



Implementing the European Commission's Fuel Cells & Hydrogen Research and Innovation activities.

IPHE 26th Steering Committee, Gwangju, Korea,
03 November 2016

Bart Biebuyck - Executive Director



<http://www.fch.europa.eu/>

Fuel Cells & Hydrogen technologies role in the Energy Union

Energy Security

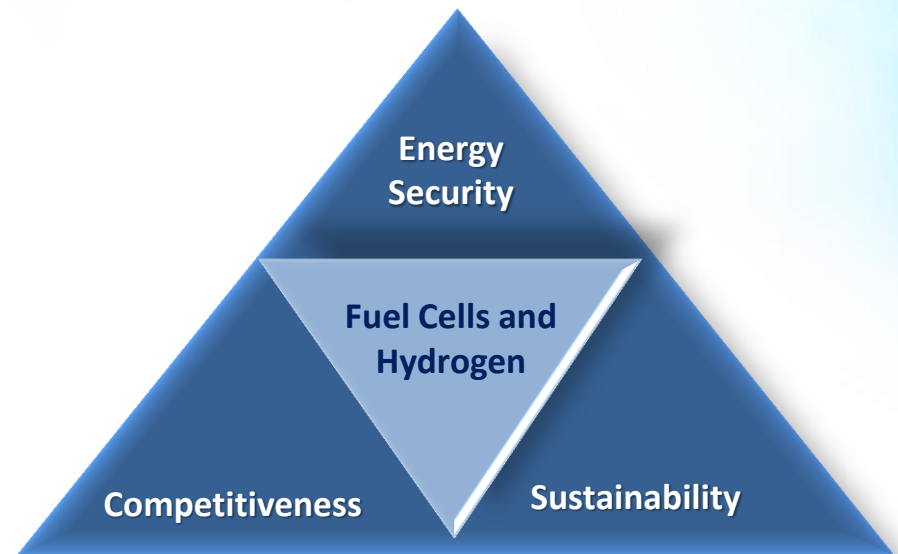
- Increase independence from unstable outside regions

Competitiveness

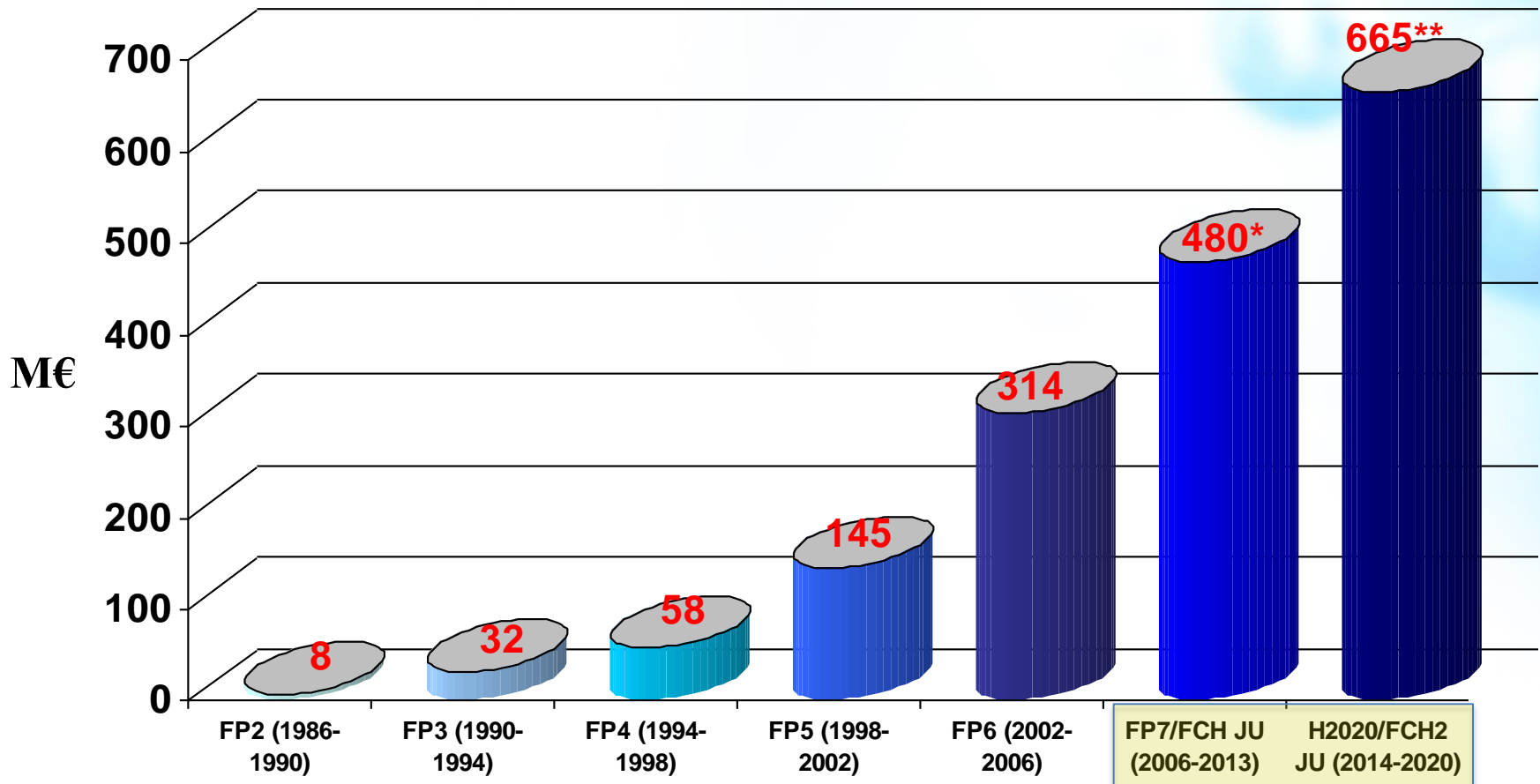
- research excellence leading to industry innovation and growth

Sustainability

- H₂ is a clean energy carrier
- Transport and Energy applications, generate electricity and heat with very high efficiency
- Possibility for storage of renewable energy sources
- Reduction of CO₂ emissions



Continuous Support in the EU Framework Programmes



* 470 mill EUR implemented by FCH JU + about 10 mill EUR already spent from EU 2007 budget, before FCH JU in place

** 665 mill EUR only to be implemented by the FCH2 JU + additional budget from EU programmes for low TRL (basic research) and structural funds/smart specialisation

TFCH2-JU is strong Public-Private Partnership with a focused objective

Fuel Cells & Hydrogen Joint Undertaking (FCH2 JU)



Industry Grouping
Close to 100 members
~ 50% SME



Research Grouping
Over 60 members



The Joint Undertaking is managed by a Governing Board composed of representatives of all three partners and lead by Industry.

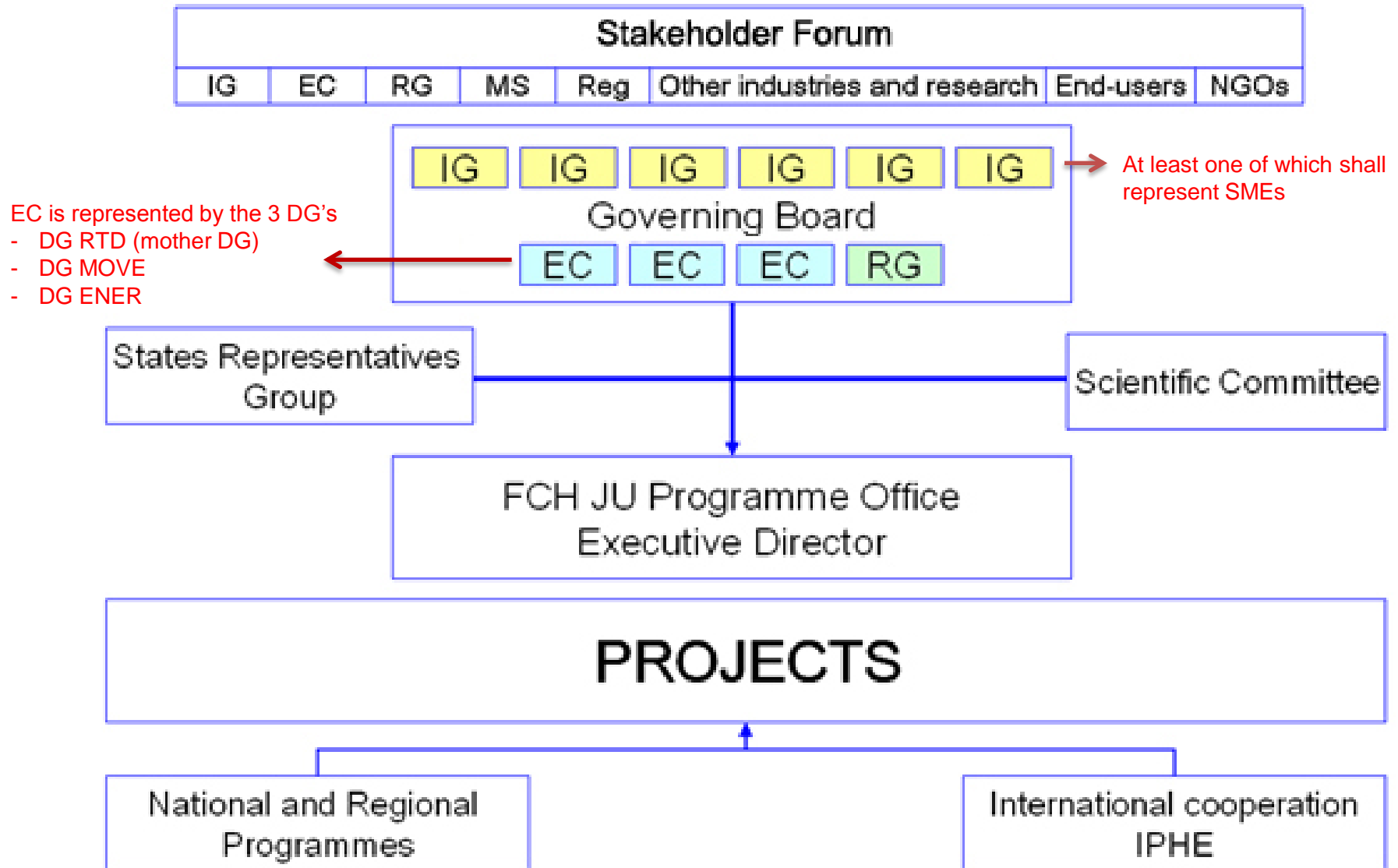
To accelerate the development of technology base towards **market deployment** of FCH technologies from 2015 onwards

Legal basis:

Council Regulations:

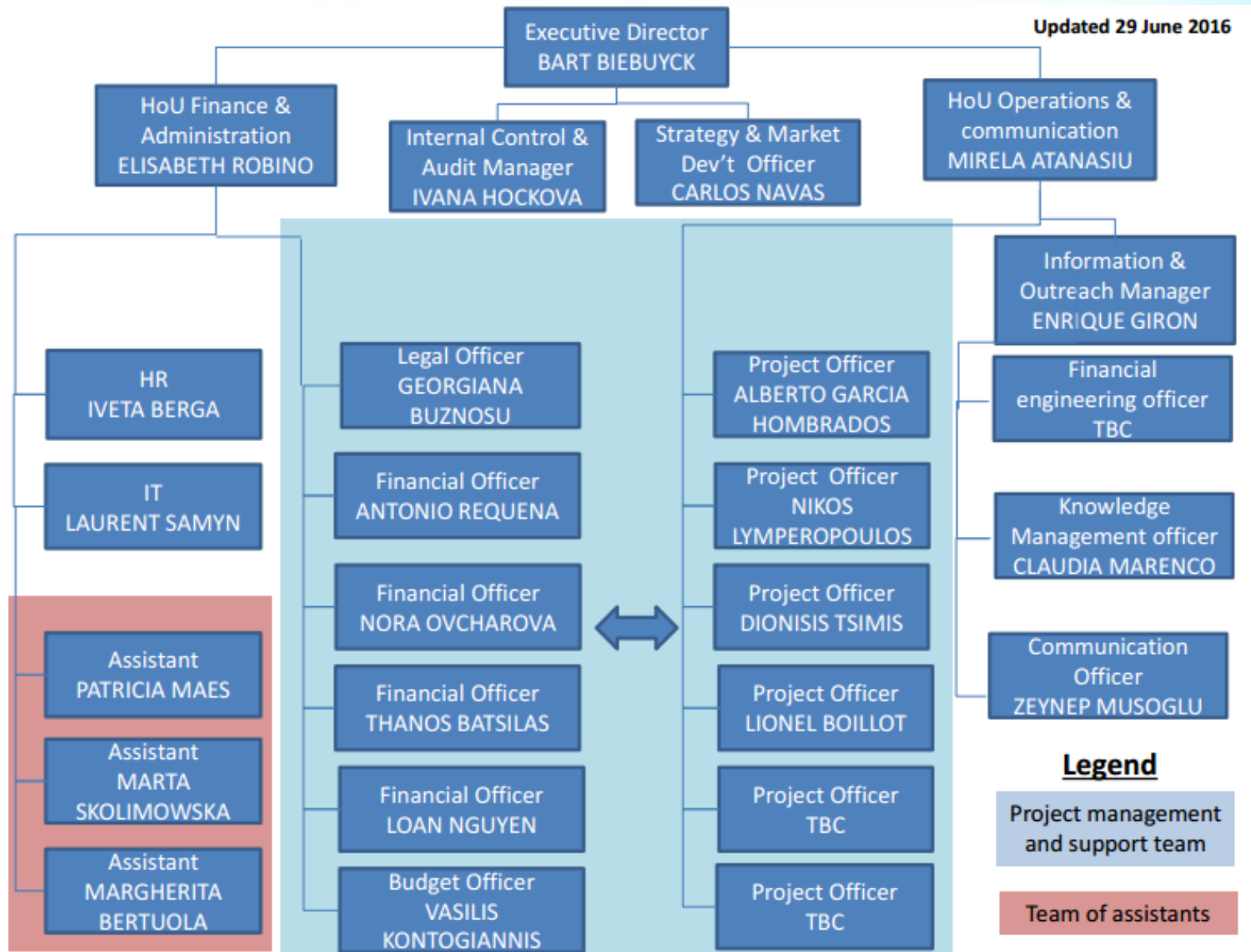
521/2008 of 30 May 2008 **(FP7)**
& amendment 1183/2011 of 14 Nov 2011
559/2014 of 6 May 2014 **(H2020)**

Governance: Bodies and Composition



Program Office Structure

26 people, 2 main pillars



FCH2 JU objectives

Reduction of production costs of long lifetime FC systems to be used in transport applications

Increase of the electrical efficiency and durability of low cost FCs used for power production

Transport

Industrial applications

Residential CHP

Feed to electricity grid

Reduce the use of critical raw materials

Existing natural gas, electricity and transport infrastructures

By-product from Chemical Industry

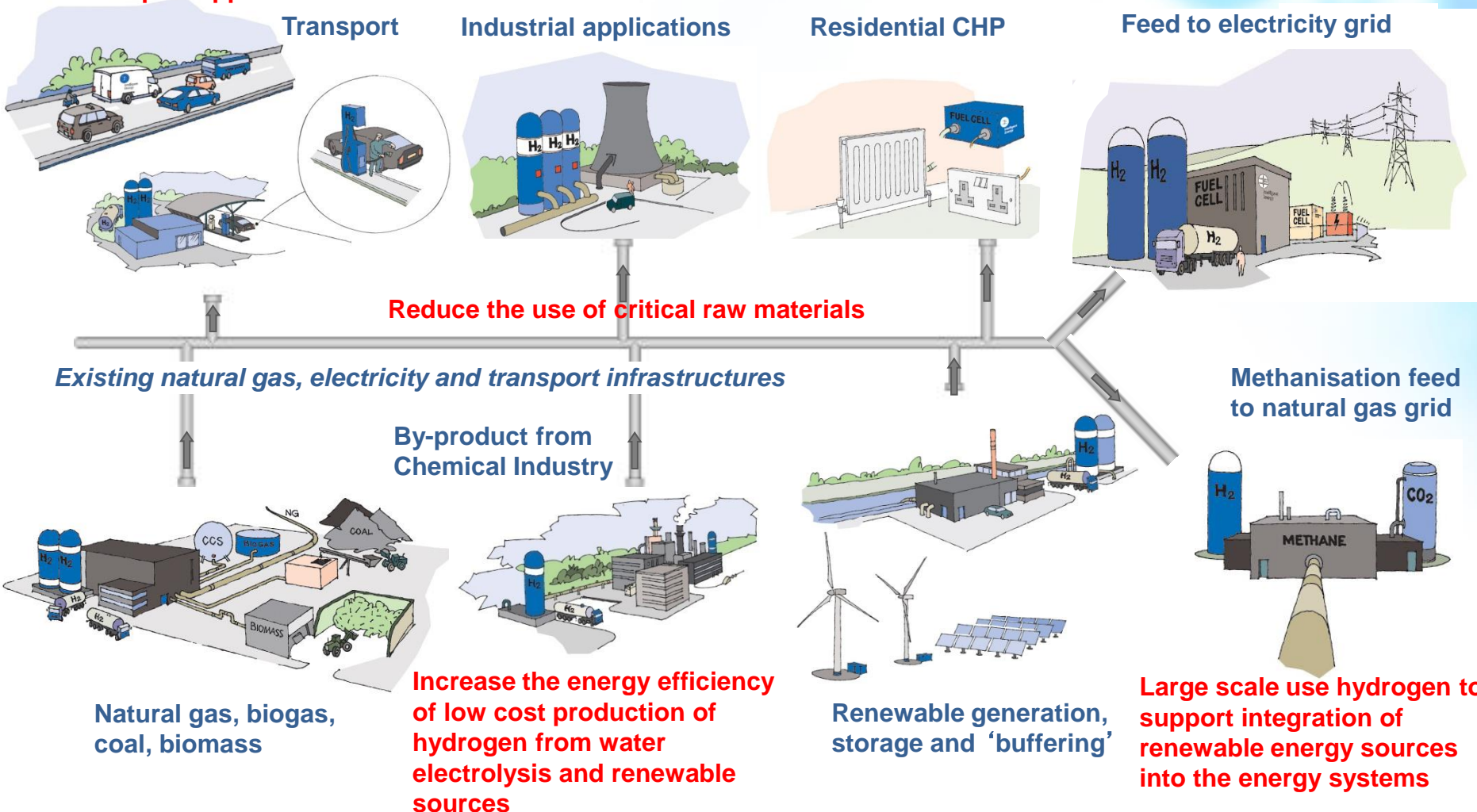
Methanisation feed to natural gas grid

Natural gas, biogas, coal, biomass

Increase the energy efficiency of low cost production of hydrogen from water electrolysis and renewable sources

Renewable generation, storage and 'buffering'

Large scale use hydrogen to support integration of renewable energy sources into the energy systems



Multi-Annual Work Plan, MAWP (2014-2020)

Estimated budget of €1.4 billion

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

TRANSPORT

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

ENERGY

- Hydrogen production and distribution
- Hydrogen storage for renewable energy integration
- Fuel cells for power and combined heat & power generation

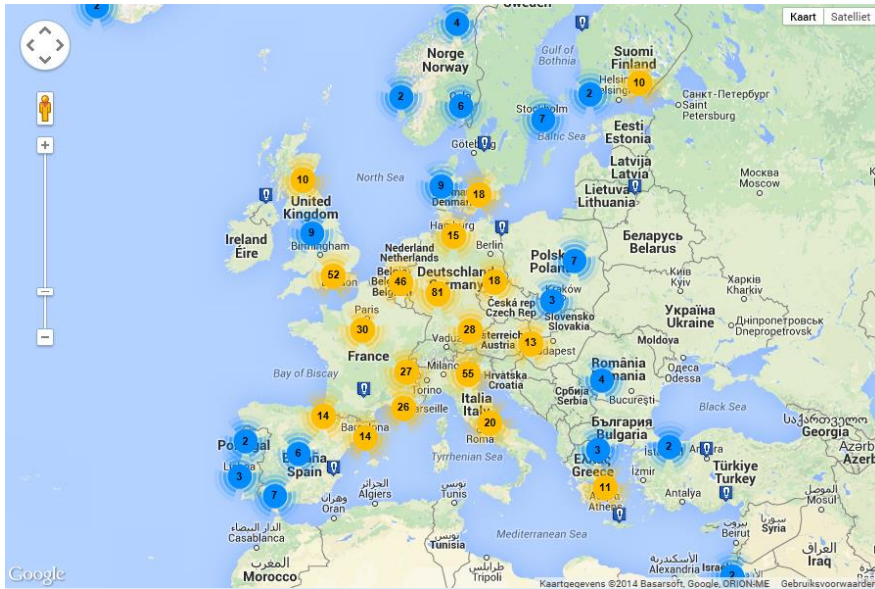
Cross-cutting Issues

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

Funding distribution	Research and Innovation		Innovation		Total	
Transports Systems	94 (±5)	14.5%	213 (±10)	33%	307	47.5%
Energy Systems	94 (±5)	14.5%	213 (±10)	33%	307	47.5%
Cross-cutting activities					32	5%
Total	192	29%	426	66%	646	100%

Strong FCH community in Europe

Projects involving 23 EU Member States



571 Beneficiaries:

35% Industries

28% SMEs

27% Research Organizations

4% High Education Institutions

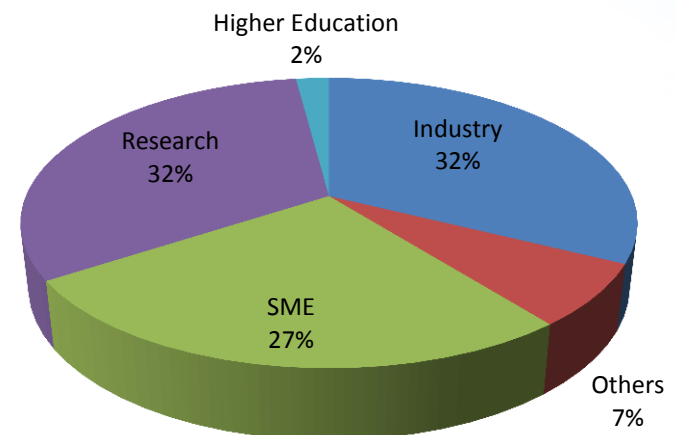
6% Others

Incl international cooperation outside EU

(Additional non-EU countries: CH, NO, IL, TR, IS, RS, CN, RU & US)



Funding of beneficiaries categories





Annual Call For Proposal Process

PROCESS OF AN ANNUAL CALL FOR PROPOSAL

The FCH JU, together with its partners, defines research and demonstration topics to be financed.

AWP
(Annual
Working Plan)

European consortia are invited to submit proposals.

Following the receipt of proposals, the FCH JU assesses each proposal on a range of criteria with independent experts.

Using a pool
of 45
independent
experts

After evaluation, the highest scoring proposals are selected for FCH JU support.

The FCH JU provides financial support to projects in the form of grants.

Roughly
100 million
Euro / year

FCH JU Project learnings: Status vs. Targets

Application	Parameter	Target (2017)	Status
Cars	Cost	70k€	● Available commercially in this price range
	Availability	98%	● >98% achieved
	System lifetime	5000h	Not enough data
Buses	Cost	700k€	● 650k€ being offered
	Fuel consumption	8.51kg/100km	● 8.0-13.2kg/100km
	Availability	90%	● over project lifetime; ● reached in certain locations over last year
Hydrogen Storage	Volumetric capacity	0.022kg/l	● 0.019 kg/l
	Gravimetric capacity	4%	● 5%
	Cost	800€/kg H2	● ca. 2,000-2,500€/kg H2
Hydrogen supply	Price at pump	10-15€/kg (MAIP 2015)	● 10€/kg found at several stations
	HRS cost	1.0-2.5M€	● met and exceeded in some cases (CAPEX, ex. works)

All targets for 2017, 2020 and 2023 can be found in our MAWP available at www.fch-ju.eu

Program Review Days (PRD) & Stakeholder forum (SF)

Publicly accessible



FUEL CELLS AND HYDROGEN
JOINT UNDERTAKING

PROGRAMME REVIEW DAYS – 21-22 NOVEMBER 2016
STAKEHOLDER FORUM – 23 NOVEMBER 2016

CONFERENCE PROGRAMME

Charlemagne building , Brussels, Belgium

MONDAY, NOVEMBER 21			TUESDAY, NOVEMBER 22		
PANEL 1	PANEL 3	PANEL 6	PANEL 2	PANEL 4	PANEL 5
3EMOTION	ALKAMMONIA	CERTIFYH	ARTEMIS	BEINGENERGY	ARTIPHYCTION
CHIC	AutoRE	FIRECOMP	AUTO-STACK CORE	CISTEM	BIONICO
H2ME	CLEARGEN DEMO	HY4ALL	CATAPULT	DEMSTACK	BIOROBUR
HAWL	D2Service	HYACINTH	CATHCAT	DIAMOND	BOR4STORE
HIGH V.LO-CITY	DEMCOPEM-2MW	HYCORA	COBRA	ENDURANCE	COMETHY
HYCARUS	DEMOSOFC	HYPACTOR	COPERNIC	EURECA	DON QUICHOTE
HYFIVE	ENE.FIELD	HYRESPONSE	H2REF	EVOLVE	EDEN
HYLIFT-EUROPE	FCPOWEREDRBS	HySEA	IMMEDIATE	FERRET	ELECTRA
HYPER	INNO-SOFC	IRMFC	IMPACT	FLUIDCELL	ELYntegration
HYTEC	ONSITE	KNOWHY	IMPALA	HEALTH-CODE	HELMETH
HYTRANSIT	PEMBEYOND	MATHRYCE	NANO-CAT	LIQUIDPOWER	HyBalance
MOBYPOST	POWER-UP	SOCTESQA	PHAEDRUS	MATISSE	HYDROSOL-PLANT
NewBusFuel	STAGE-SOFC	STACKTEST	PUMA MIND	METSAPP	HYTRANSFER
PURE	TRISOFC	SUSANA	SMARTCAT	NELLHI	INSIDE
SAPIENS			VOLUMETRIQ	PROSOFC	MEGASTACK
SUAV				REFORCELL	NOVEL
SWARM				SAPPHIRE	PECDEMO
				SCORED 2:0	SElySOs
				SECOND ACT	SOL2HY2
				T-CELL	SOPHIA
					UNIFYH

At PRD, achievements of the program versus the targets are assessed by independent experts & Scientific Committee , at the SF we show results and discuss what's next!



Thank you
Danke
Merci
Beaucoup
धन्यवाद
பக்கா பέρ
Obrigado
Bedankt
Takk skal du ha
고맙습니다
ありがとうございました
谢谢
Grazie
Спасибо

- FCH2 JU : <http://www.fch.europa.eu/>
- HYDROGEN EUROPE : www.hydrogeneurope.eu
- N.ERGHY : <http://www.nerghy.eu>