Gopstein, Avi (S4)

From: Exparte Communications
Sent: Monday, May 16, 2011 9:28 AM
To: Gopstein, Avi (S4)
Subject: FW: hydrogen fuel cell program in quadrennial report
Attachments: Personal recommendations based on May 9 meeting.pdf

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Avi, this one mentions you.

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From: sigmundgronich@aol.com [mailto:sigmundgronich@aol.com]
Sent: Friday, May 13, 2011 8:01 PM
To: Holland, Mike (S4); Gopstein, Avi (S4); Exparte Communications
Cc: kiczekef@airproducts.com; rcox@fchea.org; brose@fuelcells.org; CDunwoody@CAFCP.org
Subject: hydrogen fuel cell program in quadrennial report

Dear Mike:

Thank you and Avi for taking the time from your schedule to listen to our discussion on the hydrogen fuel cell program. I came away from the meeting feeling we were talking from two different perspectives on the financial requirements for the hydrogen fuel cell vehicle and its infrastructure, and the implications of the deployment of 1 million battery electric vehicles by 2015 on the need for the fuel cell vehicle. I put a position paper together that discusses these issues based on industry announcements, changed hydrogen fueling paradigms and the unique importance of these programs to national security and balance of payment deficits.

I hope you find the information useful and that the Quadrennial report can reflect some of the recommendations I made in the paper.

Sig Gronich

I recommend that the Department of Energy prioritize the need to develop a vehicle market transformation activity for electric platform vehicles in the Quadrennial report that is consistent with the industry's commitment to deploy vehicles as stipulated in company announcements. The support should be in two areas: tax credits for electric platform vehicles and federal cost share for infrastructure support. Electric platform vehicles should be defined to include battery electric, plug-in hybrid and hydrogen fuel cell vehicles.

The rationale for this prioritization is that within the Department programs the vehicle sector is not only necessary to meet global climate change targets as does the electric generation sector, but the vehicle sector is also of critical importance to national security and the country's balance of payment deficits. The hydrogen fuel cell vehicle offers the prospect of not only offering the option to decrease the foreign import of oil, but establishing the potential for the foreign export of fuel because of the large quantities of natural gas and coal that are available in this country. Natural gas is an excellent feedstock for the production of hydrogen. Also, oil has been exhibiting significant price escalations to the point where electric platform vehicles can be competitive in the marketplace when mass produced, whereas coal and natural gas prices have not exhibited similar behavior. Thus, the vehicle market area is an excellent candidate for the introduction of new disruptive technologies and consideration for market development activities.

Rationale for the inclusion of vehicle market transformation activities for both battery electric and hydrogen fuel cell vehicles:

As discussed with Mike Holland and Avi Gopstein of the Under Secretary's office on May 9, 2011, progress on the projected costs for hydrogen fuel cells at $50/kW and hydrogen storage at $13/kWh to $17kWh in 2010 is equivalent on a vehicle cents per mile basis to a 40 mile range battery electric vehicle with a $300/kWh high energy intensity battery to be first achieved by 2014 according to DOE program plans based on cost projections of 500,000 units. These projections are jointly developed by DOE and automotive technical teams and accepted by the industry to plan for future vehicle deployments.

David Howell, Program Manager of Energy Storage Systems, reported at the 2011 Annual Merit review for Vehicle Technologies that based on public announcements from automobile manufacturers that they plan to deploy greater than 1 million battery electric vehicles by 2015 (http://www.vehicles.energy.gov). As such the Department has included $224 million in fiscal year 2012 budget for support of the electrical infrastructure introduction. However, while the Department does accept these announcements at face value, it does not recognize industry announcements for the hydrogen fuel cell vehicle (HFCV) as being valid. The hydrogen fuel cell vehicle community has, in response to a 2011 California Fuel Cell Partnership survey, indicated that they plan to deploy 52,000 hydrogen fuel cell vehicles by 2017. This is on the basis of traditional product introduction scenarios where the components are developed and tested to meet performance and durability criteria first and then a vehicle platform is designed around the power plant. The latter process takes 5 to 6 years which leads to a 2015 commercialization date for GM, Toyota, Honda, Daimler and Hyundai for HFCVs. The early deployment of 1 million battery electric vehicles by 2015 is being done prior to low cost high energy intensity technology being available which is an accelerated more risky approach. However, GM who has made the most significant commitment to the 1 million battery electric vehicle deployment has also publically announced HFCV deployments in California, NY and Hawaii. Also at the May 9 meeting, we presented letters of intent from automobile manufacturers for the production of commercial HFCVs by 2015. If GM and the other automobile companies listed above have in recognition of the 1 million battery electric vehicles being on the road by 2015, still contemplate deploying commercial hydrogen fuel cell vehicles in 2015, then it is a fair assumption that they see missions for both technologies. DOE needs to recognize the industry position and not unilaterally conclude that the deployment of the 1 million electric vehicles will preclude HFCVs from the marketplace.

Some of the main points made at the meeting concerned that there is little precedent for people buying fuel cell cars and that the Prius sets a precedent for plug-in hybrid cars. Also, it was stated that batteries are a common product and fuel cells are not. However, the Prius did not set the precedent for the electric

charging infrastructure and the complications that all people don't have home garages and both home refueling and on-road refueling is likely to be required. Time of fueling that is similar to their automobile experience is much better accomplished with the hydrogen infrastructure model than the electric infrastructure model. And both the battery and the fuel cell will be under the hood of the car with little interface with the driver until it mal-functions.

The cost of the hydrogen infrastructure was another point addressed at the meeting. We presented a paradigm shift in the delivery and station concept which in combination with the urban centered deployment strategy over a 7 year period minimized the need for government cost share beyond some initial stations and perhaps to about 300 stations, out of tens of thousands urban stations, on the interstate system to support travel between urban centers. The urban centered approach pioneered by DOE and adopted by Europe and Japan allows for the introduction of larger more cost effective hydrogen stations sooner. We are hopeful that you presented that information to Dr. Koonin for his decision making. The anticipated federal support for the deployment for the first 50 stations to support the deployment of the first 52,000 HFCVs by 2017 is $50 million over four budget years starting in 2012. This is in comparison to the $224 million request in the 2012 budget for the electric infrastructure which is likely to be continued for a number of years.

Lastly, the recommendation included that the HFCV enjoy the same $8000 tax credit that is accorded the battery electric vehicle through 2016. The application of this tax credit to the battery electric vehicle is likely to cost billions of dollars for the 1 million vehicles while the application to the 52,000 HFCVs would be in the hundreds of millions of dollars. It is not a correct assumption that prior to 2016, the hydrogen fuel cell vehicle would require the same order of magnitude commitment as the battery electric vehicle appears to require, and therefore both can and need to be supported. Let the U.S. support both as needed to 2016, evaluate performance, durability and consumer interfaces and then decide. That is the conclusion of the industry that is proceeding with both and is willing to let the marketplace decide.