

REFHYNE

CLEAN REFINERY HYDROGEN FOR EUROPE



Project ID:	779579
PRD 2023:	Panel 1 – H2 production
Call topic:	FCH-02-5-2017: Demonstration of large electrolyzers for bulk renewable hydrogen production
Project total costs:	EUR 19 759 516.50
Clean H₂ JU max. contribution:	EUR 9 998 043.50
Project period:	1.1.2018–30.6.2024
Coordinator:	SINTEF AS, Norway
Beneficiaries:	Element Energy Limited, ITM Power (Trading) Limited, Shell Deutschland GmbH, Shell Energy Europe Limited, Sphera Solutions GmbH, SINTEF AS

<https://refhyne.eu/>

PROJECT AND OBJECTIVES

The overall objective of REFHYNE is to deploy and operate a 10 MW electrolyser in a power-to-refinery setting. REFHYNE will validate the business model for using large-scale electrolytic hydrogen as an input to refineries, show the revenues available from primary and secondary grid balancing in today's markets and create an evidence base for the policy/regulatory changes needed to underpin the required development of this market. The electrolysers have been installed, and the plant has been tested and is ready for commissioning.

NON-QUANTITATIVE OBJECTIVES

- The project aims to make recommendations for policymakers and regulators on measures required to stimulate the market for these systems. One of the key outputs of the project is a suite of reports providing the evidence base for changes to existing policies. This will include specific analysis aimed at policymakers, recommending changes to existing policies.
- It aims to assess the legislative implications of these systems and their implications for regulations, codes and standards. REFHYNE will produce a detailed assessment of the consenting process for the system and any safety or codes and standards issues encountered.

(not analysed or uploaded). Lessons learned from the design, construction and initial operation have been summarised and published (not yet analysed or uploaded).

FUTURE STEPS AND PLANS

- The full operation of the electrolyser, including dynamic response testing in grid connection mode, will begin. The system is ready for full operation. The main issue to be resolved is that of timing in relation to other site activities.
- REFHYNE will undertake economic and technical analysis of electrolyser performance. Data gathering, storage and transfer to relevant partners is not fully ready. However, data will be stored and made available for later analysis.
- The project will perform an environmental analysis of the electrolyser system and concept. The framework and models are in place, and analysis will begin once system data are available.



PROGRESS AND MAIN ACHIEVEMENTS

The electrolyser has been tested and operated at different modes of operation, up to 10 MW

QUANTITATIVE TARGETS AND STATUS

Target source	Parameter	Unit	Target	Target achieved?	SoA result achieved to date (by others)	Year of SoA target
Project's own objectives and MAWP addendum (2018–2020)	Electricity consumption at nominal capacity	kWh/kg	52	⚙️	55	2020
	Capital cost	€/(kg/day)	2 000		2 100	2020
	Degradation rate	%/1 000 h	0.15		0.19	2020
	Hot idle ramp time for H ₂ production	seconds	1		2	2020