



Fuel Cells and Hydrogen Joint Undertaking (FCH JU)

ANNUAL IMPLEMENTATION PLAN 2008

Adopted by the FCH JU Governing Board on 6 October 2008

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1. Introduction, background and mission

This document establishes the first Annual Implementation Plan (AIP) of the Fuel Cell and Hydrogen Joint Undertaking (FCH JU), outlining the scope and details of research activities prioritised for the first Call for proposals in 2008, together with supportive actions required. It also describes the objectives of the FCH JU, the policy and global context, assessment criteria, technical targets and rationale for individual activities.

The technology challenge facing fuel cells and hydrogen is of great complexity, requiring substantial investments and a high level of technological expertise. At the same time, its potential contribution to Community policies - in particular energy, environment, transport, sustainable development and economic growth - is very significant.

The European Strategic Energy Technology (SET) Plan has identified fuel cells as a key technology for Europe for achieving a 20% reduction in greenhouse gas emissions; a 20% share of renewable energy sources in the energy mix; and a 20% reduction in primary energy use by 2020 ('20-20-20' target). This is in line with the Commission's Communication, "Energy for a Changing World – An Energy Policy for Europe", the goals of its Lisbon Strategy and the European Council's Conclusion on a European Energy Strategy for Transport, 29 May 2007.

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 document, the formation of a fuel cell and hydrogen technology partnership was recommended in order to accelerate substantially the development and market introduction of fuel cell and hydrogen 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. In March 2005, HFP published a Strategic Research Agenda and Deployment Strategy, followed by an Implementation Plan in January 2007 which combined them into one consistent, long-term road map for Europe.

This process confirmed that a coherent, long-term approach at EU level was essential for achieving critical mass in terms of scale, excellence and potential for innovation. Hence the Commission's proposal for a long-term public-private-partnership in the Seventh Framework Programme (FP7) of the European Community, 2007-2013 in the form of a Joint Technology Initiative (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 Undertaking' on the basis of Article 171 of the EC Treaty.

2. RTD priorities and key objectives for 2008

The aim of the FCH JU is to execute a programme of RTD activities (hereinafter to be understood as **R**esearch, **T**echnological development and **D**emonstration) in Europe in the field of fuel cells and hydrogen that contributes to the implementation of FP7. Carried out with the cooperation and involvement of stakeholders from industry (including small and medium size enterprises), research centres, universities and regions, it will build on the achievements of the European Hydrogen and Fuel Cell Technology Platform.

The FCH JU will pool public and private resources, with activities mainly co-financed by the Commission and the industry partners. The founding members, the European Commission and

European Fuel Cell and Hydrogen Joint Technology Initiative Industry Grouping (hereinafter referred to as the NEW IG), will also share the running cost of the JU, with an additional contribution from the *New European Research Grouping on Fuel Cells and Hydrogen*, N.ERGHY, hereinafter referred to as the RG.

In particular, the FCH JU will:

- Aim at placing Europe at the forefront of fuel cell and hydrogen technologies worldwide and enabling the market breakthrough of fuel cell and hydrogen technologies, thereby allowing commercial market forces to drive the substantial potential public benefits
- Support RTD in the Member States and countries associated with the Seventh Framework Programme in a coordinated manner in order to avoid market failure, focus on developing market applications and facilitate additional industrial efforts towards a rapid development of fuel cell and hydrogen technologies
- Support the implementation of the RTD priorities of the FCH JU, notably by awarding grants following competitive calls for proposals
- Monitor and assess progress in relation to competing technologies to assure sustainability and economic competitiveness
- Aim to encourage increased public and private RTD investment in fuel cells and hydrogen technologies in the Member States and Associated countries.
- Ensure the coordination and efficient management of funds. It will be guided by the principles of transparency and openness, competitiveness and excellence, inclusiveness and close cooperation among stakeholders in order to achieve the best possible benefit for Europe. RTD activities will respect the fundamental and ethical principles applicable to the Seventh Framework Programme.

2.1 Overview of the FCH JU Multi Annual Implementation Plan

The Multi Annual Implementation Plan (MAIP), currently in the last stage of development, will be the result of a joint effort by the major stakeholders - namely the NEW IG, the RG and the European Commission. It will represent a set of high level objectives and a prioritised programme of activities, which will be implemented in 2008-2013 in order to facilitate the rapid deployment of fuel cell and hydrogen technologies, and to achieve the overall objectives of the FCH JU.

These actions have been chosen based on their potential contribution to achieving Europe's policy objectives, i.e. the Commission's '20-20-20' targets; energy security and competitiveness, and also the available budget. In this, they include in a balanced way research, technological development, demonstration and cross-cutting activities, including Regulations, Codes & Standards (RCS).

The MAIP will be implemented by Annual Implementation Plans (AIP) which will contain the list of topics and the detailed topic descriptions for the annual calls for proposals. The topics will be identified and selected based on the prioritized action portfolio of the MAIP while matching the annual budget commitments of the JTI. In the AIP for 2008 particular focus has been placed on actions for which results are required to achieve later steps in the programme, such as long-term research, assessments, studies and interdependent actions.

The MAIP is divided into four major horizontal application areas (AA): Transportation & Refuelling Infrastructure; Hydrogen Production, Storage & Distribution; Stationary Power Generation & CHP; and Early Markets. Cross-cutting activities have also been established as a fifth

area in order to make their relevance more visible. The programme structure reflects the RTD cycle from long-term and breakthrough-oriented basic research to demonstration and support activities. Pre-normative research is also included at project level.

The Joint Research Centre (JRC) has high quality activities in the field of fuel cells and hydrogen of considerable relevance to the implementation of the JTI. Its offer to the JU to contribute with a significant in-kind contribution is welcomed. Discussions are ongoing on a significant in-kind contribution from the JRC to the JU, including the precise scope and practical arrangements needed to achieve the best impact and integration of this contribution. The in-kind contribution will include direct input of the JRC work programme, primarily in the area of pre-normative research and operational level support on project level through the use of JRC capacities as reference laboratory. Furthermore, the discussions will include the needs and the possibilities of support on strategy formulation and implementation.

The main objectives and activities of the different AAs are the following:

2.1.1 Transportation & Refueling Infrastructure

This application area plans real-use, Europe-wide large-scale fleet demonstration of the next-generation fuel cell vehicles, including cars and buses, hydrogen ICE vehicles and an infrastructure with an appropriate number of refuelling stations. The activities in this AA will also provide the experimental data for the verification of the well-to-wheel technology chain needed to meet the programme target of 3,000 vehicles in the field by 2015 and prepare volume production and infrastructure from 2020.

In this context, a support action for developing a world-class European transportation stack industry is proposed in order to overcome the fragmented stack research and development activities within Europe. This will be achieved through close cooperation between research institutions, automotive OEMs and the supply industry, based on a joint technology roadmap.

The synergies between the base technology for onboard auxiliary power generation and stationary power generation will be explored and used for potential technology development of SOFC, MCFC and PEMFC.

This AA also includes RTD activities for off-road (e.g. rail, marine and air) transport applications in order to demonstrate the feasibility of the technology as “proof-of-concept” and to raise its maturity level to application readiness.

2.1.2 Hydrogen Production and Distribution

This application area aims to develop a portfolio of sustainable hydrogen production, storage and distribution processes which can meet 10% - 20% of the hydrogen demand for energy applications from carbon-free or -lean energy sources by 2015. To achieve this, the various sustainable hydrogen production and supply chains must be demonstrated and ready for commercialisation by 2013. Synergies with the AA on "Transportation & Refuelling Infrastructure" will be exploited.

Innovative hydrogen production and supply chains (e.g. low and high temperature electrolysis and direct production of hydrogen from biomass, including technologies such as enzymes for fermentation, or solar energy) will therefore receive around 50% of the budget for this application area. By helping renewable hydrogen production to become cost competitive, the actions will prepare the ground for future large investments.

Storage technologies will be developed in order to complement renewable production pathways and help establish the supply chain for hydrogen. The efficiency of existing hydrogen production processes will also be improved, contributing directly to further energy savings in Europe. Options for distributing hydrogen will also be studied.

2.1.3 Stationary Power Generation & Combined Heat and Power (CHP)

The research objectives of this application area are designed to reflect the main needs of the three principal fuel cell technologies, i.e. MCFC, PEMFC and SOFC. MCFC and PEMFC technologies are generally speaking further advanced than SOFC. Thus a diverse set of actions is required to cover the different RTD needs.

The programme aims to achieve the principal technical and economic requirements needed to compete with existing energy conversion technologies, such as high electrical efficiencies of 45%+ for power units and of 80%+ for CHP units, combined with lower emissions and use of non-hydrocarbon fuels. Focussed efforts are required to address lifetime requirements of 40,000 hours for cell and stack, as well as commercial target costs, depending on the type of application.

Basic research activities will be directed to degradation and lifetime fundamentals, and new materials for the different technologies - particularly focusing on SOFC and, to lesser extent, on PEMFC and MCFC. Applied research activities are directed towards developing components and sub-systems with improved performance, durability and cost for all three technologies in order to achieve system application readiness.

Demonstration activities target technology validation or market capacity build up, depending upon technological maturity. Generally, they will focus initially upon MCFC and PEMFC near-ready units, whilst SOFC technologies are more likely to be ready for validation and demonstration at later dates.

2.1.4 Early Markets

This application area aims to develop a range of fuel cell-based products capable of entering the market in the near term. The sectors addressed are:

- *Stationary*, with emphasis on back-up power
- *Transport*, emphasizing industrial and material handling vehicles, as well as small individual mobility markets (off-road applications)
- *Portable*, with a wide range of possible products, e.g. recreational, educational, medical emergency equipment, industrial power tools, etc.

Strong emphasis is placed on the demonstration and deployment of ready-to-market products for these applications. Existing synergies with other AAs will also be explored.

As the unit cost is quite low, the programme can support a broad variety of actions. The portable sector, in particular, offers opportunities for much greater public awareness due to the broader outreach, compared to stationary installations.

In many cases, early markets represent niche markets that are the business domains of SMEs. Support measures will therefore specifically address existing commercialization risks and regulatory hurdles that specifically impact these companies. This will include the better integration of SMEs in industrial supply chains.

The programme will thus help pave the way for a widespread acceptance of the technology, with fuel cells becoming general consumer items.

Applications supported in this area should demonstrate near term commercial potential.

2.1.5 Cross-cutting Activities

These activities will serve the objectives of the FCH JU in a variety of ways, in particular to ensure that non-technical barriers to the deployment of these technologies are properly addressed. They will include:

1. Technical activities, such as pre-normative research (PNR) on topics which transcend the boundaries of the various applications, e.g. design and test criteria for composite hydrogen storage containers, fuel quality, hydrogen leakage detection. This will ensure that the viewpoints and requirements of all potential users are integrated into PNR work.
2. Programme level activities, such as Socio-Economic Modelling and Planning, Technology Monitoring and Assessment, and Lifecycle Analysis (LCA) will assess the progress of the FCH JU in achieving its objectives. The strategic coordination of Regulations, Codes & Standards (RCS) Activities and Joint Public Awareness Activities will also help develop the market; while Educational Projects will enable wider access to training and educational information. Monitoring and assessment, including economic assessment shall be performed according to established reference frameworks where available (e.g. well to wheel, LCA).
3. Assistance to SMEs “inter alia” for their integration into the supply chains of OEMs and also in the certification processes. Special support for SMEs to acquire expertise in process and production engineering, including fabrication and assembly.

These activities will be complemented by specific tasks related to PNR, LCA and public awareness to be carried out in a co-ordinated manner as part of individual collaborative projects.

2.2 Specific topics for the 2008 Call for proposals

In line with the political and technical objectives outlined above, the following topics have been prioritised for the first call for proposals of the FCH JU:

- For the application area **Transportation and Refuelling Infrastructure**, activities will address initial steps of the large-scale demonstration of vehicles and infrastructure. Most of the effort will be devoted to the demonstration of second-generation fuel cell vehicle fleets with improved durability, robustness, reliability and efficiency. This will be complemented by the development of appropriate framework and criteria for the establishment of a European cluster of regions and municipalities for large scale vehicle demonstration. It is also proposed to perform a feasibility study that allows the future establishment of a competitive European PEMFC stack RTD cluster/consortium to address the challenges of this technology. Development activities will also be kicked off to ensure the full application readiness of on-board 70MPa storage technology as a prerequisite for the large scale demonstrations of cars and buses.

- The application area **Hydrogen Production, Storage and Distribution** will focus on the development and testing of new prototypes of low cost, low temperature, high efficient electrolyzers to enable the increased use of renewable energy, such as wind and photovoltaics. This activity is needed to support the 2015 targets mentioned in point 2.1.2 above. Moreover, research activities will be conducted to demonstrate the technical and economical feasibility of thermo-electrical-chemical decomposition of water as a potential pathway for the renewable production of hydrogen.
- The emphasis of the application area **Stationary Power Generation** will be on long-term basic research to better understand degradation/failure mechanisms and the lifetime requirements of all technologically mature fuel cell stack types (SOFC, MCFC, PEMFC) for different fuels and levels of power. For lifetime predictions, research is necessary to establish methodologies as well as tools for modelling, operational controls and diagnostics. Research should result in novel diagnostic and control tools and improvements of components and systems in terms of functionality, performance and lifetime.
- The activities of the application area **Early Markets** will focus on the demonstration of readiness of portable generators, back-up and UPS power systems in real use in order to prove their technical, environmental and economic viability, and to contribute to the establishment of certification procedures and safety regulations. These applications respond to critical market demands and are therefore suited to achieve early commercialisation success. The development of standardized fuel supply solutions for micro and portable fuel cells will be one of the main prerequisites.
- Initial **cross-cutting activities** will focus on socio-economic planning in order to consolidate the achievements of previous EC-funded projects and the development of appropriate frameworks for Technology monitoring and assessments (TMA) and Life Cycle Assessments (LCA). The results of these activities will play an important role in harmonising the different datasets, accelerating the innovation cycle and establishing a structured approach to measuring impact and progress. These activities are needed to create the required framework for the overall JTI programme.

The table below describes specific topics selected for the first call, together with their rationales. For a detailed description of the topics, see Annex 8.1 of this document. Please, note that when submitting a proposal the topic reference to be used in the submittal forms is the one identified in this Annex.

Calls for Proposals will be selective. There will be competition, based on quality and excellence, between proposals primarily, but not exclusively, within activity areas, which may result in some topics not being supported in a given call.

No.	Topic	Scope	Indicative FCH JU Funding
Area Transportation & Refuelling Infrastructure			€8.9 m
1	Large-scale demonstration of road vehicles and refuelling infrastructure	Demonstration of second-generation hydrogen fuelled vehicles fleets with improved durability, robustness, reliability and efficiency in order to prove application readiness of the technology; demonstrate the feasibility of infrastructure for daily use; demonstration trials are supported by activities on public awareness, environmental and social assessment, and certification requirements.	
2	European cluster for large-scale vehicle demonstration – Feasibility study	Feasibility study on large-scale demonstration of second-generation hydrogen fuelled vehicles fleets, including the development of criteria and framework for the selection of candidate regions.	
3	European fuel cell stack cluster – Feasibility study	Assessment of the potentialities for the formation of a European cluster of Industry, SMEs and research organisations for the establishment of a European transportation stack industry.	
4	70MPa compressed H2 onboard storage	Research and development to enable the application readiness of 70MPa on board H2 storage technology, with improved functional performance and cost reduction.	
Area Hydrogen Production, Storage & Distribution			€2.9 m
5	Development of low temperature, high efficiency electrolyser based on PEM technology	Development activities on low cost, low temperature electrolysers based on PEM technologies, including prototyping and testing; demonstration of the application and production readiness.	
6	Development of low temperature, high efficiency electrolyser based on alkaline technology	Development activities on low cost, low temperature electrolysers based on alkaline technologies, including prototyping and testing; demonstration of the application and production readiness.	
7	Thermo-chemical processes with solar heat sources	RTD activities on thermo-chemical processes coupled with solar including research on high temperature water decomposition processes	
Area Stationary Power Generation & CHP			€12.0 m
8	Operation diagnostics and control for stationary power applications	Development of control and diagnostics tools for operational performance including degradation and lifetime prediction (PEMFC, MCFC, SOFC technologies).	
9	Component and system improvement for stationary power applications	Development activities on component and system in order to meet application- relevant functional and performance criteria (PEMFC, MCFC, SOFC technologies).	
10	Degradation & lifetime fundamentals for stationary power applications	Research on factors impacting the degradation and lifetime of stacks (SOFC, PEMFC, MCFC technologies); exploration of synergies with back up and UPS units.	
Area Early Markets			€2.6 m
11	Demonstration of portable generators, backup and UPS power systems	Demonstration of application readiness with respect to cost-competitiveness, lifetime, logistics, environmental performance of portable generators, back-up and UPS-systems.	

No.	Topic	Scope	Indicative FCH JU Funding
12	Novel approaches for fuel supply technology for portable and micro fuel cell systems	Development of new fuelling systems for portable and micro Fuel Cells, including associated RCS, the requested fuel storage solutions, logistical and distribution requirements.	
Area Cross-cutting Issues			€1.7 m
13	Planning of socio-economic activities	Comprehensive state of the art analysis of socio-economic activities, building and consolidating from previous EC co-financed projects; establishment of a framework for further socio-economic activities.	
14	Development of a framework for Technology Monitoring and Assessments (TMA)	Development of a comprehensive technology monitoring and assessment (TMA) framework to be used by the FCH JU for assessing progress towards achieving both FCH JU objectives and vis-à-vis major external developments.	
15	Development of a framework for Life Cycle Assessment (LCA)	Development of dedicated practice guidance for hydrogen and fuel cell technologies to be integrated with the International Reference Life Cycle Data System (ILCD) Handbook on LCA	
Total indicative FCH JU Funding			€28.1m

3. FCH JU Governance

The FCH JU is composed of two executive bodies: the Governing Board and the Executive Director. In addition there are three advisory bodies, the Scientific Committee, the FCH States Representatives Group and the Stakeholders' General Assembly.

3.1 Governing Board

The Governing Board shall have the overall responsibility for the operations of the FCH JU and shall oversee the implementation of its activities in accordance with Article 5 of the Statutes. The NEW IG has 6 seats, the EC 5 seats and the RG 1 seat respectively.

The Governing Board was established at its first meeting on 14 July 2008. The Governing Board is planning to hold three board meetings during 2008. The key activities are listed below:

Key activities in 2008 - timetable	
Adopt/approve the key documents for starting FCH JU's operations: 2008 Annual Implementation plan, 2008 Annual budget, Financial Rules, Staff Policy Plan, Staff Implementation measures, Reference documents relating to Call for proposals, etc.	Q3-4
Start up the process to define selection criteria and appoint the Scientific Committee members ¹	Q3-4
Adopt the practical arrangements for implementing Regulation (EC) No 1049/2001 regarding transparency and access to EU documents. ²	Q4

¹ FCH JU Statutes Article 8.4

Adopt the practical arrangements for implementing Regulation (EC) No 1073/1999 in relation to the prevention of fraud, corruption and any illegal activity detrimental to the communities' interest.	Q4
Make appropriate provisions for the internal auditing function ³	Q4
Approve to start the selection process leading to the appointment of the Executive Director	Q4

3.2 Executive Director

The Executive Director is the legal representative of the FCH JU, and shall be the chief executive for the day-to-day management in accordance with the decisions of the Governing Board in line with Article 6 of the Statutes. The Executive Director will be supported by the staff of the Programme Office.

The Interim Executive Director appointed by the Commission will fulfil the functions of the Executive Director until such time he/she takes up his/her duties.⁴ He/she will be seconded by a number of Commission officials to ensure that the JU is carrying out its activities efficiently during this period.

3.3 Scientific Committee

The Scientific Committee is an advisory body to the Governing Board. It shall conduct its activities in close liaison and with the support of the Programme Office.

The members shall reflect a balanced representation of world class expertise from academia, industry and regulatory bodies. Collectively, the Scientific Committee members shall have the scientific competencies and expertise covering the complete technical domain needed to make strategic science-based recommendations regarding the FCH JU. It shall have a maximum of 9 members.

According to Article 8 in the FCH JU Statutes the role of the Scientific Committee is to:

- (a) advise on the scientific priorities for the Annual and Multiannual Implementation Plans proposal;
- (b) advise on the scientific achievements described in the Annual activity report;
- (c) advise on the composition of the peer review committees.

The Governing Board shall establish the specific criteria and selection process for the composition of the Scientific Committee and shall appoint its members. The Governing Board shall take into account the potential candidates proposed by the FCH States Representative Group.

3.4 FCH States Representatives Group

The FCH States Representatives Group (SRG) shall consist of one representative of each Member State and of each country associated to the 7th Framework programme.

² FCH JU Council Regulation No 521/2008, Article 14

³ FCH JU Statutes Article 11

⁴ FCH JU Council Regulation No 521/2008, Article 16

According to Article 9 in the Statutes the SRG shall have an advisory role to the JU and shall act as an interface between the JU and the relevant stakeholders within the respective countries. It shall in particular review information and provide opinions on the following issues:

- (a) programme progress in the FCH JU;
- (b) compliance and respect of targets;
- (c) updating of strategic orientation;
- (d) links to Framework Programme Collaborative Research;
- (e) planning and outcome of calls for proposals and tenders;
- (f) involvement of SMEs.

It shall also provide input to the JU on the following:

- (a) status of and interface to JU activities of relevant national research programmes and identification of potential areas of cooperation;
- (b) specific measures taken at national level with regard to dissemination events, dedicated technical workshops and communication activities.

The FCH States Representatives Group may issue, on its own initiative, recommendations to the FCH JU on technical, managerial and financial matters, in particular when these affect national interests. The FCH JU shall inform the FCH States Representatives Group of the follow up it has given to such recommendations.

Key activities in 2008 - timetable	
Receive nominations to the SRG from Member States and Associated Countries	Q3
Start up of the process to convene the SRG, prepare rules of procedures, elect the chair, prepare work programme etc	Q4
The SRG to propose members to the Scientific Committee	Q4

3.5 Stakeholders' General Assembly

The Stakeholders' General Assembly (SGA) shall have an advisory role to the FCH JU. It shall be open to all public and private stakeholders, international interest groups from Member States, Associated countries as well as from third countries.

The Stakeholders' General Assembly shall be informed of the activities of the FCH JU and shall be invited to provide comments.

The Stakeholders' General Assembly is an important communication channel to ensure transparency and openness of the RTD activities with its stakeholders. It shall be convened once a year.

The first Stakeholders' General Assembly will take place in Brussels 13-15 October 2008.

Key activities in 2008 - timetable	
The 1 st SRG meeting will take place 13-15 October 2008.	Q3

4. Calls for Proposals

4.1 Submission and evaluation procedure

Applications to the FCH JU for financial support to the RTD activities are made following competitive calls for proposals. The evaluation, selection and award procedures of the FCH JU are described in the document "FCH JU - Rules for submission of proposals, and the related evaluation, selection and award procedures".

The evaluation shall follow a single stage procedure.

The evaluation criteria (including weights and thresholds) and sub-criteria, together with the eligibility, selection and award criteria, for the different funding schemes are set out in "Evaluation criteria and procedures" in Annex 8.1.1.

Proposals will not be evaluated anonymously.

Ranked lists of proposals will be established for each activity area. At the Panel stage, proposals from different topics with equal overall scores will be prioritised according to the overall FCH JU Annual Implementation Plan coverage.

Proposals for the same topic with equal overall scores will be prioritised according to their scores for the S/T Quality criterion. If they are still tied, they will be prioritised according to their scores for the Impact criterion, and then by their scores for the Implementation criterion.

A reserve list will be constituted if there are a sufficient number of good quality proposals. It will be used if extra budget becomes available.

4.2 Indicative evaluation and contractual timetable

Evaluation of proposals is expected to be carried out in February 2009.

Evaluation results are estimated to be available within 2 months after the closure date.

See Annex 8.1.2 and Annex 8.1.3 for details.

4.3 Consortium agreement

The legal entities wishing to participate in a project shall form a consortium and appoint one of its members to act as its coordinator. In general, the coordinator should come from the NEW IG or from the RG.

4.4 Particular requirements for participation, evaluation and implementation

Participation in projects shall be open to legal entities and international organisations once the minimum conditions have been satisfied.

The minimum conditions to be fulfilled for Collaborative Projects and Coordinating Actions funded by the FCH JU shall be the following:

- (a) At least 3 legal entities must participate, each of which must be established in a Member State or an Associated Country, and no two of which are established in the same Member State or an Associated Country.

(b) All 3 legal entities must be independent of each other as defined in Article 6 of the Rules for Participation of the Seventh Framework Programme⁵;

(c) At least 1 legal entity must be a member of the NEW IG or the RG.

The minimum condition for service and supply contracts, Support Actions, studies and training activities funded by the FCH JU shall be the participation of one legal entity.

Forms of grants and maximum reimbursement rates for projects funded through the FCH JU will be specified in the FCH JU Grant Agreement.

4.5 Forms of grants

The FCH JU financial contribution for grants to the beneficiaries participating in the activities shall be based on the reimbursement of a percentage of eligible direct costs and on the form of a maximum reimbursement or a flat-rate for the reimbursement of indirect costs.

The call for proposals shall specify the forms of grants to be used in the actions concerned.

A grant will be awarded by means of a Grant Agreement between the FCH JU and the project participants.

The Grant Agreement will:

- provide appropriate provisions for the implementation of the RTD activities,
- ensure that appropriate financial arrangements and rules are in place relating to the intellectual property rights policy and,
- govern the relationship between the consortium and the FCH JU.

The project activities shall be financed through a financial contribution from the FCH JU and through in-kind contributions from the legal entities participating in the activities. The industry contribution shall at least match the Community contribution, i.e. the financial (cash) contribution coming from the FCH JU.

Reimbursement of direct costs

FCH JU maximum reimbursement rates of direct costs will be aligned with FP7 upper funding limits, except for the funding scheme "Coordination and Support Actions" (50% for all type of participants) and within Collaborative Projects "Other activities" (RTD funding limits apply).

Reimbursement of direct costs will be based on a maximum percentage of actual eligible direct costs, depending on the type of participant, funding scheme and type of activity, as follows:

⁵ Regulation (EC) No 1906/2006 of the European Parliament and of the Council of 18 December 2006 laying down the rules for the participation of undertakings, research centres and universities in actions under the Seventh Framework Programme and for the dissemination of research results (2007-2013)

Type of organisation	Type of Activity		
	RTD	Demonstration	Other
Industry (other than SME)	CP: max. 50% CSA: max. 50%	CP: max. 50% CSA: max. 50%	CP: 50% CSA: 50%
SME	CP: max. 75% CSA: max. 50%	CP: max. 50% CSA: max. 50%	CP: 75% CSA: 50%
Non-profit public-bodies, universities & higher education establishments, non-profit Research organisations	CP: max. 75% CSA: max. 50%	CP: max. 50% CSA: max. 50%	CP: 75% CSA: 50%

Funding schemes: CP: Collaborative project
CSA: Coordination and support action

Reimbursement of indirect costs

The reimbursement of indirect costs for every beneficiary will be:

1. Either a maximum of 20% of the direct eligible costs, excluding its direct eligible costs for subcontracting and the costs of resources made available by third parties which are not used on the premises of the beneficiaries.
2. Or a flat rate of 20% of the direct eligible costs, excluding its direct eligible costs for subcontracting and the costs of resources made available by third parties which are not used on the premises of the beneficiaries.

Option 1 is mandatory for industrial legal entities, except for those whose accounting system does not allow to distinguishing direct from indirect costs. Under this option, beneficiaries shall declare their actual indirect costs under eligible costs.

FCH JU Financial contribution

The FCH JU contribution shall be determined by applying the upper funding limits for the reimbursement of direct eligible costs and the maximum reimbursement rate or flat rate for indirect costs.

If decreases in funding rates are needed to comply with the matching principles referred in Art. 12 (3) of the FCH JU Statutes (the industry contribution shall at least match the Community's

contribution) these shall be fair and balanced proportionally. Therefore, the percentage to be reduced shall be the same for all participants, all funding schemes, and all type of activities.

Eventual decreases will be estimated per call for proposals, after evaluation, during negotiations and before signing the Grant Agreement. This reduction will depend on the weight of the industry indirect costs and on the composition of the consortia (categories of participants) applying for FCH JU funding. Industry matching volume will only be known once all the proposals in the ranked list for a call have been negotiated.

These provisions are further developed in the FCH JU Grant Agreement

5. Support activities

5.1 Preparatory actions

The Commission will be responsible for the establishment and initial operation of the FCH JU until it has the operational capacity to be autonomous. The Commission will carry out, in accordance with Community law, all necessary actions in collaboration with the other members of the JU and with the involvement of the competent bodies.

For that purpose, until such time as the Executive Director takes up his/her duties the Commission will assign a limited number of its officials, including one to fulfil the functions of the Interim Executive Director.

The Interim Executive Director may authorise all payments covered by the credits provided in the budget of the FCH JU, once approved by the Governing Board, and may conclude contracts, including staff contracts, following the adoption of the FCH JU establishment plan. The Commission authorising officer may authorise all payments covered by the credits provided in the general budget of the FCH JU.

FCH JU's operations in 2008 will be focused on launching the procedure for recruiting the staff, publishing the first call for proposals, drafting the reference documents, establishing the FCH JU bodies, preparing the accounting system as well as the necessary IT tools.

In addition, the FCH JU's operations will also cover the preparation of the necessary steps to become a fully operational Joint Undertaking. This would imply that the FCH JU Financial Rules are adopted, that the Executive Director, Accounting Officer and core staffs are recruited, those cores Service Level Agreements are signed, and that the FCH JU's bank account is opened.

5.2 IT support

For the first call for proposals, the Commission FP7 IT systems will be used for the publication of the call, as well as for the submission, evaluation and negotiation of proposals.

6. Indicators

6.1 Annual activity report

The Annual activity report will present the progress made by the FCH JU in each calendar year, in particular in relation to the Annual Implementation Plan for that year.

It will include information on the performed RTD activities; the costs and the contribution of the FCH JU for any individual project; the participation of SMEs; and any other activities during the previous year, with the corresponding expenditure.

The first Annual activity report, together with the annual accounts and balance sheets, will be presented in 2009 to the Governing Board by the Executive Director. Once approved by the Governing Board, it will be made public.

6.2 Management control and internal control procedures

The FCH JU and its bodies shall avoid any conflict of interest in the implementation of the activities.

The FCH JU has adopted specific financial rules which may depart from the Community Financial Regulation, in cases where the specific operating needs of the FCH JU so require.

The FCH JU shall establish its own internal audit capability, which shall make appropriate provisions, taking into account the size and the scope of the FCH JU.

The FCH JU shall protect the financial interests of the members and implement anti-fraud measures. In particular, the FCH JU shall ensure that the financial interests of its members are adequately protected by carrying out or commissioning appropriate internal and external controls.

In case of irregularities committed by the FCH JU or its staff, the members of the FCH JU shall reserve the right to recover any amount unduly spent, including by a reduction or suspension of subsequent contributions to the FCH JU.

For the purposes of combating fraud, corruption and other illegal acts, Regulation (EC) No 1073/1999 shall apply.

The FCH JU shall also carry out on-the-spot checks and financial audits among the recipients of the FCH JU's funding.

The Commission and/or the Court of Auditors may, as necessary, also carry out on-the-spot checks among the recipients of the FCH JU's funding and the agents responsible for its allocation. To that end, the FCH JU shall ensure that grant agreements and contracts provide for the right of the Commission and/or the Court of Auditors to carry out, on behalf of the FCH JU, the appropriate controls and, in the event of the detection of irregularities, to impose dissuasive and proportionate penalties.

7. Communication activities for 2008

The objectives of the communication activities are:

- a) to ensure that FCH JTI is perceived as a key European strategic initiative for focused, coordinated and competitive research activities in the fields of fuel cells and hydrogen;
- b) to raise public awareness about the FCH JU activities and their importance.

Activities in 2008 will therefore focus on communicating the objectives of the FCH JU and establishing some of the communication tools required. To this end, a communication strategy, including a long-term communication plan for the FCH JU, will be developed to ensure proper messaging and outreach to both stakeholders and the public.

A communication group will be established to manage the FCH JU communication activities.

Communication activities will:

- provide timely, reliable, coherent and consistent messaging;
- ensure all stakeholders have equal access to information;
- be guided by transparency and openness.

Proposed communication materials and tools include a website, press material, brochures, videos and standard presentation materials. As a key communication tool, the website should be established as soon as possible.

Meeting/Activity	Documents/Material
Develop the FCH JU website	Website
GA - Stakeholder event Oct 14-15, 2008	Conference and thematic exhibition, liaison with IPHE meeting
Establish the communication group	Nomination

8. Annexes

8.1 Calls for proposals

8.1.1 Evaluation criteria and procedures

1. General

According to Article 16 of the FCH JU Regulation the Commission shall be responsible for the establishment and initial operation of the FCH JU. Therefore, the first Call for proposals will be managed by Commission officials and the infrastructure to be used for submission of proposals will be the one of the Commission.

The evaluation of proposals is carried out by the FCH JU with the assistance of independent experts. For FCH JU 2008 Call it will be used the database of experts established by the Commission and containing the details of suitable candidates.

FCH JU staff ensures that the process is fair, and in line with the principles contained in the FCH JU rules⁶.

Experts perform evaluations on a personal basis, not as representatives of their employer, their country or any other entity. They are expected to be independent, impartial and objective, and to behave throughout in a professional manner. They sign an appointment letter, including a declaration of confidentiality and absence of conflict of interest before beginning their work. Confidentiality rules must be adhered to at all times, before, during and after the evaluation.

In addition, an independent expert might be appointed by the FCH JU to observe the evaluation process from the point of view of its working and execution. The role of the observer is to give independent advice to the FCH JU on the conduct and fairness of the evaluation sessions, on the way in which the experts apply the evaluation criteria, and on ways in which the procedures could be improved. The observer will not express views on the proposals under examination or the experts' opinions on the proposals.

2. Before the evaluation

On receipt by the FCH JU, proposals are registered and acknowledged and their contents entered into a database to support the evaluation process. **Eligibility criteria** for each proposal are also checked by FCH JU staff before the evaluation begins. Proposals which do not fulfil these criteria will not be included in the evaluation.

For this call a proposal will only be considered eligible if it meets all of the following conditions:

- It is received by the FCH JU **before the deadline**
- It involves at least the **minimum number of participants**
 - (a) at least three legal entities must participate, each of which must be established in a Member State or Associated country, and no two of which may be established in the same Member State or Associated country;

⁶ FCH JU Rules for submission of proposals, and the related evaluation, selection and award procedures (posted on CORDIS)

- (b) all three legal entities must be independent of each other as defined in Article 6 of the Rules of Participation of the Seventh Framework Programme;
- (c) at least one legal entity must be a member of the Industry Grouping or the Research Grouping.
- It is **complete** (i.e. both the requested administrative forms and the proposal description are present)
- The **content of the proposal relates to the topic(s) and funding scheme(s)**, including any special conditions set out in the relevant parts of the Annual Implementation Plan

The FCH JU establishes a **list of experts capable of evaluating the proposals** that have been received. The list is drawn up to ensure:

- A high level of expertise;
- An appropriate range of competencies.

Provided that the above conditions can be satisfied, other factors are also taken into consideration:

- An appropriate balance between academic and industrial expertise, (including evaluation of commercial potential) and users;
- A reasonable gender balance;
- A reasonable distribution of geographical origins;
- Regular rotation of experts.

In constituting the lists of experts, the FCH JU also takes account of their abilities to appreciate the industrial and/or societal dimension of the proposed work. Experts must also have the appropriate language skills required for the proposals to be evaluated.

FCH JU staff allocates proposals to individual experts, taking account of the fields of expertise of the experts, and avoiding conflicts of interest.

3. Evaluation of proposals

At the beginning of the evaluation, experts will be briefed by FCH JU staff, covering the evaluation procedure, the experts' responsibilities, the issues involved in the particular area/objective, and other relevant material (including the integration of the international cooperation dimension).

Each proposal will first be assessed independently by at least 3 experts.

The proposal will be evaluated against pre-determined evaluation criteria and sub criteria.

***Evaluation criteria applicable to
Collaborative project proposals***

S/T QUALITY “Scientific and/or technological excellence (relevant to the topics addressed by the call)”	IMPLEMENTATION “Quality and efficiency of the implementation and the management”	IMPACT “Potential impact through the development, dissemination and use of project results”
<ul style="list-style-type: none"> • Soundness of concept, and quality of objectives • Progress beyond the state-of-the-art • Quality and effectiveness of the S/T methodology and associated work plan 	<ul style="list-style-type: none"> • Appropriateness of the management structure and procedures • Quality and relevant experience of the individual participants • Quality of the consortium as a whole (including complementarity, balance) • Appropriateness of the allocation and justification of the resources to be committed (budget, staff, equipment) 	<ul style="list-style-type: none"> • Contribution, at the European [and/or international] level, to the expected impacts listed in the work programme under the relevant topic/activity • Appropriateness of measures for the dissemination and/or exploitation of project results, and management of intellectual property.

***Evaluation criteria applicable to
Coordination and support actions (Coordinating)***

S/T QUALITY “Scientific and/or technological excellence (relevant to the topics addressed by the call)”	IMPLEMENTATION “Quality and efficiency of the implementation and the management”	IMPACT “Potential impact through the development, dissemination and use of project results”
<ul style="list-style-type: none"> • Soundness of concept, and quality of objectives • Contribution to the co-ordination of high quality research • Quality and effectiveness of the co-ordination mechanisms, and associated work plan 	<ul style="list-style-type: none"> • Appropriateness of the management structure and procedures • Quality and relevant experience of the individual participants • Quality of the consortium as a whole (including complementarity, balance) • Appropriateness of the allocation and justification of the resources to be committed (budget, staff, equipment) 	<ul style="list-style-type: none"> • Contribution, at the European [and/or international] level, to the expected impacts listed in the work programme under the relevant topic/activity • Appropriateness of measures for spreading excellence, exploiting results, and disseminating knowledge, through engagement with stakeholders, and the public at large.

***Evaluation criteria applicable to
Coordination and support actions (Supporting)***

S/T QUALITY	IMPLEMENTATION	IMPACT
“Scientific and/or technological excellence (relevant to the topics addressed by the call)”	“Quality and efficiency of the implementation and the management”	“Potential impact through the development, dissemination and use of project results”
<ul style="list-style-type: none"> • Soundness of concept, and quality of objectives • Quality and effectiveness of the support action mechanisms, and associated work plan 	<ul style="list-style-type: none"> • Appropriateness of the management structure and procedures • Quality and relevant experience of the individual participants • Quality of the consortium as a whole (including complementarity, balance) [only if relevant] • Appropriateness of the allocation and justification of the resources to be committed (budget, staff, equipment) 	<ul style="list-style-type: none"> • Contribution, at the European [and/or international] level, to the expected impacts listed in the work programme under the relevant topic/activity • Appropriateness of measures for spreading excellence, exploiting results, and disseminating knowledge, through engagement with stakeholders, and the public at large.

Evaluation scores will be awarded for each of the three criteria, and not for the sub-criteria. The sub-criteria are issues, which the expert should consider in the assessment of that criterion. They also act as reminders of issues to rise later during the discussions of the proposal.

The relevance of a proposal will be considered in relation to the topic(s) of the *Annual Implementation Plan* open in the call, and to the objectives of the call. These aspects will be integrated in the application of the criterion "S/T Quality", and the first sub-criterion under "Impact" respectively. When a proposal is partially relevant because it only marginally addresses the topic(s) of the call, or if only part of the proposal addresses the topic(s), this condition will be reflected in the scoring of the first criterion. Proposals that are clearly not relevant to a call ("out of scope") will be rejected on eligibility grounds.

Each criterion will be scored out of 5. Half marks can be given.

The **scores** indicate the following with respect to the criterion under examination:

0 -	<i>The proposal fails to address the criterion under examination or cannot be judged due to missing or incomplete information</i>
1 -	Poor. <i>The criterion is addressed in an inadequate manner, or there are serious inherent weaknesses.</i>
2 -	Fair. <i>While the proposal broadly addresses the criterion, there are significant weaknesses</i>
3 -	Good. <i>The proposal addresses the criterion well, although improvements would be necessary</i>
4 -	Very Good. <i>The proposal addresses the criterion very well, although certain improvements are still possible</i>
5 -	Excellent. <i>The proposal successfully addresses all relevant aspects of the criterion in question. Any shortcomings are minor</i>

No weightings will be applied to the scores for the different criteria.

Thresholds will be applied to the scores. The threshold for individual criteria will be 3. The overall threshold, applying to the sum of the three individual scores, will be 10.

Examples of the evaluation forms and reports that will be used by the experts in this call will be made available on CORDIS.

Conflicts of interest: Under the terms of the appointment letter, experts must declare beforehand any known conflicts of interest, and must immediately inform a staff member from the FCH JU if one becomes apparent during the course of the evaluation. The FCH JU will take whatever action is necessary to remove any conflict.

Confidentiality: The appointment letter also requires experts to maintain strict confidentiality with respect to the whole evaluation process. They must follow any instruction given by the FCH JU to ensure this. Under no circumstance may an expert attempt to contact an applicant on his own account, either during the evaluation or afterwards.

4. Individual evaluation

This part of the evaluation will be carried out on the premises of the experts concerned ("remotely").

At this first step the experts are acting individually; they do not discuss the proposal with each other, nor with any third party. The experts record their individual opinions in an Individual Evaluation Report (IER), giving scores and also comments against the evaluation criteria.

When scoring proposals, experts must *only* apply the above evaluation criteria.

Experts will assess and mark the proposal exactly as it is described and presented. They do not make any assumptions or interpretations about the project in addition to what is in the proposal.

Concise but explicit justifications will be given for each score. Recommendations for improvements to be discussed as part of a possible negotiation phase will be given, if needed.

The experts will also indicate whether, in their view, the proposal deals with sensitive ethical issues, or if it requires further scrutiny with regard to security considerations.

Signature of the IER also entails a declaration that the expert has no conflict of interest in evaluating the particular proposal.

Scope of the call: It is possible that a proposal is found to be completely out of scope of the call during the course of the individual evaluation, and therefore not relevant. If an expert suspects that this may be the case, a staff member from the FCH JU will be informed immediately, and the views of the other experts will be sought.

If the consensus view is that the main part of the proposal is not relevant to the topics of the call, the proposal will be withdrawn from the evaluation, and the proposal will be deemed ineligible.

5. Consensus meeting

Once all the experts to whom a proposal has been assigned have completed their IER, the evaluation progresses to a consensus assessment, representing their common views.

This entails a consensus meeting (might be in the form of an electronic forum) to discuss the scores awarded and to prepare comments.

The consensus discussion is moderated by a representative of the FCH JU. The role of the moderator is to seek to arrive at a consensus between the individual views of experts without any prejudice for or against particular proposals or the organisations involved, and to ensure a confidential, fair and equitable evaluation of each proposal according to the required evaluation criteria.

The moderator for the group may designate an expert to be responsible for drafting the consensus report ("rapporteur"). The experts attempt to agree on a consensus score for each of the criteria that have been evaluated and suitable comments to justify the scores. Comments should be suitable for feedback to the proposal coordinator. Scores and comments are set out in a consensus report. They also come to a common view on the questions of scope, ethics and/or security, if applicable.

In case hearings will be conducted, the consensus group will also suggest questions to be asked during the hearing. (See below)

If during the consensus discussion it is found to be impossible to bring all the experts to a common point of view on any particular aspect of the proposal, the FCH JU may ask up to three additional experts to examine the proposal.

Ethical issues: If one or more experts have noted that there are ethical issues touched on by the proposal, the relevant box on the consensus report (CR) will be ticked and an Ethical Issues Report (EIR) completed, stating the nature of the ethical issues. Exceptionally for this issue, no consensus is required.

Outcome of consensus

The outcome of the consensus step is the consensus report. This will be signed/approved (either on paper, or electronically) by all experts, or as a minimum, by the "rapporteur" and the moderator. The moderator is responsible for ensuring that the consensus report reflects the consensus reached, expressed in scores and comments. In the case that it is impossible to reach a consensus, the report sets out the majority view of the experts but also records any dissenting views.

The FCH JU will take the necessary steps to assure the quality of the consensus reports, with particular attention given to clarity, consistency, and appropriate level of detail. If important changes are necessary, the reports will be referred back to the experts concerned.

The signing of the consensus report completes the consensus step.

Evaluation of a resubmitted proposal

In the case of proposals that have been submitted previously to the Commission or the FCH JU, the moderator will inform the experts and, if possible, gives them the previous evaluation summary report (see below) at the consensus stage, if the previous evaluation took place under comparable conditions (e.g. broadly similar work programme topics and criteria). If necessary, the experts will be required to provide a clear justification for their scores and comments should these differ markedly from those awarded to the earlier proposal.

6. Panel review

This is the final step involving the independent experts. It allows them to formulate their recommendations to the FCH JU having had an overview of the results of the consensus step.

The main task of the panel is to examine and compare the consensus reports in a given area, to check on the consistency of the marks applied during the consensus discussions and, where necessary, propose a new set of scores.

The panel comprises experts involved at the consensus step. One panel will cover the whole call.

The tasks of the panel will also include:

- hearings with the applicants of those proposals that have passed thresholds (see below)
- reviewing cases where a minority view was recorded in the consensus report
- recommending a priority order for proposals with the same consensus score
- making recommendations on possible clustering or combination of proposals.

The panel is chaired by the FCH JU or by an expert appointed by the FCH JU. The FCH JU will ensure fair and equal treatment of the proposals in the panel discussions. A panel rapporteur will be appointed to draft the panel's advice.

Option for hearings

Hearings with applicants may be organised as part of the panel deliberations.

Invitations will be sent to the co-ordinators of all those proposals having consensus scores above the individual and overall thresholds.

Hearings provide input to clarify further the proposals and to help the panel to establish their final rating and scores for the proposals. To this end, applicants will be invited to provide explanations and clarifications to questions submitted to them in advance. They will not be required to present their proposal.

Any particular issues raised by individual proposals requiring specific expertise may be dealt with by inviting appropriate extra experts to the hearings for those proposals. In this case, the extra experts are only invited to comment on the particular issue on which they have expertise and not on the proposal as a whole.

If a consortium submitting a proposal does not attend the hearing, but replies in written form to the questions, which were sent, their written responses will be taken into account. If a consortium both fails to reply to the questions and also to attend the hearing, the panel will arrive at a final score and comments for the proposal on the basis of the originally submitted material only.

The detailed arrangements for the hearings will be given in a letter to the coordinators concerned.

The outcome of the panel meeting is a report recording, principally:

- An evaluation summary report (ESR) for each proposal, including, where relevant, a report of any ethical issues raised and any security considerations
- A list of proposals passing all thresholds, along with a final score for each proposal passing the thresholds and the panel recommendations for priority order

- A list of evaluated proposals having failed one or more thresholds
- A list of any proposals having been found ineligible during the evaluation by experts
- A summary of any deliberations of the panel
- A record of the hearings, if any hearing was organised.

Since the same panel has considered proposals submitted to various parts of a call (for example different funding schemes, or different topics that have been allocated distinct indicative budgets in the Annual Implementation Plan), the report may contain multiple lists accordingly.

The panel report is signed by at least three panel experts, including the panel rapporteur and the chairperson. If necessary, a further special ethical review of above-threshold proposals might be organised by the FCH JU.

8.1.2 Timetable and specific information for the call

This Annual Implementation Plan provides the essential information for submitting a proposal to this call. It describes the content of the topics to be addressed, and details on how it will be implemented. The part giving the basic data on implementation (deadline, budget, additional conditions etc) is presented in the Call fiche as an annex to the Annual Implementation Plan.

- **Indicative timetable for this call**

Publication of call	<i>8th October 2008</i>
Deadline for submission of proposals	<i>15th January 2009 at 17:00:00 (Brussels local time)</i>
Evaluation of proposals	<i>February 2009</i>
If applicable, Hearings	<i>February 2009</i>
Evaluation Summary Reports sent to proposal coordinators ("initial information letter")	<i>March/April 2009</i>
Invitation letter to successful coordinators to launch grant agreement negotiations with the FCH JU	<i>April/May 2009</i>
Letter to unsuccessful applicants	<i>From May 2009</i>
Signature of first FCH JU grant agreements	<i>From September 2009</i>

- **Further information and help**

The CORDIS call page contains links to other sources that you may find useful in preparing and submitting your proposal. Direct links are also given where applicable.

- **Call information**

CORDIS call page and Annual Implementation Plan:

<http://cordis.europa.eu/fp7/dc/index.cfm>

- **Specialised and technical assistance:**

CORDIS help desk http://cordis.europa.eu/guidance/helpdesk/home_en.html

EPSS Help desk support@epss-fp7.org

IPR help desk <http://www.ipr-helpdesk.org>

FP7 reference documents are available at the CORDIS website:

http://cordis.europa.eu/fp7/find-doc_en.html

8.1.3 Call fiche

Call title: FCH JU Call for Proposals 2008 Part 1

Call identifier: FCH-JU-2008-1

Date of publication: 8th October 2008

Deadline: 15th January 2009 at 17:00:00 (Brussels local time)

Indicative budget⁷: EUR 28.1 million from the FCH JU 2008 budget.

The final budget awarded to this call, following the evaluation of projects, may vary by up to 10% of the total value of the call.

All budgetary figures given in this call are indicative. The repartition of the sub-budgets awarded within this call, following the evaluation of proposals, may vary by up to 10% of the total value of the call.

Topics called:

Area/ Topics called	Funding Schemes	Indicative FCH JU Funding Mill. €
Area SP1-JTI-FCH.1: Transportation & Refuelling Infrastructure		8.9
SP1-JTI-FCH.1.1 Demonstration of hydrogen fuelled road vehicles and refuelling infrastructure	Collaborative Project	
SP1-JTI-FCH.1.2 Preparation for large-scale vehicle demonstrations in Europe	Coordination and Support Actions (Supporting Action)	
SP1-JTI-FCH.1.3 European fuel cell stack cluster	Coordination and Support Actions (Supporting Action)	
SP1-JTI-FCH.1.4 Compressed hydrogen onboard storage	Collaborative Project	
Area SP1-JTI-FCH.2: Hydrogen Production & Distribution		2.9
SP1-JTI-FCH.2.1 Efficient PEM electrolyzers	Collaborative Project	
SP1-JTI-FCH.2.2 Efficient alkaline electrolyzers	Collaborative Project	
SP1-JTI-FCH.2.3 Water decomposition with solar heat sources	Collaborative Project	
Area SP1-JTI-FCH.3: Stationary Power Generation & CHP		12.0
SP1-JTI-FCH.3.1 Operation diagnostics and control for stationary applications	Collaborative Project	
SP1-JTI-FCH.3.2 Component and system improvement for stationary applications	Collaborative Project	

⁷ A reserve list will be constituted if there is a sufficient number of a good quality proposal.

Area/ Topics called	Funding Schemes	Indicative FCH JU Funding Mill. €
SP1-JTI-FCH.3.3 Degradation and lifetime fundamentals	Collaborative Project	
Area SP1-JTI-FCH.4: Early Markets		2.6
SP1-JTI-FCH.4.1 Portable generators, backup and UPS power systems	Collaborative Project	
SP1-JTI-FCH.4.2 Fuel supply technology for portable and micro Fuel Cells	Collaborative Project	
Area SP1-JTI-FCH.5: Cross-cutting Issues		1.7
SP1-JTI-FCH.5.1 Planning of socio-economic activities	Coordination and Support Actions (Supporting Action)	
SP1-JTI-FCH.5.2 Technology monitoring and assessment (TMA)	Coordination and Support Actions (Supporting Action)	
SP1-JTI-FCH.5.3 Life Cycle Assessment (LCA)	Coordination and Support Actions (Supporting Action)	
Total indicative FCH JU Funding		28.1

Calls for Proposals will be selective. There will be competition, based on quality and excellence, between proposals primarily, but not exclusively, within activity areas, which may result in some topics not being supported in a given call.

Submission and Evaluation procedure:

Applications to the FCH JU for financial support to participate in research activities are made following competitive calls for proposals. The evaluation, selection and award procedures of the FCH JU are described in the document "FCH JU - Rules for submission of proposals, and the related evaluation, selection and award procedures".

- The evaluation shall follow a single stage procedure.
- The evaluation criteria (including weights and thresholds) and sub-criteria, together with the eligibility, selection and award criteria, for the different funding schemes are set out in Annex 8.1.1 to this work programme.
- Proposals will not be evaluated anonymously.
- Ranked lists of proposals will be established for each area. At the Panel stage, proposals from different topics with equal overall scores will be prioritised according to the overall FCH JU Annual Implementation Plan coverage. Proposals from the same topic with equal overall scores will be prioritised according to their scores for the S/T Quality criterion. If they are still tied, they will be prioritised according to their scores for the Impact criterion, and then by their scores for the Implementation criterion. A reserve list will be constituted if there are a sufficient number of good quality proposals. It will be used if extra budget becomes available.

Indicative evaluation and contractual timetable:

Evaluation of proposals is expected to be carried out in February 2009.

Evaluation results are estimated to be available within 2 months after the closure date. A reserve list of projects might be established.

It is expected that the Grant Agreement negotiations for the short-listed proposals to be open by April/May 2009.

Consortium agreements:

Participants in the projects are required to conclude a consortium agreement.

Particular requirements for participation, evaluation and implementation:

Participation in projects shall be open to legal entities and international organisations once the minimum conditions have been satisfied.

The **minimum conditions** to be fulfilled for projects funded by the FCH Joint Undertaking shall be the following:

(a) at least three legal entities must participate, each of which must be established in a Member State or Associated country, and no two of which may be established in the same Member State or Associated country;

(b) all three legal entities must be independent of each other as defined in Article 6 of the Rules of Participation of the Seventh Framework Programme;

(c) at least one legal entity must be a member of the Industry Grouping or the Research Grouping.

The legal entities wishing to participate in a project shall form a consortium and appoint one of their members to act as its coordinator.

In general, the coordinator should come from the Industry Grouping or from the Research Grouping if such Research Grouping becomes a member of the FCH JU.

The **minimum condition** for service and supply contracts, **Support Actions**, studies and training activities funded by the FCH Joint Undertaking shall be the participation of one legal entity.

The proposals will be evaluated on the basis of the following three criteria: **1. S/T Quality; 2. Implementation; 3. Impact**. For each criterion marks from 0 to 5 will be given, with the possibility of half-point scores. Successful proposals must pass the minimum thresholds as follows:

	Minimum threshold
S/T Quality	3/5
Implementation	3/5
Impact	3/5
Overall threshold required	10/15

FCH-JU Grant Agreements will be jointly funded through:

- A financial contribution from the EC up to a maximum of EUR 28.1 million.
- In-kind contributions from the legal entities participating in the activities. The industry contribution shall at least match the financial contribution of the Community.

Forms of grant and reimbursement conditions for projects funded through the FCH JU are indicated in the point 4.5 of the 2008 AIP, and explained in the Guide for Applicants.

8.1.4 2008 Call for proposals - topic descriptions

Below is the list and description of topics open for submission of proposals for each Application Area in this Call. Reference to the selected ones has to be made in the submission forms.

APPLICATION AREA SP1-JTI-FCH.1: TRANSPORTATION & REFUELLING INFRASTRUCTURE

Topic SP1-JTI-FCH.1.1: Demonstration of hydrogen fuelled road vehicles and refuelling infrastructure

Rationale

In order to kick-start the mass production of competitive hydrogen vehicles in the 2015 – 2020 timeframe, it is essential to facilitate deployment through large-scale demonstration projects comprising vehicles and appropriate hydrogen refuelling infrastructure.

Overall project objectives/Scope of work

The objective of this action is to set up and implement a demonstration programme of hydrogen fuelled vehicles and the related infrastructure, to take place in 1 European region/ municipality. In addition to the onsite demonstration, at least two more vehicles shall be deployed on demonstration tours across Europe to provide as much as possible direct experience to a broad public audience, thereby increasing public awareness.

The candidate region needs to demonstrate experience and a strong commitment towards clean urban propulsion and ensure a high visibility of the demo project. Therefore, the candidate region/municipality shall provide an already operating hydrogen refilling infrastructure with a capacity for at least 10 passenger vehicles from the start of the project that should be funded by national, regional or private sources.

At least five vehicles shall be provided and be operational for onsite demonstration by 2010 accompanied by at least one additional fully integrated filling station capable of serving 100 vehicles (together with the existing station). In addition, at least two more vehicles shall be made available and operated at different European sites. For this purpose, a logistics concept for hydrogen refuelling must also be provided.

The demonstration programme needs to address documentation on approval and certification of vehicles and infrastructure; dissemination of lessons learned and best practices for next demo sites. A public awareness campaign and networking with potential candidate regions/ sites must also be included. The demonstration programme needs to further address: measurement, evaluation and monitoring of specific vehicle parameters such as fuel consumption, efficiency (NEDC), power, torque and degradation rate, hydrogen purity and refuelling time. Proper handling and monitoring of safety issues in the context of prevailing regulations on site must be provided.

Expected outcome

Development, delivery and operation of vehicles and infrastructure, including their comprehensive performance monitoring, proposed practices for next demo sites.

The new refilling station shall qualify for the following performance targets:

- Refuelling capacity up to 200 kg H₂/day for a typical number of 50 vehicles/day, allowing to refill 5 vehicles within one hour.

- Proof of technical concept to reach a filling capacity of 400 kg/day and 100 vehicles as technical requirement for future calls
- Refuelling station availability 98%
- Hydrogen cost at station <€10/kg (*excluding tax*) at start of project with an ultimate target of €5/kg (*excluding tax*) based on sufficient numbers of vehicles to achieve the requested economies of scale
- Hydrogen purity according to Specification SAE J2719 for 70 MPa Compressed Hydrogen Vehicles and/or ISO14687 (TC197 WG 12) and refilling time according to SAE J2601, draft September 2008 as guidance Station energy efficiency 50 – 70%
- An assessment and validation framework shall be used, based on well validated procedures, such as those developed in the *HyLights* project

Technical targets for the vehicles are:

- >2000h lifetime initially, min 3000h lifetime as programme target
- MTBF >1000 km
- Availability >95%
- Efficiency >40% (NEDC)

Other information

The consortium should include automotive OEMs, integrated infrastructure equipment providers and fuel suppliers, local and regional bodies as appropriate.

Expected duration: Up to 3 years

Funding scheme: Collaborative Project

Topic SP1-JTI-FCH.1.2: Preparation for large-scale vehicle demonstrations in Europe

Rationale

A key element for vehicle and infrastructure deployment at EU scale is the formation of clusters of EU regions/ municipalities. At a later stage, these clusters can be interconnected via hydrogen corridors to start a widespread hydrogen infrastructure.

Overall project objectives/Scope of work

The project shall execute a feasibility study on large-scale demonstration of second-generation fuel cell vehicles fleets with improved durability, robustness, reliability and efficiency, and the related daily usage of infrastructure; the study must also assess the environmental and social impact of introducing fuel cell vehicle fleets and the potentialities to establish a framework for additional demo sites across Europe. The study needs to address development of criteria and framework for the selection of candidate regions.

Expected outcome

Assessment of the related social, environmental and regulatory requirements, development of criteria for the potential formation of cluster regions/ municipalities at EU scale.

Other information

The project needs to liaise with completed and on-going EU vehicle demonstration projects and be executed by knowledgeable organisations with previous experience in the subject.

Expected duration: 1 year

Funding scheme: Coordination and Support Actions (Supporting Action)

Topic SP1-JTI-FCH.1.3: European fuel cell stack cluster

Rationale

Despite significant RTD efforts in Europe over the past 20 years in the field of proton exchange membrane (PEM) fuel cells and related materials, the landscape for research and deployment still remain fragmented in Europe.

In order to accelerate deployment in Europe, a mechanism is needed to cluster European research organisations and the fuel cell stack industry in order to achieve technology leadership in the mid and long term.

Overall project objectives/Scope of work

To establish a European fuel cell stack cluster which provides a mechanism to coordinate the relevant players in fuel cell stack research and industry and to channel their RTD activities through a joint technology roadmap with emphasis on medium (80°– 130°C) and high (130°– 180°C) temperature membrane electrode assemblies.

This Cluster will allow networking through workshops and horizontal activities in all areas related to PEM fuel cell technology, and would foster a more formal collaboration between academia, small-and medium-sized enterprises and large corporations. In particular, links between research institutions, venture capital companies and/or interested Original Equipment Manufacturers (OEMs) could lead to spin-offs companies that may serve as the core of a European fuel cell stack industry.

This topic aims to prepare for this cluster. Work should include drafting of scope and framework of the cluster, identification of and consultation with relevant players from research and industry, execution of workshops, expert interviews.

Expected outcome

A comprehensive assessment with the following key elements:

- Overall scope and framework of the cluster
- Key technical, commercial (including stack manufacturing), social targets
- Expertise, relevant players and their role and contribution to the project
- Forms of collaboration between industry and research
- Financial, resource and other requirements for success
- Proposal for implementation of the concept

Other Information

The proposed consortium should bring together high-level experts from industry and research organisations.

Expected duration: Up to 2 years

Funding scheme: Coordination and Support Actions (Supporting Action)

Topic SP1-JTI-FCH.1.4: Compressed hydrogen onboard storage

Rationale

Compressed gaseous storage of hydrogen is the most mature hydrogen storage technology for automotive application. Several European and global car companies are already operating cars with 35 MPa or 70 MPa tank systems, with 70 MPa - technology setting the benchmark for any competing system. For the commercial introduction of vehicles, improvements of performance, technology maturity, safety, and cost reductions of the tank systems are still required.

Overall project objectives/Scope of work

The action addresses development activities on materials, components and storage tanks in order to improve performance and maturity and to achieve cost reductions on the following technological options:

- Carbon-composite vessel with metallic liner (type III), and/or
- Carbon-composite vessel with plastic liner (type IV).

Specific technical targets:

Capacity	6 kg H ₂
Volumetric energy density	260 L, 0.023 kg L ⁻¹
Gravimetric energy density	125 kg, 0.048 kg kg ⁻¹
Shape	Cylindrical
Production cost @ large volumes	2000 Euro
Boil-off losses	not existing
Permeation rate	<1 Ncm ³ /L/h
Extraction efficiency	97%
Max. extraction rate	2 g H ₂ s ⁻¹
Refilling time	3 min
Refilling efficiency	98%
Heat exchanger capability	0 kW
Operating Temperature for tank components	-60°C and +85°C
Operating Lifetime	>15 years

The scope of work may include:

a) Development activities on materials such as:

Cost - efficient manufacturing processes, development of new fibre concepts, recycling concepts for carbon composite vessels, new permeation-blocking liners or investigation of liner-less vessels, protection of steels against hydrogen embrittlement. This should be complemented with simulation tools for failure mechanisms, aging effects of carbon composite materials, and crash worthiness of compressed gaseous hydrogen storage

b) Activities of tank system development such as:

- Free-form containers with other geometrical dimensions than cylindrical
- Containers with improved carbon fibre winding to improve load distribution between fibres
- On- or off-board diagnosis systems for containers
- On-Board safety systems for fire protection
- Pressure regulators, valves, as well as sensors, manufacturing concepts and hydrogen-refilling technologies

c) Validation operational performances

Expected outcome

Enhanced materials, improved tanks and related components characterised by reduced weight and volume, leading to lower cost production processes, establishment and advancement of test methods. The Technical Targets are those specified above.

Other information

The consortium should include research institutions, automotive OEMs and hydrogen supply industry; opportunities for innovative SMEs with expertise in specialised areas.

Expected duration: Up to 3 years

Funding scheme: Collaborative Project

APPLICATION AREA SP1-JTI-FCH.2: HYDROGEN PRODUCTION & DISTRIBUTION***Topic SP1-JTI-FCH.2.1: Efficient PEM electrolyzers*****Rationale**

Centralized and decentralized sustainable H₂ production using low temperature electrolyser technology requires further improvement of performance and reduction of costs. In this context, the PEM technology particularly adapted for applications in power levels up to 0.5 MW will be considered, with strong focus on technology improvements to make the technology fit for the integration with renewable energies for electricity/ H₂ generation.

Overall project objectives/ Scope of work

- Research to increase electrode stability and efficiency, development of new catalyst and materials for lowering costs and improved performance;
- Research and development on advanced power electronics
- Research to improve materials/components/systems durability/reliability, robustness in order to reduce costs while optimizing production technologies through design optimization
- Development of low cost, high efficient electrolyser system operating at high pressure (10MPa = 100bar)
- Setting up of field demonstration projects and trials on integration of electrolyser with RES. The work needs to include evaluation of system integration with RES through improvements in modelling tools
- Aspects of RCS harmonisation of electrolyser technology
- Comparative Life Cycle Assessment studies carried out according to the practice guidance developed by the FCH JTI (ref. topic SP1-JTI-FCH.5.3 of this Call)

Expected outcome

- Design and prototype demonstration of PEM electrolyser (100 Nm³/h) with 40,000 hrs lifetime by 2012,
- System Integration with RES demo project at level < 0.5 MW to verify/qualify the technology & get public acceptance
- Key performance indicators:
 - Current density @ 1.2 A/cm² with $\eta > 75\%$ on LHV basis
 - Modular system cost @ €5,000/Nm³ plant capacity
 - System availability >99%

Other information

The consortium should include industry and research organisations and give opportunities for SMEs with expertise in the field of materials, membranes, modelling and design optimization.

Expected duration: Up to 3 years

Funding scheme: Collaborative Project

Topic SP1-JTI-FCH.2.2: Efficient alkaline electrolysers

Rationale

Centralized and decentralized sustainable H₂ production using low temperature electrolyser technology requires further improvement of performance and reduction of costs. In this context, Alkaline technology particularly adapted for applications in power levels exceeding 0.5 MW will be considered, with strong focus on technology improvements to make the technology fit for the integration with renewable energies for electricity/ H₂ generation.

Overall project objectives/Scope of work

- Research to increase electrode stability and efficiency, development of new catalyst and materials for lowering costs and improved performance;
- Research and development on advanced power electronics
- Research to improve materials/components/systems durability/reliability, robustness in order to reduce costs while optimizing production technologies through design optimization
- Development of low cost, high efficient electrolyser system operating at high pressure (10MPa = 100bar)
- Setting up of field demonstration projects and Demonstration trials on integration of electrolyser with RES. The work needs to include evaluation of system integration with RES through improvements in modelling tools
- Aspects of RCS harmonisation of electrolyser technology
- Comparative Life Cycle Assessment studies carried out according to the practice guidance developed by the FCH JTI (ref. topic SP1-JTI-FCH.5.3 of this Call)

Expected outcome

- New design and prototype demonstration of efficient, high pressure module electrolyser (several 100's Nm³/hr capacity) with delivery pressure @ 3-5 MPa (2012-13)
- System Integration with RES demo project at level > MW to verify/qualify the technology and get public acceptance
- Key performance indicators:
 - Current density @ 0.75 A/cm² with $\eta > 80\%$ on LHV basis
 - Modular system cost @ €1,000/Nm³ plant capacity
 - System availability >99%

Other information

The consortium should include industry and research organisations and give opportunities for SMEs with expertise in the field of materials, membranes, modelling and design optimization.

Expected duration: Up to 3 years

Funding scheme: Collaborative Project

Topic SP1-JTI-FCH.2.3: Water decomposition with solar heat sources

Rationale

Massive CO₂ free production of hydrogen using water decomposition pathways powered by solar energy is a major component of the long-term RTD strategy of the FCH JU for sustainable hydrogen supply. Thermo-chemical cycles running below 1500 °C have the highest potential to be scaled up to a demonstration level within the FCH JTI until 2017.

In order to achieve the relevant objectives, focusing and strengthening research activities in this area is needed.

Overall project objectives/Scope of work

Research and development on materials and components for the most efficient thermo-chemical water splitting cycles: to improve the technical and economical feasibility of these processes for CO₂ free H₂ production with focus on the scale up of the technology. Work on the following topics can be envisaged:

- Development of new reactor concepts with enhanced efficiency and scalability for future application
- Simulation of the reactor-system
- Design and simulation of a scaled-up system for a demonstration in the MW range

Expected outcome

- Development of new high temperature reactors, component improvements (e.g. catalysts, adsorbents / design of reactors integrated with solar systems)
- Simulation of the components and systems
- Design study of a scaled up reactor in the demonstration range @ 1-5 MW scale for high temperature water splitting, with the following targets:
 - Integrated process concept (solar tower, reactor, peripheral components, safety concept)
 - Automation and control concept (flow sheet, software)
 - Techno-economic study to determine the feasibility of the scale up of the process to industrial application.

Other information

The consortium should include innovative SMEs with specific expertise in the field of RTD on new materials as well as design optimization; the project should build upon relevant actions financed under FP6. Work should not overlap or duplicate efforts in previous and/or on-going EU-funded projects (e.g. HYTHEC in FP6 and HyCycleS in FP7).

Expected duration: Up to 3 years

Funding scheme: Collaborative Project

APPLICATION AREA SP1-JTI-FCH.3: STATIONARY POWER GENERATION & CHP

Topic SP1-JTI-FCH.3.1: Operation diagnostics and control for stationary applications

Rationale

Effective control of stationary fuel cell stacks is vital for their optimum operation, as it influences their performance, life and reliability, as well as ultimate efficiency, fuel utilisation,

response times, emissions and waste. For this purpose, it is necessary to develop a better understanding of critical operating conditions and operating strategies and to establish a reliable management of interfaces with the application environment.

Overall project objectives/Scope of Work

Activities may include:

- Development, testing and utilisation of diagnostic techniques to reveal potential failures and optimise run parameters
- Development of controls for stationary fuel cells that provide predictable, safe and reliable generators capable of <20% loss in performance in an application type environment. Internal control systems should be able to cope with external controls and allow for standard communication protocols both with the remote systems on a grid (that may include intermittent renewable generators). Control development can also include integration into an industrial environment and process control interfaces.
- Controls should include the necessary hardware and software. Start-up, shut-down and transient conditions shall be predicted and controlled
- Considerations of relevant codes and standardisation issues

These activities are open to all technologically mature fuel cell stack types for stationary power applications.

Expected Outcome

- Novel diagnostic technologies to identify potential failure situations for current commercial stack designs, development of in-service diagnostic tools for cell/stack health checking
- Improved understanding of prediction and avoidance of failure mechanisms
- Development of strategies allowing recovery of cell and stack performance
- Control of stationary fuel cells systems in integrated generation environment to deliver low emissions and high network efficiencies

Other Information

Up to three projects may be supported under this topic, preferably each focussing on a different technology. The consortium should include academia, research organisations, component and stack suppliers, software developers, utilities, and network providers. Projects will be executed in a cluster with topics SP1-JTI-FCH.3.2 and SP1-JTI-FCH.3.3 to ensure coordination.

Expected duration: Up to 3 years

Funding Scheme: Collaborative Project

Topic SP1-JTI-FCH.3.2: Component and system improvement for stationary applications

Rationale

For a viable fuel cell industry, Balance of Plants (BoP) components, systems and sub-systems need to become readily available at a quality that is suitable for market ready products. To enter demonstration with fit-for-purpose stationary Fuel Cell systems, it is necessary to improve availability and cost-competitiveness of components as well as their suitability for mass production to meet performance and lifetime targets.

Overall project objectives / Scope of Work

The activity is open to all fuel cell technologies, pertinent fuels and levels of power. Stationary fuel cell components to be addressed include in particular:

- Power generation unit (integrated stack/ BoP)
- Power electronics
- Reforming and fuel processing
- Heat exchangers/thermal management
- Humidification
- Fluid supply and management including pumps, valves, flow meters, desulphurisation
- Exhaust cleaning and recovery

The project activities shall focus on:

- Novel designs solutions, and optimisation of components to be integrated with industrially relevant stacks
- Manufacturing process/technologies and manufacturing control techniques
- Validation and testing of components lifetime, durability/robustness according to different test regimes, in ‘application’ environment - life testing, failure mode analysis
- Demonstration of end-of-life eventualities including rework for reuse, recycle, disposal consequence and costs
- Comparative Life Cycle Assessment studies carried out according to the practice guidance developed by the FCH JTI, as soon as this guidance becomes available (ref. topic SP1-JTI-FCH.5.3 of this Call).

These activities are open to all technologically mature fuel cell stack types for stationary power applications.

Expected Outcome

Development of improved components which are viable for mass production and meeting performance and lifetime and cost targets for stationary applications, i.e. life time >10 years by 2015 (for system excl. Stack) and cost/kW of € 1500 for industrial and € 3000 for domestic micro CHP.

Other Information

Up to three projects may be supported under this topic, preferably each focusing on a different technology. The consortium should include SMEs providing specialised component solutions and research institutions providing characterisation of components and sub-systems. Projects will be executed in a cluster with topics SP1-JTI-FCH.3.1 and SP1-JTI-FCH.3.3 to ensure coordination.

Expected duration: Up to 3 years

Funding Scheme: Collaborative Project

Topic SP1-JTI-FCH.3.3: Degradation and lifetime fundamentals

Rationale

Fuel cell stacks for stationary power applications require an operational lifetime up to 40,000 hours. Improved understanding of failure mechanisms is required to ensure reliable prediction of cell and stack failure

Overall project objectives/Scope of work

- The activities should focus on understanding of failure mechanisms, degradation and deterioration phenomena in stationary operating conditions. The work should address steady state operation, abnormal operational states, thermal and/or current cycling, vibration and shock proofing, sensitivity to typical gas impurities, loss of water supply, power cycles, etc. Scope of work can include material research for current industrial cell/stack component, proof of concept of the suggested routes forward including accelerated testing techniques, statistical analysis on predictive lifetime estimates.
- Durability/failure mechanisms common to other applications need to be identified. The activities should be interfaced with other relevant actions in the field. Coordination with stationary FC programmes under the JTI, FP6 and FP7 projects to improve the quality of the knowledge base

These activities are open to all technologically mature fuel cell stack types for stationary power applications. The applications should also include onboard power generation and portable or back-up power generators.

Expected Outcome

Improved understanding of short and long term failure mechanisms, establishment of accelerated test techniques, sensitivity matrix and lifetime prediction methods.

Other information

Up to five projects may be supported under this topic, preferably presenting different approaches/focus and addressing different technologies. The consortium should include academia, research institutes, material producers, cell/stack manufacturers and end users. Projects will be executed in a cluster with topics SP1-JTI-FCH.3.1 and SP1-JTI-FCH.3.2 to ensure coordination.

Expected duration: Up to 3 years

Funding scheme: Collaborative Project

APPLICATION AREA SP1-JTI-FCH.4: EARLY MARKETS

Topic SP1-JTI-FCH.4.1: Portable generators, backup and UPS power systems

Rationale

Among the most promising early market applications for fuel cells, back-up power devices for a variety of applications have received significant attention. However, their deployment has been limited in Europe.

A strong effort is needed to gain field experience with these fuel cell systems and demonstrate the economic and environmental viability of this technology including accelerating deployment and commercialisation. Proper certification procedures must be ensured and issues of public acceptance, safety regulations including transport in public areas and transportation means need to be addressed.

Overall project objectives/Scope of Work

The project should focus on the development and deployment of portable generators, back-up and UPS power systems.

Scope of work may include: Demonstration of commercially ready fuel cell products meeting minimum customer requirements, assessment of fuelling infrastructure requirements, validation

and product testing, dissemination of results to a wider audience, preferably to potential customers (trade associations, etc.). Regulation, codes and standards issues also need to be properly addressed, in particular certification procedures of the new products.

While alpha-testing may be included in proposals, deployment of a statistically relevant number of units, i.e. 5 to 10 units per project, is necessary.

A proper benchmark of fuel cell products with current technologies need to be performed. The projects need to include comparative life cycle assessment studies carried out according to the practice guidance developed by the FCH JTI, as soon as this guidance becomes available (ref. topic SP1-JTI-FCH.5.1 of this Call).

Expected outcome

Early deployment of (portable) fuel cell based generators, back-up and UPS power systems.

Technical requirements that the proposed systems must meet include:

<u>Requirement</u>	<u>Target</u>
• Reliability	100%
• Response time of less than	5 ms
• Projected lifetimes greater than	5 years
• Target system cost	5,000€/kW
• Number of start-stop cycles	1,000

Other information

The consortium should include industry, research organisation in the fields of industry test sites, fuel cell system developers, certification agencies, OEMs (users).

Expected duration: Up to 3 years

Funding scheme: Collaborative Project

Topic SP1-JTI-FCH.4.2: Fuel supply technology for portable and micro Fuel Cells

Rationale

Micro and portable fuel cell applications in power ranges between 10-500 W based on PEM or SOFC require appropriate fuel supply systems. Proposals are sought that address novel approaches for application- specific fuelling requirements of portable and micro fuel cells.

Overall project objectives/ Scope of work

Projects should focus on novel approaches for fully integrated systems including required logistics and distribution channels to meet application and infrastructure requirements. Fuelling options may include hydrogen, direct methanol, diesel or gasoline as well as suitable containers for fast replacement and safe transportation where appropriate.

Scope of work may include: research and development, validation testing, test methods and procedures to demonstrate the required operational and safety properties. The fuelling systems routes to be developed may be based, among others, on hydrides, novel approaches with new materials, micro-reforming of carbon-containing fuels, or direct-feeding for high temperature fuel cells.

Projects must include also dissemination of results to industry and research organisations. Relevant PNR activities and RCS links must be included, where appropriate.

Expected outcome

- Development of new fuelling systems that meet application targets and the integration of the new fuel supply concept in a complete (specification of targets needed fuel cell systems
- Development of test procedures, including accelerated testing, and characterisation protocols based on application specifications

Other information

Consortia should include industrial companies, research organisations, innovative SMEs with expertise required in the field of:

- Research and/or industry test facilities
- Fuel supply system integration
- System analysis including FME
- User (OEM) requirements

Expected duration: Up to 4 years

Funding scheme: Collaborative Project

APPLICATION AREA SP1-JTI-FCH.5: CROSS-CUTTING ISSUES***Topic SP1-JTI-FCH.5.1: Planning of socio-economic activities*****Rationale**

The objective of the FCH JU is to accelerate the innovation cycle towards the commercialization of fuel cells and hydrogen. This requires the achievement of technological milestones, significant investments for the implementation of a supply infrastructure, but also the removal of non-technical barriers such a macro- and socio-economic ones. This makes solid and up to date planning tools a necessity.

Moreover, hydrogen should not be evaluated in isolation, but benchmarked against its main competitor carriers, as assessing its potential without taking competing options into account would result in misleading conclusions. Specifically in the transport sector, the major competitors for hydrogen are bio fuels and electricity.

Overall project objectives/Scope of Work

The project will provide a state of the art review of the relevant input parameters to the major technical, infrastructural, ecological and socio-economic simulation and modelling tools used for assessing the implementation of hydrogen energy systems on a European and national level. This includes for instance energy price scenarios, technology databases of existing and emerging hydrogen and fuel cell technologies, macro- and socio-economic data, but also equivalent datasets on the major competitors of hydrogen and fuel in the transport sector, such as second-generation bio fuels, plug-in hybrid electric or pure battery electric vehicles. As far as possible, existing databases and results from relevant projects (current and completed) will be consolidated in a systematic way and subsequently assessed/validated. The scope of the research work must also include suggestions for and implementation of a Quality Management procedure for new data. This consolidated assessment will then form the basis of future socio-economic work by the FCH JU.

To ensure consistency and compatibility with related tools in policy and industry context, this work needs to develop the appropriate interfaces with the project on TMA Framework and LCA Framework (topics SP1-JTI-FCH.5.2 and SP1-JTI-FCH.5.3 of this call).

Expected outcome

Update and harmonisation of all relevant datasets on hydrogen and fuel cells as well as a comprehensive collection of equivalent data on competing technologies in the transport sector, as required by major planning tools to perform socio-/ techno-/ economic analyses; comprehensive state of the art analysis on socio-economic planning for hydrogen infrastructure, establishment of a framework for further socio-economic planning activities, monitoring of activities and dissemination of results. The outcome of this work will prepare for the interim evaluation of the hydrogen and fuel cell JTI in 2011.

Other information

The consortium should include organisations with the following expertise:

- Previous involvement and know-how in performing socio-/ techno-/ economic analyses of hydrogen systems
- Building and maintaining complex databases for socio-economic applications

The work needs to build on previous FP6 EC-funded projects, in particular HyWays, but also the output of other socio-economic projects such as HyLights, Roads2HyCom, or ERANet HyCo) should be consolidated.

The successful consortium should liaise with the Institute for Energy of the EU Joint Research Centre (JRC-IE) for the implementation of this action.

Expected duration: Up to 1.5 years

Funding scheme: Coordination and Support Actions (Supporting Action)

Topic SP1-JTI-FCH.5.2: Technology monitoring and assessment (TMA)

Rationale

The FCH JU needs to assess progress both towards FCH JU objectives and vis-à-vis major external technological developments. Regular technology monitoring and assessment including major stakeholders is essential for this purpose and it is necessary to develop a specific programme assessment tool and methodology, to collect and link data developed in the FCH JU projects and benchmarked also with external inputs.

Overall project objectives/ Scope of Work

The goal of this action is to develop an appropriate TMA Framework tailored for hydrogen and fuel cell technologies; this will include establishing the data format and database for projects and external inputs; defining the incoming report frequency and the TMA reporting system. An opportune rating framework, including weighting of criteria, must also be established. This should include a definition and selection of benchmarks towards both best-in-class (BiC) and best available technology (BAT).

Website design and on line implementation of TMA reports/databases should be also envisaged. TMA reports will be developed in the form of a semi-annual briefing for the FCH JU. It is expected that a full assessment will also be performed twice throughout the lifetime of the FCH JU and then discussed with a wider community of stakeholders.

The successful project will only develop the TMA Framework; the actual execution of the TMA's will be subject to separate calls. To ensure consistency and compatibility with related

tools in policy and industry context, this work will be properly interfaced with the project on LCA (topic SP1-JTI-FCH.5.3 of this call).

Expected outcome

Definition and development of a complete TMA Framework to be used by the FCH JU, including a detailed process handbook/manual, development, definition and justification of benchmarking (BiC, BAT), interfaces and incoming/outgoing reports; database structure and implementation, including respective interfaces and report generators.

Other information

The TMA function will be provided by a consortium of knowledgeable legal entities able to deliver impartial advice. The consortium should include organisations with broad expertise in technology monitoring and assessment frameworks. Links to the EU SET-Plan shall be established and monitored. The successful consortium should liaise with the Institute for Energy of the EU Joint Research Centre (JRC-IE) for the implementation of this action.

Expected duration: Up to 1.5 years

Funding Scheme: Coordination and Support Actions (Supporting Action)

Topic SP1-JTI-FCH.5.3: Life Cycle Assessment (LCA)

Rationale

Sustainability is a key driver of the FCH JU activities and it is necessary to assess the new developments towards these goals. Life Cycle Assessment will therefore be applied throughout the FCH JU on a programme level. To meet this goal the FCH JU will require dedicated practice guidance for hydrogen and fuel cell technologies. To ensure consistency and compatibility with related tools in policy and industry context, this will be done in line and building upon the International Reference Life Cycle Data System (ILCD) Handbook on LCA, developed/coordinated by the European Commission's European Platform on LCA (EPLCA)⁸

What is needed in context of the FCH JU is a specific guidance that links the general ILCD Handbook for application to Hydrogen and Fuel Cell Technology, and related training material and courses for practitioners in industry.

It is envisaged that an LCA will be performed on both FCH JU projects and the total programme, as soon as the guidance becomes available. The resulting Life Cycle Inventory (LCI) data sets will form a database, published and maintained by the industry partners of the FCH JU, being one component of the upcoming ILCD Data Network.

Previous assessments including WtW - analysis provided by EUCAR and CONCAVE are to be considered and included. The project shall also establish an international dimension thus providing for a globally consistent framework.

Overall project objectives/Scope of work

The goal is to develop dedicated practice guidance on the technology system for hydrogen and fuel cells, drawing on the related approach of developing Product Category Rules (PCR) used in Environmental Product Declarations (EPD)⁹. Close cooperation with the European Commission's *European Platform on LCA* is necessary to ensure the requirements of the ILCD Handbook are

⁸ <http://lca.jrc.ec.europa.eu/>

⁹ ISO 14025: Environmental labels and declarations – Type III environmental declarations – Principles and procedures

met by the practice guidelines. Training courses on their application should also be developed by this project. The guidance shall cover the whole range of steps covered in the ILCD Handbook, starting from Goal and Scope Definition, collecting and calculating data, to LCIA results calculation and Interpretation, including internal quality control. The review part and documentation will directly apply the ILCD guidance.

The successful consortium will need to supply sufficient information for public presentation and debate on its results, and conduct training courses for potential users.

The project will only develop the specific guidance - the actual data collection and execution of the LCA(s) will be subject to a separate call. The LCA framework actions will be properly interfaced with the TMA framework support action (topics SP1-JTI-FCH.5.2 of the present call).

Expected Outcome

- Guidance document (PCR-type) including a detailed manual for performing ILCD-conform LCAs on Hydrogen and Fuel Cell Technologies.
- LCA study reporting templates based on the ones provided in the ILCD handbook, tailor-made for Hydrogen/Fuel Cell studies; data sets directly are to meet the ILCD documentation requirements.
- Website design with both public and restricted access areas to up-/download data for assessment, tools, etc.
- Workshops and training courses on the developed guidance document

Other information

The consortium should include organisations with expertise in life cycle assessments and methodologies as well as experience in developing PCRs.

The successful consortium should liaise with the Institute for Energy of the EU Joint Research Centre (JRC-IE) for the implementation of this action.

Expected duration: 1 year

Funding scheme: Coordination and Support Actions (Supporting Action)

8.2 Staff establishment plan 2008

Temporary Agents

Grade	Staff		2008 Establishment Plan		
	Employed on 31/12/2007		Draft Budget / Authorised		
	Permanent posts	Temporary posts	Permanent posts	Temporary posts	Functions
AD 16					
AD 15					
AD 14				1	- Executive Director
AD 13					
AD 12					
AD 11				2	- Senior Financial and Administrative Manager - Senior Programme Manager
AD 10					
AD 9				1	- Legal and Contractual Manager
AD 8				2	- Project Managers
AD 7					
AD 6					
AD 5					
Total AD¹⁰	0	0	0	6	
AST 11					
AST 10					
AST 9					
AST 8				2	- Accounting Assistant - General Administration and Human Resources Assistant
AST 7					
AST 6					
AST 5					
AST 4					
AST 3				1	- Secretary
AST 2					
AST 1					
Total AST¹¹	0	0	0	3	
TOTAL	0	0	0	9	

Contract agents

	2007 Number as of 31/12/2007	2008 estimate	Functions
Function Group IV		1	- Project Manager
Function Group III		1	- IT Assistant
Function Group II			
Function Group I			

¹⁰ AD stands for Administrator

¹¹ AST stands for Assistant

8.3 FCH JU Budget 2008

8.3.1 Estimated revenues

<u>REVENUES</u> (Million €)	Running costs	Operational costs	TOTAL
European Commission	1,584	28,100	29,684
Industry Grouping	1,900	0,000	1,900
Research Grouping	0,316	0,000	0,316
TOTAL REVENUES	3,800	28,100	31,90

8.3.2 Estimated commitment appropriations

<u>EXPENDITURE</u>	Budget 2007	Budget 2008 (*)
Title 1 Staff Expenditure: Salaries & allowances, Expenditure relating to Staff recruitment, Mission Expenses, Socio-medical infrastructure, Professional development, Receptions and Events	0,00	1,68
Title 2 Infrastructure and operating expenditure: Rental of buildings and associated costs, Information and communication technology, Movable property and associated costs, Current Administrative expenditure, Postage / Telecommunications, Meeting Expenses, Running costs in connection with operational activities, Information and publishing	0,00	2,12
Title 3 Operating Expenditure: Operating Costs	0,00	28,10
TOTAL EXPENDITURE	0,00	31,90

8.3.3 Estimated payment appropriations

<u>EXPENDITURE</u>	Executed Budget 2007	Budget 2008 (*)
Title 1 Staff Expenditure: Salaries & allowances, Expenditure relating to Staff recruitment, Mission Expenses, Socio-medical infrastructure, Professional development, Receptions and Events	0,00	1,68
Title 2 Infrastructure and operating expenditure: Rental of buildings and associated costs, Information and communication technology, Movable property and associated costs, Current Administrative expenditure, Postage / Telecommunications, Meeting Expenses, Running costs in connection with operational activities, Information and publishing	0,00	2,12
Title 3 Operating Expenditure: Operating Costs (*)	0,00	0,00
TOTAL EXPENDITURE	0,00	3,80

(*) Taking into consideration that the Call for proposals will be published in summer 2008, no grant agreement will be signed this year. Therefore, payment appropriations for operational costs in year 2008 will be zero.

8.4 Abbreviations & Definitions

Term	Definition
AA	Application areas such as Transportation & Infrastructure, Hydrogen Production & Distribution etc.
AA-EM	Application Area Early Markets, short-term markets encompassing a group of applications for which products can be commercially deployed within the 2007-2013 timeframe
AA-H	Application Area Hydrogen Production, Storage & Distribution
AA-S	Application Area Stationary Power Generation & CHP
AA-T	Application Area Transportation & Refuelling Infrastructure
AC	Associated Country means a third country which is party to an international agreement with the Community, under the terms or on the basis of which it makes a financial contribution to all or part of the Seventh Framework Programme
AIP	Annual Implementation Plan
BOP	Balance of Plant
CCI	Cross Cutting Issues
EC	European Commission
Deployment	Development phase for a given technology and/or infrastructure from its market introduction to its widespread use
ED	Executive Director
FCH	Fuel Cells & Hydrogen
FCH JU	The Fuel Cells and Hydrogen Joint Undertaking: the name refers to the legal entity established as the public & private partnership to implement the Joint Technology Initiative
SRG	FCH States Representatives Group: Advisory body of the FCH JU gathering Member States and Associated Countries' representatives
FP7	Seventh Framework Programme of the European Community for research, technological development and demonstration activities (2007-2013)
GB	Governing Board of the FCH JU
HFP	The European Hydrogen and Fuel Cell Technology Platform
IDA	Innovation and Development Actions: A programmatic cluster of the HFP Implementation Plan targeting a specific objective of the programme and encompassing a set of relevant technologies and market enablers along with the actions to achieve it
IP	Implementation Plan
JTI	Joint Technology Initiative - a policy initiative introduced in the FP7. The Term JTI may also be used to refer to the legally established structure implementing the initiative (cf. above FCH JU)
MAIP	Multi-Annual Implementation Plan
MCFC	Molten Carbonate Fuel Cells
Members	The term "members" refers to the founding members of the FCH JU (EC & NEW IG) and the RG
MS	The "Member States" shall be understood as the EU-27 Members States
NEW IG	New Energy World Industry Grouping - European Industry Grouping for a Fuel Cell and Hydrogen JTI also referred to as "Industry Grouping" or "IG"
PEMFC	Proton Exchange Membrane Fuel Cell

PNR	Pre-normative research
PO	Programme Office (also referred to as JTI PO)
RCS	Regulations & Codes and Standards
RG	New European Research Grouping on Fuel Cells and Hydrogen AISBL, also referred to as "Research Grouping" or "N.ERGHY"
RTD	Research, Technological Development & Demonstration
SOFC	Solid Oxide Fuel Cell
Stakeholders	The term "Stakeholders" embodies all public or private actors with interests in FCH activities both from the MS or third countries. It shall not be understood as "partners" or "members" of the FCH JU.
WtW	Well to Wheel