



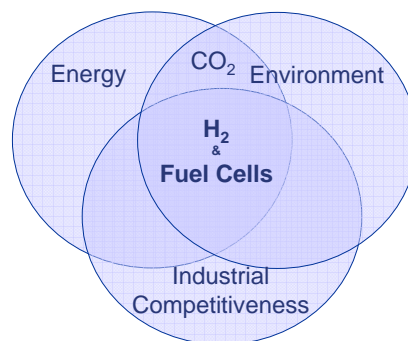
## The European Fuel Cell and Hydrogen Joint Technology Initiative: Accelerating the Innovation Cycle

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New Energy World Industry Grouping



## H2 & FC's meet our joint objectives

- Rationale Use of Energy
  - Part Load Efficiency of vehicles improved by up to 200%
  - World class efficiency for distributed generation even with power ranges <10MW
  - Significant overall efficiency gains in small and portable power
- Renewable Energy
  - Biomass
  - Wind
  - Solar
  - Hydro
- Security of Supply
- Low Carbon Society
  - Renewable
  - Nuclear
  - Fossile + CCS
- Air Quality
  - Local Zero Emission Potential
- Technology/Knowledge Driven industry
- Large World Market Potential



## Scenario „Snapshot 2020“

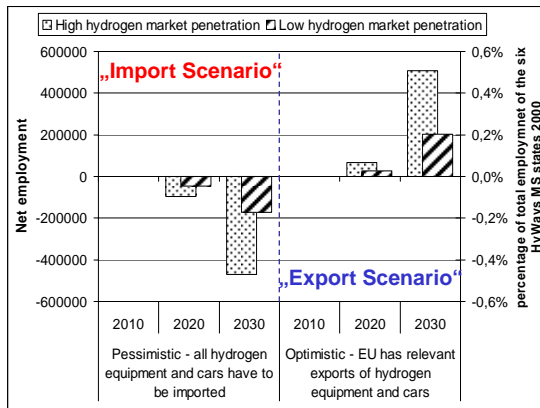
	Portable FCs for handheld electronic devices	Portable Generators & Early Markets	Stationary FCs Combined Heat and Power (CHP)	Road Transport
EU H <sub>2</sub> / FC units sold per year projection 2020	~ 250 million	~ 100,000 per year (~ 1 GW <sub>e</sub> )	100,000 to 200,000 per year (2-4 GW <sub>e</sub> )	0.4 million to 1.8 million
EU cumulative sales projections until 2020	n.a.	~ 600,000 (~ 6 GW <sub>e</sub> )	400,000 to 800,000 (8-16 GW <sub>e</sub> )	1-5 million
EU Expected 2020 Market Status	<b>Established</b>	<b>Established</b>	<b>Growth</b>	<b>Mass market roll-out</b>
Average power FC system	15 W	10 kW	<100 kW (Micro HP) >100 kW (industrial CHP)	80 kW
FC system cost target	1-2 €/ W	500 €/kW	2.000 €/kW (Micro) 1.000-1.500 €/kW (industrial CHP)	< 100 €/kW (for 150.000 units per year)

## Deployment Potential

### European H<sub>2</sub> and Fuel Cells Roadmap and Action Plan. Opportunities for EU Member States.

	2010	2015	2020	2030	2050	
<b>Phases</b>		Pre-commercial technology refinement & market preparation	Start of commercialisation	Hy P Snapshot 2020 materialisation of first impacts <ul style="list-style-type: none"> <li>New hydrogen supply capacities partially based on low-carbon sources</li> <li>Improvement in local air quality</li> <li>More than 5% of new car sales H<sub>2</sub> SFC</li> </ul>	HyWays Snapshot of 2030 Hydrogen & FC are competitive <ul style="list-style-type: none"> <li>Creation of new 200.000 – 300.000 jobs/ safeguarding existing jobs</li> <li>Shift towards carbon-free hydrogen supply</li> <li>More than 20% of new car sales H<sub>2</sub> &amp; FC</li> </ul>	H <sub>2</sub> & FC dominant technologies high impact <ul style="list-style-type: none"> <li>80% of light duty vehicles &amp; city buses fuelled with CO<sub>2</sub> free hydrogen</li> <li>reaching more than 80% CO<sub>2</sub> reduction in passenger car transport</li> <li>In stationary end-use applications, hydrogen is used in remote locations and island grids</li> </ul>
<b>Targets</b>		LHPs facilitate initial fleet of a few 1,000 vehicles by 2015 <ul style="list-style-type: none"> <li>PPP "Lighthouse Projects"</li> <li>Increase R&amp;D budgets to 90 M€/year</li> <li>Financial support for large scale demonstration projects</li> </ul>		<b>Vehicles:</b> 2.5 million of fleet <b>Cost:</b> H <sub>2</sub> : 4 €/kg (50 €/barrel) FC: 100 €/kW Tank: 10 €/MWh	<b>Vehicles:</b> 25 million of fleet <b>Cost:</b> H <sub>2</sub> : 3 €/kg (50 €/barrel) FC: 50 €/kW Tank: 5 €/MWh	
<b>Required Policy Support Actions</b>		Develop H <sub>2</sub> specific support framework <ul style="list-style-type: none"> <li>Create / support early markets</li> <li>Implement performance monitoring framework</li> <li>Long term security for investing stakeholders</li> <li>Education and training programmes</li> <li>Harmonisation of regulations codes and standards</li> </ul>	H <sub>2</sub> specific support framework <ul style="list-style-type: none"> <li>In place before 2015 at MS level</li> <li>Deployment supports, e.g. tax incentives of 180 M€/year</li> <li>Public procurement</li> <li>Planning and execution of strategic development of hydrogen infrastructure</li> </ul>	Gradual switch from hydrogen specific support to generic support of sustainability (2020 →)	Incentives provided through general support schemes for sustainability	

## “Export” or “Import”? The difference can be 1 million jobs...



**Hydrogen passenger car penetration:**  
 High scenario: 2020: 6 Mio. vehicles  
 2030: 45 Mio. vehicles  
 Low scenario: 2020: 1,3 Mio. vehicles  
 2030: 14 Mio. vehicles

Time is of the essence in order to transfer European Innovative RD&D into competitive business for European and export markets!

**500,000 jobs can be created or lost (by 2030)**

Source: HyWays, WHEC 16, Lyon, France, 15 June 2006

\* Calculations from the EU-funded project HyWays (European Hydrogen Energy Roadmap) for the six member state partners in Phase I (France, Germany, Greece, Italy, Norway, The Netherlands)



## At the door step of implementation



## The Joint Technology Initiative



### Main Objective:

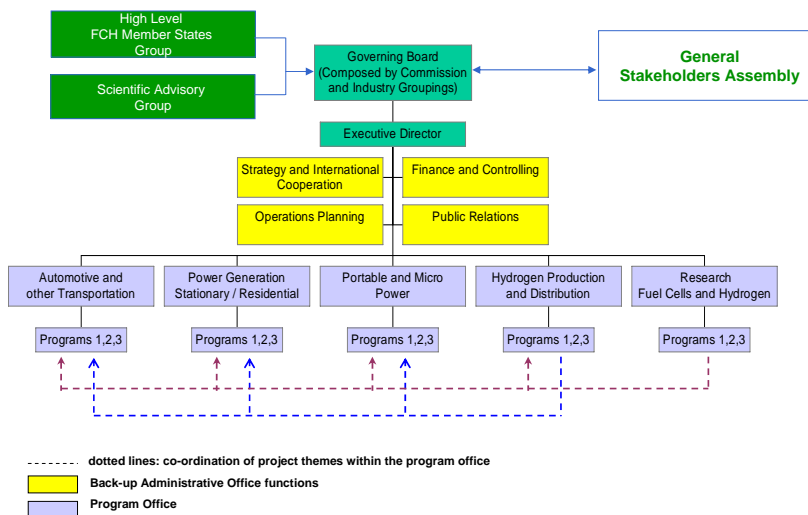
Long term planning and Coordination of European Investments on Fuel Cells and Hydrogen by all Stakeholders

### Structural Framework for Implementation:

EC-Body following EC rules and policy including financial reporting to the EP (Budget line item)



## New Energy World JTI Program Office Structure



## The Industry Grouping

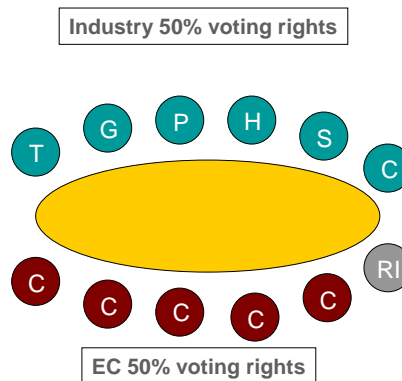
- 64 companies from 17 countries and increasing
- A major share of European fuel cell and hydrogen industry
- Representing >90% of total investment of industry
- Well balanced between large corporations and SMEs
- Shares with the EC 50% of the JTI Program Office cost



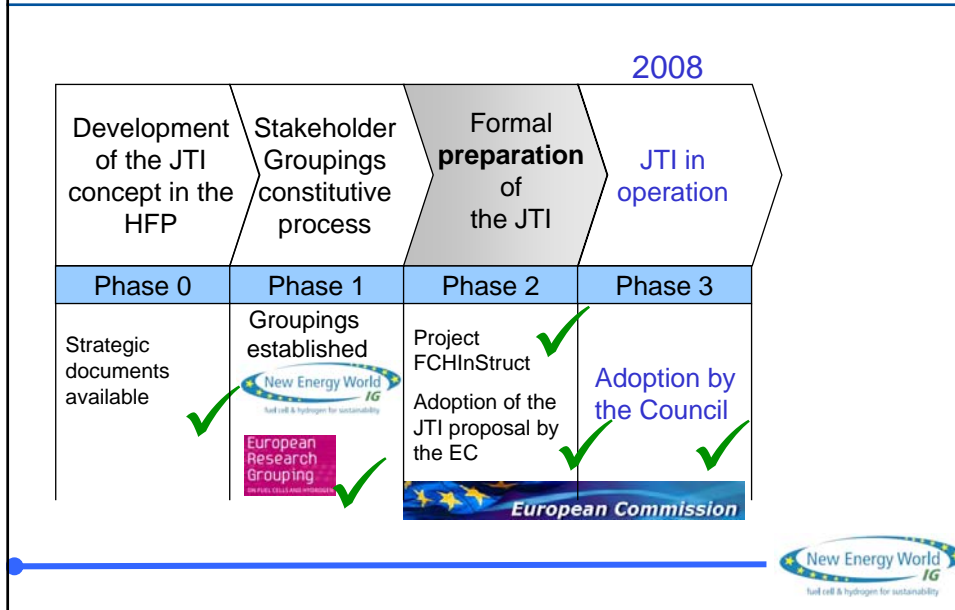
## JTI Governing Board

- T** Transportation
- G** Power Generation
- P** Portable and Micro Power
- H** Hydrogen Production & Distribution
- S** Small & Medium Enterprises
- C** Components Industry

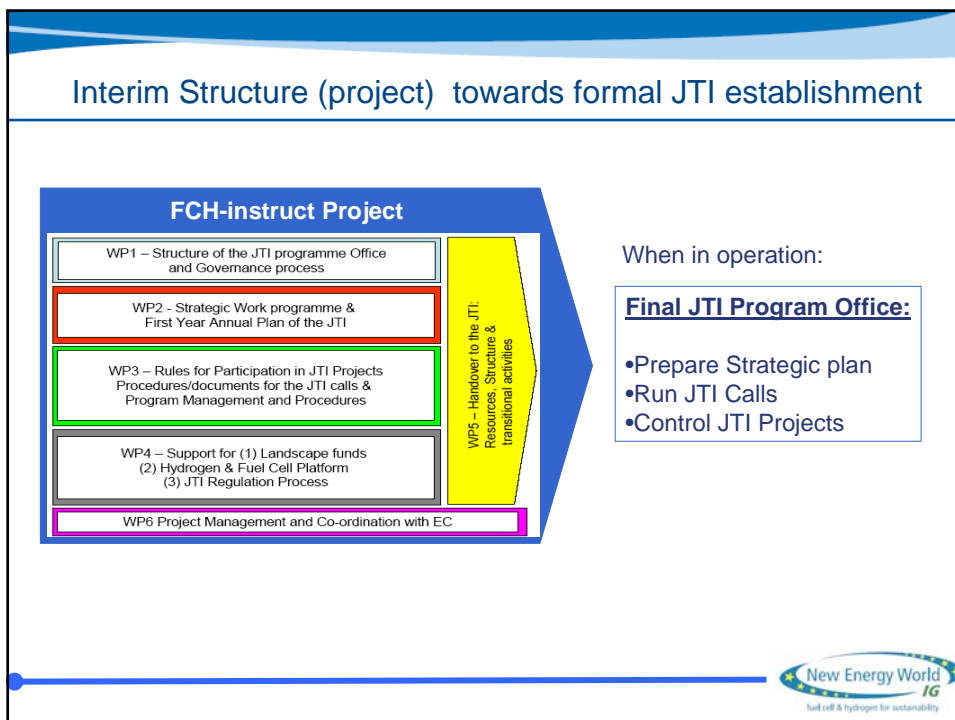
- C** European Commission
- RI** Research Grouping



## The JTI is now at the starting line



## Interim Structure (project) towards formal JTI establishment



## Objectives from an Industrial Perspective

- Get the technology ready for mass market roll out by the end of the JTI
  - Broad Test Experience from Large Scale Demonstrations
  - Lower Cost
  - Increased Durability
  - Establish Early Market Segments (Commercial)
- Prepare the Market
  - RCS
  - Policy, including Strategic Procurement
  - Infrastructure
  - Education and Public Awareness



## New Energy World JTI is not only about transportation...

H<sub>2</sub> Production & Distribution



Stationary CHP Systems

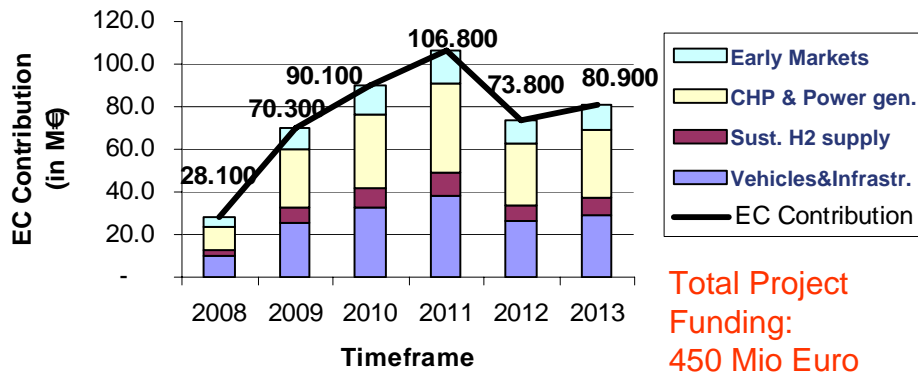


Portable FC's

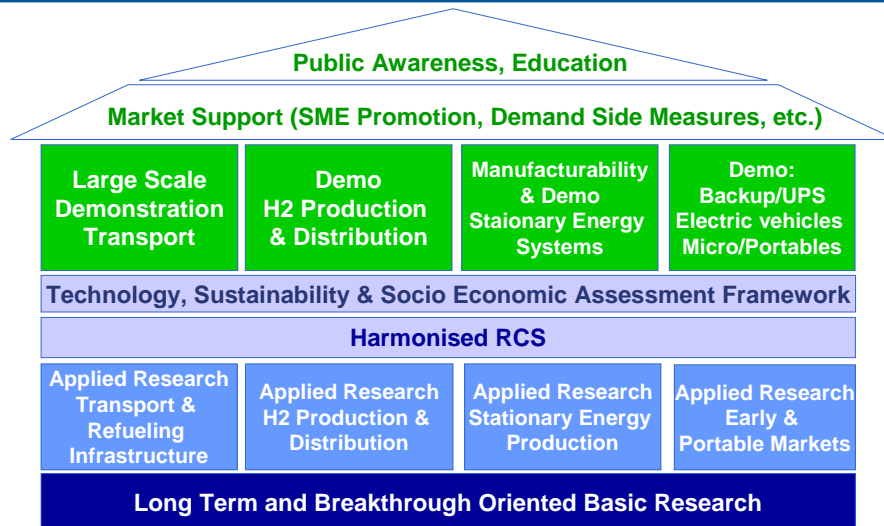


## Budget Allocation 1<sup>st</sup> Tentative Run

### JTI - Operational Budget Breakdown 2008-2013

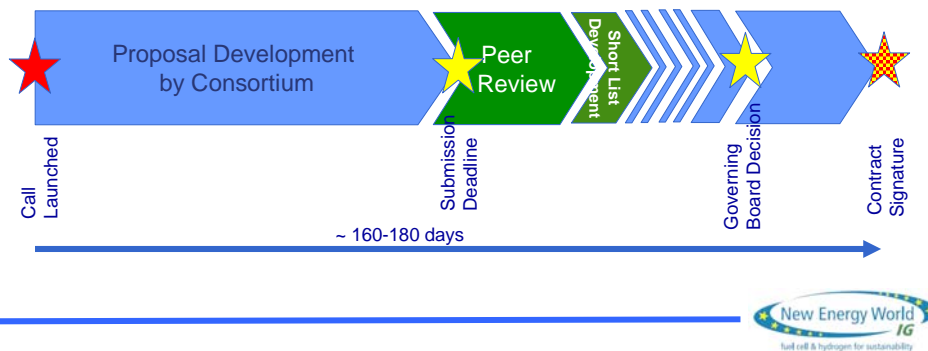


## A Balanced Portfolio for a Stable „FCH House“



## Program Facts

- Total RTD Budget approx. 900M€ / EC Contribution 450M€
- Operating Cost of the JTI Office ~20M€ (4.5%) (Total EC: 470M€)
- Dispersion via Competitive Calls between 2008 - 2013, Co-ordinator of project must be recruited from the membership of JTI IG
- Call Procedure



## Hydrogen Storage Related AR - Activities in MAIP

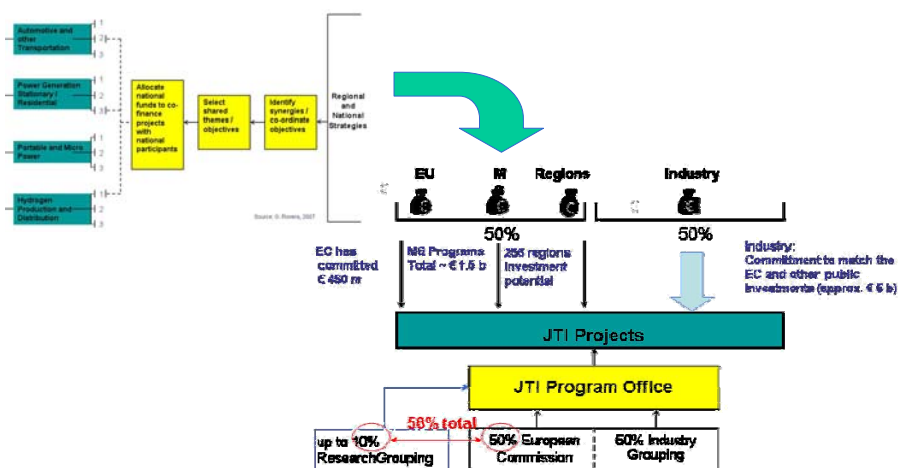
- CGH2 Vehicle Storage
- LH2 Vehicle Storage
- Periphery on H2 Tank System and Conditioning Components
- Solid and Liquid H2 Storage
- Underground H2 Storage
- Fuel Supply for Small and Micro Fuel Cells (including Canister/Cartridge Systems)
- RCS on Indoor Fuel Cell Use and H2 Refueling Stations
- PNR on Design and Testing Criteria for composite H2 Storage Containers

In total approx. 10% of overall budget is currently earmarked for H2 Storage Related Applied Research

## Upcoming Calls

- **1st Call (Test Case)**
  - Publication Date approx. Sept. 15, 2008
  - Volume Approx. 28 M€ (EC Funding)
  - All former IDAs will issue Calls
  - Plus some Program Level Cross Cutting Topics
  - Strong Research Elements
- **2nd Call**
  - Publication Date expected for January 2009
  - Volume approx. 70M€ (EC Funding)

## Aligned Funding Will Accelerate Innovation



## Summary

- **Hydrogen and Fuel Cells will require fundamental changes of industry, infrastructure and markets**
- In return they deliver key technologies for achieving EU policy goals
- **These technologies have proven to be both operational and ecological even if in market transition fuel supply is not only from renewable sources**
- **Only joint public - private effort can address the required scope of change**
- The New Energy World JTI on Hydrogen and Fuel Cells is essential to overcome market failure
- It will address all relevant sectors of the industry
- **National and regional activities are critical – but in a harmonised strategy e.g. multicentric growth of infrastructure**



*The New Energy World Joint Technology Initiative  
stands for an accelerated innovation cycle towards an  
**Environmentally Benign, Secure and Competitive  
Energy System**  
jointly implemented by public and private stakeholders.*



# Thank You !

And let's work together in a



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