



Deliverable Report

Project website & PRETZEL logo

(D7.1)

<http://pretzel-electrolyzer.eu/>

This project has received funding from the Fuel Cells and Hydrogen 2 Joint Undertaking under grant agreement No 779478. This Joint Undertaking receives support from the European Union's Horizon 2020 research and innovation programme and Hydrogen Europe and N.ERGHY





Project 779478 - PRETZEL

Novel modular stack design for high pressure PEM water electrolyzer technology with wide operation range and reduced cost

Version:	v.3	Date: 07.06.18	
Project Title:	Novel modular stack design for high pressure PEM water electrolyzer technology with wide operation range and reduced cost		
Acronym:	PRETZEL	Contract N°:	779478
Topic:	FCH-02-1-2017	Project Coordinator:	DLR, Germany
Document Classification:	PRETZEL confidential Only for members of the consortium, including the Commission Services		
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Approved (Partner)		Date of first issue:	30.05.18
Distribution:	All PRETZEL Partners		

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Abbreviations and Indices

Abbreviation	Explanation
CMS	Content Management System
PHP	Hypertext Preprocessor
WP	Work Package
D	Deliverables
PDF	Portable Document Format
URL	Uniform Resource Locator

1 Summary

This deliverable explains how PRETZEL website has been created to provide public information regarding the project. It gives details on the tools used to develop the website and illustrates the different pages the website contains. It describes of the collaborative platform that has been set up to promote the interaction within the project partners. Moreover, the PRETZEL logo is also introduced.

2 Introduction

Within Work Package 7 (WP7), the deliverable 7.1 involves the development of the project website which is under construction based on the feedback of all partners. The task is realized by the WP7 leader (IBERCAT), however the development of the website and the project logo are subcontracting towards an external company (Neocodis). The service includes design, development, hosting, maintenance and training.

This document gives an overview about the website structure as it stands at current dates into the project. The website is expected to evolve on daily basis over the entire project duration and for at least one more year after its completion. This evolution will be further reported in the forthcoming deliverables of WP7 and by project periodic reports. In addition, the project logo was depicted and selected in agreement with PRETZEL partners, becoming a part of all project related documents, presentations and outcome.

3 The Background

PRETZEL project requires a website as a Research Infrastructure to show its willingness and responsibility of dissemination. The consortium will openly disseminate the project scope, research plan and project results not only to the scientific community. The website will be used as an information channel for potential customers belonging to industry & SME, as well as, to interested stakeholders including policy markets and regulators, as well as international organizations. Nowadays a functional and attractive website is essential to build interconnectivity among target audiences.

4 Deliverable in the Project

Deliverable 7.1 (D7.1) is a description on the website development within the project.

5 Structure and content of the website

The PRETZEL website is developed by the Content Management System (CMS) WordPress which is an open source programming language. It uses PHP (Hypertext Preprocessor), which is functional, easy to use, extremely flexible and modular. This platform is popular for web content management among global enterprises and it is easy to deploy to its possibilities of ensures exchange of data with similar platforms belonging to collaborative and other institutions.

5.1 Structure

The current form of the website is available at URL <http://pretzel-electrolyzer.eu/>

There is a bar menu which reflects the different category pages enlisted. It can be found on the website as a passive information as the home page, and active pages as project, consortium, news and contact. In addition, an intranet login is included for partners benefit.

5.1.1 Home

The PRETZEL homepage depicts general information about the project and its objectives.

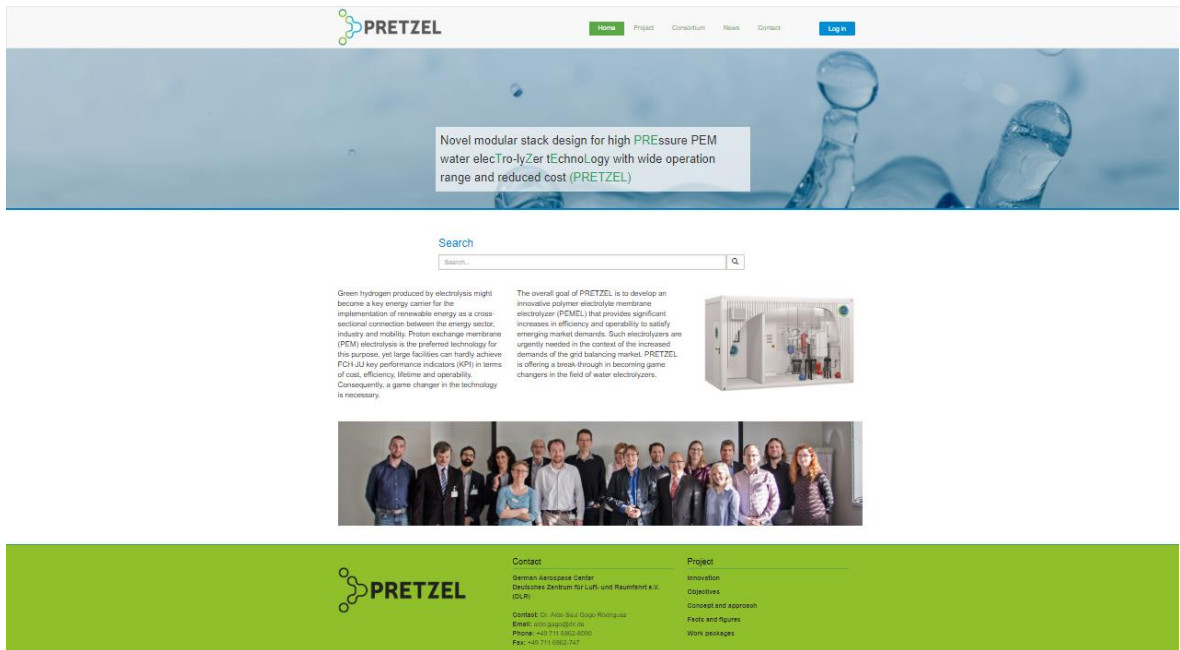
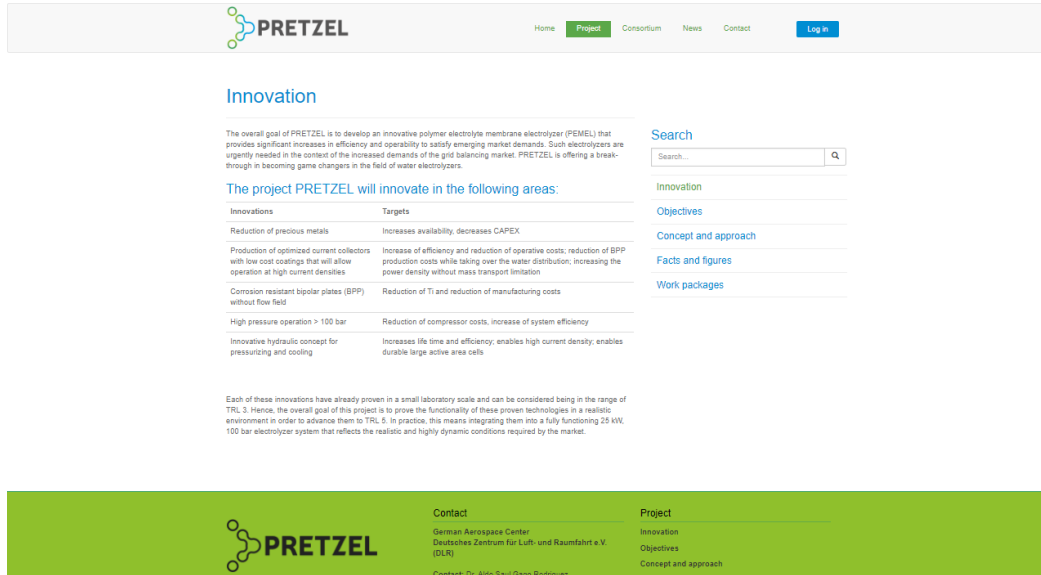


Figure 1. Website home

5.1.2 Project

In this section the areas background information of the project is itemized in detail. A menu includes the following displayed options:

- **Innovation.** Describe the overall goal for the project.



Innovation

The overall goal of PRETZEL is to develop an innovative polymer electrolyte membrane electrolyzer (PEMEL) that provides significant increases in efficiency and operability to satisfy emerging market demands. Such electrolyzers are urgently needed in the context of the increased demands of the grid balancing market. PRETZEL is offering a breakthrough in becoming game changers in the field of water electrolyzers.

The project PRETZEL will innovate in the following areas:

Innovations	Targets
Reduction of precious metals	Increases availability, decreases CAPEX
Production of optimized current collectors with low cost coatings that will allow operation at high current densities	Increase of efficiency and reduction of operative costs; reduction of BPP production costs while taking over the water distribution; increasing the power density without mass transport limitation
Corrosion resistant bipolar plates (BPP) without flow field	Reduction of TI and reduction of manufacturing costs
High pressure operation > 100 bar	Reduction of compressor costs; increase of system efficiency
Innovative hydraulic concept for pressurizing and cooling	Increases life time and efficiency; enables high current density; enables durable large active area cells

Each of these innovations have already proven in a small laboratory scale and can be considered being in the range of TRL 3. Hence, the overall goal of this project is to prove the functionality of these proven technologies in a realistic environment in order to advance them to TRL 5. In practice, this means integrating them into a fully functioning 25 kW, 100 bar electrolyzer system that reflects the realistic and highly dynamic conditions required by the market.

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Project
 Innovation
 Objectives
 Concept and approach

Figure 2. Project: Tab Innovation

- **Objectives.** Gives an idea on the targets to follow in the project.



Objectives

The project PRETZEL has the following objectives:

1. Develop and manufacture high pressure polymer electrolyte membrane electrolyzer (PEMEL) to operate at increased temperatures
2. Develop and manufacture the high pressure PEMEL stack based on the novel principle of hydraulic compression
3. Set-up and undertake continuous procedures to evaluate the development process through all phases against PRETZEL specifications
4. Integrate the innovative PEMEL stack into a high pressure PEMEL test facility and validate the overall performance and operational criteria
5. Disseminate and exploit the innovations in PRETZEL in order to prepare the market penetration of this new technology

A central objective of this project is the development of a novel PEMEL system with a maximum 25 kW electrical power consumption that generates 4.5 m³_{STP} per hour at rated power, at an output pressure of 100 bar and feed water temperature of maximum 90° C.

At the system level, the specific energy demand at rated production rate will be below 26 kWh per kg_{H₂} referring to a system efficiency of above 70% on the basis of higher heating value (HHV). Furthermore, this system will be able to operate in overload mode referring to a production rate as high as 0.3 m³_{STP} per hour (1.3 times overload). Rapid response of 1 second for a hot start and 18 seconds for a cold start are the operating targets of the system.

At the stack level, the project will implement a patented design approach based on hydraulic cell compression. This design allows for large planar cell components, which is required for future mass production, and effective cooling at very high production rates and temperature levels. Regarding sufficient stack conditioning, a cooling system will be developed for voltages of maximum 2.0 V per cell at rated power and of 2.3 V per cell in overload mode. Additionally, the target of PRETZEL is the development of a high pressure PEMEL stack, which opens a perspective for specific stack costs of below 500 € kW⁻¹. As for the production at 100 bar an additional compressor is omitted, for the targeted system specific systems costs are possible in the range of 750 € kW⁻¹.

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Project
 Innovation
 Objectives
 Concept and approach
 Facts and figures
 Work packages

Figure 3. Project: Tab Objectives

- **Concept and approach.** Contains information on the approach to be implemented, and key technical issues.

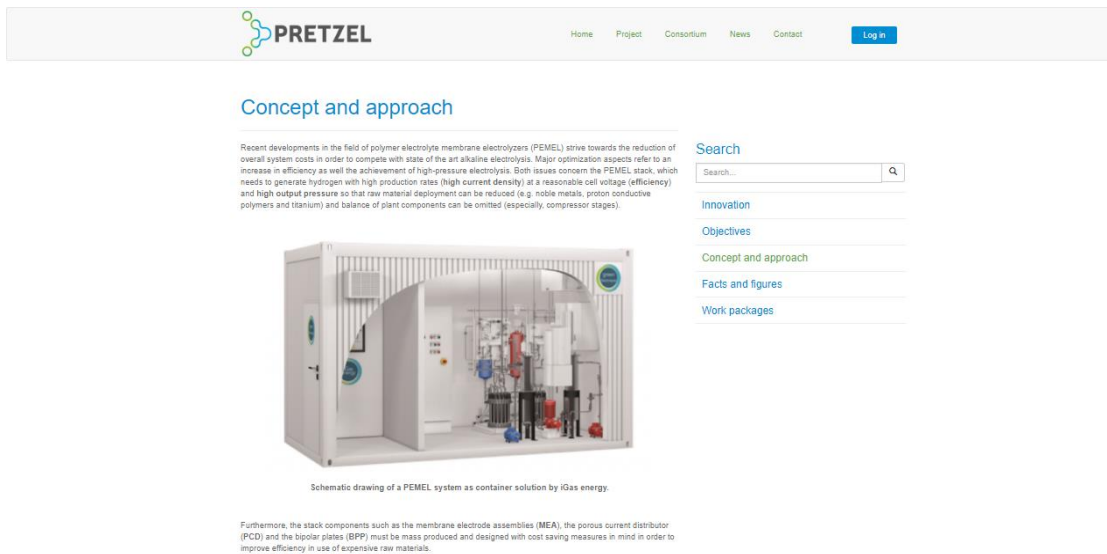


Figure 4. Project: Tab concept and approach

- **Facts and figures.** Show a summary of the project

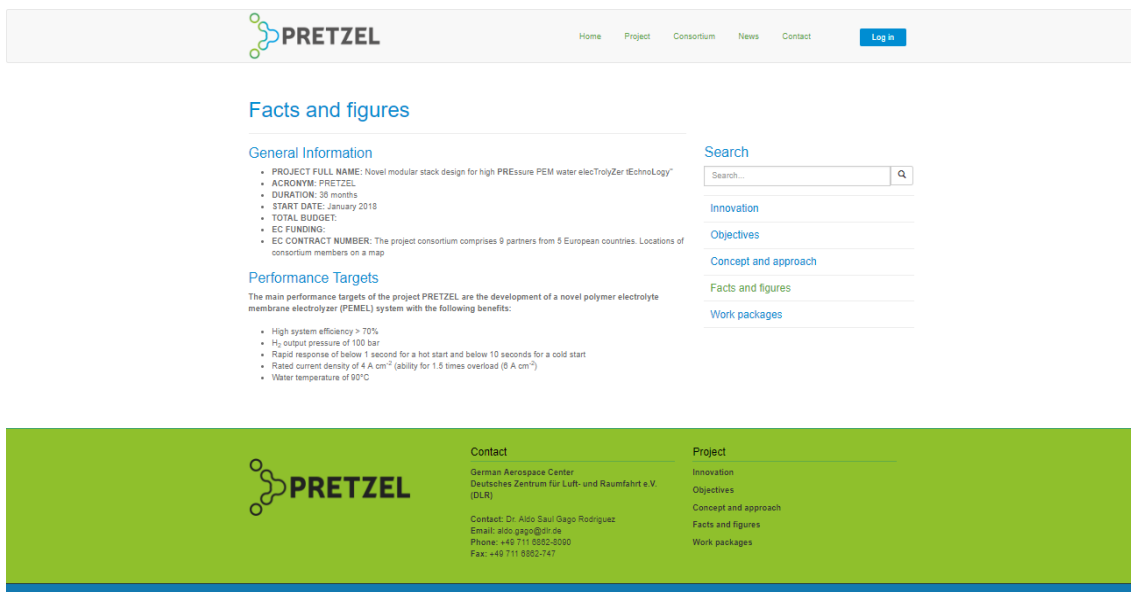
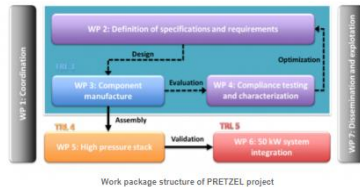


Figure 5. Project: Tab facts and figures

- **Work packages.** Contains a description of each WP included on the project

Work packages



Search

Innovation

Objectives

Concept and approach

Facts and figures

Work packages

The project PRETZEL is divided into the following seven work packages:

WORK PACKAGE 1 – Coordination

This work package is concerned with the general activity of coordination and steering of the activities in view of the time-schedule, project finances and the quality of the results.

WORK PACKAGE 2 – Definition of Specifications and Requirements

This work package will validate the component development tasks. Here the requirements and specifications on the new developed components such as catalysts, MEA, current collectors, MPLs, BPP and especially the design and tolerances will be defined as well as the measurement protocols which will be defined in collaboration to the existing standardization activities of the FCH JU and JRC.

This of course takes as long as WP 3 and 4 which will run in parallel in order to guarantee a deep communication between the component development of WP 3 followed by characterization and testing (WP 4).

WORK PACKAGE 3 – Component Manufacture

This work package is the heart of the project and the basis for reaching the FCH2 JU impacts in WP 5 and 6.

In collaboration between the Westfälische Hochschule, GKN Sinter Metals Filters GmbH (GKN) and the Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR) from spaceborne will be responsible for the design, efficient and install stacks.

Figure 6. Project: Tab work packages

5.1.3 Consortium

This page contains the project partners' presentation and the corresponding links to the webpage of each organization.

Consortium



Figure 7. Consortium

5.1.4 News

Notices, newsletters, press releases, scientific publications, forthcoming and past events, meetings or other important project announcements will be displayed in this page. Additionally, links to social media will be included in this page tab.

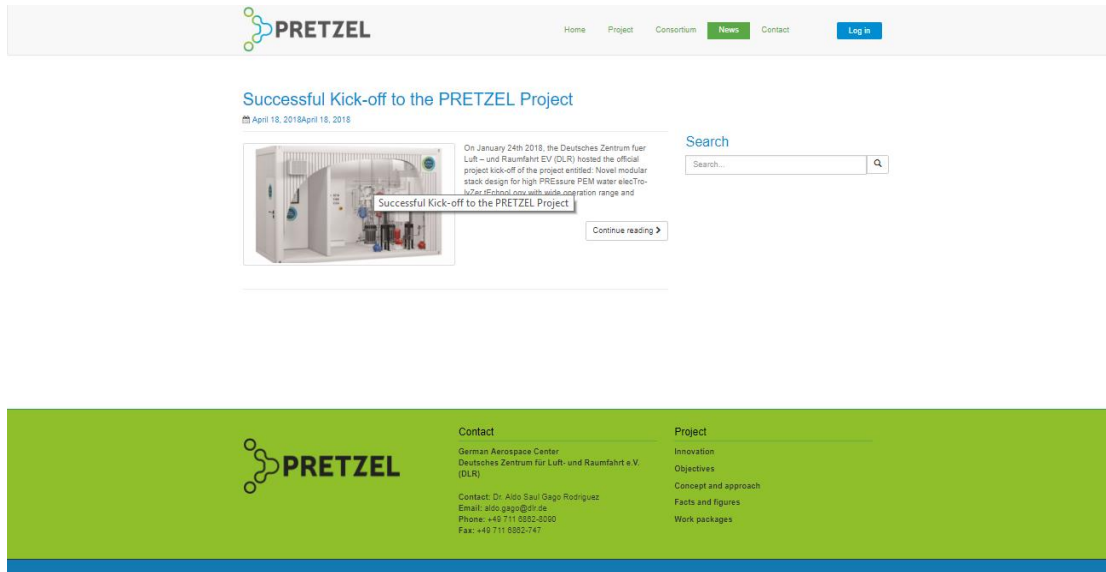


Figure 8. News

5.1.5 Contact

In order to facilitate communication, a contact form is planned to be available on the PRETZEL website, requiring name, email address, subject and message. Messages will be received from the management team.

5.1.6 Intranet

A "log in" tab is showing in the webpage which will require a username and password to have access. Such space will be only available for PRETZEL partners to facilitate the management and create a private and secure exchange of data. Files in format PDF, office documents, images, and other formats will be hosted and shared to allow a better tasks organization.

5.2 PRETZEL logo

The PRETZEL project Logo was selected in agreement with all consortium partners upon revision of several options and draft designs. The PRETZEL logo conveys the message of the project focus on water electrolysis, and will be the visual identity of the project. It will be displayed on the website and used in all documents, presentations or other means of project communication.



Figure 9. PRETZEL logo

6 Conclusion

At current date, PRETZEL website is under development. It will offer an intuitive navigation and an overview of the project to external visitors.

Some dynamic content is already included taking the advantage of the project partners' feedback. These efforts are being ramped up with the objective to have an operational webpage within next two months. From then on, the web site will leap forward in terms of frequency and quality of contents updates.