



# HYDROGEN IMPLEMENTING AGREEMENT

[www.ieahia.org](http://www.ieahia.org)

With a 30 year operating history and significant accomplishments to its credit, the International Energy Agency (IEA) Hydrogen Implementing Agreement (HIA) is a unique leader in the conduct of coordinated hydrogen research, development and demonstration activities on a global basis. Through the creation and conduct of twenty-seven annexes or tasks, the IEA HIA has facilitated and managed a comprehensive range of Research, Development & Demonstration (R, D&D) and analysis programs among its member countries. In September 2004, the IEA HIA released its anniversary report entitled *In Pursuit of the Future: 25 Years of IEA Research toward the Realisation of Hydrogen Energy Systems*. The IEA HIA continues to pride itself on collaboratively addressing many innovative, longer-term, pre-competitive R, D&D key issues related to hydrogen (H<sub>2</sub>) production, storage, conversion, safety, integrated systems, economics and markets. It is further committed to analysis and outreach in support of its R, D&D activities. In 2006, the IEA published the IEA HIA's report *Hydrogen Production and Storage: R&D Priorities and Gaps*. The IEA HIA welcomes liaison with interested groups in public and private sectors.

## The HIA Strategic Framework

- VISION** A hydrogen future based on a clean sustainable energy supply of global proportions that plays a key role in all sectors of the economy
- MISSION** Accelerate hydrogen implementation and widespread utilization to optimize environmental protection, improve energy security and promote economic development internationally, while establishing the HIA as a premier global resource for expertise in hydrogen
- STRATEGY** Facilitate, coordinate and maintain innovative research, development and demonstration activities through international cooperation and information exchange

## IEA HIA 5-Year Plan (2009-2014) : Themes & Portfolios

### Collaborative R,D&D

That advances hydrogen science and technology

- Hydrogen Production
- Hydrogen Storage
- Integrated Hydrogen Systems
- Hydrogen Integration in Existing Infrastructure

### Analysis that positions Hydrogen

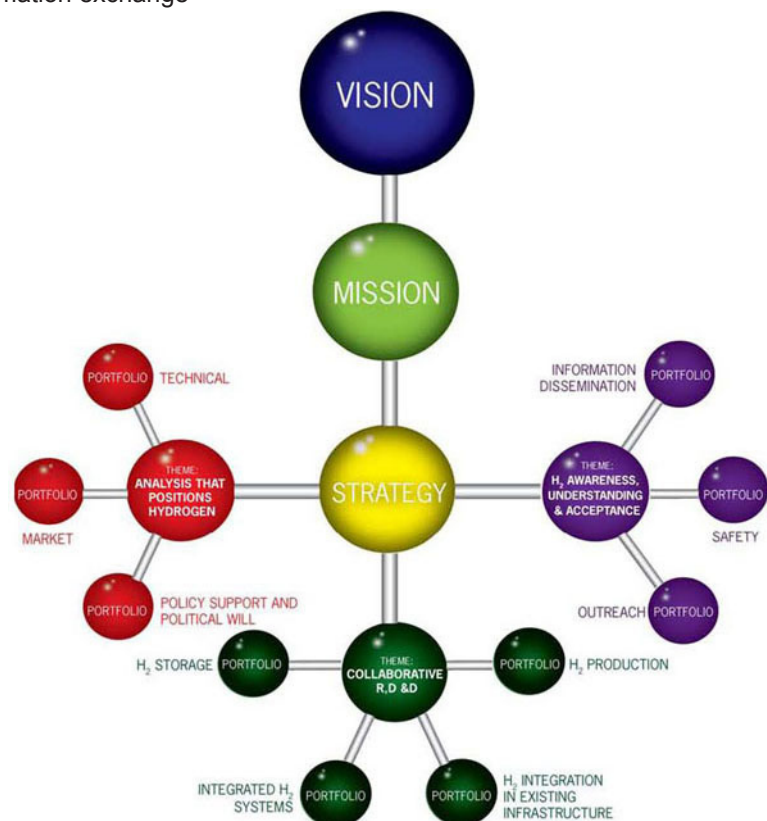
- Technical
- Market
- Support for Political Decision-Making

### Hydrogen Awareness, Understanding and Acceptance

- Information Dissemination
- Safety
- Outreach

## Members

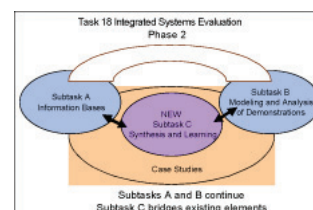
The 23 current IEA HIA members are: Australia, Canada, Denmark, Finland, France, Germany, Greece, Japan, Iceland, Italy, Korea, Lithuania, the Netherlands, New Zealand, Norway, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States, the European Commission and United Nations Industrial Development Organization (UNIDO)



## RECENT IEAHIA TASKS – SELECTED ACCOMPLISHMENTS

### Task 18 Integrated Systems Evaluation (2004-2007 complete; phase 2 extended to 2009)

- At the end of 2006 the Subtask A National Documents Database and Final Report were made publicly accessible through the Annex 18 Public website.
- Subtask B uses modeling and previously developed analytic tools to assess its portfolio of demonstration projects. Descriptive case studies are also prepared. Final Subtask B report on IEA HIA website at <http://www.ieahia.org>
- Phase 2 includes Subtask C, Synthesis and Learning, to bridge A&B's experience



### Task 19 (2004-2007 – phase 2 extended to 2009)

- Subtask A – Risk Management: through A.1 Survey of existing risk assessment methodologies for relevant case studies; A.2. Comparative risk assessment of H<sub>2</sub> systems with hydrocarbon fuel systems; and A.3. Probabilistic risk and consequence analysis
- Subtask B – Testing and Experiment Program to evaluate the effects of equipment or system failures under a range of real life scenarios, environments and mitigation measures
- Subtask C - Information Dissemination to targeted stakeholder groups



### Task 21 BioHydrogen (2005-2010)

- Subtask A – Biohydrogen Systems – increase H<sub>2</sub> production from substrates
- Subtask B – Demonstrate practical processes for solar conversion of H<sub>2</sub>O or organic substrates to H<sub>2</sub> • Subtask C – Bio-Inspired Systems - identify promising applications of enzymes and biologically inspired processes for H<sub>2</sub> production and fuel cells
- Subtask D – Overall Analysis - techno-economic analysis and evaluation

### Task 22 Fundamental & Applied H<sub>2</sub> Storage Development (2006-2009: extended to 2012)

- Successor to Task 17 has 53 projects and 55 experts from 18 countries
- Four classes of materials to be investigated: reversible metal hydrides, regenerative (chemical hydrides), nanoporous materials and rechargeable organic liquids and solids
- Two objectives: 1) Develop a reversible or regenerative H<sub>2</sub> storage medium fulfilling international targets for H<sub>2</sub> storage; 2) Enhance the fundamental and engineering understanding



### Task 23 Small Scale Reformers for On-Site H<sub>2</sub> Supply (2006-2009; extended to 2011)

- Successor annex to Task 16 Subtask C seeks basis for harmonization of technology for on-site hydrogen production from hydrocarbons (fossil and renewables)
- Subtask 1 Harmonized Industrialization – understanding approaches to reformers
- Subtask 2 Sustainability and Renewable Resources – for on-site production
- Subtask 3 Market Studies – support market development



### Task 24 Wind Energy and Hydrogen Integration (2006-2010)

- Explore issues related to: H<sub>2</sub> production via electrolysis with wind energy and applications for H<sub>2</sub> emphasizing H<sub>2</sub> storage and electrical conversion
- Subtask A: State of the Art; • Subtask B: Needed Improvements & system integration
- Subtask C: Business concept development
- Subtask D: Applications Emphasis on wind energy management

### Task 25 High Temperature Production (HTP) of Hydrogen (2007-2010)

- Will investigate H<sub>2</sub> production through innovative, high (>500°) temperature zero-emission processes with nuclear and solar heat sources
- Three major process families: thermochemical (pure and hybrid), steam electrolysis, innovative direct water splitting
- Goal is to share worldwide HTP knowledge for integration in H<sub>2</sub> roadmapping

### Task 26 Advanced Materials for Waterphotolysis of Hydrogen (2008-2011)

- The successor to Task 20 photoelectrochemical (PEC) materials and systems
- Subtask on Materials “Theory” Research and Development
- Subtask on Materials “Synthesis” Research and Development
- Subtask on Materials “Characterization” Research and Development
- Subtask on “Information Coordination/Database” Development

### Task 27 Near-Market Routes to Hydrogen by Co-utilisation of Biomass as a Renewable Energy Source (2010-2012)

- Subtask A – Co-Gasification of Biomass with Fossil Fuels • Subtask B – H<sub>2</sub> Market Facilitation – Distributed Processing to New Tradable Intermediates • Subtask B – Near Term Stand-Alone Biomass to Gasification • Subtask D – Roadmap Development and Verification

### Large Scale Hydrogen Infrastructure and Mass Storage - Task in definition

Analysis - Task in definition



Visit the HIA website at [www.ieahia.org](http://www.ieahia.org) for further information and recent publications.  
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