



DOE Hosts Annual Merit Review and Peer Evaluation



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Nearly 1000 people gathered to listen to reports and review the results of more than 250 U.S. Department of Energy hydrogen projects including those in Basic Energy Sciences. This review marked the third year of a five-year Presidential Hydrogen Initiative and reported on projects totaling \$500 million (\$800 million with cost share). Areas highlighted in the opening plenary session included coal-based hydrogen, nuclear-based hydrogen, carbon capture and sequestration, FutureGen, and work of the European Commission. Next year, Hydrogen Program Manager Steve Chalk reported that work of the U.S. Department of Transportation will be included in the plenary highlights. For those familiar with the DOE programs, this meeting was marked by steady progress and few changes in DOE goals and plans.

Relatively new DOE Assistant Secretary for Energy Efficiency and Renewable Energy, Andy Karsner, kicked off the plenary by recognizing that we are addicted to oil, we are at war in one of the world's important oil-producing regions, and we are affected by increased concern for global warming. In this context, 70% of our electricity comes from fossil fuels and a majority of our transportation fuels are imported. Biofuels, he said, will lead the way in the transition away from conventional fuels toward hydrogen.

Sunita Satyapal provided an overview of the Hydrogen Storage program. The 2010 and 2015 goals remain unchanged. Related to those two years, "gravimetric capacity" or net specific energy goals for the total system are 6% and 9% by weight; energy density goals are 1.5 and 2.7 kWh/L; and storage system cost goals are \$133 and \$67/kg of hydrogen. She emphasized

that these are system targets, not simply material targets. Annual budgets for storage have been below, but growing toward, the relatively consistently requested levels of about \$30 million.

Valri Lightner reported for the Fuel Cell Team whose 2010 and 2015 goals are also mostly unchanged. For transportation, the goals are: capital cost, \$45/kW by 2010 and \$30/kW by 2015; 5,000 hr durability by 2010. The distributed power goal is \$750/kW by 2011 with 40,000 hr durability. Ms Lightner reported significant progress in reaching cost and durability targets, and the start-up time target for 2015 had already been reached.

Pat Davis reported on the production program, the components oriented toward natural gas and renewable energy resources, with coal and nuclear reported separately. The Hydrogen Program's goal is to prove the ability to deliver \$3/gallon of gasoline equivalent (gge) via distributed natural gas reforming by the end of this year, with demonstration in 2009. Meeting these goals will allow more time to develop the full hydrogen infrastructure necessary to serve early markets. The goal for electrolytic hydrogen is higher, at \$4.50/gge by 2009 at 5,000 psi but in all cases the 2015 goal is \$2-3/ gge delivered. Mr. Davis's report shows that the hydrogen production appropriations, including all of the renewable options, were only at 23% of the administration's request. He reported the significant progress of NHA members Air Products and Chemicals and Virent, as well as the wind and electrolysis work of NHA members Xcel and the National Renewable Energy Laboratory.

Mark Paster reported on the delivery program and its goal of \$1/gge, a component of the overall delivered cost of hydrogen, by 2017. The pathways being researched include gaseous and liquid hydrogen, as well as carriers like ammonia. He reported that pipelines are the expected path long term and that fore-

court costs need to be reduced to meet the goal.

Lowell Miller, Director, Office of Sequestration, Hydrogen and Clean Coal Fuels reported on their hydrogen to coal research which emphasizes membrane-related research and co-production. Their 2015 goal is a 20 MW-scale demonstration of a 60% efficient electricity and hydrogen co-production facility producing zero emissions and hydrogen 25% cheaper than current coal-produced hydrogen.

Carl Sink reported on the nuclear hydrogen production initiative whose goal is a commercial-scale nuclear hydrogen production demonstration facility by 2020, able to produce hydrogen at less than \$2/gge, \$3 delivered.

Christy Cooper gave an important luncheon presentation on the results of DOE's baseline knowledge survey, "Measuring H2IQ". Since the public doesn't know as much about hydrogen as our community might like, this report will provide the basis for measuring future improvements in industry and DOE efforts. The results reported in the survey will be valuable to the NHA as we proceed with the Hydrogen Public Information Program.

In conclusion, progress has been made toward established goals in the DOE program, despite difficult spending decisions which could not allocate full funding to all projects. In that context, the Department's fuel cell strategy continues to emphasize transportation needs with a small amount of resources on stationery, auxiliary power and portable power markets. These early markets deserve greater emphasis given the NHA's conclusions that they provide business revenues and technology advances that will support the transportation transition.

For a longer report on the review meeting, including some of the technical presentations, please see Peter Hoffmann's Hydrogen and Fuel Cell Letter June 2006 report, www.hfcletter.com/about/DoE_Merit_Review_06.html.

