Fuel Cells and Hydrogen in the EU Energy Policy

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Energy Union

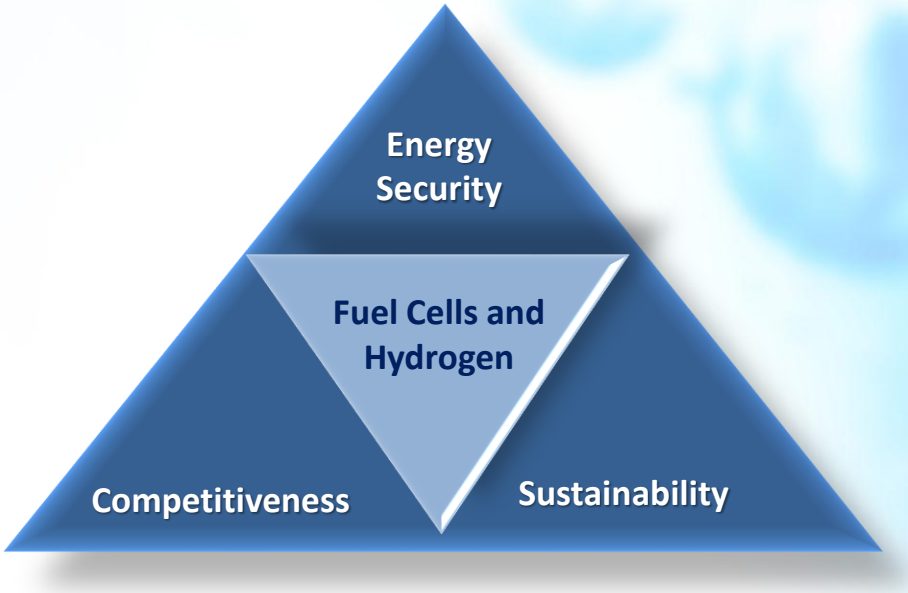
5 Policy areas:

- Supply Security
- Fully Integrated Internal Market
- Energy Efficiency
- Emissions Reduction
- Research and Innovation

Fuel Cells & Hydrogen technologies in the context of the European Energy policy

Sustainability

- H_2 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 CO_2 emissions



Energy Security

- Increase independence from unstable outside regions

Competitiveness

- research excellence leading to industry innovation and growth

Implementation via a Public-Private Partnership with a focused objective

Fuel Cells & Hydrogen Joint Undertaking

Hydrogen Europe

Industry Grouping
Close to 100 members
~ 50% SME

European Union
represented by the European Commission

N.ERGHY

Research Grouping
Over 60 members

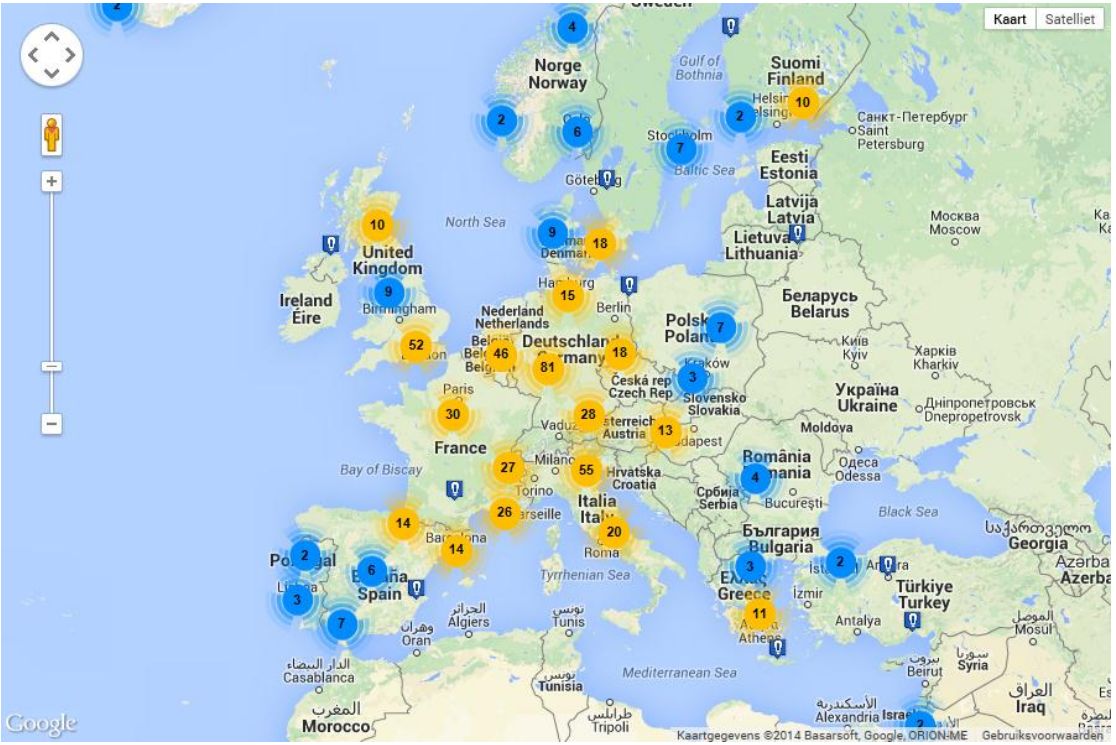
The Joint Undertaking is managed by a Governing Board composed of representatives of all three partners and lead by Industry.

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

FCH 1 JU under FP7

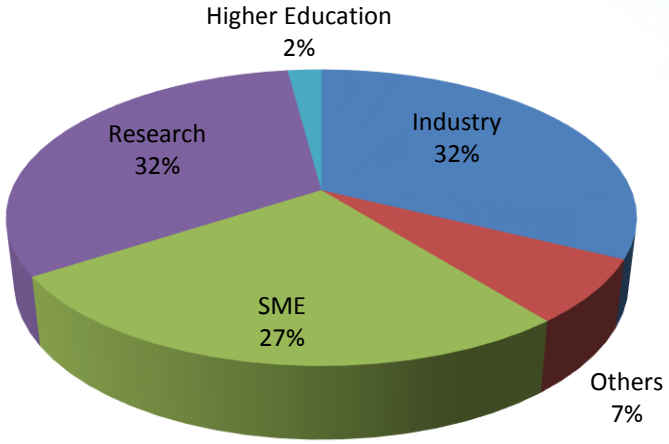
To build a strong FCH community in Europe

Budget : 2008 ~ 2013 : 940 M €



- 155 Projects & 7 Studies
- 1266 Participations
- 545 Beneficiaries:
  - 192 Industries (35%)
  - 154 SMEs (28%)
  - 149 Research Org. (27%)
  - 20 Universities(4%)
  - 30 Others (6%)

Funding of beneficiaries categories

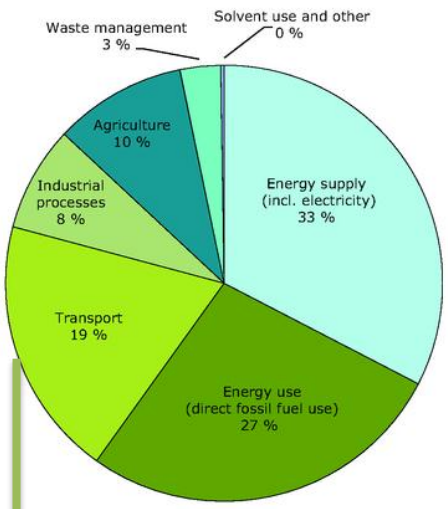


To increase the interest in FCH technologies in the 28 EU Member States

- 22 MS represented
- Missing:
  - Ireland
  - Latvia
  - Slovakia
  - Malta
  - Cyprus
  - Luxemburg

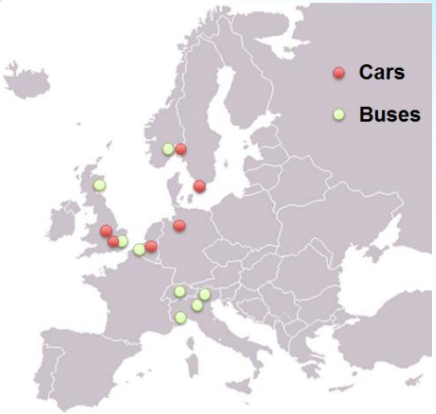
Non EU MS beneficiaries:
CH, NO, IL, TR, IS, RS, CN, RU, US

To reduce Green House Gas (GHG) Emissions in Europe



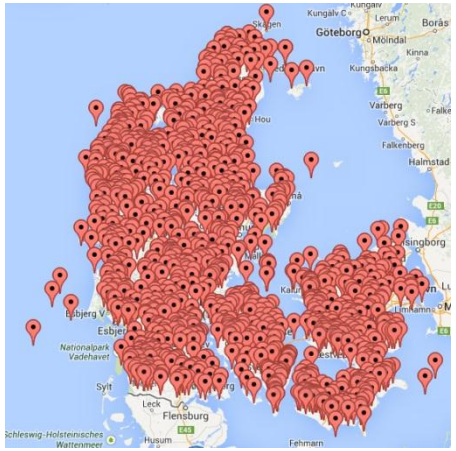
- Demonstration of > 260 hydrogen cars
- Installation of > 20 hydrogen refueling stations
- Demonstration of > 74 hydrogen buses
- Demonstration of > 400 hydrogen materials handling vehicles
- Demonstration of auxiliary power units for trucks, planes and maritime applications

H2moves.eu SCANDINAVIA · HYTEC · SWARM · HyFIVE · CHIC · HIGHVLOCITY · HyTransit · 3EMotion



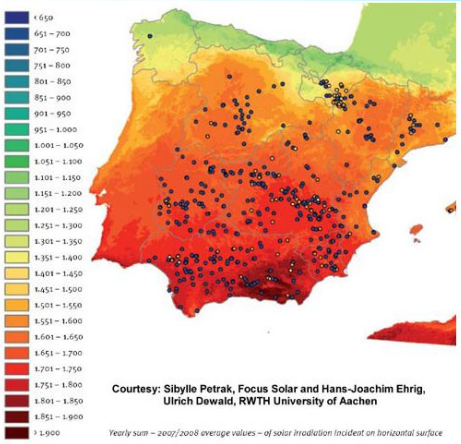
HYPER · HyLIFT Clean Efficient Power For Materials Handling · SAPIENS · pure

To increase the European energy security (1)



Wind turbines in Denmark

EU installed wind capacity



Photovoltaics in Spain

Higher generation variability

↓

Flexible system

↓

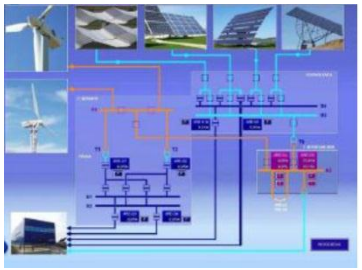
Storage

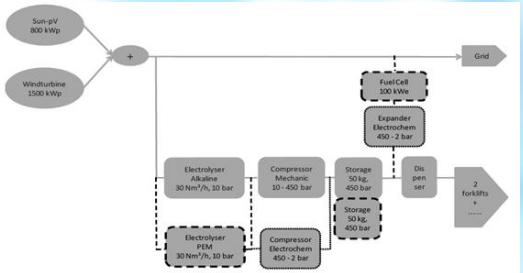
To increase the European energy security (2)

ELYGRID

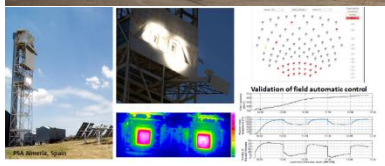
DON QUICHOTE

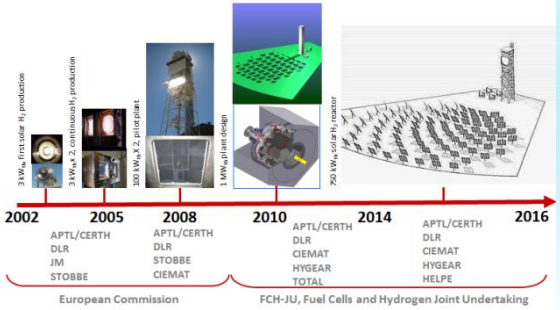
HYDROSOL

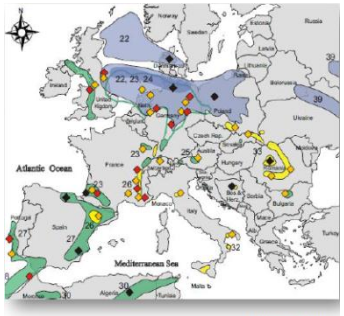




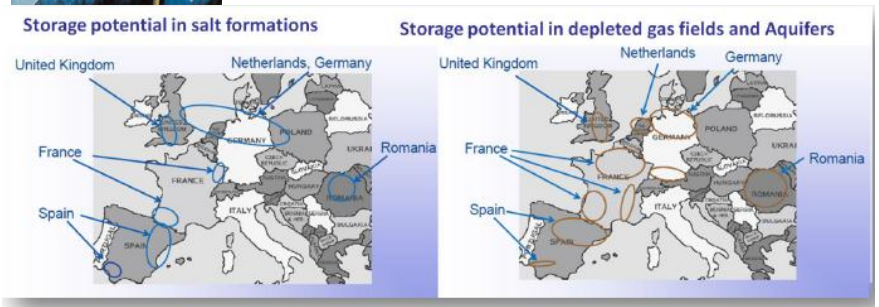
- Demonstration of high power electrolysers coupled to renewable energy sources
- Demonstration of integrated systems
- Demonstration of hydrogen production through concentrated solar energy
- Hydrogen Underground storage







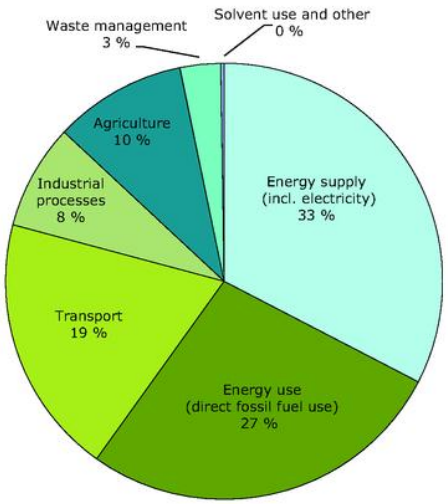
Source: KBB



Source: DEEP Underground Engineering GmbH

HyUnder

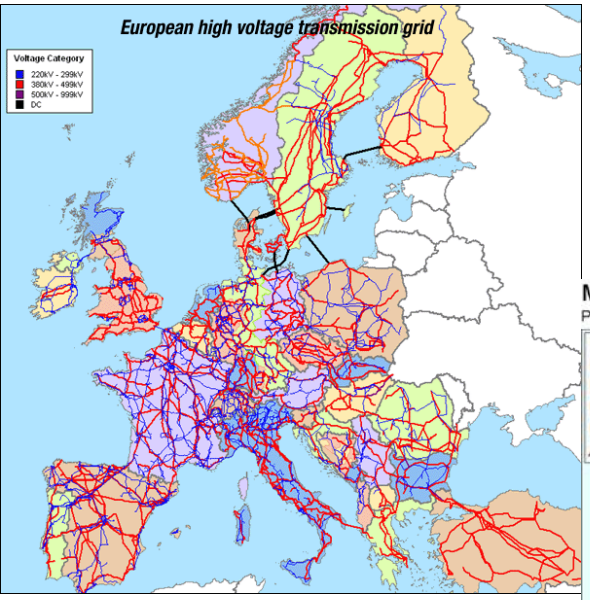
To reduce European energy consumption



- Demonstration of > 1000 residential micro-CHP units in 12 Member States (system efficiency > 95%)
- Demonstration of 3 industrial CHP projects >1,5 MW
- Demonstration of > 37 back-up power systems

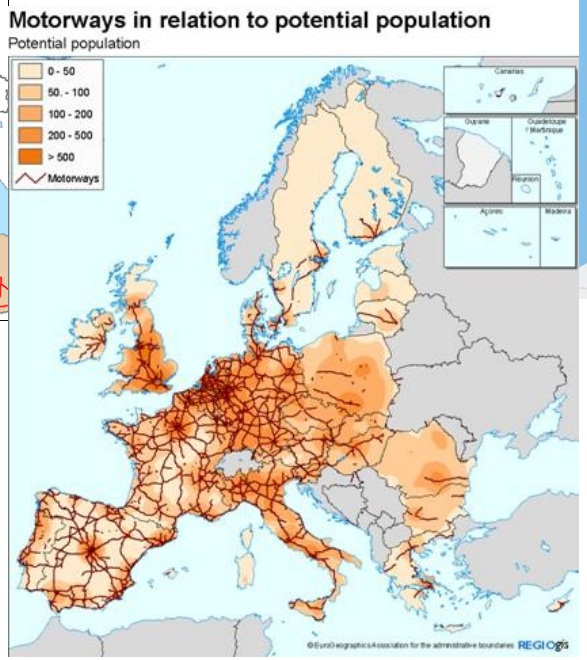
ene.field SOFT-PACT FCpoweredRBS fitup

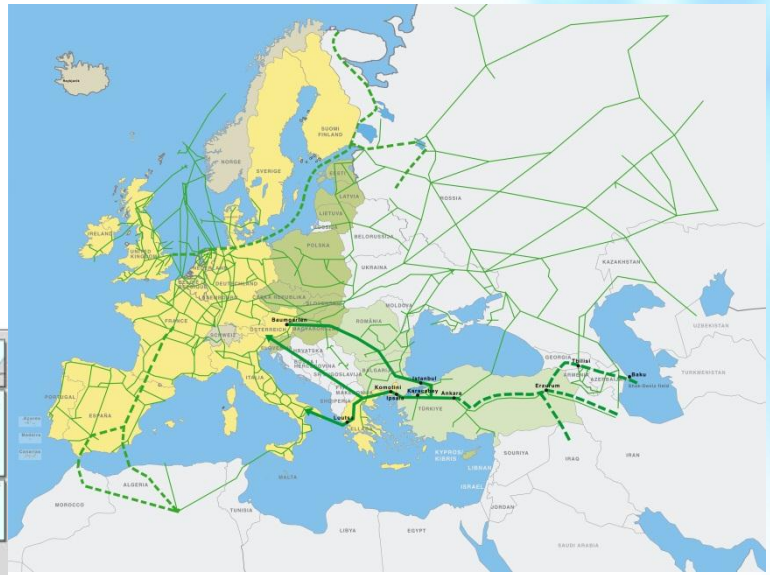
Connecting the European grids



Electricity

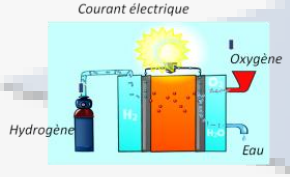
Transport

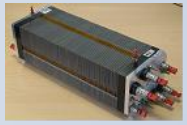




Gas

Achievements/Focus areas





Marine & aerospace

Forklifts

Hybrid FC Buses

FCEV

FCEV RE

FC in commercial planes

1995 2000 2005 2010 2015 2020

Backup power

Large scale stationary applications

Energy storage

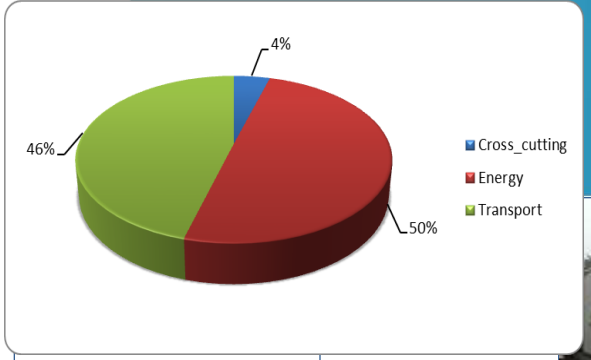
CHP Systems

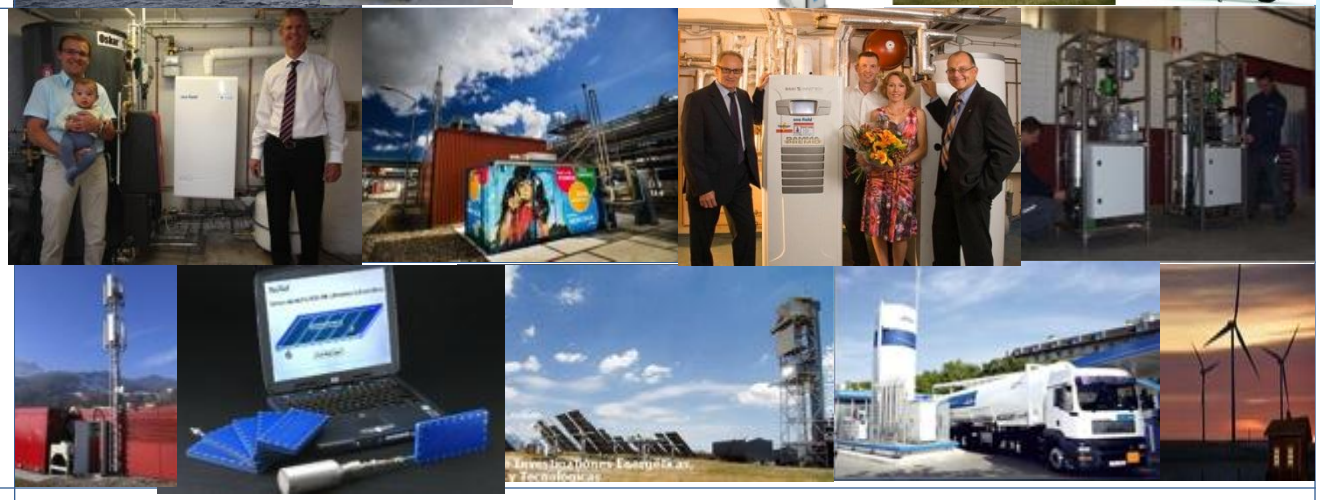
HRS

Portable applications

The scope of applications is widening with time

FCH JU current portfolio: 155 projects



TRANSPORTATION & REFUELLING INFRASTRUCTURE	**45 projects** 202 mill EUR	
ENERGY (HYDROGEN PRODUCTION & STATIONARY FUEL CELLS)	**91 projects** 210 mill EUR	
CROSS - CUTTING	**19 projects** 20 mill EUR	Regulations, Codes and Standards (RCS), Safety, Education, PNR, …

Fuel Cell and Hydrogen community in Europe

+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

FCH 2 JU under H2020

FUEL CELLS AND HYDROGEN
JOINT UNDERTAKING

FCH 2 JU 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 €1.33 billion in 2014 - 2020

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

Adopted by the Commission on 10 July 2013

FCH 2 JU objectives

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

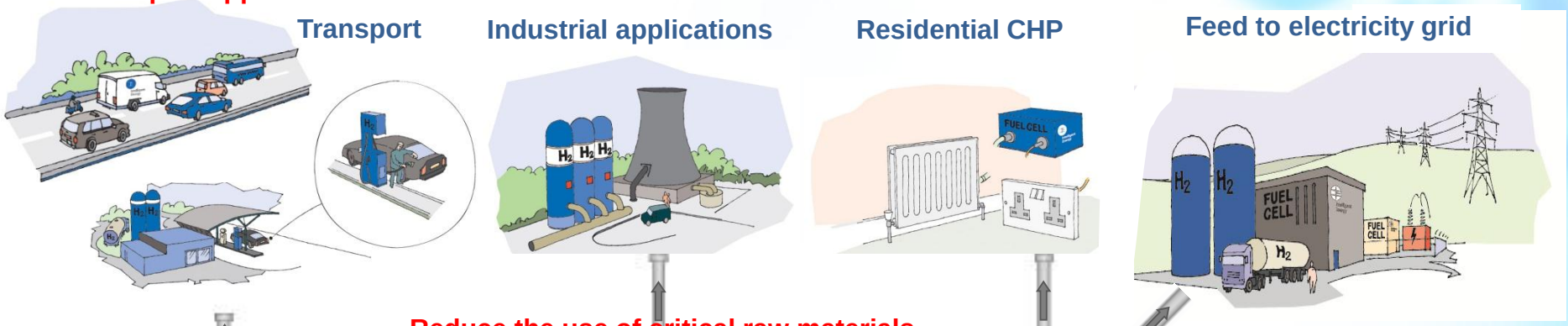
Increase of the electrical efficiency and durability of low cost FCs used for power production

Transport

Industrial applications

Residential CHP

Feed to electricity grid

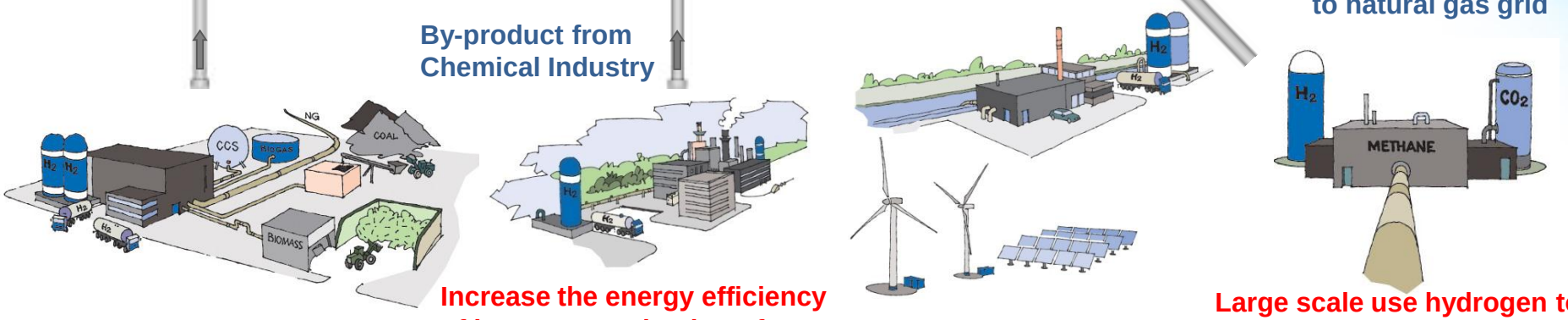


Reduce the use of critical raw materials

Existing natural gas, electricity and transport infrastructures

Methanisation feed to natural gas grid

By-product from Chemical Industry



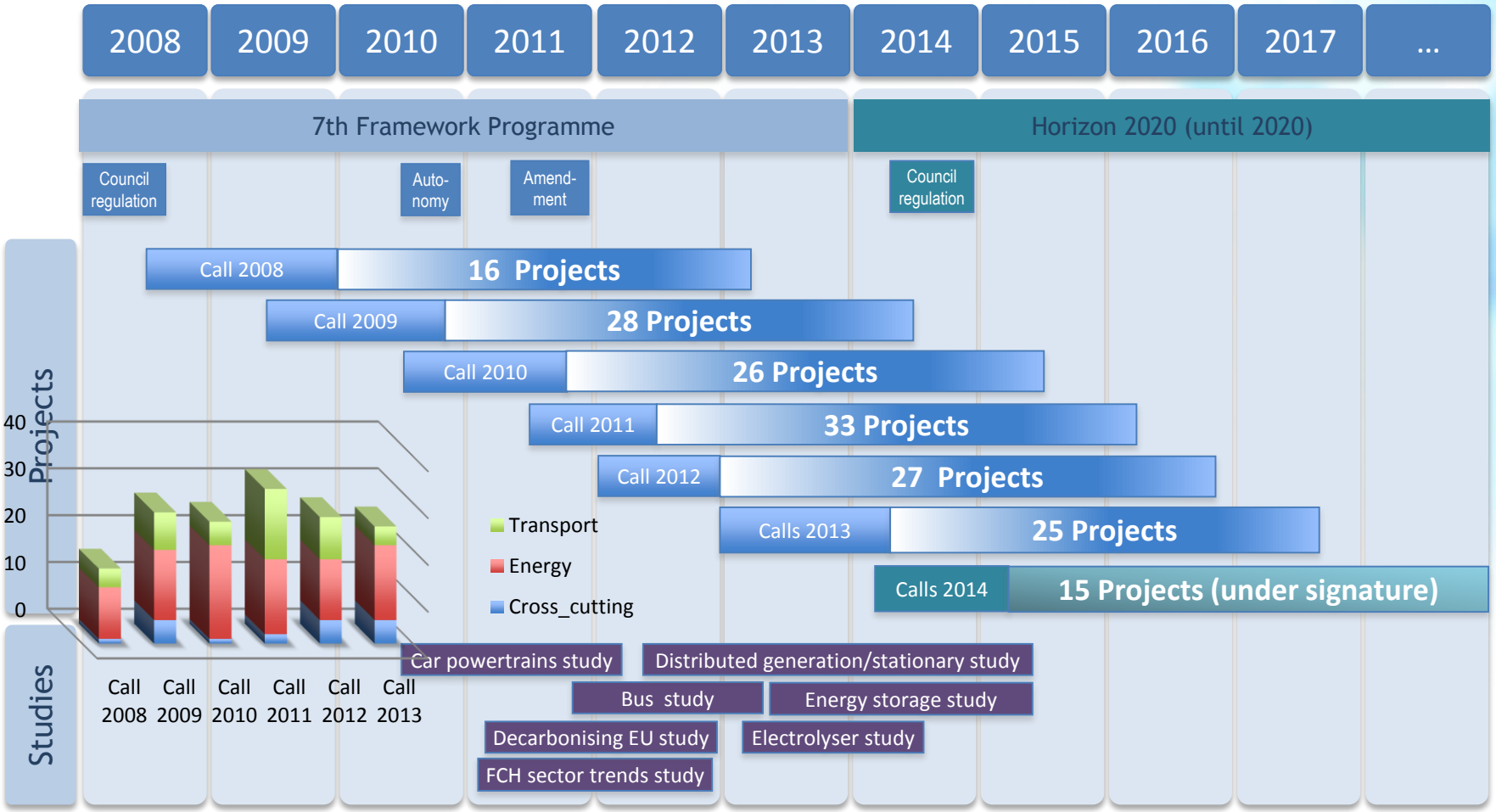
Natural gas, biogas, coal, biomass

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

Supported R&D activities 2008-2013 (and beyond…)



- Total of **155 research and demo** projects (supported by 7 studies)
- Total value of about **1 bill €** ***(incl 450 mill € EU support)***

Call for Proposals 2016

- Launch 19 January 2016
- Deadline 5 May 2016
- Indicative budget €117,5M
- Check publication via EU Participant Portal & FCH JU Website

Thank you for your attention !

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Further info :

- **FCH JU : www.fch.europa.eu**
- **Hydrogen Europe : www.hydrogeneurope.eu**
- **N.ERGHY : www.nerghy.eu**