PATH: Assisting Countries with Hydrogen Codes, Standards and Regulations

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General Manager

PARTNERSHIP FOR ADVANCING OF THE TRANSITION TO HYDROGEN
The International Coalition of Hydrogen Associations

PATH's Mission

"To help national hydrogen associations be effective industry organizers and enablers, with strong engagement of academic and other stakeholder interests, for the national interests of their countries, and for the benefit of worldwide industry collaboration."

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PATH – Partnership for Advancing the Transition to Hydrogen

- **International Coalition of Hydrogen Associations**
- 16 countries and the European Hydrogen Association
- Mission: to spread a consensus vision of the hydrogen economy globally and facilitate its implementation.
- Current Activities:
  - Assisting partners in public outreach, government policy, advocacy, and codes & standards development
  - Building the international network of hydrogen advocates by holding Executive Meetings around the world
  - Writing a report on the state of the global hydrogen economy
  - Sharing information among partners through newsletters, webpages, and the Initiative Database
  - Helping other countries form associations

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PATH Associations

- **Asociación Argentina del Hidrógeno** (Argentina)
- **Asociación Española del Hidrógeno** (Spain)
- **Association Française de l'Hydrogène** (France)
- **Australia Institute of Energy - Hydrogen Division**
- **Canadian Hydrogen and Fuel Cell Association**
- **China Association for Hydrogen Energy**
- **DCT Energia** (Brazil)
- **European Hydrogen Association**
- **Hydrogen Energy Systems Society** (Japan)
- **Italian Hydrogen Forum**
- **Malaysia Technology University**
- **Massey University Centre for Energy Research** (New Zealand)
- **National Hydrogen Association** (U.S.)
- **Polish Hydrogen and Fuel Cell Association**
- **Sociedad Mexicana del Hidrógeno** (Mexico)
- **United Kingdom Hydrogen Association**

PATH associations represent 39% of the world's population and 76% of the global GDP.

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PATH 2009 Board of Directors

- Terry Kimmel, Chairman *Canadian Hydrogen and Fuel Cell Association*
- Dr. Ken Ota, Vice Chairman *Hydrogen Energy Systems Society – (Japan)*
- Jay Laskin, Treasurer - *National Hydrogen Association (U.S.)*
- Claude Derive - *Association Francaise de l'Hydrogene (France)*
- Dr. Andrew Dicks - *Massey University, Centre for Energy Research (New Zealand)*
- Juan Carlos Bolcich – *Asociación Argentina del Hidrógeno (Argentina)*
- Lars Sjunnesson – *European Hydrogen Association (Sweden)*

International H2 Organizations

- **IAHE**: International Association for Hydrogen Energy
  - Scientists, engineers, environmentalists, and decision makers
- **PATH**: Partnership for Advancing the Transition to Hydrogen
  - National hydrogen associations
- **IPHE**: International Partnership for the Hydrogen Economy
  - 17 national governments

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PATHways Report

Assessing Progress in the Global Hydrogen Industry

PATH Project Under Development

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India

Drivers

- Reduce dependence on import of petroleum products
- Promote diverse, domestic, and sustainable new and renewable energy
- Provide electricity to remote, rural and electricity deficient areas
- Promote use of hydrogen as a fuel for transport and power generation
- Reduce carbon emissions from energy production and consumption
- Increase reliability and efficiency of electricity generation

Source: National Hydrogen Energy Board, Ministry of New and Renewable Energy, Government of India: 2006

India

Strategy for 2020 Goals

National Hydrogen Energy Road Map:

- Total systems approach for developing hydrogen energy technologies and infrastructure
  - Public/private partnership

- 1 million vehicles based on hydrogen energy
  - Green Initiative for Future Transport (GIFT)

- 1000MW generating capacity using hydrogen energy
  - Green Initiative for Power Generation (GIP)

Source: National Hydrogen Energy Board, Ministry of New and Renewable Energy, Government of India: 2006

India

Green Initiative for Future Transport (GIFT)

- Develop hydrogen powered ICE and fuel cell vehicles
  - Small two/three wheelers
  - Heavy vehicles
  - Performance issues
    - Safety
    - Convenience
    - Costs

- Requires a coordinated industry driven action plan

Source: National Hydrogen Energy Board, Ministry of New and Renewable Energy, Government of India: 2006

India

The Green Initiative for Power Generation (GIP)

Hydrogen Vision 2020 - GIP

- Hydrogen cost at delivery point @ Rs. 60-70 /Kg
- Hydrogen bulk storage methods and pipeline network
- Adequate support infrastructure including fuel stations
- Safety regulations, legislations, codes and standards
- 1000 MW power generating capacity
  - 50 MW capacity small ICE stand alone generators
  - 50 MW capacity stand alone Fuel Cell Power packs
  - 900 MW aggregate capacity centralized plants

Source: National Hydrogen Energy Board, Ministry of New and Renewable Energy, Government of India: 2006

Development of National Safety Codes and Standards is Imperative

- Inadequate safety codes, standards and regulations are a major barrier to efficient deployment of hydrogen energy systems
  - Requires one by one review of safe practices before installation of fueling stations and power generation equipment
  - Delays or prohibits implementation
- Increases the risk to government agencies, private companies and investors
- Countries can learn from others
  - Existing international codes
  - Experiences in other countries
  - Adapting learning to own needs

Safety Standards & Regulations

PATH is committed to assisting countries

- Country Workshops
  - Developed with the hydrogen association and key stakeholders in the member Country
    - Overview of existing and developing codes, standards and regulations
    - Latest advancements in safety requirements
    - Issues specific to country needs
    - Opportunity to engage stakeholders

- Webinars
  - First PATH webinar on hydrogen safety to be announced shortly
    - Overview of global situation
    - Identify follow-on needs

Contact

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