

SH₂E

SUSTAINABILITY ASSESSMENT OF HARMONISED HYDROGEN ENERGY SYSTEMS: GUIDELINES FOR LIFE CYCLE SUSTAINABILITY ASSESSMENT AND PROSPECTIVE BENCHMARKING



Project ID	101007163
PRR 2025	Pillar 5 - Cross-cutting
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Project Total Costs	2 142 778.75
Clean H ₂ JU Max. Contribution	1 997 616.25
Project Period	01-01-2021 - 30-06-2024
Coordinator Beneficiary	Fundacion IMDEA Energia, ES
Beneficiaries	SYMBIO FRANCE, THE INSTITUTE OF APPLIED ENERGY, SYMBIO, FUNDACION PARA EL DESARROLLO DE LAS NUEVAS TECNOLOGIAS DEL HIDROGENO EN ARAGON, GREENDELTA GMBH, FORSCHUNGSZENTRUM JULICH GMBH, COMMISSARIAT A L ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES

<https://sh2e.eu/>

PROJECT AND GENERAL OBJECTIVES

The goal of SH₂E is to provide a harmonised (i.e. methodologically consistent) multidimensional framework for the life cycle sustainability assessment (LCSA) of fuel cells and hydrogen (FCH) systems. To that end, SH₂E will develop and demonstrate specific guidelines for the environmental, economic and social life cycle assessments (LCAs) and benchmarking of FCH systems, while addressing their consistent integration into robust FCH LCSA guidelines. The aim of these guidelines is to be globally accepted as the reference document for LCSA of FCH systems and to set the basis for future standardisation.

NON-QUANTITATIVE OBJECTIVES

- SH₂E aims to contribute to FCH systems' sustainability. The development of harmonised guidelines contributes to assessing the sustainability of FCH systems.
- SH₂E aims to contribute to social acceptance. Better knowledge of FCH systems' social and environmental impacts will contribute to their acceptance.
- SH₂E aims to contribute to standardisation. Harmonised guidelines pave the way for a standard.

PROGRESS, MAIN ACHIEVEMENTS AND RESULTS

- SH₂E reviewed the existing LCA guidelines.
- SH₂E reviewed case studies and projects.
- Environmental LCA guidelines have been issued.
- Life cycle cost assessment guidelines have been issued.
- Social life cycle assessment guidelines have been issued.
- Criticality indicator has been proposed.
- LCSA guidelines have been issued.
- The software tool for performing FCH life cycle studies has been issued.

FUTURE STEPS AND PLANS

SH₂E has been successfully completed.

PROJECT TARGETS

Target source	Parameter	Unit	Target	Target achieved?
Project's own objectives	1 document of FCH-LCA guidelines	Number	1	✓
	1 integrated FCH-LCA/LCC/SLCA/LCSA software tool	Number	1	
	1 document of FCH-LCSA guidelines with illustrative case studies after third-party review	Number	1	
	1 document FCH-LCSA guidelines	Number	1	
	Material criticality indicator	Number	1	
	1 document of FCH-LCC guidelines and 1 document of FCH-SLCA guidelines	Number	2	
	2 FCH systems assessed and benchmarked	Number	2	