UNITED STATES ENERGY ASSOCIATION

**INTERNATIONAL PARTNERSHIP FOR THE
HYDROGEN ECONOMY MINISTERIAL
CONFERENCE**

Final Report

DOE Award Number: DE-FG36-03GO13174
United States Energy Association
Name of Project Director: William L. Polen
April 4, 2006

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Executive Summary

The inaugural ministerial meeting of the International Partnership for the Hydrogen Economy (IPHE) was conducted November 18-21, 2003 in Washington DC. On November 20, Secretary of Energy Spencer Abraham led ministerial representatives from the following fifteen nations and the European Commission in the signing of the IPHE Terms of Reference (TOR), thereby creating the IPHE as an institution designed to facilitate coordinated research on emerging hydrogen technologies: Australia, Brazil, Canada, China, France, Germany, Iceland, India, Italy, Japan, Norway, Republic of Korea, Russian Federation, United Kingdom, and the United States. The U.S. Departments of Energy, State and Transportation organized the ministerial meeting with the support of the United States Energy Association.

The IPHE is a major international component of the Administration's enhanced focus on hydrogen technology in addressing energy security and environmental needs over the coming century. The IPHE complements the \$1.2 billion five year hydrogen research and development commitment announced by President Bush in his 2003 State of the Union Address.

Energy needed to produce hydrogen can be obtained from many sources, including fossil fuels. When combined with carbon capture and storage or when produced from renewables or other emission free sources (i.e., nuclear), hydrogen production holds the promise of a plentiful fuel that will help safeguard the world's climate system. The cost of producing a unit of hydrogen, the cost of fuel cells and cost of developing hydrogen storage, transportation and distribution networks using current technology are impediments to the transition to the hydrogen economy.

A growing number of countries have committed to accelerate the development of hydrogen and fuel cell technologies to improve their energy security, environmental security and economic security. The IPHE provides an institutional mechanism for partner countries to coordinate their pre-competitive hydrogen research and development programs. Coordinated research through the IPHE is expected to accelerate breakthroughs in material science, standardization of technical codes and standards, and

the development of manufacturing economies of scale that are necessary for the widespread commercial diffusion of hydrogen technologies.

The IPHE is designed to:

- Identify and promote potential areas of bilateral and multilateral collaboration on hydrogen and fuel cell technologies;
- Analyze and recommend priorities for research, development, demonstration, and commercial utilization of hydrogen technologies and equipment;
- Analyze and develop policy recommendations on technical guidance, including common codes, standards and regulations, to advance hydrogen and fuel cell technology development, demonstration and commercial use;
- Foster implementation of large-scale, long term public-private cooperation to advance hydrogen and fuel cell technology and infrastructure research, development, demonstration and commercial use, in accordance with Partners' priorities;
- Coordinate and leverage resources to advance bilateral and multilateral cooperation in hydrogen and fuel cell technology research, development, demonstration and commercial utilization;
- Address emerging technical, financial, legal, market, socioeconomic, environmental, and policy issues and opportunities related to hydrogen and fuel cell technology that are not currently being addressed elsewhere.

Pursuant to the TOR, two IPHE standing committees were established. The Steering Committee will govern the overall framework, policies and procedures of the IPHE, periodically review the program of collaborative activities, including a review of the organizational structure if necessary, and provide direction to the Secretariat. David K. Garman, Assistant Secretary for Energy Efficiency and Renewable Energy, was elected Chair of the Steering Committee. India, Italy, Japan and Canada were elected as Vice Chairs and are expected to soon report to the Secretariat, the names of their nominees for these positions.

The Implementation and Liaison Committee reports to the Steering Committee. The Implementation and Liaison Committee will review the progress of collaborative projects; identify promising directions for research, development, demonstration, and commercial use; provide technical assessments for policy decisions, pursue international codes and standards and safety protocols, and make recommendations to the Steering Committee on needed actions. Dr. Hanns-Joachim Neef of Germany and Professor Thorsteinn Sigfusson, Chairman of Iceland New Energy, were elected co-Chairs. The European Union, Russia and Brazil were elected as vice chairs and are expected to soon report to the secretariat the names of their nominees for these positions.

The principle coordinator of the IPHE's communication and activities is the IPHE Secretariat. The Secretariat: 1) organizes the meetings of the IPHE and its committees; 2) arranges special activities such as teleconferences and workshops; 3) receives and forwards new membership requests to the Steering Committee; 4) coordinates communications with regard to IPHE activities and their status; 5) acts as a clearinghouse of information for the IPHE, 6) maintain procedures and responsibilities for key functions that are approved by the Steering Committee; and 7) performs other such tasks as the Steering Committee directs. The focus of the Secretariat will be administrative. The Secretariat will not act on matters of substance except as specifically instructed by the Steering Committee.

The U.S. Department of Energy will serve initially as the IPHE Secretariat unless otherwise decided by consensus of the Partners. This arrangement will be reviewed at two year intervals.

The ministerial meeting commenced on the evening of November 18 at a welcoming reception for over 500 participants on the floor of the international Technology Showcase. Organized by the United States Energy Association and sponsored by Daimler Chrysler, Ford Motor Company, General Motors, Shell Hydrogen and ChevronTexaco, the showcase fostered vigorous public/private interaction between technology developers/vendors, members of the official parties and other private sector companies. In addition to the sponsors, the following companies, associations and research laboratories purchased space in the showcase and organized technology exhibits: Ballard Power Systems; BOC; BP; ECD Ovonic; Fuel Cell Canada; FuelCell Energy, Inc.; H2Gen Innovations; Honda; Hydrogenics Corporation; Hyundai Motor Company; Nissan; Plug Power, Inc.; Sandia National Laboratories; Toyota; and the U.S. Fuel Cell Council. The showcase served as the venue for morning and afternoon breaks as well as evening receptions on November 19 and 20. As a result, exhibitors experienced a constant flow of traffic in the two exhibition areas: an indoor exhibit of stationary fuel cell applications and an outdoor tented exhibit of hydrogen vehicles from seven automobile manufacturers. Anecdotal evidence suggests that equipment sales were initiated at the Technology Showcase.

A Public/Private Dialogue on Moving Forward with the Hydrogen Economy was conducted on November 19. The dialogue was organized to: 1) provide a mechanism for the private sector to offer input to official party members on its research priorities, goals and objectives for the IPHE; and 2) facilitate discussion among the IPHE partners and between the partners and the private sector on the status and future directions of national hydrogen research programs. Secretary of Energy Spencer Abraham opened the dialogue with welcoming remarks, during which he read a letter addressed to the delegates from President Bush. Over 45 senior government officials and leading private sector representatives drawn from each of the IPHE partners participated in the dialogue. Results from the dialogue's policy, research and development and market facilitation tracks were reported out in a special session on the afternoon of November 20 as input to the IPHE Steering and Implementation and Liaison Committees in advance of their initial

meetings on November 21. The November 19 program concluded with a congressional reception on Capitol Hill for ministers and senior private sector representatives.

The official ministerial meeting was conducted on the morning of November 20. The Secretary of Energy Spencer Abraham opened the meeting with a keynote address. Key points from the address are as follows: 1) the U.S. is committed to the creation of a hydrogen economy as evidenced by the \$1.7 billion planned investment in hydrogen vehicle and storage technology research and development over the next five years; 2) this commitment stems from both the desire to increase U.S. energy security and because hydrogen presents a clean energy option for the future – total wells-to-wheels fuel consumption of a fuel cell vehicles powered by hydrogen is 50% less than a comparable gasoline powered vehicle and produces 60% less greenhouse gas emissions; and 3) hydrogen production on the scale necessary to transform the economy will come from sources as diverse as fossil fuels coupled with the sequestration of carbon, renewable energy, and nuclear energy.

Following Secretary Abraham's keynote address, remarks by James Connaughton, Chairman of the White House Council for Environmental Quality, and remarks by Under Secretary of State Paula Dobriansky, ministerial representatives from each partner country provided a 10 minute statement outlining their national hydrogen program and aspirations for the IPHE. Secretary of Transportation Norman Mineta provided an address at the ministerial luncheon. For ministerial statements, see <http://www.iphe.net>

On the afternoon of November 20, the ministers participated in an exclusive "ride and drive" at the Washington Grand Prix race track organized by the United States Energy Association. The ride and drive afforded ministers and senior staff with the opportunity to test drive hydrogen powered vehicles from from DaimlerChrysler, Energy Conversion Devices, Ford, GM, Hyundai, Honda, Nissan, and Toyota. Several ministers, including Mr. Admowitch of Germany and Minister Sverisdottir of Iceland, also test drove a GM mass transit hydrogen powered passenger bus. The ministerial program concluded on November 20 with a ministers-only dinner hosted by Secretary Abraham at Blair House.

Nearly 200 official party and private sector representatives participated in the initial meetings of the Steering and Implementation and Liaison committees on Friday, November 21.

Comparison of the Actual Accomplishments with the Goals and Objectives of the Project

The goal of the project was to organize and conduct a ministerial meeting to launch the International Partnership for the Hydrogen Economy, a sixteen member nation initiative designed to coordinate and accelerate pre-competitive international cooperative research, development and demonstration hydrogen and fuel cell projects.

The following goals and objectives were accomplished through the award:

- The IPHE Ministerial Meeting was conducted on November 20, 2003 with official participation from Australia, Brazil, China, European Commission, France, Germany, Iceland, India, Italy, Japan, Korea, Norway, Russia, United Kingdom, United States
- The Terms of Reference were signed by ministerial representatives officially creating the International Partnership for the Hydrogen Economy on November 20, 2003
- A Public/Private Dialogue on Moving the Hydrogen Economy Forward was conducted on November 19, 2003 to provide private sector input to the Ministerial meeting conducted the following day. Senior ministry officials and private sector corporate leaders from the hydrogen and fuel cell industry participated in the dialogue.
- The United States Energy Association created and maintained a website for the International Partnership for the Hydrogen Economy: www.iphe.net. The website contains the signed Terms of Reference, a complete set of ministerial and private sector presentations delivered at the Ministerial Conference and Public/Private Dialogue; a members only section for IPHE government representatives to access working documents for the ongoing activities of the partnership; and a photographic archive of the Ministerial Conference
- The United States Energy Association organized a Technology Showcase for leading hydrogen and fuel cell technology vendors as a method of informing the ministerial delegates and members of the public of the potential for hydrogen and fuel cell technology. The showcase was attended by over 500 meeting participants
- The United States Energy Association organized a hydrogen and fuel cell vehicle "Ride and Drive" for ministerial delegates at RFK Stadium in Washington, DC on the afternoon of November 20, 2003. Seven automobile manufacturers provided hydrogen and fuel cell vehicles for the demonstration program designed to provide an opportunity for ministers to handle the technology
- The IPHE Steering Committee and Implementation-Liaison Committee were established. The United States was appointed Chair of the Steering Committee and Iceland and Germany were appointed co-chairs of the Implementation-Liaison Committee
- The US Department of Energy was appointed the Secretariat for the IPHE for its initial two year period of operation
- The United States Energy Association conducted a US stakeholder briefing update on the activities of the IPHE for private sector participants in June 2004,

November 2004 and June 2005. Each briefing was attended by over 100 participants.

- The United States Energy Association produced a set of Hydrogen and Fuel Cell Fact sheets designed to inform the general public of the benefits of, and challenges, advancing the hydrogen economy. Fact sheets on the following subjects were developed:
 - Hydrogen Production
 - Hydrogen Storage
 - Fuel Cells
 - Regulations, Codes and Standards
 - Socioeconomics of Hydrogen

The IPHE Fact Sheets may be found at www.iphe.net

Products Developed Under this Award

- 1) The IPHE website www.iphe.net was created, updated and maintained through this award. The website contains a collection of the Ministerial Conference proceedings, current IPHE working documents developed by the committees and working groups, a calendar of events and a members only section with contact information and committee documents.
- 2) The United States Energy Association produced a set of Hydrogen and Fuel Cell Fact sheets designed to inform the general public of the benefits of, and challenges, advancing the hydrogen economy. Fact sheets on the following subjects were developed:
 - Hydrogen Production
 - Hydrogen Storage
 - Fuel Cells
 - Regulations, Codes and Standards
 - Socioeconomics of Hydrogen
- 3) The United States Energy Association published a summary of the initial US stakeholder briefing conducted in June 2004.