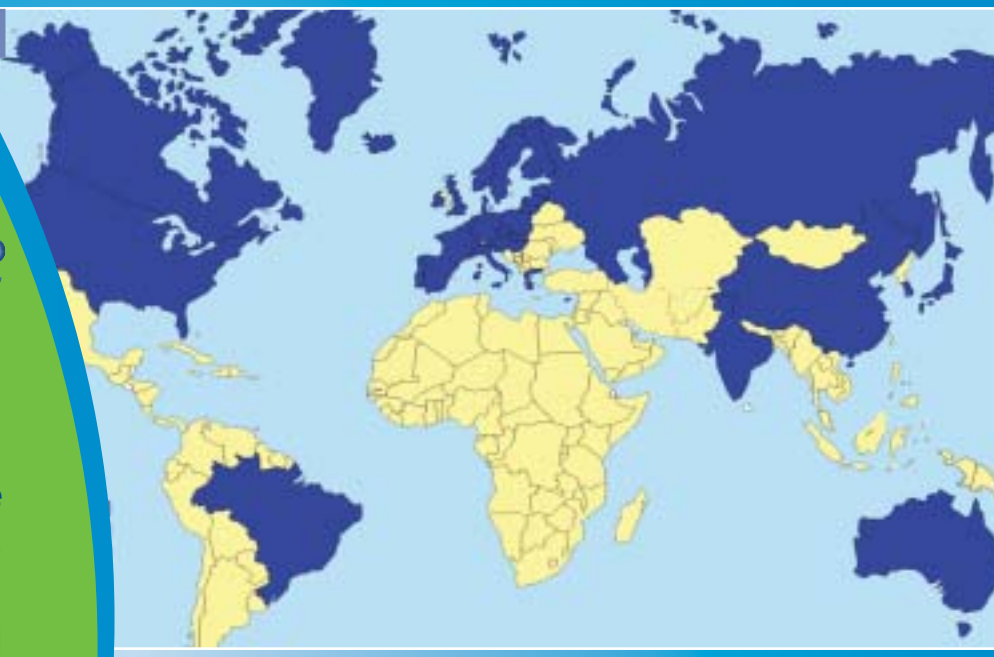
International Partnership for the Hydrogen Economy



Mission Statement:

Serve as a mechanism to organize and implement effective, efficient, and focused international research, development, demonstration and commercial utilization activities that advance the transition to a global hydrogen economy

INTRODUCTION AND OVERVIEW

Fuel Cell Cost and Durability

Cost is also the greatest impediment to widespread fuel cell development and adaptation. A technical challenge facing fuel cells is the need to increase durability and dependability to ensure commercial acceptance. Currently, high-temperature fuel cells, in particular, are prone to material breakdown and shortened operating lifetimes.

Development and demonstration of more advanced technologies will be an important step toward a hydrogen economy.

Renewable Hydrogen Energy Production

Safety Codes and Standards

Hydrogen, like gasoline or any other fuel, has safety risks and must be handled with caution. Internationally consistent codes and standards are needed to ensure safety, and to commercialize hydrogen as a fuel.

Public Acceptance

Consumers must embrace hydrogen and fuel cell technologies before their benefits can be realized. This is especially true for transportation, stationary residential, and portable applications, where consumers will interact directly with these technologies.

THE IPHE: LEADING THE WAY TO THE HYDROGEN ECONOMY

The first steps toward a hydrogen economy will build on the established commercial processes and systems in use today. A range of advanced technologies to produce, store, transport, and use hydrogen are already under development. Demonstration and commercialization of these new technologies will facilitate the transition to a hydrogen economy.

The IPHE provides a mechanism for partners to organize, coordinate and implement effective, efficient, and focused international research, development, demonstration and commercial utilization activities related to hydrogen and fuel cell technologies. The IPHE provides a forum for advancing policies, and common technical codes and standards that can accelerate the cost-effective transition to a hydrogen economy. It also educates and informs stakeholders and the general public on the benefits and challenges of establishing a hydrogen economy.

Coordination through the IPHE will leverage scarce international RD&D funds; thereby reducing the cost of the hydrogen and fuel cell research programs of the IPHE partners. IPHE partners will benefit from increased information sharing, which will facilitate efficiencies in their research and demonstration programs.

IPHE Functions:

- 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; and
- 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.

THE INTERNATIONAL PARTNERSHIP FOR THE HYDROGEN ECONOMY

The International Partnership for the Hydrogen Economy was established in 2003 as an international institution to accelerate the transition to a hydrogen economy. The IPHE Partners include:

Australia • Brazil • Canada • China • European Commission • France • Germany • Iceland • India • Italy • Japan • (Republic of) Korea • Norway • Russian Federation • United Kingdom • United States

Together, the IPHE Partners account for:

- Over $35 trillion in GDP, an amount equal to 85% of global GDP;
- Over three-quarters of global electricity consumption;
- Two-thirds of global energy consumption; and
- Two-thirds of global CO_2 emissions

By creating the IPHE, the Partners have committed to accelerate the development of hydrogen and fuel cell technologies to improve their collective energy, environmental and economic security.

Members of the IPHE Implementation–Liaison Committee, September 2004

A VISION OF THE HYDROGEN ECONOMY

Energy systems of the future must be cleaner and much more efficient, flexible, and reliable to meet growing global consumer demands. The hydrogen based energy economy offers a potential solution to satisfying global energy requirements while reducing carbon dioxide and other greenhouse gas emissions and improving energy security.

The hydrogen economy is one in which hydrogen is produced cleanly and cost-effectively, from a variety of sources. These include all renewables, fossil fuels (using carbon sequestration), and nuclear energy. In a hydrogen economy, hydrogen is routinely produced and safely stored and delivered to customers to use in residential, commercial, industrial and transportation uses.

In the hydrogen economy, hydrogen-powered fuel cells and engines are as common as the gasoline and diesel engines of the late 20th century—they power our cars, trucks, buses, and other vehicles, as well as our homes, offices, and factories.

OVERCOMING CHALLENGES TO THE HYDROGEN ECONOMY

Although the potential benefits of hydrogen and fuel cells are significant, many challenges, technical and otherwise, must be overcome before they will offer a competitive alternative for consumers.

Hydrogen Vehicle Ride & Drive during IPHE Ministerial Meeting, November 20, 2003

Production & Delivery

While hydrogen is used in various industrial applications, it is rarely used as an energy carrier. Cost is the biggest impediment to using hydrogen on a widespread basis. Hydrogen is significantly more expensive to produce than conventional fuels. In addition, the current system for delivering conventional fuels to consumers cannot be used for hydrogen. As a result, changes must be made in energy infrastructure to accommodate hydrogen utilization by residential, commercial and industrial consumers.

Storage

Hydrogen has a low energy density in terms of volume, making it difficult to store amounts necessary for most applications in a reasonably sized space. This is a particular problem for hydrogen-powered fuel cell vehicles employing on-board storage technologies. High-pressure storage tanks are currently being developed, and research is being conducted into the use of other storage technologies such as metal hydrides and carbon nanostructures (materials that can absorb and retain high concentrations of hydrogen).

An alternative may be on-board reformation of higher density fuels such as natural gas, gasoline, and methanol. An added benefit of this approach is that it does not require the development of new infrastructure for the distribution of pure hydrogen. However, on-board reformation of higher density fuels results in the emission of carbon dioxide, although in lesser quantities than the traditional use of these fuels.

IPHE ORGANIZATIONAL STRUCTURE

The IPHE organization is governed by a Terms of Reference that established a two-committee structure. A Steering Committee governs the overall framework, policies and procedures of the IPHE. It provides overall policy guidance and direction and periodically reviews collaborative activities.

The Implementation–Liaison Committee reports to the Steering Committee. This committee reviews the progress of collaborative projects; identifies directions for research, development, and demonstration; provides technical assessments for policy decisions; and pursues international codes and standards and safety protocols.

The Implementation–Liaison Committee serves as the interface with interested international stakeholders to share information on IPHE activities and will develop advice and counsel for the Steering Committee.

MEMBERSHIP AND PARTICIPATION IN THE IPHE

The IPHE has established criteria and a procedure for countries and governmental organizations that seek membership. Ministers representing countries and governmental organizations should send a letter of application to the Executive Director of the IPHE Secretariat. The letter should demonstrate the commitment of the applicant to: 1) substantial, long-term resource commitments to hydrogen and fuel cell technology research and development activities; 2) a well-defined vision and national strategy to advance technology deployment and infrastructure development, and 3) policies and strategies that effectively advance private sector development of a hydrogen economy. The Secretariat will forward letters of application to the Steering Committee for consideration.

FURTHER INFORMATION ON THE IPHE

The principal coordinator of the IPHE communications and activities is the IPHE Secretariat. For further information, please contact:

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