

Gopstein, Avi (S4)

From: Koonin, Steven
Sent: Wednesday, April 20, 2011 8:35 AM
To: DL-SC DOE-QER-TEAM
Subject: FW: Fuel Cells in the QTR
Attachments: Department of Energy Framing Document Ltr 041511.pdf

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Categories: QTR Transparency

From: McQuade, J. Michael UTCHO [<mailto:J.Michael.McQuade@utc.com>]
Sent: Wednesday, April 20, 2011 8:32 AM
To: Majumdar, Arun; Koonin, Steven
Subject: Fuel Cells in the QTR

Steve, Arun,

First, a very big compliment to you, Steve, on the quality and depth of the QTR Framing Document that was released for public comment. As you both know better than me, these processes are in many ways defined and constrained by the initial context in which they are communicated, and a terms of reference that misses the mark can make an entire, vital process doomed from the start. We do not have that problem here.

UTC has been using the various channels to provide input, including Pratt's participation last week in the public session on biofuels, and by providing a written submission to the overall document from UTC Power, our fuel cell business. This latter document provides commentary both on fuel cells and on the overall technology options section and it will go through the normal process as input to the QTR team.

After a brief discussion with the Secretary while at the SEAB meeting and at his recommendation, I have attached that document to make a few comments on the first section on fuel cells. The issue that we discussed is that statements about the gaps to viability for automotive fuel cell that the Secretary made early in his tenure have been generally interpreted much more broadly to mean that DOE does not believe in fuel cells in any application. While it is my understanding that this was not the intent, the lack of any reference in the Framing Document seem to support this view.

At UTC we have substantial work on automotive fuel cells underway but I share the view that it is still a long way to go before this is a viable option, particularly given the current state of battery progress and the need for an ubiquitous hydrogen infrastructure to make this work. However, we believe strongly that fleet applications should not be painted with the same brush. In these applications hydrogen infrastructure is only needed at a small number of controlled locations and real progress has been made on high power fuel cell durability and cost. If we get to the point where municipal fleets are required to be **no** emission rather than just **low** emission, then fuel cell buses may represent the only viable option we have.

Similar progress has been made on stationary applications, where on-board reformed natural gas fuel cells can provide building and district scale distributed power and which, when combined with

integrated thermal energy recovery, can lead to applications approaching 90% system efficiency. DOE investments in technology and in tax policies have played a big role in helping this option begin to build volume.

As the QTR goes through its process and as you, Arun, look at how the applied offices might look at fuel cells in the aftermath of the initial zeroing in the fuel cell technology budget, I would just like to be sure that we're considering adequately the full spectrum of applications for this technology and that we don't inadvertently remove fleet and stationary fuel cells technologies from the DOE radar screen based on views of the viability of automotive applications.

I am always happy to discuss more but at a minimum wanted to get this to you.

Best regards to both of you,

Michael

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