

Topics in the call 2025

Hydrogen End Uses: Transport Applications

Luca Feola
Lionel Boillot
Pietro Caloprisco



Hydrogen End Uses: Transport Applications Overview



Main Focus

- Non-road mobile machinery applications (two applications).
- Innovative manufacturing processes for MEA production.
- Continuity and development of MW scale FC **system** for maritime application.



What is new

- Manufacturing pilot lines demonstration, preparing future industrialisation.
- Synergy with previous and current projects (StaSHH, MAMA-MEA, H2MARINE).

Transport Applications Overview

| Topic | Type of Action | Budget (M€) |
|--|----------------|-------------|
| HORIZON-JTI-CLEANH2-2025-03-01: Configurable Fuel Cell Powertrain for Non-Road Mobile Machinery | RIA | 5 |
| HORIZON-JU-CLEANH2-2025-03-02: Scalable innovative processes for the production of PEMFC MEAs | RIA | 5 |
| HORIZON-JTI-CLEANH2-2025-03-03: Reliable, efficient, scalable and lower cost 1 MW-scale PEMFC system for maritime applications | RIA | 7 |

Transport Applications - Topics

HORIZON-JTI-CLEANH2-2025-03-01: Configurable Fuel Cell Powertrain for Non-Road Mobile Machinery



Demonstrate a configurable powertrain through integration in at least two NRMM applications (TRL 4 → TRL 6)

- Preferably ports or agricultural applications.
- Minimum power 100kW for the first demonstrator, minimum 200kW for the second one.
- The two demonstrators should have the same building blocks and demonstrate upscaling through different form factor or power level.
- Minimum 2000 hours demonstration in relevant environment for the largest power application, minimum 1000 hours for the other one.



HORIZON-JU-CLEANH2-2025-03-02: Scalable innovative processes for the production of PEMFC MEAs



Develop and scaling up manufacturing processes for MEAs, towards future industrialization (TRL 6, MRL 3 → MRL 5)

- Innovative processes for large scale catalysts, microporous layer deposition, in-line quality control systems.
- A pilot line to be built and adapted to several raw materials and components (membrane or GDL, catalysts) and demonstrate operation vs. cost, performance, durability KPIs.
- The pilot line should provide an estimation of its full potential: Capacity: 2000 m²/year and Scrap rate: 40% (or a projection for a year with higher level of maturity).
- Build on the outcomes of previous and current projects (MAMA-MEA, VOLUMETRIQ, NIMPHEA).



Transport Applications - Topics

HORIZON-JTI-CLEANH2-2025-03-03: Reliable, efficient, scalable and lower cost 1 MW-scale PEMFC system for maritime applications



Develop and build a new Fuel Cell Systems showing actual improvements versus SoA (TRL 4 → TRL 6)



- The full 1MW **system** should be demonstrated in relevant environment for 1000h, while a smaller part (200kW) should be tested for 40.000 hours by Accelerated Stress Test.
- Present an architecture that allows an upscale to at least 10MW.
- Fuel cell stack development and integration of the FCS in a vessel are outside the scope of the project.
- Foresee collaboration with project H2MARINE (MW stacks) to support development at system level, ensure complementarity and avoid duplication of efforts.
- Synergies with Zero Emission Waterborne Transport Partnership.