



# California Energy Commission Research Project

## Description

In June 2010, the Department entered into an interagency agreement with the California Energy Commission (CEC) to conduct research in three project areas: hydrogen fuel quality sampling and testing, hydrogen fuel dispenser evaluation, and high concentration biodiesel fuel quality testing.

## Activities

Industry and university researchers have identified certain contaminants in hydrogen that will negatively affect the operation of a fuel cell. Maximum concentrations for these contaminants have been incorporated into SAE J2719, Hydrogen Fuel Quality for Fuel Cell Vehicles Standard. No analytical test methods exist yet to identify and quantify these contaminants in hydrogen at these levels. Division (Project) staff is working to develop these test methods and will work with consensus organizations e.g., ASTM International and SAE International to incorporate these methods into the standards. DMS staff will also work to develop methods for sampling hydrogen at the dispenser.

All commercial dispensers used to sell motor vehicle fuels in California must first be evaluated and approved for use by the Department. Dispensers are evaluated for accuracy against known

standards, but these have yet to be established for gaseous hydrogen. Project staff is currently working with the National Renewable Energy Laboratory to evaluate three standards, Gravimetric, Master Meter, and Volume, Temperature, Pressure (VTP), to determine the best method to evaluate hydrogen dispensers for refueling fuel cell vehicles. Staff will then work with the National Institute of Standards and Technology and the National Conference of Weights and Measures to develop an Examination Procedure Outline (EPO) for type approval of hydrogen dispensers.

Division staff is evaluating analytical testing methods with biodiesel blends of greater than 20 percent with the goal of assisting with the development of test methods for the determination of the quality of higher level biodiesel blends. Those test methods include the comparison of atmospheric and vacuum distillations, an examination of the cold temperature flow properties of biodiesel blends, a way of determine residual reaction by product in biodiesel blends and the development of a precision statement for the existing Fourier Transform Infrared Spectroscopy (FTIR) biodiesel quantization method.

## Program Importance

EXECUTIVE ORDER B-16-2012 facilitates the rapid commercialization of zero-emission vehicles (ZEVs) in California. By

definition, a hydrogen fuel cell vehicle is a ZEV. The Executive Order sets 2015 as the target date for all major cities in California to have adequate infrastructure and be “zero-emission vehicle ready.”

This research project can assist in breaking the measurement and fuel quality barriers that currently prevent hydrogen from becoming a viable commercial fuel. In addition, the research may help smooth the way for high concentration biodiesel blends to enter the marketplace.

The Business and Professions Code requires the Department to establish specifications for automotive spark-ignition engine fuels, compression-ignition engine fuels, and hydrogen for use in internal combustion engines and fuel cells. The Department is also tasked with enforcing the accuracy of fuel dispensers, and advertising and labeling of fuels sold to the public. These are essential components to a commercial infrastructure.

### **Budget**

The CEC Research Project is funded through a reimbursement contract with the California Energy Commission in the amount of \$4 million. The contract completion date is scheduled for January 2014.

### **Staffing**

One Staff Environmental Scientist, three Environmental Scientists, two Chemists (part-time), and two Measurement Standards Specialists III perform research work under the contract.

### **Forecast**

Hydrogen fuel cell electric vehicles (FCEVs) are poised to enter the California market as early as 2015 as an integral part of many automakers’ electric-drive portfolios. But, the biggest obstacle to introducing fuel cell electric vehicles is the lack of fueling stations. The first FCEV purchasers must be confident that sufficient hydrogen fueling is available whether it’s near their home, work or favorite destination.

The increased use of biodiesel will decrease the dependence on petroleum based fuels and further the goals of AB 32 and the Low-Carbon Fuel Standard (LCFS) by the reducing the carbon intensity of California’s diesel supply.

For more information, please contact:

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