How to finance projects via FCH 2JU

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Strong public-private partnership with a focused objective

Fuel Cells & Hydrogen 2 Joint Undertaking

Industry Grouping
NEW-IG
93 members

European Union
represented by the
European Commission

Research Grouping
N.ERGHY
63 members

The Joint Undertaking is managed by a **Governing Board** composed of representatives of all three partners and lead by the Industry.

To bring to the point of market readiness a ***portfolio of clean, efficient and competitive solutions*** *based on fuel cells and hydrogen technologies in energy and transport*

FCH 2 JU under Horizon 2020

Two key activity pillars

TRANSPORT

- Road vehicles
- Non-road mobile vehicles and machinery
- Refuelling infrastructure
- Maritime, rail and **aviation applications**

ENERGY

- Fuel cells for power and combined heat & power generation
- Hydrogen production and distribution
- Hydrogen for renewable energy generation (incl. blending in natural gas grid)

CROSS-CUTTING ISSUES

(e.g. standards, consumer awareness, manufacturing methods, studies)

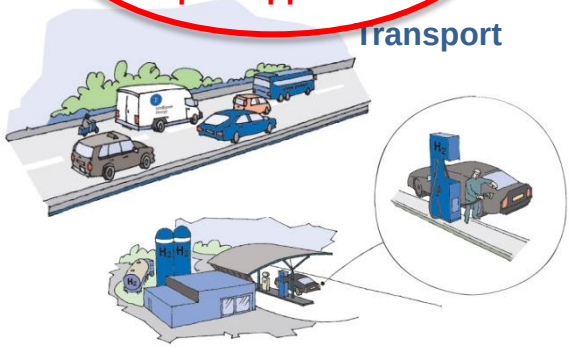
- Members: IG / RG / EC
- PPP structure
- Implementation mainly through calls for proposals or procurement studies
- More demonstration and market uptake (60% of FCH JU contribution)
- In-kind contributions only from members (or constituent entities)
- At least 3 Member States involved in a project (except support action)
- Increased Cooperation with National and Regional Initiatives

FCH 2 JU objectives

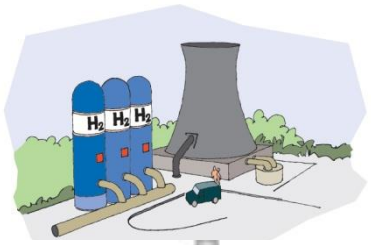
Reduction of production costs of long lifetime FC systems to be used in transport applications

Increase of the electrical efficiency and durability of low cost FCs used for power production

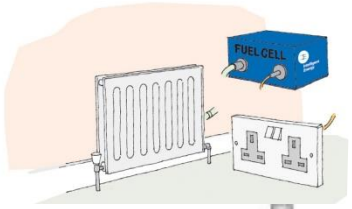
Transport



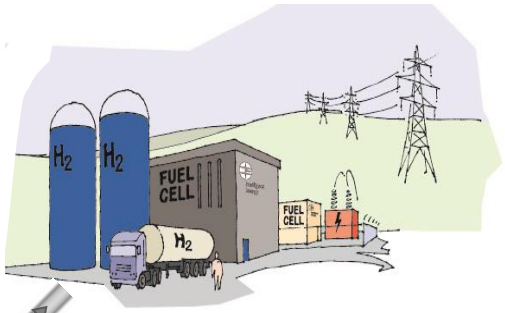
Industrial applications



Residential CHP



Feed to electricity grid

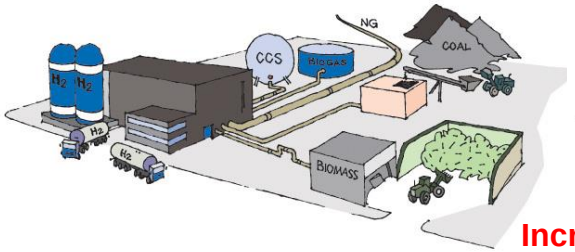


Reduce the use of critical raw materials

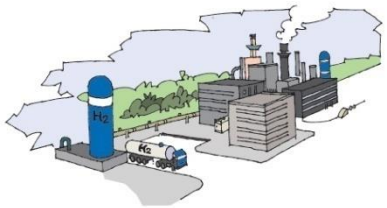
Existing natural gas, electricity and transport infrastructures

Methanisation feed to natural gas grid

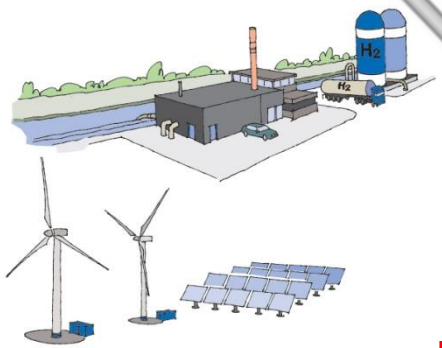
By-product from Chemical Industry



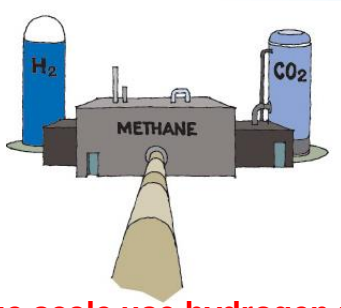
Natural gas, biogas, coal, biomass



Increase the energy efficiency of low cost production of hydrogen from water electrolysis and renewable sources



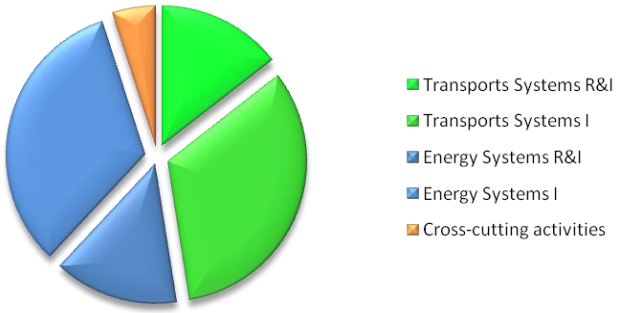
Renewable generation, storage and 'buffering'



Large scale use hydrogen to support integration of renewable energy sources into the energy systems

Multi Annual Work Plan (MAWP) 2014-2020 Budget distribution

Funding distribution	Research and Innovation		Innovation		Total	
Transports Systems	94 (±5)	14.5%	213 (±10)	33%	307	47.5%
Energy Systems	94 (±5)	14.5%	213 (±10)	33%	307	47.5%
Cross-cutting activities					32	5%
Total (MEURO)	192	29%	426	66%	**646**	100%



Budget of €1.33 billion in 2014 - 2020

Strong industry commitment to contribute inside the programme + through additional investment outside, supporting joint objectives.

MAWP extracts (1)

State-of-the-Art

In the commercial **Aviation** sector, FCH APU technologies are a pathway toward meeting increased on-board power demands from more electric aircraft architectures (rather than diverting power from main engines in flight) and can be used for 'hotel loads' on the ground and runway taxiing. Fuel cell systems are being evaluated for replacing conventional tailcone APUs and/or as multi-functional systems providing ~200kW electric, plus thermal, water generation and oxygen depleted air outputs (the latter for use in wing tank and cargo hold inerting) for future commercial aircraft implementation. They are also being evaluated (<20kW) for replacement of mechanical Ram Air Turbine systems. Flight testing of representative systems is anticipated from 2016 onwards. There are no formal FCH system standards and requirements across the aviation sector for APU requirements as yet and the critical issues that need to be addressed are weight reduction along with high levels of reliability and availability (the certainty of in-flight reliability and availability at altitude are more significant than overall lifetime). On-board hydrogen storage and replenishment also needs to be addressed. FCH technologies are also being evaluated for unmanned air vehicles, where small scale (<1kW) FCH systems have been used in hybridised and range extender applications for military and civil unmanned air vehicles.

MAWP extracts (2)

Research fields

The main areas where research & innovation, and innovation actions will be undertaken are the following:

- Road vehicles
- Refuelling infrastructure
- Non-road mobile vehicles and machinery/equipment
- Maritime, rail and aviation applications

Applications for maritime, rail and aviation and other transport modes still need additional research efforts to achieve competitiveness with incumbent technologies. These applications include propulsion for boats, APUs and in-port power supply for ships; traction motors for trains on non-electrified tracks in sensitive locations (e.g. stations, suburban trains, protected areas); and APUs for aeroplanes. Furthermore, greater use of FCH technologies in non-road applications will stimulate and leverage additional economies of scale in adjacent supply chains for fuel cell and hydrogen infrastructure related components.

MAWP extracts (3)

Consequently, development and adaptation of components and demonstration of fuel cell propulsion systems for non-road applications (e.g., materials handling, ships, trains and aeroplanes),related infrastructure and APUs for all applications will also be covered. Where possible synergies will be pursued by using and adapting suitable components between application areas. Development activities are foreseen for non-road applications only where there are specific requirements for these applications in accordance with the Directive on alternative fuels[34].

MAWP extracts (4)

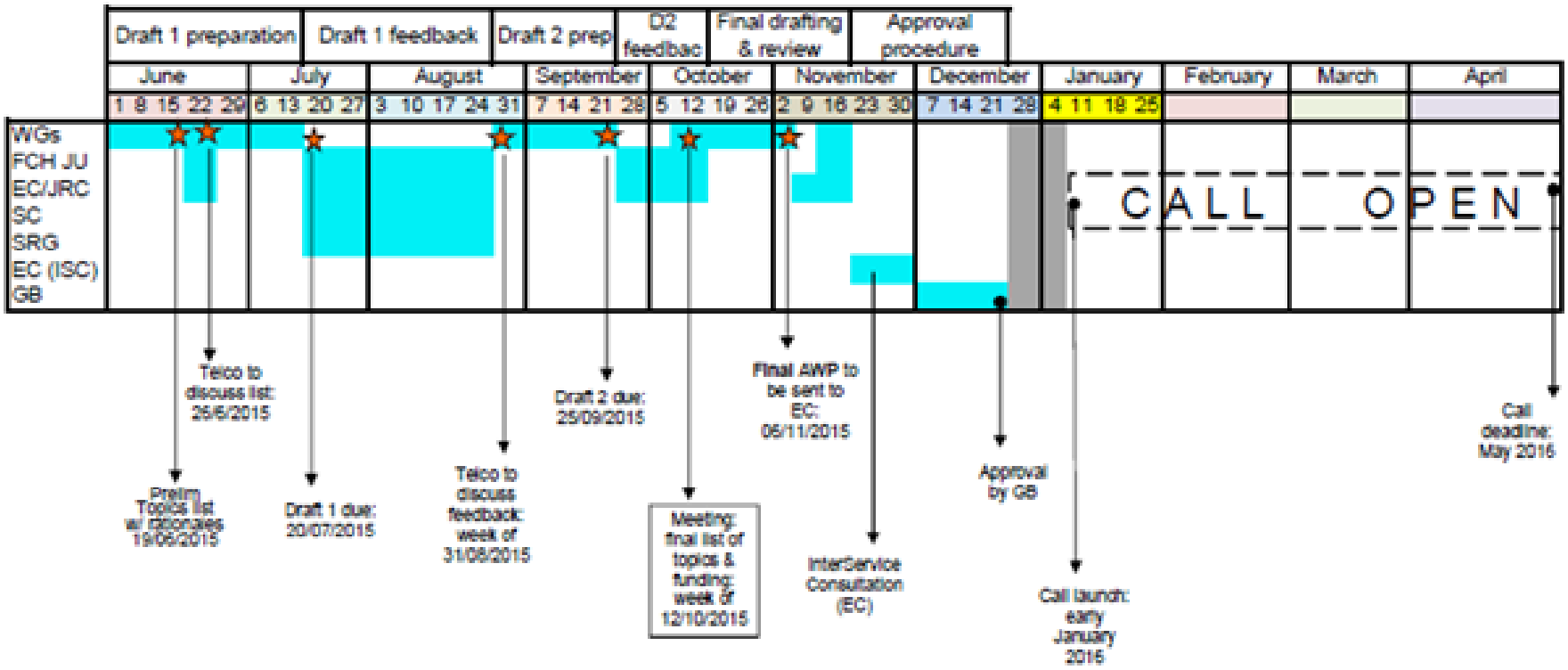
MAWP Targets

Application	Parameter	Unit	2012	FCH-JU target		
				2017	2020	2023
APU for aircraft applications (100-400 kW)	Specific FC system cost	€/kW	> 10000	10000	3000	1500
	Lifetime	hours	2000	10000	20000	40000

Develop and demonstrate truck APU options in a formal operational environment, and develop and demonstrate a set of APUs, in single or several units, in the relevant applications e.g aviation, rail and maritime, plus others where there is sufficient industry commitment. This may also include fuel cell systems for propulsion where there is suffiicent industry commitment in appropriate market segments.

Implementation of MAWP objectives via Annual Work Plans (AWPs)

AWP Preparation



- Long process (one year in advance) initiated by the IG and RG members inside the related Working Groups (WGs). Draft list of topics
- Consultation of the Scientific Committee (SC) and the States Representatives Group (SRG)
- Validation by the FCH JU Programme Office and the European Commission (EC)
- Adoption by the FCH JU Governing Board)

IG/RG Representatives in the Working Groups

Call identifier: H2020-JTI-FCH-201X-1
Total indicative budget : EUR YYY million

Publication date: defined by the call coordinator

Deadline: defined by the call coordinator

Evaluation remote + consensus

- Defined by the call coordinator
- Selection of experts by the POs

General Annexes to the Work-Plan 201X

- *Eligibility and admissibility conditions (Annexes B and C)*
- *Types of action and funding rates (Annex D)*
- *Technology readiness level (TRL) (Annex E)*
- *Evaluation criteria, scoring and threshold (Annex F)*

Additional condition for participation in some topics:

at least one constituent entity of the Industry Grouping or Research Grouping should be among the participants

Proposals are required to provide a

draft plan for exploitation and dissemination of results!

Types of Actions – Annex D

RIA - Research and Innovation Actions

funding rate max.**100%**

Actions with **Research and Development activities at the core of the project** intending to establish new scientific and technical knowledge and/or explore the feasibility of a new or improved technology, product, process, service or solution

- **may include basic and applied research**, technology development and integration, testing and validation on a small-scale prototype in a laboratory or simulated environment
- **may contain** closely connected but **limited demonstration or pilot activities** aiming to show technical feasibility in a near to operational environment

IA- Innovation Actions

funding rate max.**70%***

Actions primarily consisting of **activities directly aiming at producing plans and arrangements or designs for new, altered or improved products, processes or services**. For this purpose they may include prototyping, testing, demonstrating, piloting, large-scale product validation and market replication

*Funding 100% for non-profit legal entities

CSA - Coordination and Support Action

funding rate max.**100%**

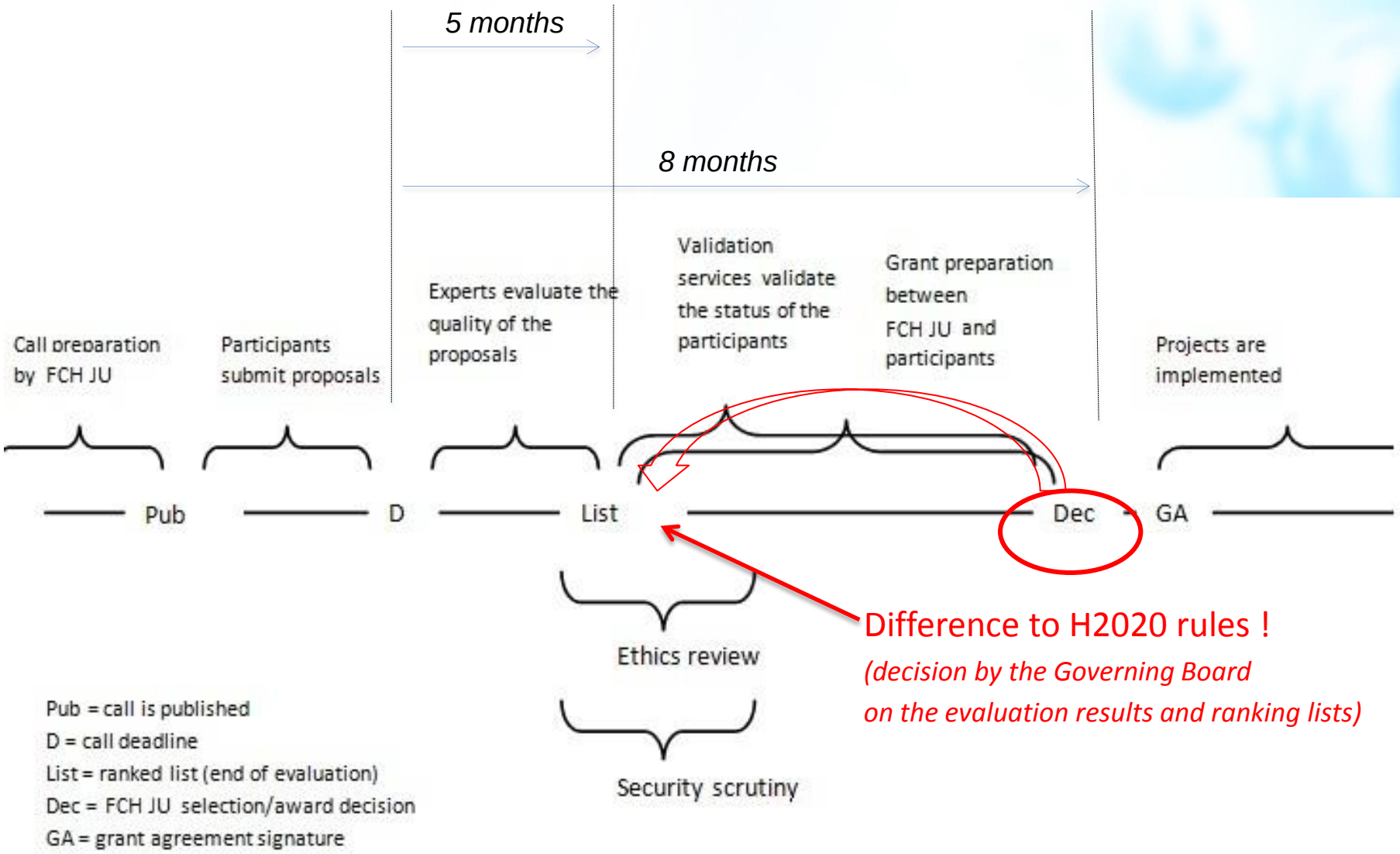
Actions consisting primarily of **accompanying measures** such as **standardization, dissemination, awareness-raising and communication, networking, coordination** or support services, policy dialogues and mutual learning exercises and studies, including design studies for new infrastructure and may also include complementary activities of strategic planning, networking and coordination between programmes in different countries.

Technology readiness levels (TRL) – Annex E

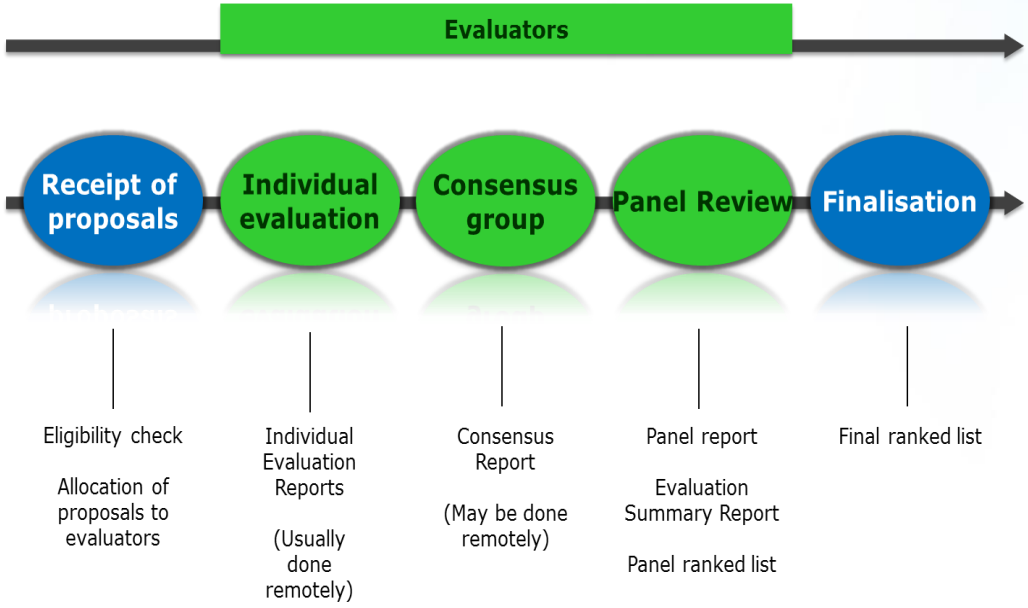
According to MAWP: mainly TRL ≥ 3
(*basic research under other EU programmes*)

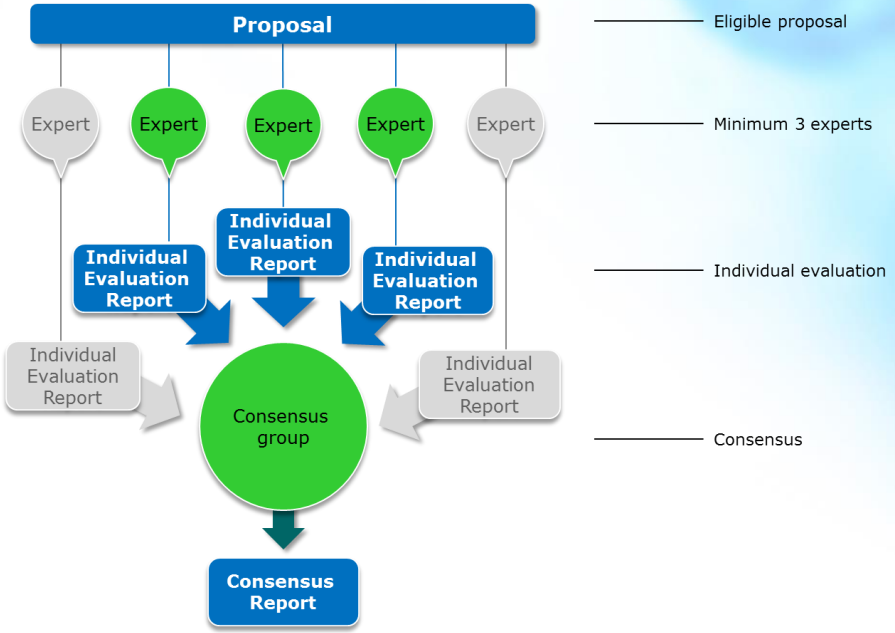
- *TRL 1 – basic principles observed*
- *TRL 2 – technology concept formulated*
- TRL 3 – experimental proof of concept
- TRL 4 – technology validated in lab
- TRL 5 – technology validated in relevant environment *(industrially relevant environment in the case of key enabling technologies)*
- TRL 6 – technology demonstrated in relevant environment *(industrially relevant environment in the case of key enabling technologies)*
- TRL 7 – system prototype demonstration in operational environment
- TRL 8 – system complete and qualified
- TRL 9 – actual system proven in operational environment *(competitive manufacturing in the case of key enabling technologies; or in space)*

Overview of process



Overview of the Evaluation Process & Role of independent experts





- **Independent experts**

evaluate proposals submitted in response to a given call

- They are responsible for carrying out the evaluation of the proposals themselves
  The experts are not allowed to delegate the work to another person!

- Significant funding decisions will be made on the basis of their advice !

Thank you for your attention !

further info

fch-projects@fch.europa.eu

FCH JU official website:

www.fch.europa.eu

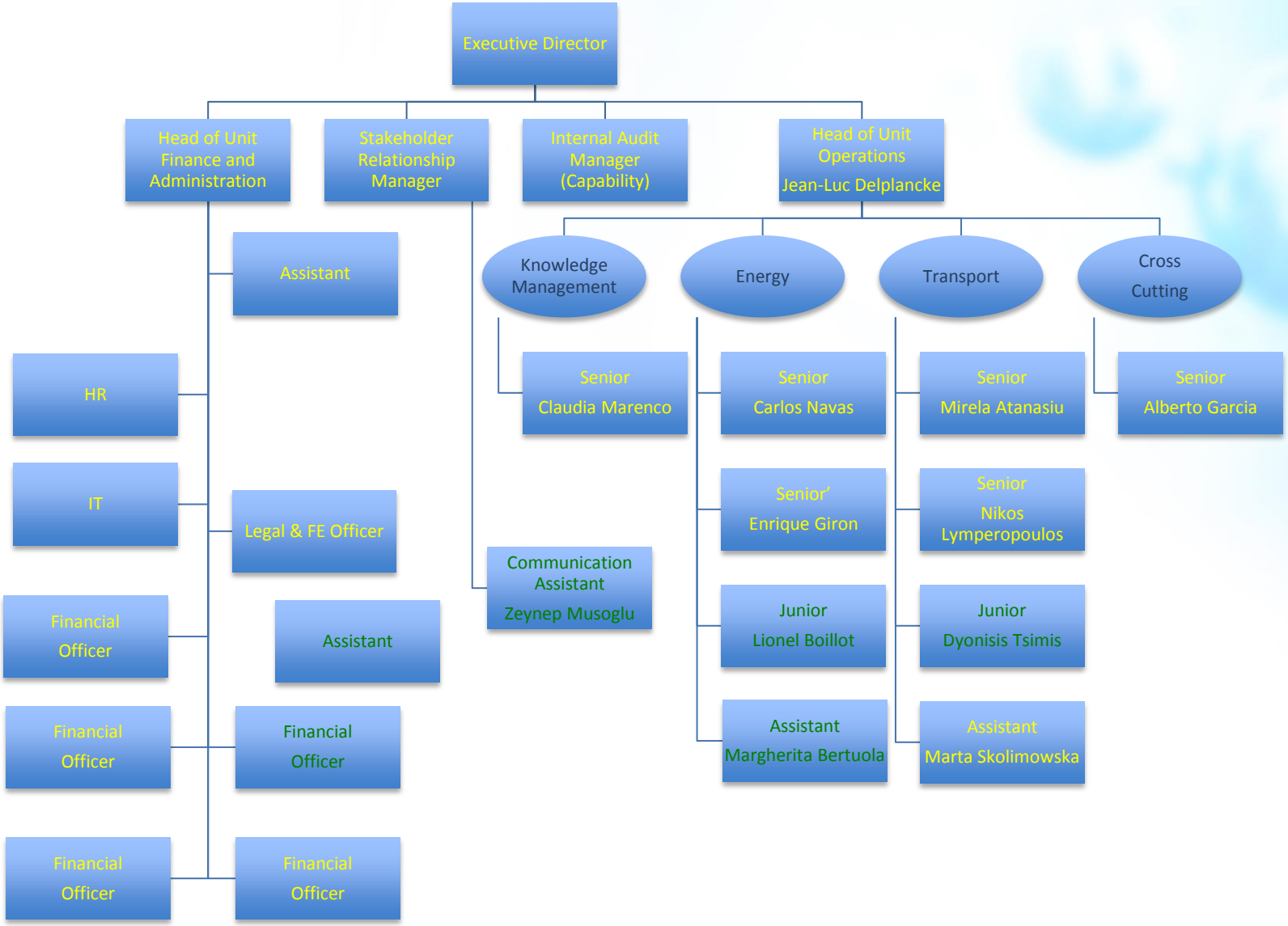
European Industry Grouping (NEW-IG):

http://www.new-ig.eu/

European Research Grouping (N.ERGHY):

http://www.nerghy.eu/

Sturcture of the Program Unit



Evaluation criteria

Research and Innovation/Innovation Actions (RIA/IA)

Excellence

- Clarity and pertinence of the objectives
- Soundness of the concept, including trans-disciplinary considerations, where relevant
- Extent that proposed work is ambitious, has innovation potential, and is beyond the state of the art (e.g. ground-breaking objectives, novel concepts and approaches)
- Credibility of the proposed approach

Impact

- The expected impacts listed in the work plan under the relevant topic
- Enhancing innovation capacity and integration of new knowledge
- Strengthening the competitiveness and growth of companies by developing innovations meeting the needs of European and global markets; and, where relevant, by delivering such innovations to the markets
- Any other environmental and socially important impacts (not already covered above)
- Effectiveness of the proposed measures to exploit and disseminate the project results (including management of IPR), to communicate the project, and to manage research data where relevant

Implementation

- Coherence and effectiveness of the work plan, including appropriateness of the allocation of tasks and resources
- Complementarity of the participants within the consortium (when relevant)
- Appropriateness of the management structures and procedures, including risk and innovation management

Evaluation criteria

Coordination & Support Actions (CSA)

Excellence

- Clarity and pertinence of the objectives
- Soundness of the concept
- Quality of the proposed coordination and/or support measures
- Credibility of the proposed approach

Impact

- The expected impacts listed in the work plan under the relevant topic
- Effectiveness of the proposed measures to exploit and disseminate the project results (including management of IPR), to communicate the project, and to manage research data where relevant

Implementation

- Coherence and effectiveness of the work plan, including appropriateness of the allocation of tasks and resources
- Complementarity of the participants within the consortium (when relevant)
- Appropriateness of the management structures and procedures, including risk and innovation management