

# EU R&D for Green Road Transport: Fuel Cells, Hydrogen and Vehicle Technology Programmes

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# The European Union

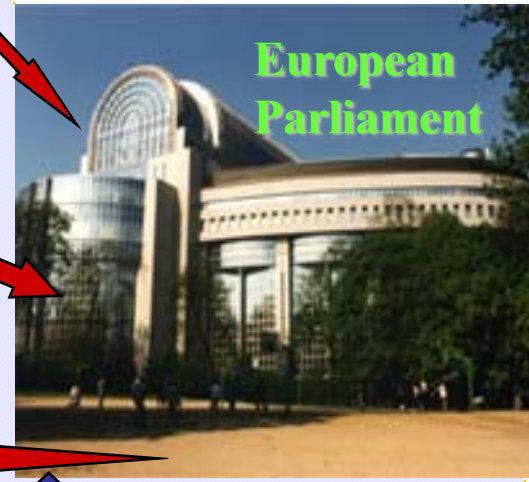
## 27 countries – 493 million people

- Austria
- Belgium
- Bulgaria
- Cyprus
- Czech Republic
- Denmark
- Estonia
- Finland
- France
- Germany
- Greece
- Hungary
- Ireland
- Italy
- Latvia
- Lithuania
- Luxembourg
- Malta
- The Netherlands
- Poland
- Portugal
- Romania
- Slovenia
- Slovakia
- Spain
- Sweden
- United Kingdom



# EU Institutions

**EXECUTIVE**  
Proposes and implements  
legislation



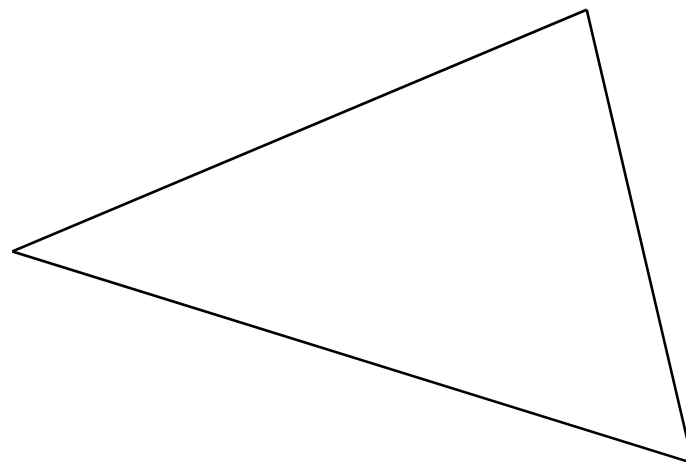
Governments of the  
27 Member States

Directly elected

**LEGISLATIVE**  
Jointly decide on legislation

# EU Energy Challenges

Sustainable  
development



Security of supply

Competitiveness

# EU Energy Targets

- ***By 2020 – the three 20s:***
  - **20% reduction in GHG emissions** compared to 1990 levels (30% if global agreement)
  - **20% reduction in global primary energy use** (through energy efficiency)
  - **20% share of renewable energy** in the EU's **overall mix** and **10% share of renewable energy in transport**
- ***By 2050: 60 to 80% reduction in GHG***

# Public RTD Funding in Europe

- **RTD** on green road transport activities in Europe is funded at different levels: **EU, national and regional.**
- **EU funding mainly through public-private partnerships:**
  - 1. The European Green Cars Initiative**
  - 2. The Fuel Cells and Hydrogen Joint Undertaking.**
- **EU RTD** to focus efforts and provide for a clear overall common strategy.

# The European Green Car Initiative

# European Green Car Initiative – Part of a European Economic Recovery Plan

- *Adopted by the EC on 26 Nov 2008 and endorsed by the EU Council on 11-12 Dec 2008 “To support innovation in manufacturing, construction and the **automobile sector**, which have recently seen **demand plummet** as a result of the **crisis** and which face significant challenges in the transition to the **green economy...**”*
- *The **European Green Car Initiative** is one of 3 Public-Private Partnerships (PPPs) proposed, together with:*
  - *European Energy Efficient Buildings Initiative*
  - *Factories of the Future Initiative*



# European Green Car Initiative – A Public-Private Partnership

- **Objective:** *to promote the convergence of **public interest** with **industrial** commitment and leadership in determining strategic research activities*
- **Quick response:** *to use existing schemes & structures (**FP7** and **ETPs**)*
- **Smart investments :** *to improve **competitiveness** of European industries & **environmental protection***
- **Implementation approach:** ***cross-thematic calls** and exploitation of other possibilities*

# European Green Car Initiative

## – 3 methods of financial support

- **R&D** mainly through FP7. Budget: **€1 billion**  
(€500 million from FP7 matched by €500 million from Industry and Member States)
- **EIB loans** in support of research & industrial innovation  
Budget: **€4 billion** (in addition to existing loans)
- **Demand side measures & public procurements:**  
reduction of circulation & registration taxes for low CO<sub>2</sub> cars

# European Green Car Initiative – Research Content

- ***Heavy duty vehicles ( Internal combustion engines, vehicle technologies for energy optimisation).***
- ***Road and urban transport electrification.***
- ***Logistics, co-modality and Intelligent Transport Systems technologies.***

# European Green Car Initiative: Road and Urban Transport Electrification

## *System levels:*

- *Power generation and grid*
- *Power distribution*
- *Power usage: the electric car*



# European Green Car Initiative - First calls for proposals

- 4 forthcoming calls in 2010

*Overall budget: +/- €100 million*

*Opening Date: July 2009*

1. Electric vehicle: physical integration
2. Electric vehicle: ICT/controls
3. « Electromobility » demonstration
4. Joint Call on Electric Batteries
  - **Budget: circa €25 million**
  - **Emphasis on development of advanced materials and on chemistry**

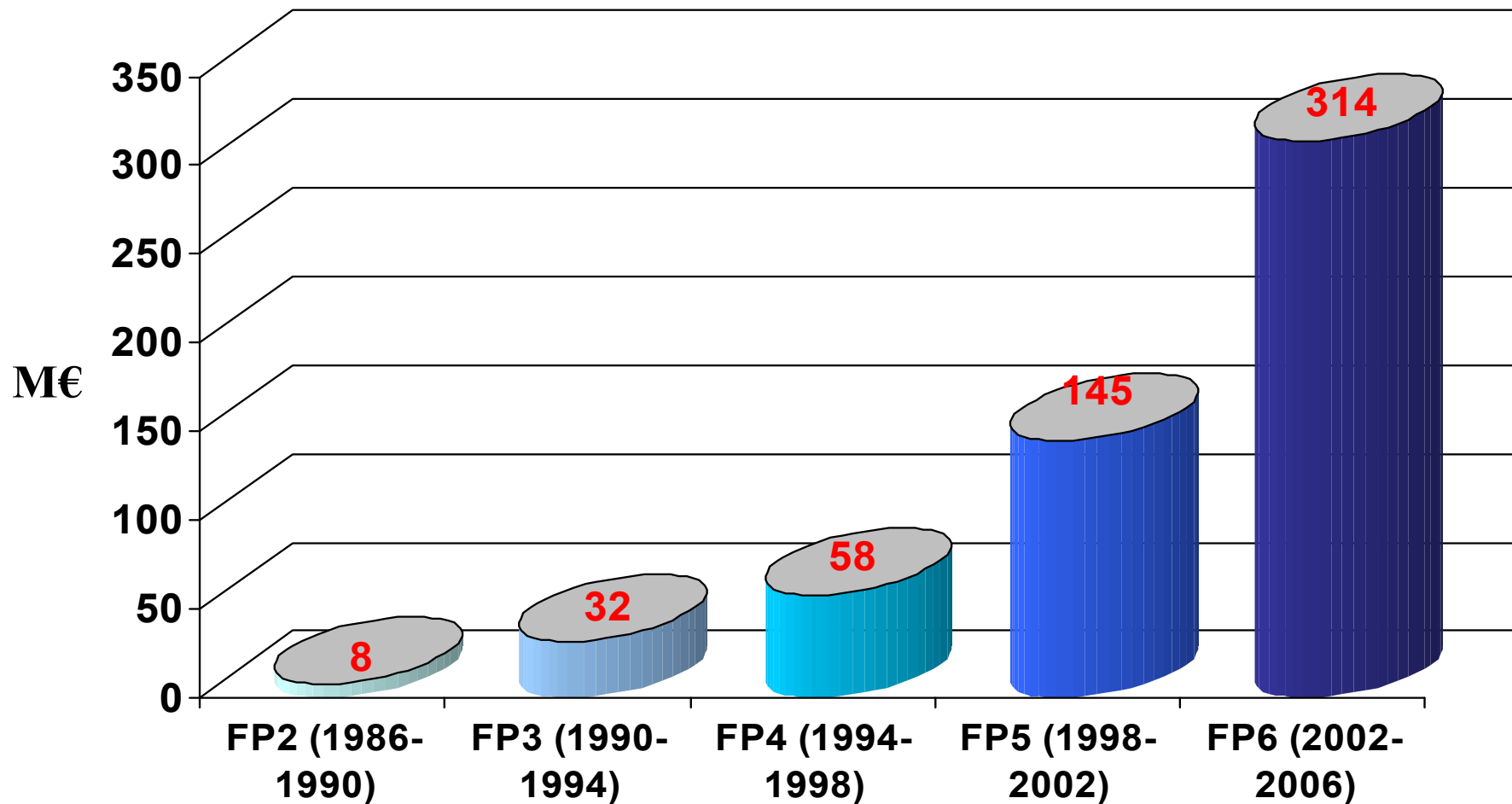


# The Fuel Cells and Hydrogen Joint Undertaking (FCH JU)

# Public RTD Funding for H<sub>2</sub>/FC in Europe

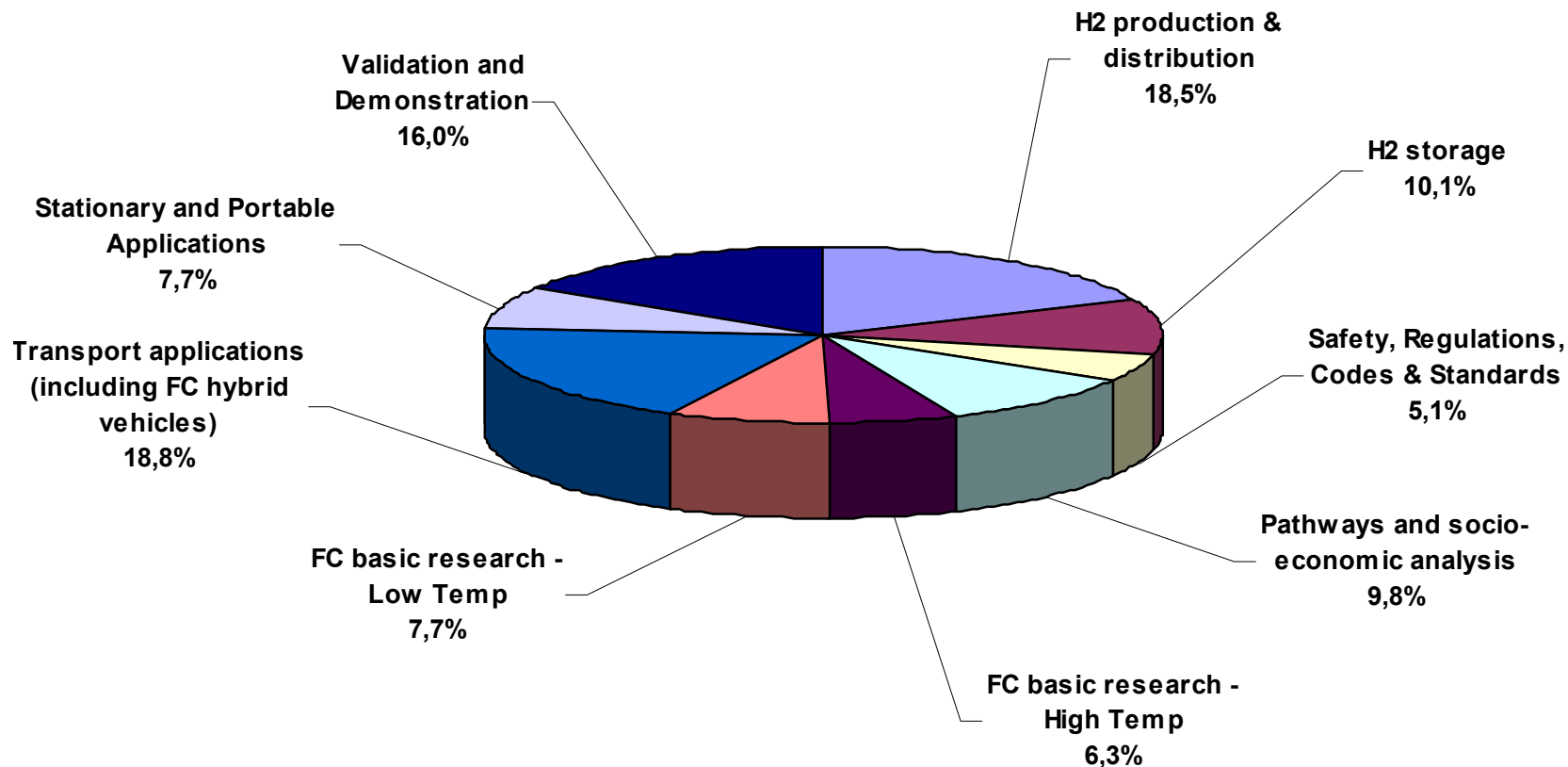
- **RTD** on H<sub>2</sub>/FC activities in Europe is funded at different levels: **EU, national and regional**.
- EU funding now through **Fuel Cells and Hydrogen Joint Undertaking (FCH JU)**.
- **The overall public budget of EU national programmes is estimated to be app. USD 333 M per year (2003-2005); industry budgets are even larger.**
- **EU RTD** to focus efforts and provide for a clear overall common strategy.

# FCH in the EU Framework Programmes ~ €550 M so far





# FP6 (2002-2006) Budget Breakdown for FC & H2 – Total EC Contribution ~€314 M



## EU-US Projects in FP6

- **CACHET: CO<sub>2</sub> capture from natural gas-based H<sub>2</sub> production**  
*Conoco Phillips Company /Chevron Energy Technology Company*
- **FCTESQA: Validation of test procedures for FC systems**  
*US DoE*
- **HYAPPROVAL: Handbook for approval of H<sub>2</sub> refuelling stations**  
*National Renewable Energy Laboratory*
- **HYPER: Installation Permitting Guidance for stationary FC systems**  
*Sandia Corporation*
- **HYWAYS: Roadmap for H<sub>2</sub> in the EU energy system**  
*MidWest Research Institute*
- **NESSHY: H<sub>2</sub> solid storage development**  
*Southwest Research Institute*
- **NEXTGENCELL: PEM material development for small CHP systems**  
*Plug Power Inc./Pemeas USA Inc.*

# The Fuel Cells and Hydrogen Joint Undertaking

- × **Public private partnership established in May 2008**
- × **Aimed at enabling market breakthrough of FCH technologies**
- × **Will establish and execute long-term, commonly agreed strategy**
- × **Shared governance**
- × **Industry lead for faster commercialisation**

# FCH JU - Governance

- ✘ The European Commission, the Industry Grouping and the Research Grouping are members of the FCH JU
- ✘ Governing Board: 6 members from Industry, 5 from EC, 1 from Research
- ✘ An Executive Director, supported by a Programme Office, will be responsible for the day-to-day management of the JU

# Budget and cost sharing of the Fuel Cells and Hydrogen JTI

- ✘ EC budget for 2008 – 2013: **€470 M** (cash contribution)
- ✘ Industry will match the EC contribution (in-kind contribution)
- ✘ Close follow-up to monitor and ensure the cost sharing between the Community and industry

# Expected outcome

- × Time to market shorter by between 2 and 5 years
- × Earlier gains for the energy system
- × Improved competitive position for the industry



# FCH JU - Scope

**Public Awareness, Education**

**Market Support (SME Promotion, Demand Side Measures, etc.)**

## Demonstrations

Vehicles &  
Infrastructure

Low Carbon  
Supply Chain

System Readiness  
Manufacturability

Backup/UPS  
Off-road H2 Vehicles  
Micro/Portable FC

**Technology, Sustainability & Socio-Economic Assessment Framework**  
**Specific PNR & Harmonised RCS**

## Research and Technological Development

Stack &  
Subsystems

Processes &  
Modules

Periphery &  
Components

Systems &  
Integration & Testing

Components

New Technologies

Material & Design & Degradation & Durability

## Long-term and Breakthrough Orientated Research

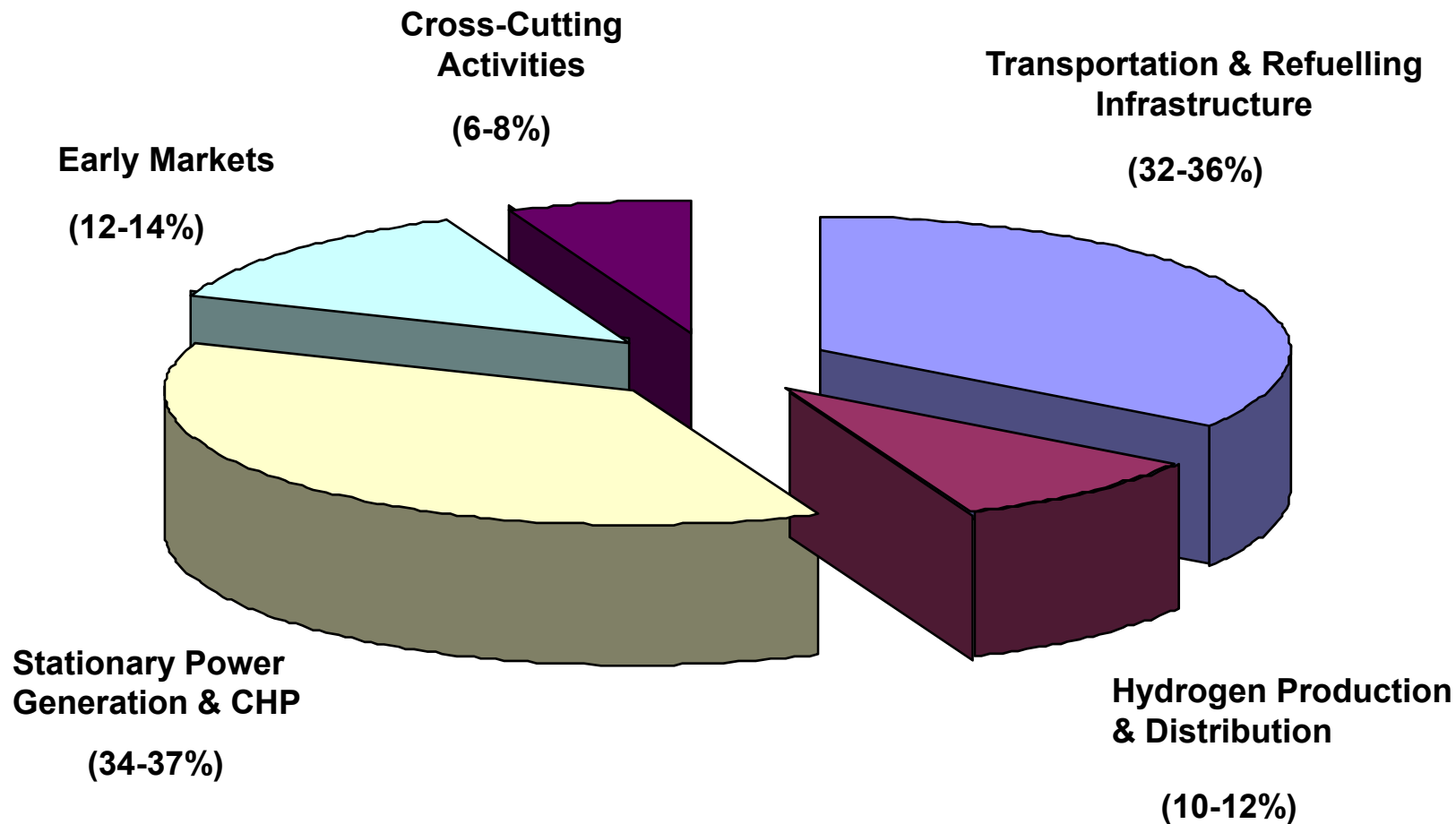
**Transport &  
Refuelling  
Infrastructure**

**Hydrogen  
Production &  
Distribution**

**Stationary  
Power  
Generation & CHP**

**Early  
Markets**

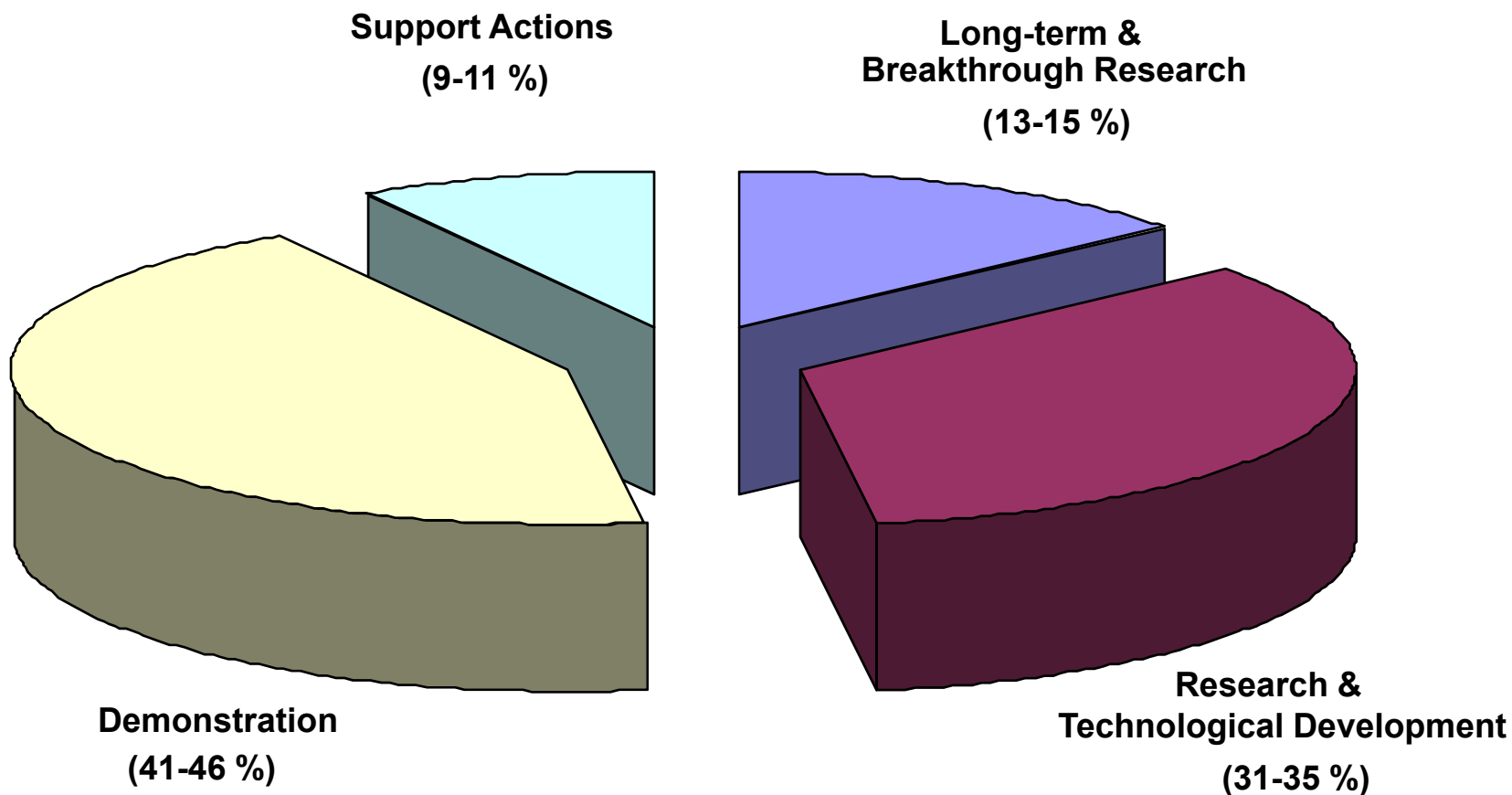
# FCH JU - Preliminary Budget Breakdown by Application Area



Not legally binding  
NOT LEGALLY BINDING



# FCH-JU: Preliminary Budget Breakdown by Action Category



Not legally binding  
NOT LEGALLY BINDING

# Participating in FCH-JU Projects

- × Open (annual) calls for proposals
- × Minimum 3 independent legal entities from different MS/AC
- × At least one legal entity belonging to the Industry Grouping or Research Grouping in each project. As a norm, the coordinator will be member of IG or RG
- × All legal entities and international organisations can participate

First Call for Proposals launched in October (€28.1 M, deadline 15 January 2009)

# International Cooperation

- ✘ EC is a member of the International Partnership for the Hydrogen Economy (IPHE), IEA, and has bilateral S&T cooperation agreements with third countries.
- ✘ Third country partners are welcome to participate in the FCH JU calls for proposals. However, as a rule they are not eligible for funding.
- ✘ The FCH JU is developing its own policy for international cooperation. EU-US cooperation will be an important element of this policy.

# EU-US Cooperation

- × EU-US bilateral discussions initiated
- × Possible areas of cooperation identified:
  - Safety, codes and standards; risk assessment
  - Socio-economic studies
  - Harmonising technology readiness scales
- × Exchange call/solicitation info for forward planning
- × Cross-participation at meetings and workshops
- × Exchange of scientists/managers

# THANK YOU FOR YOUR ATTENTION

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