



16th October 2013

California Energy Commission
Docket 12-HYD-01
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Sacramento, CA 95814

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Re: Comments from Ricardo on Draft Solicitation Concepts for Hydrogen Fuel Infrastructure



Ricardo is a leading engineering and business consultant to Automotive OEMs, suppliers and Government Agencies, and based on our experience I would like to share the following comments on the solicitation concepts for the Hydrogen Fuel Infrastructure.

Once a fuel cell vehicle market is reasonably established, there will be sufficient hydrogen demand for companies to invest in the larger build out of the infrastructure. At that time, there should also be sufficient competitive pressures to drive down the costs of the infrastructure, its maintenance and operation, and hence the price of hydrogen to the consumer. As is readily apparent, the challenge is in how the infrastructure is initially developed. It would seem important for the success of the future market that this initial infrastructure is an enabling stepping stone, and does not in itself create additional market development barriers. Ricardo would identify the following as key concerns needing to be addressed:

- The initial hydrogen stations must be able to fully support the needs of the first fuel cell vehicle owners. This would mean that the stations:
 - Can dispense hydrogen at the appropriate pressures and required specifications, for example CGA G-5.3 Commodity Specification for Hydrogen and SAE International J21719 Hydrogen Fuel Quality for Fuel Cell Vehicles.
 - Offer acceptable fill times (similar to conventional vehicles) and compliance with fueling protocols (e.g. SAE J2601).
 - Are located sufficiently close to key locations where fuel cell vehicles need to be re-fueled.
 - Are adequately staffed and operational during times convenient for customers.
 - Meet minimum peak and daily fueling capacity requirements.
- The hydrogen offered for sale should be at a price point that will not strongly discourage vehicle ownership. In the past, car consumer buying habits appear to be influenced strongly by the

purchase price of vehicles and the price of gasoline. There seems to be much less influence of total cost of ownership outside of fleet buyers. Not only should the initial hydrogen prices be acceptable, but there should be a glide path to much more competitive pricing for hydrogen in the future. For the early deployed stations, significant factors in the cost of fuel will be the operation and maintenance costs of the stations while hydrogen demand is low. There is also significant benefit in operating scale. An operator of multiple hydrogen stations should be able to achieve a lower overall operating cost and possibly reduced capital costs.

- The roll out of hydrogen stations over the next years should have an evolving plan of encouragement, incentives and support from all stakeholders. It is possible the initial sites for stations will be based on a combination of ease of permitting and construction, convenience to selected “hot spots” for hydrogen supply, and other business factors. As the build out proceeds beyond these initial sites, there will be a need to develop in areas that support the infrastructure, but will be less commercially attractive to companies. However, these sites are still important to the success of the overall hydrogen infrastructure. The future plan is potentially as important as the need to build the next stations.

The CEC staff has put significant effort into developing draft concepts for the new solicitation that should make it easier for bidders to respond. Particularly beneficial is the larger coverage of operations and maintenance costs, and more flexibility on the station locations. The CEC staff has been very good in listening to the different industry perspectives and trying to find a funding approach that will support the next set of hydrogen stations. These efforts are reflected in the draft solicitation concepts.

In terms of the future of the hydrogen infrastructure, it would have been beneficial to see consideration of the further roll out of hydrogen stations in the draft solicitation. As described above, the challenges vary as more hydrogen stations are constructed. With Automotive OEMs wishing to bring their fuel cell vehicles to market in the next 2-3 years, and hydrogen station construction times being at least 18 months, it would seem timely to be planning and enabling the roll out of the future hydrogen stations beyond this forthcoming PON. Ricardo would see this planning as time critical and would recommend that CEC considers a small set aside for future planning tasks within this upcoming PON.

Yours Sincerely,

A handwritten signature in black ink, appearing to read 'Marc Wiseman'.

Marc Wiseman
Principal
Ricardo Strategic Consulting
North America