

EGHOST

ESTABLISHING ECO-DESIGN GUIDELINES FOR HYDROGEN SYSTEMS AND TECHNOLOGIES



Project ID	101007166
PRR 2025	Pillar 5 - Cross-cutting
Call Topic	FCH-04-3-2020
Project Total Costs	1 133 541.25
Clean H ₂ JU Max. Contribution	998 991.25
Project Period	01-01-2021 - 31-05-2024
Coordinator Beneficiary	Fundacion IMDEA Energia, ES
Beneficiaries	SYMBIO, SYMBIO FRANCE, THE INSTITUTE OF APPLIED ENERGY, FUNDACION PARA EL DESARROLLO DE LAS NUEVAS TECNOLOGIAS DEL HIDROGENO EN ARAGON, UNIVERZA V LJUBLJANI, COMMISSARIAT A L ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES

<https://eghost.eu/>

PROJECT AND GENERAL OBJECTIVES

eGHOST aims to establish the first milestone in the development of eco-design criteria in the European hydrogen sector by providing a framework for the eco-(re)design of mature and emerging products and by promotion of fuel cell hydrogen (FCH) technologies as a sustainable investment.

Two guidelines for specific fuel cell hydrogen (FCH) products will be prepared and the lessons learnt will be integrated into the eGHOST white book; a reference guidance book for any future eco-design project on FCH systems. It addresses the eco(re)design of mature products (proton-exchange membrane fuel cells) and those emerging with low technology readiness levels (solid oxide electrolyzers) in such a way that sustainable design criteria can be incorporated from the earliest stages of product development.

Moreover, eGHOST will contribute to positioning FCH as a sustainable investment by developing the first preparatory study of a hydrogen product under the guiding principles of the Eco-design Directive.

NON-QUANTITATIVE OBJECTIVES

- eGHOST aimed to contribute to FCH systems' sustainability; eco-designed products will improve their sustainability performance.
- eGHOST aimed to contribute to social acceptance; sustainable products are better accepted by end users and stakeholders, including civil society.

PROGRESS, MAIN ACHIEVEMENTS AND RESULTS

Two guidelines for specific FCH products (proton-exchange membrane fuel cells (PEMFC) and solid oxide electrolysis cell (SOEC) stacks) have been completed and the lessons learnt were integrated into the eGHOST White Book, a reference guidance book for any future eco-design project of FCH systems. Achievements included:

- Life cycle sustainability assessment of a PEMFC and SOEC stack.
- Evaluation of the PEMFC stack in accordance with the EU eco-design directive.
- Proposal for alternative design concepts for both PEMFC and SOEC stacks from a sustainability perspective.
- Prioritisation of product concepts as a function of the impact reduction goals.
- Issuing of methodological and technical eco-design guidelines for both PEMFC and SOEC stacks.

eGHOST has improved the understanding of FCH technologies as a sustainable investment under the EU Taxonomy. In addition, eGHOST has pioneered the development of a social life cycle assessment in hydrogen-related projects looking at sustainable-by-design technologies that minimise environmental, economic and social impacts from the product-design phase.

PROJECT TARGETS

Target source	Parameter	Unit	Target	Achieved to date by the project	Target achieved?	SoA result achieved to date (by others)	Year for reported SoA result
Project's own objectives	Eco-design guidelines	Number	2	2	✓	N/A	N/A
	Cumulative environmental reduction	%	10	37-86 depending on product concept		18-44% carbon footprint reduction	2013
	Cumulative cost reduction	%	3	28-52 depending on product concepts		from 2.6 % reduction to 46% increment	2013
	Eco-efficiency improvement	%	10	>100 for all product concepts		N/A	N/A