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Speech

Opening Remarks of
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Over the past two days, the meeting has considered the major science, technology, economic and societal challenges facing the international community in transitioning to, and safely implementing, a next generation hydrogen economy.

We know from the U.S. Department of Energy's recent report on "*Basic Research Needs for the Hydrogen Economy"* that the scientific and research community still faces a number of fundamental challenges in this area. We also know that we will need improvements in our basic scientific understanding as well as some important technology breakthroughs if we are to overcome these barriers to a hydrogen-powered future.

Our task today is to discuss a common agenda for developing a technology base through international cooperation. As we build R&D partnerships between industry, government, and the academia community across our national borders, we must keep our respective governmental missions and regulatory frameworks in mind. We must also maintain the relevance of our research programs to the needs of the end users who, after all, will be the ultimate beneficiaries of our work.

My interest as a representative of the U.S. Department of Transportation, of course, is the critical research and development that needs to be done to enable the safe, reliable, and secure storage and transport of hydrogen, as well as the safe deployment of reliable hydrogen powered vehicles into our transportation system. DOT's Research and Special Programs Administration has major responsibility for regulating the safety of hydrogen transport and delivery via pipelines, truck or rail, and the safe transportation of hazardous materials in general. DOT's National Highway Traffic Safety Administration is responsible for developing fuel system safety requirements for passenger car and light truck occupants, and for establishing fuel economy standards for hydrogen vehicles. Other DOT administrations—for example, the Federal Railroad Administration, the Federal Transit Administration, and the Federal Motor Carrier Safety Administration—are responsible for the safety and technology issues that arise in connection with locomotives, buses and trucks that are powered by fuel cells, or compressed or liquid hydrogen.

Because transportation-related goods and services represent over 11% of the U.S. Gross National Product, our hydrogen-related R&D and technology deployment – if done right – will translate into enormous value for our society. Doing it right, therefore, must be seen as a critical objective. We must carefully think through all of the implications of moving to a hydrogen economy, including shifts in our industrial base, changes in labor force skill requirements, possible materials displacements, and the like. Transportation equipment must be safe, reliable, affordable, and user-friendly, as well as easily maintainable and recyclable. These are fairly stringent constraints, but any hydrogen vehicle will have to meet them to be considered road-worthy here in the United States. I'm sure it's no different in any of the countries represented here today.

I hope that gives you at least some familiarity with the Department of Transportation's perspective on the importance of R&D to the development of a hydrogen economy. I would add only that, while our specific regulatory responsibilities are addressed to the safety of both infrastructure and vehicles and to fuel efficiency, the core objective of the Department of Transportation is the facilitation of mobility and maximizing the contribution that transportation makes to economic growth. That's why we are such enthusiastic participants in this march toward a hydrogen economy. By ensuring that all equities are addressed from the very outset, we will accelerate significantly our accomplishment of the ultimate goal.

I would like to structure our discussion today to ensure that we have an opportunity to touch on the following areas:

- production processes
- storage technologies (pressurized tanks for gases and liquids, or solid state hydrides)
- delivery methods (pipeline, rail, tanker trucks)
- conversion technologies (fuel cells, advanced combustion)
- and finally, end-use energy markets.

Throughout our discussion we should maintain an *integrated systems perspective* of a future hydrogen economy that will be a multi-faceted enterprise and addresses some potentially turbulent transition issues.

I also think it would be helpful to ask the research community to adopt a *life-cycle perspective*, which is vital to anticipating and preventing undesirable side effects of prematurely deployed technologies. Lifecycle considerations will assist us in effecting a smoother transition from petroleum to hydrogen fuel and focus our limited resources on functional, implementable solutions. These considerations should include economics and resource sustainability, environmental impacts, and safety and reliability. This holistic perspective balances the capabilities and market needs for each technology segment and will help to ensure our energy and environmental security with end-use technologies successfully deployed as mass-market consumer products.

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