

LUXEMBOURG HYDROGEN VALLEY



Luxembourg Hydrogen Valley [LuxHyVal] delivers integrated full-chain sustainable hydrogen ecosystem with technical, economic, social, and environmental benefits and superior replicability

Deliverable D1.6 – Annual Data Reporting for CHJU v1

Lead Beneficiary: University of Luxembourg, UL

Author(s): Anastasiia Gafiullina (Project manager)

Reviewers: Bradley Ladewig (Project Coordinator)



Co-funded by
the European Union

This project is supported by the Clean Hydrogen Partnership and its members

Grant Agreement No. 101111984
HORIZON JTI CLEAN H2

D1.6 Annual Data Reporting for CHJU v1

Project acronym:	LuxHyVal
Project full title:	<i>Luxembourg Hydrogen Valley</i>
Start of the project:	November 1, 2023
Duration:	63 months
Project coordinator:	Prof. Bradley P. Ladewig on behalf of the University of Luxembourg, UL
Deliverable title:	Annual Data Reporting for CHJU v1
Deliverable n°:	D1.6
Version n°:	0.1
Nature of the deliverable:	Report
Dissemination level:	Public
WP responsible:	UL
Lead beneficiary:	UL
Due date of deliverable:	Month 8 (M8)
Actual submission date:	October 10, 2024

Deliverable status:

Version	Status	Date	Authors
1.0	Final version	10 October 2024	Anastasiia Gafiullina, UL

Copyright notice

© – 2024 – LuxHyVal. All rights reserved. Licensed to the Clean Hydrogen Joint Undertaking under conditions.

Disclaimer

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 of the Clean Hydrogen Joint Undertaking. Neither the European Union nor the granting authority can be held responsible for them.

Table of Contents

Executive summary4

1. Introduction4

2. SuiteCRM platform data.....4

PROJECT CONTEXT AND GENERAL OBJECTIVES4

SUSTAINABILITY AND CIRCULARITY ASPECTS MANAGED / PLAN TO MANAGE WITHIN THE PROJECT5

PROGRESS, MAIN ACHIEVEMENTS AND RESULTS.....5

NON-QUANTITATIVE OBJECTIVES6

FUTURE STEPS AND PLANS6

Executive summary

This deliverable (D1.6) Annual Data Reporting corresponds to the Annual Data Collecting exercise by CHJU and aimed on collecting and reporting all at once the updated project data to understand the project progress in terms of the key numerical metrics and the status, and to further prepare the Annual Data Reports.

The data are submitted directly to two portals – the TRUST (“Technology Reporting Using Structured Templates”) platform that is focused on quantitative data collection, and the SuiteCRM, that collects qualitative (descriptive) information on the project progress.

1. Introduction

As stated into the Executive Summary section, data are submitted directly to two portals – TRUST and SuiteCRM – as described here [Annual Data Collection - Clean Hydrogen Partnership \(europa.eu\)](https://europa.eu/annual-data-collection-clean-hydrogen-partnership). The TRUST (“Technology Reporting Using Structured Templates”) platform that is focused on quantitative data collection, and the SuiteCRM, that collects qualitative (descriptive) information on the project progress.

LuxHyVal project data were submitted to the SuiteCRM in March 2024 and updated for this Annual report in October 2024. In October 2024 only minor changes regarding the status of Deliverables and Tasks were introduced reflecting the progress of the work. The fields covering the project summary, the objectives, etc., were kept as initially submitted as no changes occurred there.

No data were submitted to the TRUST (“Technology Reporting Using Structured Templates”) platform, which focuses on quantitative data collection, as during the first year of the LuxHyVal project no relevant data were planned to be produced and collected and thus there are no data to be reported.

2. SuiteCRM platform data

The detailed information was submitted directly to the platform and thus are not duplicated in this Annual report-1 (D1.6). However, a very brief overview is given exactly as it was submitted to the platform:

PROJECT CONTEXT AND GENERAL OBJECTIVES

Context:

LuxHyVal launches a flagship Hydrogen Valley to boost the penetration of hydrogen ecosystems in Luxembourg by deploying green hydrogen initiatives across the entire value chain from local production to utilisation, including storage and distribution for a range of applications targeting industry and mobility, while also aiming to connect with existing/planned infrastructures. Several end-use applications in the mobility (i.e., private & public buses, light industrial vehicles) and industry (i.e., metal) are included with the support of key commercial actors along the entire value chain and political support in line with the Luxembourg Hydrogen Strategy aimed at fully decarbonising the industrial sector before 2030. Digital Twinning for optimal planning and operation is delivered to support upscaling and replication, while public perception and professional upskilling deliver social benefits and equip the workforce with the needed competences. Lastly, the lessons learned and solutions are replicated in 2 Follower Valleys in Central (CZ) and Eastern (UA) Europe.

General Objectives:

LuxHyVal aligns with the vision that hydrogen is a key piece of any decarbonisation strategy, especially for industrial and mobility energy-intensive applications, allowing for energy sector integration and sector coupling. Specifically, LuxHyVal underpins the Luxembourg hydrogen strategy to locally generate and supply Luxembourg hydrogen needs, which is currently covered by imported grey (from fossil origin) hydrogen, including a plan to replace fossil fuels with green hydrogen. This is achieved via comprehensive planning and progressive approach to get the roadmap in motion, while providing evidence and confidence to local users, citizens and stakeholders for progressive upscaling. To reach these overarching objectives, LuxHyVal's Specific Objectives (SO) with corresponding key performance indicators (KPI) and targets are defined.

SUSTAINABILITY AND CIRCULARITY ASPECTS MANAGED / PLAN TO MANAGE WITHIN THE PROJECT

Sustainability questions are addressed in the WP6 – Comprehensive impact assessment and public acceptance, more specifically, in the Task T6.3: LuxHyVal Life Cycle Assessment (months 30 - 54).

According to the plan:

The carbon footprint and other environmental impacts are quantified with LCA according to ISO 14040 and 14044, referring to the 4 stages of the assessment: goal and scope definition, life cycle inventory analysis, life cycle impact assessment, and interpretation. As LCA considers the full life cycle, it avoids burden shifting, which means it prevents reducing the environmental impacts in one stage or impact category, while increasing the impacts elsewhere in the life cycle. We use first-hand data from all partners involved in WP3, 4 and 5 jointly with data from the ecoinvent and GaBi LCA database plus literature sources. All this together guarantees reliability and completeness of the life cycle inventories.

One of the main risks in LCA is the lack of reliable and accurate data. LuxHyVal environmental assessment is not hampered from this risk. These inventories are built using best practice methods and LCA leading tool packages (i.e., OpenLCA or SimaPro software depending on preferences expressed). This allows to conduct a LCA of 1 kg of the green hydrogen produced using the LuxHyVal.

Outcomes is the comparison and benchmarked to fossil-derived hydrogen, specifically using Steam Methane Reforming (SMR) including Carbon Capture and Storage (CCS) or not, as this is the base-case comparison for current industrial consumers in LU. They are also compared to other studies on green hydrogen in Europe and beyond, taking into account the particular case of green hydrogen produced in Australia and exported to LU, in collaboration with UNSW. This task also includes an assessment of critical raw materials necessary in the installation of the LuxHyVal, and in particular in the fabrication of electrolyzers. This includes a comparative assessment using our GeoPolRisk tool between 2 different technologies namely i) PEMEL&HTEL and ii) Alkaline process that is characterised as a cost-effective technology with no necessity for noble metal catalysts.

The main goal is to provide knowledge to local and European policy makers and industries on the sustainability of their supply chains and on securing sources of critical raw materials needed in future electrolyser technologies.

PROGRESS, MAIN ACHIEVEMENTS AND RESULTS

Completed steps:

- Main project management arrangements and procedures are set up
- The main communication channels are prepared and are under the final review of the project Consortium (project website, project visual identity, first communication materials, press-release)
- Extend feasibility study is actively progressing
- Business models for hydrogen integrated ecosystems, governance and agreements for operation are completed and being evaluated

NON-QUANTITATIVE OBJECTIVES

Social Impact:

- Increase public understanding of H₂ technologies
- Upskilled professionals + students of H₂ & associated jobs

Technological Impact:

- Full integration of H₂ technology ecosystem

Economic Impact:

- Establish a functioning green H₂ market in Luxembourg
- Validate multi-stakeholder business model & governance

Environmental Impact:

- Enhanced environmental profile with zero-emission & low-noise buses

National Impact:

- Provide local supply of green H₂ and energy independency
- Reduce dependance from foreign fuels
- Boost the economic resources staying in Luxembourg

Policy & Regulatory Impact:

- Overcome bottlenecks to rapid H₂ market expansion
- Contribute to policy & regulation instruments
- Explore potential synergies with international markets

FUTURE STEPS AND PLANS

WP1_Task 1.6 Synergies & Co-funding and financing of the LuxHyVal

WP2_T2.4: Commercial negotiations and project financing

WP2_T2.5: International green hydrogen markets

WP2_T2.6: Assessment & recommendations to regulations at EU & national level

WP3_Planning and design of the LuxHyVal infrastructure (all tasks according to the GA)

WP4_Deployment and commissioning of the LuxHyVal Clean Hydrogen JU infrastructure (all tasks according to the GA)

WP5_Operation and validation of LuxHyVal with production, storage, distribution and uses (all tasks according to the GA)

WP6_Comprehensive impact assessment and public acceptance (all tasks according to the GA)

WP7_Digital tools for optimisation, upscaling and replication (all tasks according to the GA)

WP8_T8.3: Competence analysis, identification and management of exploitable results

WP8_T8.4: IPR protection, agreements and exploitation

WP8_T8.5: Clustering activities with other initiatives and projects