Air Products and Chemicals, Inc.
7201 Hamilton Boulevard
Allentown, PA 18195-1501
Telephone (610) 481-4911

9 August 2012

California Energy Commission
Dockets Office, MS-4
Docket No: 12-HYD-1 Hydrogen and Transportation
1516 Ninth Street
Sacramento, CA 95814-5512

Subject: Submittal by Air Products and Chemicals, Inc. – Input for Developing a New Solicitation for Hydrogen Infrastructure

Air Products, the leading global supplier of hydrogen in the production of cleaner burning transportation fuels, has unique experience in the hydrogen fueling industry. Our experience across varied fueling applications provided us the opportunity to assess consumer experiences, evaluate product performance and advance product improvements. Use of the company's technology is increasing and is about to reach 1,000,000 total fuelings with some dispensers accomplishing 50,000 plus fuelings per year. As such **we can supply any possible configuration of high performing fueling stations as necessary.**

Extensive work and demonstration has been performed regarding key early markets for the sale of light-duty fuel cell electric vehicles and the supply of hydrogen to these markets over the last 10 years by various governmental, academic and NGO's. We strongly urge that the lessons learned be incorporated into the California rollout. In addition, from the perspective of the provider of hydrogen fueling infrastructure, several major factors should be considered by the Commission in its approach for placing these early market stations:

- First and foremost in developing any new application is to **match the demand profile with the appropriate supply mode.** Industrial gas companies have done this as a best practice for decades. Over building (capacity or function) will result in under-utilized assets, higher financial burden, a higher cost dispensed hydrogen product and a public perception that the hydrogen economy is not moving forward.

- The greatest burden for infrastructure roll-out is the **"barrier to entry"**. CEC should fund that initial barrier (base station capabilities) and allow commercial forces to fund further expansion and/or capabilities as the learning's moving forward dictate. This will result in the greatest market coverage. We suggest the stations be designed for capacity and functionality required for the immediate future and not the end game objective.

- Allow for a phased deployment of stations to apply market learning's from each phase of deployment to subsequent phases.

- Volume demand continues to be uncertain, some OEM's continue to plan early-commercial FCV launch in 2015 others as late as 2020 which highlights a concern for volume risk on low station use and the necessity for the supply mode to match the demand profile, with a reasonable cushion.

- Overbuilding early (capacity or function) requires in addition to more capital, greater footprint and thus encroaches on gasoline infrastructure. This is a nonstarter in the early years where the hydrogen business case has yet to be made. Independent owners will not give up solid revenue generation for potential revenue generation. Overbuilding on hydrogen station capacity will limit available sites, severely.

- The production of hydrogen constitutes more than half of the cost of the hydrogen infrastructure for fuel cell electric vehicles; existing production systems should be utilized in early station investment to minimize capital outlay and risk. Existing forecourts should likewise be used.

- Air Products urges CEC to use the learning's from prior global efforts and studies in support of the concepts behind identification and supply of early stations. These efforts are resulting in the build-out of small high pressure gaseous delivered (200 bar and 420 bar) stations in Europe, Asia and elsewhere.

- The early market for fuel cell vehicles is better served at this stage by greater coverage of stations within a given region as opposed to larger or redundant stations serving a single community.

- Selected fueling station technologies should be modular and expandable, and minimize footprint to use existing retail gasoline forecourt locations, which significantly lowers the initial cost of infrastructure. Stations should be capable of easily adding capacity or function commensurate with increasing demand, when the demand materializes.

We look forward to continuing to work with the Commission as it develops its plans for hydrogen fueling infrastructure. If there's any questions or need for any additional information to support Air Products position on hydrogen infrastructure, please contact me by phone (610-481-5222) or email (bonnerbb@airproducts.com).

Sincerely,

Brian Bonner
Global Product Manager
Hydrogen Energy Systems