



# Agencia Internacional de la Energía

## “Hydrogen Implementing Agreement”

### Cooperación en el campo de la Energía del Hidrógeno

*Antonio González García-Conde*

PTE - HPC – Grupo de Representantes  
( Madrid, CDTI , 7 Mayo, 2009 )



# Programa H<sub>2</sub> Agencia Internacional Energía



Alemania



Australia



Austria



Bélgica



Canadá



Corea



Dinamarca



España



Estados Unidos



Finlandia



## Organismo autónomo de la OCDE.

(establecido en noviembre de 1974)

### Objetivos:

**Responder ante emergencias de suministro.**

**Reducir el grado de dependencia del petróleo.**



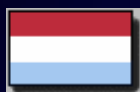
Grecia



Hungría



Italia



Luxemburgo



Noruega



Nueva Zelanda



Portugal



Reino Unido



Republica Checa



Suecia



Suiza



Irlanda



Japón



Turquía



# Organización de la AIE



## **CERT: Committee on Energy Research and Technology**

**SLT:** Standing group on Long-Term co-operation

**SOM:** Standing group on Oil Market

**CNMC:** Committee on Non-Member Countries

**SEQ:** Standing group on Emergency Questions

# Los Proyectos de la AIE

## USO FINAL

### **Advanced Fuel Cells**

### **Advanced Motor Fuels**

Buildings & Community Systems

Emissions Reduction in Combustion

Demand Side Management

District Heating and Cooling

### **Energy Storage**

Heat Pumping Technologies

Heat Transfer & Exchangers

High Temp. Materials

High Temp. Superconductivity

### **Hybrid & Electric Vehicles**

Process Integration

Pulp and Paper

## COMBUSTIBLES FOSILES

Clean Combustion Sciences

Enhanced Recovery of Oil

Fluidised Bed Conversion

### **Greenhouse Gas Programme**

Multiphase Flow Sciences



# Los Proyectos de la AIE

## ENERGIAS RENOVABLES

### **Bioenergy**

Geothermal Energy

### **Hydrogen**

Hydropower

Photovoltaic Power Systems

Solar Heating and Cooling

### **Solar Power And Chemical Energy Systems**

Ocean Energy Systems

Wind Turbine Systems

## FUSION

Environmental, Safety and Economical Aspects of Fusion Power

Fusion Materials

Nuclear Technology of Fusion Reactors

Plasma Wall Interaction in TEXTOR

Reversed Field Pinches

Sterallator Concept

Large Tokamak Facilities

ASDEX Upgrade

Spherical Tori





## HYDROGEN IMPLEMENTING AGREEMENT

A **collaborative** research and development (R&D) program  
Created in **1977** on a **task-shared**, “**bottom-up**” basis

### 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

To accelerate hydrogen implementation and widespread utilization

#### Strategy

To facilitate, coordinate and maintain innovative research, development and demonstration (RD&D) activities through international cooperation and information exchange





# Current members

## 22 contracting parties



### Australia

Dr John Wright



### Canada

Mr Nick Beck



### Denmark

Mr Jan Jensen

### Co Vice-Chair



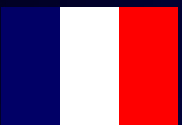
### European Commission

Dr Stathis Peteves



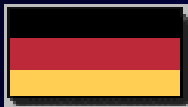
### Finland

Dr Heikki Kotila



### France

Mr Paul Lucchese



### Germany

Mr J.-F. Hake



### Greece

Dr Elli Varkaraki



### Iceland

Dr Agusta Loftsdottir



### Italy

Mr Agostino Iacobazzi



### Japan

Dr Yoshiteru Sato



### Korea

Mr Kijune Kim



### Lithuania

Dr Jurgis Vilemas



### New Zealand

Dr Steven Pearce

### Co Vice-Chair



### Norway

Ms E Fjermestad-Hagen



### Spain

Mr Antonio Garcia-Conde

### Chair



### Sweden

Dr Lars Vallander



### Switzerland

Dr Stefan Oberholzer



### The Netherlands

Mr Frank Denys



### Turkey

Dr Alper Sarioglan



### United States

Dr Carole Read



### United Kingdom

Mr Ray Eaton





# New members 2004-2009

## 8 new contracting parties

Country	Accession Year
France	2004
Finland	2005
Australia	2005
Korea	2005
New Zealand	2005
Germany	2006
Turkey	2006
Greece	2006

Contracting Parties		
2004	2009	%
14	22	~ 60 %

- **2 Non IEA member countries:**  
*Lithuania and Iceland*
- **No withdrawals during 2004-2009**
- **New Candidates:** *Russian Fed., Brazil, UNIDO (UN Industrial Dev. Org.)*







# Goals

## Science & Technology Goal

Advancement of Science via Pre-Commercial Collaborative RD&D

- Hydrogen Production
- Hydrogen Storage
- Hydrogen Systems

## Market Environment Goal

Assessment of Market Environment, including Non-Energy Sector

- Non-Energy and Industrial Processes
- Foundation for Codes & Standard
- Infrastructure

## Outreach Program Goal

Increasing Knowledge and Comfort with Hydrogen

- Membership and Participation
- Information Dissemination
- Synchronization worldwide





# Task Participation by Members

Members	15	16	17	18	19	20	21	22	23	24	25	26	27	Total Tasks/ Member
Australia			1			1		1			1	1		5
Canada	1	1	1	1	1		1	1		1				8
Denmark		1		1				1	1	1	1	1		7
European Comm.		1	1	1	1			1		1			1	7
Finland							1				1		1	3
France		1		1	1	1	1	1	1		1	1		9
Germany		1		1			1	1	1	1	1			7
Greece				1				1		1	1			4
Iceland				1				1						2
Italy		1	1	1	1		1	1			1		1	8
Japan	1	1		1	1	1	1	1	1	1		1		10
Korea						1	1	1				1		4
Lithuania			1					1						2
The Netherlands	1	1		1	1	1	1	1	1			1	1	10
New Zealand				1								1		2
Norway	1	1		1	1		1	1	1				1	8
Spain		1	1	1				1		1	1	1	1	8
Sweden	1		1	1			1	1	1					6
Switzerland		1	1	1		1		1		1	1	1		8
Turkey									1				1	2
UK	1	1		1	1	1	1	1		1	1			9
US	1	1	1	1	1	1	1	1	1	1	1	1	1	13
<b>Total Members/ Task</b>	<b>7</b>	<b>13</b>	<b>9</b>	<b>17</b>	<b>9</b>	<b>8</b>	<b>12</b>	<b>19</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>10</b>	<b>8</b>	





# Industry Participation (1/2)

Companies	Tasks												
	15	16	17*	18	19	20	21	22	23	24	25	26	27
Air Liquide									FR				
ALPHEA				FR									
BP-Amoco		USA											
BP		UK											
BTG		NL											NL
Catator									SWE				
Chevron Texaco		USA											
Danish Gas Tech				DEN									
Directed Technologies Inc												USA	
DNV													NOR
EA Technology				UK									
EGJ Udvikling		DEN											
Elcogas													SPA
ENAA				JAP						JAP			
EnCana		CN											
Energetics				USA									
Ergenics			USA										
Endesa										SPA			
ENEL		ITA											ITA
ENI		ITA											
ET Energie Technologie			GER										
Gas Natural		SPA								SPA			
Gastec		NL											
Gamesa										SPA			
Gaz de France		FR							FR				
Grontmij				SWE									





# Industry Participation (2/2)

Companies	Tasks												
	15	16	17*	18	19	20	21	22	23	24	25	26	27
Haldor Topsøe		DEN							DEN				
Hydro		NOR											
HyGear BV									NET				
Hyradix		USA											
H2PIUSA		FR											
IGS Mahler		GER							GER				
IHT										SWI			
Intematix Corporation												USA	
Intelligent Energy		USA							USA				
IRL				NZ									
Longitude 122 West				USA									
Mitsubishi Kakoki		JAP							JAP				
MVSystems												USA	
Midwest Optoelectronics												USA	
N-GHY									FR				
Norske Skog													NOR
Osaka Gas		JAP											
Services Mij				CAN									
Shell		UK											NL
Statoil		NOR											
StatoilHydro									NOR				
Suna Tech			USA										
Suncor		CN											
Sydskraft				SWE									
Tokyo Gas Co									JAP				
United Technologies			USA					USA					





# Industry Participation

No. of companies by country and task

MEMBER COUNTRY	No. Companies	TASKS							
		16	17	18	22	23	24	26	27
Canada	3	X		X					
Denmark	3	X		X		X			
France	5	X		X		X			
Germany	2	X	X			X			
Italy	2	X							X
Japan	4	X		X		X	X		
New Zealand	1			X					
Norway	5	X				X			X
Spain	4	X					X		X
Sweden	3			X		X			
Switzerland	1						X		
The Netherlands	3	X				X			X
UK	3	X		X					
USA	13	X	X	X	X	X		X	





# Tasks by Goal and Focus Area

## Science and Technology

## Outreach Program

### Production

- 15. Photo-biological Production ✓
- 16. H<sub>2</sub> from Carbon containing materials ✓
- 20. H<sub>2</sub> from Waterphotolysis ✓
- 21. BioHydrogen
- 23. Small-Scale Reformers for On-Site H<sub>2</sub> Supply (SSR for H<sub>2</sub>)
- 24. Wind Energy and H<sub>2</sub> Integration
- 25. High Temperature Processes for H<sub>2</sub> Production
- 26. Advanced Materials for Waterphotolysis of Hydrogen
- 27. New Market Routes to H<sub>2</sub> by Co-Utilization of Biomass as a Renewable Source with Fossil Fuel

### Storage

- 17. Solid and Liquid Storage ✓
- 22. Fundamental and Applied H<sub>2</sub> Storage Materials Develop.

## Market Environment

### Analysis, Safety and Economics

- 18. Integrated Systems Evaluation
- 19. Safety



# Tasks in Definition

Science and Technology & Market Analysis: STORAGE and ANALYSIS

***“Large Scale Hydrogen Infrastructure and Mass Storage”***



# Information Dissemination

Download free at [www.ieahia.org](http://www.ieahia.org)



## 25<sup>th</sup> Anniversary Report: In Pursuit of the Future

Luzzi / Bonadio / McCann Released at the National Press Club, Washington DC, 7-Sep-04

## End-Of-Term Report 2004-2009 & Strategic Plan 2009-2014

## 2007 Annual Report





# Worldwide Synchronization



## Conference/Meeting/Event Strategy

- ❑ 12 internal IEA presentations
- ❑ 40 external ExCo presentations
- ❑ 8 Conference Exhibits
- ❑ >1,015 task presentations
- ❑ >1,153 task publications
- ❑ 33 patents

## Public Relations

- ❑ Creation and inaugural award of **HIA Individual Prize** for technical excellence in H2 R&D and harmony in international cooperation; **Project Prize** in 2009



IEA HIA Chair Trygve Riis

## Media Engagement

- ❑ Released 25<sup>th</sup> Anniversary Report at **National Press Club** in Washington, D.C.
- ❑ 12 Press Releases
- ❑ Letters to the Editor



Dr. Gary Sandrock



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

*... An R,D&D Collaboration pursuing  
hydrogen sustainability*

