EUROPEAN COMMISSION
DIRECTORATE GENERAL FOR RESEARCH AND INNOVATION

Directorate K - Energy
K.2 - Energy conversion and distribution systems

Extension of the Fuel Cells & Hydrogen Joint Technology Initiative under Horizon 2020

Results of the public consultation

09 January 2013

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1. EXECUTIVE SUMMARY AND KEY MESSAGES

Hydrogen is one of the very few near-zero-emissions energy carriers that could play an important part of the future EU low-carbon energy and transport sectors. Recognising this potential, the Fuel Cell and Hydrogen Joint Undertaking (FCH JU), a Public Private Partnership between the European Commission, the industry and the research communities, was established in 2008 through the Council Regulation (EC)521/2008. Its objective was to significantly accelerate the market introduction of the fuel cell and hydrogen technologies, in order to realise their potential as an instrument to achieve a lower carbon energy system.

With the 7th Framework Programme coming to an end and Horizon 2020 expected to start in early 2014, the question is posed whether the FCH JU should be continued. For this purpose, an impact assessment of different policy options to implement the future research programme on FCH is on-going.

As part of this process, a public consultation was conducted between 11 July and 4 October 2012. 127 responses were received. 17 position papers were also submitted as well as 39 "further comments". Responses came from 20 Member States, as well as from countries associated to the Framework Programme and few responses came from 'other' countries. France with 38 responses was the most represented country, followed by Germany (17) and the UK (16). The biggest number of responses came from citizens (35 submissions), followed by SMEs (24) and research organisations (24).

The consultation responses can be summarised as follows:

- Respondents know about the FCH JU, since 57 declared to be very familiar and 49 to be familiar with the organisation. These answers combined represent 83.5% of all answers. Almost 50% of respondents had applied for FCH JU funding, and 42% were actually funded.

- Most respondents agree on the fact that FCH technology will play a notable role in the future EU low-carbon energy and transport sectors (98% of respondents), for the EU energy security of supply (94%) and for the EU industrial competitiveness (95%).

- Most also agree that the currently targeted applications can have an important socio-economic impact by 2020, with a particularly strong support for the use of hydrogen as storage medium for renewable energy (95% of respondents).

- Most respondents also believe that both the European FCH industry and the FCH research sector are more competitive or stronger than 5 years ago, and that they have the potential to be even more competitive by 2020 (99% for industry, 95% for research).

- 87% of the respondents believe that the industry cannot address the problems alone and 67% agree that Member States support will not suffice. An overwhelming 96% think that an intervention at EU level is required.

- Regarding the main problems faced by Europe, the lack of support of decision makers (87%), of access to risk finance for deployment activities (82%) and of public awareness (75%) are the main problems to be addressed in Europe. The lack of competitiveness of the technology comes last in this question (only 37% of respondents agree with this aspect).

- The lack of public RD&D funding is by far the most quoted underlying problem (81%). Research infrastructure does not seem to be a problem (38%).Other possible underlying problems range from approx. 55% to 65% of agreement.

- Regarding the current FCH JU, the majority of the respondents think that the FCH JU has reach most of the EU objectives. In order of importance, they believe this mechanism has provided medium-term stability on research, development and demonstration (RD&D) public funding for the FCH sector (79% of respondents), has contributed to increase European competitiveness (76%), has increased and improved coordination between stakeholders at EU

level (72%) and has increased the involvement of the industry in RD&D on FCH (71%). Many other aspects score above the 50%. For EU-12 involvement, outreach, and simplification of access to funding, the score is below 50%.

- Regarding future priorities, the 2 most quoted areas are hydrogen as a storage medium for renewable energy (80% of support) and refuelling stations for transport applications (75%).

- 65% of the respondents support the recommendation of the Sherpa group, i.e that it should be possible for JUs to support, to a certain extent, activities which do not directly qualify as RD&D, provided they contribute to the achievement of their innovation ecosystem goals.
- The continuation of the JU - in its current format or "modernised" - is the favoured option (70% calling for a continuation, incl. 53% in a modernised version), while a contractual Public-Private Partnership is only favoured by 4%.

- Most respondents believe that the FCH JU will have an impact on the EU competitiveness (77% of positive feedback at short-term, 88% at medium-term and 84% at long-term).

The details of all answers to the questionnaires are described in chapter 3.

2. BACKGROUND INFORMATION AND METHODOLOGY

The on-line questionnaire for a Public-Private Partnership (PPP) in Fuel Cell and Hydrogen under Horizon 2020 (the next framework programme for the period 2014-2020) was launched on 11 July 2012 and was closed on 4 October 2012. It was available at the following website:

http://ec.europa.eu/research/consultations/fch_h2020/consultation_en.htm

All citizens and organisations were invited to submit their views and opinions. Contributions have particularly been sought from companies, including SMEs, and research organisations active in research and innovation on FCH technologies. In addition to being published on the 'Your voice in Europe' website, the information about the public consultation was widely disseminated by highlighting the initiative at a series of dedicated stakeholder meetings that took place during the summer 2012, publishing it on the FCH JU website, informing the members of the advisory groups of the FCH JU (States Representatives Group and Scientific Committee), contacting project participants and sending information to a large list of stakeholders.

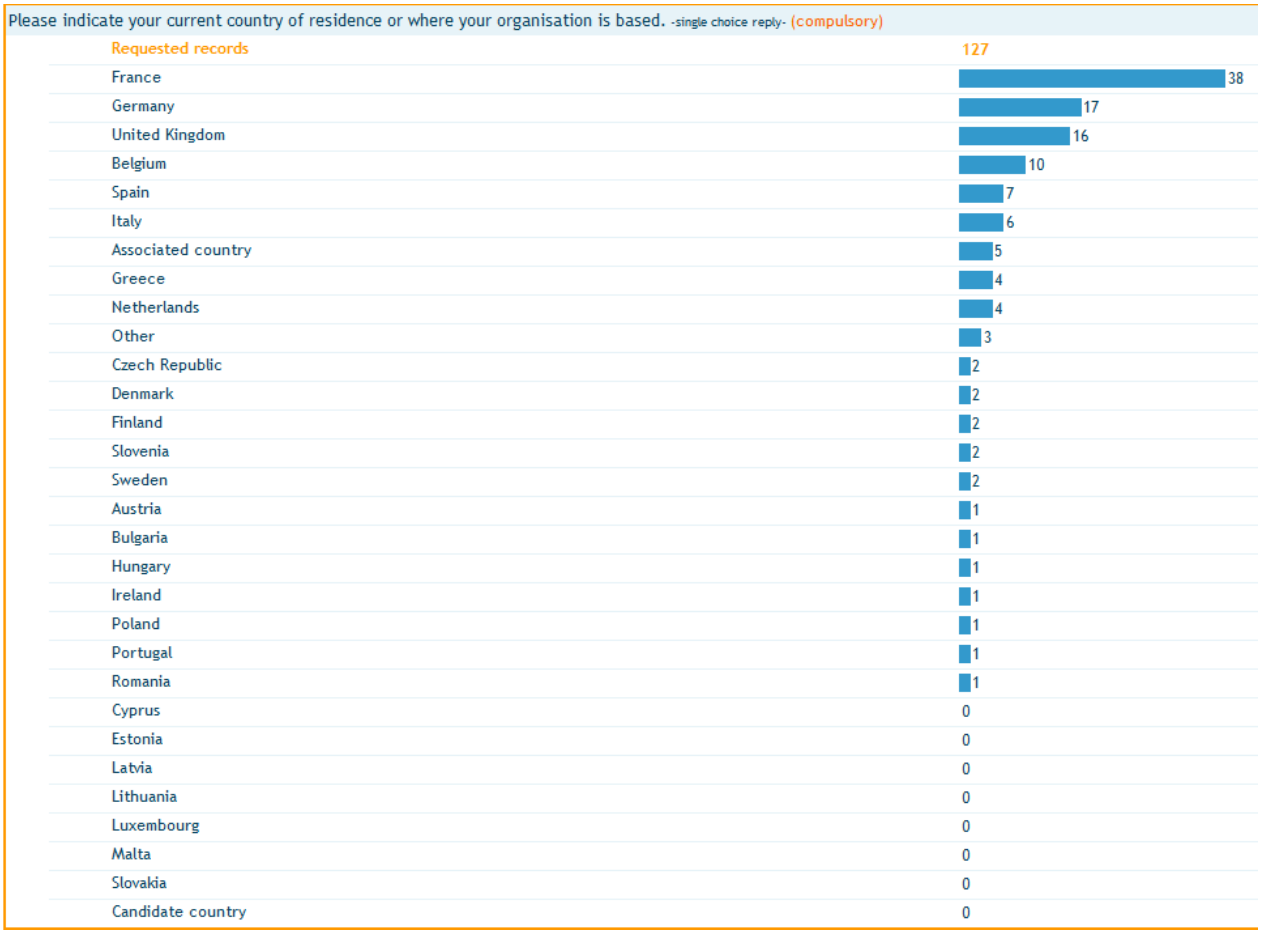
The consultation aimed at gathering key views relating to the possible extension of the FCH JU under Horizon 2020. For this purpose, a comprehensive set of questions was drawn up to identify the current key challenges in FCH research and innovation, the added value and potential impact of addressing these challenges via a PPP Joint Undertaking (JU) under Horizon 2020. The consultation also included questions addressing possible legal structures based on the options available under Horizon 2020 and recommendations from a high-level expert group. Respondents were moreover queried about lessons learned from the 1st FCH JU.

In total 127 respondents answered the questions. The participants were given the possibility to add further comments at the end of their contribution, and also to upload any position paper or document relevant for the consultation. 17 position papers were uploaded as well as 39 "further comments". The analysis of the data is presented in this document, together with a summary of the papers and the list of comments. Some participants chose to remain anonymous, and three requested their contribution not to be made public.

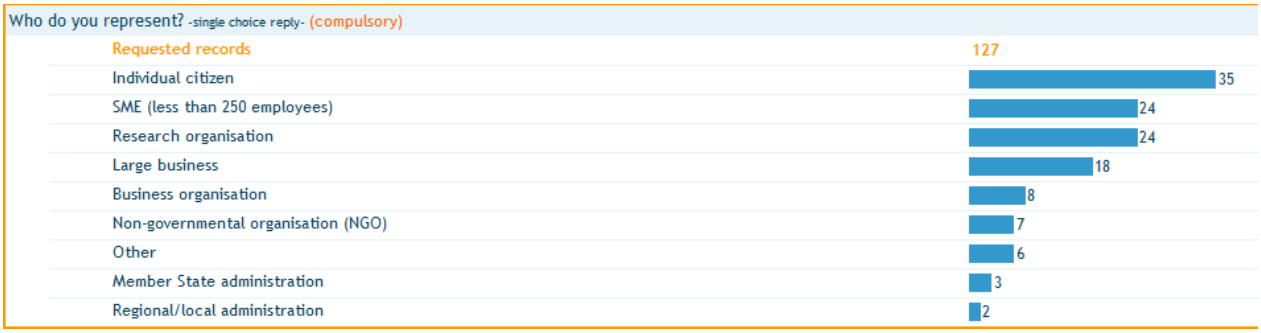
3. RESPONSE TO THE PUBLIC CONSULTATION

3.1. Respondent profile

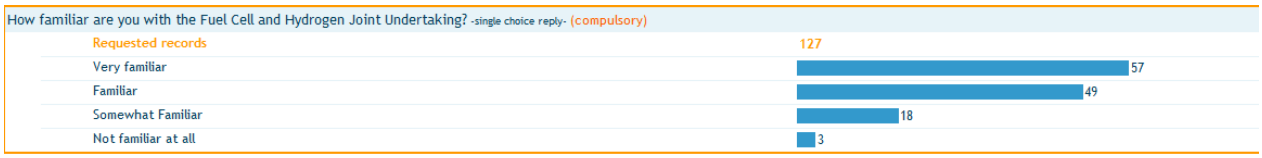
Respondents originate from at least 22 different countries, including 5 from associated countries. France is the most represented (30% of respondents), followed by Germany and the UK (approx. 13% each). The participation of Nordic countries and EU-12 countries is low.

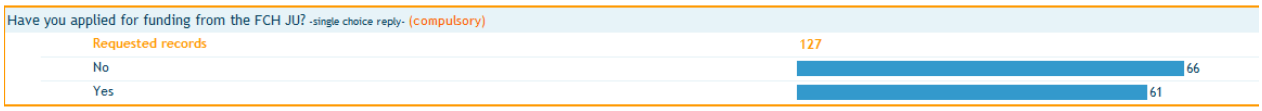


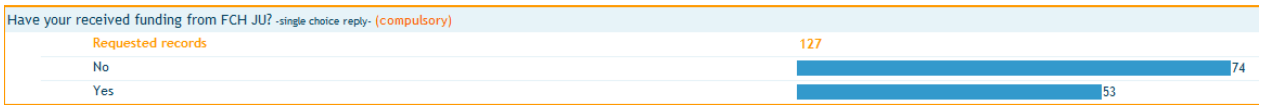
Most respondents are individual citizens (28%), followed by SMEs and research organisations (19% each). No national or regional administration has answered to the consultation. Only a few MS and decentralised authorities answered to the survey.



Most respondents declared that they are very familiar or familiar with the Joint Undertaking (83.5%), but the majority has never applied for funding nor got any funding from the FCH JU, which is seen as a logical consequence of the number of individual citizens that have participated in the consultation.

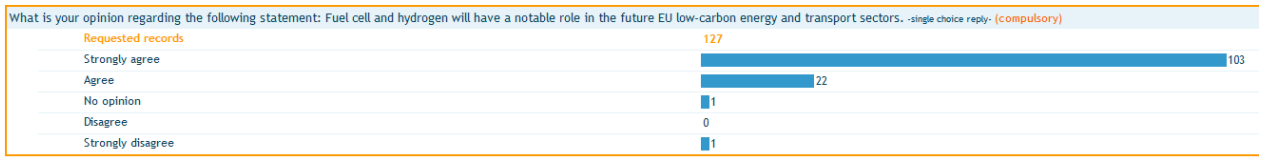


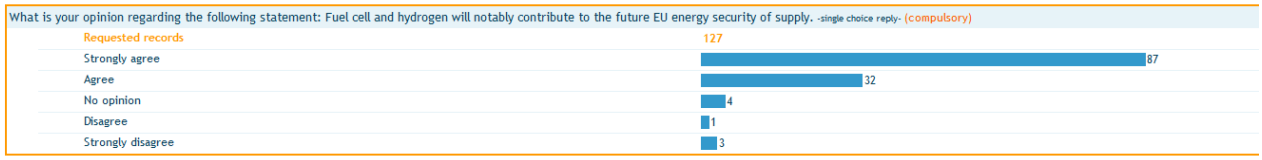


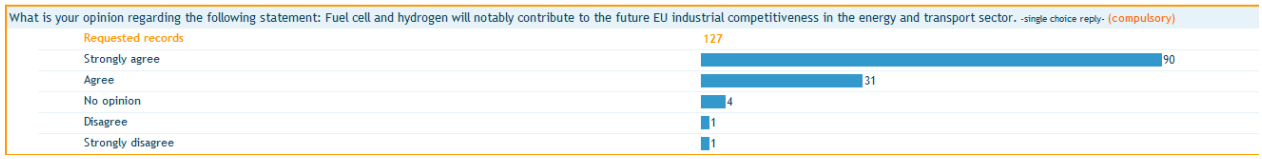


3.2. Relevance of the sector

An overwhelming majority of respondents believe that FCH technology will have a notable role in the future EU low-carbon energy and transport sectors (98% of respondents), for the EU energy security of supply (94% of respondents) and for the EU industrial competitiveness (95% of respondents).

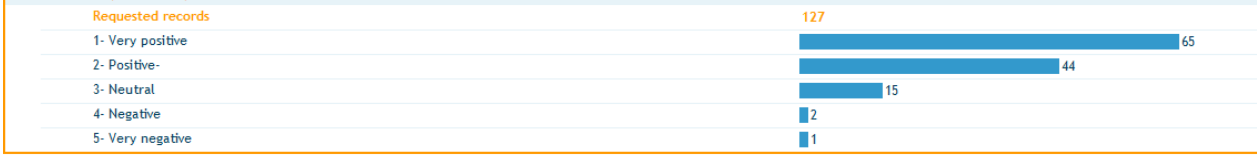




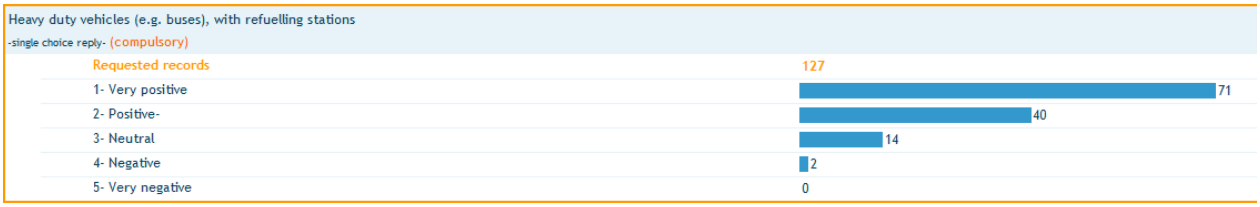


The majority of respondent have a positive opinion on the potential of socio-economic impact of all of the currently targeted applications by 2020. There is a very strong support to the use of hydrogen as storage medium for renewable energy (95% of respondents). Other applications such as transport, residential or industrial CHP or back-up power score higher than 80%. Only 3 applications gather less than 80% of positive opinion (but still more than 60%): biogas reforming for hydrogen production, micro fuel cells and material handling equipment.

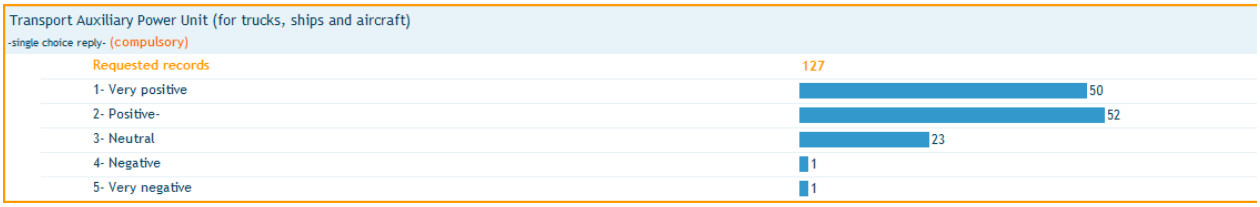
Light duty vehicles (passenger cars), with refuelling stations.
-single choice reply- (compulsory)



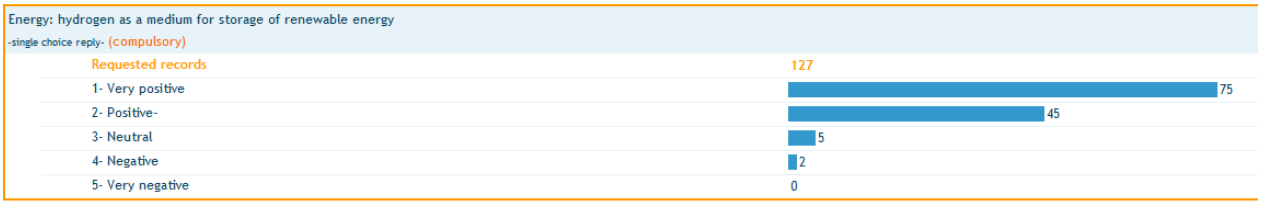
Heavy duty vehicles (e.g. buses), with refuelling stations
-single choice reply- (compulsory)



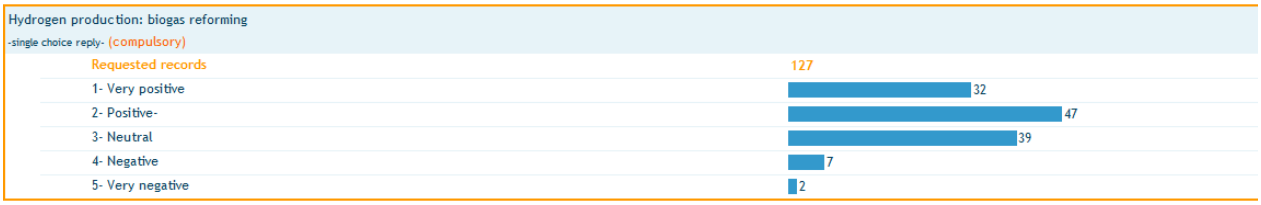
Transport Auxiliary Power Unit (for trucks, ships and aircraft)
-single choice reply- (compulsory)



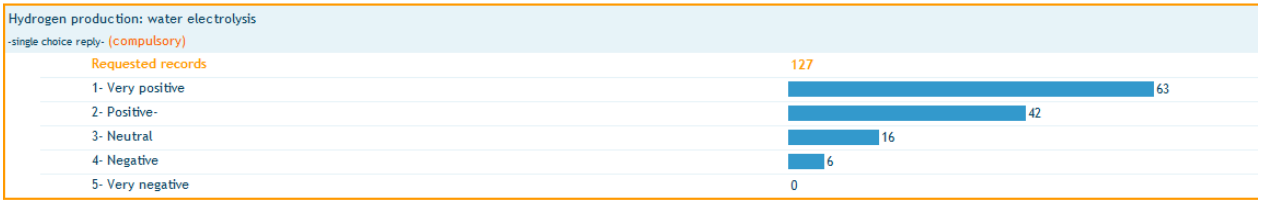
Energy: hydrogen as a medium for storage of renewable energy
-single choice reply- (compulsory)



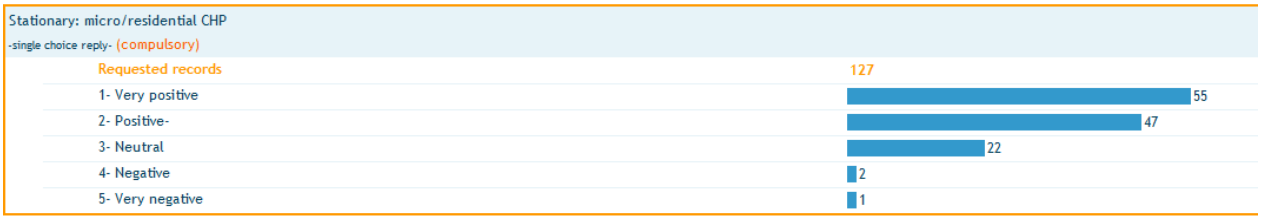
Hydrogen production: biogas reforming
-single choice reply- (compulsory)



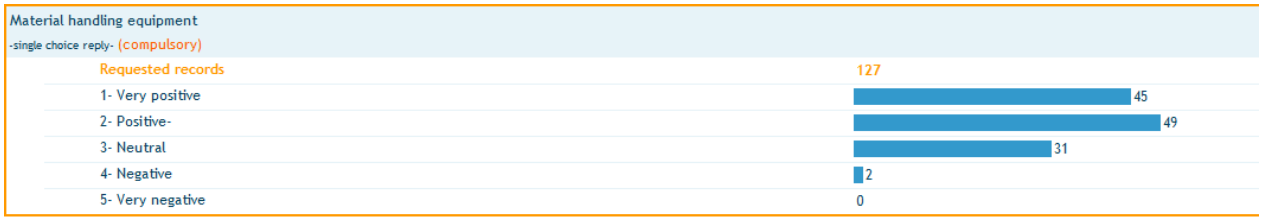
Hydrogen production: water electrolysis
-single choice reply- (compulsory)

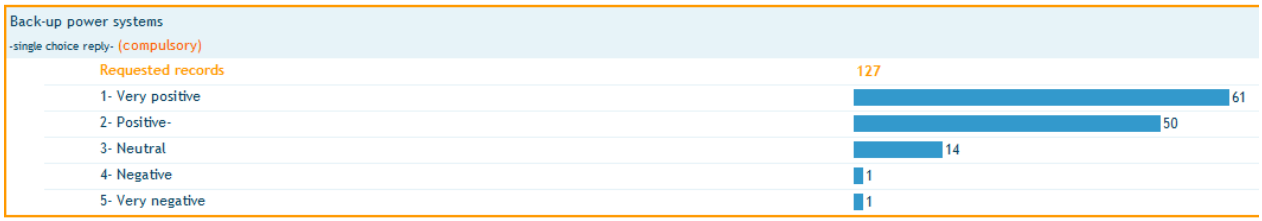


Stationary: micro/residential CHP
-single choice reply- (compulsory)



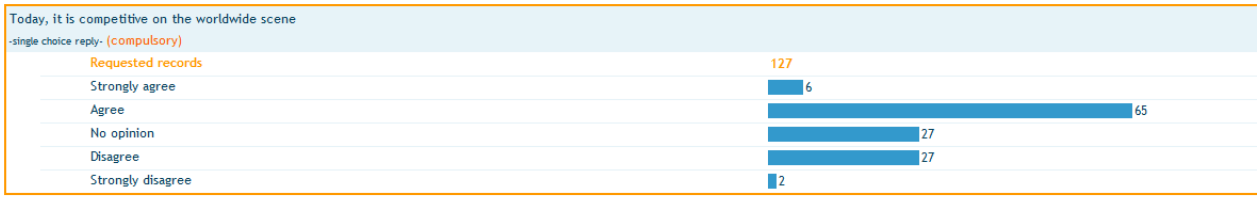
Stationary: Industrial/commercial CHP
-single choice reply- (compulsory)

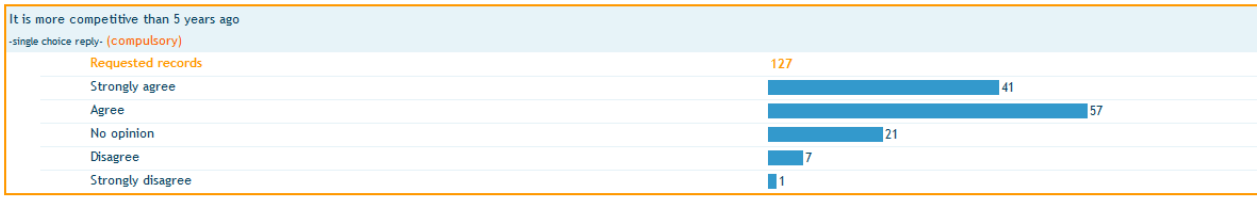


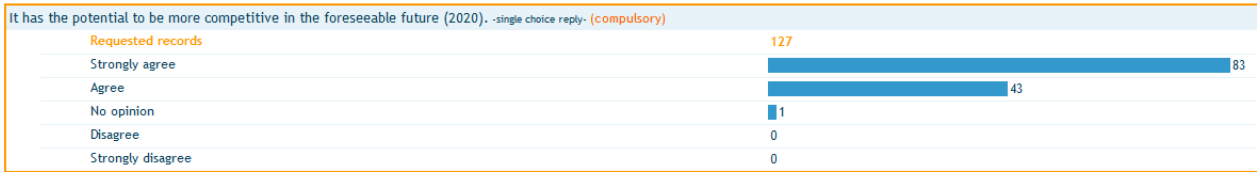


3.3. Identification of the problems

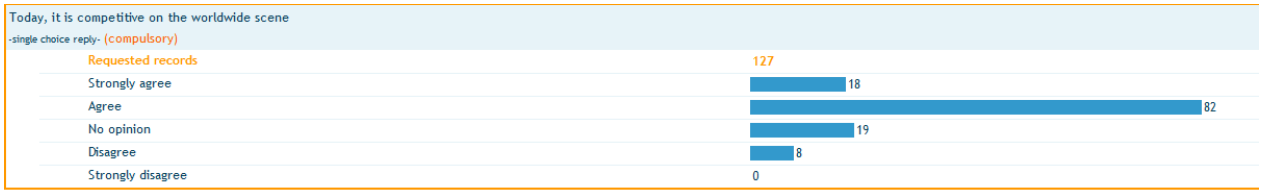
The respondents have mixed views on the European industry: only slightly more than half of the respondents (55%) think that it is competitive on the worldwide scene (20% have no opinion). The past and future trend looks more positive though, with 77% of respondents believing that it is more competitive than 5 years ago, and an impressive 99% believing that the industry has the potential to be more competitive by 2020.

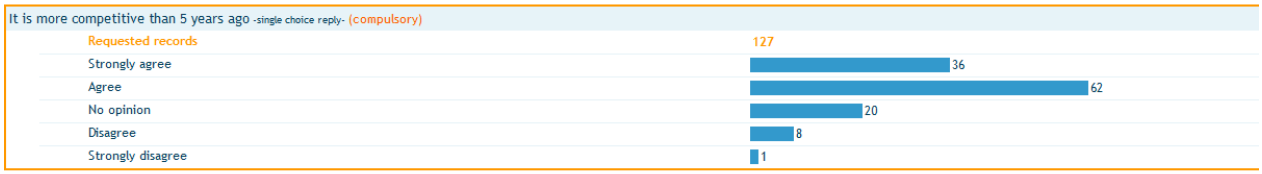


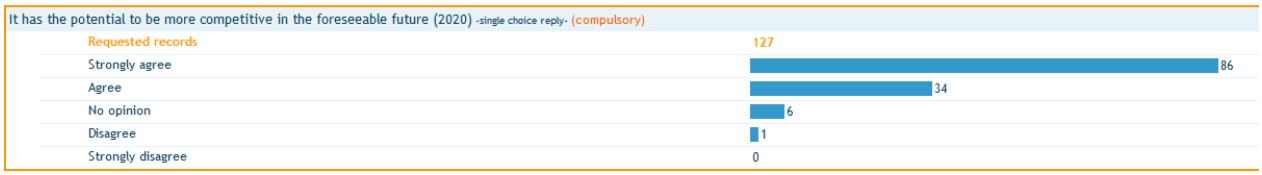




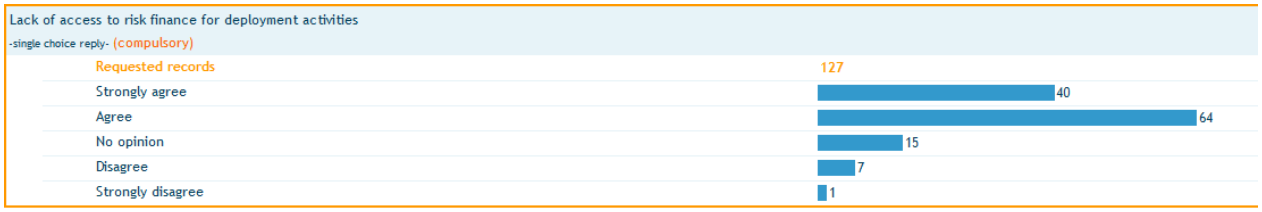
The views on the EU research sector are more positive, 79% thinking that it is competitive today and 77% that it is more than 5 years ago and 95% believing that the European research sector will be stronger by 2020.

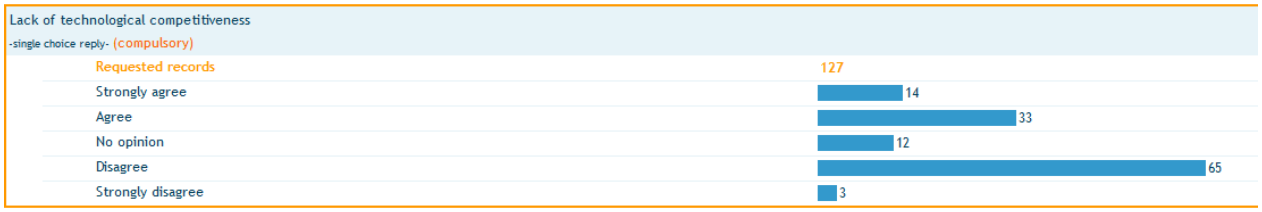


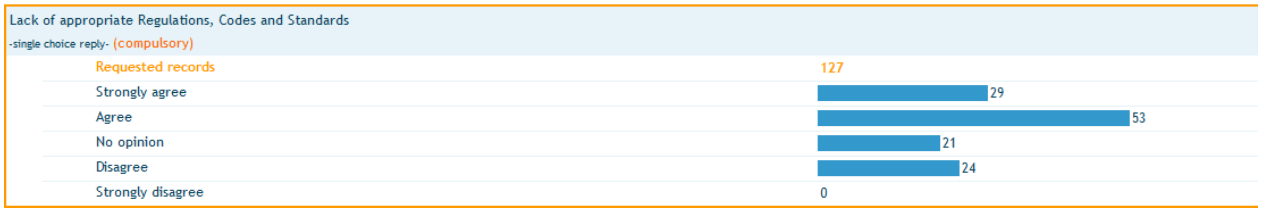


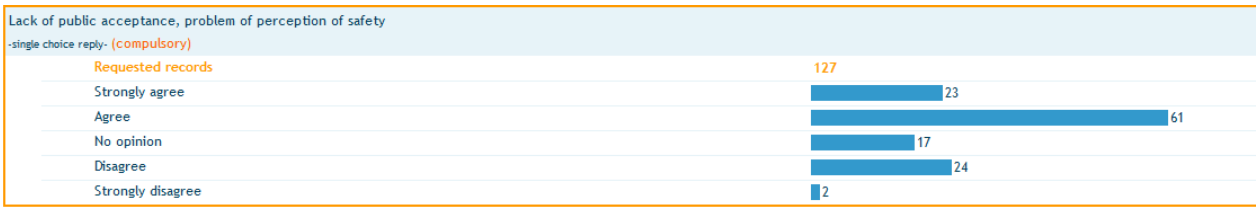


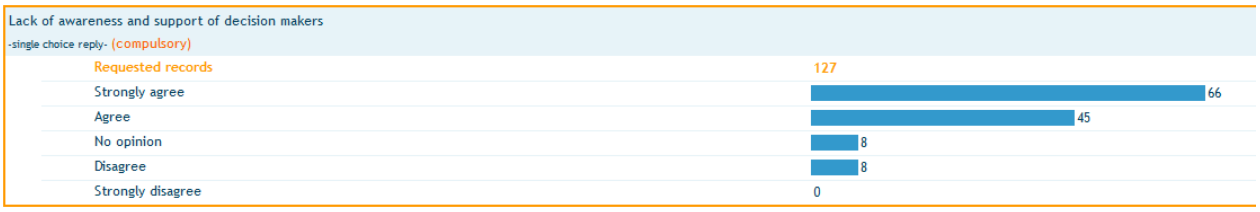
Regarding the main problems faced by Europe, the lack of support of decision makers (87%), of access to risk finance for deployment activities (82%) and of public awareness (75%) are the main problems to be addressed in Europe. Surprising, the lack of competitiveness of the technology comes last in this question (only 37% of respondents agree with this aspect).

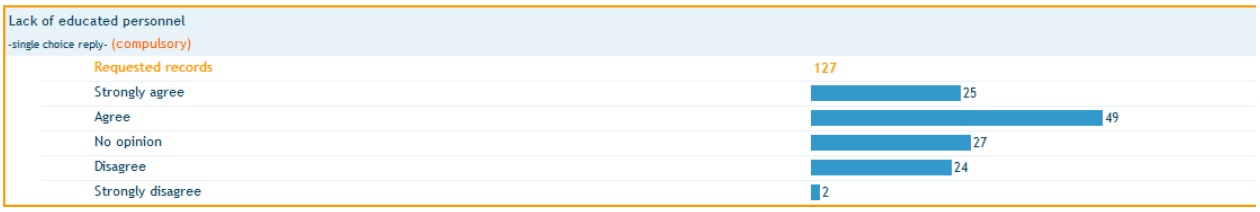




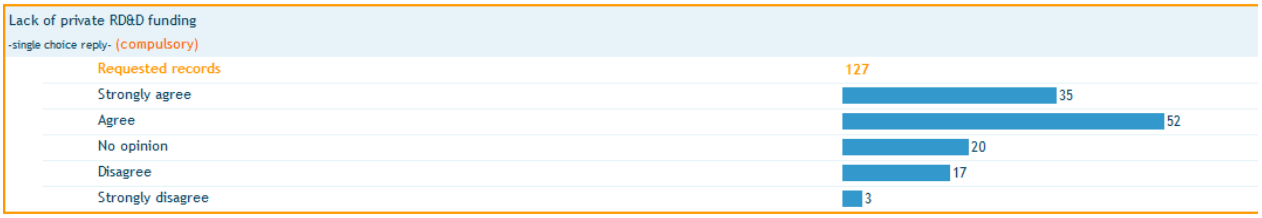


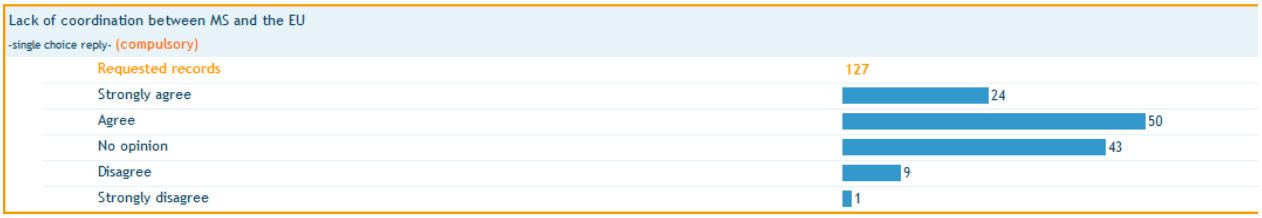


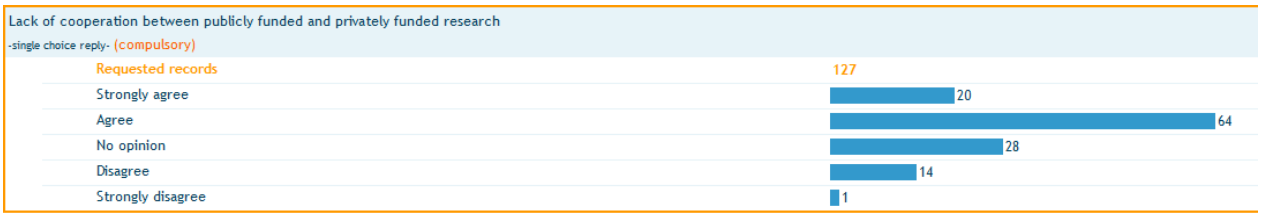


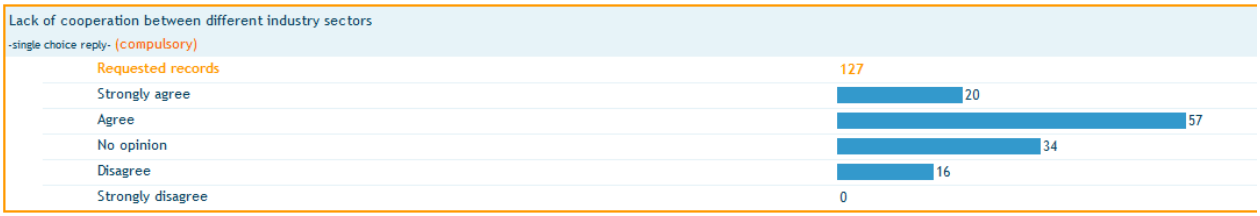


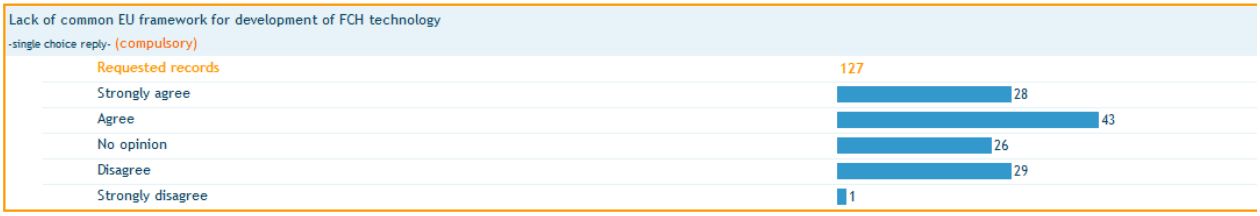
Regarding the underlying problems leading to the issues mentioned above, the lack of public R&D funding is by far the most quoted (81%). Research infrastructure does not seem to be a problem (38%).Other possible underlying problems range from approx. 55% to 65% of agreement.

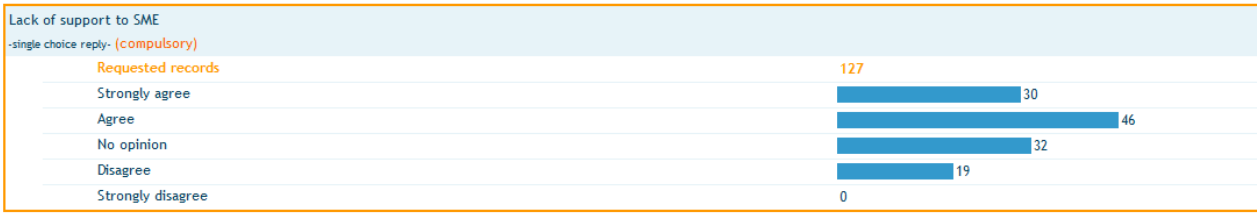


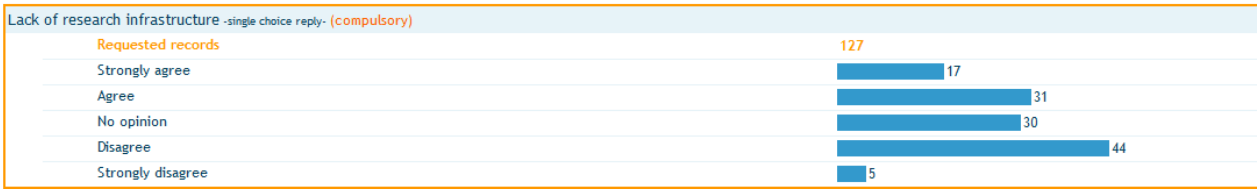






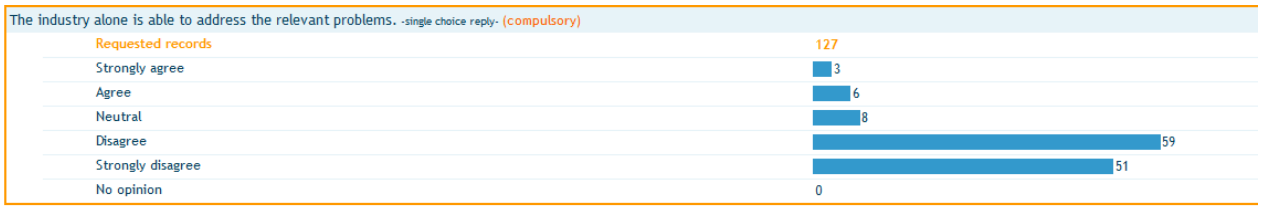


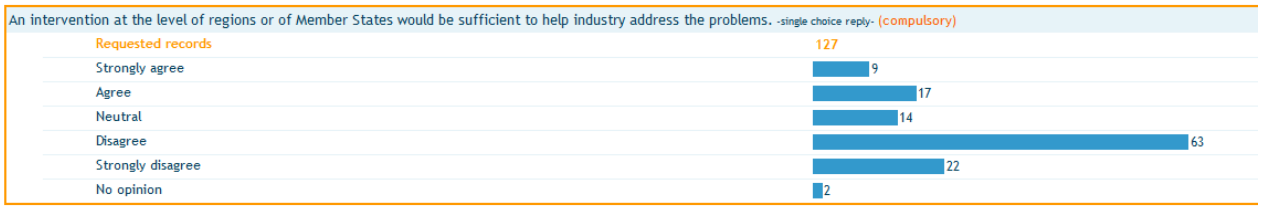


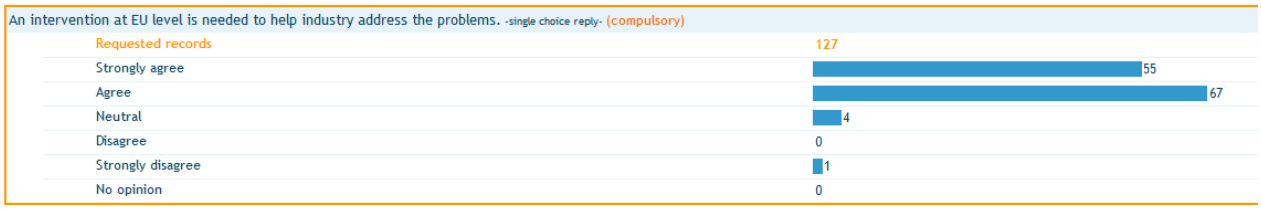


3.4. European added value

87% of the respondents believe that the industry cannot address the problems alone and 67% that Member States support will not suffice. 96% think that an intervention at EU level is therefore required.

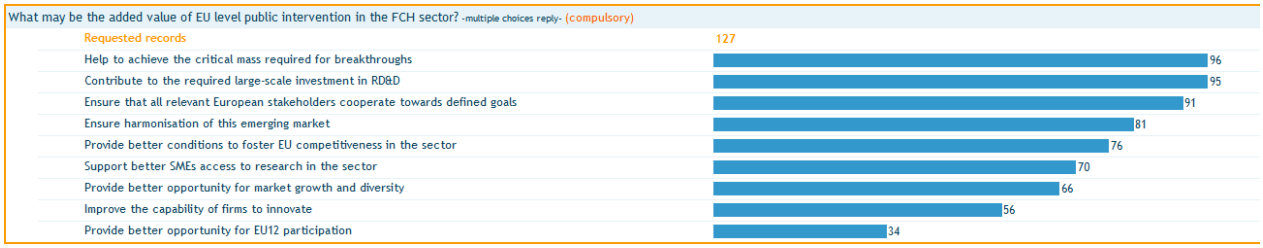






Support to achieve the critical mass required for technological breakthroughs, contribution to the required large-scale investment in R&D and demonstration and definition of common goals for all

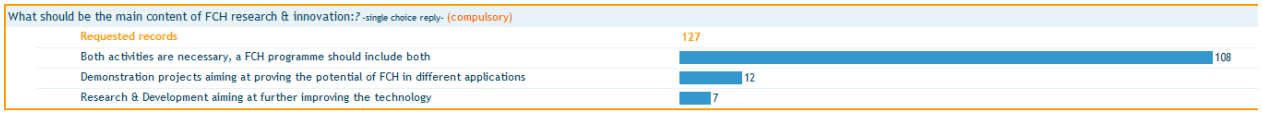
relevant European stakeholders are the 3 most quoted EU added values (all above 70% of respondents).

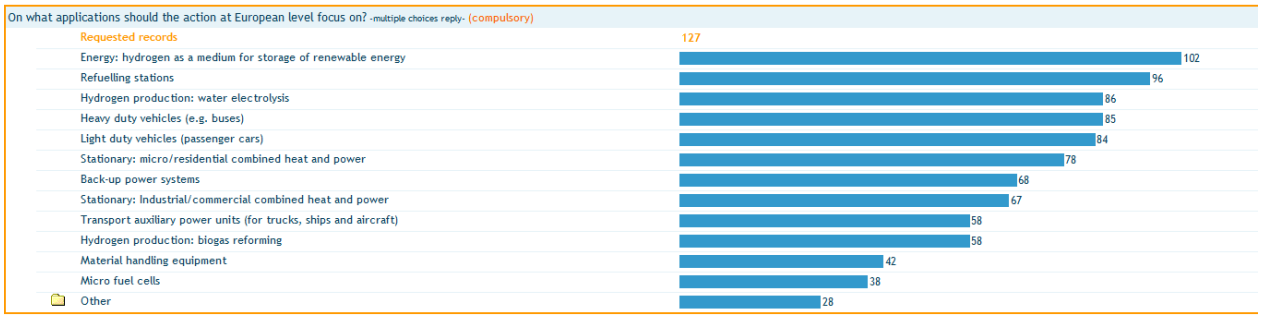


3.5. Objectives

85% of the respondents believe that the FCH research & innovation programme should include both research & development and demonstration. There is no wish to see the EU programme focusing to either research or demonstration only.

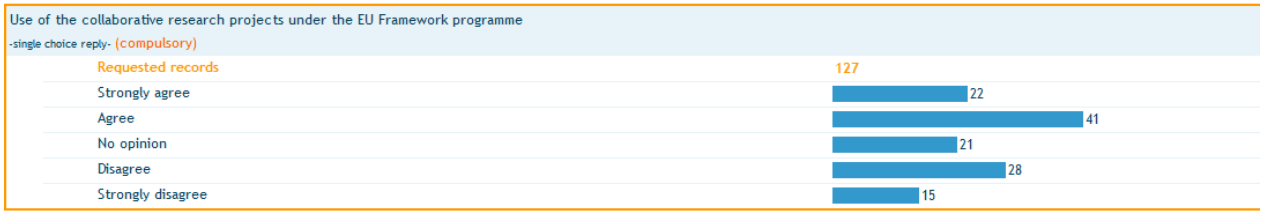
The 2 most quoted priority applications are hydrogen as a storage medium for renewable energy (80% of support) and refuelling stations for transport applications (75%).

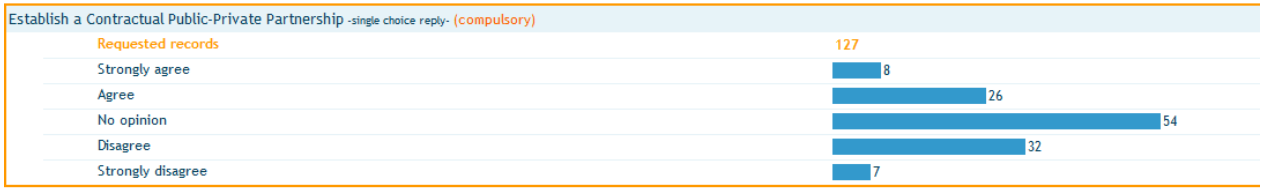


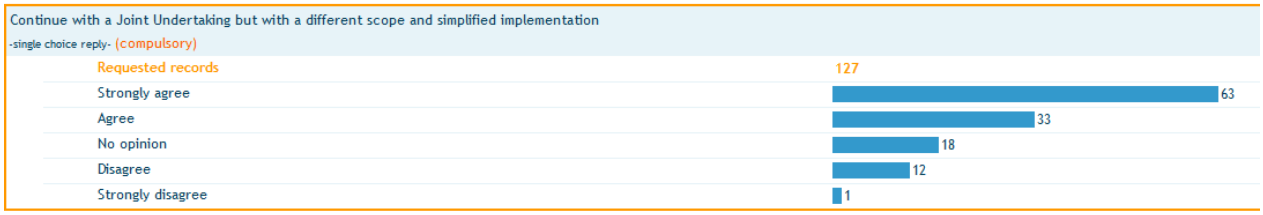


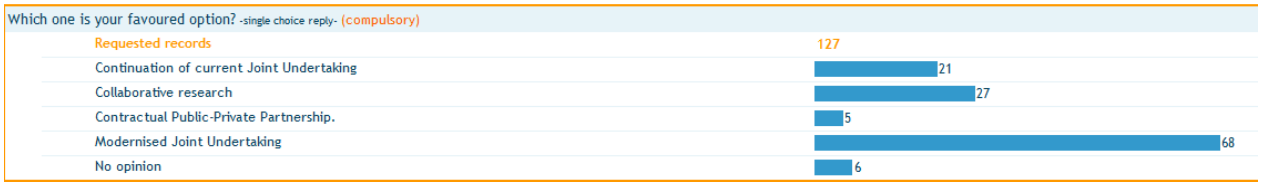
3.6. Options and impact

Of the four options considered to implement future research on FCH, only the contractual Public-Private Partnership gathers less than 50% of positive opinions. The favourite option is the continuation of the JU, in a "modernised" format, i.e. different scope and simplified implementation.

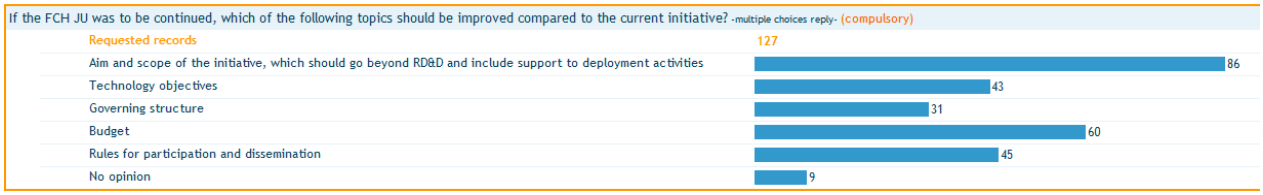




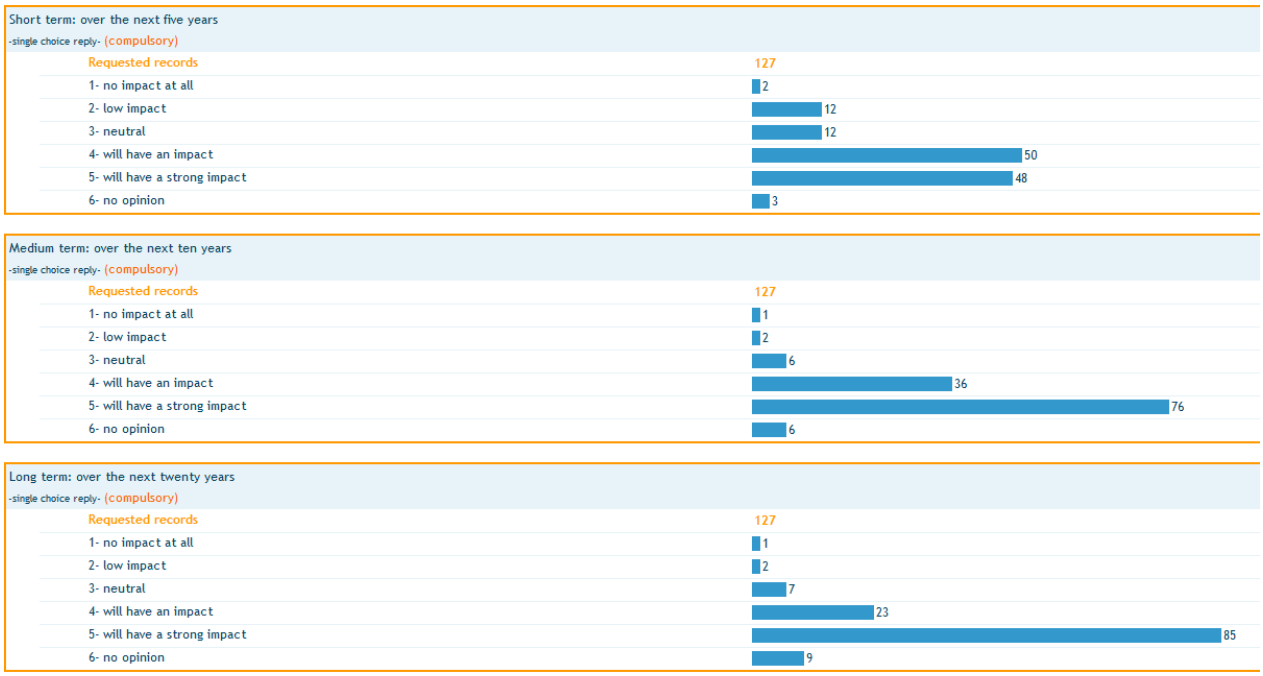




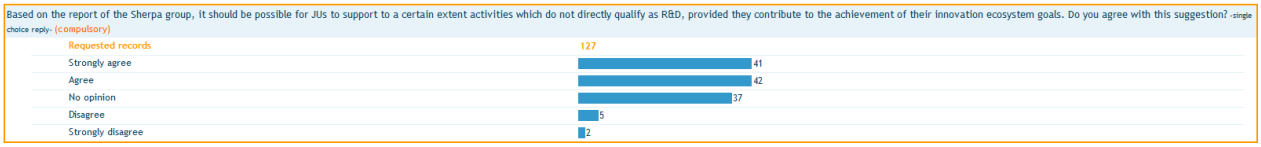
More than 67% of respondents believe that the aim and scope of the initiative should go beyond RD&D and include support to deployment activities and close to 50% that the budget should evolve (i.e. increase).



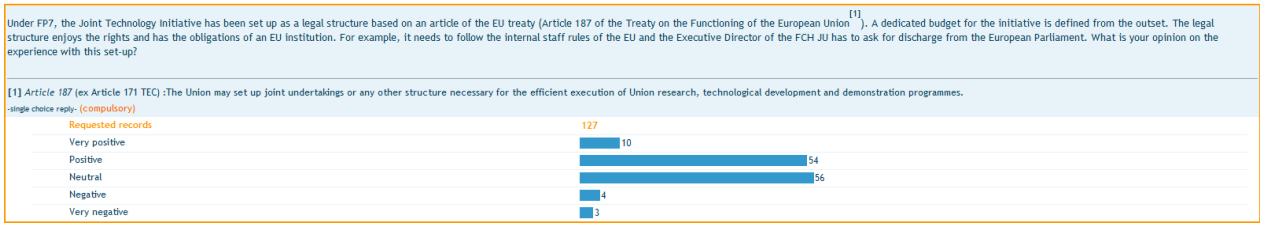
Most respondents believe that the FCH JU will have an impact on the EU competitiveness, this impact increasing over time (77% of positive feedback at short-term, 88% at medium-term and 84% at long-term).



65% of the respondents support the recommendation of the Sherpa group, i.e that it should be possible for JUs to support to a certain extent activities which do not directly qualify as R&D, provided they contribute to the achievement of their innovation ecosystem goals.



50% of the respondents have a positive opinion on the establishment of the Joint Technology Initiatives.



The majority of the respondents think that the FCH JU has reach most of the EU objectives. In order of importance, they believe this mechanism has provided medium-term stability on RD&D public funding for the FCH sector (79% of respondents), has contributed to increase European competitiveness (76%), has increased and improved coordination between stakeholders at EU level (72%) and has increased the involvement of the industry in RD&D on FCH (71%). Many other aspects score above the 50% satisfaction. Some fields below the 50% mark will require attention for the future (EU-12, outreach, simplification of access to funding).

It has contributed to the objective of significantly accelerate the market introduction of the fuel cell and hydrogen technologies

-single choice reply- (compulsory)

Requested records	127
Strongly agree	23
Agree	63
Neutral	24
Disagree	8
Strongly disagree	0
No opinion	9

It has contributed to provide medium-term stability on RD&D public funding for the FCH sector

-single choice reply- (compulsory)

Requested records	127
Strongly agree	37
Agree	63
Neutral	14
Disagree	5
Strongly disagree	0
No opinion	8

It has triggered additional private RD&D funding

-single choice reply- (compulsory)

Requested records	127
Strongly agree	23
Agree	58
Neutral	25
Disagree	10
Strongly disagree	0
No opinion	11

It has contributed to increase European competitiveness

-single choice reply- (compulsory)

Requested records	127
Strongly agree	21
Agree	76
Neutral	18
Disagree	4
Strongly disagree	0
No opinion	8

It has contributed to increase and improve coordination between stakeholders at EU level

-single choice reply- (compulsory)

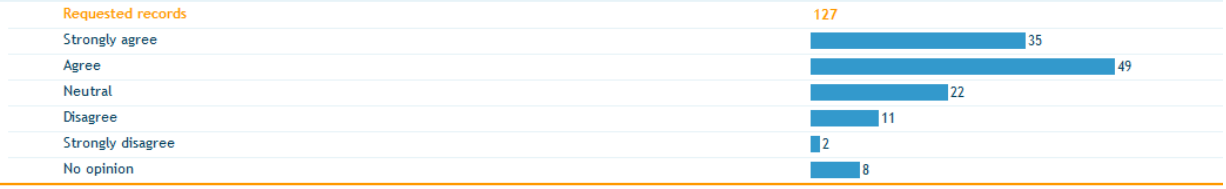
Requested records	127
Strongly agree	36
Agree	56
Neutral	19
Disagree	4
Strongly disagree	3
No opinion	9

It has contributed to simplify the management and access to EC funding for RD&D on FCH

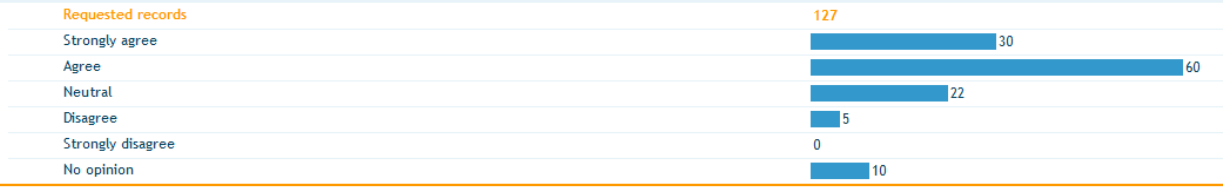
-single choice reply- (compulsory)

Requested records	127
Strongly agree	8
Agree	41
Neutral	40
Disagree	20
Strongly disagree	5
No opinion	13

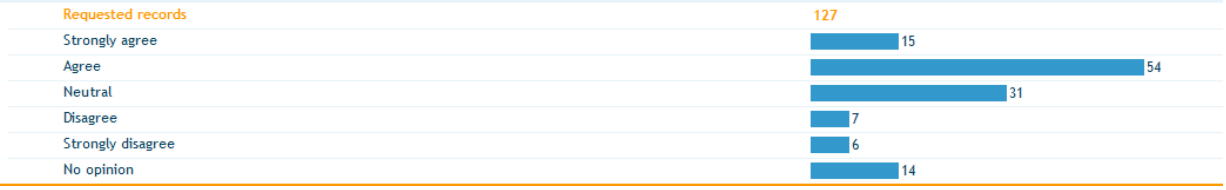
It is a useful single entry point for support on RD&D for FCH for different applications
-single choice reply- (compulsory)



It has contributed to increase the involvement of the industry in RD&D on FCH -single choice reply- (compulsory)



It has contributed to increase the involvement of SMEs in RD&D on FCH -single choice reply- (compulsory)

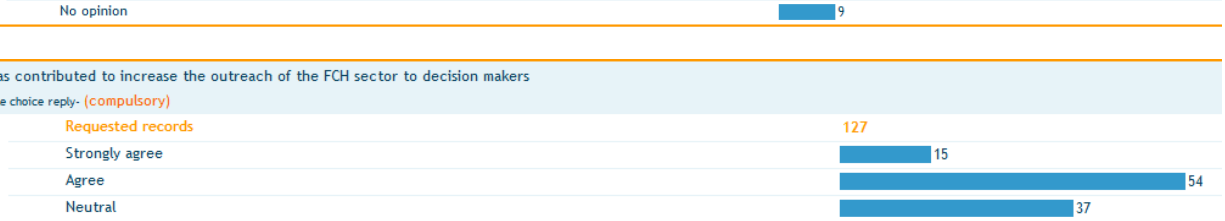


It has contributed to increase the EU-12 involvement in RD&D on FCH
-single choice reply- (compulsory)

It has contributed to improve the EU presence at international level
-single choice reply- (compulsory)

It has contributed to increase the outreach of the FCH sector to less-informed publics (wider public)
-single choice reply- (compulsory)

It has contributed to increase the outreach of the FCH sector to decision makers
-single choice reply- (compulsory)



4. POSITION PAPERS

17 papers were submitted (7 repeated) as well as 39 further comments (6 have both comments and a paper). Here is the list of the position papers, which are reported or summarised below (so are the comments):

1. N.ERGHY (New European Research Grouping on Fuel Cells and Hydrogen): N.ERGHY Position Paper on the possible continuation of the FCH JU
2. Institute for Innovative Technologies: Suggestions for FCH-JU in new Horizon 2020 program
3. Bulgarian Academy of Sciences - Consultative Scientific Council “Energy Sources and Energy Efficiency”: support to the continuation of the FCH JU in Horizon 2020
4. Ballard Power Systems: "Support of a Flexible and Effective Fuel Cell Bus Roll-out Plan"
5. Société Française de minéralogie et de cristallographie (SFMC): conclusions of Serpentine days workshop, September 2012, call for research on serpentinization phenomenon for hydrogen production
6. Christophe Monnin, CNRS Toulouse, same as above
7. Institut des Sciences de la Terre d'Orleans (ISTO), same as above
8. ISTERRE - Mineralogy & Environments Group, same as above
9. EUROBAT (European Association of Automotive and Industrial Battery Manufacturers): submission of its "WHITE PAPER, Battery Energy Storage Solutions for Electro-mobility; An Analysis of Battery Systems and their Applications in Micro, Mild, Full, Plug-in HEVs and EVs", February 2012
10. Dr Raman Saravanane, Associate Professor, Environmental Engineering, Pondicherry Engineering College, India: Elsevier article on "Start up study of UASB reactor treating press mud for biohydrogen production", Biomass and bioenergy, volume 35, issue 7, July 2011, pages 2721 – 2728
11. Anonymous, same as n°5
12. Apoidea AB, potential of hydrogen as storage of wind energy in Northern Sweden
13. Anonymous, same as n°5
14. Anonymous, same as n°5
15. Anonymous, recommendations for future FCH initiative
16. Fraunhofer Institute for Building Physics (IBP), comments on JTIs/ PPPs and specifically on the FCH JTI
17. ADEME (Agence De l'Environnement et de la Maîtrise de l'Energie): Consultation on the preparation of the Fuel Cells and Hydrogen Joint Technology Initiative under Horizon 2020

1. <u>N.ERGHY (New European Research Grouping on Fuel Cells and Hydrogen):</u>

N.ERGHY Position Paper on the possible continuation of the FCH JU, dated 29/08/2012

Due to an impressive and efficient research effort in the last 10 years, the Fuel Cell and Hydrogen technologies (FCH) are becoming affordable, reliable and efficient on their way to massive markets from 2015 on.

For the period of 2014-2020, a strong impulse for innovation in FCH technologies at the European level is needed. This includes an ambitious and complete R&D Program in order to support 1st generation technologies, enhance deployment and societal acceptance, unlock legislative limitations, prepare a 2nd generation technology portfolio, and above all, tackle the energy and environmental challenge while maintaining the competitiveness of European companies.

N.ERGHY is dedicated to representing the European FCH research community. With more than 60 members from 17 countries we are able to facilitate consensus on research priorities within the community and, if needed, to act decisively on their behalf. As a member of the Governing Board of FCH JU N.ERGHY has proven its capability to unite and act for the R&D community within this major European initiative. The association established itself as the key contact point for the FCH research in Europe and is uniquely qualified to advice on structuring & managing future European FCH R&D efforts.

To define the needs for FCH R&D in the Horizon 2020, N.ERGHY stresses the necessity for the EC, industry, Member States and regions to work closely together.

This way basic and fundamental research programs for introduction of new ideas, design, breakthrough technologies & 2nd generation technologies can be designed efficiently.

To guarantee the success & competitiveness of this technology it is essential that the FCH research has to be addressed by all three pillars of Horizon 2020:

- The priority “Excellent Science” will be targeted with FET projects dedicated to HFC breakthroughs and new ideas and comprising the definition of human capacity, students´ and researchers’ mobility, research infrastructure development and sharing.

- The “Industrial leadership” priority will be addressed by KET such as materials, nanotechnologies, processes for fuel cells and electrolysers manufacturing, etc.

- The definition of applied research, development and demonstration programs in the frame of a new HFC JTI led by industry will become a part of the “Societal Challenges” priority focusing on energy, transport, environment, smart cities, etc.

Coordination of national research programs (e.g. EERA) and pooling regional resources (e.g. HYER) will ensure a mutual contribution of the involved decision-makers and allow optimization of the joined effort

2. Institute for Innovative Technologies:

Suggestions for FCH-JU in new Horizon 2020 program:

1.) Enhance funding percentage for renewable energy & sustainable mobility demonstration, projects, given they are not commercial and not competitive with traditional fuels already. Especially such projects carried out by public transport companies, public authorities or non profit organizations does not influence the common market rules and therefor has not to bee considered as market or commercial thread and has not to be considered as state aid - and therefor not limited to lower funding rates.

2.) Enhance funding of light hydrogen vehicles demonstration projects like passenger cars – they play a very important role in the public awareness (especially in time of highest oil prices ever) and only they will allow to enlarge hydrogen refueling infrastructure and make that infrastructure of interest for traditional refueling infrastructure companies. Otherwise the H2 refueling stations will be always funded only by public means like EC/national/regional funding’s and private or company sector will not engage.

3.) Due to the common economy crisis many public authorities have big problems to realize and politically justify big investments in clean but still expensive technologies like H2 refueling stations and vehicles – therefor see mark 1.) and 2.)

4.) Make sure that only projects using (certified) hydrogen from renewables are funded with public means – only such hydrogen can solve key problems like reduction of greenhouse-gases and of energy carrier import dependency. There has to be funded also projects developing and offering tools to certify hydrogen following up the CO2-footprint of whole production process. This is also a very important fact for establishing taxation rules!

3. Bulgarian Academy of Sciences - Consultative Scientific Council “Energy Sources and Energy Efficiency”:

The Consultative Scientific Council “Energy Sources and Energy Efficiency” towards the Bulgarian Academy of Sciences strongly supports the continuation of the FCH JU in Horizon 2020. The public private partnership supporting the research is the fastest way towards commercialization of hydrogen and fuel cells. However, the philosophy of the Collaborative projects is also vivid, necessary and efficient and it should participate in the future FCH JU Implementation plans. A definite percentage of the budget should be ensured for research oriented projects, as well as for projects in early stages of technological development.

4. Ballard Power Systems: 10-pages paper on "Support of a Flexible and Effective Fuel Cell Bus Roll-out Plan"

The paper describes the potential of developing and deploying FC buses for the environment, energy security and EU leadership in green public transport. The business case and industry approach are explained, leading to several recommendations for the future research and development programme on FCH buses. These can be summarised as follows:

Recommendation nr. 1:
Instead of a yearly submittal of proposals with one single deadline, the calls could remain open for quarterly submittal before the end of every quarter.The composition of the consortium could be limited to at least three partners: one fuel cell bus manufacturer, one responsible for the fuelling infrastructure and the hydrogen production, one public transport operator.

Recommendation nr. 2 :
Allow for a more simplified proposal in terms of number of buses (starting from 2) and composition of the consortium. It may be advantageous to handle the new demonstration sites differently than the commercial pilots and market introduction proposals. In view of overlap with other infrastructure projects, it would be beneficial to the overall success of the fuel cell bus acquisition projects to have the hydrogen refueling infrastructure separated from the bus purchase

Recommendation nr. 3:
Define the conditions under which the hydrogen refueling infrastructure can be tendered and financed separately from the buses.

Recommendation nr. 4:
Define a yearly budget for urban bus applications, so that anyone at any time can judge whether to submit a proposal or not and understand the options and limitations. Any “competition” between two distinct and incomparable industries should be avoided.

Recommendation nr. 5:
Clearly define how the European procurement rules, including the Pre-commercial procurement rules, will have to be applied by the members of a consortium.

Recommendation nr. 6:
Develop a scenario matrix of budgets/eligible cost per unit with corresponding funding schemes and reporting/auditing guidelines. An indicative approach is described below:

Assuming that the Buyer takes care of the maintenance and fuel and that the FCH JU covers 20% of the fixed cost on the investment, the contribution of the FCH JU could be 36% of balance + 20% of total = **about 44% total bus acquisition cost**. This percentage could be modulated in accordance

with the volume and other criteria defined in the call. Given the volume of buses deployed, this leads to the table below.

Overview of Investment/Contribution on the above assumptions

	2014	2015	2016	2017	2018	Total
Number of buses (all)						
	25	60	150	180	250	665
of which						
8/9m midibus	10	15	40	50	75	160
12m standard	10	25	75	80	100	190
18m articulated	5	20	35	50	75	185
Price level for closed orders						
8/9m midibus	500.000	475.000	450.000	440.000	430.000	
12m standard	1.100.000	1.050.000	990.000	980.000	950.000	
18m articulated	1.400.000	1.340.000	1.280.000	1.280.000	1.250.000	
Total budget per bus model						
8/9m midibus	5.000.000	7.125.000	18.000.000	22.000.000	32.250.000	
12m standard	11.000.000	15.750.000	74.250.000	78.400.000	95.000.000	
18m standard	7.000.000	26.800.000	43.750.000	62.500.000	93.750.000	
Total budget all	23.000.000	49.675.000	136.000.000	162.900.000	221.000.000	**592.575.000**
Total contribution	10.120.000	21.857.000	59.840.000	71.676.000	97.240.000	**260.733.000** **(44%)**

Recommendation nr. 7:
We recommend a dedicated budget for urban buses based on realistic business model matrix (showing the combination of bus model, number of units in one location, etc) and corresponding eligible percentage contribution.

5. Société Française de minéralogie et de cristallographie (SFMC), 6- Christophe Monnin, CNRS Toulouse, 7- Institut des Sciences de la Terre d'Orleans (ISTO), 8- ISTERRE - Mineralogy & Environments Group, and 3 anonymous (n°11, 13 and 14):

The mineralogist and geologist community gathered in Porquerolles (France) from the 3 to 6 September for the Serpentine days workshop under the aegis of the French Mineralogy Society (SFMC). The role of the natural production of hydrogen in various processes has been widely described and debated by a very active community. It is thus surprising that the "Fuel cells & hydrogen research and innovation in Horizon 2020" agenda never consider this natural production of H2, which takes place during rock water interactions along mid oceanic ridges and in ultramafic bodies in continental environments. Schematically metals such as Fe and Ni contained in the minerals of the oceanic crust and mantle (olivine and pyroxene) are oxidized during the reaction of water with these rocks producing new minerals such as serpentine and magnetite. Water is reduced during the process which produces gaseous hydrogen at the same time as aqueous fluids with the most alkaline pH (up to 12.5) naturally found on the planet. This phenomenon called serpentinization is of fundamental

importance in plate tectonics and in the evolution of the planet. Serpentinizing environments are believed to have created the conditions for the appearance of life.

A rough estimate of the natural production of H2 can be made. Considering that about 10 billions tons of rocks are produced each year by plate tectonics and that 2% of these rocks are serpentinized, the quantity of H2 thus produced by the 60000 km of oceanic ridges is then enormous (with an order of magnitude of 1 Mt H2 per year). This process is continuous and will last as long as plate tectonics. It remains a technical challenge to capture it.

Despite its obvious importance the intricate mechanisms of serpentinization are not yet understood, needless to say the geographic extension of the phenomenon, the temperature and pressure conditions, the rates of reactions and the associated mass and energy fluxes. An ambitious research program is critical to constrain the fundamental processes, the exploration, the life time and distribution of the H2 vents, the technological implications and the environmental impacts. At a time where many countries like Russia and China are acquiring exploration licences on oceanic ridges to secure their access to natural resources such as metallic raw materials but also for hydrogen production, Europe cannot ignore this potential energy resource and needs to urgently engage a very voluntary research program on the natural production of natural H2

9. EUROBAT (European Association of Automotive and Industrial Battery Manufacturers): submission of its "WHITE PAPER, Battery Energy Storage Solutions for Electro-mobility; An Analysis of Battery Systems and their Applications in Micro, Mild, Full, Plug-in HEVs and EVs", February 2012

The report is available at: http://www.eurobat.org/eurobat-releases-white-paper-battery-energy-storage-solutions-electro-mobility-24-feb-2012

10. Dr Raman Saravanane, Associate Professor, Environmental Engineering, Pondicherry Engineering College, India: Elsevier article on "Start up study of UASB reactor treating press mud for biohydrogen production", Biomass and bioenergy, volume 35, issue 7, July 2011, pages 2721 – 2728

The paper is available under:
http://www.sciencedirect.com/science/article/pii/S0961953411001607

12. Apoidea AB, potential of hydrogen as storage of wind energy in Northern Sweden

The 2-pages paper describes how hydrogen could help develop the wind energy potential in North Sweden, which is currently hampered by the lack of capacity of the power grid. Different possible uses of hydrogen are described in order to store this potential renewable electricity. The paper can be found under: http://www.windpowerhydrogen.com/wph.pdf

15. Anonymous, recommendations for future FCH initiative

Hydrogen is a poor energy carrier due to its low volumetric energy density. It is, however, a very good intermediate chemical for producing other synthetic fuels that offer superior energy density (such as synthetic methanol, DME, methane etc), that can be directly utilised in the existing energy infrastructure. However, the important point is that it is necessary is to produce these fuels in a renewable way. This goal may be achieved by the direct formation of syngas using renewable energy sources (e.g.co-electrolysis of CO2 and H2O) or by the clean production of hydrogen as intermediate chemicals.

Thus, it should be very strongly emphasised that the FCH initiative should continue in its aim to encompass funding for all possible clean hydrogen and/or syngas production as well as fuel cell development for direct operation on synthetic fuels. Indeed, this was a major positive aspect of the current FCH-JU program.

On a more negative note, the distribution of funding of the FCH-JU appears to have a major flaw. There is a requirement that all projects must contain a partner from the FCH-JU groupings. Moreover, it is suggested that it would be beneficial if this partner were the lead group of the project. However, to become a member of the FCH-JU groupings costs an annual subscription of 4000 euros. Thus, this

rule means that on payment of a fee, one would obtain improved access to EU funding. This does not appear to be a fair distribution of EU funding.

16. Fraunhofer Institute for Building Physics (IBP), comments on JTIs/ PPPs and specifically on the FCH JTI

1. General comments on JTIs and PPPs

The main principle for assessing JTIs/PPPs from a legal and administrative point of view is to achieve and preserve processes and formalities that are straightforward, consistent and transparent. It is our understanding that the main reasons for the creation of JTIs/PPPs are 1) They shall exploit the potential of funding in a better and more efficient way than it could be done through the implementation of regular FP projects, 2) They shall ensure that the topics for research projects are defined as practical as possible by beneficiaries, the future users and especially by the industry of a specific sector. All this concerns scientific themes, i.e. the work programmes. This, first of all; only requires a direct influence on the scientific content.

On the other hand it comprehensible that there is a certain need to eventually adapt the rules of participation in specific cases. This is already the case for a number of project types under the 7th FP where specific regulations in the Annnex III of the grant agreement apply (e.g. "research for the benefit of SMEs"). But this kind of deviations should always be limited to what is absolutely necessary and should be based on objective and rational reasoning. In that respect the current JTIs were more or less successful. But in some cases this led to the corresponding irregularities (above all IMI). In other exceptional cases there are positive deviations from the rules of the FP which are of course welcome (such as the funding rate for Fraunhofer under ENIAC and ARTEMIS). Ultimately, the attractiveness of a JTI/PPP for the participants should always be at least comparable with the regular projects of the FP. If a negative deviation is to be implemented, it has to be justified how the disadvantages for the participants will be compensated. A public consultation on all specific deviations which are foreseen has to be carried out and deviations may only be allowed in those specific cases where they are appropriate.

2. On the current JTI FCH

In general, there were significant initial difficulties of which only a part was understandable. Some difficulties were understandable; other problems should certainly have been avoided. The JTI Fuel Cells and Hydrogen runs more or less smoothly. Thanks to its parallels to FP7, many synergies can be exploited. However, the unreliable regulation on funding rates (Article 15.3 of the FCH-Statutes) has very negative consequences as it usually leads to a more or less strong downward adjustment of the funding rate after the evaluation procedure. Consequently, there is no reliable basis for calculations and planning when a proposal is submitted.

17. ADEME (Agence De l'Environnement et de la Maîtrise de l'Energie): Consultation on the preparation of the Fuel Cells and Hydrogen Joint Technology Initiative under Horizon 2020

The French Environment and Energy Management Agency (ADEME) is a public agency under the joint authority of the Ministry for Ecology, Sustainable Development and Energy and the Ministry for Higher Education and Research. The agency is active in the implementation of public policy in the areas of the environment, energy and sustainable development. ADEME provides expertise and advisory services to businesses, local authorities and communities, government bodies and the public at large, to enable them to establish and consolidate their environmental action. As part of this work, within the current French State-oriented research and innovation system, ADEME’s dedicated role is to guide research and to set priority challenges in the fields of energy management and environment. In addition, the agency helps finance projects, from research to implementation notably for a portfolio of energy technologies among which fuel cells and hydrogen (FCH).

Indeed, ADEME has been promoting and supporting R&D&I activities relating to FCH for nearly 15 years. Over the period 2005 to 2010, 24 projects have been financed by ADEME representing 43 M€ from public and private sectors invested in this field at a national level. Furthermore, during the same period, ADEME has supported 22 FCH-related PhD performed by public and private laboratories. Within these projects, Research and innovation issues encompassed both technological and non-technological activities notably with a view to maintain skill and knowledge development on SOFC

technologies in complementarity with the National Research Agency FCH Programme which focused on PEMFC. For instance, demonstration of technological integration and application of FCH in the car industry (PSA's "Genepac") or for decentralized hydrogen production from biogas (Albhyon SME's "Vabhyogaz") has been implemented. Technology transfer of specific FCH components was carried out (CEA's PEMFC towards "Made in Dreux" SME and RAIGI SME). Last but not least, ADEME also supported technico-economical collaborative analyses on potential application of FCH, for instance, in the residential sector (FC4Home from EIFER, Filosofie from Alphea) and foresight studies on hydrogen infrastructure on the national territory (HyFrance3 led by CEA). This portfolio of activities enabled ADEME to stimulate and enhance cooperation among the French FCH communities. This was the aim of the pioneering "Réseau Paco (network for fuel cell)" gathering research and industry stakeholders and the subsequent HyPaC Platform which endorsed a territorial dimension by integrating local hydrogen associations such as Phyrénées (current member of HyEr) or "Mission Hydrogène des Pays de la Loire". HyPac paved the way to Afhypac "Hydrogen and fuel cell French association" which is now in charge of the promotion of FCH sector at the national level.

Since 2011, ADEME is also involved in pre-industrial deployments through the national "Programme Investissement d'Avenir (Investments for the Future Programme)" which partially concerns FCH. Within this programme, several demonstrators should be financed in the upcoming months that shall materialize French stakeholders investments to prepare market roll-out.

Building on ADEME's experience and project portfolio not only on FCH but also on energy management and renewable energy sources, ADEME also investigates the benefits of FCH at a local level taking into account specific constraints in order to assess the relevance of integrating FCH technologies in the energy mix. Indeed, criteria that lead opportunities to develop an FCH application depend on territory conditions: electric grid presence and operational features (capacity, reliability), gas grid existence, availability of renewable energy sources and related use, energy demand typology (personal mobility, freight traffic, combined heat and power uses...). Hence, emerging demonstration projects show that hydrogen can be produced for other valuable uses than only electricity storage, for instance, when the local energy-demand is well suited for a thermal recovery or electromobility use.

In addition, because ADEME is also in charge of Environment conservation policy, we consider as crucial, the environmental benefits and impacts of FCH technologies. In this perspective, ADEME promotes stakeholder involvement to ensure social feasibility and FCH risk management.

Thus, we would recommend that such local and environmental approaches were taken into account in research and innovation policies addressing FCH technologies.

In particular, regarding the future Horizon 2020 framework programme, the existence of renewed FCH JU should not exclude the support to FCH technologies from other challenges or priorities of Horizon 2020. In particular, the new SME instrument which also enables innovation from the demand side is an interesting opportunity to develop FCH projects closely linked to a specific energy use at a local scale. The three step model of the SME instrument (feasibility study, demonstration projects, pre-commercial deployment) would interestingly apply to a demand-driven energy service including FCH technology. Additionally, from an "upstream" point of view, the "Energy" societal challenge or the "future and emerging technology or FET" instrument under the "Excellence Science" priority should support fundamental research on FCH regardless of the financial commitment to the JTI under Horizon 2020.

Nevertheless, activities carried out under the current FCH JU require renewed commitment within a similar public-private partnership for the next 2014-2020 period. Yet, continuous improvements are necessary to guarantee access to funding of FCH JU R&D programme for the broad FCH community.

5. ADDITIONAL COMMENTS

name and e-mail	**further comments** (3 were 100% anonymous)	Uploaded Files
Please enter your organisation's name or your name (for individual citizen), address and e-mail address	**Do you have further comments? Please upload a position paper, if any.**	
UK Hydrogen and Fuel Cell Association	We consider the following preamble more fairly represents the range of sources and benefits arising from the development of the FCH sector than that provided as the opening paragraph of this questionnaire. Hydrogen is one of the few near-zero-emissions energy carriers that could play an important part of the future EU low-carbon energy and transport sectors. Hydrogen can be used as a storage medium for intermittent power sources, allowing for a better exploitation of renewable energy. It is efficiently produced at scale from biomass, fossil fuels and waste when carbon capture and storage is used, or from excess base load nuclear power to enable energy as required for low carbon industrial products, transport, heat and electricity at all scales. Due to their high efficiency, fuel cells are considered a very efficient means of converting any fuel to electricity, and indeed when required converting electricity to hydrogen. When fuelled with low carbon hydrogen, emissions from vehicles and stationary power systems will be minimal. Similarly, hydrogen will also be important for heat applications as it has no CO2 emissions and no risk of carbon monoxide production. Therefore, a competitive fuel cell and hydrogen industry has the potential to contribute to the ambitious energy and climate objectives for 2020 – to reduce greenhouse gas emissions by 20%, to increase the share of renewable energy to 20% and to make a 20% improvement in energy efficiency. At longer term, this technology could play a significant role in supporting Europe and industrialised countries meeting the 2050 targets of 80 to 95% cuts in CO2 emissions.	-
Fraunhofer Institute for Building Physics (IBP), Email: aleksandar.lozanovski@ibp.fraunhofer.de	The main principle for assessing JTIs/PPPs from a legal and administrative point of view is to achieve and preserve processes and formalities that are straightforward, consistent and transparent. It is our understanding that the main reasons for the creation of JTIs/PPPs are 1) They shall exploit the potential of funding in a better and more efficient way than it could be done through the implementation of regular FP projects, 2) They shall ensure that the topics for research projects are defined as practical as possible by beneficiaries, the future users and especially by the industry of a specific sector. All this concerns scientific themes, i.e. the work programmes. This, first of all; only requires a direct influence on the scientific content. On the other hand it comprehensible that there is a certain need to eventually adapt the rules of participation in specific cases. This is already the case for a number of project types under the 7th FP where specific regulations in the Annex III of the grant agreement apply (e.g. "research for the benefit of SMEs"). But this kind of deviations should always be limited to what is absolutely necessary and should be based on objective and rational reasoning. In that respect the current JTIs were more or less successful. In general, there were significant initial difficulties of which only a part was understandable. Some difficulties were understandable; other problems should certainly have been avoided. The JTI Fuel Cells and Hydrogen runs more or less smoothly. Thanks to its parallels to FP7, many	1

	synergies can be exploited. However, the unreliable regulation on funding rates (Article 15.3 of the FCH-Statutes) has very negative consequences as it usually leads to a more or less strong downward adjustment of the funding rate after the evaluation procedure. Consequently, there is no reliable basis for calculations and planning when an proposal is submitted.	
Hungarian Hydrogen and Fuel Cell Association, Dr. Jozsef Margitfalvi, president, e-mail: margitfalvi.jozsef@hfc-hungary.org	The participation and financing of EU-12 countries (new EU members) did not achieve the required level. More founding should be given to these countries. More attention and emphasizes should be paid on the use of high-throughput and combinatorial materials research.	-
Anonymous	More needs to be done to align EU, national and regional/local support measures and funding to integrate market ready applications on a larger scale in national and local energy and transport infrastructure. In view of the fuel cell electric vehicle (FCEV) roll out plans of the major car manufacturers a coordinated EU-wide engagement plan for national and local policy makers is necessary to implement large scale deployment programs for transport and stationary applications linked to local energy networks.	-
CNRS Centre National de la Recherche Scientifique, 3 rue Michel Ange 75016 Paris France,	lack of research investments on the natural hydrogen production weaken the hydrogen economy development (see attached document)	-
European Hydrogen Association EHA, Ave. des Arts 3-5, 1210 Brussels, info@h2euro.org	As the first European Industrial Initiative EII of the EU Strategic Energy Technology Plan (SET Plan) and with links to all current EII with regards to their energy storage and their links to clean transport, it will be crucial to leverage the FCH JU budget with other EU programs (TEN T and TEN E) and other EII budgets. The EU Smart Cities and Communities Initiative lighthouse projects could offer an excellent opportunity to demonstrate the impact of FCH technologies on a larger scale linked to renewable energy sources and local energy and transport networks.	-
Ministry of Education, Youth and Sports of the Czech Republic; Karmelitska 7, 118 12 Prague 1, Czech Republic; katerina.nedvedova@msmt.cz	FCH JU increased competitiveness of the EU industry in this field in the short and intermediate term by supporting demonstration and some type of the necessary infrastructure development. But by strong reduction of the basic and applied research support it causes delay of the EU side in the development of this type of technology from the long-time perspective. And it will be difficult to catch up later on. FCH JU has brought coordination and more private financing to hydrogen and fuel cell sector. However for SMEs and smaller research entities it was very complicated to participate.	-
HELION, Domaine du Petit Arbois - Bâtiment Jules Verne - BP 71 - F-13545	Better communication on programs and financial instruments should be enhanced by FCH JU	-

France		
Anonymous	1. For stronger industry participation a modernised JU should provide higher funding rates for industry and less complicated project application and administration processes. 2. The JU should make sure that the Demonstration funding favours European Industry and European components. It should exclude funding for non-European components.	-
HyET BV, Leemansweg 15 6827BX Arnhem, The Netherlands, Wiebrand.Kout@HyET.nl	The complexity of the current system favours large companies, it is difficult for SME's to 'learn the rules' and participate in FCH JU.	-
Anonymous	The application "Transport auxiliary power units (for trucks, ships and aircraft)" as diesel-application should get more funding in future, because of a currently big market in North America and Europe. The FCH-JU should support this application from laboratory level to field tests and preliminary series. Actual there is a funded project between Volvo Truck, Eberspaecher, Topsoe Fuel Cell, AVL and Research Center Jülich. Usually you need 4 to 5 Million Euro per year to develop this technology.	-
Apoidea AB	Unfortunately I just discovered this possibility to share my thoughts about the importance of renewable production of hydrogen. I should have learned more about what you have achieved so far but this is my 2 p. As an energy researcher in late 70-ties - se Sweden Beyond Oil-article in Science 216, (1982!) - I was sceptical to the idea that hydrogen generated by atomic power could solve the energy issues in the future. Today I am developing a pretty large wind farm in the north of Sweden an we encounter lack of capacity in the national grid - see enclosed document.	1
Anonymous	Although the set up of the 1st FCH Joint Undertaking has taken considerable time, it has been well worth the effort. At XXXX, we believe that the JTI has made research in fuel cell and hydrogen technology much more efficient and as a result more has been done in a shorter time frame with fewer resources than without the JTI. It has also been the industry's and research community's last man standing in the financial crises. Many national research efforts did not survive and many companies reduced their R&D spending in 2009, because of the financial crises. Without the JTI, the industry might not have survived the crises. Another advantage is the alignment that is created in the areas of codes and standards. Some projects have more than 30 relevant parties, which makes at an exercise in alignment across Europe on some small but important topics, like hydrogen quality or hydrogen quantity measurement. If the JU 2.0 becomes more efficient in its governance and funding processes, it will be a huge success. It will have a head start and can begin performing from year one as it can now build on the experience of the first six years.	-

Anonymous	Less bureaucracy urgently needed, currently FCH JU is an additional layer of administration; funding levels not competitive to national programs, monetary incentives for Europe-wide infrastructure build-up and vehicle deployment urgently needed; FCEVs should qualify for high super-credits under EU CO2 regulations	-
Anonymous	Natural hydrogen production exists and a special effort must be done to better understand the conditions of natural hydrogen production together with the technological developments needed for its exploitation.	-
Dr Raman Saravanane, Associate Professor, Environmental Engineering, Pondicherry Engineering College, Pondicherry - 605014, India, email: saravananae@gmail.com	Information on storage of hydrogen and the risk free operations can be given due priority to make awareness on public to help understand the current and future perspectives. Bio-hydrogen recovery and use from domestic and industrial waste and residues through biogas reforming can be given additional priority to help them understand the future issues and governance	1
EUROBAT (European Association of Automotive and Industrial Battery Manufacturers)	EUROBAT would like to underscore that automotive and industrial batteries (lead, nickel, lithium or sodium-based electrochemistries) are also near zero-emission energy carriers. They are complementary technologies to the FC (instead of refuelling, they need recharging) to impact the future low-carbon energy and transport sector in Europe. Therefore, EUROBAT asks, and has asked, to widen the scope and terms of the FCH JU by including battery research and innovation opportunities as part of the total solution. EUROBAT has published position papers on how Industrial and Automotive Batteries can help to achieve existing and future EU targets to reduce CO2 emissions, increase energy efficiency, and decrease energy consumption in Europe.	1
Florence Lefebvre-Joud, 17 avenue des martyrs 38054 Grenoble, florence.lefebvre-joud@cea.fr	Technology demonstration and deployment require underpinning research to go with (for analysis, diagnosis, accelerated tests establishment, etc.). This part is being given too limited interest and budget. Moreover, demonstration and deployment programs founded by EU should be asked to provide feedback in order to orientate research work on effective targets. No more "black boxes" should be accepted in these programs. Additionally, in order to prepare breakthroughs, ground-breaking research is required. At the moment it is nowhere. No more in the EU framework programs and not included in FCH JU. As a consequence we are not preparing long term development of FCH technologies and research teams are stopping or reorienting their activities. This may not contribute to the competitiveness of EU in the field of FCH.	-
ISTERRE - Mineralogy & Environments Group - Maison des Géosciences - 1381, rue de la Piscine BP 53 F-38041 GRENOBLE CEDEX 9 Email: fabrice.brunet@ujf-grenoble.fr	It is surprising that the "Fuel cells & hydrogen research and innovation in Horizon 2020" agenda never considered natural production of H2. In the Geosciences community, several contributions have been published in international journals. For example, at the scale of our research laboratory, three permanent researchers and two PhD students have been working on the subject of natural hydrogen production. We have even developed experimental set-ups to produce H2 ex-situ (in house) and characterize it purity. Scientists working on natural	1

	hydrogen processes have recently gathered at Porquerolles (France), they wrote a joint position paper to express their position with respect to the role that natural hydrogen should play in the Fuel cells & hydrogen research and innovation in Horizon 2020 (see attached document)	
Nick McCarthy, Melton Mowbray, UK, dwarfus@gmail.com	Hydrogen generation as a clean, renewable, way to store and then utilise power (though direct combustion or through fuel cells) needs significant investment. Low cost, highly efficient electrolysis is in need of both fundamental research, and the development of large scale (500MW capacity matched to the maximum output from a large wind farm for example) demonstration models.	_
AFHYPAC, 28 rue Saint Dominique, PARIS 75007, France info@afhypac.org	Further recommendations : (1) need to focus effort on key market/applications on which EU companies can become competitive given the EU home market profile (2) need to build an "environmental business case" for H2 & FC products, ie policy framework to stimulate customers to switch technologies -EU coordination of member states initiative required (3) Facilitate merging of research groups in limited number of locations to leverage efficiency & competitiveness	_
Anonymous	I based my answers on my overall view of the FCH situation in the EU/world. Not on a national perspective.	_
Anonymous	Some of the organisations involved in deploying the products seem to have a limited understanding of the operational issues with the business they are placing the products. This can make deployment difficult and put off business partners.	_
Anonymous	A key aim of such a public private partnership should be to create the market conditions required for the full realization of the technology's potential in terms of competitive contribution to the achievement of EU's environmental and energy security objectives. The establishment of these market conditions, which have already begun to be established for the development of renewable energies, necessarily involves a combination of regulatory constraints and financial transfers based on the "Polluter Pays Principle".	_
ERH2-Bretagne, 14 rue ransbach baumbach 35730 Pleurtuit (France), erh2.bretagne@gmail.com	regional associations should also be supported financially to the promotion of these technologies with policies, institutions and population	_
Alphea Hydrogène, 4 rue Jules Verne 57600 Forbach, France alphea@alphea.com	I wish to have more interactions with markets from Europe, in order to find subsidy systems to pass the "valley of death". This would help to launch early markets as for forklifts in the USA.	_
Anonymous	Progress on alternative storage solutions should be associated to the research effort on FC (for example Li-Ion	_

	batteries). Portable applications should receive a strong focus since the potential range of applications and implicitly market opportunities are huge. A chapter on improving public awareness would beneficially complement the program.	
Anonymous	In my modest opinion, the key to leverage FCH is to foster the industry and provide the necessary infrastructure to allow this sector compete with fossil fuels. Thus the consumers will have an alternative to decide and, if competitive in the four Ps (product, place, placement and promotion) this sector should take off by itself. I as a consumer will buy a hydrogen fuelled car if I have enough hydrogen stations around me, if I know that the car is safe and has an autonomy of at least 500 km and if the price of the car is affordable (maximum 30.000 euros). Moreover is recharging it is cheaper than the price of oil tanking I will definitely opt for this way of transportation. The conditions need to be set in order to allow this sector (that has a lot of potential) flourish by itself reducing at maximum its support.	-
Institute for Innovative Technologies	Enhance funding percentage for renewable energy & sustainable mobility demonstration projects - see uploaded document	1
Paul Morgan, 6 Queen Square, Cullompton, Devon, EX15 1DB, United Kingdom. morgypa2002@aol.com	As a private citizen I am excited by the possibilities offered by fuel cells and their application in everyday applications. I believe they will be a vital element of not only reducing environmental harm such as pollution and global warming but will also drive growth and enable (over time) affordable clean energy for our industries and homes.	-
Jonas Blomberg, jonas_blomberg2003@yahoo.se	There is a need for a Europe-wide debate on future fuel technologies: hydrogen, methanol, biodiesel, biogas and electricity only. It is tricky to choose the "right" fuel. Therefore, the public must be allowed to engage, be educated and discuss the options. The silence in Sweden is astonishing and alarming.	-
Adelan Ltd	The early markets initiative from FCH-JU is the best thing that has happened in the EU in my experience. This enables us to compete with the USA	-
Anonymous	Still very few Central European/new EU members players within the FCH JU, although there are several SMEs and institutions ready to cooperate. This is the greatest problem with FCH JU. In addition, some FCH JU projects have lots of organisations supporting the research, which take over 500 k Euro (100% terms) for participation and I am not sure if their contribution is not doubling.	-
Anonymous	1) in industry-led PPP such as FCH-JU, due attention should be given to not de-prioritising the "public interest" (safety, environment, ...) in favour of industrial priorities; 2) there is a need for a methodology and a tool to allow evaluation of the contribution of the financed projects to the overall EU policy goals; 3) there is a need for better	-

	coordination with other public bodies	
Ismael Aso , Calle Olivo 41- 4A 13.500 Puertollano	Increased collaboration with other centres outside Europe	-
Anonymous	Even though your questionnaire should address educated personal (such as me responsible for FC at an OEM) the questions are such that only fluent English/native speakers will answer please omit negative asked questions, significant amount of non-native speakers will have issues. If H2/FC is to be successful we have to consider industrial timelines and investments. This is not short-term therefore make the projects long. Make several larger and not thousands small ones. Focus on energy safety and transport.	-