FUEL CELLS AND HYDROGEN
JOINT UNDERTAKING

Transport Pillar

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Transport Pillar Overview

Decarbonizing the transport system

Main Focus

- Cost reduction and increased power density and durability of PEM fuel cells
- Strengthening of the European supply chain in compress hydrogen storage
- Validation of fuel cells in other transport means
- HRS technologies

What is new

- Heavy-duty trucks and mid-size passenger ships or inland freights
- Game changer fuel cell stack for automotive applications
- Fuel cell propulsion for aerial passenger vehicles

Transport Pillar

7 topics – 33.4 M€

Topic	Type of Action	Ind. FCH contribution (M€)
FCH-01-1-2018: Large Scale Demonstration of H2 fuelled HD Trucks with High Capacity Hydrogen Refuelling Stations (HRS)	IA	17
FCH-01-2-2018: Demonstration of Fuel Cell applications for mid-size passenger ships or inland freight	IA	
FCH-01-3-2018: Strengthening of the European supply chain for compressed storage systems for transport applications	RIA	2.7
FCH-01-4-2018: Fuel cell systems for the propulsion of aerial passenger vehicle	RIA	4
FCH-01-5-2018: Next generation automotive MEA development	RIA	4
FCH-01-6-2018: Game changer fuel cell stack for automotive applications	RIA	3
FCH-01-7-2018: Improvement of innovative compression concepts for large scale transport applications	RIA	2.75

Transport Pillar topics

Innovation Actions- IA

FCH-01-1-2018: Large Scale Demonstration of H2 fueled HD Trucks with High Capacity HRS

Demonstrate mid or heavy-duty (19+ tons) trucks used for long-haul traffic in interurban areas

- Minimum of 15 vehicles, minimum 80% >26 tons, minimum 3 sites, minimum 2 different countries, minimum 4 trucks/site
- Fuel cell system from 85 to 300 kW (net power)
- The maximum FCH 2 JU contribution that may be requested is EUR 12 million

Transport Pillar topics

Innovation Actions- IA

FCH-01-2-2018: Demonstration of Fuel Cell applications for mid-size passenger ships or inland freight

Develop and demonstrate > 2 mid-size ships with a FC power > than 400 kW each, for inland/coastal freight or >100 passengers

- Minimum nominal FC system power of 1MW installed, at 2 different locations, minimum of 50 % renewable based hydrogen
- Transfer of fuel cell technology developed and applied in previous FCH 2 JU projects
- Not eligible costs: Vessels' hull, superstructure and other FC unrelated components, and operational costs such as crew
- The maximum FCH 2 JU contribution that may be requested is EUR 5 million.

Transport Pillar topics

Research and Innovation Actions- RIA

FCH-01-3-2018: Strengthening of the European supply chain for compressed storage systems for transport applications

For all transport modes: achieve application specific performance and cost targets and improve manufacturing productivity of the COPV

- Storage density @ room temperature > 0.030kg/l for 700bar or 0.018kg/l for 350bar
- Target cost 400€/kg H2 or less assuming a production of 30,000 parts per year
- Expected consortium to have at least one vessel and/or material supplier, one research institute and an OEM and build on previous projects

Transport Pillar topics

Research and Innovation Actions- RIA

FCH-01-4-2018: Fuel cell systems for the propulsion of aerial passenger vehicle

Develop and demonstrate a fuel cell system dedicated to the propulsion of a 2 to 19 passengers regional aircraft

- Modular fuel cell system architecture adaptable to different aerial vehicles with 160 to 350 kg payload and 1 to 2 hour range
- Fuel cell system power output: 40 to 150 kW with >2kW/kg stacks, >5,5% mass efficiency storage, lifetime at least 4000 hours
- An in-flight demonstration of at least a single module in an existing plane.

Transport Pillar topics

Research and Innovation Actions- RIA

FCH-01-5-2018: Next generation automotive MEA development

Reducing the total platinum loading while increasing current density

- New catalysts; Catalyst Support; Catalyst layer Design; Catalyst Layer ionomer; Membrane; GDL (including MPL); MEA Integration
- The required power density of the resulting MEA is 1.8 W/cm2 @ 0.6 V
- Manufacture (in high-volume-compatible manufacturing methods) enough MEAs to be tested in a (minimum) 10 cell short stack
- Development of bipolar plates, seals, frame/sub-gasket materials and designs **are not** within the scope of this topic.

Transport Pillar topics

Research and Innovation Actions- RIA

FCH-01-6-2018: Game changer fuel cell stack for automotive applications

New concepts considering the stack as a whole and not as the sum of individual components for automotive applications

- Focus on interface optimization between components: An integrated solution at the single cell level is highly recommended
- New stack architecture allowing a simplified BOP will be privileged for system cost reduction
- At least 1 short-stack (minimum 5 kW), to be tested with AST protocol for at least 6 month real operative conditions

Transport Pillar topics

Research and Innovation Actions- RIA

FCH-01-7-2018: Improvement of innovative compression concepts for large scale transport applications

Develop and test at pilot scale a large compressor either with a disruptive technology or hybridized but with a disruptive technology.

- Flow rates of 50 kg/h or more
- From low pressure (in the range of 20 bar or less) to 450 bar or 900 bar
- Long term tests (6 months) in a relevant environment: a HRS without public access or an outdoor test facility (>1/10 of real scale)
- Demonstrate the concept does not introduce additional contaminants in the hydrogen

Overarching projects Overview

Port/harbour ecosystems

Main Focus

- Decarbonizing ecosystems
- Port applications

What is new

- Full ecosystem
- Various new MHVs specific to ports

Topic	Type of Action	Ind. Budget
FCH-03-1-2018: Developing Fuel Cell applications for port/harbour ecosystems	**RIA**	**4**

Overarching topic

Research and Innovation Actions- RIA

FCH-03-1-2018: Developing Fuel Cell applications for port/harbour ecosystems

Develop, deploy and benchmark different industrial FC vehicle for port operations

- At least two of theses: gantry cranes, yard trucks and straddle carriers (or other special MHVs)
- R&D for new FC systems is not within the scope, only the integration of the FC system and trial of the vehicles
- A key objective is noise reduction: vehicle noise < 60 dBa and global operation noise reduction
- Total fuel cell system installed power of at least 250 kW
- Minimum demonstration of 5,000 h proving 20,000 h durability
- Hydrogen port infrastructure should be considered