REFHYNE

CLEAN REFINERY HYDROGEN FOR EUROPE

Project ID	779579
PRR 2024	Pillar 1 – Renewable hydrogen production
Call topic	FCH-02-5-2017: Demonstration of large electrolysers for bulk renewable hydrogen production
Project total costs	EUR 19 759 516.50
Clean H_2 JU max. contribution	EUR 9 998 043.50
Project period	1.1.2018–30.6.2024
Coordinator	SINTEF AS, Norway
Beneficiaries	Element Energy Limited, ERM France, ITM Power (Trading) Limited, Shell Deutschland GmbH, Shell Energy Europe Limited, Sphera Solutions GmbH, Stiftelsen SINTEF

https://refhyne.eu/

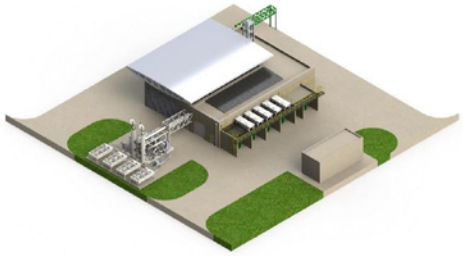
PROJECT AND GENERAL OBJECTIVES

The overall objective of the Refhyne project 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, the plant has been commissioned, and full operation and analysis are ongoing.

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 focused on policymakers and recommending changes to existing policies.

The project aims to assess the legislative implications and regulations, codes and standards implications of these systems. Refhyne will produce an assessment of the consenting process for the system and any safety issues or codes and standards issues encountered.



PROGRESS AND MAIN ACHIEVEMENTS

The electrolyser has been tested and operated in different modes of operation, up to 10 MW. Full operation is ongoing, analysis is being done continuously and the first performance reports are expected in late winter 2024.

Lessons learnt from the design, construction and first operation have been summarised and published.

FUTURE STEPS AND PLANS

The system is in full operation, and the electrolyser will undergo several modes of operation, including dynamic response testing in grid connection mode. Refhyne will now undertake economic, technical and environmental analysis of the electrolyser's performance. The framework and models are in place, and analysis will begin once more system data are available.

PROJECT TARGETS

Target source	Parameter	Unit	Target	Target achieved?	SOA result achieved to date (by others)	Year for reported SOA result
Project's own objectives and MAWP addendum (2018–2020)	Hot idle ramp time for H_2 production	seconds	1		2	2020
	Electricity consumption @ nominal capacity	kWh/kg	52		55	2020
	Degradation rate	%/1 000 h	0.15		0.19	2020
	CAPEX	€/(kg/day)	2 000		2 100	2020

Clean Hydrogen Partnership
Co-funded by the European Union