

## **Manufacturing R&D for the Hydrogen Economy Roadmap Workshop**

In his 2003 State of the Union Address, President Bush announced a \$1.2 billion Hydrogen Fuel Initiative to accelerate the development of the hydrogen and fuel cell technologies needed to move the U.S. toward a future hydrogen economy. While many scientific, technical, and institutional challenges must be overcome to realize the vision of the hydrogen energy economy, moving from today's laboratory-scale fabrication technologies to low-cost, high-volume commercial manufacturing has been identified as one potential showstopper to a future hydrogen economy.

The Federal Interagency Working Group on Manufacturing has, therefore, identified Manufacturing R&D for the Hydrogen Economy as a priority area to coordinate and leverage federal efforts aimed at low-cost, high-volume manufacturing processes; advanced manufacturing tools, manufacturing infrastructure, and measurements and standards. Participants in this working group include the Department of Energy (lead organization), Department of Agriculture, Department of Commerce, Department of Defense, Department of Transportation, Environmental Protection Agency, National Aeronautics and Space Administration, National Science Foundation, Office of Management and Budget, and the White House Office of Science and Technology Policy. Over the last year, this working group has been laying the foundation for developing a roadmap to guide and coordinate R&D efforts on manufacturing critical to commercializing hydrogen and fuel cell technologies. The *Roadmap Workshop on Manufacturing for the Hydrogen Economy* is the next step in this process.

The purpose of this workshop is to bring together key industry, university and government representatives to discuss the critical issues facing all aspects of manufacturing for hydrogen products: (1) hydrogen production and delivery systems, (2) hydrogen storage systems, and (3) fuel cells that convert hydrogen into electric energy. The workshop will outline the key technical problems facing the manufacture of hydrogen systems today and identify priorities for research and development of manufacturing processes needed for the transition to a hydrogen economy (2005-2025). The recommendations from this workshop will be incorporated into the *Roadmap on Manufacturing R&D for the Hydrogen Economy*. This roadmap will be used to guide R&D on critical manufacturing and technical standards required for low-cost, high-volume production, and to direct future public-private partnerships that will facilitate transfer of technology to industry through cost-shared projects.

## Agenda

### Workshop on Manufacturing R&D for the Hydrogen Economy

July 13-14, 2005  
Hamilton Crowne Plaza Hotel  
Washington, D.C.

*Workshop Goal – Develop a roadmap for research & development of manufacturing processes for hydrogen technologies (by identifying and prioritizing R&D needs).*

### Wednesday, July 13, 2005

#### ***Plenary Session***

08:30 Welcome & Introduction - Doug Faulkner, DOE

08:45 Plenary Remarks

- President's Manufacturing Initiative – Dale Hall, DOC/NIST
- President's Hydrogen Fuel Initiative – JoAnn Milliken, DOE
- Charge to Workshop Participants – George Sverdrup, NREL

09:45 Move to Breakout Groups

#### ***Parallel Breakout Sessions***

#### ***(1) Production & Delivery, (2) Storage, and (3) Fuel Cells***

10:00 Instructions and Introductions

10:15 Background Presentation by Industry Expert

- Requirements for manufactured systems
- Status of manufacturing technologies
  
- Production Session: Rick Zalesky, Chevron Technology Ventures
- Storage Session: Andy Abele, Quantum Technologies
- Fuel Cells Session: Steve Mallinson, Ballard Power Systems

11:00 Identify Hydrogen Systems/Components to be Manufactured through 2025  
- *Facilitated Session*

12:15 Lunch (provided)

1:15 Work in Small Groups, organized by component category to:

- Identify Current Manufacturing Status and Limitations
- Define Manufacturing Targets/Goals
- Identify Manufacturing Technology Needs

3:00 Break

3:15 Report-Outs from Small Groups and Facilitated Discussion and Input

5:15 Adjourn – dinner on your own

## **Thursday, July 14, 2005**

### ***Resume Parallel Breakout Sessions Production & Delivery, Storage, Fuel Cells***

08:30 Identify and Prioritize R&D Required to Develop the Needed  
Manufacturing Technologies -- *Facilitated Discussion Session*

10:30 Break

10:50 Review and Discuss Top-Priority Selections and Identify Gaps - *Facilitated  
Session*

11:15 Identify Core (Supporting) Technologies Needed for Manufacturing -  
*Facilitated Session*

12:00 Working Lunch: Breakout Groups prepare and review group material for  
concluding plenary summary session

### ***Plenary Session***

1:00 Summary Remarks by Breakout Group Speakers

- Production & Delivery
- Storage
- Fuel Cells

2:30 Options for Structuring Public/Private R&D Partnerships

- Pete Devlin, DOE
- Terry Lynch, DOC/NIST

2:50 Intellectual Property Considerations

- Terry Lynch, DOC/NIST
- Paul Gottlieb , DOE

3:20 Closing Remarks - JoAnn Milliken, DOE

3:30 Adjourn