and Technical Support of Advanced Technologies and Information Dissemination." The AQMP relies upon the expedited implementation of advanced technologies in Southern California across all economic sectors to achieve air quality standards and to continue reductions in air toxic exposure.

### **Resource Impacts**

#### DOE EcoCAR 3 Competition

In addition to headline sponsors DOE and GM, multiple in-kind partners will provide training and components to all participating teams. SCAQMD's proposed cofunding shall not exceed \$100,000 from the Clean Fuels Fund (31) to provide additional assistance to CSULA. The \$100,000 is to provide \$25,000 annually, renewable for three additional years, contingent upon continued team participation and upon the Executive Officer's approval.

DOE Solar Decathlon Competition

In addition to headline sponsors City of Irvine, SCE, Irvine Company, Fivepoint Communities and LPA, Inc., currently over 14 in-kind partners are providing training and components to all participating teams. SCAQMD's proposed cofunding shall not exceed \$50,000 from the Clean Fuels Fund (31) to UCI Foundation for additional assistance to Team OC to support their efforts and help with the integration of an electric vehicle in their home's energy design.

Sufficient funds are available in the Clean Fuels Fund (31), which is established as special revenue 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.