DELYCIOUS

Clean Hydrogen Partnership

Co-funded by the European Union

D2.2 Lab-scale data generation

by University of Twente

The project is supported by the Clean Hydrogen Partnership and its members under the GA 101192075. Co-funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the Clean Hydrogen Partnership. Neither the European Union nor the granting authority can be held responsible for them.

Document control sheet

Project number	101192075		
Project name	Diagnostic tools for ELectrolYsers: Cost-efficient, Innovative, Open, Universal and Safe		
Project acronym	DELYCIOUS		
Call	HORIZON-JTI-CLEANH2-2024		
Topic	HORIZON-JTI-CLEANH2-2024-01-04		
Type of action	HORIZON-JU-RIA (Research and Innovation Action)		
Granting authority	Clean Hydrogen Partnership and European Union		
Start date	01/01/2025	Duration	36 months
Project coordinator	Fraunhofer IWES		

Deliverable ID	D2.2
Deliverable Name	Lab Scale data generation
Version	1
Type of Deliverable	DATA
Work Package No	WP2
Due date	31/08/2026
Actual submission date	31/08/2026

Lead Beneficiary	University of Twente (UT)	
Author(s)	B. Choudhary, G. Raimondi, P. Teppor	
Contributor(s)	STARGATE, AL ICF	
Dissemination level	Public	☐
	Sensitive	☒
Reviewed by (WP leader or proxy)	Fraunhofer IWES	
Document Approval	Reviewer and WP leaders	

Clean Hydrogen Partnership
Co-funded by the European Union

The project is supported by the Clean Hydrogen Partnership and its members under the GA 101192075. Co-funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the Clean Hydrogen Partnership. Neither the European Union nor the granting authority can be held responsible for them.

About DELYCIOUS

As Europe accelerates its transition to clean energy, the Net Zero Industry Act identifies low-carbon hydrogen production as a strategic priority. DELYCIOUS tackles key challenges in water electrolysis technology, focusing on extending electrolyser lifespans and reducing operational costs under variable renewable energy sources. In DELYCIOUS, the development of cost-efficient, innovative, open, universal, and safe diagnostic tools to investigate the chemical and electrochemical properties of electrolysis systems is foreseen. This project combines Raman Spectroscopy (Raman) and Electrochemical Impedance Spectroscopy (EIS), to explore the chemical and electrochemical properties of electrolysis systems. By using both physical and data-driven modeling, it will be possible to identify important degradation parameters. To ensure that the diagnostic tools work effectively in various temperature ranges and across various electrolysis technologies, three technologies namely Alkaline Electrolysis (AEL), Proton Exchange Membrane Electrolysis (PEMEL), and Solid Oxide Electrolysis (SOEL) are addressed in this project, with a demonstration on alkaline electrolysers beyond 100 KW.

Consortium

Fraunhofer IWES

Coordinator

Air Liquide

UNIVERSITY OF TWENTE.

DUMAREY

HORIBA

etaflorence

stargate hydrogen

SIVONIC

Clean Hydrogen Partnership

Co-funded by the European Union

The project is supported by the Clean Hydrogen Partnership and its members under the GA 101192075. Co-funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the Clean Hydrogen Partnership. Neither the European Union nor the granting authority can be held responsible for them.

Publishable Summary

Deliverable D2.2 represents the raw process and sensor data collected under Task 2.4 between M10 and M20. The data are collected from the lab-scale electrolysis setup of University of Twente; UT (SOEL), STARGATE Hydrogen (AEL) and Air Liquide; AL ICF (PEMEL) integrating the Raman probes (developed by HORIBA, T2.3) and the EIS device (SIVONIC, T2.2). The dataset is collected executing the data generation protocol defined in D2.1 Quasi Harmonized Test Plan and has the technical objective to provide inputs data for the development of the advanced algorithms to be used for estimating the state of health of the electrolyzer as well as the remaining useful life.
This dataset will be used in concert with the one produced in T2.5 to finally produce Report D2.3 Lab-scale data validation due in M24.

Clean Hydrogen Partnership
Co-funded by the European Union

The project is supported by the Clean Hydrogen Partnership and its members under the GA 101192075. Co-funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the Clean Hydrogen Partnership. Neither the European Union nor the granting authority can be held responsible for them.