

Topics in the call 2025

Cross-cutting Issues

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Cross-cutting Issues Overview



Main Focus

- Continue raising the environmental sustainability of fuel cell and hydrogen (FCH) systems
- Keep sharing knowledge and providing training to key target groups



What is new

- Development of novel recycling technologies
- Gaining further understanding of emissions of PFAS under product use
- Sharing knowledge with professionals involved in permitting and licensing processes

Cross-cutting Issues Overview

Topic	Type of Action	Budget (M€)
HORIZON-JU-CLEANH2-2025-05-01: Simultaneous ionomer and iridium recycling	RIA	3.5
HORIZON-JU-CLEANH2-2025-05-02: Understanding emissions of PFAS from electrolyzers and/or fuel cells under product use	RIA	2
HORIZON-JU-CLEANH2-2025-05-03: Knowledge transfer and training of civil servants, safety officials, and permitting staff to improve safety assessment and licensing procedures across Europe	CSA	1

Cross-cutting Issues - Topics

HORIZON-JU-CLEANH2-2025-05-01: Simultaneous ionomer and iridium recycling



Development of recycling technologies for Ir and Ionomer used in PEMELs (TRL 3 → TRL 5)



- Aims at **recycling Ir and ionomers simultaneously after CCM separation from PEMEL stacks at the EoL** and/or from scraps and waste
- Building on findings of previous projects and in synergies with running projects, the focus is on **understanding the impact of the separation process of the waste stream on the ionomer and PGMs** (impurities, degradation in structure, change of properties,...) for optimizing their quality before their re-use in PEMEL cells
- Projects should have access to EoL PEMEL components (cells, MEAs, CCMs...), assess their degradation state, develop new methods to separate the ionomer/ Ir (99.5/ 99.9% purity), assess properties of recycled materials (e.g., 0.5-10g/ 50-500g for ionomer), perform LCA/TEA, manufacture CCMs and PEM with the recycled materials/ from diff. sources, test their performance at cell/short stack level, etc.
- Develop **pre-processing guidelines** for the input materials (granulation, extraction, homogenization...), and provide **recommendations for stack design** to improve the recyclability of the materials, e.g., better separation

Cross-cutting Issues - Topics

HORIZON-JU-CLEANH2-2025-05-02: Understanding emissions of PFAS from electrolyzers and/or fuel cells under product use



Pre-normative research on the potential PFAS emissions in PEMEL/ PEMFC under product use



- Aim to investigate potential releases of PFAS compounds (root cause, degradation mechanism, quantification of potential emissions, emissions pathways) during PEM-based product operation and to develop solutions to prevent/ minimise PFAS emissions
- Projects should **develop testing protocols and standardized methods for the operation, sampling** (e.g., sources of emissions, sampling device, sampling conditions, transport conditions,...) **and analysis** (selection of relevant substances, analytical methodology, LoD, LoQ...) of PFAS compounds potentially released from PEM-based systems in use
- Project should include **representative sample takings** from both, PEMEL and PEMFC, to provide statistically validated results → develop a standard sampling process with sample hygiene instructions for PEMEL /PEMFC effluents
- Projects should be able to quantify Total Organic Fluorine (TOF) and Total Organic Carbon (TOC) and assess the combination of targeted residuals analyses techniques, balancing non-targeted residuals of both fluorinated and non-fluorinated compounds, → develop standardized methods for PFAS emissions measurements
- Links with the JRC, EURAMET, and Mission Innovation 2.0 – Clean Hydrogen Mission countries are expected

Cross-cutting Issues - Topics

HORIZON-JU-CLEANH2-2025-05-03: Knowledge transfer and training of civil servants, safety officials, and permitting staff to improve safety assessment and licensing procedures across Europe



Training of professionals involved in permitting and licensing processes



- Aim to **facilitate the permitting and licensing processes** by providing training to staff involved therein, covering/ targeting both sides of the "table", professionals from the authorities and projects
- Projects should **collect and in-depth analyse the evaluation, permitting, and licensing procedures across the EU** in the built environment, the energy system and industrial infrastructure, cover at least countries with H2 Valleys and "Tier1" and "Tier2" countries, and a selection of "Tier3" countries if possible -> best practices (for permitting FCH tech.) handbook
- Projects should **develop and implement training programs** (incl. train-the-trainer courses) in the target countries/ regions, **at least in countries with H2 Valleys**, provide training in blended learning mode, in ≥ 10 languages, issue a certificate of accomplishment, etc. Format and delivery type should be aligned with those of the European Hydrogen Academy
- Synergies with past and ongoing projects as well as strong **links with the H2 Valleys projects supported by the JU**