



Smart Ways for In-situ Totally Integrated and Continuous Multisource Generation of Hydrogen

D7.8: Designed Communication Material progress

WP7 ,7.1

Date of document

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Technical References

Project Acronym	SWITCH
Project Title	Smart Ways for In-situ Totally Integrated and Continuous Multisource Generation of Hydrogen
Project Coordinator	Matteo Testi - FBK testi@fbk.eu
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Versions

Revision Version	Date	Changes	Changes made by Partner
0.1	25 November 2023	First release	Ilaria Alberti (FBK)

¹ PU = Public

PP = Restricted to other programme participants (including the Commission Services).

RE = Restricted to a group specified by the consortium (including the Commission Services).

CO = Confidential, only for members of the consortium (including the Commission Services).

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1 Introduction

What are communication and dissemination (C&D) materials? We can define them as the tools needed to promote a project and its results. On the communication side, these materials inform the public about the existence and main characteristics of the project. Dissemination materials instead focuses on providing a determined target audience with specific information. This is due to the fact that dissemination aims to make results public in order to share knowledge that other can use.²

A further step would be to make a concrete use of results (exploitation), which is the final goal of C&D activities.

Providing partners with a wide range of materials allows the Consortium to tailor messages and maximise the impact of project results, engaging with multiple stakeholders that might demonstrate interest in exploiting the technology developed in SWITCH.

This document describes the C&D materials created since the beginning of SWITCH. It can be quickly noted that the first set of materials, produced at the beginning of the project, focused on communication. The second set of materials concentrates on dissemination as they present the activities implemented and results achieved.

All materials have common graphical elements as they are based on the visual identity that characterize SWITCH as a distinguishable brand. In deliverable *D7.1 Project website and visual identity* the conceptualisation process and results of the logo, colour palette and infographics have been described.

The materials are and will be available on the shared drive to all the Partners, who are aware of and use these ready-made tools when communicating externally the activities done during the project. Materials to be used digitally are also on the website where they can be freely downloaded by the public.

This report is divided in two main parts. The first chapter is based on deliverable *D7.2 Designed Communication Material* as it reports the communication materials initially created. The second chapter focuses on the dissemination materials already created and those in the pipeline.

² Quick guide of H2020 Programme: https://ec.europa.eu/research/participants/docs/h2020-funding-guide/imgs/quick-guide_diss-expl_en.pdf

2 Communication tools

Let's start with a short summary on the visual identity.

Visual identity aims at communicating the project through logo, imagery, typography, colours, and creative design that are tailored on SWITCH with the final goal of distinguish it from all the other projects. In a nutshell, visual identity conveys the core meaning of the SWITCH's system at first sight.

Initially, these materials included the acknowledgment message to the “Fuel Cells and Hydrogen Joint Undertaking” (FCH JU) as indicated in the FCH JU guidelines and in Art. 38 and Art. 29.4 of the Grant Agreement (GA). However, following the publication of the Council Regulation (EU) 2021/2085 in the Official Journal³, the Clean Hydrogen Partnership⁴ became the universal successor of the FCH 2 JU and took over its legacy portfolio.

The templates, website and materials were updated to include the Clean Hydrogen Partnership acknowledgment sentence alongside the logo and the European flag, as indicated in the guidelines⁵.

The materials prepared in the first part of the project are those reported in the above-mentioned deliverables (D7.1 and 7.2):

- **Website**
- **Templates**
- **Library**
- **Flyer**
- **Roll-up**
- **Video**

³ Council Regulation (EU) 2021/2085 in the Official Journal: <https://eur-lex.europa.eu/eli/reg/2021/2085>

⁴ Legal name: Clean Hydrogen Joint Undertaking

⁵ Guidelines on the Visual identity of Clean Hydrogen Europe: https://www.clean-hydrogen.europa.eu/media/visual-identity_en

2.1 Website and Social Media

At the time the deliverable 7.1 was being written, the website⁶ was not yet completely finalised. By M5, the layout had minor changes and some advancements in the illustrations.

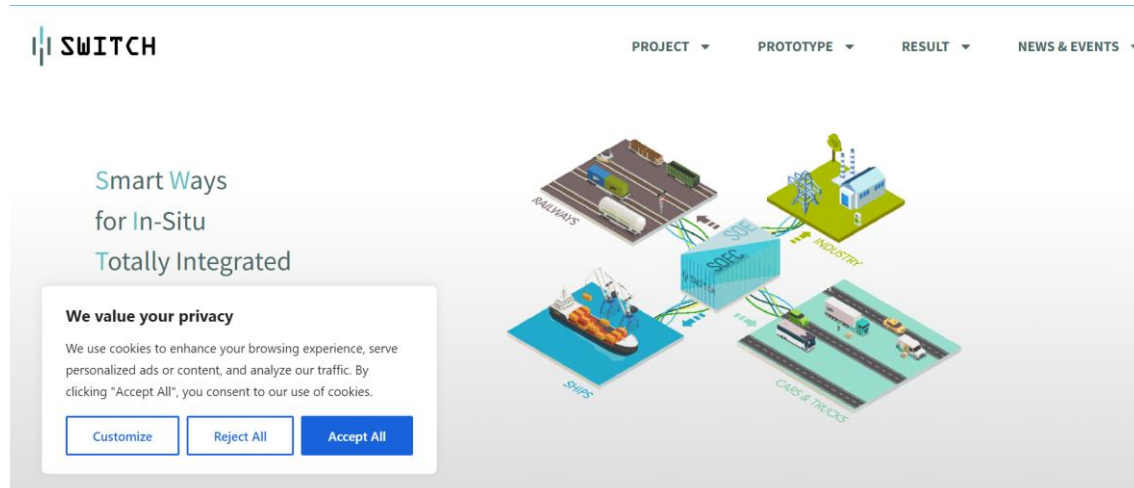


Figure 1. Screenshot of SWITCH Website

Since then, the website has been constantly updated with news and events.

Furthermore, the privacy and cookies policies have been updated accordingly to the regulations.

Another communication tool that was launched in the first phase of SWITCH was social media. The project has a LinkedIn⁷ and Twitter⁸ account that engage with public and stakeholders publishing regular posts.

2.2 Templates

Templates are fundamental in the scientific context. The Word template is used in deliverables and public report, the PowerPoint is used to present activities in conferences and events. Templates help to characterize the project SWITCH as a brand.

As said in the introduction, the templates have been updated with the acknowledgement to the Clean Hydrogen Partnership.

⁶ SWITCH Website: <https://switch-fch.eu/>

⁷ SWITCH LinkedIn account: <https://www.linkedin.com/company/switch-project/>

⁸ SWITCH Twitter account: <https://twitter.com/FchSwitch>



WPx
Title of the WP

3rd Technical Progress Meeting – 21st June 2021

Name of Presenter

Organization
email



This project has received funding from the Fuel Cells and Hydrogen 2 Joint Undertaking (now Clean Hydrogen Partnership) under Grant Agreement No 875148. This Joint Undertaking receives support from the European Union's Horizon 2020 Research and Innovation program, Hydrogen Europe and Hydrogen Europe Research



Smart Ways for In-situ Totally Integrated and Continuous Multisource Generation of Hydrogen

D#:#: Full title / Report name

WP#, T#

Date of document

Month, 202Y (Mxx)



This project has received funding from the Fuel Cells and Hydrogen 2 Joint Undertaking (now Clean Hydrogen Partnership) under Grant Agreement No 875148. This Joint Undertaking receives support from the European Union's Horizon 2020 Research and Innovation program, Hydrogen Europe and Hydrogen Europe Research



Figure 2. Screenshot of the first slide of PowerPoint presentation and Word document

2.3 Library

The so-called “Library” consists of the illustrations, icons and images created for the website and templates. These can be used by partners to communicate the project in a more graphical manner.

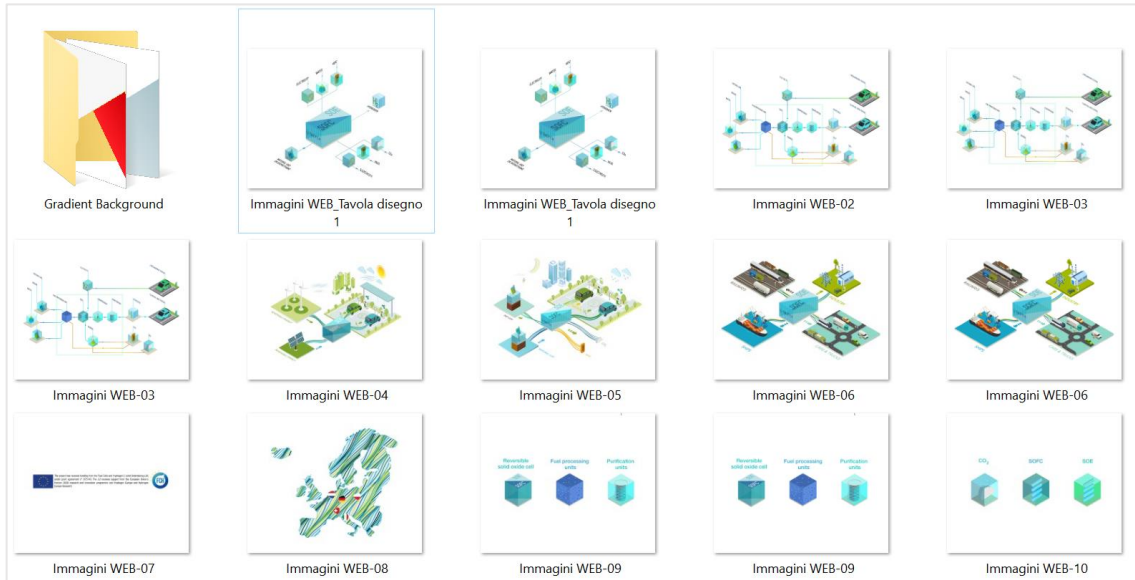


Figure 3. SWITCH Library

Part of the Library is available for download by external stakeholders on the website at [this link](#).

As it will be explained in the next chapter, the Consortium led by FBK created new materials focused on dissemination. New illustrations were also created to better explain the concepts and results of the project. These are being used on social media to disseminate the technical results of the project.

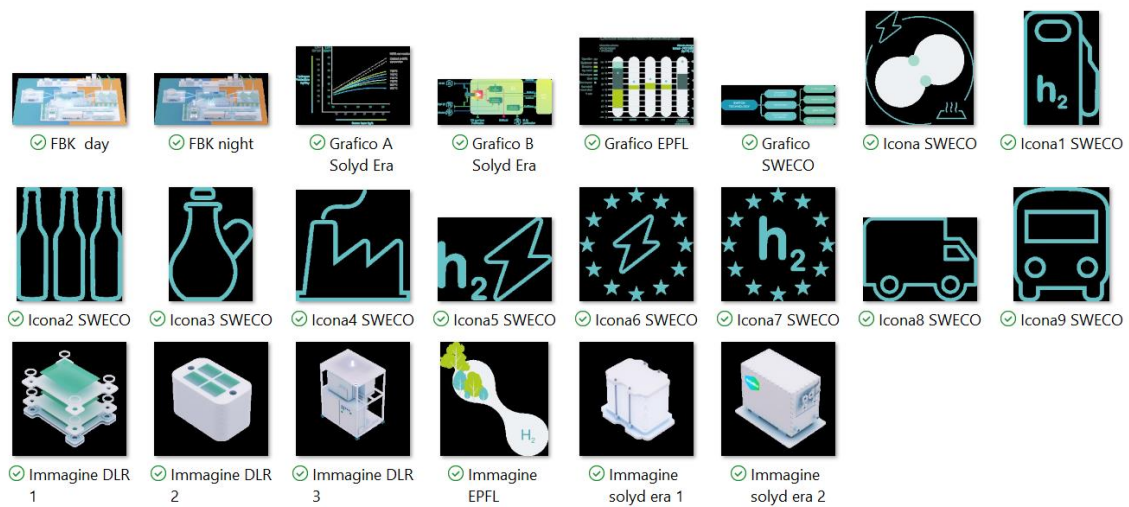


Figure 4. Additional icons and illustrations included in the Library.

2.4 Flyer

As reported in D7.2, among the initial materials produced there was also an eight-page document. Considering that general public is usually the target of this kind of materials that are not intended for scientific dissemination of the project, the document conveys simple messages with a simple language: the key information on the project objectives, ambition, and impact.

The flyer was not printed. At the beginning of the project, the Consortium decided to limit the number of hard copies and of printed materials, but rather preferred to have them in a digital version to be printed *ad hoc* or depending on the occasion. The flyer was therefore published on the website, and can be download in pdf at [this link](#).

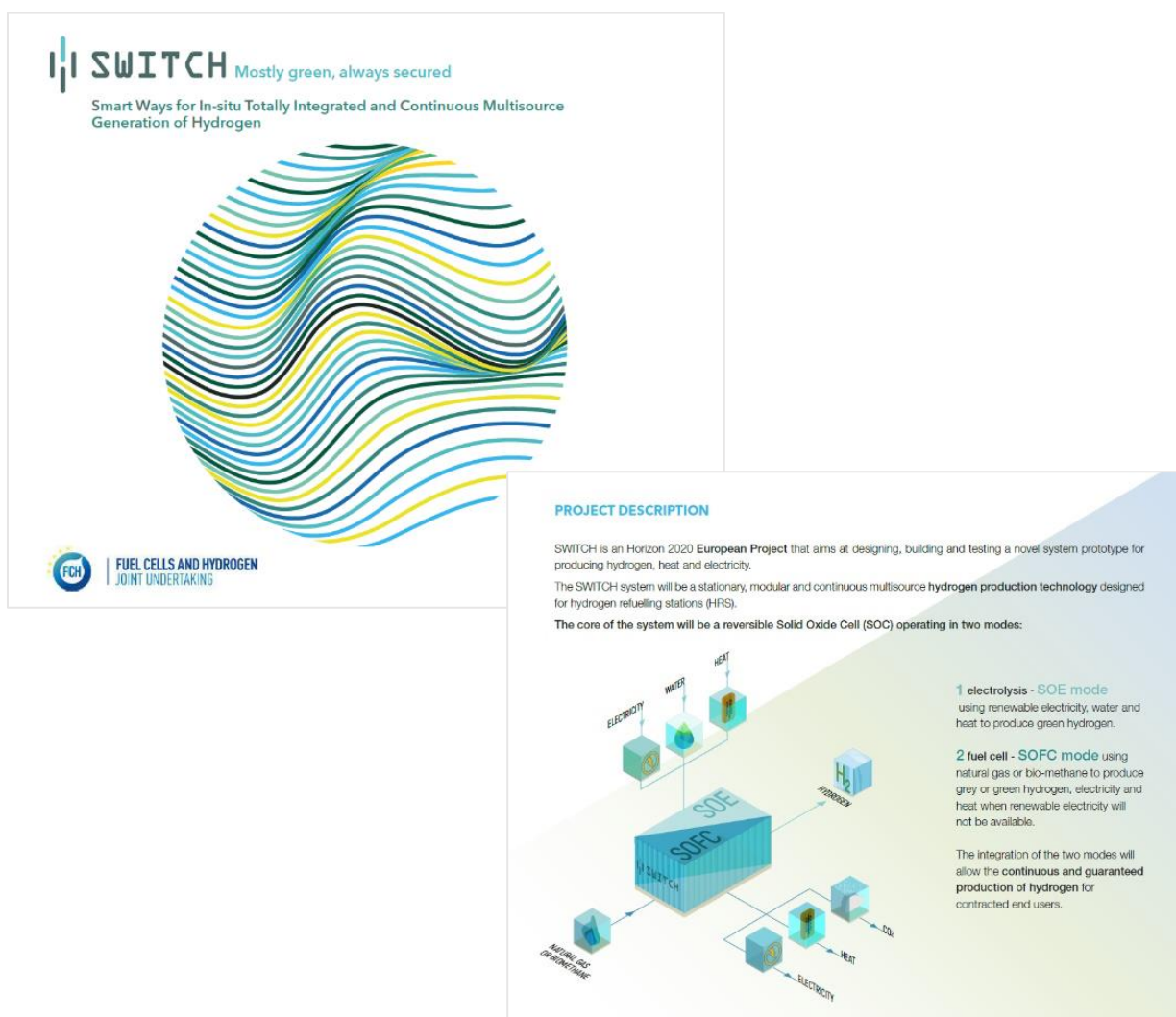


Figure 5. Screenshot of the first two pages of the flyer.

2.5 Roll-up

Roll-ups are banner that can be rolled up, making it all easy to carry around. An 85x200cm has been designed for SWITCH to be used during all SWITCH project meetings, in fairs and organised events.

As for the flyer, the roll-up was not printed at the beginning of the project.

In November 2023, Fondazione Bruno Kessler participated in the European Hydrogen Week with a booth in the Hydrogen Europe Research Pavilion. In view of the occasion, the roll-up was updated (logos of partners and acknowledgement to Clean Hydrogen Europe) and printed.



Figure 6. Project Coordinator Matteo Testi and researcher Elena Crespi at the EU Hydrogen Week 2023

2.6 Video

As reported in D7.2, a first video has been designed in graphic motion for SWITCH:

The 2:30 min video aims to describe the SWITCH project, the SWITCH system and the ambition of building an innovative prototype for “mostly green, always secured hydrogen production”. The text is simple but effective in conveying the key messages and information on the SWITCH project. It is intended to be used in virtual communication activities and to be displayed during the workshop participated or organised by the Consortium.

The has been published on the project homepage⁹ and easily explains the functioning of the SWITCH system.

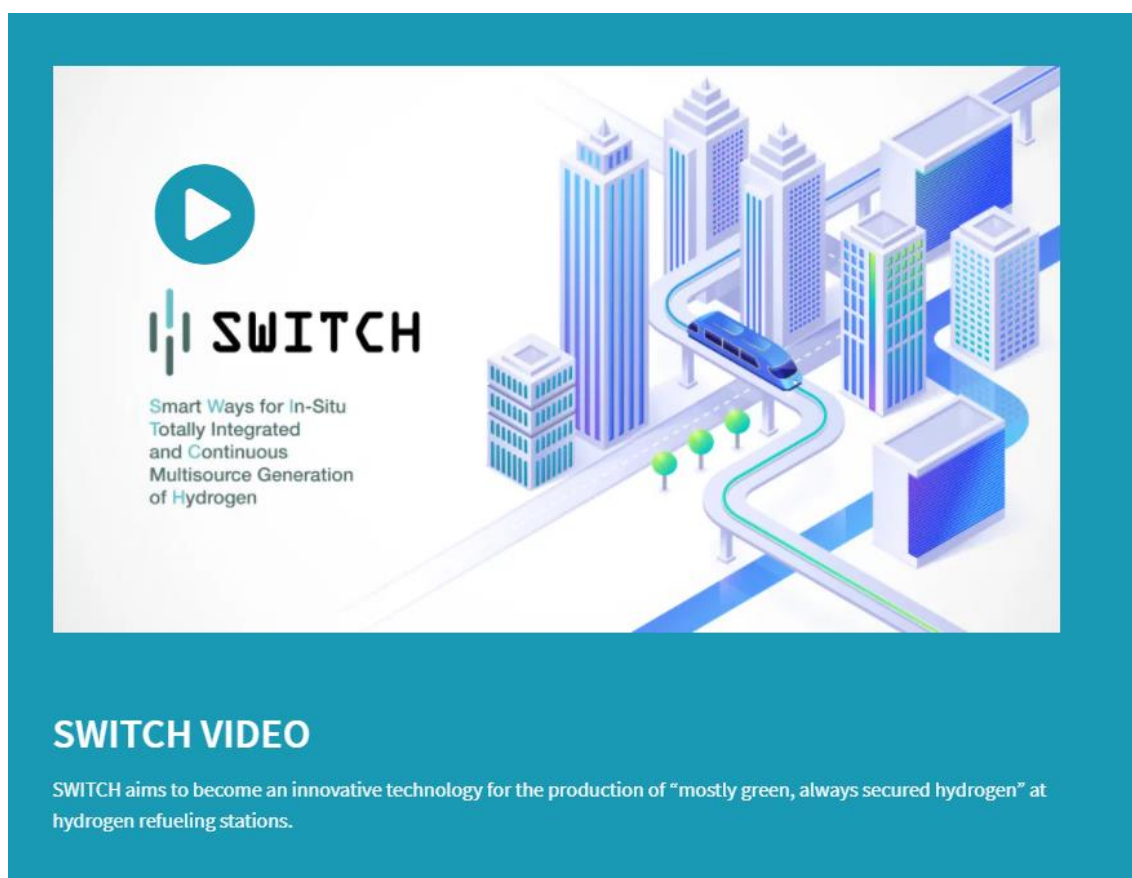


Figure 7. SWITCH First Video

The SWITCH video has been segmented into three small video pills to be used for the social media channels.

The consortium planned a second video to be released by the end of the project.

⁹ <https://switch-fch.eu/>

3 Dissemination tools

During the intermediate phase of the project, no new materials were created to communicate the results of the project.

Partners concentrated on the technical progress of the project, and to disseminate the results in conferences and fairs, and lots of these were online considering the pandemic of COVID-19 that happened in the central years of the project.

The website was regularly updated with more than 30 news in total, which were then reposted on social media: LinkedIn and Twitter.

In the final year of the project, the Consortium guided by FBK (WP Leader) started the conceptualisation of the final C&D materials. From the list initially outlined in the GA, the missing tools at the current project stage were a 16-page brochure presenting the results, and 8-page booklet with techno-economic information.

The Consortium decided to unify these two documents in a single and complete final brochure, anticipated by individual factsheets to be used online.

In the next pages, the following materials will be outlined:

- **Poster template**
- **Factsheets**
- **Final brochure**
- **Second video.**

The first materials were focusing on the communication, therefore not technical but rather to inform the public about the existence, context, and objective of the project. With this second part of materials, the consortium decided to focus on disseminating the results and therefore giving a more technical imprint to the materials.

3.1 Poster template

A poster template was made available to partners for eventual poster presentations. Posters are frequently used in conferences to let participants know about a project activities or result, giving them the possibility to ask for further questions and information. In fact, posters do not usually present lots of text but key concepts to be explored.

The image in the bottom part of the template can be changed accordingly to the text. Prepared illustrations (see section 2.3 Library) can be used, as well as images chosen by the partners.

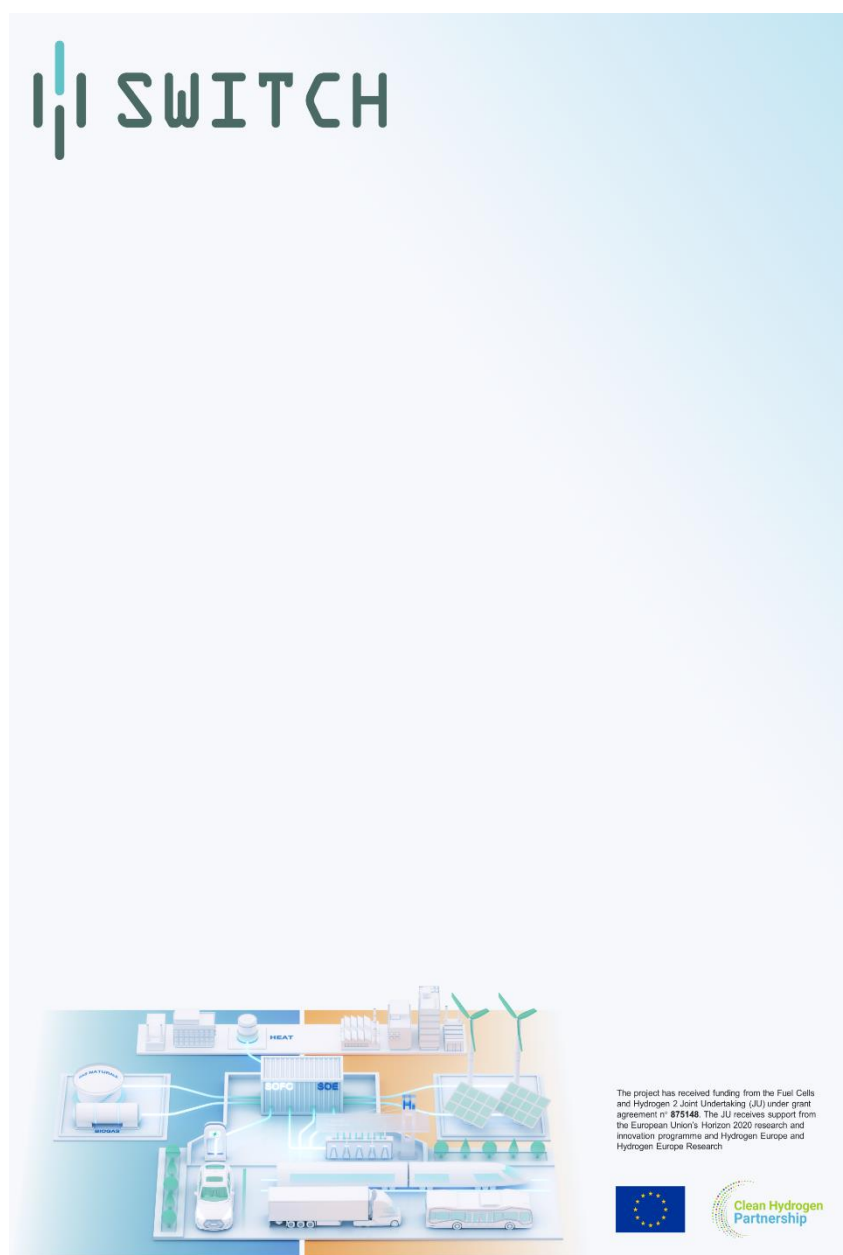


Figure 8. Screenshot of poster template

3.2 Factsheets

A factsheet is another useful tool for communication and dissemination.

It is a “sheet” about “facts”. Therefore, a short document that outlines briefly but clearly the most relevant information about a specific topic, product, company, etc. The factsheets are mainly addressed to the scientific community, investors and industrial stakeholders, policy makers that can effectively and concretely use the results.

At the beginning of 2023, the SWITCH Consortium started thinking to the most efficient way to disseminate the activities implemented and results achieved. FBK suggested to produce eye-catching documents to be used online and also in as hard copies. The activities were gathered under six main topics, and each of them was developed by one partner with the support, inputs, and feedback of the others.

The six areas were:

- **Concept and Value Proposition**
This first factsheet (Figure 10) was developed by FBK and outlines the principles the project is based on, the objectives to be achieved and the main characteristics of the system.
- **Environmental Impact Assessment.**
This factsheet (Figure 11) was elaborated by EPFL and included a comparison of H₂ production technologies on climate change impact.
- **Technology Improvements.**
This factsheet (Figure 12) was conceived by SolydEra and focused on the flexible reversible stack and gas treatment unit development.
- **Technology Improvement and Testing**
This factsheet (Figure 13) was created by DLR and reports on the different experiments done in EPFL, FBK and DLR laboratories from short stack to module level.
- **The SWITCH Prototype**
This factsheet (Figure 14) was developed by HyGEAR and gives a description of the main output of the project, the SWITCH system. The partner provides information on the hot and cold sections of the prototype, and the elements it is composed of.
- **End Users and Integration**
The last factsheet (Figure 15) was elaborated by SWECO. The partner explained the possible end uses of the prototype and listed the main target markets.

The factsheets were approved by all partners. Both a digital and printing version of the documents was saved in the SWITCH SharePoint.

FBK printed and distributed some hard copies of the factsheets at the European Hydrogen Week 2023 that took place the third week of November in Brussels.

The factsheets were launched with a news article¹⁰ on the SWITCH website and then regularly and individually posted on the social media, providing a continuous activity of the two social accounts and a higher visibility of the activity and results. More information on the data will be provided in the deliverable *D7.10 Dissemination and Communication Plan final* once all factsheets will be posted on also used in other occasions. D7.10 is scheduled for M51.

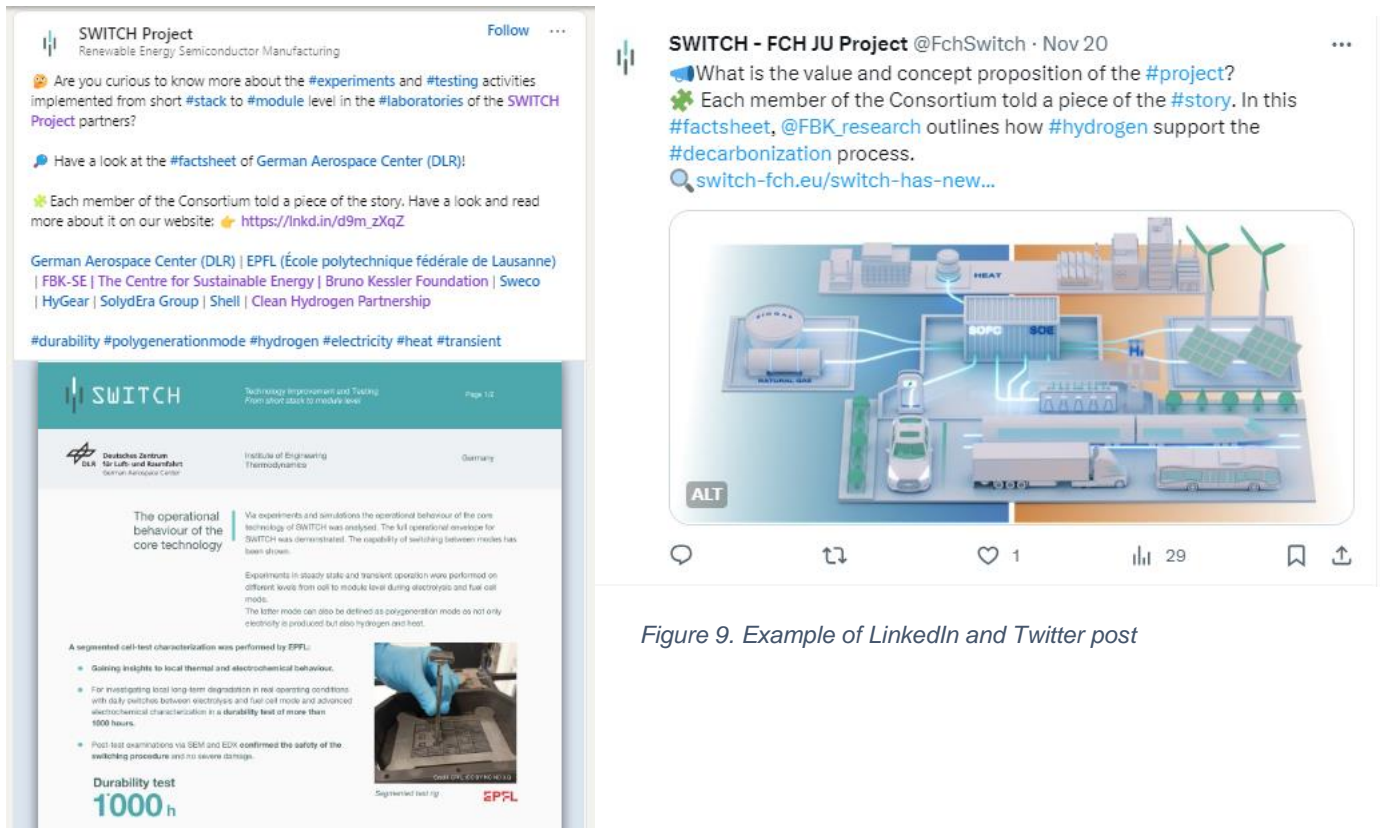


Figure 9. Example of LinkedIn and Twitter post

As it can be noticed from the images below, the visual identity has been maintained but the style of the illustrations has been modernised and it is highly eye-catching.

¹⁰ SWITCH news article (13-11-2023), SWITCH has new communication materials: <https://switch-fch.eu/switch-has-new-communication-materials/>

SWITCH Concept and Value Proposition Page 1/2

Fondazione Bruno Kessler Center for Sustainable Energy Italy

Hydrogen to support the decarbonization process

Hydrogen generation is looking to support the growth of clean and low carbon energy systems and their spread to have a fully decarbonized society. The European Green Deal focuses "on three key principles for the clean energy transition:

- 1 Ensuring a secure and affordable EU energy supply
- 2 Developing a fully integrated, interconnected, and digitalised EU energy market
- 3 Prioritising energy efficiency, improving the energy performance of our buildings and developing a power sector based largely on renewable sources" ①

The SWITCH technology is fully aligned with all these principles as it provides a continuous energy supply and builds a flexible and interconnected energy systems grid to support renewable energy sources.

The novelty of the SWITCH concept is the continuous supply of on-site hydrogen via electrolysis fed by renewable electricity or from low carbon sources where it generates simultaneously hydrogen, electricity, and heat. In this way, the generation of hydrogen is mostly green, but always secured.

Continuous energy supply

Flexible and Interconnected energy systems

SOFC Natural gas Bio gas

SOE Renewable energy

References

① European Commission (2018). Clean Energy Package. https://ec.europa.eu/commission/presscorner/detail/en/18_5723

SWITCH FBK Concept and Value Proposition Page 2/2

The intermittency of renewable energy is accommodated by being able to rapidly switch from the electrolysis operation mode to the fuel cell mode of operating the system. The core of the SWITCH system is a SOFC/SOE unit that allow the switch among the two mentioned operating modes maintaining high efficiency and performances.

The flexibility of the system is a big added value: the possibility to use distinct energy carriers, the connections to the grid as it ranges from the production to the consumption of energy and has the focus on mobility due to its reversibility.

Objectives

The SWITCH project aims at demonstrating the core building block module for an efficient technology solution supporting a reliable way to a zero-carbon hydrogen fed by renewables complemented by a secured continuous supply and production of hydrogen and power by an integrated low carbon back-up.

Technical

- Electrolysis output > 50 kg/day.
- LHV-based efficiency in electrolysis mode > 75%.
- LHV-based efficiency in fuel cell mode > 75% accounting H₂ lower heating value (LHV), electricity and useful heat or 70% accounting H₂, LHV and electricity.
- Partial load operation capability as low as 30% for hydrogen production.
- Transient operation capability and reverse cycle time of less than one hour for reversible Solid Oxide Cell (rSOC) unit.

Socio - Environmental

- Low carbon energy is fully converted into hydrogen and power.
- Smooth energy transition for Small Medium Enterprises (SMEs), whose productivity and competitiveness depends on permanent availability of hydrogen for their processes.
- Reduction of > 60% in CO₂ emission per kg of produced hydrogen via electrolysis and steam internal reforming in the SOFC module. Internal steam reforming in the SOFC module is more efficient since part of the total heat required for the steam reforming reaction comes from the heat dissipated by the fuel cell when producing electricity.
- The manufacturing of an integrated and innovative system like SWITCH creates manufacturing jobs in Europe.
- Reduction of using critical raw materials as the SWITCH system is based on the combination of a small reformer and a SOE/SOFC stack, which do not use precious materials as platinum, Iridium or Ruthenium catalysts.

Economical

The following economic impacts will be reached according to the available industrial capacity and by production sites of significant dimensions (minimum manufacturing capacity of 100 MW/year):

- Compact solution with a single CAPEX investment: a single conversion unit operating on an integrated multisource mode.
- Provision of economic and continuous hydrogen.
- Production of by-products that might have industrial uses.
- Reduction of the specific CAPEX (i.e., CAPEX per kg of H₂ or kWh electricity) to < 5,000 €/kg H₂/day) at an annual system manufacturing volume corresponding to 40,000 kg/day.
- Cost effectiveness with targets of 3.50 €/kg H₂ (@40 €/MWh_L) and 5.00 €/kg (@80 €/MWh_L).
- No need for expensive back-up system for hydrogen supply when renewable energy sources are not available.

Clean Hydrogen Partnership

This project has received funding from the Fuel Cells and Hydrogen 2 Joint Undertaking (now Clean Hydrogen Partnership) under Grant Agreement No 875148. This Joint Undertaking receives support from the European Union's Horizon 2020 Research and Innovation program, Hydrogen Europe and Hydrogen Europe Research

Go funded by The European Union

Figure 10. Factsheet "Concept and Value Proposition" (FBK)



The project has received funding from the Fuel Cells and Hydrogen 2 Joint Undertaking (JU) under grant agreement n° 875148. The JU receives support from the European Union's Horizon 2020 research and innovation programme and Hydrogen Europe and Hydrogen Europe Research



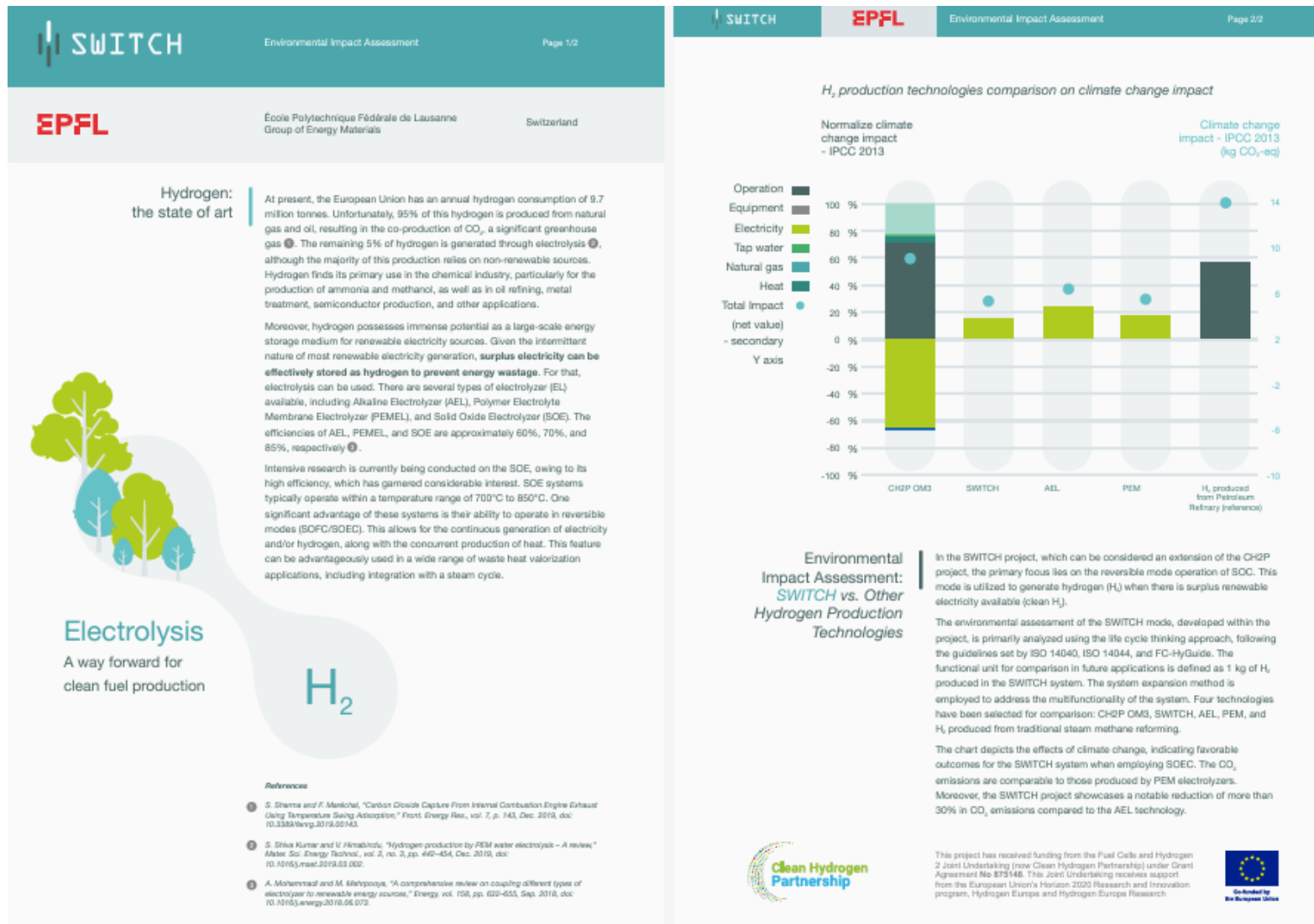




Figure 11. Factsheet “Environmental Impact Assessment” (EPFL)




Technology Improvements
Flexible reversible stack and gas treatment unit development

Page 1/2



Switzerland



Technology Improvements


Page 2/2

The core of the SWITCH system is a unit that produces electric power or hydrogen, depending on the operating mode.

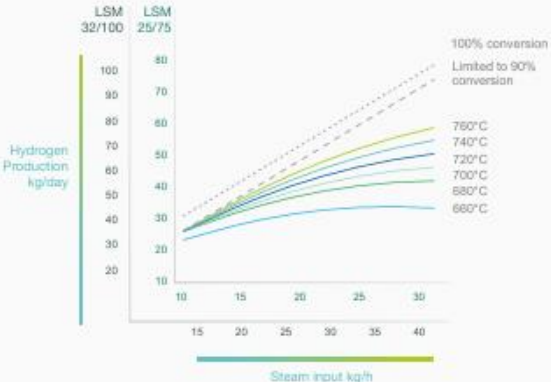
The core of the SWITCH system is a unit that produces electric power or hydrogen, depending on the operating mode. It contains stacks with ceramic cells operating between 650°C and 800°C. This unit converts fuels and gases into electricity, heat and hydrogen in different proportions when operating in fuel cell mode; and converts steam to hydrogen by using electricity when operating as an electrolyser.

Due to the SOFC technology, fuel pre-processing is less complicated and the steam electrolysis process inside the stacks takes place at a higher efficiency than competing technologies that work at a lower temperature. Hence, the system requires less electrical energy for steam electrolysis to produce hydrogen. It further allows for using cheap, widely available materials, which secures deployment at a large scale, now and in the future.

The unique and reliable design of the Large Stack Module (LSM) and its innards, which was developed by SolydEra, offers advantages over many competing technologies, and allows for flexible scaling to meet the customer's needs. It further offers the unique opportunity to combine the two operating functions in one unit, by which investment costs and footprint are kept low.



LSM - SOE Hydrogen Production Performance



Hydrogen Production kg/day


Steam input kg/h

100% conversion
Limited to 90% conversion

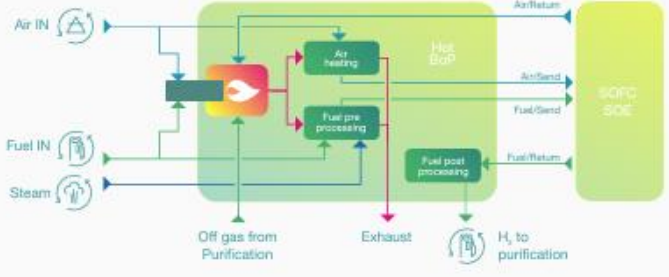
780°C
740°C
720°C
700°C
680°C
660°C


Key point

- Fully reversible system with Solid Oxide Cells technology (SOFC/SOE)
- Power production in fuel cell mode: 25 kW or 32 kW
- Power consumption in electrolysis mode: 75 kW or 100 kW, according to the H₂ yield
- Switching between both operating modes in less than an hour
- Precise gas distribution between the stacks inside the SOFC/SOE unit
- Electrical efficiency in fuel cell mode up to 62% DC (Gas-to-Power, CH₄ eq., LHV)
- Conversion efficiency in steam electrolysis mode up to 97% DC (Power-to-Gas, LHM)
- Steam conversion up to 90%
- Easily adjustable, modular design




In the SWITCH system, the SOFC/SOE unit works with a Hot Balance-of-Plant module including an air heating unit, based on special designed heat exchangers combined with electrical preheater to enhance the heat recovery and the thermal management. A fuel processor upstream and downstream of SOFC/SOE unit allows to obtain hydrogen rich gas in both fuel cell and electrolysis modes to be further purified by means of pressure swing adsorption.





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Subsidized by the European Union

Figure 12. Factsheet “Technology Improvements” (SolydEra)



Technology Improvement and Testing
From short stack to module level

Page 1/2



Deutsches Zentrum für Luft- und Raumfahrt
German Aerospace Center

Institute of Engineering Thermodynamics

Germany

The operational behaviour of the core technology

Via experiments and simulations the operational behaviour of the core technology of SWITCH was analysed. The full operational envelope for SWITCH was demonstrated. The capability of switching between modes has been shown.

Experiments in steady state and transient operation were performed on different levels from cell to module level during electrolysis and fuel cell mode.

The latter mode can also be defined as polygeneration mode as not only electricity is produced but also hydrogen and heat.

A segmented cell-test characterization was performed by EPFL:

- Gaining insights to local thermal and electrochemical behaviour.
- For investigating local long-term degradation in real operating conditions with daily switches between electrolysis and fuel cell mode and advanced electrochemical characterization in a durability test of more than 1000 hours.
- Post-test examinations via SEM and EDX confirmed the safety of the switching procedure and no severe damage.

Durability test
1000 h



Segmented test rig EPFL

A 70 cell-stack was successfully investigated by FBK:

- Investigating the thermal behaviour and mapping the performance up to 8 kW_{el} power input.
- Investigating and successfully demonstrating possible switching control and thermal control strategies.
- Studying the effect of temperature and the steam utilization factor, and thermoneutral operation on the performance of the Solid Oxide Electrolyzer (SOE).

8 kW_{el}
power input



Stack tested in FBK Laboratories FBK




Technology improvements and testing

Page 2/2

A large stack module with 25 kW_{el} and about 77 kW_{ec} was tested at DLR:

- Successful demonstration of the targeted operational range and production capacity of 24 kg/day to 54 kg/day of hydrogen in electrolysis mode and mapping of the operational range with reactant conversion ratios between 35% to 90% with core temperatures between 680°C and 760°C.
- Demonstration of 11-22 kW_{ec} of power output with about 12 kg/day to 30 kg/day of hydrogen production within polygeneration mode.
- Testing of switching procedures and development of a transient model for further simulative investigations.



Large test rig GALACTICA at DLR laboratories DLR

77 kW_{EC}
power input

54 kg/day
of hydrogen production

Module

Stack

Cell



Graphical presentation of the experimentally tested scales of SOE technology

Clean Hydrogen Partnership

This project has received funding from the Fuel Cells and Hydrogen 2 Joint Undertaking (now Clean Hydrogen Partnership) under Grant Agreement No 871148. This joint Undertaking receives support from the European Union's Horizon 2020 Research and Innovation program, Hydrogen Europe and Hydrogen Europe Research



Co-funded by the European Union

Figure 13. Factsheet "Technology Improvement and Testing" (DLR)

SWITCH The SWITCH Prototype System integration and testing Page 1/2

HYGEAR The Netherlands

The core of the system

The SWITCH prototype system comprises two Large Stack Modules (LSMs) that represent the core of the system. These LSMs can operate in fuel cell mode (SOFC-mode) or in electrolysis mode (SOE-mode) thanks to their special Solid Oxide Cells and reversible operation features. In SOFC mode, the modules simultaneously generate electric power and hydrogen via steam reforming of methane-rich fuels, whereas in SOE mode the modules produce hydrogen (H₂) via steam electrolysis. The prototype will demonstrate a production capacity of 100 kg/day of H₂ once operated in SOE mode, in addition to the 40 kg/day of H₂ plus 50 kW, once operated in SOFC mode as developed in CH2P project.

The Balance of Plant (BoP) components of the system provide all the required feed streams to the LSMs at the desired conditions, and take care of the conditioning and purification of the product gases from the LSMs. The SWITCH system consists of a cold section and a hot section.

H₂ production capacity up to 100 kg/day in SOE mode

HOT SECTION

The Hot section consists in all the equipment needed for fuel processing and steam generation.

It is designed to pre-treat all the inlet and outlet streams to both SOFC/SOE modules (air and natural gas to burner, air to the LSMs, steam to mixer, EDI water to steam generation, PSA off-gas) in order to guarantee the right chemical-physical conditions to operate in SOFC/SOE modes.

COLD SECTION

The Cold section is designed to achieve the following:

- Provide the feed streams (natural gas, air, water and utilities, i.e. nitrogen, hydrogen and forming gas) at the required conditions, in terms of pressure and temperature level, and composition;
- Condition the syngas that is produced in the Hot BoP modules, by condensing the steam and compressing the gas stream at the proper pressure level for purification in the PSA (pressure swing adsorption) unit;
- Purify and recover the produced hydrogen at a required purity level.

References

- CH2P Project: <https://ch2p.eu/>

SWITCH **HYGEAR** The SWITCH Prototype Page 2/2

HOT SECTION

The hot section includes two gas upgrading units, each one composed by:

- The SOFC/SOE modules (LSM)
- The Hot BoP, which includes the following components: Burners | Electrical Heaters | External reformers | Steam/fuel mixers | Heat exchangers | Water-Gas-Shift (WGS) reactor

The steam generation is an external unit that serves the two Hot Balance of Plants.

COLD SECTION

The Cold BoP has been sub-divided in the following sub-units:

- Air Supply
- Natural Gas Cleaning and Supply
- Water Treatment and Supply
- Gas Conditioning
- Gas Purification
- Coolant conditioning

The prototype will be arranged in two 40 feet high cube containers.

Container A

Container A accommodates the hot BoP and some elements of the cold BoP. It is dedicated to the gas upgrading section, including the steam generation units and part of the gas train (fuel, air, nitrogen and forming gas interconnection valves). The following components are included in this container:

- Two LSM modules
- Two Hot BoP modules
- One steam generation unit with the steam train
- Cooling and condensing system after the WGS units (steam condenser and water knock-out)
- The SPLIC cabinet and the power electronics.

Container B

This container accommodates most of the cold BoP and contains and contains the following components:

- The utilities gas trains
- The PSA unit
- The two compressors (for hydrogen and syngas)
- The electrical cabinets and control PLC.

CONTAINER A

LSMs: Large Stack Modules (SOFC/SOE)
 BoP: Balance of Plant
 A: Air suction blower
 Wwa: Water treatment unit

C: Steam condenser
 W: Water storage tank
 WKO: water knock-out
 E: Electrical cabinet
 PE: Power Electronics

CONTAINER B

PSA: Pressure Swing Absorber
 E: Electrical cabinet
 CP: CO gas vessel

S: Safety vessel
 U: Supply vessel
 COMPRES: syngas compressor and H₂ compressor

References

This project has received funding from the Fuel Cells and Hydrogen 2 Joint Undertaking (now Clean Hydrogen Partnership) under Grant Agreement No 875148. This Joint Undertaking receives support from the European Union's Horizon 2020 Research and Innovation program, Hydrogen Europe and Hydrogen Europe Research.

Clean Hydrogen Partnership

Horizon 2020
 EU Framework Programme for Research and Innovation

SWITCH

Clean Hydrogen Partnership

EUROPEAN UNION
 funded by the European Union

Figure 14. Factsheet "The SWITCH Prototype" (HyGEAR)

SWITCH

End Users and Integration
Exploitation

Page 1/2

SWECO

Sweco Polska

Poland

SWITCH technology and possible end uses

A fully integrated hydrogen production system has been designed, constructed and tested. The SWITCH technology allows the production of hydrogen, electricity and heat. The end result of the project can be marketed as one of three options: sold as a system, sold as a license for the system, or sold hydrogen that is produced by the system.

SWITCH TECHNOLOGY

Sell systems to customers

Sell hydrogen

License systems to customer

H₂ filling stations


Food-oil industry

Glass industry

Metallurgic and cement industry interested in emission reduction

Each of the options described helps support the hydrogen market, and the hydrogen itself has a high potential for use in the market for vehicle fueling (light duty vehicles, heavy-duty vehicles, buses, industrial vehicles), industrial use like hydrogen terminals.


The SWITCH system allows the production of **hydrogen, electricity and heat**





The Key Exploitable Result of the project is the integrated SWITCH prototype which will be a system capable to guarantee secured production of continuous green hydrogen, ensuring a fast and reliable path for the deployment of hydrogen use.


Target market

Industry segments that need continuous hydrogen supply for proper operation, between 40 kg and a few tons of hydrogen per day:



 H₂ filling stations



 Food-oil industry



 Glass industry



 Metallurgic and cement industry interested in emission reduction


SWITCH system is dedicated for following recipients:



 Hydrogen and electricity users


 European countries having an electricity mix low in carbon emissions


 European countries with a low hydrogen production capacity


 Logistic hubs


 Public transport companies



This project has received funding from the Fuel Cells and Hydrogen 2 Joint Undertaking (now Clean Hydrogen Partnership) under Grant Agreement No 875148. This Joint Undertaking receives support from the European Union's Horizon 2020 Research and Innovation program, Hydrogen Europe and Hydrogen Europe Research




Figure 15. Factsheet "End Users and Integration" (SWECO)

3.3 Final Brochure

The final brochure will result in a 30-page document and will gather together the factsheets (section 3.2) with slight modification that will mainly have the purpose to unify and make less fragmented the reading.

A very first draft has been prepared, but it will be completed in the next months with eventual additional information on the prototype.

The brochure will be uploaded in Zenodo¹¹, where a DOI has been already reserved for it.

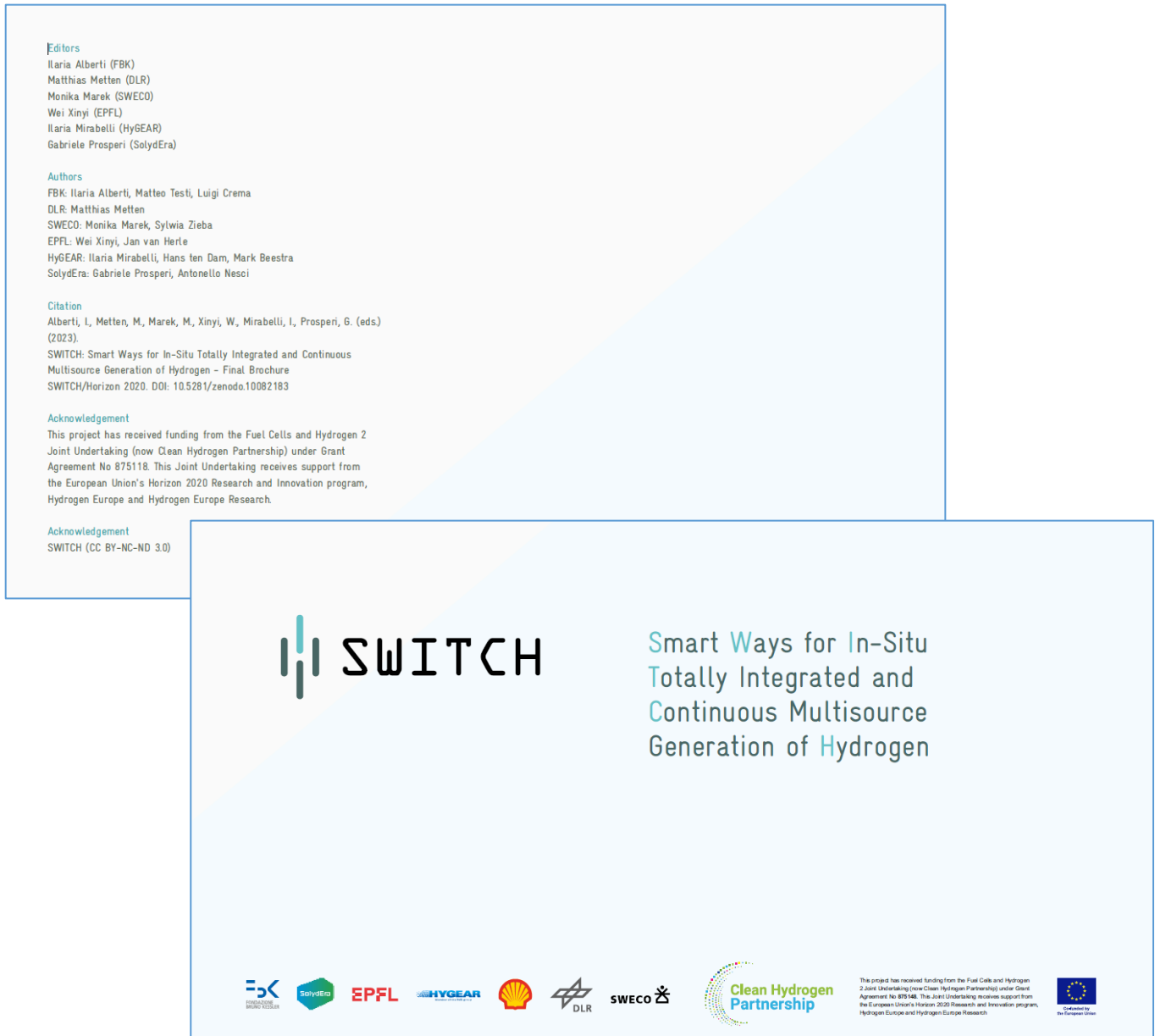


Figure 16. Screenshot of the first two pages of the final brochure (30 pages in total)

¹¹ SWITCH Community – Zenodo: <https://zenodo.org/communities/switch-fchju>



3.4 Final video

As reported in section 2.6, a second video is planned to be produced. The format will consist in interviews to partners and images of the installed SWITCH's system.

The video will target all the stakeholders, from industry to the general public and will be disseminated via the website, partners' communication channels. It will show the results achieved, explain the activities done and the role played by each partner.

3.5 Final Event

The final event is not a material but is a fundamental tool for communication and dissemination.

Partners meet monthly to discuss the advancements of the project. During these calls, the Consortium started to share their thoughts on the final event.

The partners are planning to have the final event in conjunction with the last project meeting, in March 2024. Initially, the chosen location was the one where the prototype is hosted. However, there are now two different ideas: (i) Brussel, which has been identified as a better location in order to attract more stakeholders and interested public, or (ii) online, to have a even wider impact as it would give the possibility to more people to participate, including also the possibility to have more experts.

In both cases, a press release will be published immediately after the event, shared by partners and sent to stakeholders and media.

Table 1 - Summarising table of SWITCH communication materials

Name of material	Stakeholder field	Goal	Events
Website and social media	All	Communicate to the most possible number of people. Engage with stakeholders.	-
Template	All	Dissemination of information with the distinguishable brand of SWITCH and maximise its potential	Internal meeting, external events.
Flyer	All	Promote the main activity, partners, and objective of the project	Conferences, meeting, workshops, online, etc
Roll-up	All	Attract and inform	Events organised by the project, fairs, etc.
Video	All	The first video aimed at informing the viewer on the project and attract interest. The final video will point to stimulate the viewer interest, and communicate concretely the results.	Online, conferences
Template for Poster presentation	Industrial stakeholders, Scientific audience	Attract and engage with the public	Conferences
Factsheet and Final Brochure	Industrial stakeholders, Investors, Scientific audience, Policy makers	Detailed descriptions of activities and results. The main aim is to raise interest and increase the exploitation potential	Online, fairs, events.

4 Conclusion

This report describes the communication materials created so far and those in the process of being created within the SWITCH Project.

The Consortium partners have been actively engaged in providing content and utilising the materials to promote the SWITCH project and its Key Exploitable Results. Although each material has its own purpose and target audience, all tools aim to carry out D&C activities, characterizing the project as a distinguishable brand.

This deliverable is based on deliverable D7.2. In the final technical report, the final version of the missing C&D materials will be reported.