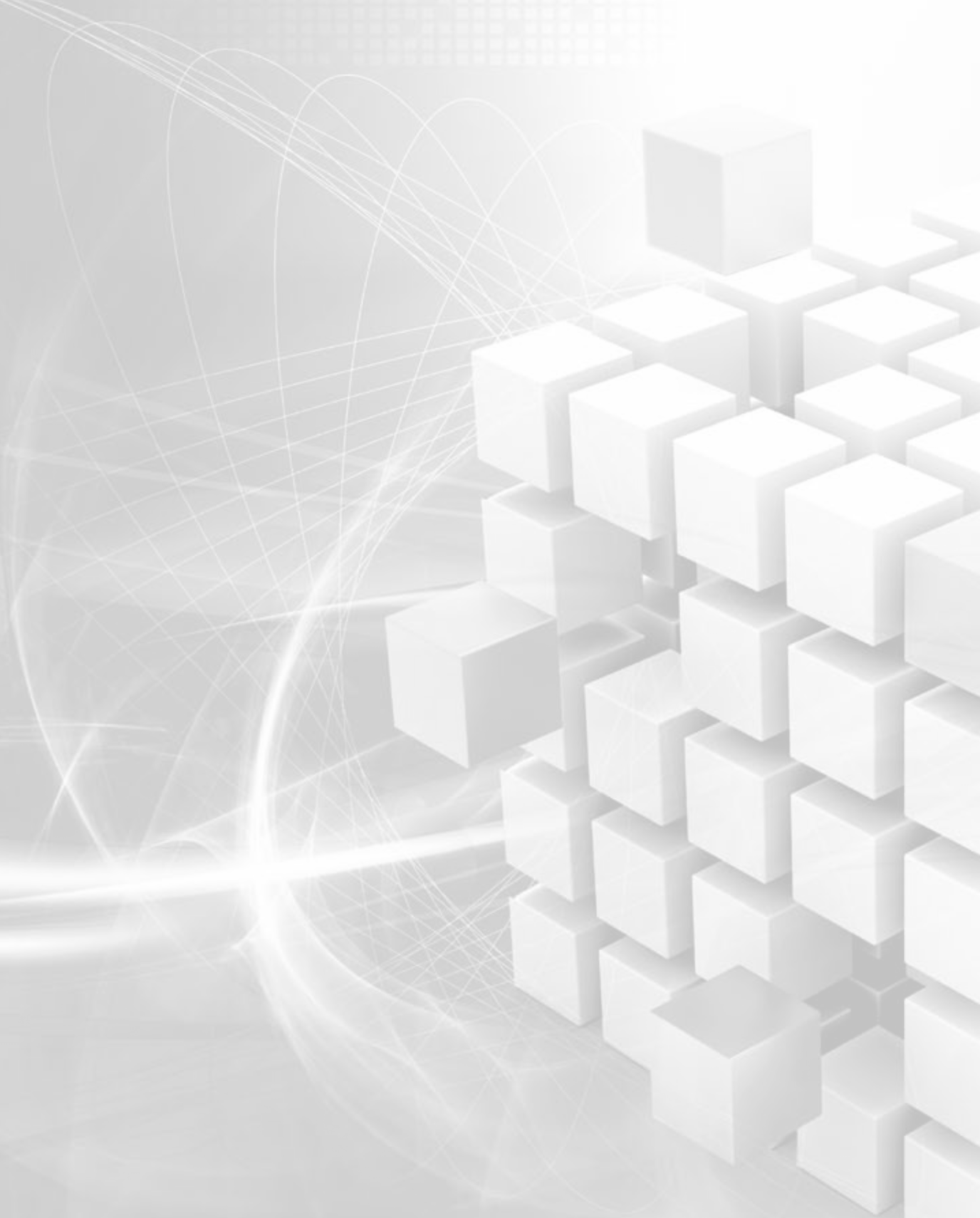




First Interim Evaluation of the Fuel Cell & Hydrogen Joint Undertaking

Expert group report





EUROPEAN COMMISSION

Directorate-General for Research and Innovation
Directorate K - Energy
Unit K.2 - Energy conversion and distribution systems

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First Interim Evaluation of the Fuel Cell & Hydrogen Joint Undertaking

EXPERT GROUP REPORT

May 2011

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CONTENTS

EXECUTIVE SUMMARY	3
ACRONYMS AND ABBREVIATIONS	10
1. INTRODUCTION	11
1.1. Objectives of the first interim evaluation of the FCH JU	11
1.2. Methodology of the first interim evaluation of the FCH JU.....	11
2. FCH JU – BACKGROUND AND IMPLEMENTATION	13
2.1. Context	13
2.2. FCH JU Legal Basis	14
2.3. FCH JU Objectives.....	15
2.4. Governance	15
2.5. Implementation of FCH JU Research Activities.....	17
2.6. FCH JU Communication	18
3. PERFORMANCE ASSESSMENT	18
3.1. Is FCH JU Effective?	18
3.2. Is FCH JU Efficient?	25
3.3. Is FCH JU of High Quality?	27
4. SWOT – ANALYSIS	29
5. CONCLUSIONS AND RECOMMENDATIONS	31
5.1. Conclusions.....	31
5.2. Recommendations for action: how to make FCH JU better?.....	32
ANNEXES	38
Annex 1. Composition of the Expert Evaluation Panel	39
Annex 2. Principal FCH-related Documents and Information Consulted	41
Annex 3. Questions used to structure stakeholder interviews.....	42
Annex 4. List of People Interviewed.....	47
Annex 5. Call Statistics.....	49

EXECUTIVE SUMMARY

This review was undertaken by an Independent Expert Group (IEG) in support of the first interim review of the Fuel Cell and Hydrogen Joint Undertaking (FCH JU).

The primary outcome is that the IEG recommends that the FCH JU should be maintained and supported to implement its work as originally envisaged. Its potential role in a new phase of EC support for innovation following FP7 should be reviewed at a later date when outputs of its projects start to become available, as none are presently available to assess. However the IEG believes that there will be a need for continuation of this, or an equivalent, initiative. The IEG has also identified some areas where its operation could be improved, and makes a number of specific recommendations to this end.

The Joint Undertaking was created as a Community Body on 30 May 2008 and became autonomous in November 2010. Between May 2008 and November 2010 the Joint Undertaking was managed by the European Commission. This review was therefore undertaken in the first few months of autonomous operation and at a point when none of its projects were completed or at the stage of producing formal results or outcomes. Consequently its conclusions are based primarily upon evidence obtained from interviewing stakeholders about activity and performance of the Joint Undertaking and from the background material procured by the Commission.

The FCH JU has as its strategic objectives the positioning of Europe at the forefront of fuel cell and hydrogen technologies and enabling their market breakthrough by supporting RTD in a coordinated manner with a focus on market applications, and by encouraging increased public and private RTD investment in FCH in Member States and Associated Countries.

The review found that the overall technical objectives of the FCH JU as defined in the Multi-Annual Implementation Plan (MAIP) remain ambitious and competitive in comparison with efforts world-wide. It also concluded that the JU approach is generally regarded as a good means to enhance public-private activities in technology development and demonstration. The IEG is satisfied the FCH JU is perceived by participants as overall an improvement to the RD&D landscape, with strong stakeholder

representation. In some areas it is also perceived as providing welcome stability for the R&D community given the cyclic nature of political interest and visibility: its presence is a reassuring “constant”.

Some problems have been encountered:

- the set-up of the FCH JU took too long and especially the establishment of structures and activities in the first two years was not as efficient as would have been wished and expected. Steps should be taken to ensure similar problems are not repeated elsewhere in future, possibly in progressing initiatives such as European Industry Initiatives of the SET Plan (EII). The IEG endorses the recommendations of the Sherpa report¹ to streamline the legal framework and review the current ‘Community body’ status which would address the problem;
- the funding rates for FCH JU projects have proved variable from year to year but are always considerably lower than those of FP 7
- the Programme Office has insufficient technical resource for effective monitoring of the developing programme;
- cohesion and collaboration with Member States’ related programmes is insufficient;
- the FCH JU lacks a formal communications plan and international engagement strategy.

Lessons learned here can and should be applied to any future Joint Technology Initiatives (JTIs) or EIIs. In particular the uncertainty of funding rates is a material failing and must be addressed.

A number of recommendations are made on changes to improve the operation and effectiveness of the FCH JU which are summarised below. Also it should be noted that a start has been made by the new permanent Executive Director on improving some of these aspects.

Recommendation 1. Reinforce portfolio management

The FCH JU needs to assume more responsibility for delivering its overall technical objectives and have an active management of its project portfolio through targeted call processes and on-going project review. The balance

¹ “Designing together the ideal house for public-private partnerships in European research”, JTI Sherpa’s Group. Final Report. January 2010

between application areas of the MAIP needs to be reviewed and methods implemented to ensure projects interact where appropriate.

To achieve its objective of placing Europe at the forefront of fuel cell and hydrogen technologies worldwide and at enabling the market breakthrough of these technologies, FCH JU should emphasise industrial leadership for large-scale projects.

The Scientific Committee (SC) has the potential to provide support to, and verification of, the above portfolio management approach, and opportunities to widen its present role to do this should be actively explored.

Recommendation 2. Ensure high agility of operations and adaptability to changing competitive forces

Over the last few years, technology development has brought fuel cells and its applications from research on how to make it work, to development on how to make it cheaper. The latter is to a large extent about cost reductions in systems and Balance of Plant (BOP) and will eventually lead to commercialisation and new products. To achieve its objectives, the FCH JU needs to maintain its focus on innovation and respond to emergent competing technologies.

The FCH JU must reinforce efforts to engage stakeholders from the complete value chain in addition to the manufacturers and researchers who represent the great majority of participants in the FCH JU.

Recommendation 3. Improve visibility, communication and outreach

International outreach and engagement should be a key role and responsibility for the FCH JU. There is an urgent need to increase FCH JU visibility, with a clear identity and mission.

The awareness of FCH JU initiatives and achievements also outside Europe should be increased and the FCH JU needs to establish what international engagement or participation should be sought to support the faster or cheaper achievement of its programme objectives.

Recommendation 4. Improve collaboration and alignment with Member States

It is clear that there is scope for improvement in the performance of the States Representatives Group (SRG) for the coordination with Member States' parallel activities. The SRG needs members connected to policy and programme management, not scientific experts, able to identify and to progress opportunities for alignment of national activities and those of the FCH JU.

Recommendation 5. Ensure high efficiency of operations

The current legal framework as a "Community body" is not well-suited to industry led public-private partnerships like JTIs and should be streamlined. The IEG supports the related recommendations of the JTI's Sherpa Group.

The time scale involved from publication of calls to negotiated call is around one year and should be improved upon. Currently the management structure is unbalanced in terms of administrative resources compared to project management, leaving the project management capability (just 25 % of the staff) under- resourced and probably insufficient to ensure delivery of objectives. A sufficiently skilled resource is needed for project monitoring and programme management (including portfolio management) greater than that presently in place.

Given the innovative nature of JUs it is recommended that an exchange of experience and advice between senior staff of all PPPs be organised, and that a dialogue is set up between FCH JU and other SET Plan initiatives of a similar nature to ensure exchange of best practice related to operation and implementation of objectives. Also, project monitoring and benchmarking of best practise should be introduced.

The full detailed recommendations are presented in the table below

1. Reinforce portfolio management		
	<i>Action:</i>	<i>Action for:</i>
1.1	The MAIP should be thoroughly reviewed and updated where necessary before the production of the AIP for 2012. This exercise should be repeated no less than every 2 years to ensure the technical priorities remain valid in relation to results achieved and developments elsewhere.	<i>FCH JU GB</i>
1.2	The current project portfolio is evidently light on hydrogen production, storage and distribution and efforts should be made to increase activity.	<i>FCH JU GB, FCH JU SC</i>
1.3	Priorities and work on RCS should be led by industry.	<i>FCH JU Executive Director</i>
1.4	The structure and composition of the annual calls should explicitly support the objectives of the FCH JU, the interests of Europe, and competition in the market place through projects that clearly have industrial leadership.	<i>FCH JU GB, FCH JU Executive Director</i>
1.5	The EC must ensure appropriate support is provided for basic research in the FP.	<i>FCH JU GB, EC</i>

2. Ensure high agility of operations and adaptability to changing competitive forces		
2.1	Actively involve all stakeholders of the value chain.	<i>FCH JU SRG, FCH JU Executive Director</i>
2.2	Establish an SME contact point at the Programme Office	<i>FCH JU Executive Director</i>
2.3	Explore opportunities for complementarity between FC electric cars and BEV in the market place	<i>FCH JU Executive Director, EC</i>
2.4	Commission a report on status, opportunities, and priorities for stationary fuel cells.	<i>FCH JU Executive Director</i>

3. Improve visibility, communication and outreach		
3.1	Develop an effective communication strategy and web site.	<i>FCH JU GB, FCH JU Executive Director</i>
3.2	The communication plan should be aligned with the FCH-JU objectives and integrate both external and internal communication.	<i>FCH JU GB, FCH JU Executive Director</i>
3.3	Use SRG and SC actively in supporting FCH JU awareness.	<i>FCH JU GB, FCH JU Executive Director</i>
3.4	Develop strategy and priorities for international outreach, engagement and cooperation.	<i>FCH JU GB, EC</i>
3.5	Outputs from the FCH JU projects should be integrated into and used to support relevant EU policies.	<i>EC</i>

4. Improve collaboration and alignment with member states		
4.1	Adjust SRG Rules of Procedure in order to better define the profile of the SRG representatives so that they are appropriately connected to political decision makers in their Member States.	<i>FCH JU GB</i>
4.2	To raise interest and attention from Member States involve representatives more proactively – candidate areas for this are developing project portfolio, communication and joint profiling events.	<i>FCH JU GB, FCH JU Executive Director</i>
4.3	Explore joint funding schemes between FCH JU and Member States.	<i>EC, FCH JU SRG</i>

5. Ensure high efficiency of operations		
5.1	The current legal framework should be streamlined to fit the purposes of setting up and implementing JTIs. The staff rules must be tailored to the needs of a PPP of this scale and in particular the number of staff for project management must be raised. Review the possibility of sharing resource for required administrative functions between JUs to reduce costs to each and so allowing extra skilled project management resource to be included with no marginal cost increase.	<i>EC, FCH JU GB, FCH JU Executive Director</i>
5.2	Plans should be developed and implemented for interaction and exchange between projects supported by the JU	<i>FCH JU Executive Director</i>
5.3	Establish as soon as possible a high quality, robust system for project monitoring and assessment.	<i>FCH JU Executive Director</i>
5.4	Undertake international benchmarking to establish best practice for project commissioning.	<i>FCH JU Executive Director</i>

ACRONYMS AND ABBREVIATIONS

AIP	Annual Implementation Plan
BEV	Battery Electric Vehicle
BOP	Balance of Plant
EC	European Commission
EII	European Industrial Initiative
ETP	European Technology Platform
FCEV	Fuel Cell Electric Vehicle
FCH	Fuel Cell and Hydrogen
FCH JU	Fuel Cell and Hydrogen Joint Undertaking
FP	Framework Programme
FP 7	7th Framework programme
GA	General Assembly
GB	Governing Board (of the FCH JU)
HFP	Hydrogen and Fuel Cell Technology Platform
HyRaMP	European Hydrogen Regions and Municipalities Partnership
IEG	Independent Expert Group
IG	Industry Grouping (of The FCH JU)
JTI	Joint Technology Initiative
JU	Joint Undertaking
MAIP	Multi-Annual Implementation Plan
PEMFC	Proton Exchange Membrane fuel cell
PO	Programme office (of the FCH JU)
PPP	Public -private partnership
R&D	Research & Development
RD&D	Research, Development, & Demonstration
RCS	Regulations, Codes, and Standards
RG	Research Grouping (of the FCH JU)
RTD	Research, Technological Development and Demonstration
SC	Scientific Committee (of the FCH JU)
SET Plan	Strategic Energy Technology Plan
SOFC	Solid Oxide Fuel Cell
SGA	Stakeholder General Assembly
SME	Small and medium sized enterprise
SRG	States Representatives' Group (for the FCH JU)

1. INTRODUCTION

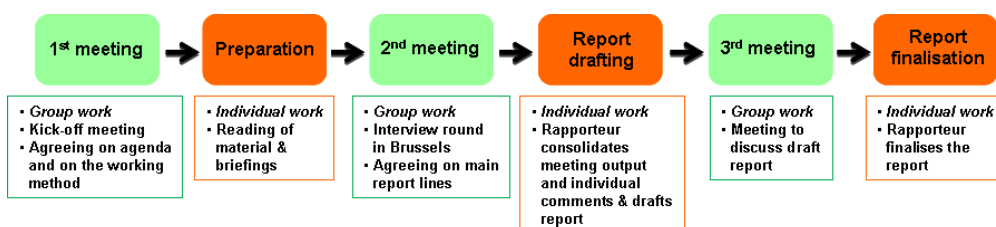
1.1. Objectives of the first interim evaluation of the FCH JU

This report presents the conclusions of a review of the Fuel Cell & Hydrogen Joint Undertaking (FCH JU) performed by an Independent Expert Group (IEG) constituted for the purpose by the European Commission (See Annex1). The review was undertaken in support of an evaluation required by Article 11(2) of the Council Regulation EC 521/2008 establishing the FCH JU, which stated *“By 30 May 2011, but in any case no later than 30 June 2011, as well as by 31 December 2013, the Commission shall conduct an interim evaluation of the FCH Joint Undertaking with the assistance of independent experts, on the basis of the terms of reference established after consultation of the FCH Joint Undertaking. These evaluations shall cover the quality and efficiency of the FCH Joint Undertaking and progress towards its objectives.”*

Reviews of two other similar Joint Undertakings were also underway during the performance of the FCH JU review. At the suggestion of the Commission, and with the agreement of the Expert Group, a similar review structure was adopted for the FCH JU review as for the others, based on assessment against three criteria of effectiveness, efficiency, and quality.

1.2. Methodology of the first interim evaluation of the FCH JU

The IEG followed the methodology suggested in its Terms of Reference which resulted in a work structure comprising six steps:



(i) A kick-off meeting for the expert group was held in Brussels on 13 December 2010 for briefing by Commission officials, fixing the schedule and discussion on the working method to be adopted. This discussed the

objectives of the review, background material assembled by the Commission, and overall approach. It then agreed the list of people to be interviewed to ensure a representative and complete coverage of the main stakeholders in the FCH JU, further reports and information to be provided, and the timeline for the work. The IEG decided that the interviews would be performed on the basis of the questions as defined in the Terms of Reference including more detailed sub-questions that were developed by the IEG in the follow-up of the meeting. It was agreed that the Commission would provide a Secretariat to support the group.

(ii) The kick-off meeting was followed by a study of the background material on the FCH JU (see Annex 2), and then development and agreement electronically of a full set of questions as the basis for interviews, provided in Annex 3.

(iii) A second meeting was then held in Brussels on 17-18 January 2011 to interview those previously identified, listed in Annex 4. The interviews were conducted both face-to-face and by tele- and video- conference depending on the availabilities and locations of the interviewees. Each interviewee was provided with the IEG's full set of questions one week in advance of the interview, and requested to be prepared to respond to those questions relating to their own involvement with the FCH JU. In addition, the interviewees provided also written answers to the questions. Following this process it was evident certain further information and data was required from the European Commission and also from the FCH JU Programme Office (PO).

(iv) Subsequent to the meeting, the requested further information was procured by the Secretariat, and clarified through an electronic exchange. In parallel members of the Expert group conducted interviews with local members of the States' Representative Group, using the questions of Annex 3. Members then provided summary views and conclusions to the Rapporteur who in dialogue with the Chair produced a draft report based on the meeting and interview outputs and input from members. This report was circulated to members and the Group Secretariat in advance of the next and final meeting.

(v) The third meeting was held on 3-4 March 2011 in Brussels, and included a telephone interview with the vice-chairman of the European Regions and

Municipalities Partnership for Hydrogen and Fuel Cells (HyRaMP). The report was discussed in detail and the findings and conclusions refined and agreed.

(vi) Following this meeting the Rapporteur modified the report following the principles and specific requirements agreed in the above-mentioned meeting. The final report was then approved by the Group and the Chair and submitted to the Commission on 13 April 2011.

2. FCH JU – BACKGROUND AND IMPLEMENTATION

2.1. Context

The background to the creation of the FCH JU is clearly summarised in the MAIP, which states:

The challenge facing fuel cells and hydrogen technologies is of great complexity, requiring substantial investments and a high level of scientific, technological and industrial expertise. At the same time, their potential contribution to Community policies - in particular energy, environment, transport and industrial-competitiveness – is very important.

The European Strategic Energy Technology (SET) Plan has identified fuel cells and hydrogen among the technologies needed for Europe to achieve the targets for 2020 - 20% reduction in greenhouse gas emissions. Apart from being one of the first five Joint Undertakings, FCH JU is also considered as the first European Industrial Initiative (EII) under the SET Plan.

In May 2003, the Hydrogen and Fuel Cell High Level Group presented its vision report, “*Hydrogen Energy and Fuel Cells – A Vision of Our Future*”. In this, the formation of a hydrogen and fuel cell public-private partnership was recommended in order to substantially accelerate the development and market introduction of these technologies. In December 2003, the European Commission facilitated the creation of a European Hydrogen and Fuel Cell Technology Platform (HFP), bringing together all interested stakeholders from the EU and the Associated Countries. In March 2005, the HFP published a Strategic Research Agenda and Deployment Strategy, followed

by an Implementation Plan in January 2007 – a comprehensive, long-term road map for Europe. This process confirmed that a coherent, long-term approach at EU level is essential for achieving critical mass in terms of scale, excellence and potential for innovation.

2.2. FCH JU Legal Basis

HFC technologies fulfilled all criteria for setting up a Joint Technology Initiative (JTI) as defined in the decision on the 7th Framework Programme of the European Community (2007-2013)². Therefore, the Commission's proposal for setting up a long-term public-private partnership in FP7 in the form of a JTI on Fuel Cells and Hydrogen was a consequential step to address the challenge. In practical terms, this JTI was set up as a Joint Undertaking³. on the basis of Article 171 of the EC Treaty (now Article 187 of the Lisbon Treaty⁴) with the European Commission, the NEW Industrial Grouping and the Research Grouping as members. As a Community Body the FCH JU has to work in accordance with the rules and procedures as defined by the Financial Regulation⁵ which has specific implications for the management of human and financial resources. The FCH JU is controlled by a Governing Board which appointed an Executive Director in charge of day-to-day operation in September 2010.

² FP7: Decision No 1982/2006/EC of the European Parliament and of the Council of 18 December 2006 concerning the Seventh Framework Programme of the European Community for research, technological development and demonstration activities (2006 to 2013) (OJ L 412, 30.12.2006, p. 9

³ Council Regulation (EC) No 521/2008 of 30 May 2008 setting up the Fuel Cells and Hydrogen Joint Undertaking

⁴ Treaty on the Functioning of the European Union, Article 187 (former Article 171 of the EC Treaty): "The Union may set up joint undertakings or any other structure for the efficient execution of Union research, technological development and demonstration programmes."

⁵ Council Regulation (EC, Euratom) 1605/2002 of 25 June 2002 on the Financial Regulation applicable to the general budget of the European Communities.

2.3. FCH JU Objectives

The objectives for the FCH JU are defined by Council Regulation 521/2008 as:

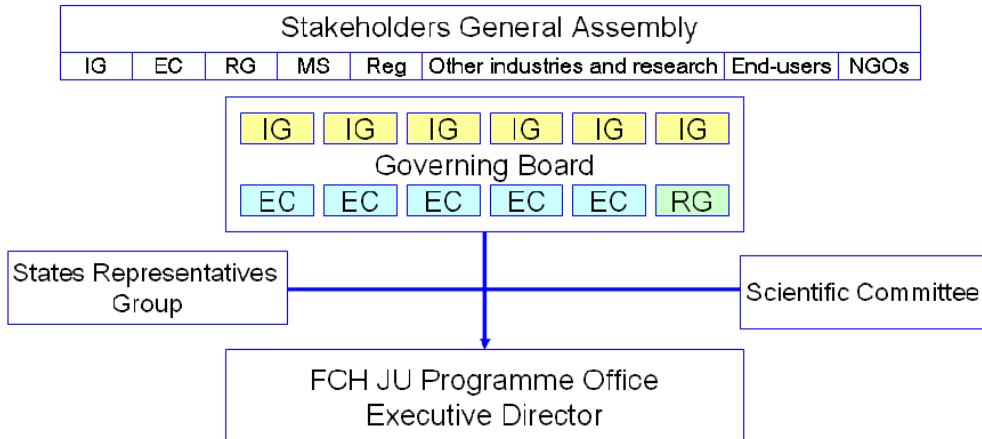
The FCH Joint Undertaking shall contribute to the implementation of the Seventh Framework Programme and in particular the Specific Programme 'Cooperation' themes for 'Energy', 'Nanosciences, Nanotechnologies, Materials and New Production Technologies', 'Environment (including Climate Change)', and 'Transport (including Aeronautics)'.

It shall, in particular:

- (a) aim at placing Europe at the forefront of fuel cell and hydrogen technologies worldwide and at enabling the market breakthrough of fuel cell and hydrogen technologies, thereby allowing commercial market forces to drive the substantial potential public benefits;*
- (b) support Research, Technological development and Demonstration (hereinafter referred to as RTD) in the Member States and countries associated with the Seventh Framework Programme (hereinafter referred to as Associated countries) in a coordinated manner to overcome the market failure and focus on developing market applications and thereby facilitate additional industrial efforts towards a rapid deployment of fuel cells and hydrogen technologies;*
- (c) support the implementation of the RTD priorities of the JTI on Fuel Cells and Hydrogen, notably by awarding grants following competitive calls for proposals;*
- (d) aim to encourage increased public and private research investment in fuel cells and hydrogen technologies in the Member States and Associated countries.*

2.4. Governance

The implementation of the FCH JU as an autonomous body is now complete, although this was only finalised in November 2010. Its governance structure comprises: Two executive bodies (the Governing Board and the Executive Director assisted by the Programme Office) and three advisory bodies (the Scientific Committee, the States Representatives Group and the Stakeholders' General Assembly) as shown in the diagram below:



The Governing Board is the main decision-making body of the FCH JU. All three members of the FCH JU are represented on the Governing Board: the NEW Industry Grouping has six seats, the European Commission has five seats and the N.ERGHY Research Grouping has one seat. The Governing Board has overall responsibility for the operations of the Joint Undertaking: implementation of activities, approval of the annual implementation plan, budget, accounts and the balance sheet; approval of the list of selected project proposals, etc. Notably it appointed a permanent Executive Director in September 2010. Prior to this time an interim structure was operated by the European Commission using interim staff to ensure that an operational body existed to progress the activities of the FCH JU. It also completed the creation of the envisaged autonomous body. The Governing Board had met 7 times by March 2011.

The Executive Director is the legal representative of the FCH JU. He is the chief executive responsible for the implementation of the Joint Undertaking, in accordance with the decisions of the Governing Board the Executive Director and the Programme Office are in charge of the day-to-day management of the Fuel Cells and Hydrogen Joint Undertaking. The key responsibilities of the Programme Office are: Organising the calls for proposals, selection of projects and management of funding; Managing the R&D agenda of the Joint Undertaking in coordination with members and other stakeholders and Communication on the Joint Undertaking and fuel cell and hydrogen technologies.

The States Representatives Group (SRG) should act as an interface between the FCH JU and the relevant stakeholders within their respective countries.

The SRG reviews information and provides opinions on programme progress in the FCH JU, compliance and respect of targets, coordination with national programmes and more. It meets at least twice a year. Articles 9.3 and 9.4 of the Annex to the FCH JU Regulation describe its specific tasks. The SRG Chairperson attends the meetings of the Governing Board as an observer.

The Scientific Committee gives its science-based recommendations on the priorities and the progress of the FCH JU to the Governing Board. Its members are selected by the Governing Board on the basis of their scientific competencies and expertise. Its main tasks are to advise on the R&D agenda set out in the Multi-Annual and Annual Implementation Plans and to evaluate the scientific achievements as described in the annual activity report.

The Stakeholders' General Assembly (SGA) is an annual event aimed at informing all interested parties about the activities of the FCH JU and acquiring feedback for future planning of the programme. It is also an important communication channel to ensure transparency and openness of the FCH JU's activities with its stakeholders.

Based on information from the interviews conducted the structure of key bodies, namely the Governing Board, the Executive Director and the Programme Office, the Industry and Research Groupings, the States Representatives Group, the Scientific Committee and the Stakeholders General assembly operated as planned to develop strategy, improve networking and coordination, and develop details of the Annual Implementation Plans (AIPs).

2.5. Implementation of FCH JU Research Activities

The MAIP and the AIP represent the background and framework for the project portfolio and for definition of calls.

Three annual calls for proposals were completed in 2008, 2009 and 2010 and details can be found on the FCH JU website⁶. A portfolio of projects has been selected. Those from the first two calls have been launched and are on-going. Those from 2010 call were approved by the GB on 10th March

⁶ www.fch-ju.eu

2011 and negotiation letters have already been sent out. It is expected that negotiations will be completed for all projects by the end of July 2011. At the time of this review preparations for the 2011 call were underway, and it is planned that it will be launched in May 2011. Consequently the operational delivery of the FCH JU to date is as originally planned.

As yet none of the FCH JU research projects have been completed and indeed none have progressed beyond the initial stages of work. Details of the projects supported can be found in the Annual Activity Report 2008, and Management Report 2009. Annex 5 provides statistics for the Calls completed to date.

2.6. FCH JU Communication

There is presently no formal communication and dissemination plan for the FCH JU, and one reason for this is that the Commission until the autumn of 2010 was responsible for the JU office. No communications role was included in the task force, and the topic was given no priority. A communication and dissemination plan is to be developed by the FCH JU office, but the timescale for this is not defined.

3. PERFORMANCE ASSESSMENT

As this interim evaluation takes place only months after the FCH JU became an autonomous body the findings on the performance of the FCH JU are based upon the evidence received during the interviews described above. As noted above none of the FCH JU projects have yet completed, and most are at an early stage, so formal outputs are not yet available.

3.1. Is FCH JU Effective?

First of all, the IEG states that the establishment of the FCH JU as an industry led public-private partnership (PPP) is an achievement on its own and represents a valuable instrument for the European Union. It is a unique platform and instrument for FCH at European level involving the most

important stakeholders in defining objectives and implementing and monitoring activities towards deployment objectives in the FCH area.

The overall objectives of the FCH JU as defined in the Multi-Annual Implementation Plan (MAIP) remain ambitious and competitive in comparison with efforts world-wide. Although some stakeholders wished the MAIP to remain unchanged in the interest of stability and consistency, the MAIP is undergoing a revision at present in which all the stakeholder groups are involved. The IEG sees this revision as timely to account for evolving priorities, markets, policies, and technology status of its own and competing technologies as well as in the light of developments elsewhere, evolution of the political view of FCH technologies, and the emergence of complementary developments such as battery vehicles. Stability and consistency are important aspects for consideration when assessing proposed changes, but are not valid reasons to avoid a review. The IEG endorses the current review and recommends it be completed and implemented, after discussion, before the agreement of the next AIP. A similar review should be undertaken regularly, at intervals not exceeding two years.

The FCH JU is part of a broader EU policy initiative, the SET Plan, and so appropriate links should be established between it and related activities such as other SET Plan EIs. When results become available from FCH JU projects they should be integrated into and used to support all relevant EU policies including the SET Plan.

On the basis of its investigation the IEG concludes that the FCH JU approach is generally regarded as a good means to enhance public-private activities in technology development and demonstration. The IEG also judges the FCH JU is perceived by participants as overall an improvement to the RD&D landscape, with strong stakeholder representation. In some areas it is also perceived as providing welcome stability for the R&D community given the cyclic nature of political interest and visibility: its presence is a reassuring “constant”.

Programme Management

For the IEG it appeared, from its activities to date, that the JU has acted broadly as research funder, in a similar fashion to the Framework Programme, when what is needed is a research “sponsor”. The crucial

difference between these approaches is that a sponsor would assume responsibility for delivering the objectives of the JU by active management of its R&D portfolio through call processes as well as project monitoring and review. An active project portfolio management is crucial for the FCH JU achieving its overall objectives towards deployment of new technologies. In contrast a funder defines the scope of Calls for Proposals and then effectively administers the proposal evaluation, contract award, and contract management. The IEG found that so far the JU has acted more in the second mode; it therefore recommends that delivery of the FCH JU objectives should now be a primary focus.

The IEG did not detect focused plans to promote interaction and exchange between projects and, given the integrated nature of the FCH JU objectives represented in the MAIP, felt this should be addressed. There is a need to decide what such interaction should be for maximum delivery efficiency of the overall FCH JU programme, and how best to achieve it. The planned Stakeholder General Assemblies will probably provide one opportunity. At such an event the Merit Review approach used by the US Department of Energy⁷ may be one proven model, but as the support schemes have some differences it may not wholly suit the needs for the portfolio of JU projects.

This view is reinforced by the difficulty of relating current funded projects to the delivery of specific JU objectives at present. The IEG suggests that both the portfolio management identified above and a more explicit structuring or clustering of projects based on major objectives would help address this problem.

A further issue identified by the IEG is whether the FCH JU has the methods to engage fully and effectively with all the entities affected by its technologies. There is inevitably strong influence of the original FCH development community in its work, and there was only limited evidence of engagement with the full range of stakeholders, notably including end-users, market regulators, financial organisations, service and related business (many of which are SMEs).

⁷ <http://www.annualmeritreview.energy.gov>.

Industrial Participation

The IEG observed that in a substantial proportion of current projects industrial leadership was difficult to identify from existing project data because the coordinators were mainly research organisations giving the impression that the projects were little different to typical Framework Programme ones. It is recognised that this could be simply a practical convenience, as industrial participants may not wish to undertake what they perceive as a time-consuming and unrewarding administration, but clear visibility of industrial leadership at project level should be a characteristic of most JU projects and the fact that it is not obvious is a weakness. The IEG recommends that specific attention is paid to keeping industry in the lead of the whole programme.

The IEG took note that direct participation of SMEs in the FCH JU programmes has so far proved better than in FP7 overall. This level of SME participation is being achieved in spite of perceived high risks and relatively low rewards. The risk is for the rigorous and detailed processes required to prepare and submit a proposal, which are expensive for small companies, to have a 30% chance of funding about 12 months later. Because of the funding arrangements of the JU and its industry matching principle, it is also the case that the level of funding is not known until projects have been selected and then are typically much lower than is normal under FP7 and possibly also some Member States' schemes. Consequently by comparison with the latter many SMEs claim FCH JU funding is less attractive than local support schemes.

The IEG believes that revisiting the funding issue to find ways of better aligning the funding with FP7 is an important priority; it was informed that an amendment to the financial regulation was being pursued. The IEG sees specific opportunities for further strengthening SME participation. Therefore, the IEP recommends the establishment of a special contact point providing information and assistance for SMEs in the FCH JU Programme Office.

Regulations, Codes, and Standards

A critical requirement for market entry of fuel cell and hydrogen systems will be the timely availability of suitable Regulations, Codes and Standards (RCS). As these are primarily commercial and regulatory instruments any

necessary precursor R&D for their introduction should ideally be identified and led by industry. The IEG noted there was presently little evidence that needs (or lack of needs) for such work within the JU activities was originating from the Industrial Grouping in the detailing of the MAIP and the AIP. The IEG recommends this should be more explicitly addressed in future.

Cohesion with Member States' activities

The IEG found that to date the ability of the SRG to improve the cohesion between the activities of the JU and Member States' programmes appears limited in terms of demonstrable improvements. Generally it seems the Member States are disengaged from the operation and steering of the JU. In addition it is not evident that the SRG members are all connected directly to their domestic policy and programme delivery in the FCH domain. In the view of the IEG the SRG's present somewhat distant advisory role seems inconsistent with the focused approach of the SET-Plan, and apparently fails to motivate many of its members. Therefore, the IEG recommends the GB should consider how the potential of the SRG to better link the FCH JU programme to national activities in complementary and synergetic ways can be better exploited.

According to estimates made by representatives of the RG and IG the FCH JU currently represents around 20% of European research activity in the field of fuel cells and hydrogen, and between 10 and 20% of development and demonstrations. Consequently while there is evidently a good interaction with the industrial and development community (by the very nature of the JU) it is especially disappointing that formal interaction and coordination with Member States' programmes appears weak. There is a clear desire amongst participants to see a more explicit coordination with these programmes, although few specific suggestions about how it could be best achieved.

In contrast the HyRaMP initiative has proved an effective vehicle to enhance stakeholder interaction with the JU, and it could potentially offer an attractive route to coordinate with related initiatives in the regions. How this should best connect to the national representation embodied in the SRG has not apparently been addressed. So far the latter has not, on the evidence received, represented or recognised them, and there is potential value in a more explicit relationship between the SRG and HyRaMP.

Finance

Because of the so-called "matching principle", the funding rates for FCH JU projects have proved considerably lower than in FP 7. Following a request from the FCH JU GB and in line with the recommendations of the Sherpa report⁸, an amendment is planned to reduce this gap, which the IEG welcomes. It is regrettable that the funding rate impact of the FCH JU financing as achieved was not acknowledged nor communicated clearly to potential project participants earlier, as it has proved to be a cause of difficulty and confusion to many project participants

The application of standard EC financial procedures as defined by the Financial Regulation has proved complex when applied to an activity of the scale of FCH JU. The IEG strongly endorses the proposal in the Sherpa report that specific regulatory provisions appropriate to the scale and activity of PPPs should be developed

The funding arrangements also have created problems for research participants, who experience and perceive them in similar ways to SMEs. It is difficult for these stakeholders to understand why the scheme provides funding that is not only unknown at the time of making a proposal but is virtually guaranteed to be less than under any comparable Framework programme. In addition to the overall funding level is the question of whether the absolute size of the FCH JU is matched to the challenges it is trying to address.

Communications

In spite of the substantial effort represented by the FCH JU programme, it is generally felt to have a very low public profile and visibility outside those directly involved in its activities. The FCH JU should be the main entry point for FCH in Europe, but it had no unique web site being represented within the EU Research & Innovation pages where the content is mainly concerned with its history, call procedures, Board decisions and similar. This is partly due to the absence of any formal communication plan and resource within the FCH JU, and partly due to the absence of specific results or outcomes to communicate, and thus very limited efforts have so far been made. A Call

⁸ "Designing together the ideal house for public-private partnerships in European research". JTI Sherpas' Group. Final Report., January 2010

for Proposals may be exciting for the research community, but is of little interest to others so it should be acknowledged that the present position is wholly understandable. However it is inconsistent with the intent behind the creation of the FCH JU that it does not pursue a higher profile more aggressively. There is a stated intent by the FCH JU to develop a communications strategy. This should be addressed more urgently with a view to the JU becoming the obvious portal for information on European FCH efforts, including a richer web presence with a clear identity. During the review the first version of a new independent website⁹ was released which it is hoped will be a first step towards this.

The annual SGA is an excellent instrument for information and networking. The SGA is a unique European instrument to formulate joint objectives involving most stakeholders. It is not a top down process. It may also be an instrument for consultation with stakeholders on strategy evolution.

One relevant issue that should be recognised is that the formal title, whether Fuel Cell & Hydrogen Joint Undertaking, or FCH JU, will not be easily remembered or understood by most individuals. Consideration should be given to developing a more easily recognisable and memorable “trading name” to aid in raising its profile, in the style of, purely for example, “European Fuel Cells” or something similar.

International Cooperation

The FCH JU should at first sight be a major route for international cooperation, given its absolute scale and position in Europe. However, in the absence of a stronger coordination with Member States’ programmes, a number of which have bilateral international collaborations, establishing this in a way that appears rational from outside Europe remains a challenge. There are also views within the SRG that strengthening the internal structure of European activity should be the first priority, which would be a precursor to identifying true value-adding collaborations. Given this position, and the absence of a specific international budget within the FCH JU, the IEG identified this as an area where agreeing the appropriate strategy and priorities should be the first steps. At the least a formal monitoring of international developments is essential.

⁹ <http://www.fch-ju.eu>

3.2. Is FCH JU Efficient?

The IEG noted that due to the present legal and the regulatory framework for a Community body the start up and implementation of the FCH JU structures and activities in the first two years was not as efficient as would have been wished and expected. This is both a broad belief of the FCH community, and also based on reasonable objective evidence. However, it must be remembered that this relates to the period before its ability to operate wholly autonomously and with an interim management and team structure. The interim arrangements experienced many problems due to processes not being clear or in place, systems which did not work as required, negotiation tools not in place, and thus an inability to respond promptly or clearly to the community. This resulted in delays and uncertainty, and eventually led to the withdrawal of some participants, an experience that was negative for the FCH JU image and its perception outside. It has also meant that some European countries have taken a lead and so regard the FCH JU as a supplement to their own activities rather than the primary engine of development. However, the recent achievement of autonomous status and the benefits of a new permanent Executive Director provide encouraging signs this is improving, a view apparently shared by the stakeholder community. However, it is notable that in a number of areas, including communications, project management, and technical management, the future approaches are still at the stage of planning rather than implementation.

For future JTIs the IEG supports the recommendations of the Sherpa Groups' report¹⁰ that the current legal framework be streamlined to fit the purposes of a PPP. In this respect, the "Community body" status of JTIs should be reviewed and the IEG favours the option of a "special body" offering the opportunity to develop a framework regulation adapted to the specific needs of EIs and JTIs.

Processes

It is important to note that "autonomous" does not extend to staff management and financial processes which must adopt EC processes. These both delay process and affect output. Consequently the IEG endorses the

¹⁰ "Designing together the ideal house for public-private partnerships in European research". JTI Sherpas' Group. Final Report. January 2010

proposal in the Sherpa report that the application of these processes should be reviewed and an acceptable system more appropriate to a PPP of the scale of the FCH JU identified. The existence of the JU Governing Board and the strong representation of the EC on it, suggests that suitable oversight of internal processes can be devised based upon the governance structure of the JU itself, without strict conformance to EC rules designed for much more complex and less directly managed operations.

Whether current operational efficiency is acceptable, and comparable with best practice elsewhere, is difficult to assess. Due to constraints and requirements arising from its status as a Community body the current structure is unbalanced when comparing administrative resource (13 persons) to project management and monitoring (5 Project Officers). The timescale from publication of calls for proposals through selection to contract offer is approximately nine months, and with the inevitable contract negotiations the overall timescale is around a year. While this is comparable with historical Framework Programme performance for large projects it seems inappropriately long for a targeted, industrially led, and market-driven initiative.

Consequently the IEG recommends some form of international benchmarking against comparable schemes should be undertaken to help guide targets for future project commissioning, and the benchmarks should include the practices of industrial concerns with established outsourcing or supply chain management expertise. It seems no such benchmarking has yet been done for the FCH JU, and the IEG recommends it should be undertaken as soon as practicably possible.

There have been no formal exchanges on operating processes between the FCH JU and similar existing initiatives relating to the implementation of their respective technical programmes, although there are regular meetings of the Executive Directors to discuss administrative processes and associated matters. There are probable efficiency improvements regarding the implementation of technical programmes and effective achievement of their objectives that could be realised through an exchange of experience and best practice between JUs. Therefore the IEG recommends that a regular dialogue and exchange of best practice between JU and other SET-Plan elements on this subject should be established. This should include a review of the possibility of sharing resource for required administrative functions

between JUs to reduce costs to each and so allowing extra skilled project management resource to be included with no marginal cost increase.

Portfolio Management

The IEG sees it as essential that as the project portfolio becomes established sufficient skilled resource is made available for project monitoring and overall programme management. The relationship between the FCH JU objectives and the current project portfolio is already difficult to identify from reports. While plans for improved project monitoring were outlined by the FCH JU management, they are as yet undetailed and moreover do not appear to address portfolio management as such. This is of particular importance as the FCH JU covers mainly three distinct technical communities: PEMFC, SOFC, and hydrogen. Ensuring their diverse activities are efficiently linked is critical and is one element of portfolio management.

Additionally external expert monitoring of achievements by the SC would be useful. The IEG sees this as a possible task for the SC. In addition, the SC might also contribute to science and technology observatory and foresight.

In general there is a need for exploratory (frontier) research to address major technological barriers and prepare for the next generation of technologies. This would include long-term research as well as short-term high risk/high reward efforts. It could be part of the overall FCH JU programme but then would require special calls and evaluation processes, or managed outside the FCH JU. Without such an activity to enable radical innovation the FCH JU could end up demonstrating obsolete technologies.

The existing project portfolio is clearly light on hydrogen production, storage and distribution. This is a critical area for the successful deployment of many fuel cells, especially in transport, and one needing technical breakthroughs, so efforts should be prioritised to increase its share of the FCH JU activity.

3.3. Is FCH JU of High Quality?

The resources, capabilities, competences, and support offered to the FCH JU by a number of major European industrial organisations, together with the positive response to its Calls for Proposals, demonstrates without question that it has the potential to become a real flagship for its technology

development and progression to market exploitation. However, it cannot do this credibly until a rational coordination, or even a defined co-existence, with Member States' programmes is established. The IEG sees this as an important condition for the FCH JU becoming a European flagship with importance on a global scale.

In terms of the detailed RD&D activities so far supported by the FCH JU, the IEG had no concern about their overall technical or scientific quality to the extent these can be judged in advance of concrete outcomes. What is less certain is whether the detailed call topics and subsequent projects are wholly in response to challenges identified as arising from the FCH JU objectives as opposed to specific industrial interests and established programmes and competences of the research community. The latter is a constant risk for any initiative arising from a relatively focused and specialised expert community and has to be balanced against exploiting the insight and special knowledge that they have. The IEG recommends that a method of reviewing and testing the correlation between the project targets and both the overall interests of Europe and the FCH JU objectives should be regularly applied by the GB and as an important verification of the optimal structure of the programme.

The appropriate vehicle for this is most probably the MAIP and the AIP, and their structure should be reviewed to ensure they do not inadvertently inhibit the most efficient operation of the programme. At present the MAIP defines the distribution of funds between application areas and it is unclear whether these are applied strictly in the definition of each AIP or whether they can be interpreted flexibly to meet its specific requirements.

The IEG formed the view that the SC presently is only partly engaged with the development of the FCH JU activities, but that the members were open to the possibility of closer involvement. While they are consulted on the proposed Call topics it appears they are not used during their development or elsewhere. There appears to be potential to offer a wider role to the SC, perhaps with a parallel review of membership to ensure any sufficient competences to cover the full scope of the MAIP are present, and some belief that this would be beneficial. However, any such evolution should be done as part of a broader review of operation of the FCH JU, and noting that as an unpaid advisory body the SC may be limited in what its members are prepared to undertake in that guise.

4. SWOT – ANALYSIS

Following the performance evaluation, in order to place the assessment in a broader, strategic context, the IEG performed a SWOT analysis (strengths, weaknesses, opportunities and threats).

The SWOT exercise gauged weaknesses and strengths, analysed barriers and drivers and helped assessing how the JU could seize opportunities and deal with potential threats, and was a useful tool to draw general conclusions and formulate recommendations.

The following SWOT analysis highlights the substantial strengths of the JU, but also shows that it has some serious weaknesses to overcome. These are mainly connected to the existing bureaucratic rules and regulations; lack of coordination with national programmes and low visibility. The IEG focused in particular on the identification of opportunities and threats as external factors which cannot be steered by the JU, but that emerge from the dynamics of the context and of the FCH and in general from the energy market and from socio-economic as well as political factors.

Strengths

- Impressive mobilisation and pooling of resources and expertise
- FCH JU has proved a valid instrument to achieve alignment on strategies and potentially efficient use of resources.
- Strong stakeholder participation
- Ensuring a steady industry-led development towards longer term targets through varying economic cycles
- Gained attention of MS programmes and evidence of influencing content

Weaknesses

- Burdensome administrative rules and regulations
- Call procedures too long and complicated
- Excessive PO resource dedicated to administration in comparison to that provided for project management
- Project funding rates inferior to FP rates, due to the Industry 'matching' requirement
- Lack of clear strategy for stationary applications

Weaknesses (continuation)

- Lack of coordination with national programmes
- Insufficient support from FP basic research for radical innovation
- No concerted communication efforts and low visibility
- Lack of international dimension
- Programme management resource insufficient to deliver results
- Strong industrial leadership in projects is not visible

Opportunities

- Create European lead in emerging field of high potential
- FCH JU can act as catalyser of innovation and a valorisation agency for developments elsewhere in Europe
- Common vision building and communication to participants and beneficiaries
- Greater involvement in hydrogen production and distribution technology developments
- Create real alignment with regional and national initiatives
- Large cohesive effort facilitates raising visibility
- Improve international collaboration and learning from developments elsewhere. FCH JU as influencer of political agenda
- Emerging limitations of BEV open opportunities for FC EV
- Means to coordinate system optimisation/cost reduction

Threats

- Performance of and opportunities for the technology do not attract necessary investments for the supplier and infrastructure industry.
- Technical obstacles, especially for subsystem performance & cost bases
- Failure in transport sector (due to failing infrastructure, accidents, costs; failure of BEV promises prejudicing other uses
- Asian technology breakthrough/EU lagging behind.
- Failing political/policy support for FCH
- Failing acceptance by end-users due to incapability to communicate benefits to society

5. CONCLUSIONS AND RECOMMANDATIONS

5.1. Conclusions

Due to the slow start-up this review was conducted in advance of any tangible output. However, based on its observations the IEG is satisfied the FCH JU is perceived by participants as overall an improvement to the RD&D landscape, with strong stakeholder representation. In some areas it is also perceived as providing welcome stability for the R&D community given the cyclic nature of political interest and visibility: its presence is a reassuring “constant”. The IEG recommends that it should be maintained and supported to implement its work as originally envisaged. Its potential role in a new phase of EC support for innovation following FP7 should be reviewed at a later date when outputs of its projects start to become available, as none are presently available to assess. However the IEG believes that there will be a need for continuation of this, or an equivalent, initiative.

As results become available the policy Directorates of the European Commission should ensure that they are integrated into and used to support relevant EU policies.

There is, in the opinion of the IEG, potential benefit in greater involvement of the Scientific Committee in the work of the FCH JU. Specific recommendations are contained below, which include a greater contribution to assessing the fit of proposed projects to delivering the overall FCH JU objectives, monitoring developments elsewhere, and in supporting communication of FCH JU progress and achievements.

The FCH JU should ensure the results of its own experiences are available in developing proposals for the new phase of EU R&D, and lessons learned here can and should be applied to any future EIs or JTIs. In particular the uncertainty of funding rates is a material failing and must be addressed. The IEG endorses the Sherpa report recommendation to include appropriate conditions for PPPs in the current revision of the Community Financial Regulation. The process of creation of the FCH JU was too slow and complex and steps should be taken to ensure similar problems are not repeated elsewhere in future, possibly in progressing initiatives such as EI.

5.2. Recommendations for action: how to make FCH JU better?

The recommendations comprise a set of actions that aim to remove or reduce weaknesses as identified in the current operations of the FCH JU and its effectiveness and quality. Recommendations are also presented with the aim to explore opportunities and identify threats.

Recommendation 1. Reinforce portfolio management

The FCH JU needs to assume more responsibility for delivering its overall technical objectives and have an active management of its project portfolio through targeted call processes and on-going project review. The balance between application areas needs to be reviewed and how projects interact should be worked out.

To achieve its objectives of placing Europe at the forefront of fuel cell and hydrogen technologies worldwide and at enabling the market breakthrough of fuel cell and hydrogen technologies, FCH JU should emphasise industrial leadership for large-scale projects.

The SC has the potential to provide support to, and verification of, the above portfolio management approach, and opportunities to widen its present role to do this should be actively explored.

In particular, the IEG recommends:

- 1.1 The MAIP should be thoroughly reviewed and updated where necessary before the production of the AIP for 2012. This exercise should be repeated no less than every 2 years to ensure the technical priorities remain valid in relation to results achieved and developments elsewhere. A method of reviewing and testing the correlation between the project targets and overall objectives should be regularly applied as an important verification of the optimal structure of the programme.
FCH JU GB
- 1.2 In particular, the current portfolio is clearly light on hydrogen production, storage and distribution (see Annex

5). This is a critical area and one needing breakthroughs, so efforts should be made to increase activity.

FCH JU GB, FCH JU SC

- 1.3 Priorities and work on RCS should be led by industry. Efforts should be made to develop evidence of needs (or lack of needs) feeding from IG to the AIP and work programme. The programme office should present evidence of how this is followed up.

FCH JU Executive Director

- 1.4 The structure and composition of the annual calls should explicitly support the objectives of the FCH JU, the interests of Europe, and competition in the market place through projects that clearly have industrial leadership.

FCH JU GB, FCH JU Executive Director

- 1.5 The JU programme is not structured for, and does not encourage, basic research seeking radical innovation. The EC must ensure appropriate support is provided for such work through other suitable instruments.

FCH JU GB, EC

Recommendation 2. Ensure high agility of operations and adaptability to changing competitive forces

Over the last few years, technology development has brought fuel cells and its applications from research on how to make it work, to development on how to make it cheaper. The latter is to a large extent about cost reductions in systems and BOP and will eventually lead to commercialisation and new products. To achieve its objectives, the FCH JU needs to maintain its focus on innovation and respond to emergent competing technologies.

The FCH JU must reinforce efforts to engage stakeholders from the complete value chain in addition to the manufacturers and researchers who represent the great majority of participants in the FCH JU.

In particular, the IEG recommends:

- 2.1 Actively involve all stakeholders of the value chain: Involve regions (through HyRaMP), trade associations for industry users, and various potential consumer bodies, to effectively
- 2.2 Calibrate project portfolio against end user development and needs.
SRG, FCH JU Executive Director
- 2.3 Establish an SME contact point at the Programme Office to facilitate participation of SMEs in product development projects and early markets.
FCH JU Executive Director
- 2.4 Explore opportunities for complementarity between FC electric cars and BEV in the market place.
EC, FCH JU Executive Director
- 2.5 A strategy plan should be developed with the purpose of strengthening the development plans for stationary applications. This could be based on a review similar to the recent report on automotive applications “A portfolio of power-trains for Europe: a fact-based analysis” (the so called “McKinsey report”) which has been effective in clarifying status, opportunities, and priorities for the technology.
FCH JU Executive Director

Recommendation 3. Improve visibility, communication and outreach

International outreach and engagement should be a key role and responsibility for the FCH JU. There is an urgent need to increase FCH JU visibility, with a clear identity and mission.

The awareness of its initiatives and achievements also outside Europe should be increased and the FCH JU needs to establish what international engagement or participation should be sought to support the faster or cheaper achievement of its programme objectives.

In particular, the IEG recommends:

- 3.1 Develop an effective communication strategy and web site that will raise the profile of Europe's R&D efforts on fuel cells and hydrogen, and of the FCH JU itself as the centrepiece of these. As part of such a strategy consideration should be given to adopting a more easily recognisable and memorable "trading name" for the JU. The communication strategy must be targeted according to stakeholders.

FCH JU GB, FCH JU Executive Director

- 3.2 It is important that a future communication plan is aligned with the FCH-JU objectives and integrates both external and internal communication. Messages should effectively create a credible brand and raise understanding of the role and potential of the FCH JU. Internal as well as external communication should be targeted, while taking into account the different needs of research and industry stakeholders. The communication plan should encompass guidance for those directly involved in the FCH JU projects to ensure consistency of communication from all sources within the FCH JU to the "external" stakeholders.

FCH JU GB, FCH JU Executive Director

- 3.3 Engage the States Representatives Group and the Scientific Committee actively in supporting FCH JU communication and outreach activities.

FCH JU GB, FCH JU Executive Director

- 3.4 An appropriate strategy and priorities should be developed and agreed for international outreach, engagement and cooperation.

FCH JU GB, EC

- 3.5 Outputs from the FCH JU projects should be integrated into and used to support relevant EU policies.

EC

Recommendation 4. Improve collaboration and alignment with Member States

It is clear that there is scope for improvement in the performance of the SRG for the coordination with Member States' parallel activities. The SRG needs members connected to policy and programme management, not scientific experts, able to identify and to progress opportunities for alignment of national activities and those of the FCH JU.

In particular, the IEG recommends:

- 4.1 Adjust SRG Rules of Procedure in order to better define the profile of the SRG representatives so that they are appropriately connected to political decision makers in their Member States.

FCH JU GB

- 4.2 To raise interest and attention from Member States involve representatives more proactively – candidate areas for this are developing project portfolio, communication and joint profiling events.

FCH JU GB, FCH JU Executive Director

- 4.3 Explore joint funding schemes between FCH JU and Member States.

EC, FCH JU SRG

Recommendation 5. Ensure high efficiency of operations

The current legal framework as a “Community body” is not well-suited to industry led public-private partnerships like JTIs and should be streamlined. The IEG supports the related recommendations of the JTI’s Sherpa Group.

The time scale involved from publication of calls to negotiated call is around one year and should be improved upon. Currently the management structure is unbalanced in terms of administrative resources compared to project management, leaving the project management capability (just 25 % of the staff) under- resourced and probably insufficient to ensure delivery of objectives. A sufficiently skilled resource is needed for project monitoring

and programme management (including portfolio management) greater than that presently in place.

Given the innovative nature of JUs it is recommended that an exchange of experience and advice between senior staff of all PPPs be organised, and that a dialogue is set up between FCH JU and other SET Plan initiatives of a similar nature to ensure exchange of best practice related to operation and implementation of objectives. Also, project monitoring and benchmarking of best practise should be introduced.

In particular, the IEG recommends:

- 5.1 The current legal framework should be streamlined to fit the purposes of setting up and implementing JTIs. The staff rules must be tailored to the needs of a PPP of this scale and in particular the number of staff for project management must be raised. Review the possibility of sharing resource for required administrative functions between JUs to reduce costs to each and so allowing extra skilled project management resource to be included with no marginal cost increase.

EC, FCH JU GB, FCH JU Executive Director

- 5.2 Proper interaction and exchange between projects supported by the JU needs to be ensured. This is a desirable element of such a programme so an efficient and appropriate means to provide it should be identified and implemented.

FCH JU Executive Director

- 5.3 As the number of projects of the FCH JU portfolio is increasing and projects are progressing, it is recommended that a high quality, robust system for project monitoring and assessment be established as soon as possible.

FCH JU Executive Director

- 5.4 Establish international benchmarking to guide targets for future project commissioning, including practices of industrial concerns with established outsourcing or supply chain management.

FCH JU Executive Director

ANNEXES

Annex 1. Composition of the Expert Evaluation Panel

Elisabet Fjermestad Hagen (**Chair**)

John Loughhead (**Rapporteur**)

Jens Rostrup-Nielsen

Maria-Rosaria Di Nucci

Ana Sofia Caires Sousa Branco

Manfred Horvat (**Common reviewer with IMI and CleanSky Joint Undertakings**)

Elisabet Fjermestad Hagen (Chair) (N) - before her retirement was employed by Norsk Hydro ASA in the position of Director, responsible for business development of new energy markets. She has been involved in business activities in raw materials and energy areas, establishments of new companies in areas of bioenergy and natural gas and in projects for hydrogen and fuel cells. She participates in national and international committees related to research and industrial development of future energy markets.

John Loughhead (Rapporteur) (UK) is the Executive Director of the UK Energy Research Centre. He is a professional engineer and has worked in new energy systems R&D for over 30 years. His current role covers the UK's research into new sustainable energy systems. Much of his career has been spent in industrial positions, latterly as Corporate Vice-President for Technology and Intellectual Property of the Alstom group, where he was responsible for technology management and a number of new product developments related to energy systems.

Dr. Jens Rostrup-Nielsen (DK) is a founding member of the Scientific Council of the European Research Council (ERC). His professional carrier has been dominated by his function (1986-2006) as Executive Vice President (R&D) at the Danish company Haldor Topsøe A/S (catalysts and catalytic processes). He has published around 100 papers in refereed journals and 22 patents. He is adjunct professor at the Technical University of Denmark and affiliate professor at KTH Stockholm and member of the Danish Academy of Technical Sciences (president 1995-99), IVA, Sweden, and the Royal Academy of Engineering. He chaired the Danish Research Policy Council 1987-91. His European activities include presidency of European Research Management Association (EIRMA) 1993-95 and membership of the EU advisory bodies IRDAC, EURAB, H2-Fuel Cell Platform and now ERC.

Maria Rosaria Di Nucci (I) is associate senior research fellow at the Environmental Policy Research Centre of the Freie Universität Berlin and independent consultant. She has been working in energy policy for over 25 years and participated in a large number of projects. A further focus of her activities is impact assessment. Di Nucci is expert evaluator for a number of European public RTD funding organisations and the EC. Currently she is involved in the evaluation of the national (NKI) (2009-2012) as well as in the international (IKI) “Climate Protection Initiative” of the German Federal Ministry for Environment.

Ana Sofia Caires Branco (PT) is a Technological Physics Engineer with post-graduations in Innovation Management and European Union. Currently she is a Technology Transfer expert having worked in an energy agency (AREAM), in an International services company (ATOS ORIGIN) and in an energy and transport research centre (CIDAUT). She has participated in many EC projects and in several evaluation exercises as an independent expert for the EC, having been also the secretary of EARPA’s Urban Mobility TF.

Manfred Horvat (AT) is Honorary professor for European and International Research and Technology Cooperation at Vienna University of Technology; senior advisor for ministries in Austria and other countries and expert for the European Commission and international organisations. In his past career, he was responsible for the operational implementation of the EU RTD Framework Programmes in Austria from 1993 to 2006. Currently, he is member of the evaluation panels for the Joint Undertakings Clean Sky, Innovative Medicine Initiative and also Fuel Cells and Hydrogen.

Annex 2. Principal FCH-related documents and information consulted

Document FCH JU 2009.9: FCH JU Staff Policy Plan

FCH JU: Rules of Procedure of the Governing Board, 26 September 2008

FCH JU: Records of decisions taken by the Governing Board, (2008 – 2010)

Document FCH JU 2009.001: Multi-Annual Implementation Plan 2008 -2013, May 2009

FCH JU document: Priority Research Technological Development and Demonstration Topics 2008-2013 (undated and unreferenced)

FCH JU Documents: Annual Implementation Plans 2008, 2009, 2010

European Commission Communication COM (2009) 519: Investing in the development of low-carbon technologies (SET-Plan), 7.10.2009

Annex to Commission Decision 2343/2002: Financial Rules of the Fuel Cells and Hydrogen Joint Undertaking

Council Regulation (EC) 521/2008: Setting up of FCH JU, 30 May 2008

FCH JU: States Representatives Group Rules of Procedure, (March 2009)

FCH JU: Management Report 2009, unreferenced, 15 June 2010

FCH JU: Document 2009.007 Annual Activity Report 2008, 15 May 2009

JTI Sherpas' Group Final Report: Designing together the "ideal house" for public-private partnerships in European research, January 2010

McKinsey Group: The role of battery electric vehicles, plug-in hybrids, and fuel cell electric vehicles, undated

FCH JU: Independent observers report of evaluation of proposals received in response to Call FCH JU 2008-1, 1 March 2009

FCH JU: Independent observers report of evaluation of proposals received in response to Call FCH JU 2009-1, 31 December 2009

Annex 3. Questions used to structure stakeholder interviews

General	
Q1	<p>(a) What is the realistic competitive market position of FCH Technologies (transport and stationary) in the short, medium and long terms?</p> <p>(b) How will current European RDD&D activities influence this?</p> <p>(c) Who are the key players in realising (1) market impact and (2) environmental benefits</p> <p>(d) What is the risk that we shall still be “5 years away” in 2015?</p> <p>(e) For transport, what impact will the market introduction of battery cars this year have on prospects for FC vehicles?</p>
Q2	<p>What changes have occurred from a technology development point of view (e.g. complementary/competitive technology) and in the global economic/financial context of this sector since the initiation of the FCH JU programme and what are their likely effects? What is the JU process for monitoring such global developments and updating its overall plans?</p>
Effectiveness: Progress towards meeting the objectives set.	
Q3	<p>What is the advantage of using the JU instrument to achieve the objectives set in the Article 2 of the Council Regulation setting up the JU?</p>
Q3.1	<p>How has the FCH JU so far effectively supported the objective of placing Europe at the forefront of fuel cell and hydrogen technologies worldwide and at enabling the market breakthrough of fuel cell and hydrogen technologies? How does it compare in effectiveness to initiatives elsewhere? What results have been achieved against the Targets 2010 included in the MAIP 2008 – 2013. Which have not been achieved and why?</p>

Q3.2	Where has the FCH JU effectively facilitated additional industrial efforts for a rapid deployment of fuel cells and hydrogen technologies, and contributed to the development of their market applications, aiming at overcoming their market failure?
Q3.3	How has the FCH JU so far effectively contributed to the implementation of FP7? In particular, has there been so far effective contribution towards reaching the objectives of the specific 'Cooperation' themes ('Energy', 'Nanosciences, Nanotechnologies, Materials and New Production Technologies', 'Environment (including Climate Change)', and 'Transport) which support budget wise the FCH JU programme? Where has the FCH JU ensured complementarity with other activities of the Seventh Framework Programme?
Q3.4	How does the FCH JU enhance the coordination of RDD&D in the Member States and Associated countries? What process is used by the JU to achieve this? Can you give specific examples of success and failure? What leverage has been achieved by the FCH JU of R&D investment at national/regional programme level? What increase in interaction between Industry and Research communities has the FCH JU realised?
Q3.5	To what extent has the FCH JU driven the participation/involvement of Small and Medium-sized Enterprises (SMEs) in integrated programmes with large industry and/or public bodies? What are the inhibitors to their participation?
Q3.6	What impact has the FCH JU had on the main related Community policies in the field of energy (e.g. SET Plan), environment, transport, sustainable development and economic growth? What impact has the FCH JU had on the main related national policies, especially national R&D programme priorities and spending?
Q3.7	Are the objectives of the FCH JU still in line with its challenges? What should be different in 2017 because of the JU? What other things could it potentially achieve and what must be changed to enable this?

<p>Efficiency: The extent to which the JU has been operated efficiently, whether there has been good communication of objectives and progress, and the ability to address problems as they arose.</p>	
Q4	Are the overall legal framework and the modalities for implementation of the JU clear, appropriate and effective? What consequences are there, if any, of its status as an EU Body? What issues do IPR rules create for the various types of participant?
Q5	How efficiently are the activities of the JU carried out?
Q6	How effective have the activities of the JU been in achieving the objectives set? How is the coordination, concertation and integration of project activities and results within and across the different application areas organised and achieved towards the expected outcomes of FCH JU?
Q7	How appropriate and effective is the level of supervision/control within the JU in monitoring progress in programme implementation? How exactly is progress monitored? What tools and indicators are used?
Q8A	In the framework of the FCH JU, has the cooperation between industry and public sector been efficient in enhancing trans-national public-private links, and in combining private-sector investment and European public funding?
Q8B	How should the JU address international collaboration possibilities? How effective are its activities in this area presently?
Q9A	How suitable and effective are the activities undertaken to increase the visibility of FCH-JU? - What impact has the FCH-JU had in the technical media and the national media? Has a clear “brand” been established by the JU?
Q9B	How effective is the JU in terms of knowledge dissemination to professional, political, media, and public audiences? How do the Programme Office competences meet the need to do this professionally?
Q10	How adaptable is the JU to changing research needs and policy priorities

	and how are external stakeholders from science, industry and policy involved in identifying these needs and shaping the priorities? How ambitious are the programme targets? How adequate are they to deliver the strategic objectives? What are now the major challenges for the next 5 years?
Q11	What are the ToR for the scientific Committee? What need is there for an advisory committee on strategy and innovation aspects?
Quality: The extent to which the JU supports top-class RTD in the area.	
Q12	How are quality standards set for the project activities, and how are they monitored and assessed? At this stage, what indications exist that the RTD activities supported by the JU are of high quality?
Q13	Does the FCH JU attract the best organisations active in the field? How is the participation pattern in terms of stakeholders (academic, industrial, including SMEs, and research organisation sectors), geographical and gender balance?
Q14	Are the measures described in the Multiannual Implementation Plan and in the Annual Implementation Plans appropriate to ensure innovation?
Q15	What indicators are used to judge if the JU is perceived as flagship for Public-Private partnership-supported RTD in the world? What do they show and what more could be done in this respect? What benchmarking has been done or is planned against comparable initiatives?
Closing points	
Q16	What are the main lessons learnt that can be applied to future JUs?
Q17	What changes if any should be made to the regulatory or organisational structure of this JU to ensure its effectiveness?

Specific Questions for Industry & Research Grouping	
Q18	How satisfactory is the present projects' funding rate? Do you consider the present "infrastructure" set within the JU satisfactory? Where do you see the real added value of the JU? Which aspects should be improved?
Q19	How effective is the interaction with and within the board? Where do you see margins for improvement? Are there particular areas for potential conflict of interest? If so, where?
Q20	What should be the role and scope of the scientific committee? How well do its members' expertise cover all key areas?
Specific Questions for Industry Grouping only	
Q21	How well are industrial priorities (both stationary and mobile) represented in the JU Programme? How completely are the major challenges to commercialisation addressed?
Q22	How much of the development and demonstration need for commercialisation do you expect the JU to meet? How much of this need do you expect to be met from non-EU programmes?
Specific Questions for Research Grouping only	
Q23	To what extent does the JU address the research priorities and needs seen by the research community? How effective and important is the Scientific Committee?
Q24	What impact would it have on FCH research in total if the JU focused solely on development and demonstration?

Annex 4. List of People Interviewed

Interviews with the whole panel of experts

Henri Winand	IG representative in FCH JU Governing Board
Knut Harg	Chairman of Scientific Committee
Paul Lucchese	RG representative in FCH Governing Board
Angelo Moreno	RG Leader of Application Area "Stationary power generation and CHP"
Panayotis Moschopoulos	DG RTD Directorate A (Policy Officer responsible for JTIs till December 30th 2010)
Mirela Atanasiu	Project Manager of Programme Office
Bert de Colvenaer	FCH JU Executive Director
Jörg Wind	IG Leader of Application Area "Transport and Refuelling Infrastructure"
Raffaele Liberali	EC representative on the FCH JU Governing Board
Bernard Frois	Chairman of States Representatives Group
Monika Kentzler	Coordinator of "CHIC" project
Gijs Vriesman	Chairman of FCH JU Governing Board
Dimitrios K. Niakolas	Coordinator of "ROBANODE" project
Davide Damosso	Vice-chairman of HyRaMP

Interviews with individual members of the panel of experts

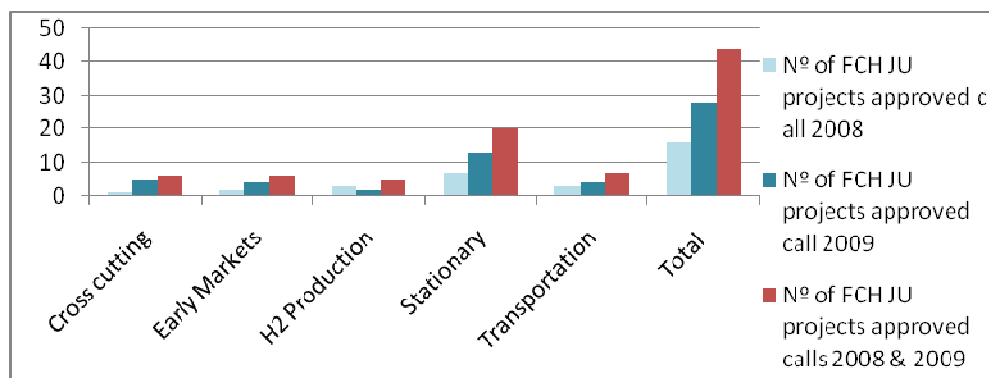
Georg Menzen	German Representative in the SRG, vice Chair
Borja Izquierdo	Spanish Representative in the SRG
Stian Nygaard	Norwegian Representative in the SRG
Aksel Mortensgaard	Danish Representative in the SRG
Frank Denys	The Netherlands Representative in the SRG
Gerald Vones	Austrian Representative in the SRG
Raffaele Vellone	Italian Representative in the SRG

Annex 5. Call Statistics

Overall

In total, there have been three Calls for Proposals published by FCH JU, although the results of the latest, 2010, call are not yet available to be included in this overview. The FCH JU's 1st call for proposals, with indicative Community funding of €28.1M4, was finalized in December 2009 with the conclusion of grant agreements for 16 projects. The 2nd call, with an indicative Community funding of €71.3M, was concluded in December 2010 with 28 grant agreements. More details can be found in the FCH website: <http://www.fch-ju.eu> .

Application Area	Call 2008		Call 2009		Total (call 2008+call 2009)	
	Nº of projects	Grant Allocated	Nº of projects	Grant Allocated	Nº of projects	Grant Allocated
Cross cutting	1	257.075 €	5	2.365.323 €	6	2.622.398 €
Early Markets	2	2.424.775 €	4	12.062.375 €	6	14.487.150 €
H2 Production	3	3.394.684 €	2	3.657.396 €	5	7.052.080 €
Stationary	7	11.696.714 €	13	23.935.916 €	20	35.632.630 €
Transportation	3	9.448.356 €	4	30.505.633 €	7	39.953.989 €
Total	16	27.221.604 €	28	72.526.643 €	44	99.748.247 €



Comments:

- The Transportation & Refueling infrastructure AA had just 7 projects approved (16% of the total) but 40% of the Grant allocated. (in the MAIP, it was expected to have between 32-36% of the funds)
- Stationary applications had 20 projects approved (50% of the total number of projects approved) with 35% of the funds allocated more or less as foreseen in the MAIP(34-37%)
- H2 production projects had only 5 projects approved and a total grant of a little more of 7M€ (around 7% of the total grant). This AA thus had fewer funds than the 10-12% initially

Moreover, it should be noted that the EC contribution allocated to the SMEs exceeds 20% of the total EC contribution, which is greater than the FP7 average.

FCH JU calls	EC contribution for SME	Total of EC contribution	% EC contribution for SME
2008 Call	6.957.260,00	27.221.604,00	25,6%
2009 Call	13.891.008,50	72.526.646,00	19,2%
Total	20.848.268,50	99.748.250,00	20,9%

Call statistics 2008 Overview

The call was published on 8th October 2008, with deadline on 15th January 2009. The total budget of the call was 28.1 Mio. Euro, consisting of 15 Topics based on the 2008 RTD Priorities and covering all five application areas described in the AIP 2008. The call was designed as a single stage process. The commission received in total 32 proposals. All of them were eligible. The distribution of proposals and requested funding between areas was as follows:

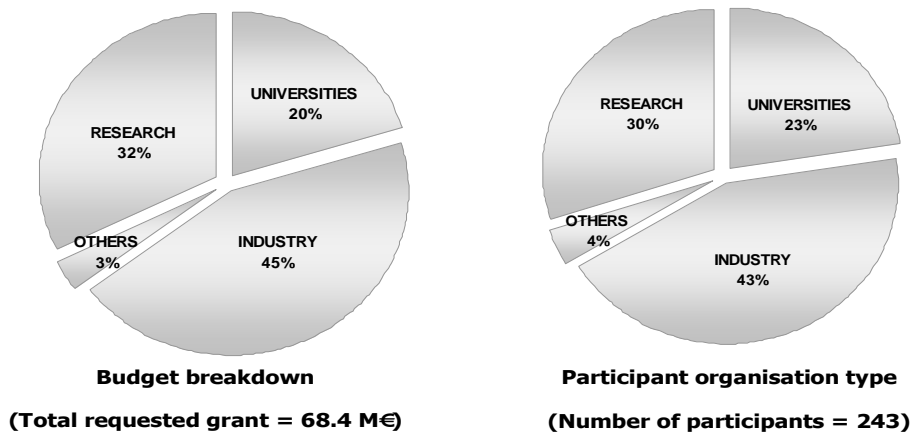
Call 2008						
Application Area	n° of proposals	Requested funds (Million €)	N° of projects funded	%	Grant Allocated (Million €)	% request/grant
Cross cutting	1	0,27	1	100%	0,26	95%
Early Markets	5	9,31	2	40%	2,42	26%
H2 Production	7	13,30	3	43%	3,39	26%
Stationary	15	32,03	7	47%	11,70	37%
Transportation	4	13,54	3	75%	9,45	70%
Total	32	68,45	16	50%	27,22	40%

The total number of partners involved in the proposal was 243, with the above distribution between organization categories. About one third of all partners (78 out of 243) declared themselves in the submission as SME. According to the number of partners per country, Germany contributed most with 45 partners, followed by France (27), Italy (23) Spain (17) and Switzerland (17). Altogether partners from 24 countries were included in at least one of the proposals.

Out of 32 proposals submitted, 18 passed the thresholds at the evaluation stage. A list of 16 projects was subsequently put forward for

the Governing Board to be selected for negotiations. During negotiation phase, two projects chose to withdraw due to changed circumstances of the partners and negotiations were started with the proposals on the reserve list for the application area in question (Stationary Power Generation & Combined Heat & Power). Partners from 19 countries have been funded, with a predominance of German entities.

In relation to the type of participants, it can be seen than in 2008 call more than 40 were industry with a similar correspondence in the budget breakdown.



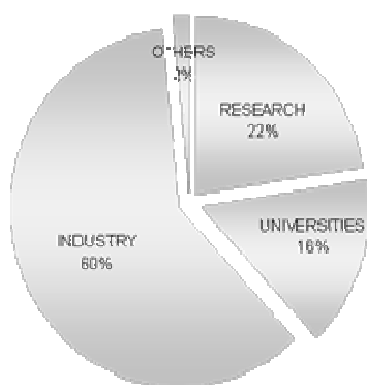
Call statistics 2009 call Overview

The Call for Proposals 2009 was published on 2 July 2009 and the deadline for submissions was 15 October 2009. The Call comprised 29 Topics based on the 2009 RTD Priorities and covering all five application areas described in the AIP 2009. The call was designed as a single stage process.

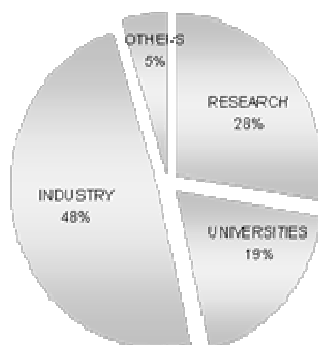
Altogether 50 projects were submitted in the call of which 31 passed the evaluation thresholds (62% success rate). Of those, 28 have been finally funded. Almost half of the proposals fall in the category of “Stationary” (21 out of 50), whereas the oversubscription was highest in the Panel “Hydrogen Production” with requested funding of 237 % related to the budget. For each of the panel at least 7 projects have been submitted.

Call 2009						
Application Area	n° of proposals	Requested funds (Million €)	N° of projects funded	%	Grant Allocated request/g (Million €)	% rant
Cross cutting	8	4,89	5	63%	2,37	48%
Early Markets	7	21,35	4	57%	12,06	56%
H2 Production	7	13,52	2	29%	3,66	27%
Stationary	21	46,51	13	62%	23,94	51%
Transportation	7	43,89	4	57%	30,51	70%
Total	50	130,16	28	56%	72,53	56%

In relation to the type of participants, it can be seen that in 2009 call around 50% were industry and responsible for 60% of the budget.



Budget breakdown
(Total requested grant = 130.1 M€)



Participant organisation type
(Number of participants = 400)

European Commission

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The Fuel Cells and Hydrogen Joint Undertaking (FCH JU) is a public private partnership supporting research, technological development and demonstration (RTD) activities in fuel cells and hydrogen energy technologies in Europe.

The FCH JU was established by Council Regulation (EC) No. 521/2008 of 30 May 2008 on the basis of Article 187 TFEU under the Seventh Framework Programme (FP7) on the European Union.

The objectives of the FCH JU is to significantly accelerate the market introduction of the fuel cells and hydrogen technologies, realising their potential as an instrument in achieving a carbon-clean energy system.

The first evaluation of the Fuel Cells and Hydrogen Joint Undertaking (FCH JU) was carried out by the Commission with the assistance of a group of independent Experts. This evaluation covered the assessment of the quality and efficiency of the FCH JU and progress towards reaching its objectives.

