Transport Pillar Topics in the 2015 call

Carlos NAVAS, Project Manager - Transport

Transport pillar
FCH-02 2014

Topic	Type of Action	Ind. Budget M EUR
FCH-01.1-2015: Low cost and durable PEMFCs for transport applications	Research & Innovation (RIA)	25
FCH-01.2-2015: Diagnostics and control for increased fuel cell system lifetime in automotive applications		
FCH-01.3-2015: Development of Industrialization-ready PEMFC systems and system components		
FCH-01.4-2015: Adaptation of existing fuel cell components and systems from road to non-road applications		
FCH-01.5-2015: Develop technologies for achieving competitive solutions for APU transport applications based on existing technology		

Transport pillar
Topic 1.1: Low cost and durable PEMFCs for transport applications

Challenge

- Need to develop further existing concepts for key MEA components

Scope

- Must
  - Validate performance and durability on MEAs (>150cm2), using experimental and modelling evaluations
  - Understand component and stack degradation mechanisms
  - Align specifications and interfaces for each component and architecture
  - Define, achieve and evaluate new architectures and prototypes optimizing electrochemistry, water and heat management
- Demonstration of full size stack is mandatory
- Other objectives are optional (see topic text)

Impact

- Reach MAWP KPIs on power density, durability and cost
- Advanced developments on catalyst layer, GDL, MPL, BPP, MEA that meet technical and economic requirements

Indicative Funding; No. of projects

- EU contribution of 6 MEuro; 1 project; 3-4 years

Other information

- TRL4 @ start, TRL6 @ end

Transport pillar

Topic 1.2: Diagnostics and control for increased fuel cell system lifetime in automotive applications

Challenge

- Detection of faults/problems and their cause & scheduling of power production, management of hybridisation strategies, and management of ancillary units.

Scope

- Enhanced understanding of component and stack degradation mechanisms in real operating conditions using both experimental and modelling approaches
- Development of appropriate monitoring and diagnostic methods for observing degradation
- Development of cost-effective control methods for automotive fuel cell systems, integrated with the diagnostic methods mentioned above; Preferentially, these methods should be modular,
- Implementation of the developed diagnostics and control systems in a prototype with a special focus of power management between FC system and battery pack.
- Demonstration of the prototype in operation, preferably in relevant environmental conditions, for a length of time sufficient to quantify the gains in terms of system lifetime obtained by the implementation of the new diagnostics and control system

Impact

- Reduce costs while attaining durability targets

Indicative Funding; No. of projects

- EU contribution of 3MEuro; 1 project; 3 years

Other information

- TRL3 @ start; TRL5-6 @end

Topic 1.3: Development of Industrialization-ready PEMFC systems and system components

Challenge

- Reliability and cost of PEMFC components are not adequate

Scope

- Improved BoP components; FC stack may be funded, but should not be the focus
- Must have:
  - System designs that minimize corrosion/degradation
  - Advanced freeze start designs
  - Improved air compressor prototypes
- Other objectives are optional (see text)
- Methodologies required (see text)

Impact

- Achievement of targets related to cost, degradation and freeze start

Indicative Funding; No. of projects

- EU contribution of 5 MEuro; 2 projects; 3-4 years

Other information

- TRL4 @ start; TRL7 @ end

Transport pillar

Topic 1.4: Adaptation of existing fuel cell components and systems from road to non-road applications

Challenge

- Adaptation of road FC systems to non-road applications to transfer learnings

Scope

- Adaptation of FC components from cars, buses to other non-road applications
- May include:
  - FC stack and BoP components
  - Hydrogen storage concepts
  - Control strategies

Impact

- Identification of optimal application(s) for transfer of learnings from road to non-road re FCs
- Implementation in an actual FC power unit

Indicative Funding; No. of projects

- EU contribution of 3 MEuro; 1 project; 3 years

Other information

- TRL4 @ start; TRL6 @ end

Transport pillar

Topic 1.5: Develop technologies for achieving competitive solutions for APU transport applications based on existing technology

Challenge

- Improve FC-based APUs

Scope

- Design, develop and test APU fuel cell systems against realistic specific requirements covering the main application field
- Surface transport application (and relevant targets) to be identified by proposals
- Prototype testing in a relevant end user environment

Impact

- Meet targets on cost (ROI < 2yrs) and lifetime, and packaging requirements
- Tank-to-electricity efficiency of ≥35%

Indicative Funding; No. of projects

- EU contribution of 3.5 MEuro; 2 projects; 4 years

Other information

- TRL4 @ start; TRL6 @ end

Overarching projects in the 2015 call

Enrique GIRON, Project Manager - Transport

Overarching projects
FCH-02 2014

Topic	Type of Action	Ind. Budget M EUR
FCH-03.1-2015: Large scale demonstration of Hydrogen Refuelling Stations and FCEV road vehicles - including buses and on site electrolysis	Innovation (IA)	39.5
FCH-03.2-2015: Hydrogen territories		
FCH-03.3-2015: Hydrogen delivery with high capacity compressed gas trailer	Research & Innovation (RIA)	2

Overarching projects

Topic 3.1: Large scale demonstration of Hydrogen Refuelling Stations and FCEV road vehicles - including buses and on site electrolysis

Challenge

- Improve performance and lower costs of both fuel cell electric vehicles (FCEVs) and hydrogen refuelling infrastructure to strengthen customer acceptance.
- Integrate of electrolysis in HRS to offer balancing services to the power industry.

Scope

- Vehicles:
  - At least 200 FCEVs.
  - Passenger cars, utility vehicles and buses can be included
  - Minimum 36 months in operation.
- HRS:
  - At least 20 HRS
  - High volumes of hydrogen per day with back to back refuelling
  - Minimum operation of 5 years
- On-site Hydrogen production & grid support
  - Demonstrate the use of fluctuating renewable energy sources for hydrogen supplied to the HRS
  - Develop a model of the required electrical behaviour
  - Identify preferred electrolyser and HRS design (for both grid balancing and providing the hydrogen demand)
  - Demonstrate cost effective and optimised running strategies for a cluster of electrolysers acting as a single capacity
  - Electricity consumption below 60 kWh/kgH2
- Other objectives
  - Prepare for the use of low-carbon hydrogen and aim to reduce the carbon intensity of the hydrogen refuelled by at least 50% on a well-to wheel basis as compared to new gasoline and diesel vehicles
  - Gather new learning on customer acceptance, techniques for the operation of a station network, business models for national HRS roll-out, technology performance and the impact of different national policies on roll-out effectiveness

Topic 3.1: Large scale demonstration of Hydrogen Refuelling Stations and FCEV road vehicles - including buses and on site electrolysis (cont.)

Impact

- **Vehicles**
  - **At least 80% of the vehicles to be deployed in the project should be "next" generation**
  - **Passenger cars:**
    - 6,000h vehicle operation lifetime
    - Vehicle range > 400 km
  - **Buses:**
    - >15,000h / 2 x 8,000h vehicle operation lifetime initially, minimum 20,000h lifetime as program target
    - Availability >90% (to be measured in available operation time)
  - **Two funding levels for vehicles: "high" and "lower". Maximum 20% of the vehicles funded at high funding level. The rest, and any vehicle introduced after the third year of the project will be funded at the lower level.**
- **HRS**
  - **Overcoming the barriers to the roll-out of FCEVs (5/9)**
  - **For cars: provide a clear and configured HRS network**
  - **For busses: allow for supply to a realistically scaled bus fleet of up to 20 buses**
  - **Availability of the station of 98%**
  - **An average maximum funding per HRS is 700,000 €, excluding electrolysis**
- **On-site hydrogen production & grid support**
  - **At least four electrolysers operated as a single system**
  - **Total installed capacity of electrolysis funded by this project at least 1 MW (with at least 50% of the capacity in decentralised mode).**
- **Other**

Indicative Funding; No. of projects

- **EU maximum contribution that may be requested of 35 MEuro; 1 project; 6 years**

Other information

- **TRL6-7 @ start, TRL7-8 @ end**

Overarching projects
Topic 3.2: Hydrogen territories

Challenge

- Deployment of hydrogen technologies in European isolated territories in order to prove the viability and feasibility of hydrogen economy concept in off-grid areas.

Scope

- Near/fully autonomous hydrogen buildings/quarters/districts
- Zero emission mobility: through the integration of hydrogen refuelling infrastructures and provision of vehicle fleets powered by hydrogen
- Co-involve at least one follower territory
- Hydrogen Territory Platform

Impact

- Develop and demonstrate wide-scale, innovative replicable and integrated hydrogen energy solutions in both energy and transport
- Valorise the use of renewables
- Demonstrate the positive impact of electrolysis on grid balancing
- Conclude on a business model for the use of hydrogen in isolated territories

Indicative Funding; No. of projects

- EU maximum contribution that may be requested is 5MEuro; 1 project; 5 years

Other information

- TRL7 @ start; TRL5-6 @end

Overarching projects

Topic 3.3: Hydrogen delivery with high capacity compressed gas trailer

Challenge

- For distribution of gaseous hydrogen, reduce cost, reduce the number of distribution trucks on the road and minimize the impact of delivery at hydrogen retail

Scope

- Industry agreement on standard equipment and procedures for loading and off-loading trucks at ≥ 450bar
- Define standard equipment and procedures for the interfaces between the high pressure truck and the truck filling station and the high pressure truck and the hydrogen retail station
- Design and build, or adapt an existing high capacity trailer
- Demonstration of trailer delivery (at least 10) at a filling station using the agreed equipment and procedures.
- Initiation of the process to certify high-pressure trucks for operation on European roads

Impact

- Industry agreement on the interfaces between high pressure hydrogen trucks and truck filling points as well as hydrogen refuelling stations regarding equipment and procedures
- Initiate process to amend EU legislation to allow high pressure hydrogen trucks on the road
- The feasibility of the 2023 cost (≤450€/kg) and capacity (≥1000kg) targets validated
- Offloading time has been optimised within safety (target is ≤60min for 200 kg)

Indicative Funding; No. of projects

- EU contribution of 2 MEuro; 1 projects; 2 years

Other information

- TRL3 @ start; TRL7 @ end

Call Material http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/calls/h2020-jti-fch-2015-1.html

FCH JU official website:
www.fch.europa.eu

European Industry Grouping for a FCH-JTI (NEW-IG):
http://www.fchindustry-jti.eu

New European Research Grouping on FCH (N.ERGHY):
http://www.nerghy.eu