PEACE

NEWSLETTER No. 9

on hydrogen production

March 2026

Content

1. Editorial

Dear readers,
In this issue, we highlight technical progress of the PEACE project: the upgrading of the **Balance of Plant for dual-stage pressurized operation** and the successful assembly of the **PEACE short stack**. These achievements bring us closer to validating high-pressure alkaline electrolysis technology capable of supporting cost-effective renewable hydrogen production.

PEACE has recently actively engaged with the hydrogen community. We organised a dedicated **workshop at Hydrogen Days** in Prague and attended **European Hydrogen Energy Conference**.

This edition also features a spotlight on the **Clean Hydrogen Partnership** and its 2026 €105 million call, reinforcing Europe's commitment to hydrogen research and innovation.

As the sector evolves, collaboration, technological excellence and strategic alignment remain key. Through steady progress and active engagement, PEACE contributes to strengthening Europe's hydrogen future.

We hope you enjoy this issue.

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2. About PEACE

"Pressurized Efficient Alkaline EleCtrolysEr" (PEACE) project is a research and innovation activity funded under the EU Horizon Europe programme by the Clean Hydrogen Partnership and coordinated by the German Aerospace Center (DLR). The PEACE project will deliver **high-pressure alkaline electrolysis** (AEL) technology which will substantially **reduce hydrogen production costs**. We will propose a new concept of hydrogen production with **two-stage pressurization** that will be demonstrated on an AEL system of 50 kW capable of operating at pressures exceeding 50 bar. The integration of advanced components, innovative design, and optimized operation strategies will be explored through modelling and experimental testing, ultimately aiming to demonstrate a system with impressive efficiency characteristics (see more on PEACE website).

Project members: German Aerospace Center (DLR); Materials Mates Italia (MMI); Eindhoven University of Technology (TU/e); Brandenburgische Technische Universität Cottbus Senftenberg (BTU); GRANT Garant (GG); The Hydrogen Chemistry Company (HyCC); Technical University of Denmark (DTU)

PEACE Project Team (February 2026), Source: PEACE project (CC-BY-NC-ND 4.0)

2.1 UPGRADING THE BALANCE OF PLANT FOR DUAL-STAGE PRESSURIZED OPERATION

Key PEACE project member **Brandenburg University of Technology Cottbus – Senftenberg (BTU)** is preparing the PEACE alkaline electrolysis technology demonstrator: an upgraded **Balance of Plant (BoP)** designed to adapt BTU's existing test rig for **dual-stage pressurization operation** is ready to be implemented in practice. The updated setup enables the electrolyser stack to operate at internal pressures of up to **60 (90) bar**, while being externally pressurized to **30 (60) bar** using a pressure vessel.

Key modifications to **piping, sensors, valves, and metering devices** have been installed to decouple internal and external pressures, ensure safe operation, and enable reliable leak detection. In addition, a revised vessel pressurization approach allows continuous monitoring of potential hydrogen or oxygen leaks while minimizing corrosion risks. Electrical connections and signals from the new components will be integrated into the existing control system.

These upgrades will enable the integration and testing of the newly developed **PEACE stack** and will serve as a **proof of concept for dual-stage pressurized AEL technology**, providing valuable experimental data to validate simulation results.

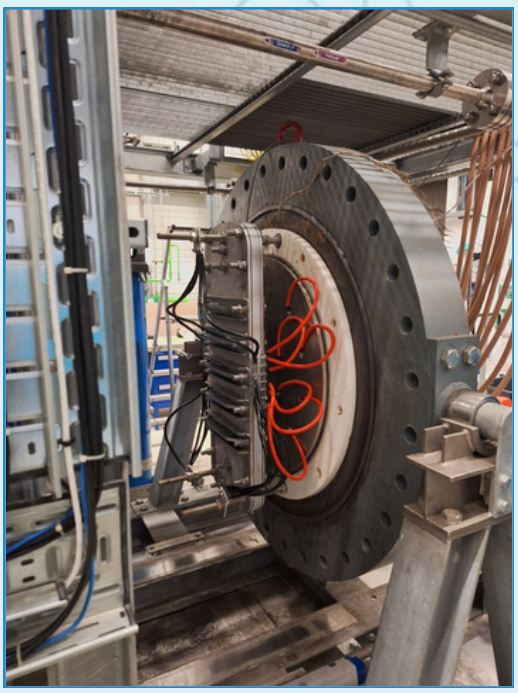
2.2 PEACE SHORT STACK SUCCESSFULLY ASSEMBLED

The **PEACE project is one step closer to full demonstration** of its innovative high-pressure alkaline electrolysis (AEL) technology with successful construction and assembly of a **three-cell short stack**.

Developed and assembled by PEACE project member **Materials Mates Italia (MMI),** the short stack represents the scale-up of solutions validated in earlier PEACE activities and integrates components previously qualified within the project. Its design ensures full compatibility with the **BTU** test infrastructure, including installation inside a pressurized vessel and operation under dual-stage pressurization conditions.

The short stack consists of plastic components (separator body and gasket press), metallic parts (bipolar plates and current collector plates), elastic elements and sealings, electrodes, and endplates. Particular emphasis was placed on **low-cost, scalable manufacturing approaches**, avoiding critical mechanical processes and relying on materials with high availability—key requirements for future industrial deployment.

Stack assembly reflects close collaboration across the PEACE consortium. Industrial expertise from MMI builds on prior electrochemical performance test evaluation works carried out at at **German Aerospace Center (DLR)**, and **Eindhoven University of Technology (TU/e)**, demonstrating the value of strong industry–academia cooperation.



BTU test site with the short stack and pressure vessel, Source: PEACE project (CC-BY-NC-ND 4.0)

At the same time, the short stack has provided valuable insights into certain design limitations and areas for improvement. These findings will be carefully addressed and rectified in the **development of the full stack**, ensuring enhanced performance, robustness, and scalability in the next phase: the development of a **cost-competitive, pressurized alkaline electrolyser** for large-scale green hydrogen production is previewed to be operational at BTU premises in **2026**.

2.3 PEACE PROJECT WORKSHOP AT HYDROGEN DAYS 2026 - PRAGUE, 12 MARCH 2026

The PEACE project participated in **Hydrogen Days 2026**, one of Central Europe's leading hydrogen events, held in Prague. During the conference, the project organised a dedicated workshop to present its latest progress and scientific results to researchers, industry representatives, and stakeholders in the hydrogen sector.

PEACE team at Hydrogen Days 2026, Source: PEACE project (CC-BY-NC-ND 4.0)

Project Overview

The workshop highlighted recent advances in **highly pressurised alkaline electrolysis (AEL) technology** developed within PEACE. The project coordinator, **Dr. Fatemeh Razmjooei (DLR)**, introduced the project's objectives:

Dr. Razmjooei's PEACE introduction, Source: PEACE project (CC-BY-NC-ND 4.0)

- Develop and demonstrate an AEL system exceeding **50 kW**, capable of operating at pressures up to **90 bar** using a **dual-stage pressurisation concept**, supported by optimised balance-of-plant (BoP), stack design, and stack and system components.
- Achieve an **efficiency of 70% (LHV) at 1 A/cm²** using high-concentration KOH feedstock at **80 °C**, while ensuring long-term stability.
- Demonstrate system durability through a **500-hour endurance test,** with degradation not exceeding **0.11 %/kh**.

A summary of the key results presented at the workshop follows.

1. Promising efficiency and results at pressurized condition

Electrochemical testing at large size pressurized unit demonstrated a **best performance of 1.8 V at 1 A/cm²**, an important step towards the project's efficiency targets.

Dirk Ullmer (DLR) presented collaborative work with TU/e, highlighting:

Dirk Ullmer at Hydrogen Days 2026, Source: PEACE project (CC-BY-NC-ND 4.0)

- Evaluation of different large electrochemical unit before stacking up under ambient and pressurized conditions reaching to performance of lower than **1.8 V at 1 A/cm².**
- Negligible degradation under harsh and demanding conditions was observed.
- These insights confirm the possibility of achieving high performance both efficiency and high durability under medium pressurized conditions.

2. Validation at Larger Cell and Stack Level

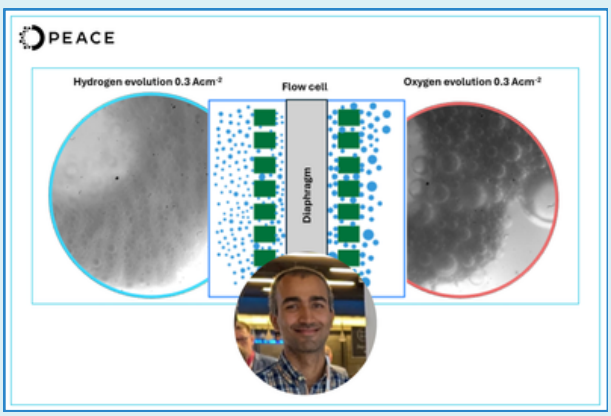
Validation was extended to short stack and tested at DLR under pressurised conditions:

- Achieved **voltage of < 1.8 V at 1 A/cm²**
- **Negligible degradation was observed over long-term operation**.

These results indicate that the system design can meet performance targets at larger scales.

3. Bubble Dynamics

Saksham Pandey (TU/e) presented high-resolution videos showing **bubble behaviour in alkaline water electrolysis**:



Extract of Saksham Pandey's presentation, Source: PEACE project (CC-BY-NC-ND 4.0)

- Micron scale visualization in an alkaline flow cell at high current densities
- **Oxygen and hydrogen bubbles differ in size and dynamics**: oxygen bubbles tend to stick, while smaller hydrogen bubbles glide on the electrode surface.
- **Polarity** and **voltage switch** experimentssuggest **solutal Marangoni forces** govern bubble dynamics

These insights support optimisation of cell component design and operational parameters.

4. PEACE Short-Stack

Paolo Lupotto (MMI) discussed the construction of the three-cell short stack (1750 cm^2):

Paolo Lupotto at Hydrogen Days 2026, Source: PEACE project (CC-BY-NC-ND 4.0)

- Short stack was developed by integrating final stack components.
- **Compatible with BTU test infrastructure** for **dual-stage pressurisation.**
- Emphasis on **low-cost, scalable manufacturing,** using widely available materials and avoiding complex mechanical processes.
- The short stack serves as **a model for a 50 kW pressurised AEL demonstrator,** to be operational at BTU in 2026 following CE marking and EU PED certification.

5. PEACE Proof-of-Concept Stack

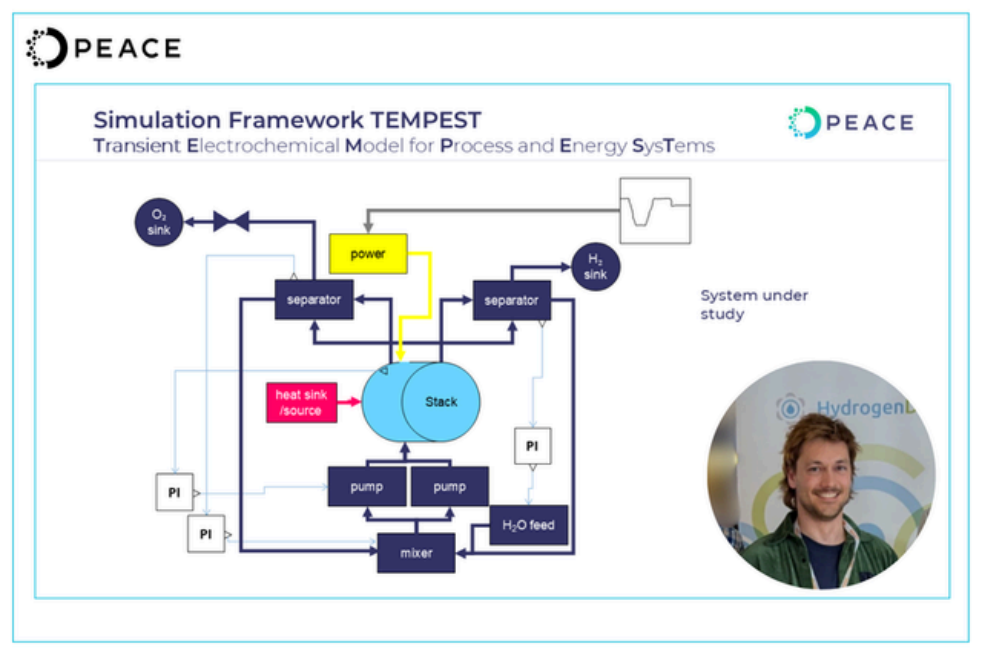
Prof. Lars Röntzsch (BTU) outlined upgrades to the testing site for the PoC stack:

- **Balance of Plant (BoP) upgrades** to support dual-stage pressurisation.
- Stack operation at internal pressures up to **60–90 bar**, with external vessel pressures of **30–60 bar**.
- Improvements to piping, sensors, valves, and leak detection ensure safe, reliable operation.
- Short-stack installation and testing allowed further refinements before full pressurised operation.

Lars Röntzsch's speech at Hydrogen Days 2026, Source: PEACE project (CC-BY-NC-ND 4.0)

6. Modelling and Operational Optimisation

In parallel, **DLR** developed a **transient simulation model**, validated against experimental data starting from the smaller scale, as presented by **Hans Wiggenhauser (DLR)**.



Extract of Hans Wiggenhauser's presentation, Source: PEACE project (CC-BY-NC-ND 4.0)

- Model helps analyse system behaviour and optimise operational strategies.
- Controlling **electrolyte flow** emerged as key to maintaining **high gas purity** and **stable operation**.

These modelling efforts support the design of improved operational strategies for future system demonstrations at BTU.

8. Conclusion

The **PEACE workshop at Hydrogen Days 2026** offered a valuable platform to share results with the hydrogen community and engage with experts from research and industry. Such interactions are crucial for validating technologies, gathering feedback, and strengthening collaboration across Europe's hydrogen ecosystem.

The PEACE consortium thanks the **Hydrogen Days organisers (HYTEP)** for hosting the workshop and providing an excellent opportunity to showcase the project's progress.

2.4 SPOTLIGHT ON THE CLEAN HYDROGEN PARTNERSHIP

The PEACE project is a European collaborative research initiative. In official terms, it is a research and innovation action funded by the **Clean Hydrogen Partnership (CHP)** under the Horizon Europe programme of the European Union.

The Clean Hydrogen Partnership, formally the *Clean Hydrogen Joint Undertaking*, is a unique **public-private partnership** supporting research and innovation (R&I) activities in hydrogen technologies across Europe. It brings together **three** key stakeholders: the **European Commission**, **Hydrogen Europe** (the leading European association of hydrogen industries), and **Hydrogen Europe Research** (the European association of research and technology organisations within the hydrogen and fuel cell sector). This collaboration aims to pool expertise, accelerate technological progress, and strengthen Europe's competitiveness in clean hydrogen technologies.

Established in **2021** as the **successor to the Fuel Cell and Hydrogen Joint Undertaking**, the CHP operates within the framework of Horizon Europe, with a total budget exceeding **€2 billion (public and private combined)** over the 2021-2027 period.

At its core, the CHP is driving forward the **European Green Deal** goals by supporting research and innovation across the entire clean hydrogen value chain, with a strong focus on:

- Renewable hydrogen production and its transmission, distribution, and storage
- Fuel cell and hydrogen end-use technologies for transport, industry, and energy systems
- Demonstration and deployment of innovative solutions that can scale up rapidly and reduce costs in hard-to-decarbonise sectors.

The Partnership's work is guided by ambitious objectives: contribute to the EU's **climate ambitions for 2030 and 2050**, support the implementation of the Commission's hydrogen strategy, strengthen the competitiveness of the EU's clean hydrogen value chain, and stimulate transformative research and innovation across Europe.

Through **targeted calls for proposals** — opened annually under Horizon Europe — the CHP funds innovative projects like PEACE that can bring hydrogen technologies from research into real-world application and market readiness.

In short, the Clean Hydrogen Partnership plays a **central role in Europe's transition to a climate-neutral economy**, empowering collaborative research, enabling cutting-edge innovation, and helping pave the way for hydrogen to become a cornerstone of sustainable energy across the continent. The PEACE project is proud to be part of the vibrant clean hydrogen community supported by the Clean Hydrogen Partnership. We look forward to staying actively engaged with this ecosystem and to exploring future opportunities under the upcoming 2026 call (see more in Section 5).

2.5 PEACE PROJECT AT EHEC 2026

The PEACE project was represented at the renowned **European Hydrogen Energy Conference** (EHEC) taking place on 11 – 13 March 2026 in Seville, Spain.

PEACE project team member **Akshata Barge** (German Aerospace Center - DLR) presented a poster entitled: "Investigation of Alkaline Water Electrolyzer Response under Various Operational Conditions". The poster was co-authored by Davide Grilli, Dirk Ullmer, Hans Wiggenhauser, Kamal Ghotia, Fatemeh Razmjooei & Asif Ansar

Find out more about the poster at the PEACE website.

3. Hydrogen News

3.1. SECOND HYDROGEN BANK AUCTION: 6 WINNING PROJECTS

In January 2026, the Second European Hydrogen Bank auction for renewable hydrogen production entered the final pre-implementation phase: **grant agreements were signed with 6 selected projects**. To be noted that there were 15 initially selected projects but due to several drop-offs projects on the reserve list were invited to join the negotiation phase.

The six project – 1 from Finland, 2 from Norway, and 3 from Spain – get **€270.6 million in support,** compared to the original €1.2 billion of funding available at the start of the auction. Selected projects will produce hydrogen that will serve as renewable fuel of non-biological origin (RFNBO). It is estimated that together, these projects are to produce around 500 kilo tonnes of renewable hydrogen, cutting almost 3.4 million tonnes of CO_2 emissions over an operational period of 10 years.

Source of the news

4. Hydrogen Events

Hannover Messe, 20 – 24 April, 2025, Hannover (DE)

The world's most important industrial trade will display more than 200 exhibitors from the hydrogen and fuel cell sector. One of the PEACE project members, **Institute of Engineering Thermodynamics of the German Aerospace Center (DLR)**, will be there, too. **Hall 11, Stand E22** - let's talk hydrogen there!

Event link

5. Hydrogen Project Funding Opportunities

CLEAN HYDROGEN PARTNERSHIP (CHP) CALL 2026

A freshly opened CHP call for proposals to support the development of cutting-edge hydrogen technologies aligned with the Strategic Research Agenda and the EU's clean energy objectives. **€105 million call under Horizon Europe covers 21 topics**, mostly research and innovation actions (see below). The call will be implemented through lump sum grants.

Importantly, the 2026 call places strong emphasis on synergies with other European partnerships, national programmes, and regional initiatives, reinforcing integration across the hydrogen ecosystem.

Call topics:

Renewable Hydrogen Production (€16M)

HORIZON-JU-CLEANH2-2026-01-01: Development and validation of innovative approaches, catalysts, electrolytes and components for electrolysis technologies based on low-quality water

HORIZON-JU-CLEANH2-2026-01-02: Cost-efficient and reliable designs towards gigawatt-scale electrolytic hydrogen production plants

HORIZON-JU-CLEANH2-2026-01-03: Improved components and tools to increase the safety of electrolysers

HORIZON-JU-CLEANH2-2026-01-04: Innovative business models advancing renewable electrolysis integration in industry

HORIZON-JU-CLEANH2-2026-01-05: Sustainable hydrogen production from renewable gases and biogenic waste sources through innovative modular reactor design, process intensification and integration

HORIZON-JU-CLEANH2-2026-01-06: Scalable and high efficiency materials and reactors for direct solar hydrogen production

Hydrogen Storage and Distribution (€17.5M)

HORIZON-JU-CLEANH2-2026-02-01: Affordable, Safe and Sustainable aboveground medium to large GH2 storage

HORIZON-JU-CLEANH2-2026-02-02: Demonstrating in-line inspection (ILI) to monitor cracks assuring compatibility for operation with hydrogen in new and repurposed offshore natural gas pipelines

HORIZON-JU-CLEANH2-2026-02-03: New thermal insulation concepts for bulk liquid hydrogen shipping

HORIZON-JU-CLEANH2-2026-02-04: Cost-efficient small scale hydrogen liquefaction

Transport (€25M)

HORIZON-JU-CLEANH2-2026-03-01: Integration of control & monitoring tools and strategies for improved Fuel Cell System durability & reliability

HORIZON-JU-CLEANH2-2026-03-02: Components Development and Experimental Testing for an Onboard Liquid Hydrogen Supply and Conditioning System in HighPower Fuel Cell Aviation Applications

HORIZON-JU-CLEANH2-2026-03-03: Flexible and standardised hydrogen storage system

HORIZON-JU-CLEANH2-2026-03-04: Multi-fuel SOFC powertrain for maritime transport

Heat and Power (€16M)

HORIZON-JU-CLEANH2-2026-04-01: Next generation of reversible proton conducting ceramic cells and stacks for efficient energy applications at ≥1 kW scale

HORIZON-JU-CLEANH2-2026-04-02: Demonstration of rSOC operation for local gridconnected hydrogen production and utilisation

HORIZON-JU-CLEANH2-2026-04-03: Fuel-flexible gas turbine combustion technology for clean and efficient ammonia firing

Cross-cutting activities (€5.5M)

HORIZON-JU-CLEANH2-2026-05-01: Public datasets of technologies along the hydrogen value chain for life cycle (sustainability) assessment

HORIZON-JU-CLEANH2-2026-05-02: Pre-Normative Research on hydrogen odorisation: enhancing safety and detection along the hydrogen value chain

Hydrogen Valleys (€25M)

HORIZON-JU-CLEANH2-2026-06-01: Large-scale Hydrogen Valley

HORIZON-JU-CLEANH2-2026-06-02: Small-scale Hydrogen Valley

Deadline date: 15 April, 2026

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"Pressurized Efficient Alkaline EleCtrolysEr" (PEACE) is a research and innovation project funded under the EU **Horizon Europe programme** by the **Clean Hydrogen Partnership.**

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