



Fuel Cells & Hydrogen

Latest developments at EU level

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1. FCH 1 JU - update



Projects from 2013-2 Call

Application Area	Number of Projects	Total Budget (M€)	EC contribution (M€)
1. Transportation & Refuelling Infrastructure	1	38	15
2. Hydrogen Production & Distribution	NO PROPOSALS SELECTED FOR FUNDING		
3. Stationary Power Generation & CHP	NOT CALLED		
4. Early Markets	NO PROPOSALS SELECTED FOR FUNDING		
5. Cross-Cutting issues	1	0.5	0.4
TOTAL	2	38.5	15.5

FCH (1) JU – global overview*

- ✓ **153 projects financed**
- ✓ **540 participants from 33 countries:**
 - **300+ enterprises**
 - of which almost 50% SMEs
 - **70+ research institutes**
 - **90+ universities**
- ✓ **EU contribution to the FCH (1) JU ~ 470 M €**
- ✓ **Special role for EC Joint Research Centre (PNR, RCS...)**
- ✓ **Includes international cooperation outside EU**

* Provisional figures pending finalisation of the negotiations of the 2013 calls

Main achievements of FCH (1) JU

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Transport:

- Demonstration of 49 buses, 37 passenger cars, 95 mini cars
- Bus H2 consumption halved
- 13 new refuelling stations in EU
- H2 cost <10€/kg



Stationary Power:

- 1000 domestic CHP generators being installed
- Cost -50%, efficiency 90%, lifetime up to 8 years

Early markets:

- 9 fork lifts, 1 tow truck demonstrated
- 19 back up power units installed





Benchmark studies

TOPIC	Budget €	Status
"The development of the electrolysis in the EU and its role in using H2 as a mechanism for energy storage "	113.848	Finished and available on FCH JU website
"Financing of a Hydrogen Refuelling Infrastructure : conditions for private investments and required forms of public support"	390.200	Finished and available on FCH JU website
"The role of fuel cells in distributed power generation"	~1.100.000	Ongoing
"A fact based comparison of technologies for energy storage"	~1.100.000	Starting soon
"Development of a European Urban Fuel Cell Bus Commercialisation Strategy"	~1.200.000	Starting soon

2. FCH 2 JU in H2020 – State of play



What is Horizon 2020?

- Biggest ever European R & I Programme for 2014-2020
- Budget of nearly 80 billion €
- Aiming at:
 - ✓ **boosting investment in growth & jobs**
 - ✓ **addressing people's concerns about living conditions**
 - ✓ **strengthening EU's global position in research, innovation & technology**
- **International participation a key element**
(http://ec.europa.eu/programmes/horizon2020/sites/horizon2020/files/Factsheet_international_participation.pdf)



FCH 2 JU in Horizon 2020 (1)

- Continuation of FCH (1) JU proposed under H2020
- Part of the Innovation Investment Package, worth € 22 B
- To cover activities of value close to € 1.3 B
- Adoption by the Council in May 2014
- Launching Event on 9th July 2014
 - with publication of 1st Call for Proposals (budget ~ € 94 M)



New features:

- ✓ 2 main areas of activity: "Energy" & "Transport"
- ✓ More emphasis on close to market activities
- ✓ Main priorities: H2 based renewable energy storage + road transport & infrastructure
- ✓ Resource scarcity receives more attention
- ✓ EU contribution up from 470M€ to 665M€*

2014 Stakeholders Forum

- ✓ When? Provisionally on 12th November 2014
- ✓ Where? Brussels, Belgium
- ✓ How? New organisational formula to increase impact
- ✓ Open to public!

More info soon on:

<http://www.fch-ju.eu/>





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3. Other EU initiatives



"Clean Power for Transport" Package (1): RATIONALE

- Sets out alternative fuels strategy for long-term substitution of oil in transport
- Main objectives:
 - ✓ creating certainty for investors
 - ✓ removing technical and regulatory barriers across the EU

→ To enable mobility based on alternative fuels Europe-wide



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"Clean Power for Transport" Package (2): REQUIREMENTS

The amended directive:

- Requires Member States to develop national policy frameworks for build-up of alternative fuels and their infrastructure;
 - Foresees the use of common technical specifications for recharging and refuelling stations;
 - Sets requirements for fuel labelling to ensure vehicle/fuel compatibility.
- ✓ Adoption by the European Council foreseen in summer 2014

"Clean Power for Transport" Package (3): H2 infrastructure

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Requirements for hydrogen in national policy frameworks :

- Coverage: "appropriate number of points"
- Timeline: "by end of 2025"



"Clean Power for Transport" Package (4): H2 standardisation



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- For hydrogen the directive requires development of standards containing coherent and single technical interoperability specifications for:
 - outdoor **hydrogen refuelling points** dispensing gaseous hydrogen compatible with ISO/TS 20100:2008 (or its later edition)
 - **hydrogen purity** dispensed by hydrogen refuelling points compatible with ISO 14687-2:2012
 - **fuelling algorithms and equipment of hydrogen refuelling points** compatible with ISO/TS 20100:2008 or its later edition
 - **connectors for vehicles** for the refuelling of gaseous hydrogen compatible with ISO 17268:2012
- DE-US-JP-Scan-EU cooperation on pre-normative issues related to HRS
- 7/Feb/2014: Commission issued standardisation request to ESOs
- Publication deadline for the standard: 31/12/2015

1. Energy security

Efforts to reduce Europe's high energy dependency should be intensified. Major objectives include:

- ✓ Moderating energy demand via enhanced **energy efficiency** as 1st step
- ✓ Further **diversification of energy supply** together with
- ✓ Coordinated development of **infrastructure** in support of this diversification
- ✓ Developing **renewable & indigenous energy** sources
- ✓ Enhancing Europe's bargaining power



2. Industrial competitiveness

Europe needs strong & competitive industrial base as key driver for economic growth & jobs. In this context special attention will be paid to:

- ✓ Promoting European & international standards & regulations
- ✓ Maximising efficiency of public investment in research
- ✓ Addressing STEM (science, technology, engineering & mathematics) skills shortages
- ✓ Tapping the potential of cleantech for enhancing EU's competitiveness

Commission is proposing new climate & energy objectives for 2030, to:

- ✓ Reduce EU's dependence on imported fossil fuels
 - ✓ Make Europe's economy more energy/resource efficient
 - ✓ Boost investments, develop new technologies & create jobs
 - ✓ Reduce the environmental footprint of European economy
- ➔ **The new framework will be basis for EU position in negotiations on new international climate agreement in 2015**

New targets for 2030:

- ✓ **GHG emission 40% lower than 1990 levels**
- ✓ **Renewable energy of at least 27% of energy consumption**

To be complemented by:

- ✓ **KPIs for:**
 - **Competitiveness of the energy system**
 - **Security of energy supply**
- ✓ **Reformed EU emission trading system as key component**

Framework to be finalised by end of October 2014

EU to promote cooperation between European standardisation organisations and international standardisation bodies.

➔ Annual EU Work Programme for European standardisation:

- ✓ **To identify strategic priorities**
- ✓ **Taking into account**
 - ✓ **EU long-term growth strategies**
 - ✓ **Economic competitiveness**
 - ✓ **Societal needs**

Regulation EU No 1025/2012

<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2012:316:0012:0033:EN:PDF>

4. Power to Gas



Power to Gas (P2G) (1)

- **P2G is a technology that converts electrical power to gas via electrolysis. There are two types P2G:**
 - 1) With H₂ as end product, which can be used in transport/industry directly or injected into natural gas grid
 - 2) Where H₂ is combined with CO₂ to form methane, which can be fed into natural gas grid
- **It is attractive because:**
 - ✓ It can use electricity from fluctuating RES (solar, wind), otherwise wasted
 - ✓ Produced gas is easily storable (whether H₂ or CH₄) in contrast to electricity
 - ✓ When electricity shortage arises H₂ can be converted back into electricity (using fuel cells) to balance the grid

Power to Gas (P2G) in FCH 2 JU

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- ✓ P2G is expected to play an important role in integrating increasing share of fluctuating RES in Europe's future energy system
- ✓ Consequently, one of priorities for FCH 2 JU
- ✓ Main focus will be on pure H₂ to power fuel cell applications
- ✓ Economics key for deployment!





**THANK YOU FOR YOUR
ATTENTION**