



The Role of the IPHE in Promoting International Cooperation



International Partnership
for the Hydrogen Economy

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April, 2008



Presentation Outline

- IPHE Overview
- International Hydrogen and Fuel Cell Activities
- International Partnerships



IPHE Purpose

“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 and to provide a forum for advancing policies, and common codes and standards.”



IPHE History

- Established in November 2003 for 10 years
- Two committee structure (ILC and SC) supported by a Secretariat
- Chaired by United States for initial 4 years including Secretariat function
- 17 partners with growing interest



IPHE Partners



Russian Federation



USA



Canada



Iceland



IPHE Partners' Economy:

- Over \$35 Trillion in GDP, 85% of world GDP
- Nearly 3.5 billion people
- Over 75% of electricity used worldwide;
- > 2/3 of CO₂ emissions and energy consumption



Japan



Republic of Korea



China



India



United Kingdom



France



Germany



Italy



Australia



Brazil



Norway



European Commission

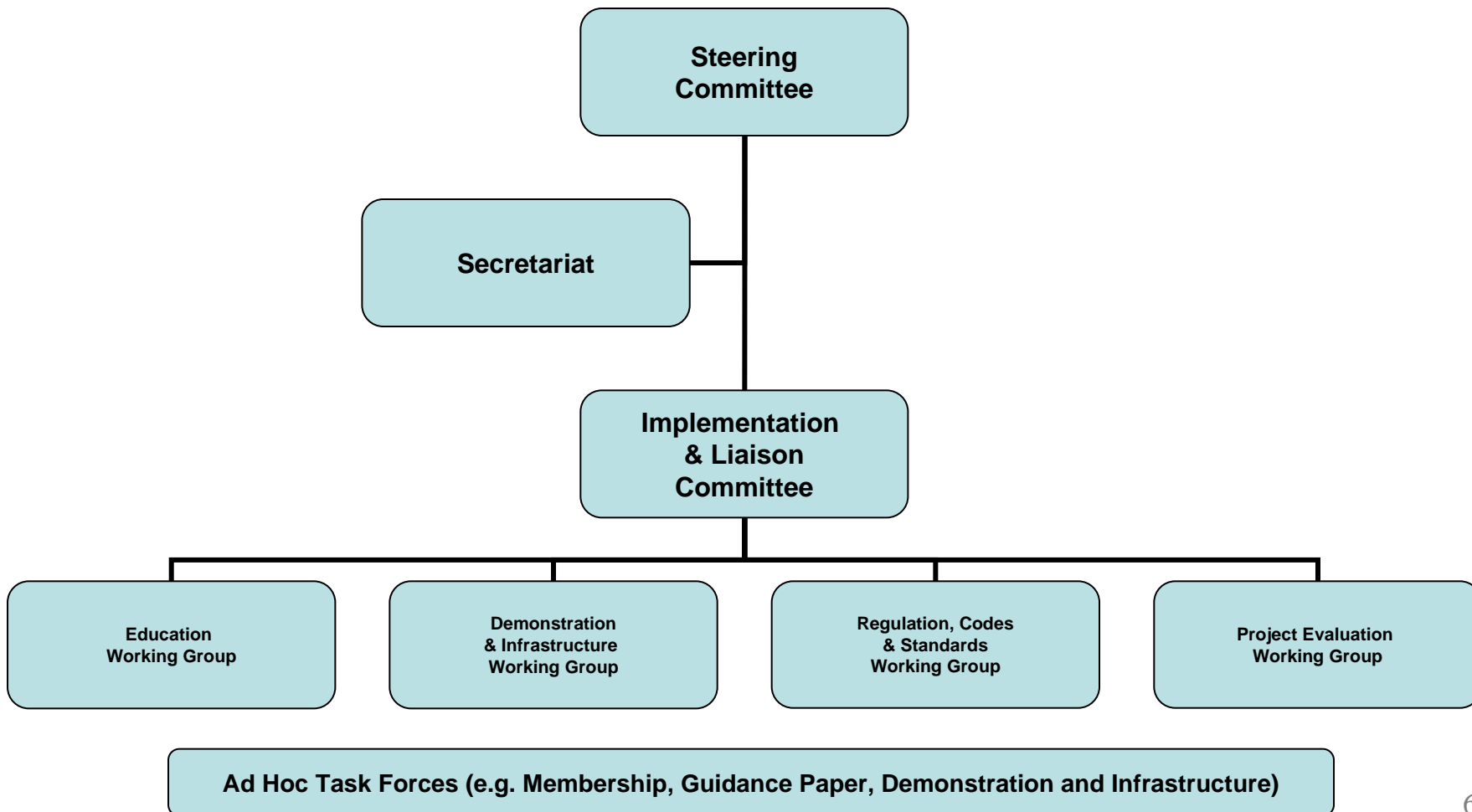


New Zealand





IPHE Structure





IPHE Functions

- Identifies/promotes potential areas of bilateral & multilateral collaboration;
- Analyzes & recommends priorities for RD&D/commercial/utilization
- Analyzes & develops policy recommendations on technical guidance
- Fosters implementation of public-private cooperation
- Coordinates & leverages resources to advance bilateral/multilateral cooperation
- Addresses emerging technical, financial, legal, market, socioeconomic, environmental, policy issues & opportunities not currently being addressed elsewhere



IPHE Priorities

1. Accelerating the market penetration and early adoption of hydrogen and fuel cell technologies and its supporting infrastructure.
2. Raising profile with policy-makers and public - Continuing education (ILC) and outreach (SC) efforts.
3. Monitor hydrogen, fuel cell and complementary technology developments.
4. Policy and regulatory actions to support widespread deployment.



IPHE Activities

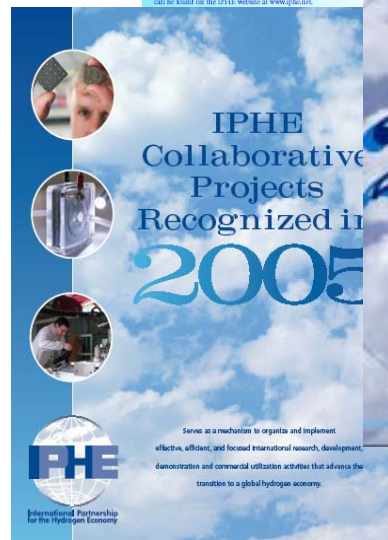
- RD&D and commercial utilization collaborative projects & workshops
- IPHE communication and outreach
- IPHE publications
 - Newsletter
 - Collaborative Projects Brochure
 - Awards Program
 - Scoping Papers



From left to right: Royal Dutch Shell and David L. Paul, Chevron Corporation Lead Recipient of Inaugural IPHE Award

SHELL'S BENTHAM AND CHEVRON'S PAUL LEAD RECIPIENTS OF INAUGURAL IPHE AWARDS PROGRAM

Talbot Hunt, Director of Energy Research for the European Commission, Chairman of the Atomic Energy Commission of France, named the inaugural Excellence in Leadership and Technical Achievement of the International Partnership for the Hydrogen Economy (IPHE) 2006 World Hydrogen Energy Conference (WHEC) in Lyon, France. The IPHE Annual Awards Program was launched this year to formal and honor exceptional international hydrogen and fuel cell advances. All the objectives of the IPHE. Detailed information on all of the awards can be found on the IPHE website at www.iphe.net.





Accomplishments

- Unique forum joining together leading countries working to advance hydrogen technologies
 - IPHE-IEA MOU 
- Organized and implemented effective collaborative activities and projects
 - 30 collaborative R&D projects approved
 - Dozens of IPHE sponsored workshops
- Identifying common international priorities for advancing hydrogen in the economy
 - Engaging governments and aligning objectives



Global Public Investments

For 2007 – Public investment of just under \$1B US

- **North America - \$400M US**
- **Europe – \$214M US**
- **Asia - \$262M US**





Industry Focus on Commercialization

According to Fuel Cell Today ramp-up of activity in 2007*

- Over past three years, annual growth rate of 59%
- 12,000 new units shipped
 - 98% of units low temperature (PEM, DMFC)
 - 8000 units in transport sector (APU, materials handling)
 - UPS for ICT and CHP dominate stationary markets
 - Military driving portable markets
- Global Manufacturing: 100,000 units per annum
 - 25% from companies dedicated to h₂/fuel cells
- Cost reductions averaging 10% to 20% per annum

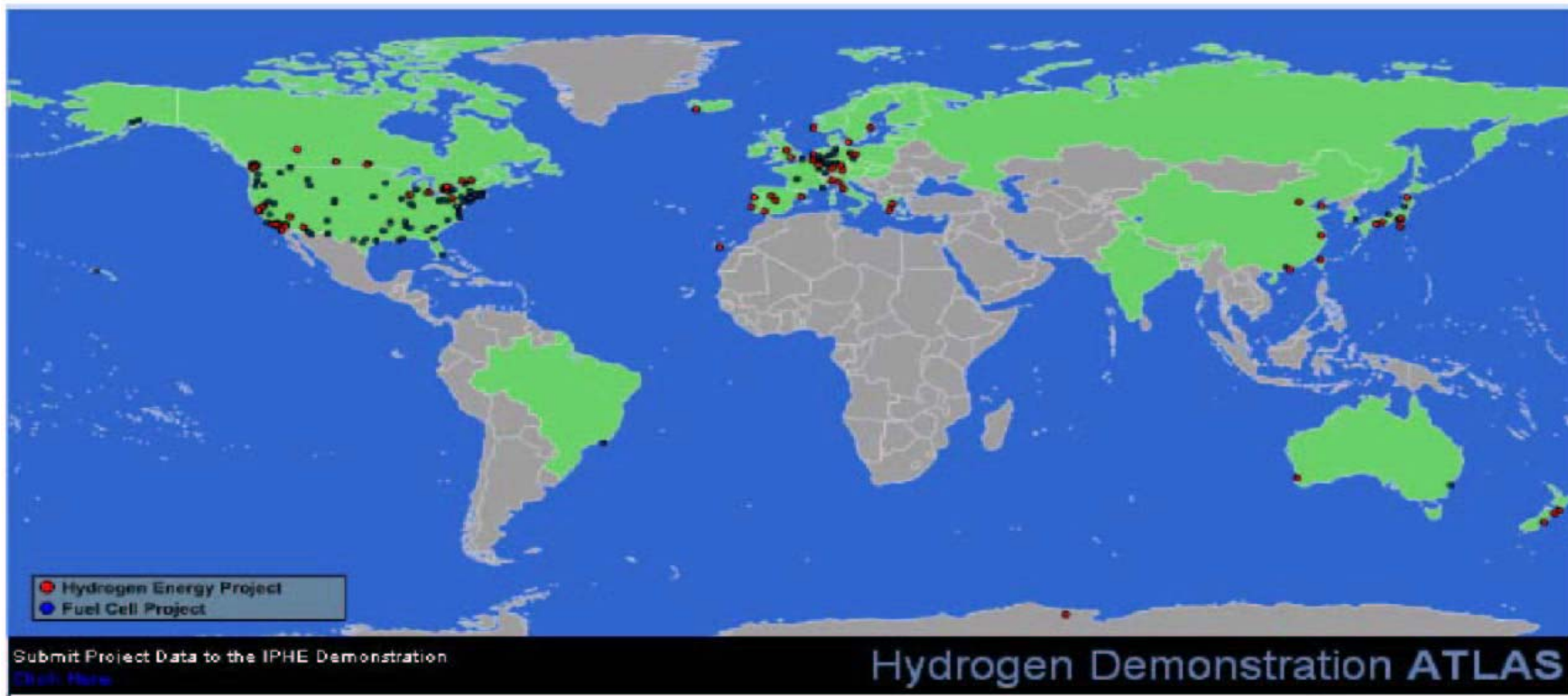


*Fuel Cell Today: Fuel Cells: Commercialization Industry Review 2008



IPHE Member Activities Demonstration

- Trend towards global collaboration for demonstration
- IPHE provides a venue for sharing information, best practices and resources





IPHE Demonstration Highlights



Canada: British Columbia's Hydrogen Highway



Germany: Clean Energy Partnership
Fuel cell vehicles in Berlin
Build-up of hydrogen infrastructure



US - 77 fuel cell vehicles and 14 H2 refueling stations currently in operation



Europe: HyWays: A European Roadmap



Japan: Large-Scale Demonstration Project for Stationary PEFC system
Stationary 1kW-class PEFC CHP systems for residential throughout Japan



IPHE Demonstration Highlights

- H₂/Fuel Cell Automobiles



Members have partnerships with major automotive OEM's including Daimler, Ford, GM, Toyota, Honda, Nissan, Hyundai, BMW, Fiat



Over 100 vehicles demonstrated with significant programs in US, Japan & Germany

Transport still big commercial prize for hydrogen technologies but requires advances in PEM technology, H₂ infrastructure & storage



IPHE Member Activities Deployment

- UPS for ICT, Residential Back-up Power, Buses, Materials Handling



Canada and US:
Fuel Cell Forklifts at
GM and Walmart
Distribution Centres



Japan: Large-Scale Demo Project for Stationary PEFC system – over 2000 units installed

H2 Fuel Cell Buses across Europe, in China, UK, US, and Canada – 20 fuel cell buses in Whistler, BC



US: Uninterrupted power supply (UPS) to keep critical data centers and telecommunications up and running



IPHE Member Activities H2 Infrastructure

- H2 production/distribution from a variety of hydro carbon and renewable hydrogen sources



New Zealand: Wind-/HyLink-/AFC H2 Distributed energy project a first for rural communities



Germany: H2 for transit buses

Italy, China: Green Coal-Based Power Generation



Canada: World First 700 Bar H2 Refueling Station



Japan: JHFC Yokohama-Tsurumi Hydrogen Station

US: Hydrogen and gasoline station Washington, DC





IPHE Member Activities - R&D

R&D to support commercialization

- Linking learnings from demonstration to R&D
- Durable electrodes and membranes for PEM & alkaline fuel cells, materials to reduce h2 degradation
- Hydrogen Production – coal with CO-02 sequestration, biomass, renewables/electrolysis, natural gas and natural gas via medium-temperature plasma
- Hydrogen Storage – low pressure with focus on materials, chemical, high pressure, h2 separation membranes
- Hydrogen delivery and cost models for pathways



Focus: IPHE Fuel Cell Projects

Autobrane: Automotive High Temperature Fuel Cell Membranes

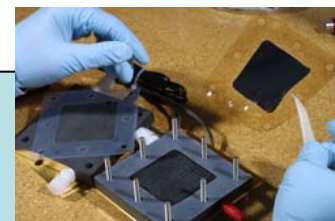
Application of Gradient Porous Composite MEAs for Different Types of Fuel Cells

Diagnostic Tools as Applied to PEM Fuel Cells

CARISMA: Coordination Action for Research on Intermediate and high temperature Specialized Membrane Electrode Assemblies

SOFC600: Demonstration of SOFC stack technology for operation at 600°C

NextGenCell: Next Generation Stationary Fuel Cells





Partnerships are Essential

- Governments have played a key role in developing H₂ and fuel cell technologies through targeted investments - \$1B US in 2007*
 - Seven IPHE countries account for 80% of global investments
 - US, Japan, Germany, South Korea, China, Canada, UK
 - Significant investments made by the EC
 - Leveraging significant private sector investment
 - Many countries are home to industrial leaders across the value chain
- Drivers include energy security, environmental performance, health, and economic competitiveness and for some, energy accessibility and poverty reduction
- Partnership: partners share with each other the profits or losses of the undertaking in which all have invested.
- IPHE advocates an international, inclusive approach with strong leadership



IPHE Partnerships with the Developing World

Opportunities:

- Increased engagement
- Sharing of knowledge and expertise – partnerships in R&D, learning demonstrations, and product deployment
- Examining longer term potential for capacity building - development/manufacturing capacity



Thank you.

www.iphe.net