Fuel Cells and Hydrogen Joint Undertaking

Current status and perspectives

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General context

Security of energy supply:
Transport - largest oil consumer: 55% and rising
Bulk of production in unstable regions
New oil reserves expensive and polluting

High oil import bill:
Up to € 1 billion per day in 2011
Trade balance deficit: ~ 2.5 % of GDP

CO2 emissions from the transport sector:
25% of total EU CO2 emissions and the only sector rising

Storage
Balancing energy production from RES

Prerogative for EU industry:
Maintain its global competitiveness

The FCH JU in the SET Plan

EU targets :

20 % increase in renewables
20 % increase in efficiency
20 % decrease in emissions

Fuel Cell and Hydrogen Joint Undertaking

- FCH JU : community body
- Budget : 940 M €
- FCH JU Programme Office

450 = RTD : 315 ENER : 120 MOVE : 15

Public-private partnership

Fuel Cells & Hydrogen Joint Undertaking

Industry Grouping
Over 60 members

European Union
represented by the
European Commission

Research Grouping
Over 60 members

Both the Industry Grouping and the Research Grouping are non-profit organisations with open membership

To accelerate the development of technology base towards **market deployment of FCH technologies** from 2015 onwards

Funding distribution by AAs

Figure 1 : Budget breakdown by application area

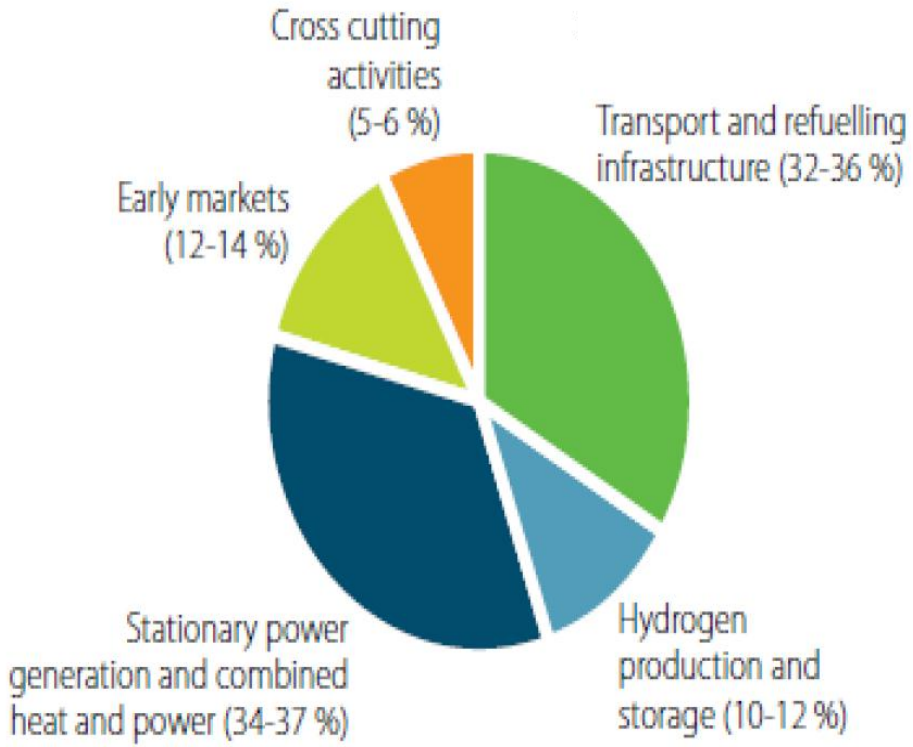
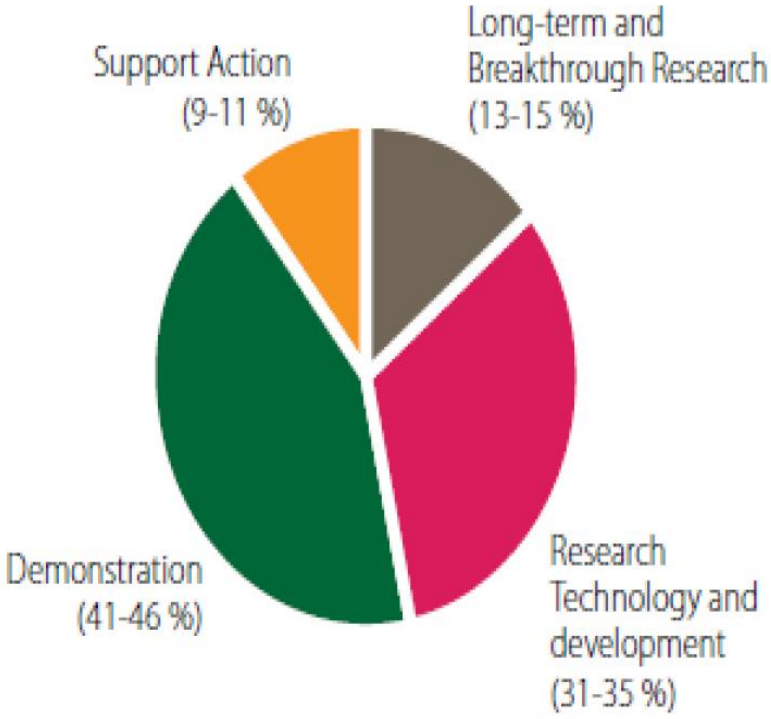


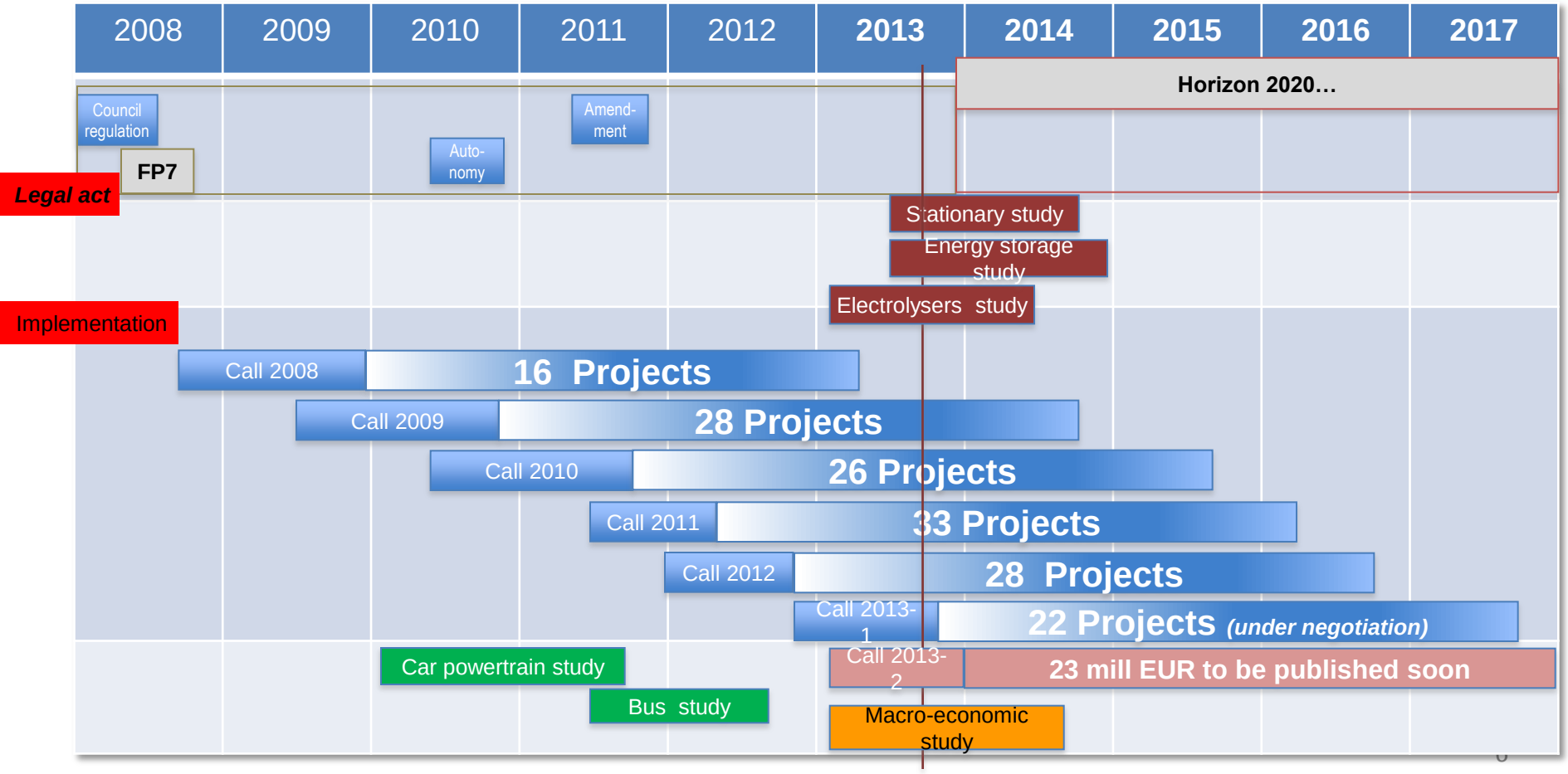
Figure 2: Budget breakdown by activity type



FCH JU Programme evolution
State of play

915 mill EUR (442 mill EUR contribution from EU) in about 153 projects/grants

Additional 6 mill EUR in studies (to support programme planning/strategy)



Overview of the Call FCH JU 2013-2

Topics published

Publication date: 28 November 2013

Deadline: 27 February 2014 at 17.00.00 (Brussels local time)

Budget: EUR 23 million

4 topics from different areas, not covered so far by the programme

Evaluations in March 2014

Demonstration:

Large-scale demonstration of **urban buses** including the build-up of the necessary refuelling infrastructure (at least 5 urban buses + one refuelling station per site → total of minimum 15 buses in 2 different sites) – max 15 mill EUR

Demonstration of the technological readiness of **H2 production from biogas** including possibility to supply H2 as a high value fuel to a nearby vehicle fuelling stations (installation and continuous operation for at least 25,000 hours + H2 production between 100 and 500 kg/day, associated to a hydrogen storage system, with means of supply to a fuelling station) – max 10 mill EUR

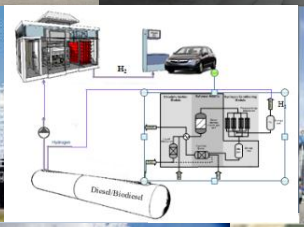
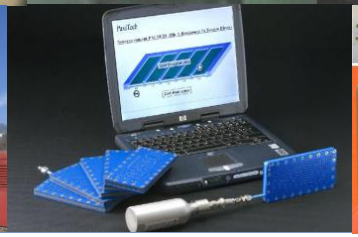
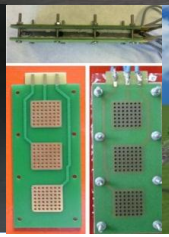
Demonstration of **portable generators, back-up power and/or UPS products** (normally 1-10 KW, but exceptionally up to 50 kW) – up to 250 kW of units in sufficient sites, including at least 1 year operation in the field

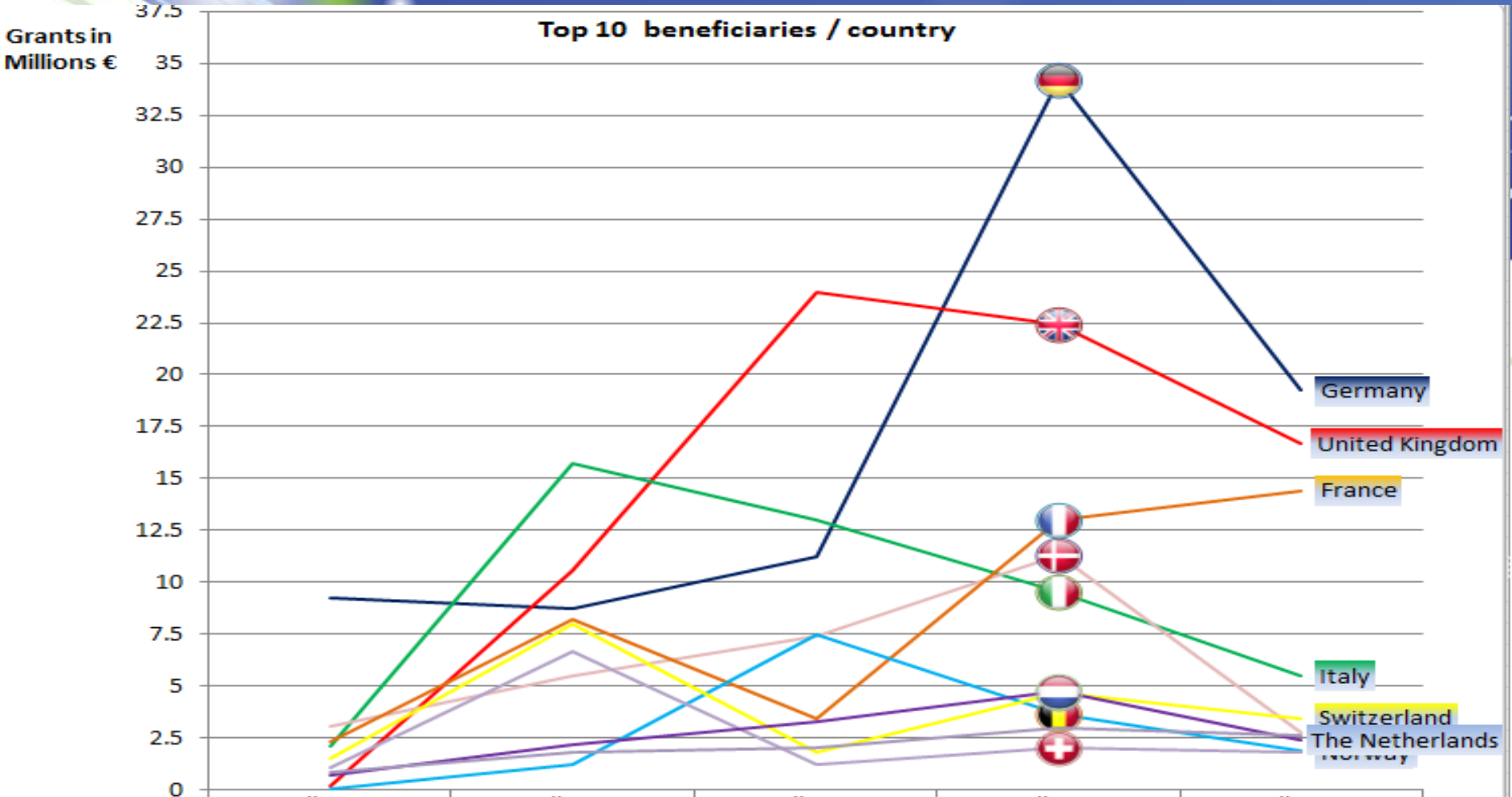
Support Action:

European framework for **'guarantee of origin' for green H2** – investigate and initiate 'green hydrogen certificates scheme', based on recent European policy directives

131 FCH JU signed projects

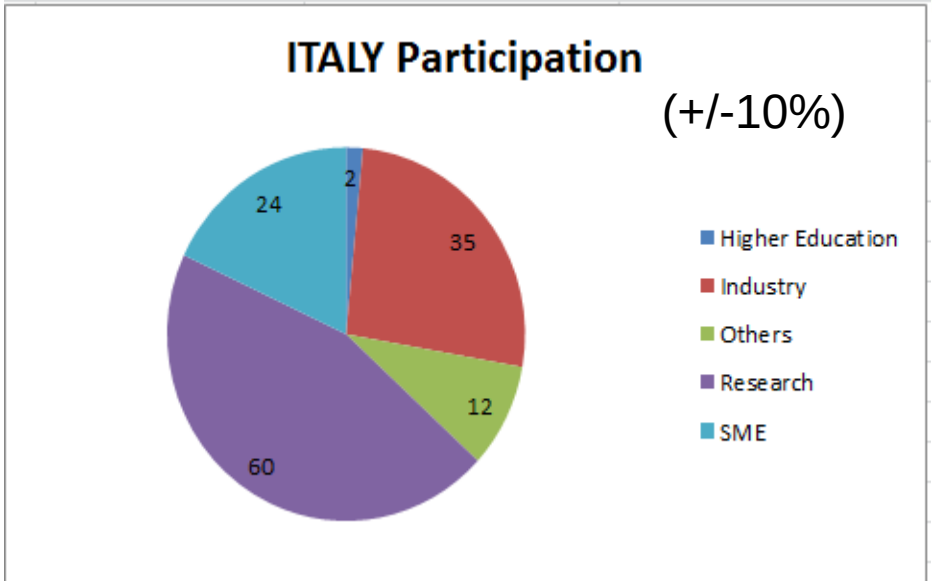
(+ 21/22 under negotiation call 2013-1)

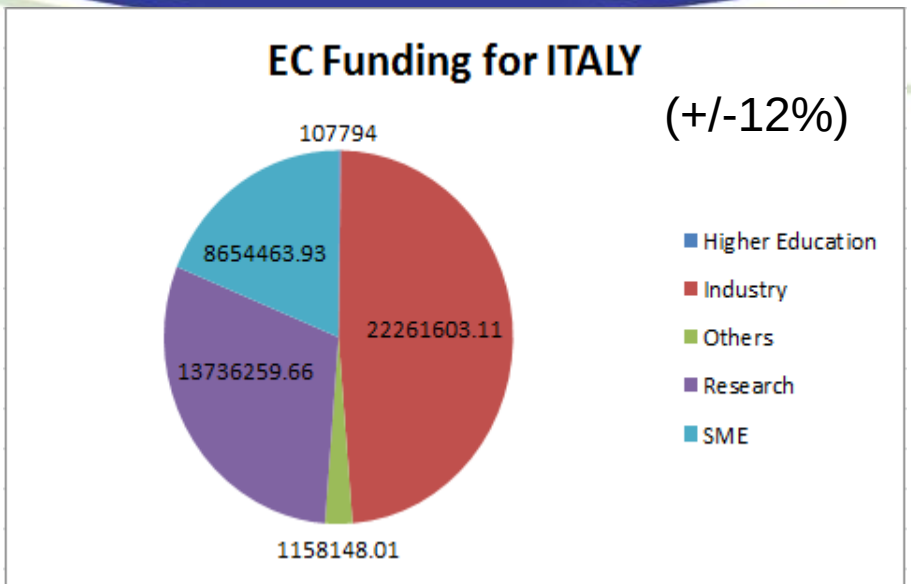
TRANSPORTATION & REFUELLING INFRASTRUCTURE	       
HYDROGEN PRODUCTION & DISTRIBUTION	   
STATIONARY POWER GENERATION & CHP	   
EARLY MARKETS	     
CROSS - CUTTING	RCS, Safety, Education, PNR, …



	Call 2008	Call 2009	Call 2010	Call 2011	Call 2012
Germany	9.27934481	8.73624394	11.221953	34.21660077	19.23178057
United Kingdom	0.17475209	10.545095	23.977673	22.413995	16.6870428
Italy	2.13477746	15.75784703	13.003067	9.515803	5.50677422
Denmark	3.10314931	5.4910117	7.38168	11.317072	2.8093728
France	2.3757316	8.26183325	3.477994	12.988366	14.4407118
Belgium	0.071142	1.2322756	7.463537	3.684717	1.8678456
Switzerland	1.5163127	8.00215372	1.796943	4.668378	3.47931602
Norway	1.090138	6.707959	1.243235	2.011002	1.794281
The Netherlands	0.741099	2.183187	3.278157	4.763748	2.401197
Spain	0.869798	1.8051	2.063817	2.977134	2.65156879

A brief overview of Italy Part 2





	Count of Project Number	Sum of Participant EC Contribution	Sum of Participant Total Cost
Higher Education	2	107794	141368
Industry	35	22261603.11	56806360.9
Others	12	1158148.01	1470456.01
Research	60	13736259.66	24897756.14
SME	24	8654463.93	15416882.72
Grand Total	**133**	**45918268.71**	**98732823.77**

FCH activities under Horizon 2020

Two key activity pillars

TRANSPORT

- Road vehicles
- Non-road mobile vehicles and machinery
- Refuelling infrastructure
- Maritime, rail and aviation applications

ENERGY

- Fuel cells for power and combined heat & power generation
- Hydrogen production and distribution
- Hydrogen for renewable energy generation (incl. blending in natural gas grid)

CROSS-CUTTING ISSUES

(e.g. standards, consumer awareness, manufacturing methods, studies)

Strategic objective

By 2020, fuel cell and hydrogen technologies will be demonstrated as one of the pillars of future European energy and transport systems, making a valued contribution to the transformation to a low carbon economy by 2050.

Budget of €1.4 billion in 2014 - 2020

Strong industry commitment to contribute inside the programme + through additional investment outside, supporting joint objectives.

Clean Power for transport package

Alternative fuels for transport

- A H2 refuelling point every 300 km;
- A H2 refuelling point per 250,000 inhabitants in urban areas;
- Member States without H2 refuelling points at the time of entry into force of this Directive will have until 2030 to implement it (instead of 2020 originally proposed by the EC)

	Road						Air	Rail	Water		
											
Range	*Urban*	*Medium*	*Long*	*Short*	*Medium*	*Long*			*Inland*	*Short sea*	*Maritime*
Natural gas					LNG	LNG	✗		LNG	LNG	LNG
Electricity		✗	✗		✗	✗	✗			✗	
Biofuels											
Hydrogen						✗	✗			✗	

Strong International Momentum

Current state of initiatives

H2Mobility Germany:
Recent announcement made - 350M€ for 400HRS by 2023

H2 Mobilité: Government and **industry** partners building common strategy

UK H2Mobility: Government and 11 companies developed common strategy

Business case in development

Danish Government has announced an Energy Plan 2020 that includes a **range of initiatives for** hydrogen infra-structure and FCEVs, amongst which are significant incentives

Government and **13 compa-nies** announced program for FCEV **mass production** and **100 HRS** by 2015 **connecting** 4 metropolitan areas

Government announced program to finance and deploy **100,000 FCEV** and **170 HRS** by 2020

Demo initiatives in California and East Coast H_2 Highway; partially funded by DoE.

New **"Clean Fuels Outlet" regulation** in **California** requiring deployment of HRS (to avoid penalties).

California Fuel Cell Partnership announced roadmap to **rollout 68 stations by 2015**

H2USA started

Summary

Italy has a great potential to do more & better .....

- Stronger and clearer National Strategy about FCH
  - EU and National policy makers' alignment
- States Representatives Group (Art 1 of the SRG Rules of Procedure)
  - Input on status of and interface with FCH JU activities with regard to relevant national research programmes and identification of potential areas of cooperation.
  - EU & National programmes' alignment
- Scientific Committee
- Regions

Summary

- FC&H is one of the Strategic Energy Technologies for Europe to contribute towards an effective sustainable energy and transport systems;

- FCH JU is a Public Private Partnership which might act as facilitator (e.g. public and private interests and needs).

Thank you for your kind attention !

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FCH JU Main Achievements

- **Transport sector :**
  - 49 buses, 37 passenger cars, 95 mini cars
  - 13 new refuelling stations
  - FC Bus H_2 consumption halved
  - H_2 cost < 10€/kg
- **Stationary sector :**
  - 1000 domestic Combined Heat & Power generators
  - Cost - 50%, efficiency 90%, lifetime up to 8 years
- **Early markets sector :**
  - 9 fork lifts, 1 tow truck
  - 19 back up power units

- **For the European FCH community :**
  - Strong, visible and coherent
  - Consensus strategy (MAIP/AIP)
  - Pre-competitive collaboration
  - 430 participants in 127 projects
  - SME participation 23%

Fuel Cell and Hydrogen Community

+10%

average increase of annual **turnover** (on a 2012 total of €0.5 billion)

+8%

average increase of **R&D expenditures** (2012 total €1.8 billion)

+6%

average increase of **market deployment expenditures** (2012 total €0.6 billon)

+6%

growth in **jobs** per year (~4,000 FTE in 2012) while average EU job market has contracted

+16%

annual increase in **patents** granted in the EU to European companies (average 1.5% for all European industries)

Source: Trends in investments, jobs and turnover in the Fuel cells and Hydrogen sector, 2012