PROTOSTACK

TUBULAR PROTON CONDUCTING CERAMIC STACKS FOR PRESSURIZED HYDROGEN PRODUCTION

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PRR 2025	Pillar 1 - H_2 Production
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Clean H_2 JU Max. Contribution	2 497 013.75
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Coordinator Beneficiary	SINTEF AS, NO
Beneficiaries	DEMCON HIGH-TECH SYSTEMS EINDHOVEN B.V., DEMCON LIFE SCIENCES and HEALTHEINDHOVEN B.V., DEMCON HIGH-TECH SYSTEMS ENSCHEDE BV, ATENA SCARL - DISTRETTO ALTA TECNOLOGIA ENERGIA AMBIENTE, COORSTEK MEMBRANE SCIENCES AS, SHELL GLOBAL SOLUTIONS INTERNATIONAL BV, UNIVERSITA DEGLI STUDI DI NAPOLI PARTHENOPE, AGENZIA NAZIONALE PER LE NUOVE TECNOLOGIE, L'ENERGIA E LO SVILUPPO ECONOMICO SOSTENIBILE, AGENCIA ESTATAL CONSEJO SUPERIOR DE INVESTIGACIONES CIENTIFICAS

https://protostack.eu/

PROJECT AND GENERAL OBJECTIVES

PROTOSTACK will create a radically new, compact and modular proton-conducting ceramic electrolyte (PCCEL) stack design with integrated hot-box for operation and delivery of hydrogen up to 30 bar. The stack will be demonstrated at 5 kW and provide a pathway for further scale-up to systems of hundreds of kW. These achievements will be an important proof of technological feasibility that will attest to the advancement of PCCEL technology from technology readiness level 2 to 4.

NON-QUANTITATIVE OBJECTIVES

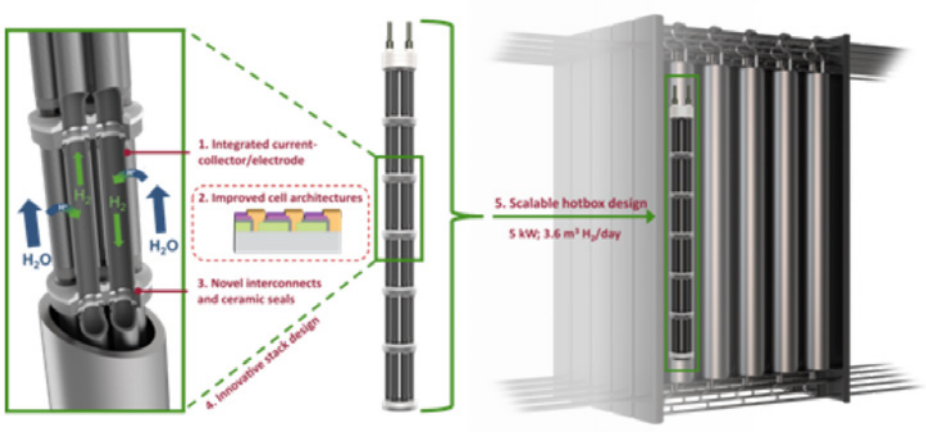
The overall consortium will engage in wide communication and dissemination activities to ensure maximum impact of the PROTOSTACK's outcomes and the industry partners have high ambition for business exploitation and commercialisation of the PROTOSTACK technology.

PROGRESS, MAIN ACHIEVEMENTS AND RESULTS

- Final designs of the hot-box and stack concept have been completed.
- Production of stack components is underway.
- Validation of key cell and stack components in terms of functionality, scalable manufacturing and stability, as well as the production of the first short-stack with the new stack design for validation of the stack concept.
- Organisation of an autumn school in Valencia with more than 100 participants - mostly graduate students.

FUTURE STEPS AND PLANS

- Continued validation and optimisation of cell and stack components, and dedicated programs for stack production and testing, with emphasis on durability and performance benchmarking under varying operating conditions and delivery pressure.
- Construction and integration of the new hot-box.
- Updated system balance of plant and safety assessment.
- Detailed techno-economic and life-cycle analysis of the technology employed for specific integration scenarios and use-cases for the technology.



Stack concept and overview of key innovations in PROTOSTACK

Clean Hydrogen Partnership
Co-funded by the European Union