



ANNUAL ACTIVITY REPORT 2015



FUEL CELLS AND HYDROGEN
JOINT UNDERTAKING

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FCH JOINT UNDERTAKING



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ANNUAL ACTIVITY REPORT 2015

In accordance with Article 17 of the Statutes of the FCH 2 JU annexed to Council Regulation (EU) No 559/2014 and with Article 20 of the Financial Rules of the FCH 2 JU.

The annual activity report will be made publicly available after its approval by the Governing Board.

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FACTSHEET

NAME	Fuel Cells and Hydrogen 2 Joint Undertaking
OBJECTIVES	<p>(a) To contribute to the implementation of Regulation (EU) N° 1291/2013, and in particular the Secure, Clean and Efficient Energy Challenge and the Smart, Green and Integrated Transport Challenge under part III of Annex I of Decision 2013/743/EU;</p> <p>(b) To contribute to the objectives of the Joint Technology Initiative on Fuel Cells and Hydrogen, through the development of a strong, sustainable and globally competitive fuel cells and hydrogen sector in the Union.</p>
FOUNDING LEGAL ACT	Council Regulation (EU) N° 559/2014 of 6 May 2014 – OJ L169/108-129 of 7.6.2014
EXECUTIVE DIRECTOR	<p>Until 31 December 2015: Bert de Colvenaer</p> <p>From 01 January 2016 to 15 May 2016: Philippe Vannson (Acting)</p> <p>Since 16 May 2016: Bart Biebuyck</p>
GOVERNING BOARD	<p>Chair: Pierre-Etienne Franc</p> <p>Governing Board Composition: http://www.fch.europa.eu/page/governing-board#</p>
OTHER BODIES	States Representatives Group, Scientific Committee, Stakeholders Forum
STAFF	24 Temporary agents and 2 Contract agents
2015 BUDGET	EUR 131 582 290 of which EUR 126 270 350 for operational activities and EUR 5 311 940 for administrative costs
GRANTS	15 signed (from the 2014 call) for a total value of EUR 82,110,633.62
STRATEGIC RESEARCH AGENDA	The Multi Annual Work Plan 2014-2020 was not updated during 2015
CALL IMPLEMENTATION	<p>1 call launched in 2015</p> <p>Number of eligible proposals submitted: 66</p> <p>Number of eligible proposals: 62</p> <p>Global project portfolio (since the setting up): 155 projects under FP7 and 30 projects under H2020 (call 2014 + call 2015)</p> <p>4 studies (from the AWP 2014) contracted in 2014 were conducted in 2015</p> <p>3 studies were included in the AWP 2015 (to be contracted in 2016)</p> <p>Tenders paid in 2015: EUR 478,228.00 from FP7 and EUR 188,500.00 from H2020</p>
PARTICIPATION, INCLUDING SMES	<p>Total number of participations in funded projects (call 2014): 152</p> <p>of which:</p> <p>% of SMEs: 25</p> <p>% of private for profit/large companies: 43</p>

EXECUTIVE SUMMARY

For the FCH 2 JU, 2015 was a year of **multidimensional progress**. The main aspects are summarised below:

1. The adoption of the Energy Union Package on 25 February 2015 provides a **new opportunity**: a) to raise awareness and **demonstrate the potential of FCH technologies** in addressing the challenges of energy and climate-change policies; and b) **to confirm the key contribution the FCH 2 JU can make** to achieving three core priorities of the Juncker Commission: a new boost for Jobs, Growth and Investment; a Resilient Energy Union, and a Deeper and Fairer Internal Market.

This is evidenced by various elements such as: i) the success of the Programme Review Days and Stakeholder Forum which gathered **over 400 participants**; ii) the **commitment made by around 30 cities and bus operators** which, in response to the letter of understanding¹ signed in 2014 by five bus manufacturers, declared their intention in June 2015 to **purchase and operate several hundred fuel cell buses**; and iii) the results of the projects closed under FP7.

2. Forging a consensus among a range of industries that do not normally work with each other and **building up a critical mass to initiate the deployment of the technology** has been one of the FCH JU's primary achievements to date.

Results generated by the closed projects (53 of the 155 FCH-FP7 projects were closed as of 31 December 2015), which were mainly Coordination and Support Actions (CSA) and research projects, were **essential** in: (i) helping to **define the framework for demonstration projects** both in the field of transportation applications and stationary power applications; (ii) allowing **catching up the state-of-the-art performances** of fuel cells and hydrogen technologies; and (iii) **increasing knowledge** through education and training programmes in particular for professional audiences.

These results were used to determine the topics of the following calls, notably for demonstration projects. They were also the basis for establishing consortia active in the transport and energy sectors.

Furthermore, based on the project outputs, **success stories** were identified and 15 pitches were produced. These will be published on the FCH 2 JU web and further disseminated during 2016.

3. The new IT tools for H2020 became fully functional for the FCH 2 JU and were used for the first time for the preparation, signature and payment of the related pre-financing of the 15 grant agreements (GAs) in the 2014 call. The average time to grant (TTG) was within eight months for 12 of the projects, the slight delay for the remaining three being due to justifiable reasons. The average time to pay (TTP) the pre-financing was eight days.

Following the evaluation of the proposals in the 2015 call, on 18 November 2015, the Governing Board approved a list of 15 actions selected for funding (a success rate of 24.6 %, similar to that of 2014). Grant preparation is ongoing and grant signature is expected in the first quarter of 2016.

4. The number of periodic and final reports validated increased to 81, covering 957 cost claims (61 reports covering 551 cost claims in 2014) reflecting both the increasing maturity of the FP7 projects and a catching up in the assessment of reports.

A new session of the communication campaign was organised and the *ex-post* audit effort was pursued in line with the FCH-FP7 *ex-post* audit strategy, with the launch of 29 new audits. Satisfactory results in terms of low error rates were confirmed, resulting in a cumulative residual error rate for finalised audits of under 2 %.

¹ <http://www.fch.europa.eu/sites/default/files/Content-letter%20of%20understanding.compressed.pdf>

5. Following the adoption in March 2015 of the RTD family anti-fraud strategy by the Common Support Centre (CSC), particular attention was paid to fraud detection and prevention, with awareness sessions for staff and an internal workshop in November 2015 focusing on ethical values and anti-fraud measures.

Overall, it can be concluded that for the FCH 2 JU, 2015 was a year of progress in the legislative framework, in the outreach to a large range of stakeholders in the IT tools, in the outcomes of FP 7 projects, in the further implementation of the H2020 programme, and in the strengthening of the internal control framework.

This strong base, together with the long-term commitment of the private and public sectors, should facilitate the move towards the market deployment of FCH technologies.

01

IMPLEMENTATION OF THE ANNUAL WORK PLAN 2015

In July 2014, President Jean-Claude Juncker highlighted in his Political Guidelines² the need “to pool our resources, combine our infrastructures (...) and to diversify our energy sources and reduce the high energy dependency of several of our Member States”.

Indeed, 94 % of EU transport currently relies on oil products, 90 % of which are imported, and 75 % of the EU’s housing stock is largely energy inefficient.

On 25 February 2015, Commissioner Miguel Arias Cañete insisted that: “Our path to real energy security and climate protection begins here at home. That is why I will focus on building our common energy market, saving more energy, expanding renewables and diversifying our energy supply”. He launched the Energy Union Framework Strategy³, one of the Commission’s 10 priorities, with the following statement: “We have to move away from an economy driven by fossil fuels, an economy where energy is based on a centralised, supply-side approach and which relies on old technologies and outdated business models. We have to empower consumers providing them with information, choice and creating flexibility to manage demand as well as supply.”

He was supported in his approach by Commissioner Maroš Šefcovic who said on 21 June 2015: “We would like to provide Europeans with energy which is secure, competitive and sustainable”.

The Communication from the European Commission⁴ on ‘A Framework Strategy for a Resilient Energy Union with a Forward-Looking Climate Change Policy’ includes among its lines of action:

- Energy security, solidarity and trust
- Energy efficiency
- Decarbonising the economy
- Research, innovation and competitiveness.

In particular, the importance of supporting European research and innovation, for which Horizon 2020 represents its largest implementation tool to date, was highlighted by Commissioner Moedas⁵.

Building a resilient Energy Union in Europe with a *forward-looking* climate-change policy will not be possible without promising technologies. Fuel cells and hydrogen could constitute a triple ‘win’ for Europe because they have the potential to enhance energy security (through superior efficiency and the diversification of energy sources), environmental sustainability (through the reduction of greenhouse gas emissions from both the energy and transport sectors) while simultaneously bringing economic benefits. They contribute to the following key priorities identified by President Juncker:

- A New Boost for Jobs, Growth and Investment
- A Resilient Energy Union with a *Forward-Looking* Climate Change Policy
- A Deeper and Fairer Internal Market with a Strengthened Industrial Base

² <http://www.eesc.europa.eu/resources/docs/jean-claude-juncker---political-guidelines.pdf>

³ http://ec.europa.eu/priorities/energy-union/index_en.htm

⁴ COM(2015)80, Energy Union Package

⁵ See, for example: https://ec.europa.eu/commission/2014-2019/moedas/announcements/european-research-and-innovation-global-challenges_en

In recent years, although the fuel cell and hydrogen industry has moved into a new stage of commercial development, some important financial, economic, technical and societal challenges must be addressed before the technology can be deployed at a large scale. High technology costs coupled with lack of hydrogen distribution infrastructure remain the key bottlenecks. Sustained political support as well as industry commitment is crucial to ensure new investments in fuel cell and hydrogen technology that are necessary to trigger the transition to mass production (to cut costs due to learning curve and economies of scale) and to consolidate this nascent industry with an important potential for supporting European policy prerogatives.

To address these issues at the European level, the Fuel Cells and Hydrogen 2 Joint Undertaking (FCH 2 JU) has been set up within the Horizon 2020 Framework Programme by Council Regulation No 559/2014, as a unique public private partnership supporting research, technological development and demonstration (RTD) activities in these technologies in Europe.

This section of the Annual Activity Report (AAR) highlights the main activities and achievements of the FCH 2 JU in 2015. They reflect the Annual Work Plan (AWP) 2015 adopted by the Governing Board on 18 December 2014 and amended on 30 April 2015.

1.1 KEY OBJECTIVES IN 2015 AND ASSOCIATED RISKS

In 2015, all operational posts within the Programme Unit (seven project officers and two assistants) were occupied continuously and the Unit was involved in the following activities:

- management of all running projects under the FP7 programme (calls 2008-2013(1&2));
- preparation of the GAs for the projects selected from the first call (call 2014) under the H2020 programme;
- launch of the second call under the H2020 programme (call 2015);
- preparation of the third call under the H2020 Programme (call 2016); and
- the launch and follow-up of the studies.

As regards the management of projects from the FP7 calls (2008-2013), 28 projects were finalised in 2015 with the last payment being made to the consortia, and 53 reporting periods were finalised with their related payments. For these tasks, the Unit members were responsible for monitoring the projects' technical reports and deliverables and for assessing the related financial reports together with the financial officers (FOs). Seventy-three amendments were also implemented in the system: some were very simple (information letters) while others were the result of lengthy negotiations and important modifications to either the project descriptions of work or composition of the consortia.

By 31 December 2015, 53 projects had been finalised with a final payment to the beneficiaries for a total project cost of EUR 167,351,861.64. The FCH 2 JU's contribution represented about 45 % of these costs. The in-kind contribution from the industry (31 %) and research (23 %) beneficiaries represented 54 % of this cost. The difference (1 %) corresponded to the Joint Research Centre's (JRC) contribution. At the end of 2015, the leverage effect of the finalised FP7 projects was about 1.2 – i.e. for each euro provided by the FCH 2 JU, the industry and research beneficiaries provided EUR 1.2 in kind. This result is better than was expected in the FCH JU Council Regulation (leverage effect of 1), especially when taking into account the fact that only one demonstration project (H2moves Scandinavia) was finalised.

In 2015, with the help of external experts, 31 project mid-term review meetings took place at the FCH 2 JU premises. The contracting and processing of reimbursement claims from these experts was carried out using the new IT tool (EMI) introduced in COMPASS. The recommendation at the end of most of the mid-term meetings was to continue with each project, sometimes with suggestions for improving the results and/or outputs. The recommendations were negative for just three projects. Here, the relevant project coordinators were given a chance to propose remediation, and for all three projects the proposed changes were accepted by the external experts and the project officers. Amendments were used to implement changes for the remaining duration of these three projects.

Besides the activities related to FP7 projects, the Programme Unit was also involved in the procurement negotiations and related discussions on several studies (see 1.4 below).

1.2 KNOWLEDGE MANAGEMENT AND PROJECT INFORMATION

For the 155 projects funded under FP7, the publishable reports, public deliverables (see 1.5.1 here below), lists of publications and patents (see Annexes 3 and 4) are being uploaded progressively on the FCH 2 JU website. The same will be done for information related to Horizon 2020 projects on receipt.

The lists of beneficiaries and funding have been updated with the results of the 2013-1, 2013-2 and 2014 calls.

From the knowledge management point of view, an initial attempt was made to use the Temonas software (developed under an FCH JU project of the same name) for collecting information on a set of 'pilot' projects: template questionnaires for recording data for various technologies and TRL levels were developed in collaboration with the various stakeholders, including the FCH JU Scientific Committee (SC), the Industry Grouping (IG) and the Research Grouping (RG). Selected finished projects under the transport and energy pillars were asked to respond to these questionnaires online to test both the web accessibility and the quality of data that could be obtained.

Although the software functionalities for data collection could be validated, the overall response and the quality of the data received were somewhat disappointing.

It is hoped that a better response can be achieved in the future via improved instructions and increased awareness among the beneficiaries of the use of this reporting, as well as their assurance that the data will be treated with care regarding confidentiality. It is indeed the intention of the Programme Office to exploit the project information to obtain a valid picture of the overall progress of the technologies and to disclose data only in an aggregated/anonymised- format. To support this task, data reporting obligations have been added as specific deliverables for the Horizon 2020 projects. Data collection and aggregation is the main priority of the new knowledge management officer who started work in September 2015, replacing the former officer who left the Programme Office in March.

1.3 CALLS FOR PROPOSALS AND GRANT INFORMATION

2014 CALL

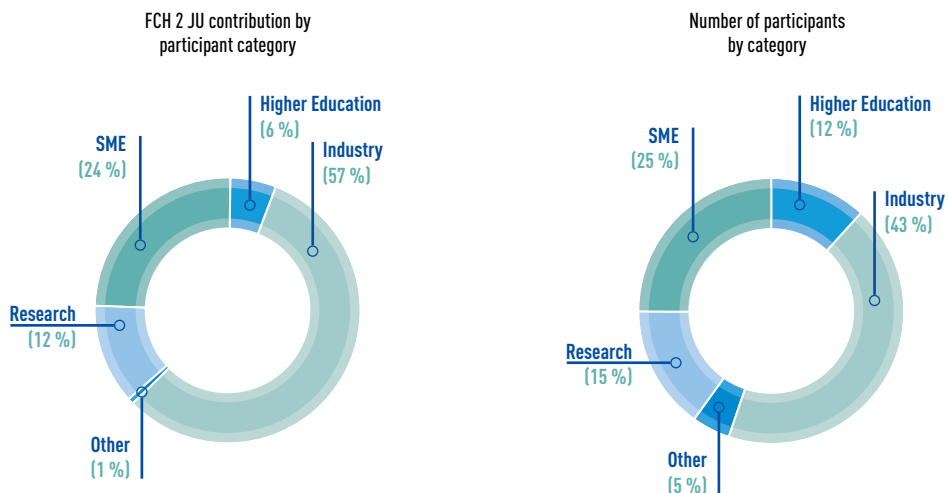
The 2014 call for proposals was closed on 6 November 2014. Fifty-seven eligible proposals were received and submitted to the evaluation exercise that took place from 17 November to 19 December 2014, with the help of 35 independent experts. Fifteen proposals were selected for funding: the list of these and the reserve lists were adopted by the Governing Board by written procedure on 26 February 2015. All consortia were informed of the evaluation results, 124 days (Time To Inform, TTI) after the closure of the call. This information was done well in advance of the TTI target fixed by the Commission (152 days) (see table below). Immediately after the information had been sent, preparation of the GAs began. A few issues needed to be fixed before the new IT tools under H2020 (COMPASS and SYGMA) became fully functional for the FCH 2 JU, which resulted in a slight delay in the TTG – with an estimated impact of around 20 days.

Nevertheless, within this margin of 20 days, it can be said that all the GAs were signed before the TTG target fixed by the Commission, i.e. 243 days after the closure of the call, except for three projects (H2REF, HySEA and HyBalance) where the signature took longer due to specific circumstances, such as the need for additional information or complex project FCH 2 JU funding with national funding.

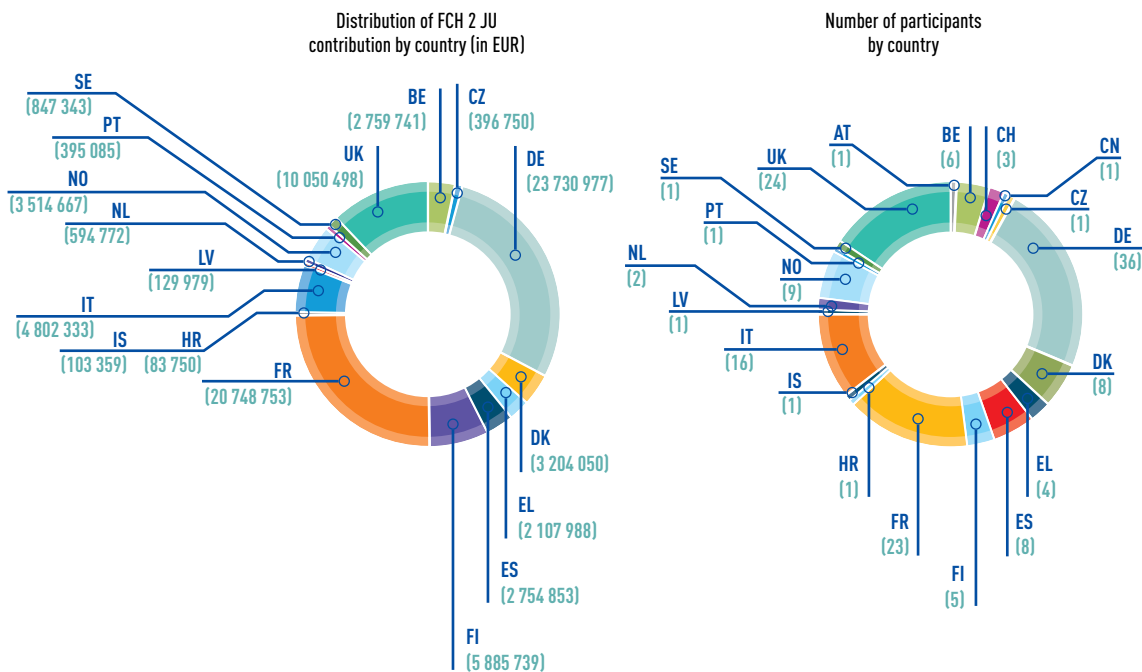
PROJECT CALL ID	PROJECT NUMBER	PROJECT ACRONYM	TTX TIME TO INFORM	TTX TIME TO SIGN	TTX TIME TO GRANT
H2020-JTI-FCH-2014-1	671384	HyBalance	124	281	405
H2020-JTI-FCH-2014-1	671396	AutoRE	124	119	243
H2020-JTI-FCH-2014-1	671403	INNO-SOFC	124	102	226
H2020-JTI-FCH-2014-1	671426	NewBusFuel	124	120	244
H2020-JTI-FCH-2014-1	671438	H2ME	124	126	250
H2020-JTI-FCH-2014-1	671457	HY4ALL	124	126	250
H2020-JTI-FCH-2014-1	671458	ELYntegration	124	122	246
H2020-JTI-FCH-2014-1	671459	BIONICO	124	125	249
H2020-JTI-FCH-2014-1	671461	HySEA	124	141	265
H2020-JTI-FCH-2014-1	671463	H2REF	124	139	263
H2020-JTI-FCH-2014-1	671465	VOLUMETRIQ	124	125	249

H2020-JTI-FCH-2014-1	671470	DEMOSOFC	124	119	243
H2020-JTI-FCH-2014-1	671473	D2Service	124	127	251
H2020-JTI-FCH-2014-1	671481	SElySOs	124	126	250
H2020-JTI-FCH-2014-1	671486	HEALTH-CODE	124	119	243

The 15 projects listed above include 152 participants for the total FCH 2 JU contribution of EUR 82,110,633.62. The figures below provide statistics on the distribution of the number of participants and the FCH 2 JU contribution by participant category. It should be noted that SME participation was verified manually by the Programme Office, as under H2020 only self-declaration by SME participants is registered. SMEs represented 25 % of the number of participants in successful projects and 24 % of the FCH 2 JU contribution.



Beneficiaries from 17 EU Member States or Associated Countries are participating in the 15 projects and have received funding. Beneficiaries from three other countries (one EU Member State (AT) and two third countries (CH and CN)) are also participating in the projects but are not receiving FCH 2 JU funding. The figures below indicate the distribution of the participants and the FCH 2 JU contribution by country.



2015 CALL

With the help of the IG, RG and EC representatives, the Programme Unit prepared the amended AWP 2015, including the 2015 call for proposals. This amendment was required since it was necessary to know the results of the 2014 call for proposals before publishing the 2015 call. This procedure was adopted by the Governing Board on 18 December 2014 while adopting the AWP 2015. The amended AWP 2015 was adopted by the Governing Board on 30 April 2015. On 5 May 2015, the call – with 20 topics distributed among the transport pillar (five), energy pillar (nine), overarching projects (three) and cross-cutting (three) – was launched with an indicative budget of EUR 123 million. The closure of the call was fixed for 27 August 2015.

Three main difficulties were observed during the preparation of this amended AWP:

- the late submission of comments from DG MOVE and DG ENER representatives on the topics proposed by the IG and RG representatives. Moreover, some of these inputs contradicted the needs expressed by the IG and RG experts, with lengthy and sometimes harsh discussions to find a satisfactory compromise. In order to eliminate this problem, a new procedure and timeline were discussed with IG, RG, EC, SC and SRG representatives and implemented for the preparation of the 2016 call for proposals.
- it was not possible to consult the Scientific Committee (SC) members or the States Representative Group (SRG) members since the composition of these two advisory bodies had not been finalised before the launch of the call.
- all supporting documents, such as the vade-mecum for proposal submission, the guide for applicants, the model GA, etc. were adapted to the new requirements of the Common Support Centre (CSC) introduced at the beginning of 2015. A lack of communication between the CSC and the JUs in general was noted during this preparation and resulted in last-minute interactions between the European Commission (EC) and the Programme Office. The issue was raised before the CSC executive committee and it is expected that there will be better communication in the future.

On 7 May, a public information session on the 2015 call was held in Brussels. This info day was followed by a brokerage event organised by the IG and RG for their members. The info day documents were used for in-person meetings or webinars for beneficiaries in the following countries: UK (10/06), ES (01/06), RO (10/06), TR (26/04), PT (26/05), CH (29/06) and IT (19/06).

Sixty-six proposals were received for the 2015 call for proposals; results of the evaluation of these proposals are presented in paragraph 1.3.2.

2016 CALL

With the help of the IG, RG and EC representatives, the Programme Unit began preparations for the AWP 2016. As mentioned above, a new procedure was discussed with the different stakeholders and was submitted to the Governing Board on 30 June 2015 for discussion. Consolidated advice from SRG and SC members respectively was submitted on the first draft of the call topics. Answers concerning the implementation of these recommendations were provided by the Governing Board in agreement with the new Council Regulation for FCH2 JU. The AWP 2016 was adopted by the Governing Board on 23 December 2015. The call – with 24 topics distributed between the transport pillar (10), the energy pillar (11), overarching projects (1) and cross-cutting (2) – was launched on 19 January 2016 with an indicative budget of EUR 117.5 million. Closure of the call is fixed for 3 May 2016.

In the 2015 innovation action proposals, which included products nearing commercialisation, it was noted that consortia partners were often unwilling to declare and share details of their business plans (e.g. competitors participating in the same proposal) in order to protect sensitive commercial data. However, for the evaluation of their proposals, they were willing to share such information with the project coordinator, FCH2 JU staff and the evaluators. Sharing confidential information was possible during grant preparation and implementation, but not during the submission step and evaluation exercise. Consequently, some proposals only provided aggregated information on their direct costs. This posed a problem for the experts in charge of evaluating proposals, as regards assessing these costs. To overcome such constraints, following a discussion during the 2015 panel meeting, the Programme Office proposed that the Governing Board included hearings for the Innovation Actions in the 2016 call. The Governing Board members stressed the need to clarify that the hearings must be considered only as assistance to the evaluators, to clarify certain issues from the initial proposal submitted, but by no means as support for the applicants, to help them improve their initial proposals. Similarly, such hearings will not provide any room for pre-negotiating a proposal (e.g. the possibility to reduce costs and/or activities). This process must fully comply with Horizon 2020 rules. Provided these precautions are duly taken into account, the Governing Board has accepted the principle of introducing hearings for the Innovation Actions in the 2016 call.

1.3.1 PROGRESS AGAINST KPIS/STATISTICS (ANNEXES 5, 6 AND 7)

Annex 5 lists the H2020 KPI indicators. Since, to date, no project report for any H2020 project funded by the FCH JU has been submitted, the first KPIs are not yet applicable. Only KPIs relating to the 2014 call for proposals are provided, all of which are good. A detailed explanation of the figures is provided under the 2014 call (1.3 above).

Annex 6 lists the indicators for monitoring Horizon 2020 cross-cutting issues. The 2014 call for proposals attracted participants from 25 of the 28 Member States, which corresponds to the highest participation rate by different Member States in the FCH2 JU programme. Only beneficiaries from Luxembourg, Cyprus and Bulgaria did not participate in the 2014 call.

The distribution of FCH2 JU contributions according to the type of activities and the pillars is compared with the Multi-Annual Work Plan (MAWP) targets in the table below:

ACTIVITY AND PILLAR	MAWP TARGET (%)	FCH2 JU CONTRIBUTION (%)
Innovation action in Transport	33	39
Research and Innovation action in Transport	14,5	16
Innovation action in Energy	33	19
Research and Innovation action in Energy	14,5	22
Cross-cutting activity	5	4

Transport activities received more FCH2 JU contributions in the 2014 call than the targets given for the 2014-2020 programme. In the energy pillar, research and innovation activities received a larger contribution from the FCH2 JU than innovation activities. This will need to be corrected in the following calls for proposals, together with a greater effort as regards cross-cutting activities.

Annex 7 lists two FCH2 JU-specific KPIs with the results for the 2014 call. It is difficult to evaluate the share of 2014 call projects dealing with the listed research activities as often a single project addresses different activities and an estimation of the funding per activity has to be performed by the project officers. As regards the 2014 call, data are not yet available for projects benefiting from additional EU Structural Funds.

1.3.2 EVALUATION: PROCEDURES AND GLOBAL EVALUATION OUTCOME, REDRESS, STATISTICS (NO. OF EVALUATORS, GENDER, AREA, ETC.)

Under the amended version of the AWP 2015, approved by the Governing Board on 30 April 2015, the FCH2 JU published the H2020-JTI-FCH-2015 call for proposals in May 2015 (Official Journal C149).

In accordance with the FCH2 JU rules (vade-mecum) on proposal submission and evaluation, adopted on 30 June 2014 by the Governing Board, an evaluation report, including all annexes (main list, reserve list, ineligible list, evaluation summary reports (ESRs), statistical information on proposals received, and experts' report, panel report and observer report) was submitted to the Board for approval.

Sixty-six proposals were received; four were withdrawn by the FCH2 JU due to abusive submission. The distribution of the 62 proposals according to pillar and call topic is provided below:

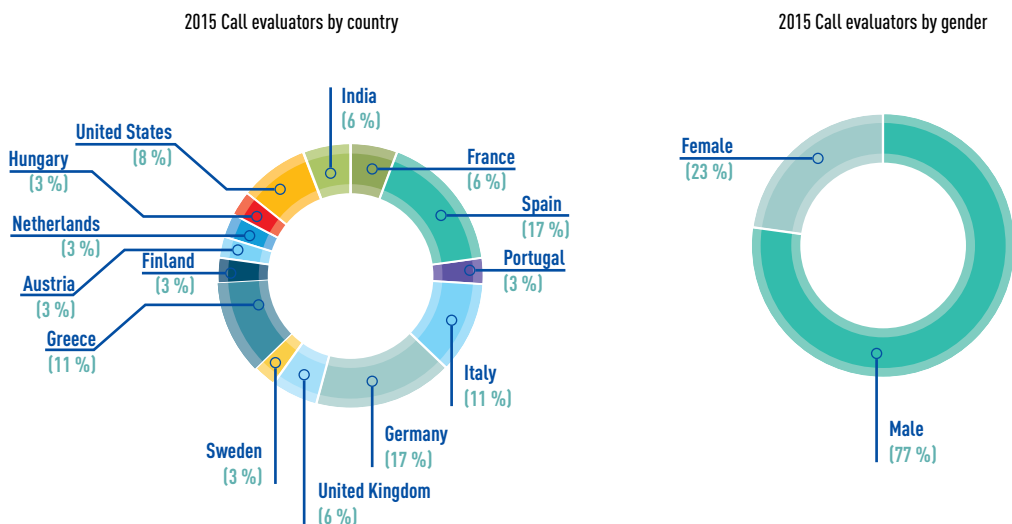
TRANSPORT PILLAR: 19	ENERGY PILLAR: 34	OVERARCHING: 5	CROSS-CUTTING: 4
1.1:4	2.1:3	3.1:1	4.1:2
1.2:3	2.2:5	3.2:4	4.2:1
1.3:3	2.3:4	3.3:0	4.3:1
1.1:4	2.4:3		
1.4:2	2.5:4		
1.5:7	2.6:9		
	2.7:3		
	2.8:2		
	2.9:1		

The 62 proposals included 479 participants.

One proposal was found to be ineligible (minimum condition for participation not met, e.g. at least three participants from three different Member States or Associated Countries).

Of the total of 61 proposals evaluated by 35 independent experts (33 evaluators and two chairs), 23 proposals (37.7 %) passed all thresholds of the call.

The figures below provide statistics on the selected experts:



The final ranking list for the call provided by the FCH2 JU Programme Office did not deviate from the experts' recommendations.

The distribution of retained proposals and budget per pillar and activity is provided in the table below:

AREA/PANEL	AVAILABLE BUDGET (MILL EUR)	TOTAL NUMBER OF PROPOSALS EVALUATED	NUMEBR OF PROPOSALS HAVING FAILED THE THRESHOLDS	NUMBER OF PROPOSALS EQUAL OR ABOVE THE THRESHOLDS	NUMBER OF PROPOSALS RETAINED (MAIN LISTS)	PROPOSED BUDGET (EUR)
TRANSPORT PILLAR Research and Innovation Activities	25	19	15	4	3	14 058 470
ENERGY PILLAR Research and Innovation Activities	20	28	13	15	8	21 428 326.00
ENERGY PILLAR Innovation Activities	34	5	4	1	1	33 932 752.75
OVERARCHING Innovation Activities	39.5	5	3	2	2	39 999 549
OVERARCHING Research and Innovation Activities	2	0	0	0	0	0
CROSS-CUTTING	2.5	4	3	1	1	497 666.25
TOTAL	123	61	38	23	15	109 916 764
		100 %	62.3 %	37.7 %	24.6 %	

The FCH2 JU Programme Office proposed that the Governing Board started the Grant Agreement Preparation (GAP) phase with 15 proposals for an FCH2 JU contribution of EUR 109,916,764.00 (including small increases in the budget for Energy – Research and Overarching Activities in order to optimise the use of the call budget).

Two reserve lists were produced, for the Energy – Research Activities and Transport – Research Activities whereby proposals passing the thresholds cannot be funded due to restrictions in the number of projects to be funded per topic. These proposals could only be funded if any of the proposals in the related main list and topic should fail the GAP step. There were no reserve lists for the other panels.

Thirty-eight proposals were rejected and one proposal was declared ineligible. A remaining budget of EUR 13,083,236.00 (about 10.64 %) was not used under the 2015 call.

On 18 November 2015, the Governing Board adopted all lists of actions, including the rejection list, ineligible list, reserve lists and main list.

Information letters were sent to the proposal coordinators on 21 November, i.e. less than three months after closure of the call (well in advance of the TTI target fixed by the EC (152 days)).

Six proposals introduced a redress request that will be treated in 2016.

1.4 CALL FOR TENDERS

In addition, the FCH JU has funded a number of studies and supporting actions through calls for tender.

On the basis of the AWP 2014, the FCH JU contracted four studies in 2014:

1. Development of a European commercialisation strategy for stationary fuel cell applications (distributed power generation);
2. Economic and technical assessment of the role of hydrogen in energy storage;
3. Development of a European Urban Fuel Cell Bus Commercialisation Strategy based on the results of the fact-based comparison of alternative powertrains carried out in 2012;
4. Green Hydrogen Production Pathways.

The two first studies were carried out in 2014 but continued to be disseminated in 2015.

- The study on **stationary fuel cells** was the subject of a launch event in Brussels, a lunch debate in the European Parliament as well as a series of round tables in European cities. The study is available at <http://www.fch.europa.eu/studies>
- Regarding the study on **energy storage**, a launch event was organised in March 2015. The study was also presented at a few conferences. Moreover, it was useful to trigger discussion with other energy sector, in particular the gas sector through Eurogas⁶ and the wind energy sector through the European Energy Research Alliances and their joint programme on wind energy (EERA JP Wind Energy)⁷. The study is available at <http://www.fch.europa.eu/studies>

The **bus** study started in March 2014 and continued until May 2015. The study was instrumental in building a growing coalition, now composed of more than 45 cities and/or bus operators, 5 bus manufacturers, a number of technology suppliers and H2 infrastructure providers. In 2014 the 5 bus manufacturers had signed a public letter of intent indicating their willingness to provide several hundreds of fuel cell bus before 2020. In June 2015, the cities and bus operators replied by signing in presence of the European Commissioner for Transport, Violeta Bulc, a letter declaring their intention to purchase and operate several hundreds of fuel cell buses in the same time frame. The two letters of intent and the study report are available at <http://www.fch.europa.eu/studies>.

The study on **green hydrogen** pathways was contracted in 2014 but conducted in 2015. It identifies and assesses the merits of the different technologies that can produce green hydrogen (beyond electrolysis, which was the subject of a previous study). The study, which will help the FCH2 JU to select its funding priorities in the field of hydrogen production, is available at <http://www.fch.europa.eu/studies>.

⁶ www.eurogas.org

⁷ <http://www.eera-set.eu/eera-joint-programmes-jps/wind-energy/>

The AWP 2015 foresaw operational procurements on the following topics:

1. Joint Procurement Strategy for fuel cell buses;
2. Business model and financing arrangement for the commercialisation of micro-CHP fuel cells;
3. Early business cases for energy storage through hydrogen.

The strategy for the joint procurement and co-financing of hydrogen buses is a direct continuation of the bus study mentioned above. The idea is to systematically identify cities/regions that are willing to test about 20 fuel cell electric buses per location and build clusters to organise joint procurement with other cities, the aim being to reach the joint procurement of about 100 buses by cluster and several hundred in total. The expected benefits of this activity are: (a) the creation of volume to push costs down; (b) the creation of competition to push prices down; and (c) the standardisation of bus requirements to push costs down. In July, the FCH 2 JU contracted five cluster coordinators to build this joint procurement strategy. The end results will be available in June 2016 but it can already be said that cities have indicated a serious and informed wish to procure more than 550 fuel cell buses and to put them into operation before 2020.

For the other two studies, intense preparatory work was done in 2015 and they should be contracted in 2016.

1.5. DISSEMINATION OF AND INFORMATION ON PROJECTS RESULTS

1.5.1. PROJECT INFORMATION ON THE FCH 2 JU WEBSITE

During 2015, the FCH 2 JU revised the website structure concerning the funded projects, on the one hand to accommodate the different particularities of the two Framework Programmes to which the projects belong (FP7 until 2013 calls, Horizon 2020 since call 2014, i.e. projects that were signed in 2015), and on the other hand to increase the amount of information that can be retrieved by external visitors to the website.

Revised structure

Projects can now be viewed [alphabetically](#) (all projects), [alphabetically by application area](#) (FP7 projects only) and [alphabetically by pillar](#) (H2020 projects only).

Improved project information

The existing basic information related to the projects has been checked and updated (budgets, participants, duration, etc.). It is intended that these data will be continuously updated, i.e. to reflect any amendment affecting, for example, budget, participants or duration.

The existing information on projects has been complemented with a list of references of the project-reported patents (see Annex 4) and publications (see Annex 3) as well as with public deliverables (after approval by the project manager), according to a mass upload based on the situation in June 2015. At the moment, this only refers to FP7 projects, as Horizon 2020 projects had only just started. This is currently still in the process of being verified for completion. It is then intended to keep all this information updated on a quarterly basis (at least), progressively adding newly approved deliverables and new references to patents and publications.

Publishable summaries are still to be added for all projects and will be treated in a similar manner to the deliverables and references to patents and publications: uploaded and updated. The addition is planned for the first quarter of 2016. The publishable summaries will only be available for the projects that have already reported progress to the FCH 2 JU, i.e. typically 18 months after their start.

Retrieving information

Each project has a dedicated page on the FCH 2 JU website where all the related information can be retrieved. These pages can be accessed from the alphabetical lists, by application area (FP7 projects) or by pillar (Horizon 2020 projects).

Patents (see Annex 4), publications (see Annex 3) and deliverables can also be searched separately by application area (FP7 projects only). It is intended to implement a comparable search for H2020 projects by pillar but this has not been treated as a priority since we had no such content for these projects in 2015.

A similar search dedicated to publishable summaries will also be implemented once they have been published on the website.

1.5.2. PROGRAMME REVIEW DAYS 2014 AND 2015

The fourth edition of the Programme Review Days (PRD) took place on 10 and 11 November 2014. With the help of an external expert, the knowledge management officer prepared the final report which was published on the FCH 2 JU website on 10 April 2015. The analysis of the project results in the light of the assessment of the FCH 2 JU programme's progress and achievements was carried out with the help of the SC members and other external experts.

The fifth edition of the PRD was organised on 17 and 18 November 2015 at the EC's Charlemagne Building in Brussels. The objective was to assess progress and achievements of the FCH 2 JU programme, notably in relation to the targets of its multi-annual and annual plans, as well as in relation to international developments.

As in previous editions, the review of FCH 2 JU projects was conducted in two phases:

1. Remote assessment during the preparation of the PRD based on the evaluation by 19 experts (including nine from the SC) of progress against the multi-annual and annual targets and the international state of the art; and
2. The public event at which the projects presented posters in dedicated sessions, while selected projects also made oral presentations. The posters were produced by the FCH 2 JU Programme Office using information retrieved from the coordinators according to a pre-designed template. A total of 100 posters were produced and were displayed throughout the PRD and Stakeholders Forum (SF) (held on the following day, 19 November 2015). Oral presentations were made on 47 projects, in six sessions, according to subject.

A total of 317 participants attended the 2015 PRD event (against 284 in 2014) (see paragraph 2.1).

1.5.3. SUCCESS STORIES

In 2015, a brainstorming activity with IG representatives took place in order to identify success stories funded by the FCH 2 JU – 15 pitches were identified:

1. Hydrogen enables us to get the most out of our wind and solar energy
2. The rebirth of an old technology? Alkaline water electrolysis is the new phoenix
3. Green hydrogen – from laboratory to field trials
4. Reduce electricity and gas bills while minimising CO₂ emissions with FC-mCHP
5. A reliable and clean solution for back-up power through fuel cells
6. Lower cost energy for industry with fuel cell CHP
7. Hydrogen and fuel cells – creating local jobs and supporting growth
8. PEM water electrolysis for hydrogen as a clean, local fuel for transport
9. Hydrogen cars: zero-emission electric vehicles with long range and quick refills
10. Fuel cell buses: clean electric urban transport with the advantages of diesel buses
11. Hydrogen infrastructure: from national plans to a comprehensive European strategy
12. For a 0 (CO₂) emission transport system
13. R&D in fuel cells: developing long-lasting, performant and cheaper systems
14. Strengthen know-how for a European stack industry
15. Hydrogen fuel cell vehicles can be considered as safe as other vehicles.

References to the related FCH 2 JU projects together with the anonymised data available from the project results were produced for all these pitches.

On 18 November 2015, the GB members gave a mandate to the Programme Office to find a communication agency to produce high-quality success stories. The Programme Office will report to the Governing Board on the progress of this task and the success stories will be published in 2016.

1.6. OPERATIONAL BUDGET EXECUTION

FP7 budget

At the end of 2015, 73 operational payments for 72 periodic reports and 1 operational study were made for a total of EUR 44,644,225. The budget execution (in terms of payment appropriations) was 75.7 % (74.7 % in 2014).

H2020 budget

In 2015, 15 pre-financing payments were made for the 2014 call projects. In addition, there were three payments for operational studies. The budget execution (in terms of payments) reached 99 %.

In terms of commitment appropriations 2 global commitments for the call 2015 and the studies under the 2015 Annual Work programme were made with the budget execution being at 88.7 %. From the unused commitment appropriations, a sum of EUR 13,684,458 has been reintroduced into the 2016 budget and will be used for 2016 call for proposals.

1.7. IN-KIND CONTRIBUTIONS

FP7 programme

The FCH JU founding regulation (Council Regulation 521/2008 as amended by Regulation 1183/2011) establishes that the operational costs of the FCH JU shall be covered through the financial contribution of the European Union and through in-kind contributions from the legal entities participating in the activities.

Calculation of the level of in-kind contributions is carried out following a methodology approved by the Governing Board on 10 February 2012. Verification of these costs includes: 1) *ex-ante* controls before validation of the cost claims submitted by the beneficiaries (either based on desk-review assessment by the Programme Office and/or certificates on financial statements provided by independent auditors); and 2) *ex-post* audits after validation of the cost claims, carried out by independent auditors appointed by FCH JU, in line with the FCH JU *ex-post* audit strategy.

In addition, in accordance with the methodology, the aggregated level of in-kind contributions is assessed every year by an independent external auditor. In 2015, KPMG carried out the assessment and concluded that the aggregated level of in-kind contributions certified by the FCH2 JU Executive Director (cut-off date 31 December 2014) for EUR 485,888,775.22 should be decreased by EUR 155,374.84 (or -0.03 %) to EUR 485,733,400.88. The auditor recommended strengthening the procedure by adding a further verification step.

As of 31 December 2015, details of the aggregated level of in-kind contributions are as follows (in EUR):

FP7 YEAR 2015	ACCUMULATED VALIDATED IKC CONTRIBUTIONS AT 01/01/2015	VALIDATED IKC CONTRIBUTIONS IN YEAR 2015	IKC CONTRIBUTIONS RECEIVED BUT NOT VALIDATED AT 31/12/2015	IKC CONTRIBUTION ESTIMATE (PRO-RATA) AT 31/12/2015	IKC CONTRIBUTION ESTIMATE TO BE VALIDATED AS FROM 01/01/2016	FORECAST OF AGGREGATED LEVEL OF IN-KIND CONTRIBUTIONS
Industry Grouping	77 118 618	41 351 626	37 974 957	71 890 426	103 905 836	332 241 463
Research Grouping	36 166 527	30 945 787	16 593 566	30 582 108	42 371 041	156 659 029
TOTAL	113 285 145	72 297 413	54 568 523	102 472 534	146 276 877	488 900 492

H2020 programme

The FCH 2 JU legal framework for in-kind contributions, as defined in Council Regulation 559/2014 of 6 May 2014 establishing the FCH 2 JU, is described in section 2.2.2.

Calculation of the level of in-kind contributions is carried out following the methodology endorsed by the Governing Board on 18 November 2015. The same *ex-ante* controls and *ex-post* audits apply to the valuation of the IKOP under H2020 as under FP7.

As of 31 December 2015, the estimated in-kind contributions related to the 15 projects signed related to the H2020 Programme (2014 call) was as follows (in EUR):

H2020 YEAR 2015	ACCUMULATED VALIDATED IKOP CONTRIBUTIONS AT 01/01/2015	VALIDATED IKOP CONTRIBUTIONS IN YEAR 2015	IKOP CONTRIBUTIONS RECEIVED BUT NOT VALIDATED AT 31/12/2015	IKOP CONTRIBUTION ESTIMATE (PRO-RATA) AT 31/12/2015	IKOP CONTRIBUTION ESTIMATE TO BE VALIDATED AS FROM 01/01/2016	FORECAST OF AGGREGATED LEVEL OF IKOP CONTRIBUTIONS
Industry Grouping				3 868 029	30 947 115	34 815 144
Research Grouping				19 924	150 962	170 886
TOTAL	0	0	0	3 887 953	31 098 077	34 986 030

02

SUPPORT TO OPERATIONS

2.1. COMMUNICATION ACTIVITIES

2.1.1. COMMUNICATION STRATEGY

With the implementation of the FCH JU second phase, the FCH 2 JU redefined its communication objectives and priorities.

A new communication strategy has been developed, identifying key audiences and priorities based on the latest developments within the organisation. The strategy's main role is to frame annual communication plans which describe detailed actions, such as specific audiences to focus on for the year, new material to be developed, and the events to attend or organise.

The communication strategy builds on the document 'FCH 2 JU Communication Objectives, Roles and Responsibilities', adopted by the Governing Board on 11 February 2015, in which four general communication objectives were identified:

- To ensure appropriate and dedicated political support to put in place an adequate European regulatory framework supporting FCH technologies;
- To facilitate access to support mechanisms at European, national and regional level complementary to those offered by the FCH 2 JU, including new and additional financial resources;
- To increase the public and political awareness of FCH technologies and their applications in order to achieve a critical mass of supporters and ensure the correct perception and acceptance;
- To expand the outreach of the FCH sector to new public and private audiences and partners with the aim of opening up markets and developing new business cases.

A two-dimensional communication strategy

Communication activities are organised mainly to achieve two types of goals: to increase the visibility of the FCH 2 JU as an organisation and to increase the share of FCH technology as part of the larger European landscape to support market introduction.

1) Raising the organisation's profile

It aims to enhance the visibility and reputation of the FCH 2 JU, conveying the Joint Undertakings' achievements and successes, and further promoting participation in the FCH 2 JU calls for proposals;

2) Highlighting the technology's potential and market readiness

This part focuses on allocating specific communication actions to key selected sectors (different purposes, different audiences, and different messages) in order to increase the visibility of the most advanced and DEMO projects.

Key driver

To implement communication actions efficiently, the strategy also emphasises the need to increase and maintain a high level of coordination between all actors involved in communication, with the aim of delivering a "one-voice" approach.

The communication strategy was adopted by the Governing Board on 14 December 2015.

2.1.2. NEW MATERIALS AND CHANNELS

Brochure: 'How to get involved in the FCH JU programme under Horizon 2020'

To further engage with potential applicants of the FCH 2 JU programme, an explanatory brochure has been produced with the aim of providing clear information on the programme's rules on the participation and organisation of calls for proposals. The instrument has been widely disseminated through FCH 2 JU channels and during events.



Video

An FCH 2 JU video has been produced with the purpose of presenting both the organisation and the technology, with a special focus on transport activities: <http://www.fch.europa.eu/image/about-fch2-joint-undertaking>

The video has been used mainly as communication material during events.

Banner

On the occasion of the PRD-SF 2015, a large banner was produced with a brand new design. It was placed on the Charlemagne Building for one week to advertise the organisation, the technology and the two events.



FCH2 JU website

The new FCH 2 JU website has been improved in order to add attractive content. In this respect, the 'multimedia' part has been reorganised to enable better presentation of pictures and videos.

2.1.3. Communication objectives and outreach to key audiences – 2015 activities

Audiences

The communication strategy identifies five categories of audiences:

CATEGORY	TARGETS AUDIENCE
Policy-makers	EU level, Member States, municipal and regional authorities, councillors and scientific attachés of National Permanent Representations to the EU
New public	Public transport authorities, bus operators, renewables and energy associations, energy service companies (ESCOs), utilities, decentralised heating operators, actors in the building and renovation field
Decision supporters and multipliers	Environmental and national energy and mobility associations, NGOs
General public	
FCH stakeholders and potential applicants	IG/IR group, technological experts, new beneficiaries (SMEs and Member States which are not represented), National Contact Points (NCP)
Financial actors	EU/national and regional funding programmes and structures

The 2015 activities addressed each of these categories, with a special focus on policy-makers and new public.

Objectives

In 2015, communication activities were organised mainly to: improve the programme’s visibility to engender stronger support for both the FCH 2 JU programme and the FCH technology among European and national decision-makers; to foster coordination with EU programmes working towards leveraging synergies with other European financing institutions; and to highlight the technology’s potential with project results examples to wider audiences (operators, utilities, NGOs, etc.).

2015 Communication activities

A relevant set of institutional communication initiatives was carried out by the Programme Office in order to ensure political visibility and support to the overall FCH 2 JU programme.

European Parliament

The Programme Office (i.e. the Executive Director and/or a Programme Office representative) had regular contacts and/or meetings with the Chairs of the European Parliament Committees (ITRE/ENVI/TRAN) mainly involved/interested in the FCH 2 JU activities. The key messages focused on: 1) information about the FCH 2 JU programme and its objectives; 2) dissemination of project results and achievements; and 3) clarification of the added value of a PPP and the FCH 2 JU funding mechanism. A number of other MEPs have also been contacted or have attended meetings.

In addition, the Programme Office coordinated the organisation of the 3rd Joint Exhibition of six JUs based in Brussels (BBI, Clean Sky, ECSEL, FCH, IMI and SESAR). The event took place from 7 to 10 December 2015 at the European Parliament premises. This joint event aimed to convey important messages to MEPs by stressing the ability of JUs to facilitate a leverage effect and increase R&D investment in the sectors concerned. Journalists, MEPs, EC and Court of Auditors’ representatives were present.

European Commission

FCH 2 JU activities have been actively promoted through meetings with Heads of Cabinet and Members of the Cabinet of the Commissioners for Climate Action and Energy, Research and Innovation, and Energy Union.

Council

All the activities initiated in recent years have been further developed and strengthened. During the Latvian Presidency of the EU Council, the Programme Office maintained contacts with the relevant delegates and actively promoted the involvement of the FCH 2 JU in high-level events taking place in Riga.

Committee of the Regions

In May, on the occasion of an official meeting of the Commission for Territorial Cohesion Policy and EU Budget of the Committee of the Regions, the FCH 2 JU was officially invited, together with the Latvian Minister of Transport, to illustrate the role that hydrogen could play in the urban mobility of the future.

Member States

The Executive Director and/or a Programme Office representative participated in several meetings, conferences and Info Days in Brussels and in cities in a number of EU Member States, ensuring visibility, gathering political support for the overall programme, and raising awareness of FCH2 JU activities (i.e. calls for proposals).

Participation in the Hannover Messe 2015

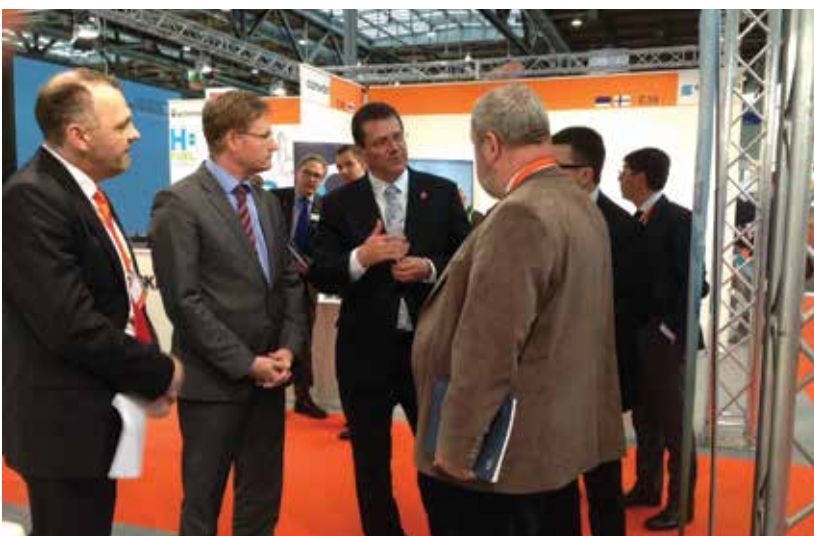
In April 2015, the FCH 2 JU joined participated in the leading fair in the FCH sector to present specific project results and to disseminate newly published material (studies on energy storage and on stationary FC in distributed generation, and the brochure for applicants).



The Programme Office's participation was coordinated by project teams to enable the delivery of joint messages to emphasise the added value of FCH 2 JU support to projects and their outcome.

It was also during the Hannover Messe that the FCH 2 JU met with Mr Maroš Šefčovič, Vice President of the European Commission, in charge of the Energy Union, to present the JU's latest activities.

Mr Šefčovič expressed strong support for fuel cells and hydrogen, calling it the energy of the future.



Organisation of the first Smart Specialisation Workshop on Fuel Cells and Hydrogen

In line with the strategic approach of the EC to allow R&I activities to access European Structural and Investment Fund interventions, the FCH 2 JU held this workshop together with the EC and with the active support of the Rhône-Alpes region.

This reinforced the FCH 2 JU's role as the European platform bridging the gap between research and deployment. Attendance at the workshop highlighted the significant interest from regions in the implementation of fuel cells and hydrogen technologies for both clean transport and sustainable and low-carbon energy. The workshop laid the foundations for constructive dialogue between regional and industrial actors from both a pragmatic and practical approach (85 participants including 30 regions).

EU Sustainable Energy Week

For the first time, the FCH 2 JU participated in the EUSEW. This allowed it to raise its visibility in a wider context and to highlight new outcomes within its energy pillar. The 2015 conference focused on energy efficiency, while heating and cooling policy issues were on the EU's agenda. The FCH 2 JU acknowledged this occasion as being appropriate to highlight key developments in the field.

The FCH 2 JU participated in a session as part of the main programme, in the 'High Level Policy Conference', together with DG RTD and with a focus on 'Public Private Partnership (PPP) as a tool to accelerate energy innovation'. The FCH 2 JU secured a diverse range of speakers (EC, regions, industry, etc.) to trigger key discussions and showcase the added value of a PPP in the FCH field. The session ended with the presentation of the latest developments in the field of micro-CHP (following publication of a new study on [Distributed Generation](#) and the progress of the FCH 2 JU-funded project ene.field).

Joint workshop with DG Move on innovation pipelines – TEN-T Days 2015

As a new highlight and for the first time in 2015, a new concept built upon the already existing 'innovation' session was implemented within the TEN-T Days' agenda, devoted to emphasising a specific technology and with the objective of better coordinating all EU programmes and initiatives. DG Move selected the FCH 2 JU to join this first workshop, considering the potential of FCH technologies.

This was a major opportunity for the FCH 2 JU to address a very wide audience related to mobility, while being present in a strategic location, as Latvia held the presidency of the Council of the EU at that time.

This unique three-hour session took place as part of the main agenda focusing on FCH technology, with the participation of: EC Commissioner for Transport Ms Violeta Bulc; Mayor of Riga, Mr Nils Ušakovs, Mr Olivier Onidi, Director European Mobility Network, the European Investment Bank and wide industry representation. It was during this workshop that, as a follow-up to the 2014 bus industry's commitment towards the city's representatives⁸, the FCH 2 JU organised a signature ceremony underlining the commitment of innovative first buyers (representatives from five national clusters (Germany, Italy, Latvia, the Netherlands and the UK) towards the major commitment of about 30 cities to jointly operate several hundred hydrogen electric buses. The bus operators' letter of intent was welcomed by Commissioner for Transport, Ms Violeta Bulc.



A significant H₂ exhibition was also organised (cars, buses, trucks, etc.), providing an occasion for the Commissioner, Mayor and other decision-makers to acknowledge the readiness of the technology and its many benefits.

⁸ <http://www.fch.europa.eu/news/european-bus-manufacturers-and-leading-mayors-step-fuel-cellelectric->



Webinar with the Covenant of Mayors

As increasing synergies are being created among the different FCH 2 JU bus projects and complementary communication actions are being undertaken, some common key audiences have been identified. Amongst these, city representatives remain crucial to address the potential of FCEB and increase visibility of all FCH 2 JU efforts to improve certain aspects of the technology as well as triggering coalitions and regional clusters. In that respect, the FCH 2 JU has made contact with the Convent of Mayor's office in Brussels to present FCH 2 JU activities, and a first webinar has been organised aimed at the COM members, entitled 'New transport technologies: How can cities move in energy efficient ways?'. The webinar addressed a different audience (outside the H₂ loop) as participation was mainly from southern and eastern countries, in line with the objective of targeting wider audiences (in this case broadening the geographical scope).

K4I – innovation Summit

In December 2015, the FCH 2 JU, along with the other Joint Undertakings, took part in the 'Knowledge for Innovation' event during the 7th European Innovation Summit. The event took place in the European Parliament, assuring the JU's visibility among EP members, high-level policy-makers. The event highlighted the fact that PPPs are starting to showcase clear socio-economic benefits. The FCH 2 JU stated that, according to industry data, it has sparked investments across the fuel cells and hydrogen industry, and the FCH sector now represents very significant economic potential⁹. In parallel with the presentations, the FCH 2 JU had a dedicated stand during the event.

A joint press release was produced, focusing on the initial socio-economic benefits of PPPs: <http://www.fch.europa.eu/press-releases/european-public-private-partnerships-delivering-first-socio-economic-impacts>

Press and multipliers

In 2015, the FCH 2 JU continued to maintain relations with journalists by sharing news and press releases on key moments and the release of specific news.

Examples of press clippings:

1) **Le Vif L'express, 16 April 2015:** 'Une solution énergétique propre et sûre: l'hydrogène'

On the request of the FCH 2 JU, an interview was set up between the Belgian's leading weekly magazine and the FCH JU's Head of Unit and Director. This led to a two-page article focusing on the added value of H₂ as a clean fuel for different applications.

<http://www.fch.europa.eu/sites/default/files/Hydrog%C3%A8ne%20Le%20Vif%20%28ID%202839158%29.pdf>

2) **L'ECHO, 3 October 2015:** 'Premier coup de pelle pour l'hydrogène en Belgique'

On 2 October 2015, in the presence of the Flemish Minister for Budget, Finance and Energy, Annemie Turtelboom, the first stone of the hydrogen refuelling station was laid in Zaventem. As this is part of the FCH JU-financed project SWARM, the FCH 2 JU Director participated in the official launch which resulted in very good press coverage. The Belgian financial newspaper L'ECHO featured the story with a picture:

<http://www.fch.europa.eu/press-clippings/premier-coup-de-pelle-pour-l-hydrog%C3%A8ne-en-belgique>

⁹ <http://fch.europa.eu/news/spotlight-ppps-first-socio-economic-impacts-european-innovation-summit>

3) Science Business, 17 December 2015: article on the FCH 2 JU – interview with Executive Director

<http://www.sciencebusiness.net/news/77367/%E2%80%98Remember,-it-took-the-world-120-years-to-make-an-efficient-diesel-engine%E2%80%99>

2.1.4. PROGRAMME REVIEW DAYS AND STAKEHOLDER FORUM 2015

The FCH 2 JU held its annual three days event in the EC’s Charlemagne Building – see point 1.5.2 for more on the PRD.

The purpose of the Stakeholder Forum 2015 was to act as a gatherer within the European FCH community in order to trigger discussions on further objectives and a strategic vision. It also aimed to highlight the progress and potential of the FCH sector and to attract a wider range of participants. The FCH 2 JU undertook a significant update of its databases, in particular to identify new types of audiences to be invited, such as European/national associations and NGOs. The FCH JU invited all these new actors to the PRD-SF 2015.

During the registration process, the FCH 2 JU coordinated actions with several EC communication units in an effort to advertise the event more widely and boost registrations.

This enabled the FCH 2 JU to:

1. Advertise the actual event and make an impact on registrations (421 registrations in total, which is a record for the FCH 2 JU);
2. To share the information about web-streaming services as a second chance to follow the event should some audiences be unable to attend.

The information has been picked-up by the ‘Innovation Union’ Twitter and Facebook account, by H2020 website and Inea social media channels.

In total, 421 registrations were counted and 413 onsite participants were recorded, which contributed to the most successful participation rate for the PRD-SF to date.

As to the event itself, the link between the PRD and the SF was established by FCH2 JU Executive Director Bert De Colvenaer during the opening remarks of the SF. His main observations included reference to the fact that, in addition to a general increase in the projects’ technology readiness level, there is now greater coordination between EU programmes, especially in the FCH sector.





Mrs Annemie Turtelboom, Vice-Minister-President of the Government of Flanders, Flemish Minister for Budget, Finance and Energy, participated in the SF.

During her presentation, Mrs Turtelboom stressed that “as the minister responsible for energy in Flanders, the topic of hydrogen has an increasing interest and relevance for the Flemish policies towards clean technologies”.

Events, conferences, workshops and other initiatives attended by the FCH 2 JU during 2015

- 7-9 Sept: HYPOTHESIS (HYdrogen POWer THEoretical and Engineering Solutions International Symposium) - La Grande Motte, FR
- 14,15 Sept: Secure, clean and efficient energy info day - Brussels, BE
- 13-16 Sept 2015: EFCD (Electrolysis and Fuel Cell Discussions) - Brussels, BE
- 15-16 Sept: Joint Workshop Clean Sky - Lampholdhousen, DE
- 21-25 Sept: Global Fuel Cell Excursion - South Korea
- 29 Sept: 3rd International Workshop on Degradation Issues of Fuel Cells and Electrolysers - Santorini, EL
- 19 Oct: Busworld Academy - Kortrijk, BE
- 19-25 Oct: 6th H₂ Safety Conference - Yokohama, JP

2.2. LEGAL AND FINANCIAL FRAMEWORK

1. Financial rules

Regulation EC 2015/1929 amended the EU General Financial Regulation¹⁰. This amendment had two different impacts on the financial rules of the FCH 2 JU:

1. A revision of the **public procurement rules** to align them with the new Directives 2014/24/EU on public procurement and 2014/23/EU on concession contracts. This change in the General Financial Regulation applies directly to the FCH 2 JU because its financial rules refer directly to the procurement rules set out in the General Financial Regulation.
2. A revision of the rules on **external audit, discharge and annual reporting** applicable to bodies implementing PPPs, i.e. articles 60 and 209 of the General Financial Regulation. The changes in these provisions have modified the rules of the PPPs.

¹⁰ Regulation (EU, Euratom) No 966/2012 of the European Parliament and of the Council of 25/10/2012 on the financial rules applicable to the general budget of the Union

The integration of this second category of modification requires a two-step process:

- First, the EC adopted a delegated act¹¹ amending the model for financial rules of bodies implementing PPPs.
- Second, the FCH 2 JU must revise its financial rules to align them with the revised model. The FCH 2 JU prepared such a revision which was sent to the EC for agreement. Thereafter, the FCH 2 JU's revised financial rules will be submitted to the Governing Board for adoption.

2. Methodologies for reporting and assessing IG and RG members' in-kind contributions and additional activities

The FCH 2 JU's founding regulation provides that its two private members, Hydrogen Europe and N.ERGHY have to contribute to FCH 2 JU activities by providing a cash contribution to the administrative costs, in-kind contributions incurred in operational activities (referred to as IKOP) and additional activities (referred to as IKAA).

In-kind contributions in operational activities (IKOP): The FCH 2 JU finalised its methodology for planning, reporting, certifying and verifying IKOP. The methodology was endorsed by the Governing Board on 18 November 2015 and the first annual reporting will take place accordingly at the beginning of 2016.

Additional activities (IKAA): The FCH 2 JU and its three members developed a methodology for planning, reporting, certifying and verifying IKAA. While some elements of the methodology still require fine-tuning before it is approved, two annual plannings have already taken place (plan for 2014-2015 and plan for 2016) while the first reporting exercise (based on the plan for 2014-2015) will take place at the beginning of 2016.

3. Internal procedures

The FCH 2 JU either adopted or revised the following internal procedures:

a) Guidance on confidentiality and discretion

By its very nature, FCH2 JU works with information in all forms (electronic, material/paper or verbal). In accordance with article 15 of the Founding Regulation¹², FCH 2 JU has a duty to ensure the protection of sensitive information whose disclosure could damage the interests of its members or of participants in its activities.

In order to ensure compliance with the requirements of article 15, as well as with other requirements contained in the Regulation regarding public access documents¹³ and in the rules for protection of personal data¹⁴, the guidelines aim to guide FCH JU staff in the appropriate handling of information they generate or receive and which they intend to store, process or further disseminate.

b) FCH 2 JU internal rules on the review of project periodic reports

c) Procedure for review involving external experts

The EC Internal Audit Services performed a limited review of the FCH 2 JU's intellectual property and dissemination policy. It recommended having more explicit requirements in terms of dissemination and ensuring compliance with these requirements. As a result, the two internal procedures mentioned above were revised accordingly.

d) Rules on the prevention and management of conflict of interests which are now under review by the EC

On the basis of a recommendation from the discharge authorities and one from an audit performed by the FCH 2 JU's internal auditor, the FCH

¹¹ Commission Delegated Regulation (EU) C(2015)7554 – 30 October 2015, amending Commission Delegated Regulation (EU) No 110/2014 on the model financial regulation for public-private bodies

¹² Council Regulation (EU) No 559/2014 of 6 May 2014 establishing the Fuel Cells and Hydrogen 2 Joint Undertaking

¹³ Regulation (EC) No 1049/2001 of the European Parliament and of the Council of 30 May 2001 regarding public access to European Parliament, Council and Commission documents

¹⁴ Regulation (EC) No 45/2001 of the European Parliament and of the Council of 18 December 2000 on the protection of individuals with regard to the processing of personal data by the Community institutions and bodies and on the free movement of such data

2 JU prepared internal rules which specify in a more comprehensive manner the obligations in terms of conflict of interests. The rules have been submitted to the EC for review.

4. Data protection

The FCH 2 JU conducted a general review and update of its data protection practices by reviewing its privacy statement and notifications of data-processing operations.

2.3. BUDGETARY AND FINANCIAL MANAGEMENT

The section below is an extract of the report on budgetary and financial management provided for in article 39 of the FCH 2 JU financial rules where more detailed information can be found.

2.3.1. BUDGET

The FCH 2 JU budget comprises revenue and expenditure. The budget for expenditure is divided into three titles:

- Title 1 covers staff expenditure such as salaries, training, costs associated with the recruitment procedure, missions, medical expenses and representational costs;
- Title 2 covers the cost associated with the functioning of the FCH 2 JU, such as renting premises, IT needs, expenses related to external communication, expert fees and costs of *ex-post* audits;
- Title 3 covers the operational activities of FCH 2 JU.

An overview of the initial budget and amendments is presented in the table below:

BUDGET 2015 (IN EUR)								
	VOTED BUDGET		1 ST AMENDING BUDGET		2 ND AMENDING BUDGET		FINAL BUDGET	
	CA	PA	CA	PA	CA	PA	CA	PA
Revenue								
EU operational	12 321 843	88 030 063	280	747 856	13 948 227		126 270 350	88 777 919
EU administrative	2 293 682	2 293 682	-280	-1 432			2 293 402	2 292 250
Industry Grouping	2 588 933	2 588 933	-241	-1 232			2 588 692	2 587 701
Research Grouping	429 886	429 886	-39	-200			429 847	429 685
Total revenue	117 634 344	93 342 564	-280	744 992	13 948 227	-	131 582 290	94 087 555
Expenditure								
Title 1	3 295 025	3 295 025		97 190			3 295 025	3 392 215
Title 2	2 017 475	2 017 475	-560	761 943			2 016 915	2 779 418
Title 3 - FP7	-	58 043 219		-42 572	769 128		769 128	58 000 647
Title 3 - H2020	112 321 843	29 986 844	280	-71 569	13 179 099		125 501 222	29 915 275
Total expenditure	17 634 344	93 342 564	-280	744 992	13 948 227	-	131 582 290	94 087 555

The 2015 budget was approved by the Governing Board on 18 December 2014. Commitment appropriations increased by 17 % compared to 2014, mainly due to the higher sum for the 2015 call for proposals.

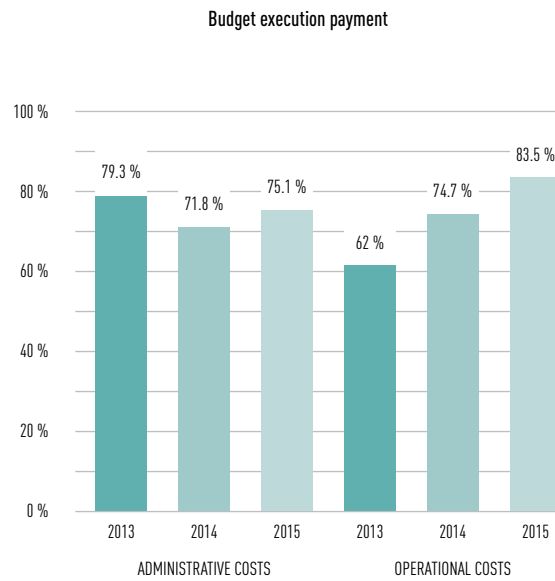
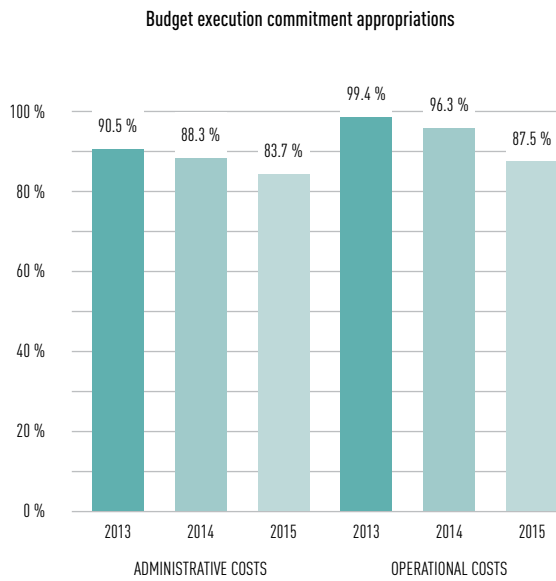
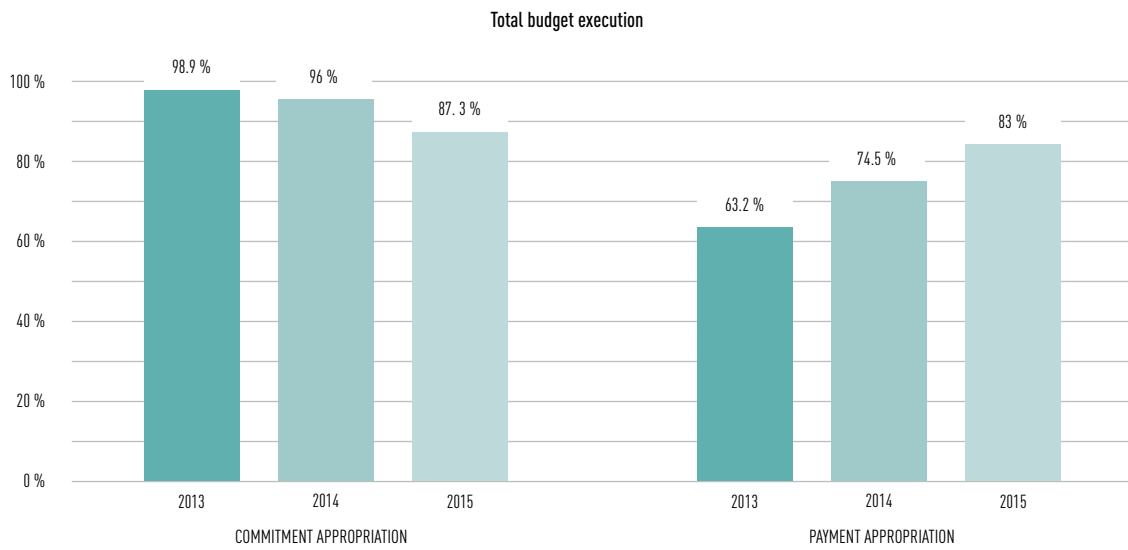
The 1st amendment was made based on the decision of the Governing Board of 11 March 2015 on carry-over amounts, unused payment appropriations for operational costs, and adjustments following cuts by the Council and Parliament on the voted budget.

The 2nd amendment was adopted together with the updated 2015 AWP based on the decision of the Governing Board on 30 April 2015, and consisted of a reactivation of EUR 13,948,226.63 (from operations in 2014) to be used for the 2015 call.

Two budget transfers were also made between different budget lines in the same chapter without any impact on the voted budget.

2.3.2. BUDGET EXECUTION

Overall in 2015, budget execution of both commitment and payment appropriations reached 87.3 % and 83 % respectively. The lower commitment execution rate was due to the outcome of the evaluation for the 2015 call. As regards payments, this represents the best execution rate of payments for the FCH 2 JU to date.



The following graphs depict the budget execution for operational and administrative costs.

Revenues

FCH 2 JU revenue for 2015:

AMOUNT (IN EUR)		
Heading	Budget	Cashed
Union contribution for operational expenditure	64 587 752	64 587 752
Union contribution for administrative expenditure	2 292 250	2 292 250
Industry Grouping	2 587 701	2 587 701
Research Grouping	429 685	429 685
Other revenues ¹⁵	-	1 057 578
Reactivation of appropriations	24 190 167	
TOTAL	94 087 555	70 954 966

Expenditure

Administrative expenditure

FCH 2 JU's administrative costs recorded a lower rate of use (83.7 %) compared to 2013 and 2014. This was mainly due to delays in replacing staff leaving either at the end of 2014 or the beginning of 2015, as well as the recruitment of new staff at lower grades. Savings were also made in costs of *ex-post* audits and experts (mid-term reviewers for FP7 projects and evaluators for the 2015 call).

Unused H2020 appropriations are expected to be reactivated in future annual budgets in accordance with FCH 2 JU financial rules.

Payment execution rate (75.1 %) was slightly higher than in 2014 (71.8 %).

The following table summarises the breakdown between the two programmes (FP7/H2020) for the implementation of administrative costs in 2015. Commitments refer to 2015 appropriations excluding any carry-overs from previous years, whereas payments refer to all payments made during the year.

ADMINISTRATIVE EXPENDITURE (IN EUR)						
	Commitment appropriations	Committed	% execution	Payment appropriations	Paid	% execution
FP7	4 350 826	4 350 826	100 %	4 350 826	3 779 200	86.9 %
H2020	967 121	100 745	10.4 %	964 817	-	0 %
Carry-overs from 2014			0.0 %	861 996	861 996	100 %
TOTAL	5 317 947	4 451 571	83.7 %	6 177 639	4 641 196	75.1 %

Operational expenditure

For **H2020 operational costs** (call, studies, JRC) in terms of commitment the budget execution reached 88.7 %. This is mainly due to the outcome of evaluations of the 2015 call which resulted in unused appropriations of EUR 13,684,458 (which were reactivated in the 2016 budget). The remaining sum of EUR 500,000 refers to the cancelled global commitment for studies in AWP 2014.

The amount of payment appropriations aimed to pay for the first pre-financing of the GAs for the 2014 call. The execution rate for H2020 payments reached 99 % following payments for 15 pre-financing and three instalments from studies in AWP 2014 and 2015.

¹⁵ This includes mainly recoveries from audits and early termination of projects

For FP7, there are no new commitment appropriations (as there are no new calls under the programme for 2008-2013). On the payment side, the execution rate is the highest for the JU to date, showing a reliable budgetary planning. According to the 2 JUs financial rules, the appropriations from previous years should be used first. The C2 fund source which refers to these appropriations was executed fully in 2015.

An overview of the operational costs budget execution is provided below:

OPERATIONAL EXPENDITURE (IN EUR)									
Title Chapter Article Item	Heading	Commitment				Payment			
		Commitment appropriations (CA) (1)	Commitments made (2)	Non-used appropriations (on commitment appropriations) (3)=(1)-(2)	% committed (4)=(2)/(1)	Payment appropriations (PA) (5)	TOTAL PAYMENTS (6)	Unused payment appropriations (7)=(5)-(6)	% paid (8)=(6)/(5)
3 0 0 1	Implementing the research agenda of FCH JU: FP7	1 764 686	21 895	-	1.2 %	58 996 205	44 644 225	14 351 980	75.7 %
3 0 0 2	Implementing the research agenda of FCH JU: H2020	125 501 222	111 316 764	14 184 458	88.7 %	29 915 275	29 636 133	279 142	99 %
TOTAL TITLE 3		127 265 908	111 338 659	14 184 458	87.5 %	88 911 480	74 280 358	14 631 122	83.5 %

Overview of programme implementation

The following tables provide an overview of FP7 and H2020 implementation.

As regards FP7 operational costs, the execution rate has reached 69.8 %. The operational commitments refer to individual commitments. The amounts shown after 2016 represent the remaining obligations under signed GAs. From a total of 155 GAs signed, one project was cancelled and final payments were made for 53. In addition, 13 operational studies were conducted.

As regards H2020 operational costs, the amount committed until 2015 refers to 15 individual commitments for the 2014 call, two individual commitments for operational studies, and two global commitments for the 2015 call and studies in AWP 2015.

FP7 (IN EUR)					
Type	Execution until 31/12/2015	2016	2017	Subsequent years	Total
Commitments (operational costs)	453 128 214	-	-	-	453 128 214
Payments (operational costs)	316 039 617	61 552 088	32 178 026	27 458 891	437 228 622
Cumulative execution (operational costs)	69.8 %	83.3 %	90.4 %	96.5 %	96.5 %
Commitments (administrative costs)	22 554 588	4 331 282	4 089 129	-	30 974 999
Payments (administrative costs)	21 960 159	4 925 711	4 089 129	-	30 974 999
Cumulative execution (administrative costs)	97.4 %	100 %	100 %	100 %	100 %
Overall FP7 execution	71 %	84.3 %	91 %	96.7 %	96.7 %

H2020 (IN EUR)					
Type	Execution until 31/12/2015	2016	2017	Subsequent years	Total
Commitments (operational costs)	193 525 898	104 955 460	94 501 558	253 017 084	646 000 000
Payments (operational costs)	29 636 133	48 635 500	85 762 247	481 966 119	646 000 000
Cumulative execution (operational costs)	15.3 %	26.2 %	41.7 %	100 %	100 %
Commitments (administrative costs)	100 746	934 736	1 026 280	35 731 551	38 000 000
Payments (administrative costs)	100 746	934 736	1 026 280	35 731 551	38 000 000
Cumulative execution (administrative costs)	100 %	100 %	100 %	100 %	100 %
Overall H2020 execution	15.4 %	26.5 %	42 %	100 %	100 %

With regards to administrative costs, payments until 2015 were EUR 594,429.36 less than the commitments made during the same period. As explained in the administrative expenditure section above, this difference is due to open commitments from 2014 and 2015 for which payments will be due in 2016.

2.3.3. TIME TO PAY

Operational payments

FP7 programme

The average time to pay for cost claims was 85 days which is below the maximum payment limit and KPI target for interim and final payments (90 days).

The analysis of the reports comprises a review and validation of the technical report and all financial claims and certificates of financial statements submitted by beneficiaries in each project, including any adjustments for previous reporting periods and for audit findings.

The number of reports handled in 2015 increased by 50 % compared to 2014 when human resources dealing with the assessment of periodic reports (project managers and finance officers) increased by 37.5 %.

H2020

The average time to pay for pre-financing was eight days. At this time, no interim/final payments were due as the first grants were only signed in 2015.

Administrative payments

In 2015, the average time to pay for administrative payments (invoices, experts, staff missions, etc.) was 18 days. About 12.5 % of payments were late (without financial impact), mainly related to: 1) the reimbursement of experts (evaluators for the 2014 call and mid-term reviewers) due to the lack of adaptation of the internal working practice to the newly introduced IT tool; and 2) the reimbursement of staff mission costs due to the increased workload. Corrective measures were introduced to limit the risk of late payments.

2.4. PROCUREMENT AND CONTRACTS

The tender and contract management has been simplified as far as possible by joining the inter-institutional procurement procedures launched by the EC, and by using the resulting multi-annual Framework Contracts. FCH 2 JU also cooperates with other Joint Undertakings in tendering needs in order to minimise the administrative effort. These Framework Contracts have been concluded mainly in the field of IT services, audits and interim staff provision.

Most of FCH 2 JU's contracting in 2015 was done under existing multi-annual Framework Contracts. The most significant of these, in usage volume terms, were in software licences and in communications services for the services provided in the 2015 PRD and SF.

TYPE OF CONTRACT	AREA	SELECTION PROCEDURE	NAME OF CONTRACTOR	AMOUNT (IN EUR)
Service Contract	Operational Study	Service Contract No 145	Element Energy Limited	300 000
Specific Contract	Audit	Specific Contract implementing Framework Contract No IMI-2011-SC-101	PKF Littlejohn LLP	168 042.22
Specific Contract	IT services	Specific Contract implementing Framework Contract No IMI.2014.FWC.043	RealDolmen	148 831.70
Specific Contract	Audit	Specific Contract implementing Framework Contract No IMI-2011-SC-100	KPMG AG	143 470.01
Service Contract	Operational Study	Service Contract No 136	Ludwig-Bölkow-Systemtechnik GmbH	98 500.00
Specific Contract	IT services	Specific Contract implementing Framework Contract No IMI.2014.FWC.043	RealDolmen	71 465.86
Specific Contract	IT services	Specific Contract implementing Framework Contract No IMI.2014.FWC.043	RealDolmen	71 465.86
Purchase Order	Communication	Purchase Order under Framework Contract OIB. DR.2/2012/1171/58/C0/C2(Lot B)	Eurest	50 055
Specific Contract	IT services	Specific Contract implementing Framework Contract No DI/07180	T-Systems International GmbH	42 339.42
Purchase Order	HR Interim Services	Purchase Order under Framework Contract IMI.2011.SC.137	Start People	27 932.74
Specific Contract	Communication	Specific Contract implementing Framework Contract No RTD-L05-2010-INFORMATION PRODUCTS LOT1	Retell consortium	23 490.46
Purchase Order	HR Interim Services	Purchase Order under Framework Contract IMI.2011.SC.137	Start People	23 201.74
Specific Contract	Communication	Specific Contract implementing Framework Contract No RTD-L05-2010-INFORMATION PRODUCTS LOT1	Retell consortium	22 813.59
Specific Contract	Communication	Specific Contract implementing Framework Contract No RTD-L05-2010-INFORMATION PRODUCTS LOT1	Retell consortium	21 944.15
Purchase Order	HR Interim Services	Purchase Order under Framework Contract IMI.2011.SC.137	Start People	21 365.12
Specific Contract	IT services	Specific Contract implementing Framework Contract No RTD IT/H2020-2013-L2-01-00-FCH-2015-FWC 40/02	Intrasoft International SA and Sword Technologies SA	18 785

Apart from the contracts mentioned above, two operational studies from AWP 2014 and 2015 were concluded in 2015 (see section 1.4 'call for tenders').

The table above gives details of the contracts awarded in 2015, including the procedure used in each case and the name of the contractor(s). Only tenders with a value exceeding EUR 15,000 are listed below:

2.5. IT AND LOGISTICS

The year 2015 was driven by a change in the IT service providers for internal support (common JU IT infrastructure and document repository application M-Files) and the deployment of the new grant management tool COMPASS/SYGMA used for the first time in 2015 for the preparation, signature and payment of pre-financing of the grants under the 2014 call.

Support to FCH core business

As in previous years, adequate access to the complete set of EC applications for grant management provided by the EC was ensured on behalf of the FCH staff, with an improved system of access rights, in line with Internal Audit Capability (IAC) or European Court of Auditors (ECA) recommendations. Close contacts were maintained with the Common Support Service to ensure a smooth transition between former and new IT applications for coordination aimed at the successful implementation of the H2020 calls. New functionalities were introduced: single submission

(SESAM and Force) aiming at increased efficiency, less administrative work and more time to pay; the expert management tool (EMI) became fully operational for the FCH 2 JU, and greater use was made of CORDA for statistical reporting.

Business support tools

The Technology MONitoring and ASsessment platform (TEMONAS) was delivered in 2013 to the FCH JU as the result of the homonymous project financed under the 2010 call in the cross-cutting application area. The database and application portals are hosted at the FCH JU premises. It provides a technology monitoring and assessment (TMA) tool specifically tailored for the needs of research programme progress assessment. Maintenance contracts as well as a development contract were renewed in 2015 to allow some corrections and additional developments whose needs had been identified during the internal test phase. These will make the tool operational for the coordinators who are expected to enter their projects' results and for the knowledge management officer who intends to use the tool for data collection with the goal of generating anonymised data reflecting technology progress.

In 2015, we renewed the hosting of the FCH 2 JU website with the same supplier to ensure the stability and continuity of this essential external communication and visibility of the FCH programme.

FCH internal support

In 2015, we continued to use the shared IMI cloud application platform to fill the gap in some EC applications which were not available (i.e. SYSPER). The vacancy platform was widely used and improved. HR officers were asked to define the needs/requirements regarding either the existing or the new functionalities (ISA, eMA) of the HR IT applications to be developed by IMI. A revised common IT security plan and common work programme for 2016 has been developed and approved by the management of the five JUs.

With the full electronic processing, storage and retrieval of all documents directly stored in the EC applications, the FCH 2 JU document management system is becoming more of an archiving system with no significant development although it is still essential for internal communications and documentation. A first test of partial disaster recovery was done and lessons learned to improve the stability, capacity and reliability. The server was upgraded, disk space expanded and the vault cleaned both for files and access rights.

The new telecommunication line (testa-NG) should have been replaced by the end of 2014. It is a key item for running the JU's business processes, and any interruption could be extremely damaging. The Directorate-General for Informatics has postponed the migration until March 2016 in fact, so as to allow the best possible deployment. The prolongation of the data line with the existing provider is ensured until the end of 2016 to allow the business continuity for all the Joint Technology Initiatives (JTIs). FCH 2 JU is the contractual entity for the services supplier and the JUs hosted in the White Atrium building. The test period took place during the first quarter of 2015 after a significant change of security and configuration. The specific contracts were therefore divided into two parts related to the installation and the monthly running costs while taking on board the new JUs joining the building and sharing the costs. The migration project itself is divided into six stages. The logical and physical site surveys had already been carried out in 2014, corresponding to stages 1 and 2. Stages 3 and 4 respectively for the Terminal Access Point (TAP) installation and local loop delivery took place in 2015 and the required building infrastructure works were performed during the second and third quarters. Stage 5 related to the installation of the router, connection of the TAP to the network; the final testing took place during the last quarter of 2015. The final stage of the actual migration is now planned for March 2016.

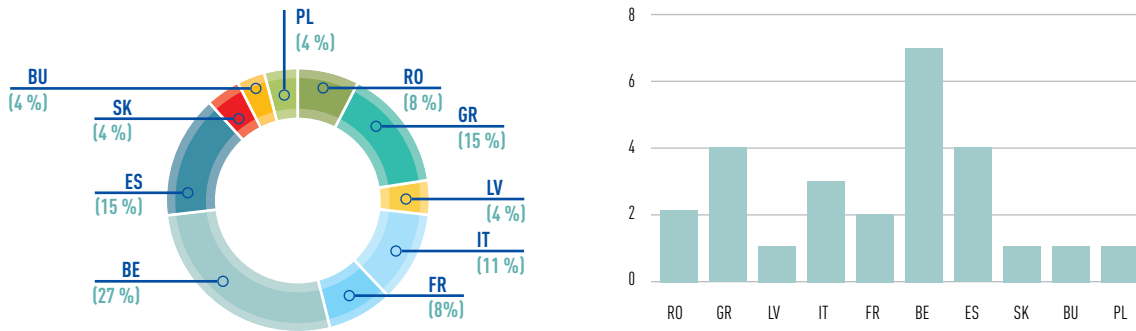
The new Framework Contract for IT services from 2015 onwards introduced some simplifications such as reducing the number of service providers to one contractor by merging internal telecom services with end-support services in a global SLA. In the meantime, additional services, absent in available EC Framework Contracts to date, have been added (e.g. repairs, disposals and hosting). A transition period of six months was organised to ensure the handover with the new service provider did not have any impact on business. The second quarter included the handover of the telephony services, upgrade of the PABX to support two new Joint Undertakings (BBI, S2R), migration and capacity increase of the internet line with a new carrier provider. Close monitoring of those activities was performed and several monthly infrastructure workshops organised. Some urgent renewals of infrastructure components were introduced as a result of these technical meetings, notably on the firewall to increase network security but also on the redundancy principle of all strategic elements.

2.6. HUMAN RESOURCES

By the end of 2015, the FCH 2 JU Programme Office was fully staffed with 26 team members (24 temporary agents and two contract agents) representing 10 different EU Member States. The team is well balanced in terms of gender equality (52 % men and 48 % women).

Five staff members left the Programme Office during 2015: four resigned and one left at the end of contract. Fulfilling the Staff Establishment Plan 2015 was ensured by completing three selection procedures resulting in recruitment of new staff members in the following areas of competence:

FCH 2 JU staff by nationalities



- Human Resources and General Administration Officer/AST 6 (took up duties on 1 July 2015)
- Internal Control and Audit Manager/AD 8 (took up duties on 16 August 2015)
- Knowledge Management Officer/AD 8 (took up duties on 16 September 2015)

The posts of Senior Project Manager – cross-cutting activity area/AD 8 (took up duties on 16 February 2015) and Junior Project Manager – Energy area/AD 5 (took up duties on 16 July 2015) were filled by candidates from the reserve lists.

Details of the Staff Establishment Plan are shown in Annex 2.

In order to provide support to the Programme Office in the areas of communication and knowledge management, two short-term contracts for interim services for up to six months were used in 2015. A joint call for tenders was launched with the other Joint Undertakings at the end of 2015 for a new Framework Contract in the field of interim services to replace the expiring contract.

The Programme Office depends on the expertise and motivation of its staff to achieve its goals. During a workshop as part of the Away Day 2015, the core values for the team were redefined and integrated into one mission statement for the organisation: <http://www.fch.europa.eu/page/mission-values>.

Open communication, a positive and collaborative team atmosphere and a healthy work environment have been promoted by introducing dedicated space for social contacts and exchange of information within the team.

In 2015, special focus was put on identifying training needs and promoting professional development through training opportunities, especially for H2020 applications and tools, as well as the development of staff skills and competences required for implementing the team’s objectives. Inter-JU training sessions aimed at raising awareness of fraud and its prevention and detection were organised and well attended. Individual training maps taking into account the feedback development exercise carried out in 2014 are under development in preparation for the Appraisal Exercise 2016 in order to better address individual training needs, manage talents and ensure consistency in professional and personal development of all staff in line with the Programme Office’s mission and tasks.

A Reclassification Exercise was carried out for the first time in 2015 and the decision on staff reclassified (two temporary agents and one contract agent) was adopted with reclassifications taking effect retroactively on 1 January 2015.

New Implementing Rules of the revised staff regulations, based on the “model decisions” developed jointly by agencies and DG HR and subject to an “ex-ante agreement” by the EC, were adopted by the FCH JU GB in the course of 2015, as follows:

- Engagement and use of TA 2f) (15 June 2015)
- Appraisal of TA 2f) (15 June 2015)
- Appraisal of CA 3a) (15 June 2015)
- Leave on personal grounds for officials and unpaid leave for TAs and CAs (12 December 2015)

03

GOVERNANCE

3.1. GOVERNING BOARD

In 2015, the GB met three times: on 3 March, 30 June and 18 November. Important decisions were taken at the meetings (or by written procedure), in particular the adoption of the AWP 2015, the opinion on the 2014 final annual accounts, the assessment and approval of the AAR 2014, the approval of the annual assessment of the level of in-kind contributions as of 31 December 2014, and the new FCH 2 JU communication strategy, etc.

3.2. EXECUTIVE DIRECTOR

The mandate of the executive director ended on 31 December 2015. Pending finalisation of the selection procedure for a new executive director, processed by the EC, the GB appointed an acting executive director on 18 November 2015 for the period from 1 January 2016 until the date prior to the effective date of the appointment of a new executive director.

For information on the Executive Director's communication activities 2015, please refer to 2.1.

3.3. STATES REPRESENTATIVES GROUP

In 2015, the SRG met three times: on 13 January, 22 June and 16 November. In particular, in January, the SRG adopted its new Rules of Procedures and in June both the chair and vice-chair were elected. Amongst many other activities focused on monitoring achievements and results of the FCH 2 JU, particular attention was paid to: 1) A Smart Specialisation strategy. In particular, a dedicated workshop took place in Lyon on 22-23 April 2015, which gathered together 30 regions and presented them with a broad spectrum of initiatives and concrete projects (see 2.1.3). Dedicated workshops on regional applications of FCH technologies will be organised in 2016, according to the unanimous request of the participants. 2) Strategy for the mobility sector. In particular, a joint workshop FCH 2 JU-DG MOVE took place in Riga on 23 June 2015 in order to discuss the better coordination of EU programmes and initiatives for innovation and new technologies (see 2.1.3). 3) Launch of a discussion on the Directive 'Deployment of Alternative Fuels Infrastructure' in view of monitoring the implementation status of the above-mentioned Directive and identifying the most active regions in the fuel cells and hydrogen sector. In particular, following an exchange between the SRG members and the chair and vice-chair of the FCH 2 JU GB, it was decided that: a) SRG members will provide a time schedule for the preparation of the relevant National Policy Framework; b) industry (Hydrogen Europe) will provide a map for strategic hydrogen infrastructure in Europe; and c) the EC will formally address a letter to the SRG members in order to identify the information to be collected at national level. A clear timeline was also set up. These actions have been identified as key priorities, and will be closely followed up in 2016.

In addition, important exchanges between both the GB chair and vice-chair took place in the context of the SRG meetings with the aim of facilitating an alignment between the industrial objectives and EU/national programmes.

During 2015, the SRG was consulted on developing the call topics and documents and on the AWP 2016. On 18 November, the GB validated a set of answers provided by the Coordinators' Group to the questions/comments raised by States Representatives Group.

In 2015, four new SRG members (Austria, Lithuania, Sweden and Croatia) were appointed by the relevant national authorities.

3.4. SCIENTIFIC COMMITTEE

In 2015, the SC met three times: on 7 July, 18 November and 4 December. Some teleconferences also took place, in particular in view of organising PRD.

In June, a new SC was appointed, and nine members were elected following the specific criteria and selection process for the composition of the SC adopted by the GB by written procedure in February. In July, the SC adopted its own Rules of Procedures and elected among its members both the chair and vice-chair.

During 2015, the SC was consulted on developing the call topics and documents and on the AWP 2016. On 18 November, the GB validated the set of answers provided by the Coordinators' Group to the questions/comments raised by the SC.

3.5. STAKEHOLDERS FORUM

The SF is an important communication channel to ensure the transparency and openness of the FCH 2 JU programme. Open to all EU and non-EU public and private stakeholders, the 2015 SF registered a very high level of participation. Participants included policy-makers, industry decision-makers, SMEs, academia and researchers, representatives of other PPPs and research funding organisations.

For more information on the SF in 2015, please see 2.1.4.

04

INTERNAL CONTROL FRAMEWORK

The foundation of the FCH 2 JU Internal Control Framework is provided for by a set of 16 **Internal Control Standards** (ICS) which were adopted by the GB on 15 June 2010. Following a revision of the control framework by the EC in 2014, an update of these standards and associated requirements was prepared in 2015 and is expected to be adopted in quarter 1 of 2016.

The revision resulted in updated and simplified requirements (34 in total from 61 previously). More attention is placed on staff allocation, mobility and development, on processes and procedures where an exception report is added as a requirement, and on the business continuity area. There is also a change in the internal audit capability role reflecting the alignment of the relevant provisions of the Council Regulation No 559/2014 with the FCH 2 JU financial rules.

Overall, the standards are inspired by the internationally recognised COSO framework and are structured around six building blocks:

1. Mission and values
2. Human resources
3. Planning and risk management processes
4. Operations and control activities
5. Information and financial reporting
6. Evaluation and audit

The FCH JU Internal Control Framework provides for mid-year management reports from the heads of unit to the executive director, including a declaration of assurance. In the second half of the year, the heads of unit review is encompassed in their input in the AAR and on a review by the internal control coordinator of the state of the internal control system (see sections 4.6 and 5.2).

4.1. FINANCIAL PROCEDURES

In the context of the implementation of H2020, the new financial circuits (SYGMA and SYGMA L) were adopted in line with the common circuits adopted by the CSC.

4.2. EX-ANTE CONTROLS ON OPERATIONAL EXPENDITURE

In 2015, FCH 2 JU continued to apply the provision of article 66 of the Financial Regulation and article 18 of the FCH 2 JU Financial Rules (*“each operation shall be subject at least to an ex ante control based on a desk review of documents and on the available results of controls already carried out relating to the operational and financial aspects of the operation”*).

FCH 2 JU has developed an *ex-ante* control system comprising desk reviews (performed by FCH 2 JU project, finance and legal officers and subject to operational and financial verification), mid-term reviews carried out by external experts, and ad-hoc technical reviews (when deemed necessary).

Two major procedures were updated in 2015:

1. The updated procedure on review/assessment of periodic reports was adopted by the executive director in December 2015. This update reflects in particular the use of internal tools on project monitoring and the use of a single submission/rejection mode, as from November 2015. These changes aim to simplify the beneficiaries' reporting practice, improve the monitoring of the submitted reports and reduce the overall processing time for the payment file.
2. The procedure on project reviews with the assistance of external experts – this clarifies the steps, process and checks related to this important aspect of project monitoring.

4.3. EX-POST CONTROL OF OPERATIONAL EXPENDITURE AND ERROR RATES IDENTIFIED

Ex-post controls are defined as the controls executed to verify the financial and operational aspects of finalised budgetary transactions in accordance with article 19 of FCH 2 JU financial rules.

Ex-post controls are the last stage of the JU's control strategy in the project life cycle. This stage includes the *ex-post* audits as well as the recovery/correction of any amounts found to have been paid in excess of the amount due.

Ex-post audits have three main objectives: (1) to assess the legality and regularity of expenditure on a multi-annual basis; (2) to provide an indication of the effectiveness of the *ex-ante* controls; and (3) to provide the basis for corrective and recovery mechanisms.

FP7 programme

FCH 2 JU *ex-post* controls of FCH FP7 grants include financial audits which are carried out by external audit firms. The main activities of *ex-post* controls include management of FP7 *ex-post* audits of beneficiaries through a Framework Contract with external audit firms and implementation of the FP7 *ex-post* audit strategy to ensure appropriate audit coverage of the cost claims validated.

Because of its multi-annual nature, the effectiveness of the FCH JU's control strategy can only be fully measured and assessed in the final stages of the JU's programme, once the *ex-post* control strategy has been fully implemented, and systematic errors have been detected and corrected.

The main legality and regularity indicator in this stage is the 'error rate' detected by *ex-post* audits.

The following two aspects have to be considered when providing information on error rates and inferring conclusions from those errors:

- Due to the multi-annual perspective of *ex-post* audits, their effectiveness has to be measured by presenting '**cumulative**' information on the errors detected;
- **Two types of *ex-post* audits** have to be distinguished with **two different objectives**: 'representative' audits with a goal of producing a representative estimate of the error rate present in the population, and 'corrective' audits (e.g. risk-based audits) with the objective of detecting and correcting as many errors as possible.

Bearing in mind these two aspects, **three types of cumulative error rates** are calculated to provide a comprehensive overall view of the results of *ex-post* audits (see table 4.3.3.). For each type of error, the rate is calculated at 'total cost' and at the 'FCH JU contribution' level. This distinction is necessary as not all errors detected at total cost have a financial impact on the FCH JU contribution¹⁶.

¹⁶ For example, an error detected on indirect costs (at total cost level) for a beneficiary using the 'actual' indirect cost method but with a maximum reimbursement rate of 20 % could have no impact in the FCH JU contribution if 'declared' and 'eligible' indirect costs are above the 20 % reimbursed by the JU

Overall error rate

This is the error rate derived from all audits, comprising both 'representative' and 'risk-based' audits. It is calculated as a percentage of the value¹⁷ of the errors detected divided by the value of total costs accepted by the JU.

It provides information on the importance of errors detected, but it cannot be used as a reference for inferring conclusions on the expected error in the non-audited population, for the following reasons: 1) it is the result of 'representative' and 'risk-based' audits with two different objectives; and 2) as it is based on values, it is easily influenced by the error rates resulting from the individual audits of the cost claims of the highest values, which may not necessarily be those most representative for inferring conclusions.

Representative error rate

This is the error rate resulting from the representative audits. It will give a reasonable estimate about the level of error in the population at the time of the audits, but it says nothing about the corrections and follow-up undertaken by the FCH JU, nor of the final financial impact on the JU contribution of any error. The formula for calculating the representative error rate, under the FCH JU *ex-post* audit strategy approved by the GB, is shown in Annex 9.

Residual error rate

This is the level of error remaining in the population after corrections and recoveries made by the FCH JU. This includes extrapolation of audit results to non-audited contracts and the correction of errors. The formula for the calculation of the residual error rate, in line with the *ex-post* strategy and shown in Annex 9, is based on the following assumptions: 1) all the errors detected will be corrected; and 2) the residual error rate for participations subject to extrapolation is estimated to be equal to the non-systematic error rate.

Ex-post audit resources

The lean structure of the FCH JU does not allow for the setting up of an internal *ex-post* audit section, therefore *ex-post* audits are outsourced to external audit firms.

Whereas the execution of the audit work is externalised, some of the JU's staff are responsible for the management of *ex-post* audits, in particular the following three processes:

1. Planning (i.e. selection of 'representative' and 'risk-based' audits, coordination with EC audits and preparation of audit input files);
2. Monitoring (i.e. regular follow-up of audit status, interaction with audit firms on technical questions, and more importantly, quality checks of audit reports);
3. Evaluation/implementation of audit results (i.e. inferring conclusions on the basis of identified error rates, extrapolation procedures and initiation of recovery orders/offsetting with future payments to correct errors detected).

The following table gives an overview of the resources devoted to *ex-post* audits.

TABLE 4.3.1: RESOURCES DEVOTED TO EX-POST AUDITS

	2011	2012	2013	2014	2015
Internal resources <i>ex-post</i> audits ⁽¹⁸⁾	1 FTE	1.5 FTE	2 FTE	2 FTE	1.5 FTE
Cost of externalised audits (commitments, in EUR)	EUR 77 820	EUR 208 665	EUR 161 082	EUR 245 081	EUR 315 716

¹⁷ When considering the value of errors detected, three calculations are provided: 1) with only the errors in favour of the JU (i.e. ineligible costs detected by the auditors; the JU has to recover the unduly paid funds, and these errors are expressed in negative values); 2) with only the errors in favour of the beneficiary (i.e. additional eligible costs identified by the auditors and not declared by the beneficiary, who can submit an additional cost claim, and additional payment by the JU is subject to certain conditions; these errors are expressed in positive values); and 3) with the total net value of errors (in favour of both the JU and the beneficiary)

¹⁸ Due to the lean structure of the FCH JU and cost-efficiency reasons, there is no single function in the JU fully dedicated to the management of *ex-post* audits. The reported figure in 'FTE: Full Time Equivalent' is therefore an estimation of the time devoted by various members of JU staff to *ex-post* audits in order to manage the three processes under the JU's responsibility (i.e. planning, monitoring/quality checks, and evaluation/implementation of audit results)

The FCH JU FP7 *ex-post* audit strategy was adopted by the GB on 6 January 2011, and its implementation began in September 2011.

The following table gives an overview of the number of *ex-post* audits and their audit coverage.

TABLE 4.3.2: NUMBER OF AUDITS AND AUDIT COVERAGE CUMULATIVE

BATCH	YEAR	TO BE LAUNCHED	ONGOING	FINALISED ⁽¹⁸⁾	TOTAL	OF WHICH	
						REPRESENTATIVE	RISK-BASED
1 st batch	2011	0	0	5	5	5	0
2 nd batch	2011	0	0	7	7	6	1
3 rd batch	2012	0	0	9	9	7	2
4 th batch	2012	0	0	12	12	12	0
5 th batch	2013	0	0	15	15	11	4
6 th batch	2014	0	0	20	20	15	5
7 th batch	2014	0	0	2	2	0	2
8 th batch	2015	0	14	15	29	27	2
Total (audits)		0	14	85	99	83	16
Total (cost claims)						326	
Total costs accepted by FCH JU (<i>cumulative</i>) (in EUR) (A)						355 396 824	
Total costs of audits launched (<i>cumulative</i>) (in EUR) (B)						78 884 542	
Total costs of audits finalised ¹⁹ (<i>cumulative</i>) (in EUR) (C)						67 254 473	
Direct audit coverage of total audits (in %) (B/A)						22 %	
Direct audit coverage of finalised audits (in %) (C/A)						19 %	
Total FCH JU beneficiaries (D)						544	
FCH JU beneficiaries audited (E)						99	
Audit coverage (number of benef.) of total audits (in %) (E/D)						18 %	

The first cost claims were received by the FCH JU in the spring of 2011 and the first *ex-post* audits were launched immediately after the JU's validation of the first claims. In the calendar year 2011, two batches were launched: the first (five audits) in September 2011 and the second (seven audits) in December 2011. During 2012, two additional batches were launched: the third (nine audits) in February 2012 and the fourth (12 audits) in December 2012. In 2013, one batch was launched: the fifth (15 audits) in May 2013. In the calendar year 2014, two additional batches were launched: the sixth (20 audits) in May 2014 and the seventh (two audits) in October 2014.

In 2015, the eighth batch (29 audits) was launched, of which 27 were considered as representative audits and two audits were launched by request as part of the risk-based strategy. By 31 December 2015, all previous batches had been finalised.

In conclusion, since launching the *ex-post* audits, 99 audits have been launched of which 83 were 'representative' and 16 'risk-based'. Of these 99 (comprising 326 cost claims), 85 have been finalised and 14 are ongoing. The cumulative audit coverage represents 19 % (on finalised audits) and 22 % (on total audits) of the value of validated cost claims at the cut-off²⁰ reporting date (i.e. 31 December 2015).

In terms of the number of beneficiaries, the total number of FCH JU beneficiaries is 544, of which 99 have been selected for audit, representing an audit coverage (in number) of 18 %.

¹⁹ **Finalised audits** An audit is considered 'finalised' when the audit adjustment and the related 'error rate' is final. This comprises either audits with 'Final Audit Reports' received or, if not received, with a 'Pre-final audit report' (after a contradictory procedure with the beneficiary) approved by the JU and therefore with a definitive audit adjustment and error rate. For Annual Activity Report assurance purposes, we have considered all audits as 'finalised' by 31 December 2015

²⁰ The cut-off reporting date has been fixed at 31 December 2015, as this date coincides with the cut-off date for the preparation of the annual accounts

The error rates resulting from the 85 finalised audits (of which 70 are representative and 15 are risk based) are as follows:

TABLE 4.3.3: INDICATORS OF ERROR

	ACHIEVED CUMULATIVE PERIOD (AS OF 31 DECEMBER 2015)	
	TOTAL COST (IN EUR)	FCH JU CONTRIBUTION (IN EUR)
Costs accepted by FCH JU FOs (in EUR) (A)	61 303 426	26 877 799
Overall errors (in EUR) in favour of the FCH JU (B)	-3 039 132	-1 263 840
'Overall error rate' (only in favour of the FCH JU) (B/A)	-4.96 %	-4.70 %
Overall errors (in EUR) in favour of the beneficiary (C)	2 195 624	490 940
'Overall error rate' (only in favour of the beneficiary) (C/A)	3.58 %	1.83 %
Total overall errors (in EUR) (in favour of the FCH JU and the beneficiary (D)	-843 508	-772 900
'Overall error rate' (netting off errors in favour of the JU and the beneficiary (D/A)	-1.38 %	-2.88 %
'Representative error rate' (formula in Annex 9) (%)	-2.09 %	-2.02 %
'Residual error rate' (formula in Annex 9) (%)	-0.98 %	-1.01 %

The difference between the 'representative error rate' and the 'residual error rate' is the result of the following: 1) the correction of errors in an important part of the population due to the high audit coverage; and 2) the effect of extrapolation of audit results to non-audited cost claims of audited beneficiaries.

In 2015, in one of the representative FCH 2 JU audits, a significant negative (-17.01 %) adjustment at the level of costs submitted by the beneficiary was identified. The FCH 2 JU analysed the root cause of the errors and impact on the FCH 2 JU contribution. Based on this analysis, the main reason for the adjustment was related to a wrong estimate of indirect cost percentage applied by the beneficiary. Auditors have corrected this estimate in the actual figures, although there was no impact on the overall FCH 2 JU contribution, given the funding model applied by 2 JU – where the indirect costs are only reimbursed up to maximum 20 % of the total direct costs. The beneficiary concerned was new to the FP programmes and was recommended by the auditors to apply correct calculation methods.

When isolating this particular instance, the overall cumulative representative error rates as of 31 December 2015 were the following:

TABLE 4.3.4: INDICATORS OF REPRESENTATIVE ERROR RATES – REVISED

'Representative error rate' (formula in Annex 9) (%)	-1.88 %	-1.97 %
'Residual error rate' (formula in Annex 9) (%)	-0.80 %	-0.96 %

Further analysis of the error rates and whether or not a reservation is necessary in the declaration of assurance concerning the accuracy of the cost claims is addressed in section 5.3. Reservations.

Implementation of audit results

As a result of errors identified during the FCH 2 JU *ex-post* audits, JU funds paid unduly need to be recovered. The FCH 2 JU has implemented the necessary controls and monitoring mechanisms to ensure that all errors detected in favour of the JU are corrected in due course (either through a recovery order or offsetting a future payment).

The detailed situation on the implementation (at project level) of *ex-post* audit results is as shown below.

TABLE 4.3.5: IMPLEMENTATION OF EX-POST AUDIT RESULTS IN FAVOUR OF THE FCH JU (IN EUR)

AUDIT LAUNCHING YEAR	AUDIT ADJUSTMENT (IN FAVOUR OF FCH JU)		ADJUSTMENTS PENDING IMPLEMENTATION		ADJUSTMENTS IMPLEMENTED	
	ON TOTAL COSTS	ON FCH JU CONTRIBUTION	ON TOTAL COSTS	ON FCH JU CONTRIBUTION	ON TOTAL COSTS	ON FCH JU CONTRIBUTION
2011	824 960	214 492			824 960	214 492
2012	629 111	346 512			629 111	346 512
2013	138 734	66 592			138 734	66 592
2014	1 079 716	457 728	286 715	145 437	793 001	312 291
2015	260 705	67 876	218 564	61 598	42 141	6 277
	2 933 227	1 153 200	505 279	207 036	2 427 948	946 164

At the cut-off reporting date (i.e. 31 December 2015), the percentages of total adjustments effectively implemented are over 80 % at both total cost and FCH 2 JU contribution level. These percentages prove the continuous timely implementation of audit results, and consequently the effective correction of detected errors by the FCH 2 JU. Indeed, the vast majority of the adjustments with pending implementations are not due to JU delays, but can be simply explained by the fact that the audits have been finalised recently and implementation will follow shortly. This is the case for most of the audits launched in 2015 for which the letters of conclusion have been sent very recently. As can be seen in the table above, the FCH 2 JU has implemented results from all audits that were launched before 2014.

So far, the FCH 2 JU has focused its *ex-post* audit effort on finalising a representative number of audits in order to have sufficient information for the calculation of a 'representative error rate' in preparation for the 2015 AAR.

Implementation of extrapolation

Extrapolation is the process by which 'systematic' errors detected on audited cost claims are 'extrapolated' to all other non-audited FCH 2 JU claims of the same audited beneficiary. The timely implementation of 'extrapolation' relies on beneficiaries preparing and submitting revised cost claims from which the effect of any systematic error(s) detected in audits has been eradicated.

The overall situation on the implementation of extrapolation is shown in the table below.

TABLE 4.3.6: IMPLEMENTATION OF EXTRAPOLATION OF EX-POST AUDIT RESULTS

	BENEFICIARIES	COST CLAIMS
Audits finalised	85	
Letters of conclusion sent as of reporting date	85	
No of which potentially concerned by extrapolation	33	
Extrapolation feedback not received from beneficiary	4	
Extrapolation feedback received from beneficiary	29	119
Of which projects not affected		53
Of which projects affected		66
Of which non-implemented		20
Of which implemented		46

At the cut-off reporting date (31 December 2015), 33 of the 85 finalised audits were potentially affected by extrapolation. Feedback was not received from the beneficiary in four of those cases. For the remaining 29 audits, the beneficiary has provided the necessary information which covers 119 cost claims. Of these 119 cost claims, 66 are affected by extrapolation, and the FCH 2 JU has implemented the extrapolation in 46 of these (70 %). This represents a significant increase as compared to last year when the FCH 2 JU reported a 50 % implementation rate.

Liquidated damages²¹

Liquidated damages are applied systematically by the FCH 2 JU. In some cases, they do not result in a recovery order due to the application of the de minimis rule.

At the cut-off reporting date (31 December 2015), 25 of the 85 finalised audits (269 cost claims) were assessed as requiring liquidated damages for a total amount of EUR 131,925. Pre-information letters (i.e. letters of conclusion) have been sent to beneficiaries in all 25 cases, and recovery orders have already been issued and cashed for 20 cases, for a total value of EUR 52,185.47.

H2020 programme

Additional activities in *ex-post* controls in 2015 included:

- Liaison with CSC (the EC's Common Support Centre) on recent developments in the methodology for the H2020 programme (audit strategy, audit programmes, etc.) to ensure the smooth transition between the FP7 and H2020 programmes, taking into account the specificities of the FCH 2 JU, including establishing the H2020 audit targets per year (approved as Annex 1 to the new H2020 audit strategy);
- Development and comment on procedures that should be used as an indicative model audit programme for audits of the cost statements under H2020, in close liaison with the Common Audit Service (CAS).

As of the date of this report, discussions are ongoing with the EC to ensure that the effectiveness and level of assurance obtained from the FCH JU's *ex-post* audit process under FP7 is maintained under the new H2020 programme where the CAS is responsible for *ex-post* audits.

4.4. AUDIT BY THE EUROPEAN COURT OF AUDITORS

Council Regulation (EU) No 559/2014 of 6 May 2014 establishing the FCH 2 JU confirmed the ECA as the external auditor of the JU and the separate discharge for the Joint Undertaking (independent from the EC).

In its Specific Annual Report on the 2014 accounts of the FCH 2 JU, the Court provided a 'clean opinion' on the following the reliability of FCH JU accounts, and the legality and regularity of the underlying transactions.

In 2015, the FCH 2 JU noted and communicated to the external audit firms Moore, Stephens, Littlejohn and KPMG the recommendations made by the ECA following its visit to these firms to further improve their audit work programme and documentation to ensure increased audit evidence.

As regards the 'Audit of the Fuel Cells and Hydrogen Joint Undertaking for the financial year 2015', the ECA reported no findings on the internal control system in place at FCH 2 JU, based on their investigations in November 2015. The next mission in the FCH 2 JU financial year, which will include an examination of the follow-up provided on the conclusions of the audit performed by the EC's Internal Audit Service (IAS) on the evaluation and selection process of H2020 grant proposals (for details, see 4.5. below), will take place in March 2016.

4.5. INTERNAL AUDIT

Based on Council Regulation (EU) No 559/2014 of 6 May 2014 establishing the FCH 2 JU, the internal audit operation is under the authority and responsibility of the IAS, succeeding the previous role taken by the Internal Audit Capability (IAC) of the FCH JU.

Within the FCH 2 JU, a new role as internal control and audit manager was established in 2015, to take over most of the responsibilities of the previous IAC function, except:

- Internal audit assurance engagements that are carried out by the EC's IAS;
- Annual assessment of the level of IKOP in-kind contributions carried out by an independent external auditor (see section 1.7. for details).

²¹ Liquidated damages will only be applied where the unjustified contribution exceeds 2 % of the total contribution claimed for the given period

In 2015, the focus was on the following:

- The FCH 2 JU finalised the implementation of the action plan to address IAS recommendations on a limited review of ‘Use and dissemination of research results’ carried out by the IAS;
- The IAS finalised an audit on ‘Evaluation and selection process of H2020 grant proposals’. The final audit report was received on 20 November 2015 and the FCH 2 JU communicated the action plan to the IAS on 21 December 2015. The action plan was approved and accepted by the IAS on 12 January 2016.

Finally, in terms of the FCH 2 JU’s follow-up of action plans addressing the audit recommendations resulting from the IAC’s previous assurance engagements, all the audit recommendations have been implemented.

Risk management and conflict of interest

In the annual risk assessment exercise, conducted in October 2015, the following significant risks and responses to those risks, in terms of action plans, were identified:

RISK IDENTIFIED	ACTION PLAN
FCH 2 JU would fail to deliver on additional activities	Work closely with the stakeholders, attend meetings and actively participate in the preparation of the reporting and the plan for 2016. For the first certification year 2015, terms of reference and eligibility criteria for additional activities were defined in close cooperation with the FCH 2 JU and its members.
Unclear translation of strategic objectives, as defined in MAWP, into annual work plan (i.e. selection of grant topics)	In line with the findings and recommendations from the IAS report on the evaluation and selection process for H2020 grant proposals, the internal procedure will be developed and an endorsement sought from the GB.
Stakeholders losing confidence in the industry	Work closely with the industry, steering their actions in line with the strategic objectives of the FCH 2 JU, and active participation in meetings/regular consultations. Ensure the access to relevant information for stakeholders.
Loss of control of important administrative processes in H2020 (e.g. <i>ex-past</i> audits) due to centralisation (important processes taken over by the CSC)	Liaise with the CSC at working and executive levels plus active participation in meetings.
High dependency on the common H2020 IT tools – security and data quality issues	Close contact with the EC, regular reporting, implementation of the complete Information Security System
Risk of not receiving clean audit opinions from the ECA and subsequently discharge from the EP	Close cooperation with the ECA, EC and other stakeholders (EP)
High dependency on key personnel, business continuity, back-up planning	Knowledge sharing and back-up planning, implementation of the talent management; updating the business continuity plan based on the business impact assessment.

Conflict of interest

As mentioned in section 2.2., on the basis of a recommendation from the discharge authority and a recommendation from an audit performed jointly by the EC’s IAS and the FCH 2 JU internal auditor, the FCH 2 JU prepared internal rules which specify in a more comprehensive way the obligations in terms of conflict of interest. The rules have been submitted to the EC for its review.

In the frame of the Internal Control Awareness session held on 30 November 2015, the staff members received training on the definition of the Conflict of Interest and possible prevention of conflict of interests and reporting requirements in terms of acceptance of gifts, favours or payments.

Fraud prevention and detection

The FCH 2 JU management pays particular attention to fraud prevention and detection. In 2015, most of the staff members participated in training on fraud prevention and detection organised by the EC, with a special focus on fraud in research projects.

As regards occupational fraud, an internal control awareness session (mentioned above) included a section on ethics and fraud, with a focus on the definition of fraud, red flags and whistle-blowing reporting.

FCH 2 JU takes part in and implements the preventive and corrective measures in line with the newly adopted common 'Anti-fraud strategy and anti-fraud action plan' (in 2015) at EC level.

4.6. COMPLIANCE AND EFFECTIVENESS OF INTERNAL CONTROL

In the AAR 2014, some areas were identified as having room for improvement. The following should be noted:

- **ICS 3 – Staff allocation and mobility**

The update on recruitment policy included in the action plan was postponed due to other priorities and because it was not deemed urgent given that as of September 2015 no additional recruitment is foreseen.

- **ICS 8 – Processes and procedures**

As mentioned in section 2.2 the methodology on IKOP was endorsed by the GB in 2015, whereas the methodology for IKAA will be finalised in 2016.

- **ICS 11 – Document management**

With regards to the JU document management system, it is expected that it will continue to be used for FP7 programme and horizontal activities but not for the H2020 programme as the relevant documents will be available mainly in COMPASS.

- **ICS 13 – Accounting and financial reporting**

In accordance with a service level agreement with DG BUDG, a back-up for the FCH 2 JU financial contact point was appointed by the executive director in 2015.

Furthermore, with reference to the focal activities included in the AWP 2015, it should be noted that:

- As mentioned above, a session organised internally on internal control awareness was held on 30 November 2015 and focused on ethical values and anti-fraud measures;
- The annual risk-management exercise was carried out in October 2015;
- An anti-fraud seminar was given by DG RTD in June 2015 and attended by most staff members;
- As noted in section 2.6, the mission and core values of the JU were redefined during the Away Day that took place in September 2015;
- To achieve full compliance with the revised internal control standards requirements, the FCH 2 JU has drawn up an action plan, with a special focus in 2016 on the learning and development plan for the staff members (ICS 4: Staff appraisal and development).

05

MANAGEMENT ASSURANCE

5.1. ASSESSMENT OF THE ANNUAL ACTIVITY REPORT BY THE GOVERNING BOARD

This section will be provided separately.

5.2. ELEMENTS SUPPORTING ASSURANCE

Reasonable assurance is the personal judgement of the JU's Executive Director – as the JU's authorising officer at the date of signature of this AAR – based on all the information at his disposal.

The main elements supporting such assurance are based on the JU's management assessment of the robustness of the JU's internal control framework, the results of audits from the ECA and the IAS, the reporting from the internal control and audit manager, and the reporting from the heads of unit.

No significant weaknesses were identified or reported under section 2 ('Support to operations') and section 4 ('Internal Control Framework'). Furthermore, based on their review, the heads of unit consider that, given the scope of the statement of assurance and taking into account the controls and monitoring system in place, the weaknesses they identified do not call into question reasonable assurance as to the use of resources for their intended purpose, in accordance with the principles of sound financial management and the fact that the implemented control procedures give the necessary guarantees on the legality and regularity of the underlying transactions.

5.3. RESERVATIONS

The **representative error rate** resulting from the 70 representative audits which have been finalised is **-2.09 %** at total cost level and **-2.02 %** at FCH JU contribution level.

The residual error rate (i.e. error remaining in the population after corrections and recoveries) calculated at this point is **-0.98 %** at total cost level and **-1.01 %** at FCH JU contribution level.

Taking into consideration:

- the residual error rates below 2 % at this point in time;
- the adequate audit coverage, comprising a representative number of finalised audits;
- the experience gained by the JU's staff in the *ex-ante* validation of costs claims;
- the continuous reinforcement of JU's *ex-ante* controls;
- the improved quality of beneficiaries' cost claims as a result of the communication campaigns carried out by the FCH JU in the period 2012-2015;

no reservation is necessary. In the opinion of the executive director, considering the aspects above and with the information available at this stage, it is possible to state with reasonable assurance that by the end of the programme the residual error rate will be below the materiality threshold (i.e. 2 %) established in Annex 9 ('Materiality criteria').

FCH JU actions towards an acceptable level of 'residual error rate'

The declaration of assurance last year (2014) did not include a reservation, as is the case this year (2015). This is the result of the FCH 2 JU's firm commitment to maintain a robust internal control system in which *ex-post* audits play a significant role. The 'residual error rate' is a key indicator of the legality and regularity of the JU's transactions. In this context, in 2012, the FCH JU laid down an action plan with the aim of achieving an acceptable level of 'residual error rate', which should provide sufficient assurance to the executive director, while at the same time respecting cost-benefit principles (i.e. the cost of controls have to be measured against the benefits that those additional controls can bring to the organisation – auditing 100 % of the cost claims is not cost-efficient).

The FCH JU action plan includes a combination of **preventive, detective and corrective measures** and is closely monitored. The measures/actions can be grouped around three main axes and are ongoing:

- Organisation of **communication campaigns** to prevent financial errors in cost reporting by improving awareness of the regulatory framework among the beneficiaries. In total, seven campaigns have been organised by FCH JU to date (three in 2012; two in 2013, one in 2014 and one in 2015). The set-up of the campaigns was reviewed in 2013 to maximise its impact, with the possibility to participate 'on-site' and 'online', a focused audience (including auditors responsible for the preparation of the CFS and *ex-post* auditors) and focused on the most recurrent issues. The 2015 campaign continued with the on-site and online participation approach, with particular emphasis on the eligibility aspects in 'demonstration' projects. A total of 146 beneficiaries involved in 129 projects attended the communication campaigns, which represents approximately 27 % and 83 % of FCH 2 JU beneficiaries and projects, respectively. The communication campaigns were highly appreciated by the participants and their positive impact has been visible since 2013, through better quality cost reporting by the beneficiaries.
- Reinforcement of FCH JU **ex-ante controls** in order to allow for higher detection and correction of errors before validation of cost claims (e.g. JU's scrutiny of the CFS has been strengthened, JU's *ex ante* checklists were updated, and other aspects have been reinforced following the IAC audit recommendations on '*ex-ante* controls').
- Continuation of the FCH JU's *ex-post* audit efforts. During 2014 and 2015, this effort enabled the closure of an important number of ongoing audits (i.e. the number of audits finalised increased from 45 by the end of 2013 to 85 by the end of 2015). In 2015, the JU also confirmed the paramount importance of *ex-post* audits within its control strategy, as well as the need to ensure that controls are cost-effective. In this sense, a significant *ex-post* audit effort has continued with the launching of 29 new audits, but to ensure that controls are cost-effective, the target audit coverage (in value) has been reduced as a result of the positive trend observed in terms of low error rates. The combination of appropriate audit coverage and a relatively low detected error rate has resulted in a residual error rate below 2 %.

Likewise, the positive feedback loop generated by a combination of the three actions above is of particular importance. For example, the (preventive) communication campaigns are also a very useful platform for sharing experiences between beneficiaries and with JU actors. Also, *ex-post* audits have a multiplying effect: lessons learned from the results of these audits provide very valuable information not only to the audited beneficiary, but also to the JU's *ex-ante* controllers for future cost claims and to other beneficiaries in the same project.

The FCH 2 JU has a clear control strategy of a multi-annual nature which is a combination of *ex-ante* and *ex-post* controls, and takes into consideration cost-efficiency aspects. This strategy has proved its effectiveness from an assurance point of view. Therefore, the FCH 2 JU is fully committed to continuing its work along the same control principles.

5.4. OVERALL CONCLUSIONS

The purpose of this section is to provide overall conclusions on the declaration of assurance as a whole (section 6).

It is important to note that only material weaknesses/risks lead to a reservation on the assurance in section 6. The concept of 'materiality' provides the Executive Director with a basis for assessing the importance of the weaknesses/risks identified. Deciding whether something is material involves making a judgement in both qualitative and quantitative terms (see details on the 'Materiality criteria' in Annex 9).

Based on the information provided in the sections above, the following conclusions can be drawn:

- As regards the FCH 2 JU's policy activities, no qualification will be made. There is also no reservation in the procedures relating to the selection of contractors and beneficiaries for FCH 2 JU projects and its underlying financial operations (legal and financial commitments). This is also the case for JU's payments relating to administrative expenditure and procurement, as well as for pre-financing payments in the case of grants.
- The amounts that have a higher risk of being affected by errors are the expenditures incurred against cost statements. Based on the analysis of error rates and the effectiveness of the preventive, detective and corrective actions presented in 5.3, no reservation is necessary in this area either.

In conclusion, the management of the JU has reasonable assurance that, overall, suitable controls are in place and working as intended, risks are being properly monitored and mitigated, and necessary improvements noted by the auditors (IAS and the ECA) are being implemented. Therefore, the executive director, in his capacity as authorising officer, has signed the declaration of assurance presented below.

06

DECLARATION OF ASSURANCE

I, the undersigned, Mr.Philippe Vannson, Acting Executive Director of FCH 2 JU, In my capacity as authorising officer:

Declare that the information contained in this report gives a true and fair view²².

State that I have reasonable assurance that the resources assigned to the activities described in this report have been used for their intended purpose and in accordance with the principles of sound financial management, and that the control procedures put in place give the necessary guarantees concerning the legality and regularity of the underlying transactions.

This reasonable assurance is based on my own judgement and on the information at my disposal, such as the results of the self-assessment, *ex-post* controls, the work of the internal audit capability, the observations of the Internal Audit Service and the lessons learnt from the reports of the Court of Auditors for years prior to the year of this declaration.

Confirm that I am not aware of anything not reported here which could harm the interests of the Joint Undertaking.

Brussels, 26 February, 2016



Philippe Vannson
Acting Executive Director
Fuel Cells and Hydrogen 2 Joint Undertaking

²² True and fair in this context means a reliable, complete and correct view on the state of affairs within the Joint Undertaking

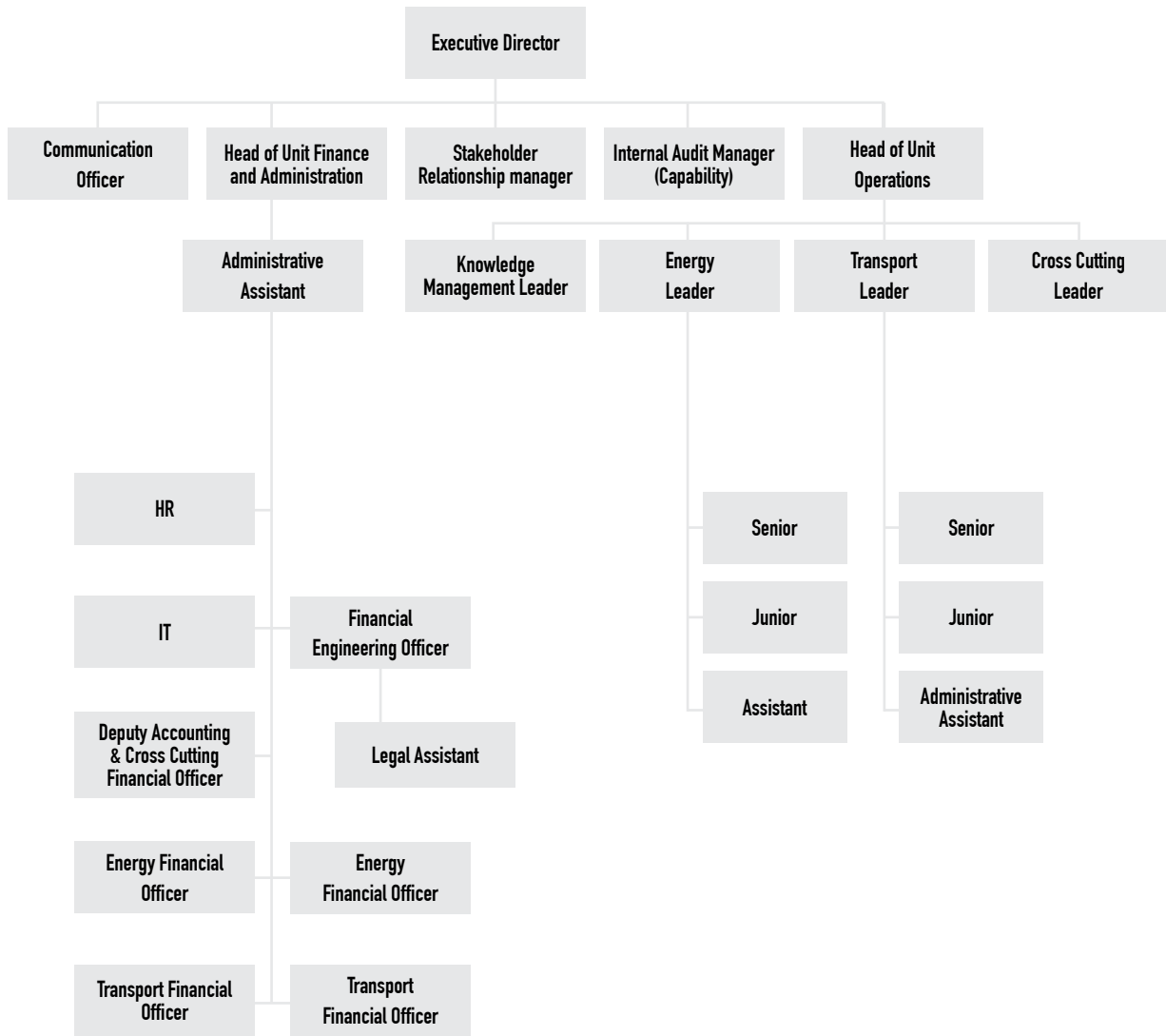
07

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ANNEX 1

Organisation chart



ANNEX 2

Establishment plan

CATEGORY AND GRADE	ESTABLISHMENT PLAN 2015		POSTS ACTUALLY FILLED AT 31 DECEMBER 2014		POSTS FILLED BY EXTERNAL PUBLICATION/ RESERVE LISTS IN 2015		PROMOTION/ RE-CLASSIFICATION IN 2015		DEPARTURES 2015		POSTS ACTUALLY FILLED AT 31 DECEMBER 2015	
	perm	temp	perm	temp	perm	temp ⁽⁴⁾	perm	temp	perm	temp	perm	temp
AD 16												
AD 15												
AD 14		1		1								1
AD 13												
AD 12												
AD 11		3		3						1		2
AD 10												
AD 9		1						1				1
AD 8		4		4		3				1		5
AD 7		2		2								2
AD 6												
AD 5		4		4		1				1		4
Total AD		15		14		4				3		15
AST 11												
AST 10												
AST 9												
AST 8		1						1				1
AST 7		3		3						1		1
AST 6				1		1						2
AST 5												
AST 4		1		1								1
AST 3		4		4								4
AST 2												
AST 1												
Total AST		9		9		1				1		9
Total		24		23		5				4		24

In addition, the FCH 2 JU employs two contract agents from FG III and FG IV.

ANNEX 3

Publications from projects

Project ID	Project acronym	Publication title
244821	ASSENT	Effect of anode off-gas recycling on reforming of natural gas for solid oxide fuel cell systems
244821	ASSENT	Analysis of solid oxide fuel cell system concepts with anode recycling
245128	GENIUS	"Implementation of a model-based methodology aimed at detecting degradation and faulty operation in SOFC systems"
245128	GENIUS	Application of Fault Tree Analysis to Fuel cell diagnosis
245128	GENIUS	A Neural Network Estimator Of SOFC Performance For On-Field Diagnostics And Prognostics Applications
245128	GENIUS	A Review on Solid Oxide Fuel Cell Models
245156	DEMMEA	Covalent cross linking in phosphoric acid of pyridine based aromatic polyethers bearing side double bonds for use in high temperature polymer electrolyte membrane fuel cells
245156	DEMMEA	Cross linked high temperature polymer electrolytes through oxadiazole bond formation and their applications in HT PEM fuel cells
245156	DEMMEA	Design of a reference electrode for high temperature PEM fuel cells
245156	DEMMEA	Cooperative behaviour of Pt microelectrodes during CO bulk electro- oxidation
245156	DEMMEA	Thermal crosslinking of aromatic polyethers bearing pyridine groups for use as high temperature polymer electrolytes
245156	DEMMEA	Polymer blends based on copolymers bearing both side and main chain pyridine units as proton exchange membranes for high temperature fuel cells
245156	DEMMEA	Analyzing the Influence of H ₃ PO ₄ as Catalyst Poison in High Temperature PEM Fuel Cells Using in-operando X-ray Absorption Spectroscopy
245156	DEMMEA	3D ordered layers of vertically aligned carbon nanofilaments as a model approach to study electrocatalysis on nanomaterials
245156	DEMMEA	Using Ordered Carbon Nanomaterials for Shedding Light on the Mechanism of the Cathodic Oxygen Reduction Reaction
245156	DEMMEA	Sulfonated aromatic polyethers containing pyridine units as electrolytes for high temperature fuel cells
245156	DEMMEA	Preparation and characterization of Pt on modified multi-wall carbon nanotubes to be used as electrocatalysts for high temperature fuel cell applications
245156	DEMMEA	The Effect of Structural Variations on Aromatic Polyethers for High-Temperature PEM Fuel Cells
245156	DEMMEA	Mass transport effects in CO bulk electro-oxidation on Pt nanoparticles supported on vertically aligned carbon nanofilaments
245156	DEMMEA	Preparation, testing and modeling of three-dimensionally ordered catalytic layers for electrocatalysis of fuel cell reactions
245156	DEMMEA	Further insight into the oxygen reduction reaction on Pt nanoparticles supported on spatially structured catalytic layers
245156	DEMMEA	Cross linking of side chain unsaturated aromatic polyethers for high temperature polymer electrolyte membrane fuel cell applications

	Main author	Title of the periodical	Publication date	Relevant pages
	Halinen, Matias	Fuel Cells	08-Aug-2012	754-760
	Roland Peters, FZJ	International Journal of Hydrogen Energy	19-Apr-2013	
	Marra D.,	Proceedings of the ASME Design Engineering Technical Conference	07-Aug-2011	449-455
	Yousfi Steiner N.	Fuel Cells	27-Mar-2012	302-309
	Marra D.	Journal of Power Sources	30-Apr-2013	
	Wang, K.	International Journal of Hydrogen Energy	01-Jun-2011	7212-7228
	Konstantinia D. Papadimitriou, Maria Geormezi, Stylianos G. Neophytides, Joannis K. Kallitsis	Journal of Membranes Science	25-Jan-2013	1-9
	Christina I. Morfopoulou, Aikaterini K. Andreopoulou, Maria K. Daletou, Stylianos G. Neophytides, Joannis K. Kallitsis	Journal of Materials Chemistry	07-Dec-2012	1613-1622
	Sebastian Kaserer, Christoph Rakousky, Julia Melke, Christina Roth	Journal of Applied Electrochemistry	28-Apr-2013	-
	Alfonso Crespo-Yapur, Antoine Bonnefont, Rolf Schuster, Katharina Krischer, Elena R. Savinova	ChemPhysChem	01-Mar-2013	1117-1121
	Ioannis Kalamaras, Maria K. Daletou, Stylianos G. Neophytides, Joannis K. Kallitsis	Journal of Membranes Science	22-May-2012	42-50
	M. Geormezi, V. Deimede, J.K. Kallitsisa, S. Neophytides	Journal of Membranes Science	02-Jan-2012	57-66
	Sebastian Kaserer, Keegan M. Caldwell, David E. Ramaker, Christina Roth	Journal of Physical Chemistry C	01-Mar-2013	6210-6217
	P.S. Ruvinskiy, A. Bonnefont, E.R. Savinova	Electrochimica Acta	03-Apr-2012	174-186
	Pavel S. Ruvinskiy, Antoine Bonnefont, Cuong Pham-Huu, Elena R. Savinova	Langmuir	14-Jun-2011	9018-9027
	I. Kalamaras, M. K. Daletou, V. G. Gregoriou, J. K. Kallitsis	Fuel Cells	17-Nov-2011	921-931
	A. Orfanidi, M.K. Daletou, S.G. Neophytides	Applied Catalysis B: Environmental	22-Jun-2011	379-389
	Christina Morfopoulou, Aikaterini K. Andreopoulou, Joannis K. Kallitsis	Polymer Chemistry	09-Aug-2011	4325-4334
	Pavel S. Ruvinskiy, Antoine Bonnefont, Maryam Bayati, Elena R. Savinova	Physical Chemistry Chemical Physics	08-Sep-2010	15207-15216
	P.S. Ruvinskiy, A. Bonnefont, M. Houllé, C. Pham-Huu, E.R. Savinova	Electrochimica Acta	18-Jan-2010	3245-3256
	Pavel S. Ruvinskiy, Antoine Bonnefont, Elena R. Savinova	Electrocatalysis	13-Apr-2011	123-133
	Konstantinia D. Papadimitriou, Fotis Paloukis, Stylianos G. Neophytides, Joannis K. Kallitsis	Macromolecules	18-May-2011	4942-4951

245171	MCFC-CONTEX	Experimental analysis of SO ₂ effects on Molten Carbonate Fuel Cells
245171	MCFC-CONTEX	Effects of sulfur contaminants on MCFC performance
245171	MCFC-CONTEX	Membranes and molten carbonate fuel cells to capture CO ₂ and increment energy production in natural gas power plants
245171	MCFC-CONTEX	Electrochemical Impedance Study of the Poisoning Behaviour of Ni-based Anodes at Low Concentrations of H ₂ S in a MCFC
245171	MCFC-CONTEX	Experimental and theoretical analysis of H ₂ S effects on MCFCs
245171	MCFC-CONTEX	MCFC fed with biogas: Experimental investigation of sulphur poisoning using impedance spectroscopy
245171	MCFC-CONTEX	Strategies and new developments in the field of molten carbonates and high-temperature fuel cells in the carbon cycle
245202	IRAFC	Cross-Linking of Side Chain Unsaturated Aromatic Polyethers for High Temperature Polymer Electrolyte Membrane Fuel Cell Applications
245202	IRAFC	Nontrivial Redox Behavior of Nanosized Cobalt: New Insights from Ambient Pressure X-ray Photoelectron and Absorption Spectroscopies
245202	IRAFC	When a Metastable Oxide Stabilizes at the Nanoscale: Wurtzite CoO Formation upon Dealloying of PtCo Nanoparticles
245202	IRAFC	Development of an Internal Reforming Methanol Fuel Cell: Concept, Challenges and Opportunities
245202	IRAFC	The effect of structural variations on aromatic polyethers for high temperature PEM fuel cells
245202	IRAFC	CuMnO _x catalysts for internal reforming methanol fuel cells: Application aspects
245202	IRAFC	Performance of internal reforming methanol fuel cell under various methanol/water concentrations
245202	IRAFC	Thermal crosslinking of aromatic polyethers bearing pyridine groups for use as high temperature polymer electrolytes
245202	IRAFC	Alloys in catalysis: phase separation and surface segregation phenomena in response to the reactive environment
245202	IRAFC	Bimetallic Nickel-Cobalt Nanosized Layers Supported on Polar ZnO Surfaces: Metal-Support Interaction and Alloy Effects Studied by Synchrotron Radiation X-ray Photoelectron Spectroscopy
245202	IRAFC	Probing Metal-Support Interaction in Reactive Environments: An in Situ Study of PtCo Bimetallic Nanoparticles Supported on TiO ₂
245202	IRAFC	Side chain crosslinking of aromatic polyethers for high temperature polymer electrolyte membrane fuel cell applications
245202	IRAFC	Methanol Steam Reforming over Indium-Promoted Pt/Al ₂ O ₃ Catalyst: Nature of the Active Surface
245202	IRAFC	Cross linked high temperature polymer electrolytes through oxadiazole bond formation and their applications in HT PEM fuel cells
245202	IRAFC	Covalent crosslinking in phosphoric acid of pyridine based aromatic polyethers bearing side double bonds for use in high temperature polymer electrolyte membrane fuel cells

N. Di Giulio, B. Bosio, J. Han, S.J. McPhail	International Journal of Hydrogen Energy	01-Aug-2014	12300-12308
I. Rexed, C. Lagergren, G. Lindbergh	International Journal of Hydrogen Energy	04-Aug-2014	12242-12250
Paolo Greppi, Barbara Bosio, Elisabetta Arato	Journal of the American Chemical Society	20-Mar-2013	8755-8764
H. Devianto, E. Simonetti, S.J. McPhail, F. Zaza, V. Cigolotti, C. Paoletti, A. Moreno, A. La Barbera, I. Luisetto	International Journal of Hydrogen Energy	01-Dec-2012	19312-19318
N. Di Giulio, B. Bosio, V. Cigolotti, S.W. Nam	International Journal of Hydrogen Energy	01-Dec-2012	19329-19336
Viviana Cigolotti, Stephen McPhail, Angelo Moreno, Sung Pil Yoon, Jong Hee Han, Suk Woo Nam, Tae-Hoon Lim	International Journal of Hydrogen Energy	01-Aug-2011	10311-10318
M. Cassir, S.J. McPhail, A. Moreno	International Journal of Hydrogen Energy	02-Dec-2012	pp. 19345-19350
Konstantinia D. Papadimitriou, Fotis Paloukis, Stylianos G. Neophytides, Joannis K. Kallitsis	Macromolecules	18-May-2011	4942-4951
Vasiliki Papaefthimiou, Thierry Dintzer, Véronique Dupuis, Alexandre Tamion, Florent Tournus, Arnaud Hillion, Detre Teschner, Michael Hävecker, Axel	ACS Nano	10-Feb-2011	2182-2190
Vasiliki Papaefthimiou, Thierry Dintzer, Véronique Dupuis, Alexandre Tamion, Florent Tournus, Detre Teschner, Michael Hävecker, Axel Knop-Gericke, R.	Journal of Physical Chemistry Letters	04-Apr-2011	900-904
G. Avgouropoulos, T. Ioannides, J.K. Kallitsis, S. Neophytides	Chemical Engineering Journal	23-May-2011	95-101
Christina Morfopoulou, Aikaterini K. Andreopoulou, Joannis K. Kallitsis	Journal of Polymer Science, Part A: Polymer Chemistry	15-Oct-2011	4325-4334
Joan Papavasiliou, George Avgouropoulos, Theophilos Ioannides	International Journal of Hydrogen Energy	01-Nov-2012	16739-16747
G. Avgouropoulos, S. G. Neophytides	Journal of Applied Electrochemistry	01-Sep-2012	719-726
Ioannis Kalamaras, Maria K. Daletou, Stylianos G. Neophytides, Joannis K. Kallitsis	Journal of Membranes Science	01-Oct-2012	42-50
Spiros Zafeiratos, Simone Piccinin, Detre Teschner	Catalysis Science and Technology	26-Jan-2012	1787-1801
Y. T. Law, T. Skála, I. Piš, V. Nehasil, M. Vondráček, S. Zafeiratos	Journal of Physical Chemistry C	12-Apr-2012	10048-10056
V. Papaefthimiou, T. Dintzer, M. Lebedeva, D. Teschner, M. Hävecker, A. Knop-Gericke, R. Schlögl, V. Pierron-Bohnes, E. Savinova, S. Zafeiratos	Journal of Physical Chemistry C	11-Jun-2012	14342-14349
Andrea Vöge, Valadoula A. Deimede, Joannis K. Kallitsis	Journal of Polymer Science, Part A: Polymer Chemistry	04-Oct-2011	207-216
Roland L. Barbosa, Vasiliki Papaefthimiou, Yeuk T. Law, Detre Teschner, Michael Hävecker, Axel Knop-Gericke, Ralf Zapf, Gunther Kolb, Robert Schlögl	Journal of Physical Chemistry C	07-Mar-2013	6143-6150
Christina I. Morfopoulou, Aikaterini K. Andreopoulou, Maria K. Daletou, Stylianos G. Neophytides, Joannis K. Kallitsis	Journal of Materials Chemistry	07-Dec-2012	1613-1622
Konstantinia D. Papadimitriou, Maria Geormezi, Stylianos G. Neophytides, Joannis K. Kallitsis	Journal of Membranes Science	15-Apr-2013	1-9

245202	IRAFC	Microchannel Fuel Processors as Hydrogen Source for Fuel Cells in Distributed Energy Supply Systems	
245224	HYDROSOL-3D	Hydrogen production via solar-aided water splitting thermochemical cycles with nickel ferrite: Experiments and modeling	
245224	HYDROSOL-3D	Hydrogen production via solar-aided water splitting thermochemical cycles: Combustion synthesis and preliminary evaluation of spinel redox-pair materials	
245224	HYDROSOL-3D	Development of a system model for a hydrogen production process on a solar tower	
245262	NEXPEL	A Microblock Ionomer in Proton Exchange Membrane Electrolysis for the Production of High Purity Hydrogen	
245339	LOLIPEM	Durability of Sulfonated Aromatic Polymers for Proton-Exchange-Membrane Fuel Cells	
245339	LOLIPEM	Thermogravimetric analysis of SPEEK membranes: Thermal stability, degree of sulfonation and cross-linking reaction	
245339	LOLIPEM	Water activity coefficient and proton mobility in hydrate acidic polymers	
245339	LOLIPEM	Building Bridges: Crosslinking of Sulfonated Aromatic Polymers – a Review	
245339	LOLIPEM	Sulfonated aromatic ionomers: Analysis of proton conductivity and proton mobility	
245339	LOLIPEM	High Performance Sulfonated Aromatic Ionomers by Solvothermal Macromolecular Synthesis	
245339	LOLIPEM	New Results on the Visco-Elastic Behaviour of Ionomer Membranes and Relations Between T-RH Plots and Proton Conductivity Decay of Nafion 117 in the Range 50-140°C	
245339	LOLIPEM	Influence of the preparation conditions on the properties of polymeric and hybrid cation exchange membranes	
245339	LOLIPEM	New approach for the evaluation of membranes transport properties for polymer electrolyte membrane fuel cells	
245339	LOLIPEM	Conductivity and hydration of sulfonated polyethersulfone in the range 70-120°C: effect of temperature and relative humidity cycling	
245339	LOLIPEM	Permeability and Diffusivity Measurements on Polymer Electrolyte Membranes	
245339	LOLIPEM	Electrodeposition Of PEM Fuel Cell Catalysts By The Use Of A Hydrogen Depolarized Anode	
245339	LOLIPEM	Stabilization of Sulfonated Aromatic Polymer (SAP) Membranes Based on SPEEK-WC for PEMFCs	
245339	LOLIPEM	Annealing of Nafion 1100 in the Presence of an Annealing Agent: A Powerful Method for Increasing Ionomer Working Temperature in PEMFCs	
245339	LOLIPEM	Proton Mobility in Sulfonated PolyEtherEtherKetone (SPEEK): Influence of Thermal Crosslinking and Annealing	
245339	LOLIPEM	Crosslinked SPEEK membranes: Mechanical, thermal and hydrothermal properties	
245339	LOLIPEM	Proton-Conducting Cross-Linked Sulfonated Aromatic Polymers for Fuel Cells Application	
245339	LOLIPEM	Cross-linking of sulfonated polyetheretherketone by thermal treatment: how does the reaction occur?	
245339	LOLIPEM	More on NAFION conductivity decay at temperatures higher than 80°C: preparation and first characterization of in-plane oriented layered morphologies	
245339	LOLIPEM	Electrocatalyst-Membrane Interface and Fuel Cell Performance with Sulfonated PolyEtherEtherKetone as Ionomer	

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Agrafiotis C., Zygogianni A., Pagkoura C., Kostoglou M., Konstandopoulos A. G.	AIChE Journal	28-Aug-2012	1213-1225
Christos C. Agrafiotis, Chrysoula Pagkoura, Alexandra Zygogianni, George Karagiannakis, Margaritis Kostoglou, Athanasios G. Konstandopoulos	International Journal of Hydrogen Energy	06-Apr-2012	8964-8980
J.-P. Sařck, M. Roeb, C. Sattler, R. Pitz-Paal, A. Heinzel	Solar Energy	12-Oct-2011	99-111
Daniel W. Smith	Macromolecules	26-Feb-2013	1504 - 1511
H. Hou, M. L. Di Vona, P. Knauth	ChemSusChem	18-Nov-2011	1-12
P. Knauth, H. Hou, E. Bloch, E. Sgreccia, M. L. Di Vona	Journal of Analytical and Applied Pyrolysis	29-Jul-2011	361-365
P. Knauth, E. Sgreccia, A. Donnadio, M. Casciola, M. L. Di Vona	Journal of the Electrochemical Society	07-Dec-2010	159-165
H. Hou, M.L. Di Vona, P. Knauth	Journal of Membranes Science	17-Aug-2012	113-127
P. Knauth; M.L. Di Vona	Solid State Ionics	25-Feb-2012	255-259
M. L. Di Vona, G. Alberti, E. Sgreccia, M. Casciola, P. Knauth	International Journal of Hydrogen Energy	24-Mar-2012	8672-8680
G. Alberti, M.L. Di Vona, R. Narducci	International Journal of Hydrogen Energy	15-Sep-2011	6302-6307
Fontananova E., Cucunato V., Curcio E., Trotta F., Biasizzo M., Drioli E., Barbieri G.	Electrochimica Acta	30-Jan-2012	164-172
Brunetti A., Fontananova E., Donnadio A., Casciola M., Di Vona M.L., Sgreccia E., Drioli E., Barbieri G.	Journal of Power Sources	24-Jan-2012	222-230
A. Donnadio, M. Casciola, M.L. Di Vona, M. Tamilvanan	Journal of Power Sources	11-Jan-2012	145-150
F. Arena, J. Mitzel, R. Hempelmann	Fuel Cells	19-Dec-2012	56-64
J. Mitzel, F. Arena, H. Natter, T. Walter, M. Batzer, M. Stefener, R. Hempelmann	International Journal of Hydrogen Energy	11-Oct-2011	6261-6267
E. Fontananova, A. Brunetti, F. Trotta, M. Biasizzo, E. Drioli, G. Barbieri	Fuel Cells	08-Nov-2012	86-97
Alberti G., Narducci R., Di Vona M. L., Giancola S.	Fuel Cells	08-Nov-2012	42-47
Knauth P., Pasquini L., Maranesi B., Pelzer K., Polini R., Di Vona M. L.	Fuel Cells	16-Mar-2013	79-95
H. Hou, B. Maranesi, J.F Chailan, M. Khadhraoui, R. Polini, M.L. Di Vona, P. Knauth	Journal of Materials Research	14-Aug-2012	1950-1957
B. Maranesi, L. Pasquini, M. Khadhraoui, P. Knauth, M. L. Di Vona	Materials Research Society Symposium - Proceedings	01-Mar-2012	60-65
B. Maranesi, H. Hou, R. Polini, E. Sgreccia, G. Alberti, R. Narducci, P. Knauth, M. L. Di Vona	Fuel Cells	18-Feb-2013	107-117
Alberti G., Narducci R., Di Vona M. L., Giancola S.	Industrial and Engineering Chemistry Research	14-Mar-2013	0-0
F. Arena, J. Mitzel, R. Hempelmann	Zeitschrift fur Physikalische Chemie	11-Feb-2013	0-0

245355	ROBANODE	Mathematical modeling of Ni/GDC and Au-Ni/GDC SOFC anodes performance under internal methane steam reforming conditions
245355	ROBANODE	Study of the synergistic interaction between nickel, gold and molybdenum in novel modified NiO/GDC cermets, possible anode materials for CH ₄ fueled SOFCs
245355	ROBANODE	On the active surface state of nickel-ceria solid oxide fuel cell anodes during methane electro-oxidation
245355	ROBANODE	Fundamental Studies of Sonoelectrochemical Nanomaterials Preparation
245355	ROBANODE	Design of experiment approach applied to reducing and oxidizing tolerance of anode supported solid oxide fuel cell. Part II: Electrical, electrochemical and microstructural characterization of tape-cast cells
245355	ROBANODE	Redox stable Ni-YSZ anode support in solid oxide fuel cell stack configuration
256627	CATION	LCA-LCC analysis of a 230 kW SOFC system for distributed generation applications
256647	MAESTRO	Effect of side-chain length on the electrospinning of perfluorosulfonic acid ionomers
256647	MAESTRO	Physical and chemical modification routes leading to improved mechanical properties of perfluorosulfonic acid membranes for PEM fuel cells
256647	MAESTRO	Short side chain perfluorosulfonic acid membranes and their composites with nanosized zirconium phosphate: hydration, mechanical properties and proton conductivity
256647	MAESTRO	Layered zirconium alkylphosphates: suitable materials for novel PFSA composite membranes with improved proton conductivity and mechanical stability
256653	SSH2S	Experimental results of an air-cooled lab-scale H ₂ storage tank based on sodium alanate
256653	SSH2S	Catalytic Influence of Various Cerium Precursors on the Hydrogen Sorption Properties of NaAlH ₄
256653	SSH2S	Experimental study of powder bed behavior of sodium alanate in a lab-scale H ₂ storage tank with flow-through mode
256653	SSH2S	Additive Effects of LiBH ₄ and ZrCoH ₃ on the Hydrogen Sorption of the Li-Mg-N-H Hydrogen Storage System
256653	SSH2S	Effect of a Ti-Based Additive on the Desorption in Isotope-Labeled LiB(H,D) ₄ -Mg(H,D) ₂ Nanocomposites
256653	SSH2S	Tailored heat transfer characteristics of pelletized LiNH ₂ -MgH ₂ and NaAlH ₄ hydrogen storage materials
256653	SSH2S	Preparation, scale-up and testing of nanoscale, doped amide systems for hydrogen storage
256653	SSH2S	Theoretical and experimental study on Mg(BH ₄) ₂ -Zn(BH ₄) ₂ mixed borohydrides
256653	SSH2S	Advanced reactor concept for complex hydrides: Hydrogen desorption at fuel cell relevant boundary conditions
256653	SSH2S	Advanced reactor concept for complex hydrides: Hydrogen absorption from room temperature
256653	SSH2S	Material properties and empirical rate equations for hydrogen sorption reactions in 2 LiNH ₂ -1.1 MgH ₂ -0.1 LiBH ₄ -3 wt.% ZrCoH ₃
256653	SSH2S	Optimization of hydrogen charging process parameters for an advanced complex hydride reactor concept

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256653	SSH2S	Experimental investigation of a liquid cooled high temperature proton exchange membrane (HT-PEM) fuel cell coupled to a sodium alanate tank	
256653	SSH2S	Beneficial effects of stoichiometry and nanostructure for a LiBH_4 – MgH_2 hydrogen storage system	
256653	SSH2S	Hydrogen storage of Mg–Zn mixed metal borohydrides	
256653	SSH2S	Investigation on the Decomposition Enthalpy of Novel Mixed Mg $(1-x)$ Zn x $(\text{BH}_4)_2$ Borohydrides by Means of Periodic DFT Calculations	
256653	SSH2S	Destabilization effect of transition metal fluorides on sodium borohydride	
256653	SSH2S	Considerations on the H_2 desorption process for a combination reactor based on metal and complex hydrides	
256653	SSH2S	Numerical investigation of hydrogen charging performance for a combination reactor with embedded metal hydride and coolant tubes	
256653	SSH2S	Thermodynamic modelling of $\text{Mg}(\text{BH}_4)_2$	
256673	D-CODE	A review on non-model based diagnosis methodologies for PEM fuel cell stacks and systems	
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256673	D-CODE	A double-fuzzy diagnostic methodology dedicated to on-line fault diagnosis of PEMFC stack	
256693	DESIGN	A random-effects model for long-term degradation analysis of solid oxide fuel cells	
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256694	LOTUS	System design and process layout for a SOFC micro-CHP unit with reduced operating temperatures	
256730	SCOTAS-SOFC	Full Ceramic Fuel Cells Based on Strontium Titanate Anodes, an Approach towards More Robust SOFCs	
256730	SCOTAS-SOFC	Thermomechanical properties of Y-substituted SrTiO_3 used as re-oxidation stable anode substrate material	
256730	SCOTAS-SOFC	Influence of phase transformations on mechanical properties of novel ceramics for solid oxide fuel cell anode applications	
256730	SCOTAS-SOFC	Impedance and Stability of M/CGO (M: Ni, Pd, Ru) Co-infiltrated Nb-doped SrTiO_3 SOFC Anodes	
256730	SCOTAS-SOFC	Effect of Ru/CGO versus Ni/CGO Co-infiltration on the Performance and Stability of STN-based SOFCs	
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256730	SCOTAS-SOFC	Instability and growth of nanoscale $\text{Ce}_{0.86}\text{d}_{0.201.9}/\text{NiO}$ infiltrate in $\text{Sr}_{0.94}\text{Ti}_{0.9}\text{Nb}_{0.103}\text{Zr}_{0.84}\text{Y}_{0.1601.92}$ anodes for solid oxide fuel cells	
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256730	SCOTAS-SOFC	Evaluation of Ca Doped La _{0.2} Sr _{0.7} TiO ₃ as an Alternative Material for Use in SOFC Anodes	
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278054	DURAMET	Synthesis of Pd	
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278054	DURAMET	Graphene-supported substoichiometric sodium tantalate as methanol tolerant non-noble metal catalyst for the electro-reduction of oxygen	
278138	NEMESIS2+	An experimental investigation of biodiesel steam reforming	
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300081	ELECTROHYPEM	Electrochemical characterization of a PEM water electrolyzer based on a sulfonated polysulfone membrane	
300081	ELECTROHYPEM	Design and testing of a compact PEM electrolyzer system	
300081	ELECTROHYPEM	Polymer electrolyte membrane water electrolysis: status of technologies and potential applications in combination with renewable power sources	
300081	ELECTROHYPEM	Proton exchange membrane water electrolysis with short-side-chain Aquivion membrane and IrO2 anode catalyst	
300081	ELECTROHYPEM	Performance analysis of short-side-chain Aquivion® perfluorosulfonic acid polymer for proton exchange membrane water electrolysis	

	Bruna Silva, Ioan Solomon, Ana M. Ribeiro, U-Hwang Lee, Young Kyu Hwang, Jong-San Chang, José M. Loureiro, Alírio E. Rodrigues	Separation and Purification Technology	24-Aug-2013	744-756
	Jorge Paredes Garibay, Jarno J. J. Kaakkunen, Raimo Penttilä, Jennifer Harris, John McIntyre, Petri Laakso, Veli Kujanpää	Journal of Laser Applications	01-Feb-2015	S29207
	Kaspar Lasn, Andreas Echtermeyer	International Journal of Hydrogen Energy	01-Sep-2014	
	Kaspar Lasn, Andreas Echtermeyer	International Journal of Hydrogen Energy	01-Sep-2014	
	Gandiglio M., Lanzini A., Leone P., Santarelli M., Borchiellini R.	Energy	01-Jul-2013	142-155
	B. Tjaden, M. Gandiglio, A. Lanzini, M. Santarelli, M. Järvinen	Energy and Fuels	16-May-2014	4216-4232
	Davide Papurello, Erna Schuhfried, Andrea Lanzini, Andrea Romano, Luca Cappellin, Tilmann D. Märk, Silvia Silvestri, Franco Biasioli	Fuel Processing Technology	03-Feb-2014	133-140
	D. Papurello, R. Borchiellini, P. Bareschino, V. Chiodo, S. Freni, A. Lanzini, F. Pepe, G.A. Ortigoza, M Santarelli	Applied Energy	15-Jul-2014	254-263
	Papurello D., Lanzini A., Leone P., Santarelli M., Silvestri S.	Waste Management	01-Jul-2014	2047-2056
	Madi H., Lanzini A., Diethelm S., Papurello D., Van Herle J., Lualdi M., Gutzon Larsen J., Santarelli M.	Journal of Power Sources	15-Jan-2015	460-471
	V. Chiodo, A. Galvagno, A. Lanzini, D. Papurello, F. Urbani, S. Freni, M. Santarelli	Energy Conversion and Management	01-Jun-2015	252-258
	Kupecki J., Jewulski J., Motylinski K.	International Journal of Hydrogen Energy	31-Dec-2015	
	F. Currelletti, M. Gandiglio, A. Lanzini, M. Santarelli, F. Maréchal,	Journal of Power Sources	31-Dec-2015	
	Ramchandra Bhandari, Clemens A. Trudewind, Petra Zapp	Journal of Cleaner Production	22-Jul-2013	151-163
	A. Drljo, W. Wukovits, A. Friedl	Chemical Engineering Transactions	04-Aug-2014	1393 – 1398
	Santarelli M., Barra S., Sagnelli F., Zitella P.	Bioresource Technology	09-Nov-2012	430-438
	W. Wukovits, A. Drljo, E. Hilby, A. Friedl	Chemical Engineering Transactions	04-Apr-2013	1003 - 1008
	Krzysztof Urbaniec	Journal of Cleaner Production	01-Jan-2013	353-354
	M. Lakshmi Narasu, Krzysztof Urbaniec	Journal of Cleaner Production	01-Aug-2013	11-13
	W. Wukovits, A. Drljo, A. Friedl	Chemie-Ingenieur-Technik	01-Sep-2014	1347
	J. Rechberger	SAE International Journal of Commercial Vehicles	01-Jan-2013	
	S. Siracusano, V. Baglio, F. Lufrano, P. Staiti, A.S. Aricò	Journal of Membranes Science	15-Dec-2013	209-214
	N. Briguglio, G. Brunaccini, S. Siracusano, N. Randazzo, G. Dispenza, M. Ferraro, R. Ornelas, A.S. Aricò, V. Antonucci,	International Journal of Hydrogen Energy	30-Aug-2013	11519-11529
	A. S. Aricò, S. Siracusano, N. Briguglio, V. Baglio, A. Di Blasi, V. Antonucci	Journal of Applied Electrochemistry	01-Sep-2013	107-118
	A. Skulimowska, M. Zaton, M. Dupont, S. Sunde, L. Merlo, D. J. Jones, J. Rozière	International Journal of Hydrogen Energy	15-Apr-2014	6307-6316
	S. Siracusano, V. Baglio, A. Stassi, L. Merlo, E. Moukheiber, A.S. Aricò	Journal of Membranes Science	01-Sep-2014	1-7

300081	ELECTROHYPEM	Nanosized IrOx and IrRuOx electrocatalysts for the O2 evolution reaction in PEM water electrolyzers	
300081	ELECTROHYPEM	Performance of a PEM water electrolyser combining an IrRu-oxide anode electrocatalyst and a short-side chain Aquivion membrane	
301782	FLUMABACK	Fast measurement of proton exchange membrane fuel cell impedance based on pseudo-random binary sequence perturbation signals and continuous wavelet transform	
303024	EURECA	Investigation of tungsten carbide supported Pd or Pt as anode catalysts for PEM fuel cells	
303024	EURECA	Is platinum necessary for efficient hydrogen evolution? – DFT study of metal monolayers on tungsten carbide	
303024	EURECA	Efficient Use of Resources in Energy Converting Applications	
303417	HYUNDER	Hydrogen underground storage in Romania, potential directions of development, stakeholders and general aspects	
303422	MATHRYCE	Fatigue crack initiation and growth in a CrMo steel under hydrogen pressure	
303445	STACKTEST	Parametric Sensitivity Tests—European Polymer Electrolyte Membrane Fuel Cell Stack Test Procedures	
303445	STACKTEST	Validation of the Influence of Test Parameters in Performance Measurements of a PEMFC Stack	
303445	STACKTEST	Polymer electrolyte membrane fuel cell efficiency at the stack level	
303447	HYPER	Rapid surfactant-free synthesis of Mg(OH)2 nanoplates and pseudomorphic dehydration to MgO	
303447	HYPER	Revisiting the Hydrogen Storage Behavior of the Na-O-H System	
303447	HYPER	Recent Advances in the Use of Sodium Borohydride as a Solid State Hydrogen Store	
303449	STAMPEM	“Carbon-polymer composite coatings for PEM fuel cell bipolar plates”	
303449	STAMPEM	<ul style="list-style-type: none"> “An investigation of the typical corrosion parameters used to test polymer electrolyte fuel cell bipolar plate coatings, with titanium nitride coated stainless steel as a case study” 	
303454	TRISOFC	Emission and economic performance assessment of a solid oxide fuel cell micro-combined heat and power system in a domestic building	
303454	TRISOFC	Fuel cell technology for domestic built environment applications: State-of-the-art review	
303454	TRISOFC	Schottky Junction Effect on High Performance Fuel Cells Based on Nanocomposite Materials	
303454	TRISOFC	Electrochemical study of lithiated transition metal oxide composite for single layer fuel cell	
303454	TRISOFC	Flowerlike CeO2 microspheres coated with Sr2Fe1.5Mo0.5Ox nanoparticles for an advanced fuel cell	
303454	TRISOFC	Synthesis of Ba0.3Ca0.7Co0.8Fe0.2O3- composite material as novel catalytic cathode for ceria-carbonate electrolyte fuel cells	
303454	TRISOFC	Fabrication of electrolyte-free fuel cell with Mg0.4Zn0.6O/Ce0.8Sm0.2O2-Li0.3Ni0.6Cu0.07Sr0.03O2- layer	

S. Siracusano, N. Van Dijk, E. Payne-Johnson, V. Baglio, A.S. Aricò	Applied Catalysis B: Environmental	01-Mar-2015	488-495
S. Siracusano, V. Baglio, E. Moukheiber, L. Merlo, A.S. Aricò	International Journal of Hydrogen Energy	01-May-2015	
Andrej Debenjak, Pavle Bošković, Bojan Musizza, Janko Petrović, Đani Jurić	Journal of Power Sources	01-May-2014	112-118
Vladimir M. Nikolic, Dragana L. Zugic, Ivana M. Perovic, Aleksandra B. Saponjic, Biljana M. Babic, Igor A. Pasti, Milica P. Marceta Kaninski	International Journal of Hydrogen Energy	01-Aug-2013	11340-11345
Dragana D. Vasić, Anđelko Čadež, Vladimir M. Nikolić, Milica P. Marčeta-Kaninski, Igor A. Paštić	International Journal of Hydrogen Energy	13-Dec-2013	16071-16079
N. Jacobs, J. Busselmann, S. Theuring, M. Zobel, A. Dyck	ECS Transactions	31-Aug-2013	197-208
Ioan Iordache, Dorin Schitea, Adrian V. Gheorghe, Mihaela Iordache	International Journal of Hydrogen Energy	01-Jul-2014	11071-11081
L. Briottet, I. Moro, M. Escot, J. Furtado, P. Bortot, G.M. Tamponi, J. Solin, G. Odemer, C. Blanc, E. Andrieu	International Journal of Hydrogen Energy	01-Dec-2015	17021-17030
Samuel Simon Araya, Søren Juhl Andreassen, Søren Knudsen Kær	Journal of Fuel Cell Science and Technology	01-Dec-2014	061007
Corinna Harms, Frank Köhrmann, Alexander Dyck	Solid State Ionics	01-Jul-2015	75-79
Piotr Piela, Jens Mitzel	Journal of Power Sources	01-Oct-2015	95-103
James M. Hanlon, Laura Bravo Diaz, Giulia Balducci, Blane A. Stobbs, Marek Bielewski, Peter Chung, Ian MacLaren, Duncan H. Gregory	CrystEngComm	01-Jan-2015	5672-5679
Jianfeng Mao, Qinfen Gu, Duncan Gregory	Materials	01-May-2015	2191-2203
Jianfeng Mao, Duncan Gregory	Energies	01-Jan-2015	430-453
H. Husby, O. E. Kongstein, A. Oedegaard, F. Seland	International Journal of Hydrogen Energy	13-Jan-2014	951-957
A. Orsi, O.E. Kongstein, P.J. Hamilton, A. Oedegaard, I.H. Svenum, K. Cooke	Journal of Power Sources	01-Jul-2015	530-537
Theo Elmer, Mark Worall, Shenyi Wu, Saffa B. Riffat	Applied Thermal Engineering	01-Nov-2015	1082-1089
Theo Elmer, Mark Worall, Shenyi Wu, Saffa B. Riffat	Renewable and Sustainable Energy Reviews	01-Feb-2015	913-931
Bin Zhu, Peter D. Lund, Rizwan Raza, Ying Ma, Liangdong Fan, Muhammad Afzal, Janne Patakangas, Yunjun He, Yufeng Zhao, Wenyi Tan, Qiu-An Hua	Advanced Energy Materials	01-Apr-2015	
Huiqing Hu, Qizhao Lin, Afzal Muhammad, Bin Zhu	Journal of Power Sources	01-Jul-2015	388-393
Yanyan Liu, Yongfu Tang, Zhaohui Ma, Manish Singh, Yunjuan He, Wenjing Dong, Chunwen Sun, Bin Zhu	Scientific Reports	08-Jul-2015	11946
Muhammad Afzal, Rizwan Raza, Shangfeng Du, Raquel Bohn Lima, Bin Zhu	Electrochimica Acta	01-Oct-2015	385-391
Huiqing Hu, Qizhao Lin, Zhigang Zhu, Bin Zhu, Xianrong Liu	Journal of Power Sources	01-Feb-2014	577-581

303454	TRISOFC	Time-dependent performance change of single layer fuel cell with $\text{Li}_0.4\text{Mg}_0.3\text{Zn}_0.30/\text{Ce}_0.8\text{Sm}_0.202$ -composite
303454	TRISOFC	Functional semiconductor-ionic composite $\text{GDC-KZnAl/LiNiCuZnO}_x$ for single-component fuel cell
303454	TRISOFC	Understanding the electrochemical mechanism of the core-shell ceria-LiZnO nanocomposite in a low temperature solid oxide fuel cell
303454	TRISOFC	Study on GDC-KZnAl composite electrolytes for low-temperature solid oxide fuel cells
303454	TRISOFC	Synthesis of hierarchically porous LiNiCuZn -oxide and its electrochemical performance for low-temperature fuel cells
303454	TRISOFC	Microstructure and catalytic activity of $\text{Li}_0.15\text{Ni}_0.25\text{Cu}_0.3\text{Zn}_0.302$ - $\text{Ce}_0.8\text{Sm}_0.201.9$ -carbonate nanocomposite materials functioning as single component fuel cell
303454	TRISOFC	A commercial lithium battery LiMn -oxide for fuel cell applications
303454	TRISOFC	Ceria-carbonate composite for low temperature solid oxide fuel cell: Sintering aid and composite effect
303454	TRISOFC	Recent development of ceria-based (nano)composite materials for low temperature ceramic fuel cells and electrolyte-free fuel cells
303454	TRISOFC	A new energy conversion technology based on nano-redox and nano-device processes
303454	TRISOFC	Electrochemical study of lithiated transition metal oxide composite as symmetrical electrode for low temperature ceramic fuel cells
303454	TRISOFC	Development of high-performance anode supported solid oxide fuel cell
303454	TRISOFC	Novel electrolytes for solid oxide fuel cells with improved mechanical properties
303454	TRISOFC	Novel electrolytes for solid oxide fuel cells with improved mechanical properties
303454	TRISOFC	Effects of electrolyte pattern on mechanical and electrochemical properties of solid oxide fuel cells
303454	TRISOFC	Measurement of the temperature distribution in a large solid oxide fuel cell short stack
303454	TRISOFC	Design and fabrication of stair-step-type electrolyte structure for solid oxide fuel cells
303454	TRISOFC	Electrochemical behaviour and sulfur tolerance of $\text{V}_x\text{Mo}_{(1-x)}\text{O}_y$ as solid oxide fuel cell anode
303454	TRISOFC	Effects of ceramic based pastes on electrochemical performance of solid oxide fuel cells
303454	TRISOFC	Effects of anode fabrication parameters on the performance and redox behavior of solid oxide fuel cells
303454	TRISOFC	Mechanical and electrochemical behavior of novel electrolytes based on partially stabilized zirconia for solid oxide fuel cells
303454	TRISOFC	Strength evaluation of glass-ceramic composites containing yttria stabilized zirconia after thermal cycling
303454	TRISOFC	The role of lamination conditions on electrochemical and mechanical performance of ceramic electrolytes for solid oxide fuel cells
303454	TRISOFC	A Performance Prediction Tool for Solid Oxide Fuel Cells after Single Redox Cycle

Huiqing Hu, Qizhao Lin, Zhigang Zhu, Xiangrong Liu, Bin Zhu	International Journal of Hydrogen Energy	01-Jul-2014	10718-10723
Bin Zhu, Liangdong Fan, Yufeng Zhao, Wenyi Tan, Dingbang Xiong, Hao Wang	RSC Advances	01-Jan-2014	9920
Liangdong Fan, Ying Ma, Xiaodi Wang, Manish Singh, Bin Zhu	Journal of Materials Chemistry A	01-Jan-2014	5399
Ying Ma, Manish Singh, Xiaodi Wang, Fan Yang, Qiuhan Huang, Bin Zhu	International Journal of Hydrogen Energy	01-Oct-2014	17460-17465
Yufeng Zhao, Yunjuan He, Liangdong Fan, Jing He, Ding-Bang Xiong, Faming Gao, Bin Zhu	International Journal of Hydrogen Energy	01-Aug-2014	12317-12322
Cai Pan, Wenyi Tan, Jiangan Lu, Bin Zhu	International Journal of Hydrogen Energy	01-Nov-2014	19140-19147
Bin Zhu, Liangdong Fan, Yunjun He, Yufeng Zhao, Hao Wang	Materials Letters	01-Jul-2014	85-88
Mingming Chen, Hongjuan Zhang, Liangdong Fan, Chengyang Wang, Bin Zhu	International Journal of Hydrogen Energy	01-Aug-2014	12309-12316
Liangdong Fan, Chengyang Wang, Mingming Chen, Bin Zhu	Journal of Power Sources	01-Jul-2013	154-174
Bin Zhu, Peter Lund, Rizwan Raza, Janne Patakangas, Qiu-An Huang, Liangdong Fan, Manish Singh	Nano Energy	01-Nov-2013	1179-1185
Liangdong Fan, Hongjuan Zhang, Mingming Chen, Chengyang Wang, Hao Wang, Manish Singh, Bin Zhu	International Journal of Hydrogen Energy	01-Aug-2013	11398-11405
Bora Timurkutluk, Cigdem Timurkutluk, Mahmut D. Mat, Yuksel Kaplan	International Journal of Energy Research	01-Dec-2012	1383-1387
Bora Timurkutluk, Selahattin Celik, Cigdem Timurkutluk, Mahmut D. Mat, Yuksel Kaplan	International Journal of Hydrogen Energy	01-Sep-2012	13499-13509
Bora Timurkutluk, Selahattin Celik, Cigdem Timurkutluk, Mahmut D. Mat, Yuksel Kaplan	International Journal of Hydrogen Energy	01-Sep-2012	13499-13509
Bora Timurkutluk, Selahattin Celik, Serkan Toros, Cigdem Timurkutluk, Mahmut D. Mat, Yuksel Kaplan	Ceramics International	01-Sep-2012	5651-5659
Selahattin Celik, Bora Timurkutluk, Mahmut D. Mat	International Journal of Hydrogen Energy	01-Aug-2013	10534-10541
Yuksel Palaci, Bora Timurkutluk	International Journal of Energy Research	01-May-2013	631-637
Berceste Beyribey, Bora Timurkutluk, Turul Y. Erturul, Cigdem Timurkutluk, Mahmut D. Mat	Ceramics International	01-Aug-2013	7053-7061
Abdullah Mat, Bora Timurkutluk, Cigdem Timurkutluk, Yuksel Kaplan	Ceramics International	01-Jul-2014	8575-8583
Bora Timurkutluk, Mahmut D. Mat	Journal of Power Sources	01-Jul-2014	108-116
Selahattin Celik, Bora Timurkutluk, Serkan Toros, Cigdem Timurkutluk	Ceramics International	01-Aug-2015	8785-8790
Bora Timurkutluk, Yelda Ciftik, Hatice Korkmaz	Ceramics International	01-Jun-2015	6985-6990
Bora Timurkutluk	Ceramics International	01-Mar-2015	2057-2068
B. Timurkutluk, M. D. Mat	Fuel Cells	01-Feb-2015	71-89

303454	TRISOFC	Synthesis of Ba _{0.3} Ca _{0.7} Co _{0.8} Fe _{0.2} O _{3-δ} composite material as novel catalytic cathode for ceria-carbonate electrolyte fuel cells
325326	H2SENSE	Developments in gas sensor technology for hydrogen safety
325326	H2SENSE	An assessment on the quantification of hydrogen releases through oxygen displacement using oxygen sensors
325326	H2SENSE	Evaluation of selectivity of commercial hydrogen sensors
325326	H2SENSE	Assessment of commercial micro-machined hydrogen sensors performance metrics for safety sensing applications
325326	H2SENSE	Selectivity and resistance to poisons of commercial hydrogen sensors
325357	H2TRUST	Hydrogen Safety Risk Assessment Methodology applied to a Fluidized Bed Membrane Reactor for Autothermal Reforming of Natural Gas

Muhammad Afzal, Rizwan Raza, Shangfeng Du, Raquel Bohn Lima, Bin Zhu	Electrochimica Acta	01-Oct-2015	385-391
T. Hübert, L. Boon-Brett, V. Palmisano, M.A. Bader	International Journal of Hydrogen Energy	01-Dec-2014	20474-20483
W.J. Buttner, R. Burgess, C. Rivkin, M.B. Post, L. Boon-Brett, V. Palmisano, P. Moretto	International Journal of Hydrogen Energy	01-Dec-2014	20484-20490
V. Palmisano, L. Boon-Brett, C. Bonato, F. Harskamp, W.J. Buttner, M.B. Post, R. Burgess, C. Rivkin	International Journal of Hydrogen Energy	01-Dec-2014	20491-20496
H. El Matbouly, F. Domingue, V. Palmisano, L. Boon-Brett, M.B. Post, C. Rivkin, R. Burgess, W.J. Buttner	International Journal of Hydrogen Energy	01-Mar-2014	4664-4673
V. Palmisano, E. Weidner, L. Boon-Brett, C. Bonato, F. Harskamp, P. Moretto, M.B. Post, R. Burgess, C. Rivkin, W.J. Buttner	International Journal of Hydrogen Energy	01-Mar-2015	
N. Psara, M. Van Sint Annaland, F. Gallucci	International Journal of Hydrogen Energy	01-Jun-2015	

ANNEX 4

Patents from projects

Project call identifier	Project ID	Project acronym	Application reference	Applicants	Subject title
FCH-JU-2008-1	244821	ASSENT	EP11006485.4-2119	R. Deja, R. Peters, L. Blum, Forschungszentrum Jülich GmbH	Festoxid-Brennstoffzellen-System sowie Verfahren zum Betreiben eines solchen – Solid Oxide Fuel Cell System and Method for Operating the Same
FCH-JU-2008-1	244821	ASSENT	FI 20105697	Wärtsilä Finland Oy, ownership transferred to Convion Oy 14.1.2013	Control arrangement and method in fuel cell system
FCH-JU-2008-1	244821	ASSENT	FI 20106241	Wärtsilä Finland Oy, ownership transferred to Convion Oy 14.1.2013	Method and control arrangement for a fuel cell device
FCH-JU-2008-1	244821	ASSENT	FI 20116281	Wärtsilä Finland Oy, ownership transferred to Convion Oy 14.1.2013	Method and arrangement for controlling water content of cell anode gas
FCH-JU-2008-1	244821	ASSENT	FI 20125147	Wärtsilä Finland Oy, ownership transferred to Convion Oy 14.1.2013	Method and arrangement for utilizing recirculation for high temperature fuel cell system
FCH-JU-2008-1	244821	ASSENT	PCT/FI2012/050405	Wärtsilä Finland Oy, ownership transferred to Convion Oy 14.1.2013	Method and arrangement for determining enthalpy balance of a fuel cell system
FCH-JU-2008-1	244821	ASSENT	PCT/FI2012/050407	Wärtsilä Finland Oy, ownership transferred to Convion Oy 14.1.2013	Method and arrangement for determining enthalpy change of a fuel cell system
FCH-JU-2008-1	245156	DEMMEA	GR 20110100058 A	ADVENT S.A., University of Patras, FORTH/ICE-HT	Cross-linked or non-cross-linked aromatic copolymeric proton-conducting electrolytes for polymeric membrane fuel cells
FCH-JU-2008-1	245156	DEMMEA	US2012202129	Advent Technologies (GR)	Crosslinked or non-crosslinked aromatic (co)polymers as proton conductors for use in high temperature pem fuel cells
FCH-JU-2008-1	245202	IRAFC	GR20110100058 A	ADVENT S.A., University of Patras, FORTH/ICE-HT	Cross-linked or non-cross-linked aromatic copolymeric proton-conducting electrolytes for polymeric membrane fuel cells
FCH-JU-2008-1	245202	IRAFC	US2012/0202,129	ADVENT S.A., University of Patras, FORTH/ICE-HT	Crosslinked or non-crosslinked aromatic (co)polymers as proton conductors for use in high temperature pem fuel cells
FCH-JU-2008-1	245224	HYDRO-SOL-3D	US 2011/0135566 A1	Martin Roeb, Christian Sattler, Peter-Michael Rietbrock, Ruth Küster, Athanasios G. Konstandopoulos, Christos Agrafiotis, Lamark De Oliveira, Mark Schmitz	Gas/solid phase reaction

FCH-JU-2009-1	256627	CATION	EP2719447A1	Yves De Vos; Freddy Wollants; Jean-Paul Hubert Janssens	Combined heat exchanging and fluid mixing apparatus
FCH-JU-2009-1	256627	CATION	FI20115307	Wärtsilä Finland Oy	A heating method and arrangement for enhanced heating of a high temperature fuel cell device
FCH-JU-2009-1	256653	SSH2S	DE102012100875A1	I.Utz, M. Linder	Verfahren zur Speicherung von Wasserstoff und Wasserstoffspeichervorrichtung
FCH-JU-2009-1	256673	D-CODE	Patent under submission	University of Salerno: Inventors: R. Petrone, C. Pianese, P. Polverino, M. Sorrentino	Identification of fuel cell impedance for on-board diagnosis applications
FCH-JU-2009-1	256730	SCO-TAS-SOFC	EP No. 14158353.4 - 1360	T. Ramos, B. R. Sudireddy, K. Agersted, P. Holtappels	Structurally reinforced ceramic supports
FCH-JU-2009-1	256764	ASTERIX3	EP12171563	HTceramix S.A.	Gas distribution element for a fuel cell
FCH-JU-2009-1	256764	ASTERIX3	EP12171565	HTceramix S.A.	Gas distribution element with a supporting layer
FCH-JU-2009-1	256764	ASTERIX3	EP12171566	HTceramix S.A.	A gas flow dividing element
FCH-JU-2009-1	256768	RAMSES	ITB02014A000267	AEA - Loccioni	Method for size control and surface inspection of a fuel cell, and corresponding control apparatus
FCH-JU-2009-1	256768	RAMSES	ITVR20130200	SOFCPower SPA	Method for depositing a layer of material on a metallic support for fuel cells or electrolysis cells
FCH-JU-2010-1	278674	LASER-CELL	GB12084828	AFC Energy PLC	Fuel cells (Laser-sintered GDL)
FCH-JU-2010-1	278674	LASER-CELL	WO2014174303	AFC ENERGY PLC	(EN) Fuel cells; (FR) Pile à combustible
FCH-JU-2010-1	278674	LASER-CELL	WO2015033123	AFC ENERGY PLC	(EN) Fuel cells, electrodes, and method of manufacture; (FR) Piles à combustible, électrodes et procédé de fabrication
FCH-JU-2010-1	278732	RESELYSER	PCTEP2012053376	Doyen, Willy; Alvarez Gallego, YolandaB-2160 Wommelgem (BE) Alvarez Gallego, Yolanda B-2000 Antwerpen (BE)	Novel separator, an electrochemical cell therewith and use thereof therein
FCH-JU-2010-1	278798	SOFCOM	combustor-P-409295	IEN-Bocian P., wi tkowski B., Kuczy ski P., Razum M., Podsiadło S., Golec T.	A method and gas burner for low-calorific gas with high inlet temperature
FCH-JU-2011-1	300081	ELECTROHY-PEM	PCTGB2014051370	ITM Power Ltd	Additive to prevent degradation of polymer membranes -free radical resistant materials
FCH-JU-2011-1	300081	ELECTROHY-PEM	UK patent 1409685.3	ITM Power Ltd	Catalyst Ink
FCH-JU-2011-1	300081	ELECTROHY-PEM	UK patent 1409686.1	ITM Power Ltd	Super-conductive membrane
FCH-JU-2011-1	303445	STACKTEST	PL414321	Wojciech Tokarz, Piotr Piela	Method for stopping work of a fuel cell fuelled with a gaseous fuel

ANNEX 5

Horizon 2020 Key Performance Indicators

TABLE I: Horizon 2020 Key Performance Indicators²³

		Key Performance Indicator	Type of data required	Results
INDUSTRIAL LEADERSHIP	12	SME - Share of participating SMEs introducing innovations new to the company or the market (covering the period of the project plus three years)	Number of SMEs that have introduced innovations	Not available (no project report already submitted for H2020 project)
	13	SME - Growth and job creation in participating SMEs	Turnover of company, number of employees	Not available (no project report already submitted for H2020 project)
SOCIAL CHALLENGES	14	Publications in peer-reviewed high-impact journals	Publications from relevant funded projects (DOI: Digital Object Identifiers); journal impact benchmark (ranking) data to be collected by commercially available bibliometric databases	Not available (no project report already submitted for H2020 project)
	15	Patent applications and patents awarded in the area of the JTI	Patent application number	Not available (no project report already submitted for H2020 project)
	16	Number of prototypes testing activities	Reports on prototypes and testing activities	Not available (no project report already submitted for H2020 project)
	17	Number of joint public-private publications in projects	Properly flagged publications data (DOI) from relevant funded projects	Not available (no project report already submitted for H2020 project)
	18	New products, processes and methods launched on the market	Project count and drop-down list allowing choice of the type processes, products, methods	Not available (no project report already submitted for H2020 project)
EVALUATION	NA	TTI all applicants of the outcome of the evaluation of their application from the final date for submission of completed proposals	Number and % of information letters sent to applicants within target average TTI (calendar days) maximum TTI (calendar days)	15 proposals from the 2014 call for proposals (100 %) with information letters sent to applicants within target (152 days) average TTI: 124 days maximum TTI: 124 days
	NA	Redress after evaluations	Number of redresses requested	1 redress requested (no grounds for complaint)
GRANTS	NA	TTG measured (average) from call deadline to signature of grants	Number and % of grants signed within target average TTG in calendar days maximum TTG in calendar days	12 out of 15 projects (80 %) signed within target (243 ± 20 days) average TTG: 259 days maximum TTG: 405 days

23 Based on Annex II to Council Decision 2013/743/EU

		Key Performance Indicator	Type of data required	Results
PAYMENTS	NA	TTP (% made on time) - pre-financing - interim payment - final payment	Average number of days for grants pre-financing, interim payments and final payments; Average number of days for administrative payments; Number of experts appointed	Average TTP for pre-financing: 8 days (no other payment under H2020 yet)
HR	NA	Vacancy rate (%)	% of posts filled, composition of the JU staff	0% (all posts filled)
JU EFFICIENCY	NA	Budget implementation/ execution: 1. % CA to total budget 2. % PA to total budget	% of CA and PA	At total budget level (FP7 and H2020) 87.3 % CA 83.0 % PA
		Administrative budget: number and % of total of late payments	Number of delayed payments % of delayed payments (of the total)	12.5 % of late payments (no financial impact)


ANNEX 6

Indicators for monitoring Horizon 2020 cross-cutting issues

TABLE II – 2014 CALL: INDICATORS FOR MONITORING HORIZON 2020 CROSS-CUTTING ISSUES²⁴

	CROSS-CUTTING ISSUE	DEFINITION/RESPONDING TO QUESTION	TYPE OF DATA REQUIRED	RESULTS
2	Widening the participation	2.1 Total number of participations by EU-28 Member State	Nationality of Horizon 2020 applicants and beneficiaries (number of)	279 applicants from EU-28 MS at submission stage 138 beneficiaries from EU-28 MS at GA signature stage
NA		2.2 Total amount of EU financial contribution by EU-28 Member State (EUR millions)	Nationality of Horizon 2020 beneficiaries and corresponding EU financial contribution	EUR 78,492,607.62 contribution to EU-28 MS beneficiaries at GA signature stage
NA		Total number of participations by Associated Countries	Nationality of Horizon 2020 applicants and beneficiaries (number of)	20 applicants from Associated Countries at submission stage 10 beneficiaries from Associated Countries at GA signature stage
NA		Total amount of EU financial contribution by Associated Country (EUR million)	Nationality of Horizon 2020 beneficiaries and corresponding EU financial contribution	EUR 3,618,026.00 contribution to Associated Countries beneficiaries at GA signature stage
3	SMEs participation	3.1 Share of EU financial contribution going to SMEs (Enabling and industrial tech and Part III of Horizon 2020)	Number of Horizon 2020 beneficiaries flagged as SME; % of EU contribution going to beneficiaries flagged as SME	38 Horizon 2020 beneficiaries flagged as SME at GA signature stage 24.43 % of FCH JU contribution going to beneficiaries flagged as SME
6	Gender	6.1 Percentage of women participants in Horizon 2020 projects	Gender of participants in Horizon 2020 projects	Not available (no project report already submitted for H2020 project)
		6.2 Percentage of women project coordinators in Horizon 2020	Gender of MSC fellows, ERC principle investigators and scientific coordinators in other Horizon 2020 activities	20 % of women project coordinators
		6.3 Percentage of women in EC advisory groups, expert groups, evaluation panels, individual experts, etc.	Gender of memberships in advisory groups, panels, etc.	Compiled by Responsible Directorate/Service/Joint Undertaking based on existing administrative data made available by the CSC 23 % of women in the 2014 call evaluation experts
7	International cooperation	7.1 Share of third-country participants in Horizon 2020	Nationality of Horizon 2020 beneficiaries	4 beneficiaries from Third Countries at GA signature stage
		7.2 Percentage of EU financial contribution attributed to third-country participants	Nationality of Horizon 2020 beneficiaries and corresponding EU financial contribution	0 % of EU financial contribution attributed to third country participants

24 Based on Annex III to Council Decision 2013/743/EU

		9.1 Share of projects and EU financial contribution allocated to Innovation Actions (IAs)	Number of IA proposals and projects properly flagged in the WP; follow up at grant level	6 topics (40 %) identified as IA in AWP 2014 EUR 62.5 million (67 %) as EU financial contribution for IA in AWP 2014 4 projects (27 %) identified as IA EUR 47.5 million (58 %) as EU financial contribution for IA projects										
9	Bridging from discovery to market	9.2 Within the innovation actions, share of EU financial contribution focused on demonstration and first-of-a-kind activities	Topics properly flagged in the WP; follow-up at grant level	Not applicable										
NA		Scale of impact of projects (High Technology Readiness Level)	Number of projects addressing TRL ²⁵ at the end of the project	1 CSA project (no TRL) 1 project at TRL 3 5 projects at TRL 5 3 projects at TRL 6 5 projects at TRL 7										
11	Private sector participation	11.1 Percentage of Horizon 2020 beneficiaries from the private for-profit sector	Number of and % of the total Horizon 2020 beneficiaries classified by type of activity and legal status	104 beneficiaries (68 %) who do not declare themselves as non-profit										
		11.2 Share of EU financial contribution going to private for-profit entities (Enabling & industrial tech and Part III of Horizon 2020)	Horizon 2020 beneficiaries classified by type of activity; corresponding EU contribution	EUR 66.5 million (81 %) for beneficiaries who do not declare themselves as non-profit										
12	Funding for PPPs	12.1 EU financial contribution for PPP (Art. 187)	EU contribution to PPP (Art. 187)	Cumulative at 31 December 2015 (based on financing decisions): For administrative costs: EUR 782,005 For operations: EUR 208,476,744										
		12.2 PPPs leverage: total amount of funds leveraged through Art. 187 initiatives, including additional activities, divided by the EU contribution	Total funding made by private actors involved in PPPs – in-kind contribution already committed by private members in project selected for funding – additional activities (i.e. research expenditures/investment of industry in the sector, compared to previous year)	First reporting in Q2, 2016										
13	Communication and dissemination	13.3 Dissemination and outreach activities other than peer-reviewed publications – [conferences, workshops, press releases, publications, flyers, exhibitions, trainings, social media, websites, communication campaigns (e.g. radio, TV)]	A drop-down list allows choice of the type of dissemination activity. Number of events, funding amount and number of persons reached thanks to the dissemination activities	Not available (no project report already submitted for H2020 project)										
14	Participation patterns of independent experts	14.2 Proposal evaluators by country	Nationality of proposal evaluators	 <table border="1"> <tr> <td>Germany: 5 (14 %)</td> <td>Portugal: 2 (6 %)</td> </tr> <tr> <td>Spain: 5 (14 %)</td> <td>Italy: 2 (6 %)</td> </tr> <tr> <td>France: 5 (14 %)</td> <td>Switzerland: 2 (6 %)</td> </tr> <tr> <td>United States: 4 (11 %)</td> <td>India: 2 (6 %)</td> </tr> <tr> <td>United Kingdom: 3 (9 %)</td> <td>Other: 5 (<5 %)</td> </tr> </table>	Germany: 5 (14 %)	Portugal: 2 (6 %)	Spain: 5 (14 %)	Italy: 2 (6 %)	France: 5 (14 %)	Switzerland: 2 (6 %)	United States: 4 (11 %)	India: 2 (6 %)	United Kingdom: 3 (9 %)	Other: 5 (<5 %)
Germany: 5 (14 %)	Portugal: 2 (6 %)													
Spain: 5 (14 %)	Italy: 2 (6 %)													
France: 5 (14 %)	Switzerland: 2 (6 %)													
United States: 4 (11 %)	India: 2 (6 %)													
United Kingdom: 3 (9 %)	Other: 5 (<5 %)													

25 TRL: Technology Readiness Level

		14.3 Proposal evaluators by organisations' type of activity	Type of activity of evaluators' organisations	
				<p> Multiple organisation type: 11 (31 %) Higher education establishments: 6 (17 %) Others: 5 (14 %) Consultancy firms: 4 (11 %) NONE: 3 (9 %) Private Non-Profit Research Centres: 2 (6 %) Public Research Centres: 2 (6 %) Others (<5 %): 2 (6 %) </p>
NA	Participation of RTOs and Universities	Participation of RTOs ²⁷ and Universities in PPPs (Art. 187 initiatives)	Number of participations of RTOs in funded projects and % of the total Number of participations of universities in funded projects and % of the total % of budget allocated to RTOs and to universities	RTOs: 23 (15 %) and 12 % of budget Higher education: 18 (12 %) and 6 % of budget
NA	Ethics	The objective is to ensure that research projects funded are compliant with provisions on ethics	% of proposals not granted because of non-compliance with ethical rules/proposals invited to grant (target 0 %); time to ethics clearance (target 45 days) ²⁸	0 % Not applicable
NA	Audit	Error rate	% of common representative error; % residual error	N/A: first audits on H2020 projects in 2017
NA		Implementation of <i>ex-post</i> audit results	Number of cases implemented; in total EUR million; of cases implemented/total cases	N/A

Notes:

* Horizon 2020 applicants - all those who submitted Horizon 2020 proposals

* Horizon 2020 beneficiaries - all those who have signed an Horizon 2020 GA

*Responsible Directorate - DG RTD Directorates and R&I DGs family in charge of managing Horizon 2020 activities

*Services - executive agencies and other external bodies in charge of Horizon 2020 activities

*Project officer - is in charge of managing Horizon 2020 projects in the responsible Directorate/Service including executive agencies

²⁶ RTO: Research and Technology Organisation

²⁷ Data relates to pre-granting ethics review; this time span runs in parallel with the granting process

ANNEX 7

Key Performance Indicators specific for FCH 2 JU – 2014 call

#	Key Performance Indicator	Results
1	Share of the fund allocated to the following research activities: <ul style="list-style-type: none">- renewable energy- end-user energy efficiency- smart grids- storage	Renewable energy: ~10 % End user energy-efficiency: ~30 % Smart grids: ~3 % Storage: ~7 %
2	Demonstrator projects hosted in MSs and regions benefiting from EU Structural Funds	Not applicable

ANNEX 8

Draft annual accounts

Balance sheet

		EUR '000
	31.12.2015	31.12.2014
NON-CURRENT ASSETS		
Intangible assets	0	1
Property, plant and equipment	44	48
Pre-financing	64 790	34 680
	64 834	34 729
CURRENT ASSETS		
Pre-financing	55 011	6 970
Exchange receivables and non-exchange recoverables	19 225	27 360
	74 236	34 330
TOTAL ASSETS	139 071	69 060
CURRENT LIABILITIES		
Provisions	-	-
Payables and other liabilities	(190 667)	(162 475)
Accrued charges and deferred income	(82 131)	(17 167)
	(272 799)	(179 641)
TOTAL LIABILITIES	(272 799)	(179 641)
NET ASSETS		
Contribution from members	567 213	425 019
Accumulated deficit	(535 600)	(369 729)
Economic result of the year	(165 341)	(165 871)
NET ASSETS	(133 728)	(110 581)

Statement of financial performance

		EUR '000
	2015	2014
REVENUE		
Revenue from non-exchange transactions		
Recovery of expenses	3 107	985

Other	41	-
Total	3 148	985
Revenue from exchange transactions		
Financial income	2	33
Other exchange revenue	0	14
Total	2	47
	3 150	1 032
EXPENSES		
Operating costs	(164 168)	(162 985)
Staff costs	(2 485)	(2 160)
Finance costs	(0)	249
Other expenses	(1 837)	(2 006)
	(168 491)	(166 903)
ECONOMIC RESULT OF THE YEAR	(165 341)	(165 871)

ANNEX 9

Materiality Criteria

The '**materiality**' concept provides the Executive Director with a basis for assessing the importance of the weaknesses/risks identified and thus whether those weaknesses should be subject to a formal reservation to his declaration.

When deciding whether something is material, **qualitative and quantitative** terms have been considered.

In **qualitative** terms, when assessing the significance of any weakness, the following factors have been taken into account:

- The nature and scope of the weakness;
- The duration of the weakness;
- The existence of compensatory measures (mitigating controls which reduce the impact of the weakness);
- The existence of effective corrective actions to correct the weaknesses (action plans and financial corrections) which have had a measurable impact.

In **quantitative** terms, in order to make a judgement on the significance of a weakness, the potential maximum (financial) impact is quantified.

Whereas the FCH 2 JU control strategy is of a multi-annual nature (i.e. the effectiveness of the JU's control strategy can only be assessed at the end of the programme, when the strategy has been fully implemented and errors detected have been corrected), the Executive Director is required to sign a declaration of assurance for each financial year. In order to determine whether to qualify his declaration of assurance with a reservation, the effectiveness of the JU's control system has to be assessed, not only for the year of reference, but more importantly, with a multi-annual outlook.

The **control objective** for FCH 2 JU is to ensure that the '**residual error rate**', i.e. the level of errors which remain undetected and uncorrected, does not exceed 2 % by the end of the JU's programme. Progress towards this objective is to be (re)assessed annually, in view of the results of the implementation of the *ex-post* audit strategy. As long as the residual error rate is not (yet) below 2 % at the end of a reporting year within the programme life cycle, a reservation would (still) be made. Nevertheless, apart from the residual error rate, the Executive Director may also take into account other management information at his disposal to identify the overall impact of a weakness and determine whether or not it leads to a reservation.

If an adequate calculation of the residual error rate is not possible, for reasons not involving control deficiencies, the consequences are to be assessed quantitatively by estimating the likely exposure for the reporting year. The relative impact on the declaration of assurance would be then considered by analysing the available information on qualitative grounds and considering evidence from other sources and areas (e.g. information available on error rates in more experienced organisations with similar risk profiles).

Considering the crucial role of *ex-post* audits within the JU's control system, its effectiveness needs to check whether the scope and results of the *ex-post* audits carried out are sufficient and adequate to meet the control objectives.

EFFECTIVENESS OF CONTROLS

The **starting point** to determine the effectiveness of the controls in place is the 'representative error rate' expressed as a percentage of errors in favour of the FCH 2 JU detected by *ex-post* audits measured with respect to the amounts accepted after *ex-ante* controls.

According to the FCH 2 JU *ex-post* audit strategy approved by the GB, the 'representative error rate' will be based on the simple average error rate (AER) for a stratified population, from which a judgemental sample has been drawn according to the following formula:

$$\text{AER}\% = \frac{\sum (\text{err})}{n} = \text{RepER}\%$$

Where:

Σ (**err**) = sum of all individual error rates of the sample (in %). Only the errors in favour of the JU will be taken into consideration.

n = sample size

Second step: calculation of **residual error rate**

To take into account the impact of the *ex-post* controls, this error level is to be adjusted by subtracting:

- errors detected and corrected as a result of the implementation of audit conclusions;
- errors corrected as a result of the extrapolation of audit results to non-audited contracts with the same beneficiary.

This results in a residual error rate, which is calculated by using the following formula:

$$\text{ResER}\% = \frac{(\text{RepER}\% * (P-A) - (\text{RepERsys}\% * E))}{P}$$

Where:

ResER% = residual error rate, expressed as a percentage

RepER% = representative error rate, or error rate detected in the representative sample, in the form of the AER, expressed as a percentage and calculated as described above (AER%).

RepERsys% = systematic portion of the RepER% (the RepER% is composed of complementary portions reflecting the proportion of 'systematic' and 'non-systematic' errors detected) expressed as a percentage

P = total amount in EUR of the auditable population

A = total of all audited amounts, expressed in EUR

E = total non-audited amounts of all audited beneficiaries. This will comprise the total amount, expressed in EUR, of all non-audited validated cost statements for all audited beneficiaries, excluding those beneficiaries for which an extrapolation is ongoing.

This calculation will be performed on a point-in-time basis, i.e. all the figures will be provided as of a certain date.

ADEQUACY OF THE AUDIT SCOPE

The quantity and adequacy of the audit effort carried out is to be measured by comparing the actual audits to the target audit coverage.

ANNEX 10

List of acronyms

AER	Average Error Rate
APU	Auxiliary Power Unit
ARTEMIS	Advanced Research and Technology for Embedded intelligence and Systems
ASME	American Society of Mechanical Engineers
AST	Assistant
AWP	Annual Work Plan
BBI	Bio-based Industries
CA	Contractual Agent
CAS	Common Audit Service
CFS	Certificate of Financial Statements
CHP	Combined Heat and Power
CIRCA	Communication and Information Resource Centre for Administrations
CORDA	Common Research Data Warehouse
COSO	Committee of Sponsoring Organizations of the Treadway Commission
CS JU	Clean Sky Joint Undertaking
DEMMEA	Degradation Mechanisms of Membrane-Electrode-Assembly for High Temperature PEMFCs and Optimization of the Individual Components
DG	Directorate-General
DG Budget	Directorate-General for Budget
DG Energy	Directorate-General for Energy
DG Environment	Directorate-General for the Environment
DG Human Resources and Security	Directorate-General for Human Resources and Security
DG MOVE	Directorate-General for Mobility and Transport
DG Research and Innovation	Directorate-General for Research and Innovation
ECA	European Court of Auditors
EMI	Experts Management Tool
ENIAC	European Nanoelectronics Initiative Advisory Council
ENVI	European Parliament Committee on ENVironment, Public Health and Food Safety

EP	European Parliament
ESR	Evaluation Summary Report
ESS	Electronic Submission System
EU	European Union
FCEV	Fuel Cell Electric Vehicle
FCH JU	Fuel Cells and Hydrogen Joint Undertaking
FO	Financial Officer
FORCE	Form C Editor
FP7	Seventh Framework Programme
FTE	Full-Time Equivalent
GA	Grant Agreement
GB	Governing Board
H2020	Horizon 2020
HFC	Hydrogen and Fuel Cells
HR	Human Resources
IAC	Internal Audit Capability
IAS	Internal Audit Service
ICC	Internal Control Coordinator
ICE	Internal Combustion Engine
ICS	Internal Codes and Standards
ICT	Information and Communications Technology
IEA	International Energy Agency
IG	Industry Grouping
IKAA	Contributions in-Kind in Additional Activities
IKOP	Contributions in-Kind in Operational Activities
IMI JU	Innovative Medicines Initiative Joint Undertaking
ISA	Information System for Absences
IT	Information Technology
ITRE	European Parliament Committee on Industry, Research and Energy
JRC	Joint Research Centre
JTI	Joint Technology Initiative
KPI	Key Performance Indicator
MAIP	Multi-Annual Implementation Plan
MAWP	Multi-Annual Work Programme
MEA	Membrane Electrode Assembly
MEP	Member of the European Parliament
MHV	Materials Handling Vehicle
N.ERGHY	New European Research Grouping on fuel cells and Hydrogen
NEF	NEgotiation Form Facility
NEW-IG	New Energy World Industry Grouping for Sustainability

OEM	Original Equipment Manufacturer
OLAF	European Anti-Fraud Office
PA	Payment Appropriation
PEM	Polymer Electrolyte Membrane
PEM	Proton Exchange Membrane
PNR	Pre-Normative Research
PPP	Public- Private Partnership
RACER	Relevant Accepted Credible Easy and Robust
RCS	Regulation Code and Standards
RE	Renewable Energy
RG	Research Grouping
RTD	Research Technology Development
S&D	Group of the Progressive Alliance of Socialists and Democrats in the European Parliament
SAP	Sulfonated Aromatic Polymer
SC	Scientific Committee of the Fuel Cells and Hydrogen Joint Undertaking
SESAM	European Commission Online Reporting Tool for Research and Technological Projects
SET Plan	Strategic Energy Technology Plan
SLA	Service-Level Agreement
SMART	Specific, Measurable or verifiable, discussed and Accepted, Realistic and Timed
SME	Small and Medium-sized Enterprise
SOFC	Solid Oxide Fuel Cell
SRG	States Representatives Group
STTP	Strategic Transport Technology Plan
TEMONAS	TEchnology MONitoring and ASsessment platform
TMA	Technology Monitoring and Assessment
TRAN	European Parliament Committee on Transport and Tourism
TTG	Time To Grant
TTI	Time To Inform
TTP	Time To Pay
TTS	Time To Sign
UK	United Kingdom
US	United States
VAT	Value Added Tax



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