

Topics in the call 2022

Hydrogen End Uses Transport

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Transport Overview



Main Focus



- Adaptation of key FC system components for heavy duty applications
- Push toward aviation propulsion: upscaling stack and LH2 storage
- Bringing the learnings from first demonstrations (inland vessels and trucks) to fleets



What is new

- Large scale demonstration of trucks
- Decarbonisation of the inland waterways
- Cooperation with Connecting Europe Facility for Transport work programme

Transport Overview

Topic	Type of Action	Ind. Budget (M€)	Deadline
HORIZON-JTI-CLEANH2-2022-03-01: Development and optimisation of reliable and versatile PEMFC stacks for high power range applications	RIA	2 x 3,5	20/09/2022
HORIZON-JTI-CLEANH2-2022-03-02: Innovative and optimised MEA components towards next generation of improved PEMFC stacks for heavy duty vehicles	RIA	2 x 3	31/05/2022
HORIZON-JTI-CLEANH2-2022-03-03: Large scale demonstration of European H2 Heavy Duty Vehicle along the TEN-T corridors	IA 	30	31/05/2022
HORIZON-JTI-CLEANH2-2022-03-04: Liquid hydrogen tanks for heavy-duty vehicles	RIA	2 x 2,5	31/05/2022
HORIZON-JTI-CLEANH2-2022-03-05: Large scale demonstration of hydrogen fuel cell propelled inland waterway vessels	IA 	15	31/05/2022
HORIZON-JTI-CLEANH2-2022-03-06: Development and optimisation of a dedicated Fuel Cells for Aviation: from dedicated stack (100s kW) up to full system (MWs)	RIA	20	31/05/2022

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HORIZON-JTI-CLEANH2-2022-03-07: Development of specific aviation cryogenic storage system with a gauging, fuel metering, heat management and monitoring system	RIA	10	31/05/2022
HORIZON-JTI-CLEANH2-2022-03-08: Development and optimisation of a dedicated Fuel Cells for Aviation: disruptive next-gen high temperature Fuel Cells technology for future aviation	RIA	5	31/05/2022

HORIZON-JTI-CLEANH2-2022-03-01: Development and optimisation of reliable and versatile PEMFC stacks for high power range applications



Development of stacks suitable for sustained operation at high stack-power.



- Primary focus heavy duty road applications
- Main KPI: attainment of 20,000 hours
- Focus of the research at stack level (MEA innovation is out of scope)

HORIZON-JTI-CLEANH2-2022-03-02: Innovative and optimised MEA components towards next generation of improved PEMFC stacks for heavy duty vehicles



Development of MEA toward HDV applications.



- Overall goal: increased durability (20.000 h) without scarifying performance (1.2 W/cm²@0.65 V)
- Reduction of PGM loading (< 0.30 g/kW) and contribution to stack for HDV cost reduction (< 75 EUR/kW)
- Durable catalysts, chemically and mechanically stable PEM, electrodes designed for HDV applications
- MEA validation in single cells / short stacks using EU harmonised protocols

HORIZON-JTI-CLEANH2-2022-03-03: Large scale demonstration of European H2 Heavy Duty Vehicle along the TEN-T corridors



 Deployment and operation in real-life conditions of 150 FCH trucks.

- Trucks rigid or tractors
- Minimum range for 50% of the trucks: 600 km and at least 65% of the fleet should be long haul: > 37 tons
- Trucks to be operated for a minimum of 2 years, yearly minimum milage 40.000/60.000 km (distribution/long haul)
- Solid data monitoring strategy
- Deployment along the core and comprehensive TEN-T corridors – complementary proposal to CEF Transport for the HRS funding

HORIZON-JTI-CLEANH2-2022-03-04: Liquid hydrogen tanks for heavy-duty vehicles

 Analysis of Onboard LH2 tanks to evaluate the feasibility of the technology.

- Full-scale analysis of existing concepts to store LH2
- The analysis should lead to strategies for improving important parameters such as tanks composition; volumetric efficiency; potential losses of H2
- A full scale LH2 tank system for heavy duty road application will have to be tested (test bench)

HORIZON-JTI-CLEANH2-2022 -03-05: Large scale demonstration of hydrogen fuel cell propelled inland waterway vessels



Deployment of 5 inland waterway vessels with fuel cells and electric propulsion.



- Retrofitting and/or new build with a focus on converting ship types with the highest impact on emissions
- FC power above 500kW and preferably at 1 MW scale (modular and easy-to-scale solution)
- Bunker hydrogen in at least 2 different ports
- Deployment along the core and comprehensive TEN-T corridors – complementary proposal to CEF Transport for the HRS funding

HORIZON-JTI-CLEANH2-2022-03-06: Development and optimisation of a dedicated Fuel Cells for Aviation: from dedicated stack (100s kW) up to full system (MWs)



Development of an aviation-specific stack and FC system fit for aircraft integration.



- Development of a 250 kW stack with module scalability to at least 1.5 MW
- Stack adaptation to the aviation requirements (i.e. temperature, pressure, vibration, durability, safety)
- Lab & ground tests to prove the feasibility of the concept



HORIZON-JTI-CLEANH2-2022-03-07: Development of specific aviation cryogenic storage system with a gauging, fuel metering, heat management and monitoring system



Advancements in LH2 aviation storage through 2 demonstrators.



- Demonstrator 1: focus on lightweight and materials selection for the LH2 tank
- Demonstrator 2: design and integration of the storage solution including the development of BoP components
- Focus on safe operations

HORIZON-JTI-CLEANH2-2022-03-08: Development and optimisation of a dedicated Fuel Cells for Aviation: disruptive next-gen high temperature Fuel Cells technology for future aviation



Development of an aviation-specific disruptive fuel cell.



- KPIs: Durability, performance, mechanical strength
- Design a fuel cell technology working at 120°C+ (constant operation)
- In the scope: the development of single components and MEA overall architecture