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Direct seawater electrolysis technology for distributed hydrogen production



SWEETHY - Deliverable report

D1.2 – Ethics Plan



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Project Summary

SWEETHY will develop an advanced technology for direct seawater electrolysis that will be able to produce H_2 and O_2 under intermittent conditions accounting for the coupling to renewable power sources (especially wind, PV). The electrolyser will be based on an anion exchange membrane (AEM) operating in natural or alkaline seawater, and the SWEETHY technology will be developed along three dimensions: a) Materials optimization to meet the specific requirement of seawater environment: A focus will be made on corrosion resistance and selective PGM-free electrocatalysts for hydrogen and oxygen evolution reactions, on AEM with high selectivity for transporting hydroxide anions and anti-fouling properties as well as on novel anti-corrosion coatings for bipolar plates and porous transport layers prepared by plasma spraying and electrodeposition. b) An electrolyser stack prototype based on a novel stack architecture applying hydraulic cell compression is developed to host the advanced materials to produce H_2 at high pressure. Beneficial functions of the targeted unique stack are related to scalability and maintainability that will be tremendously improved in comparison to conventional AEMWE stacks. c) Sustainability analysis studies not only for the electrolyser system but also for its integration into renewable-power systems and for efficient by-product utilization in industrial symbioses, feeding back to materials optimization and stack development early on. Complementing LCA, social LCA and techno-economic analyses/optimization by qualitative work ensures both environmental, economic, and social sustainability. Combining these three dimensions, SWEETHY will utilize Mediterranean seawater feed in Messina, Italy, to withstand more than 2000 h of operation to produce $20 \text{ gH}_2/\text{h}$ with a degradation rate lower than $1\%/100\text{h}$. In addition, SWEETHY will demonstrate how the operation of the electrolyser can ensure an optimized revenue concerning by-products and grid services.



Public summary

SWEETHY Ethics Plan is the first draft of the document, which frames the ethics issues of the project. The update and last version of the SWEETHY Ethics Plan will be registered in February 2027 as a sensitive deliverable. The current SWEETHY Ethics Plan focuses on the environmental, health and safety issues, as they are the most relevant to the project flow. SWEETHY involves development of new materials and processes, which includes analysis and risk assessment prior to the actions start. The correct assessment of the possible risks will contribute to safer workflow and help estimate the following risks that are otherwise not foreseen initially. The current Ethics Plan describes the steps to be taken to develop the full version of the Ethics Plan as a deliverable in February 2027. Ethics Plan is an important document, which states the actions to assure that the work within SWEETHY is performed according to ethics principles stated in the national and the European regulatory documentations.



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Project partners:

#	Partner short name	Partner Full Name
1	RISE	RISE RESEARCH INSTITUTES OF SWEDEN AB
2	CNR	CONSIGLIO NAZIONALE DELLE RICERCHE
3	CIDETEC	FUNDACION CIDETEC
4	DLR	DEUTSCHES ZENTRUM FÜR LUFT- UND RAUMFAHRT EV
5	IC	INSTITUT DE LA CORROSION SASU
6	SINTEF	SINTEF AS
7	PROPULS	PROPULS GMBH
8	CENMAT	CUTTING-EDGE NANOMATERIALS CENMAT UG HAFTUNGSBESCHRANKT
9	UNR	UNIRESEARCH BV

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