

	<p>D. 7.6</p> <p>Communication and Dissemination report</p>	 
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<p>Sustainable and cost-efficient catalyst for hydrogen and energy storage applications based on liquid organic hydrogen carriers : economic viability for market uptake</p>
<p>GRANT AGREEMENT NUMBER 101007223 SHERLOHCK — H2020 FCH-02-1-2020</p>
<p>D. 7.6</p> <p>Communication and Dissemination report</p>

WP7:	Communication, dissemination, international cooperation and exploitation plan
Task 7.1:	Communication and dissemination plan
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D. 7.6

Communication and Dissemination
report



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1 Executive summary

This document is the first communication and dissemination report related to the SHERLOHCK project within the H2020 framework program. The report summarizes all the activities carried out by the consortium for a) promoting the project outside the consortium and b) maximizing impact and awareness of the project during the first 18 months (M1–M18) of the project life cycle, from January 2020 to June 2022. Therefore, this document is the mid-term communication report of the SHERLOHCK project.

It is important to keep in mind that the diffusion of the results occurs according to the intellectual property protection established in the Grant Agreement. All information relating to the project are disseminated to several, diversified audiences.

This document is structured as follow:

- WP7 brief description;
- Target audience;
- Activities and materials.

This report is a deliverable (D. 7.6) of task 7.1 “**Communication and Dissemination Plan**” which falls within work package 7 (WP7) “**Communication, dissemination, international cooperation, and exploitation plan**”.

2 WP7 brief description

WP7 covers all the consortium activities related to project results’ communication and dissemination. WP7 also is responsible for fostering international cooperation and implementing the exploitation plan. Thus, the communication and the dissemination of the results of SHERLOHCK are crucial for the success of WP7, and the project as a whole.

3 Target audience

The need for continually available, renewable energy sources is crucial for several actors of nowadays society, from industry to governments and the general public. Thus, SHERLOHCK aims to address its message to a diversified, wide audience. To communicate and disseminate efficiently the results of the SHERLOHCK project, the audience has been divided into different categories:

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- **Industrials:** SHERLOHCK will specifically target hydrogen and energy-related industries and partners directly involved in the development/utilization of hydrogen-sourced green energy applications/solutions.
- **Public organizations and associations:** These public organizations and associations are well-identified and credible actors in the European hydrogen industry. Addressing these targets will help to benefit from their dissemination/communication capabilities.
- **Universities and specialized schools:** Particular attention will be put to education when considering the dissemination and communication of SHERLOHCK. Indeed, one of the major pillars of European industrial competitiveness, such as hydrogen energy (which is a flagship for Europe), is the capability to attract and train students.
- **Policymakers:** Communicating with policymakers is vital to developing a specific segment of an industrial sector. Therefore, SHERLOHCK will focus on such actors to show the relevance of LOHC technology.
- **Wide public:** Last, but not least, increasing the awareness of the European citizens is also important for the development and adoption of hydrogen technologies.

4 Activities and materials

In this section, we will first introduce concisely all the activities, the materials, and tools adopted by the consortium for promoting/enhancing the communication and dissemination of the results of the SHERLOHCK project. Conclusions and outlooks will be given in the section 5 of the report.

4.1 Project Website

The website is available at <https://sherlohck.eu/>, works with all browsers (Chrome, Firefox...), and is accessible from mobile devices. The main goals of the website are:

- a. Manage the external communication for promoting the project and raising awareness (all audiences)
- b. Keep audience updated through news and newsletters;
- c. Serve as an external communication platform.

You can find a detailed description of the website pages and functionalities in the following session.

4.1.1 Home page and main menu

The home page summarizes the project concisely. In addition, the 'Latest News' section at the center of the main page provides the most relevant news related to the project (meetings, conferences, publications...). Figure 1 shows a screenshot of the home page of the public website.

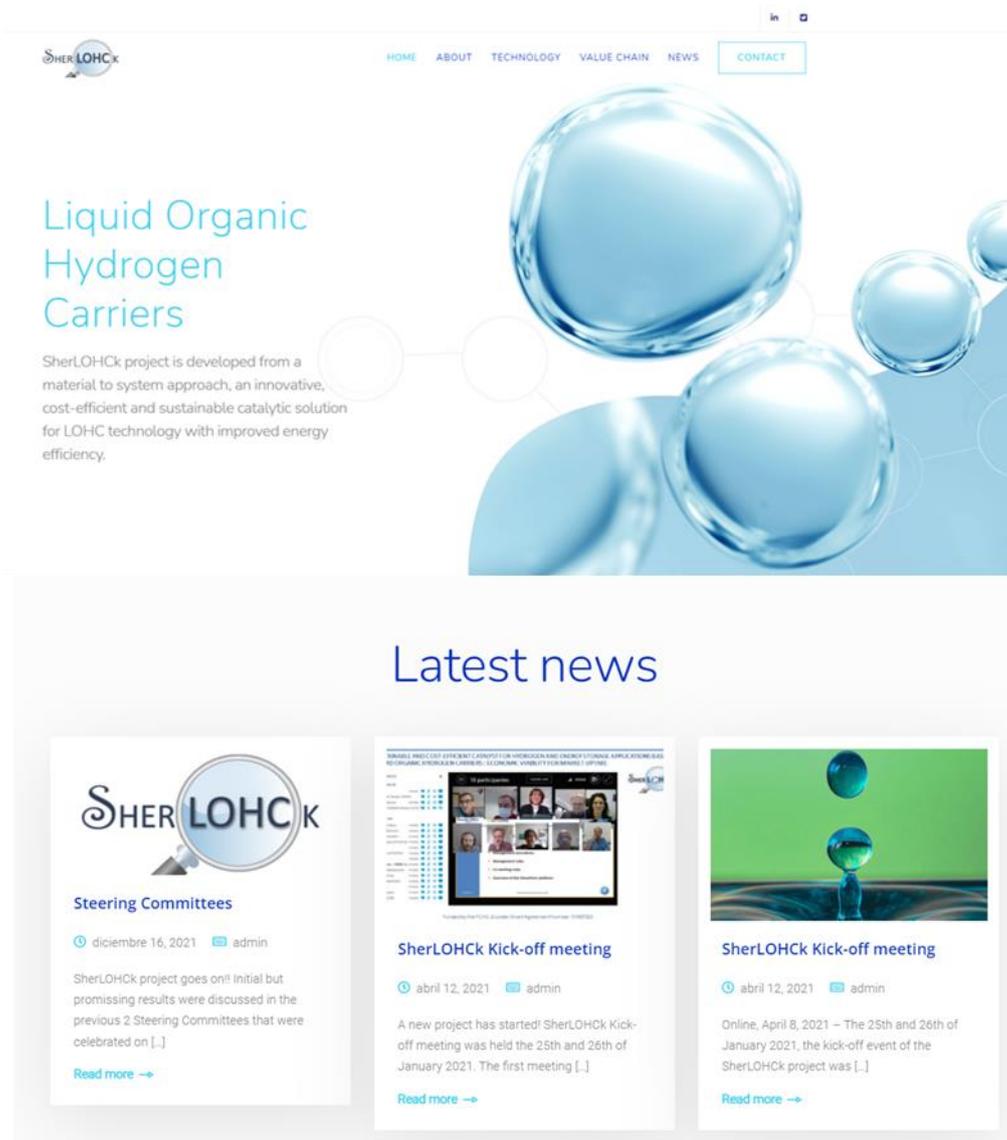
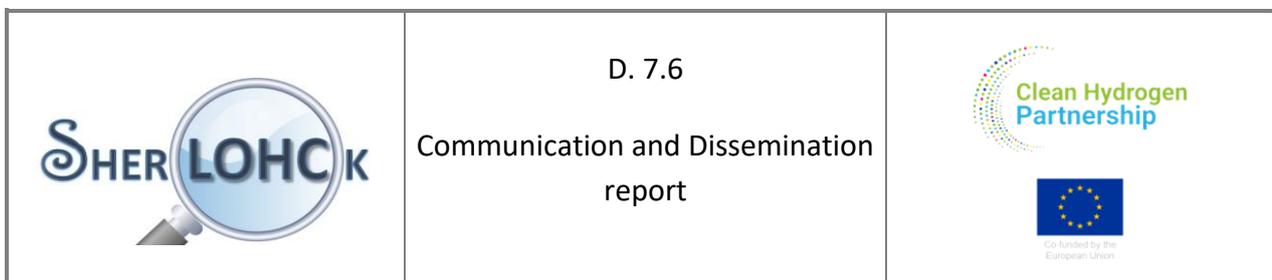


Figure 1 – Screenshot of the main page of SHERLOHCK’s website



The main menu is always visible on top of each page (Figure 2), through which it is possible to navigate between the six section of the website:

1. Home: brings visitors back to the home page;
2. About: This section contains information about the consortium objectives, the project targets, and partners' logos. By clicking on the logos visitors are redirected to each partner website;
3. Technology: Information about LOHC technology;
4. Value chain: in this section, SHERLOHCK work packages are described in a nutshell.
5. News: Here, the latest news about the consortium can be found. Visitors can also subscribe to the project newsletters.
6. Contact: It contains the contact details for reaching out to the SherLOHCK consortium. It is possible to send a message directly from the website as well.

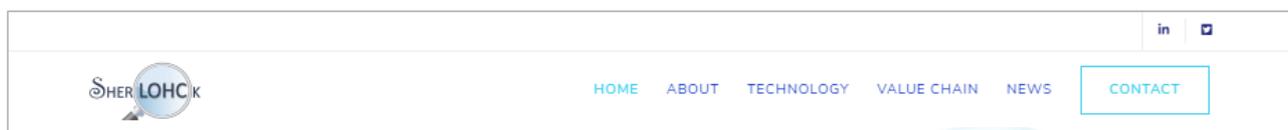


Figure 2 – A screenshot of the main menu.

Information about the granting institutions are at the bottom of the each page (Figure 3).

In the next paragraphs, we will go briefly each of the six section of the website.

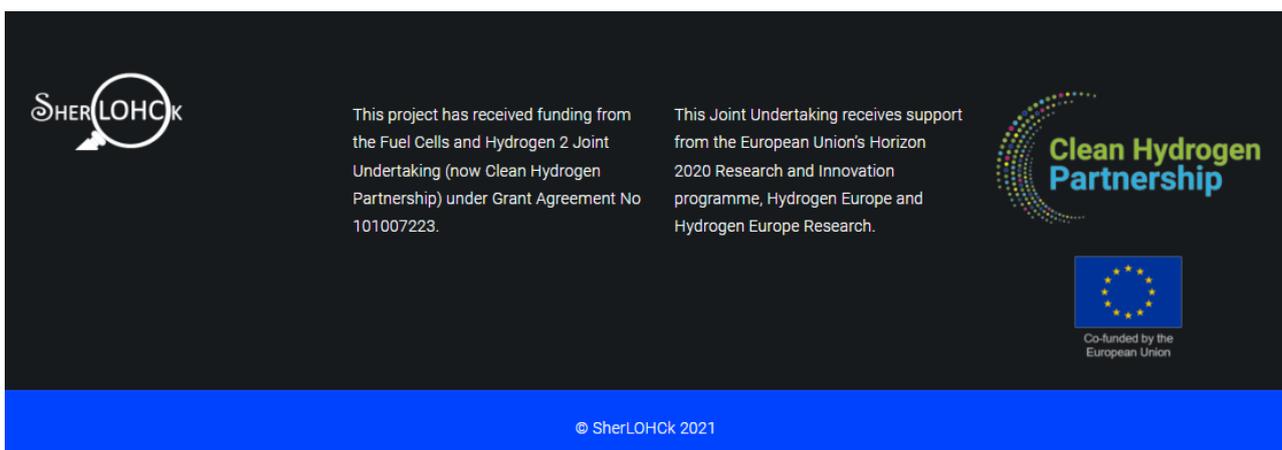


Figure 3 – Reference to the H2020 Fuel Cells and Hydrogen 2 Joint Undertaking (FCH2 JU) funding by the European Union including both the FCH logo and EU logo are located at the bottom of the homepage.

4.1.2 About

The second section “About” elaborates in-depth on the specific objectives of the FCH UJ project. First, it explains what LOHC technology consists of. Then, the main targets are stated, and finally, all the consortium partners are represented by their logos with links to each partner’s websites. Below, you can find a few screenshot of the About section to simulate the navigation (Figure 4–5). New information appears when scrolling down.

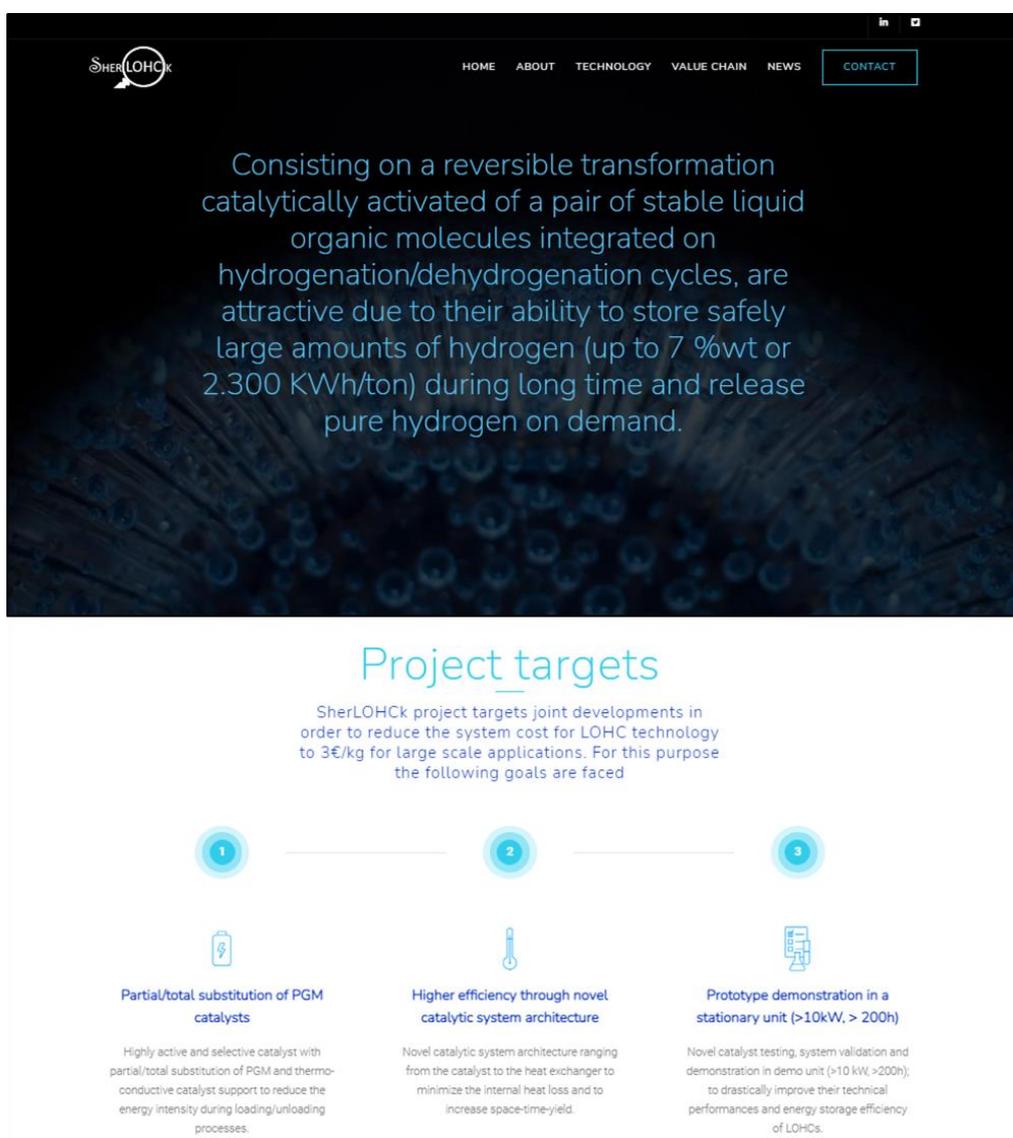


Figure 4 – Screenshot of the top part of the About section.

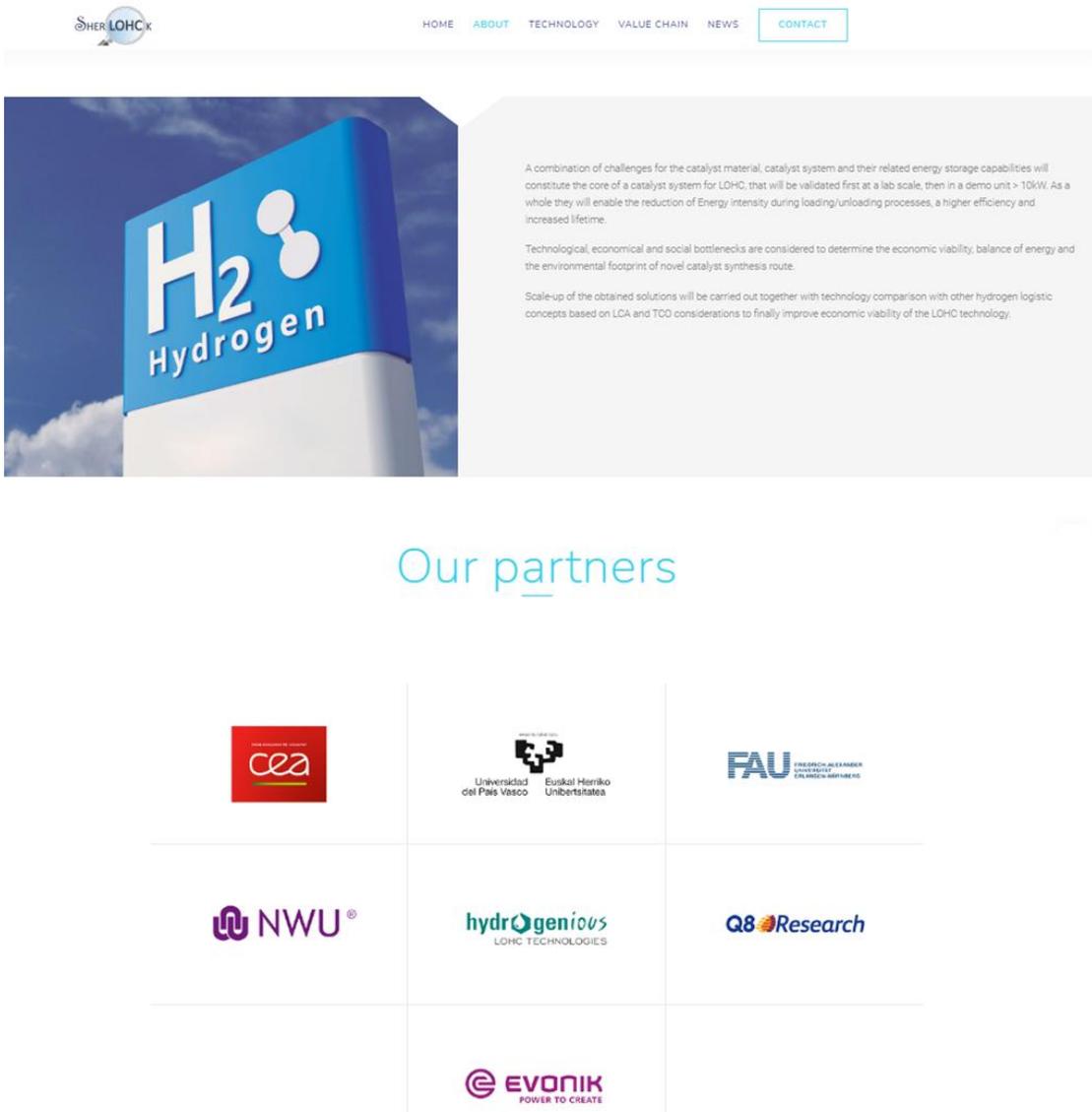


Figure 5 – Screenshot of the bottom part of the About section.

4.1.3 Technology

This section aims to explain graphically what LOHC technology is about and the main steps involved in such processes using a flowchart (Figure 6).

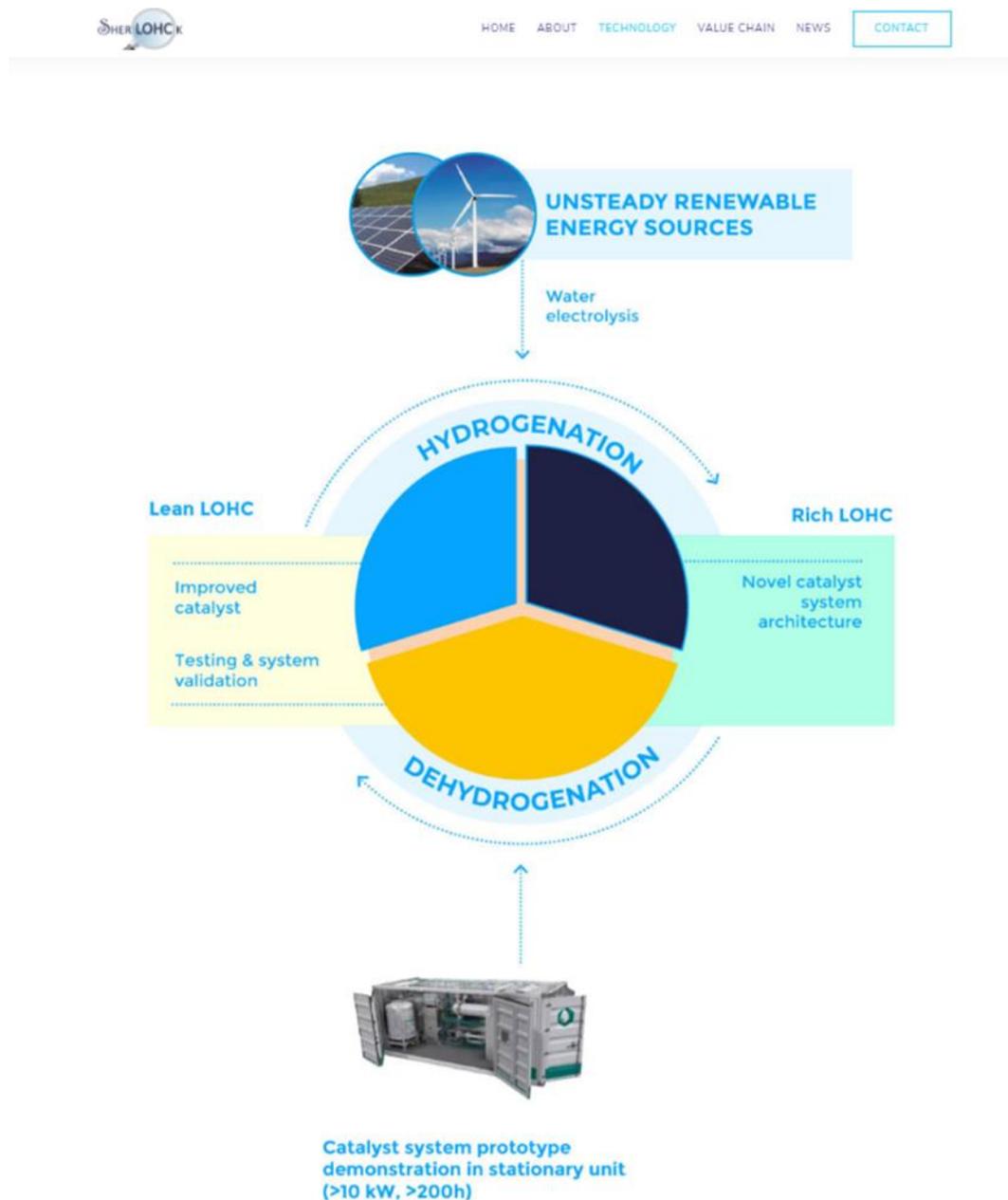


Figure 6 – Screenshot of the Technology section.

4.1.4 Value chain

This section defines the steps (work packages) in SherLOHCK. The work packages are classified as “Research and Innovation” and “Application”. A flowchart indicates the order of the different steps summarizing in a brief sentence the task involved in each step (see Figure 7). Each partner of the consortium are represented through their logo. A second flowchart (Methodology) describes the methodology scheme gathering the different activities and challenges addressed during the project and indicating the outcomes of each activity.

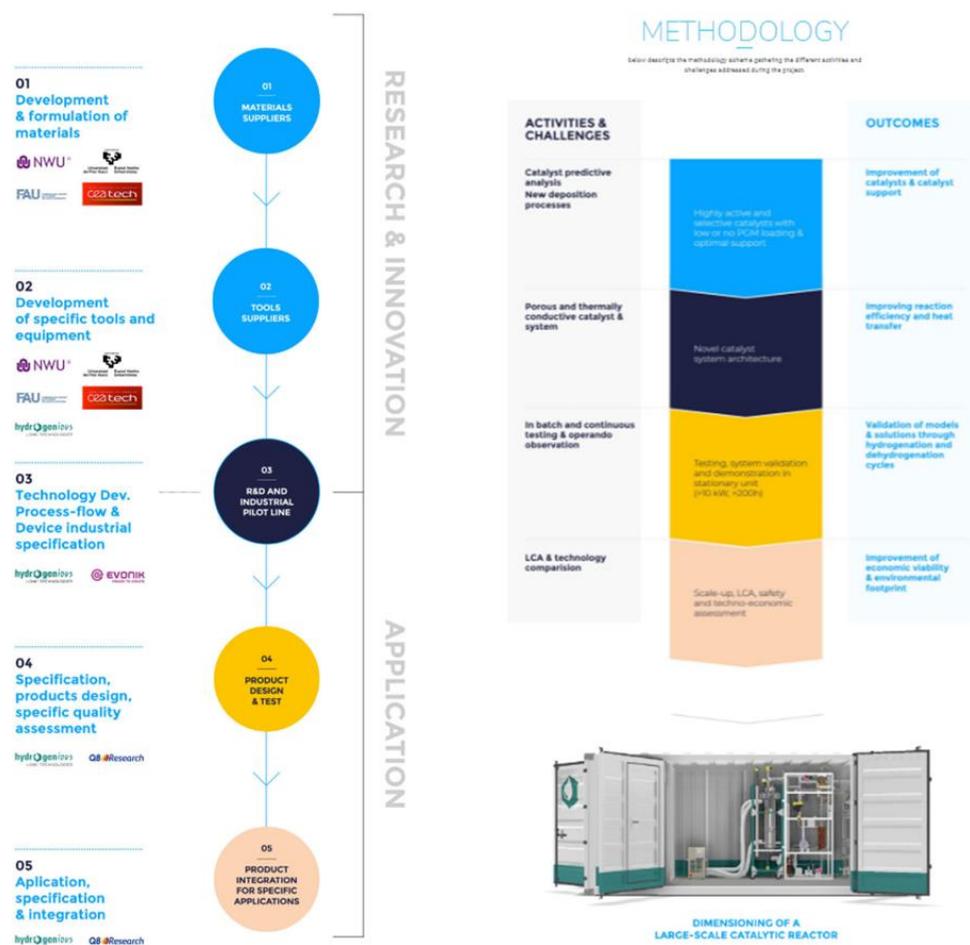


Figure 7 – Screenshot of the flowcharts in the “Value Chain” section.

4.1.5 News

The “News” section (Figure 8) shows the latest updates related to the activity of the project in order to get a quick refresh on what happened in the recent period. This page will be constantly updated with the latest material such as upcoming meetings, participation in events, dissemination actions, conferences, publications, whitepapers, newsletters, news, photos, etc. In the near future, this section will also show finished deliverables open to the public. There is an option to subscribe to the newsletters of the project that will be published periodically.

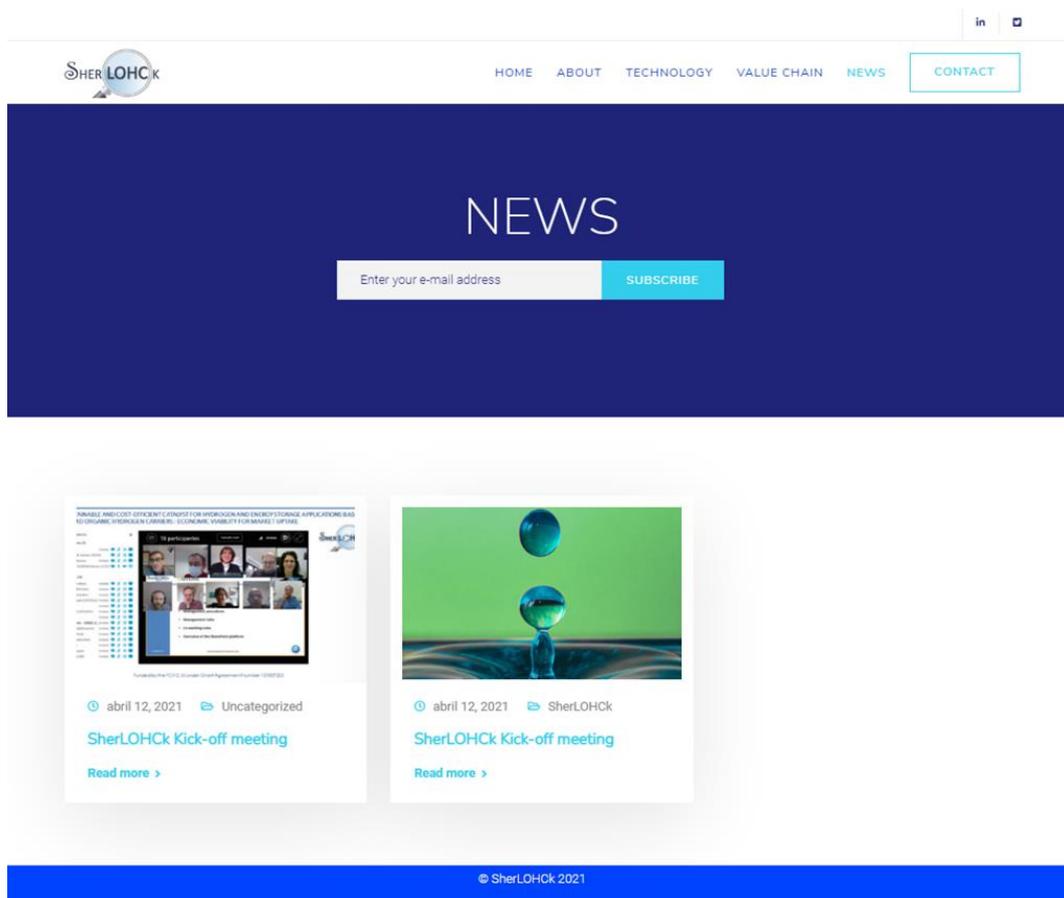


Figure 8 – Scenshot of the “News” section of SherLOHCK’s website.

4.1.6 Contacts

The contact page (Figure 9) links the website visitors to the consortium. Two options are given:

1. An e-mail address: info@sherlohck.eu
2. A contact form. It requires entering personal data (name and email address) in order to submit a message to the SherLOHCK project

Additionally, the links for social media (Linkedin and Twitter) of the SherLOHCK project can also be found.

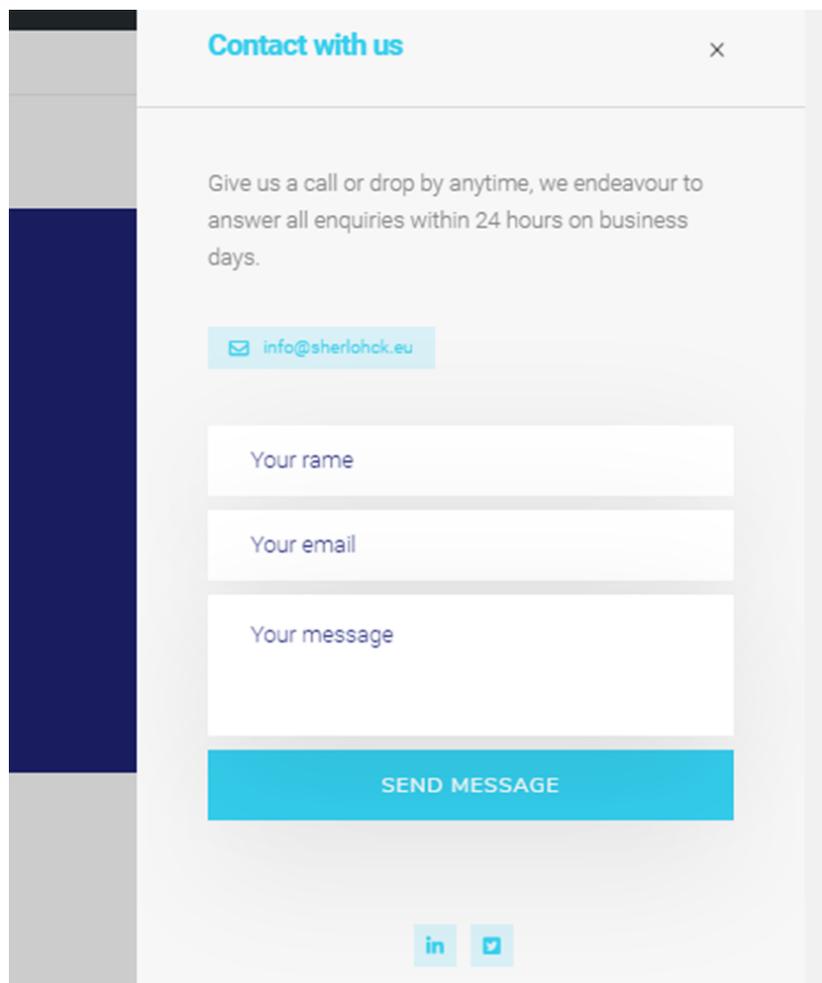
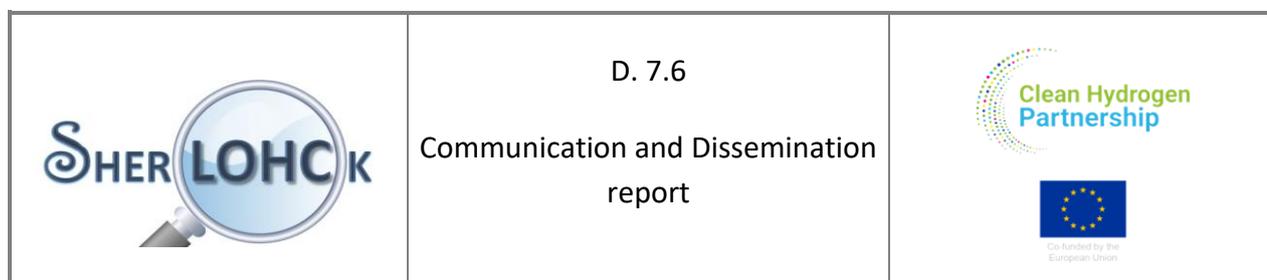


Figure 9 – Scenshot of the “contact” section of SherLOHCK’s website



4.2 Social networks

In our society, Social media & social networks are the best tools for reaching out to the largest audience (the entire world) on the one hand, and for targeted audiences on the other. For this purpose, the consortium promotes its activities and news mainly on two social platforms: LinkedIn and Twitter. These two platforms allow the consortium increase the visibility of the website and the overall project, thus increasing SHERLOHCK's supporters.

4.2.1 LinkedIn (<https://www.linkedin.com/in/sherlohck/?originalSubdomain=es>)

LinkedIn is the most famous professional social network. It allows connecting with experts and professionals from the industrial and the academic sectors with variegated background as well as the specific sector in which the consortium operates. As such, LinkedIn offers the unique opportunity to aim both to the large audience and targeted ones. Because of its peculiarity, the impact of SHERLOHCK's posts on LinkedIn is a good indicator of the visibility on the project online.

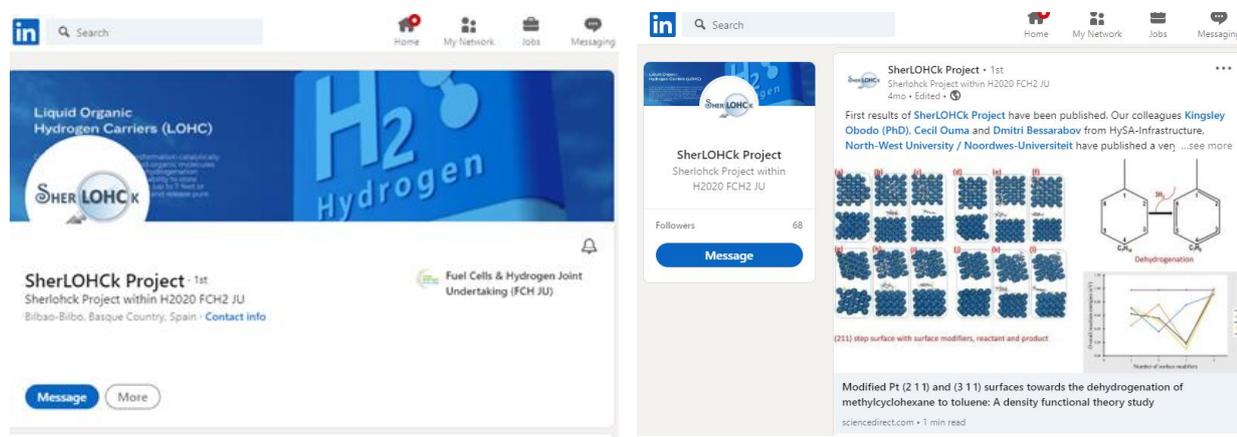


Figure 10 –Screenshots of the landing page of SherLOHCK on LinkedIn (left) and example of post (right)

4.2.2 Twitter (<https://twitter.com/SherlohckProj>)

Twitter is one of the most used social network in the world and its main purpose is allowing newsmakers, influencers, and the general public to post and share news and diversified information in a very concise way. For this reason, posts on Twitter are more likely to reach a wide audience, though allowing to reach targeted audiences as well. Similarly to LinkedIn, monitoring the consortium post on Twitter (likes, retweets, comments) is indicative of the whole project visibility.

4.3 Press releases

Press releases are also used as communication and dissemination tools for enhancing the visibility of the result of the project. Below, a list of the already published press release can be found:

- KPRT announced on their website their involvement in SHERLOHCK.
- <https://www.engineeringnews.co.za/article/south-africa-helping-hydrogen-down-cost-curve-giving-it-greater-zip-2021-06-24/>
- <https://hysainfrastructure.com/lohck-development-in-south-africa/>

4.4 High-Impact communication material

Several high-impact communication material (brochures or flyers, roll-ups, templates) have been produced and they are the object of D. 7.2. They have the advantage of being delivered in person during live events, thus enhancing connection with stakeholders and persons of interest (through presence and empathy). The high impact communication material is presented in Figures 11–16.

4.4.1 Brochure or Flyer

The project brochure is an important promotional tool that summarizes the project’s main objectives and approach. The front page brochure layout is mainly focused on transmitting the project’s main message. More detailed objectives and insights are described in the next pages of the brochure.



Figure 11 – Brochure’s front (left) and back page (right)



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Liquid Organic Hydrogen Carriers (LOHC)

Consisting on a reversible transformation catalytically activated of a pair of stable liquid organic molecules integrated on hydrogenation/dehydrogenation cycles, are attractive due to their ability to store safely large amounts of hydrogen (up to 7 %wt or 2,200 kWh/ton) during long time and release pure hydrogen on demand.

SherLOHCk project targets joint developments in order to reduce the system cost for LOHC technology to 3€/kg for large scale applications. For this purpose the following goals are faced:

01 Partial/total substitution of PCM catalysts
Highly active and selective catalyst with partial/total substitution of PCM and thermally-conductive catalyst support to reduce the energy intensity during loading/unloading processes.

02 Higher efficiency through novel catalytic system architecture
Novel catalytic system architecture coming from the catalyst to the heat exchanger to minimize the internal heat loss and to increase space-time-yield.

03 Prototype demonstration in a stationary unit (>10kW, >200h)
Novel catalyst testing, system validation and demonstration in demo unit (>10 kW, >200h); to drastically improve their technical performances and energy storage efficiency of LOHC.

A combination of challenges for the catalyst material, catalyst system and their related energy storage capabilities will constitute the core of a catalyst system for LOHC, that will be validated first at a lab scale, then in a demo unit, >10kW. As a whole they will enable the reduction of energy intensity during loading/unloading processes, a higher efficiency and increased lifetime.

Technological, economical and social bottlenecks are considered to determine the economic viability, balance of energy and the environmental footprint of novel catalyst synthesis route. Scale-up of the obtained solutions will be carried out together with technology comparison with other hydrogen logistic concepts based on LCA and TCO considerations to finally improve economic viability of the LOHC technology.

SherLOHCk technologies

Viability for energy storage

FIGURE 1

SherLOHCk project, as illustrated in Figure 1, encompasses joint developments on three main areas: a) improved catalyst with partial/total substitution of PCM catalysts, b) two novel catalytic system architectures (bimetal and cellular structures) c) intensive testing and validation to foster the scale-up and the environmental and economic viability of LOHC technology.



Our Value chain

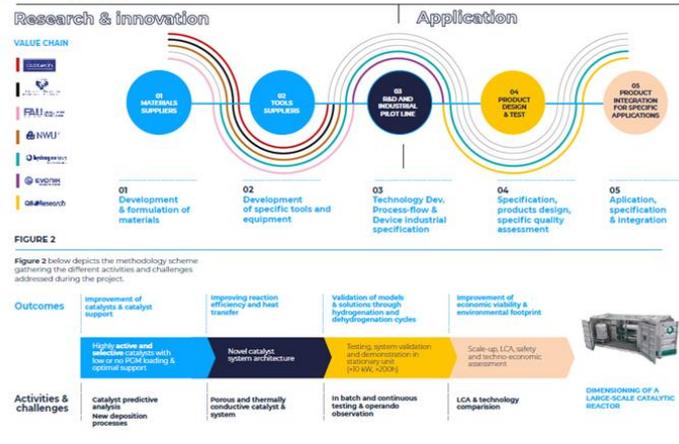


Figure 12 – Brochure’s middle pages

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4.4.2 Roll-ups

When showcased to live events, roll-ups (Figure 13) are great visual aids to enhance the visibility project . Design and layout are based on the project’s CI.

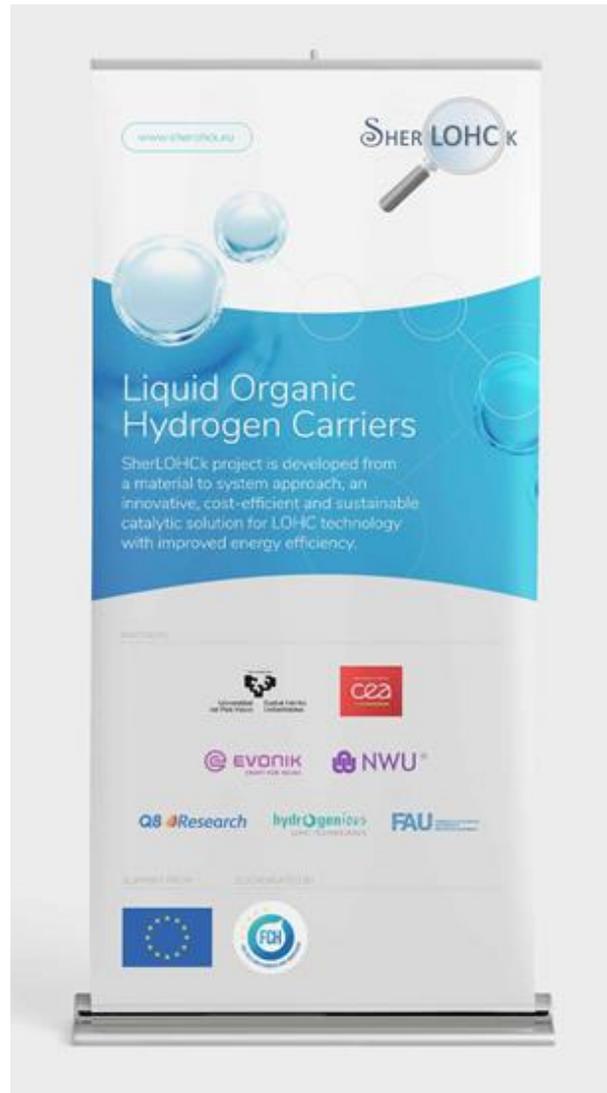
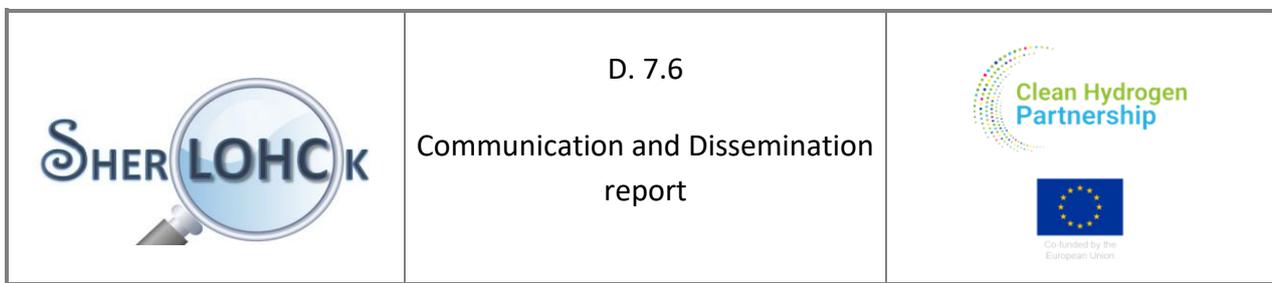


Figure 13 – Mockup of the roll-up



4.4.3 Templates

To keep the visibility of the project unique and to promote consistency and coherence, the consortium has prepared templates for presentations and reports (Figure 14).

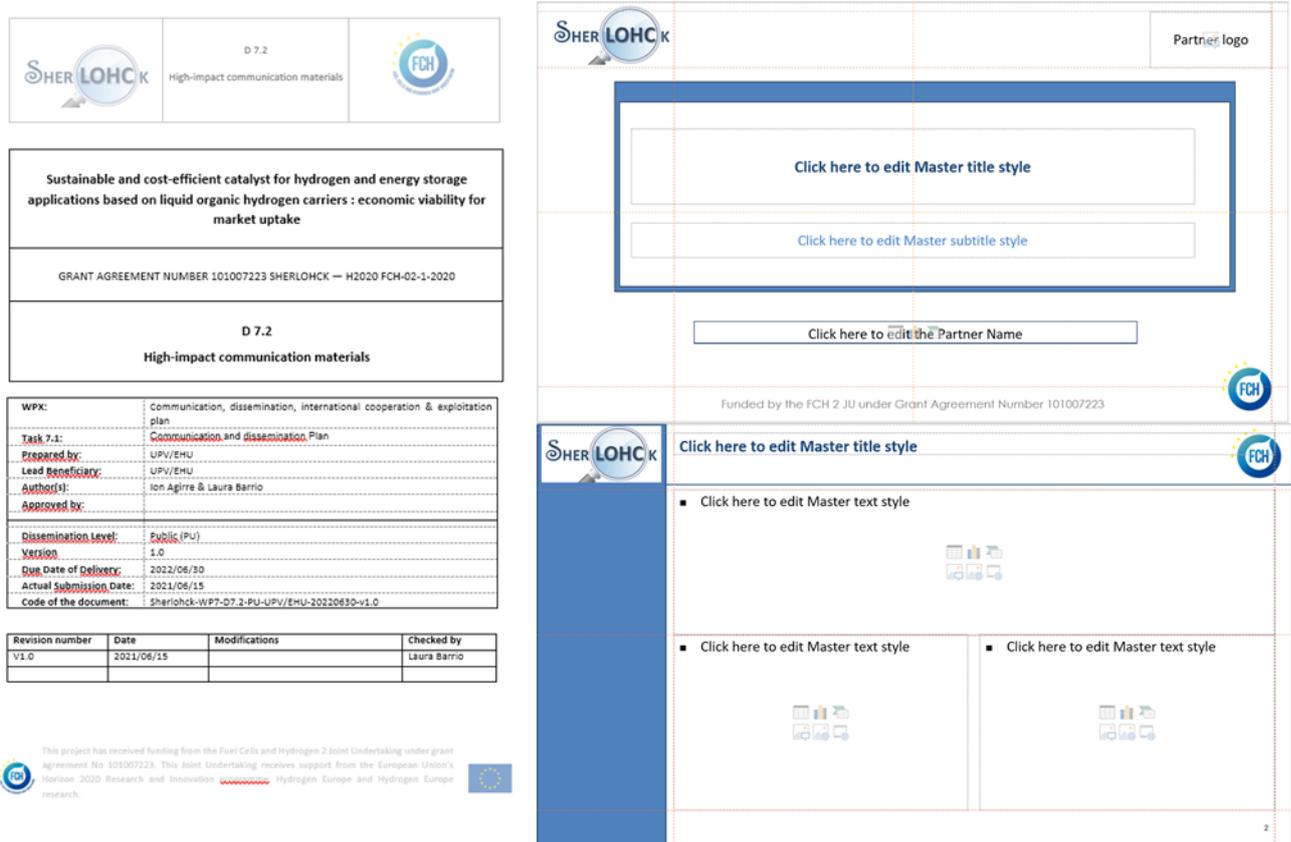


Figure 14 – Examples of deliverable report (left) and presentation (right) templates

4.4.4 Official Project presentation

SherLOHCK has one official presentation (Figure 15), whose purpose is to ensure consistency and coherence of the message delivered by the different partners at various conferences and events.



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SherLOHCK
Liquid Organic Hydrogen Carriers

The LOHC presents developers have a need to secure efficient, an economic, cost-effective, sustainable, reliable, scalable for LOHC technology with improved energy efficiency.

Liquid Organic Hydrogen Carriers (LOHC)

Consisting in a reversible transformation catalytically activated of a pair of stable liquid organic compounds (reactant and hydrogenation/dehydrogenation system), we allow us to store safely large amounts of hydrogen (up to 7 bar or 3.200 GWh/m³) being long time and release pure hydrogen on demand.

SherLOHCK technologies viability for energy storage

Process flow: **HYDROGENATION** (Low LOHC, High LOHC, Energy Efficiency) → **HYDROGEN** → **DEHYDROGENATION** (High LOHC, Low LOHC, Energy Efficiency).

Benefits: **Highly efficient energy storage**, **Highly efficient energy storage**, **Highly efficient energy storage**.

LOHC Introduction

WHAT IS LOHC?

LOHC is a liquid organic carrier that is able to store hydrogen molecules as a reversible reaction of liquid organic hydrogen carriers.

WHY?

The Liquid Organic Hydrogen Carriers (LOHC) system is a promising technology for hydrogen storage and transport. It offers a safe, efficient, and scalable way to store and transport hydrogen.

Performance Potential?

The great performance requirement is a significant one, it requires:

- High efficiency
- High energy density
- High stability
- High LOHC stability

Limitations

- Economic stability and environmental footprint
- Stability
- LOHC stability
- LOHC catalyst

SherLOHCK Objectives

OBJECTIVE FOCUS ON CATALYST REACTORS

- High stability
- High energy density
- High efficiency
- High LOHC stability

SherLOHCK project targets joint developments in order to reduce the system cost for LOHC technology to 30\$/kg for large scale applications. For the purpose the following goals are based:

- 01 Partial total substitution of Pd/C catalysts**
- 02 Higher efficiency through novel catalytic system architecture**
- 03 Prototype demonstration in a stationary cell (>10kW, >200h)**

Lessons learned from hydrogen

77% (Low LOHC), 15% (High LOHC), 8% (High Efficiency).

SherLOHCK Targeted Hydrogen Market

Energy Storage and H₂

Multiple hydrogen storage solutions available:

- Highly efficient energy storage
- Highly efficient energy storage
- Highly efficient energy storage

SherLOHCK technologies viability for energy storage

Outcomes: **Highly efficient energy storage**, **Highly efficient energy storage**, **Highly efficient energy storage**.

Activities & challenges: **Highly efficient energy storage**, **Highly efficient energy storage**, **Highly efficient energy storage**.

SherLOHCK Targeted Hydrogen Market

Long-term business

Key metrics: **Highly efficient energy storage**, **Highly efficient energy storage**, **Highly efficient energy storage**.

A combination of challenges for the catalyst material, catalyst system and their manufacturing (storage capabilities, and control) the cost of a catalyst system for LOHC that will be suitable for a large scale (there is a demand for 100k) as a whole they will require the reduction of energy intensity through the manufacturing process, a higher efficiency and increased costs.

Our Value chain Research & Innovation

01: Conceptual design, 02: Design and development, 03: Technology development, 04: Scale-up, 05: Commercialization.

General Info

info@sherlohck.eu

Figure 15 – Official presentation of SherLOHCK

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4.5 Attended conferences, exhibitions and workshops

Conferences, workshops, and more generally live events, are well-suited environments to connect directly and network with industrials, professional, and academics. Due to the particular R&D nature of the SHERLOHCK project, these events represent an important factor to get visibility and recognition from the specific sector targeted by the project. Below, a list of the attended conferences and workshops can be found:

- 1) “Evaluation of the bimetallic Pt-Ni and Pt-Co catalysts on the LOHC dehydrogenation”, World Hydrogen Conference (WHEC), Istanbul, 27–30 June 2022, Oral presentation
- 2) “LOHC dehydrogenation on bimetallic Pt-Ni and Pt-Co catalysts”, European Hydrogen Energy Conference (EHEC), Madrid, 17–20 May 2022, Oral presentation
- 3) “Project SHERLOHCK: development of Liquid Organic Hydrogen Carriers”, Downstream 4.0 summit, online event, 27–28 November 2021, Oral presentation
- 4) “Project SHERLOHCK: development of Liquid Organic Hydrogen Carriers”, Large Hydrogen Infrastructures, online event, November 10th 2021, Oral presentation
- 5) “R&I needs on Advanced Materials to unlock the hydrogen revolution”, EMRI online event, November 5th 2021, Oral presentation
- 6) “Project SHERLOHCK: development of Liquid Organic Hydrogen Carriers”, Hydrogen Industrial Series Europe, online event, July 7th 2021, Oral presentation