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COMMISSION STAFF WORKING DOCUMENT

EXECUTIVE SUMMARY OF THE IMPACT ASSESSMENT

Accompanying the document

Proposal for a
COUNCIL REGULATION

on the Fuel Cells and Hydrogen 2 Joint Undertaking

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COMMISSION STAFF WORKING DOCUMENT

EXECUTIVE SUMMARY OF THE IMPACT ASSESSMENT

Accompanying the document

Proposal for a
COUNCIL REGULATION

on the Fuel Cells and Hydrogen 2 Joint Undertaking

1. PURPOSE, PROCEDURES AND MAIN CONCLUSION OF THE IMPACT ASSESSMENT

1. The purpose of this document is to consider different policy options for implementing the fuel cells and hydrogen (FCH) research and innovation programme under Horizon 2020, given that the end of the FCH Joint Undertaking (JU) is approaching and decisions have to be taken on what to do next. The considered policy options are:

   - PO1: Continuing the FCH Public-Private Partnership in the current form (Joint Undertaking) within Horizon 2020. This is the base-case scenario against which all other options are being assessed;
   - PO2: Using collaborative research projects under the EU Framework Programme Horizon 2020, thus not prolonging the current FCH JU;
   - PO3: Implementing Horizon 2020 for the FCH technologies through a Contractual Public-Private Partnership;
   - PO4: Implementing a FCH Public-Private Partnership through a modernised Joint Undertaking adapted to Horizon 2020

2. In the analysis, the same overall EU contribution was assumed for all the options.

3. From the comparison of the different Policy options, it is concluded that PO4 is the most efficient option to address the underlying problem drivers and reach the stated objectives. This assessment is supported by the results from a stakeholder consultation and a public consultation.

4. In the preparation of this Impact Assessment, the Commission has consulted the industry and research communities, the Member States and the general public. This was done through meetings, surveys and consultations. A stakeholder study was launched on trends in terms of investments, jobs and turnover in the fuel cells and hydrogen sector. In addition, a public consultation was launched in July 2012 to collect the views of other stakeholders and the wider public.

2. PROBLEM DEFINITION AND CONTEXT

5. In 2009 the European Union adopted a set of legislation (known as "*Climate and Energy Package*"), which sets a series of key energy objectives for 2020 with binding commitments from the Member States: to reduce greenhouse gas emissions by 20%, rising to 30% if the conditions are right; to increase the share of renewable energy to 20%; and to make a 20% improvement in energy efficiency. This energy policy is a key contribution for achieving the objective of the Europe 2020 strategy for smart, sustainable and inclusive growth.

6. The Roadmap 2050, adopted by the Commission on 15th December 2011, explores the routes towards a secure, competitive and decarbonised energy system by 2050. The Roadmap highlights the important role to be played by switching to renewable energy sources, managing electricity in new ways and shifting towards alternative fuels, including hydrogen.

7. On January 23rd 2013 the Commission adopted a Communication "*Clean Power for Transport: A European alternative fuels strategy*" which was accompanied by a legislative proposal setting binding targets for the build-up of the minimum alternative fuels infrastructure, with special emphasis on common standards. Hydrogen is one of the alternative fuels included in the Package.

8. Hydrogen, as a clean energy carrier, and fuel cells as efficient energy converters, are technologies that offer a pathway for clean systems that reduce emissions, enhance energy security, and stimulate the economy. Their potential applications include a number of strategic sectors, such as power generation and surface transport, and, in the long term, are expected to contribute to the EU energy and climate objectives.

9. At EU level, the European Commission has supported research and development in fuel cells and hydrogen technologies since the early EU Framework Programmes (FP) with increasing funding levels over time (e.g. 145 M€ in FP5, 315 M€ in FP6).

10. In 2008, Council Regulation (EC) 521/2008 established the Fuel Cells and Hydrogen (FCH) Joint Undertaking (FCH JU) for a period up to 31 December 2017, set-up as a PPP with 50/50 co-financing between the two founding members, the European Commission and the FCH Industry Grouping. Shortly after the establishment of the FCH JU, the Research Grouping became a member. The maximum EU contribution to the FCH JU is 470M€.

11. The Commission proposal on Horizon 2020 envisages activities supporting FCH technologies under the Societal Challenge "Secure, clean and efficient energy" and "Smart, green and integrated transport".

12. Although the FCH sector is small, it is of strategic importance due to its potential knock-on effect for example on the European automotive industry. It is estimated that by 2040-2050, 10-15% of all cars manufactured in the EU will be FC-based. If Europe fails to become a competitive provider of FCH technologies, this would result in a significant loss of jobs in the European automotive industry.

13. Several technological and cost-related challenges need to be overcome. Despite the progress of the past years, the level of performance, reliability and cost required for a large-scale deployment in most applications has not been achieved yet and a

sustained effort on R&D will be required until 2020 to have these solutions competitive with incumbent technologies.

14. The underlying problem drivers are market failure for first movers, sub-optimal leveraging of available funding, and fragmentation and lack of critical mass.

- *Market failure*. The full scale deployment and commercialisation of fuel cells is mainly hampered by (1) the high cost of fuel cells and (2) the lack of hydrogen distribution infrastructure. This "chicken and egg" problem makes it difficult for any player to move first. In addition, the societal and environmental benefits that would result from these technologies cannot be "internalised" and monetised on the short term. It will not be possible to overcome these challenges through market forces alone or dispersed public and private initiatives only.

- *Need for leveraging of available funding*. The scale and scope of the industry research agenda for developing FCH technologies during 2014-2020 go beyond the capacity of individual companies or Member States, both in terms of financial commitment and of the research capacity involved.

- *Fragmentation and lack of critical mass*. The sector is dispersed across different countries, activity areas (energy, transport) and actors. This restricts the exchange and pooling of knowledge and experience. The coordination at EU level of the activities of different FCH stakeholders is needed.

15. The existing FCH JU has put in place a significant project portfolio of strategic importance. Market introduction has been achieved for some early applications such as forklifts and small back-up power units. For both energy and transport applications substantial progress took place. It has also encouraged industry, Member States and the research community to commit more of their own resources. Industry and SME participation is stable and significantly higher than in FP7.

16. The interim evaluation, finalised in 2011 with the help of independent experts, concluded that the JU approach generally succeeds to enhance public-private activities in technology development and demonstration, and provides stability for the R&D community. The overall technical objectives of the FCH JU were judged ambitious and competitive.

3. OBJECTIVES

17. The general objective of the FCH 2 Joint Undertaking for the period of 2014-2024 is to develop a strong, sustainable and globally competitive fuel cells and hydrogen sector in the Union. This will allow supporting the EU policies on sustainable energy and transport, climate change, the environment and industrial competitiveness as embodied in the Europe 2020 strategy for growth, and help achieve the EU's overarching objective of smart, sustainable and inclusive growth.

18. The above general objective is therefore translated into the following and operational objectives, to be reached by 2020:

Specific objectives

- Reduce the production cost of fuel cell systems to be used in transport applications, while increasing their lifetime to levels competitive with conventional technologies,

- Increase the electrical efficiency and the durability of the different fuel cells used for power production, while reducing costs, to levels competitive with conventional technologies,

- Increase the energy efficiency of production of hydrogen from water electrolysis while reducing capital costs, so that the combination of the hydrogen and the fuel cell system is competitive with the alternatives available in the marketplace, and

- Demonstrate on a large scale the feasibility of using hydrogen to support integration of renewable energy sources into the energy systems, including through its use as a competitive energy storage medium for electricity produced from renewable energy sources.

Operational objectives

- Leverage private and public (including Member States) investment for R&D and innovation on FCH technologies worth at least two times the size of the EU contribution.

- Maintain, and if possible increase, SME participation in the activities at or over the current 25%.

- Unlock the excellence and innovation potential in Member States and Regions - in particular those benefitting from the EU Structural Funds - in the field of FCH technologies through their hosting of FCH demonstration projects.

- Ensure the efficient implementation of the FCH programme, in particular by substantially shortening the time-to-grant and time-to-pay.

4. THE POLICY OPTIONS CONSIDERED

19. In this Impact Assessment, four policy options are discussed for organising research and innovation on fuel cells and hydrogen during the next programming period 2014-2020. The "no-EU action" option to discontinue public research funding at European level is discarded; research for fuel cells and hydrogen is included in the Horizon 2020 Framework Programme for Research and Innovation as part of the effort to develop key technologies for sustainable energy and transport systems. The four policy options (PO) are:

- PO1: Fuel Cell and Hydrogen Public-Private Partnership in the current form (Joint Undertaking) under Horizon 2020 (Business-as-Usual)

  The business-as-usual scenario relies on the continuing of the JUs under Horizon 2020 as they currently exist under the 7th Framework Programme, i.e. retaining their current scope of objectives and their current implementation arrangements (governance, financial rules, funding rules, etc.)

- PO2: Use of the collaborative research projects under the EU Framework Programme Horizon 2020, thus not prolonging the current FCH JU

  R&D would be implemented through the standard funding schemes of the EU Framework Programme and, separately, through national and regional programmes. Comitology would be re-introduced. EU public support would depend on annual or biennial budgets and work programmes and would not be guaranteed. The industry and research actors would no longer be in the driver seat for defining the programme priorities and timelines.

- PO3: Implement Horizon 2020 for the fuel cell and hydrogen technologies through a Contractual Public-Private Partnership

  Within a contractual Public-Private Partnership, the Commission services or an executive agency would manage projects in the framework of successive work programmes. A contractual arrangement for the PPP between the European Commission and the relevant stakeholders would be signed. The industry and research stakeholders would be asked to advice in a formal way on the programme's scope and objectives, but would not co-decide. A constant, stable level of EU public support for FCH technologies could not be guaranteed as the budget would be subject to an annual decision, even if an overall budget for the period 2014-2020 would be indicated.

- PO4: Fuel Cell and Hydrogen Public-Private Partnership through a modernised Joint Undertaking adapted to Horizon 2020

  A "modernised JU" will allow a re-orientation of the objectives and activities of the FCH JU, structuring the programme around two main innovation pillars, respectively dedicated to Energy and Transport Systems, and one cluster of cross-cutting research activities. This would allow putting more emphasis on energy applications, in particular on the use of hydrogen as a storage medium for renewable electricity, hydrogen infrastructure and a variety of activities to support market introduction. It would also allow putting more emphasis on large scale demonstrations.

  The "modernised JU" option builds upon the past experience and the lessons learned and it further improves the design and suitability of the instrument to the new challenges under Horizon 2020 by simplifying the administration, financial procedures and rules for participation. It would also allow strengthening the coordination with Member States and cooperation with Regions.

5. COMPARISON OF POLICY OPTIONS AND IDENTIFICATION OF PREFERRED OPTION

20. Since PO4 is the only option that provides support to market introduction activities, it is best suited to attract further leverage for the deployment actions from industry and other stakeholders. It provides a stable critical mass along the FCH value chain, including infrastructure and hydrogen providers, which facilitates the simultaneous coverage of technology and infrastructure development, thus contributing to solving the chicken-and-egg problem.

21. The options based on a Joint Undertaking (PO1 and PO4) are the most efficient in addressing the underlying problem drivers, i.e. alleviating market failure, leveraging available funding and providing a critical mass. Firstly, shared governance between industry, the research community and the EC allows for close coordination and prioritisation of the R&D programme, which helps to create the right products, applications and standards. Secondly, a long-term budget plan and roadmap provides stability and encourages industry, Member States and the research community to commit more of their own resources. Looking towards the programming period 2014-2020, the private sector involved in the current JU expects to leverage an additional investment of approximately 4B€. Thirdly, the members of the FCH JU groupings form the core entities active in the sector in Europe. This represents a critical mass; a focal point from which coalitions can be built, and which can communicate with a single strong voice.

22. The comparison of the different Policy Options, leads to a conclusion that PO4 is the most efficient option to address the underlying problem drivers and reach the stated objectives. PO4 (the modernised JU) would also allow incorporating the recommendations of the Interim Evaluation of the FCH JU.

23. This conclusion is strongly supported by the stakeholders. The stakeholder survey shows that 93% of the beneficiaries are in favour of continuation of the JU. The responses from the Industry Grouping in particular identify the modernised JU (PO4) as having the strongest impact. This is underlined by the results from the public consultation, showing that a majority of respondents favour the continuation of the JU in a modernised form, i.e. PO4.

6. IMPLEMENTATION, BUDGET AND GOVERNANCE

24. The FCH 2 JU programme of research and innovation for the period 2014 – 2020 is structured around two main innovation pillars, respectively dedicated to Transport and Energy Systems, and one cluster of cross-cutting research activities. The two innovation pillars have an area of overlap (integrated energy and transport systems). The modernised JU will put more emphasis on energy applications (in particular on using hydrogen for storage of renewable electricity) and activities to support market introduction. In addition, it will increase the share of demonstration.

25. The proposed maximum EU contribution to the FCH 2 JU is €700 million. This amount has been established in order to meet the specific and operational objectives described in the impact assessment. The proposed budget is higher than the €470 million earmarked for the existing JU. This increase reflects the fact that the modernised JU will have a re-orientation of priorities, which also implies a re-focussing of the budget. The private funding in the FCH 2 JU will take place inside and outside the calls for proposals.

26. In line with the current structure, the FCH 2 JU Programme is implemented by a Programme Office, under supervision of the FCH 2 JU Governing Board (GB). The GB consists of representatives of the Industry Grouping (six seats), the EC (three seats) and the Research Grouping (one seat). The Governing Board will translate the objectives of the JU into a Multi Annual Implementation Plan and Annual Implementation Plans.

27. The Commission will carry out both the final and the mid-term evaluations of the FCH 2 JU with the assistance of independent experts. The performance of the JU will be monitored using Key Performance Indicators in line with its specific objectives.