Renewable and flexible fuel power generation technology enabling the multisectorial decarbonization with Zero emissions

NEWSLETTER 4 - August 2026

ALL-IN Zero Reaches the Finish Line

Welcome to the fourth and final edition of our annual newsletter! As the ALL-IN Zero project reaches its conclusion in August 2026, the interdisciplinary team behind the **ALL-IN Zero project** has continued to work with dedication, delivering its final results and demonstrating the potential of its multi-fuel technology. This closing newsletter looks back at the latest project developments and milestones achieved during this final year. If you missed our previous editions, you can access them here.
Newsletter 01. October 2023 – Newsletter 02. August 2024 – Newsletter 03. August 2025

The **ALL-IN Zero project** is focused on developing a versatile, multi-fuel energy system capable of operating with low, zero, or carbon-negative fuels, such as ammonia, natural gas, biogas, and alcohols, among others. These fuels feed into a Compact Membrane Reactor (CMR), producing a temporary intermediate energy carrier: hydrogen. This hydrogen is then consumed on-site by an Internal Combustion Engine (ICE) and a Fuel Cell System (FCS) to deliver clean electrical and mechanical power with zero emissions.

To learn more about the ALL-IN Zero initiative, visit our website: https://allinzero.eu/

The ALL-IN Zero Team



ALL-IN Zero Plenary Meetings — 7th General Assembly & Final Meeting

The ALL-IN Zero consortium held its 7th General Assembly on 24th - 25th February 2026 at AVL in Graz (Austria), and gathered one final time for the project's closing meeting on 20th - 21st July 2026 in Valencia, hosted by UPV - CMT-Motores Térmicos.

These meetings brought together the interdisciplinary project team to review the final results across all Work Packages, consolidate the project's main achievements, and prepare its conclusions and legacy.

The sessions featured high-level presentations, fruitful discussions, and inspiring ideas, reflecting the team's strong collaboration and shared commitment to advancing zero-emission, multi-fuel energy solutions.

A remarkable journey comes to a close as the project delivers its final outcomes! Learn more about the meetings: 7th GA | Final Meeting

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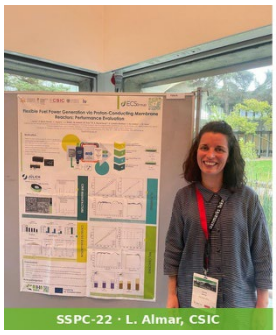


ALL-IN Zero at ICIM-18: Electrochemical Ceramic Reactors Take the Stage

The ALL-IN Zero project was showcased at the 18th International Conference on Inorganic Membranes (ICIM-18), in Montpellier (France) 29/6-3/7 2026 and co-organized by ITQ (CSIC-UPV). Dr. Laura Almar (ITQ, CSIC-UPV) presented ALL-IN Zero results on the efficient conversion of ammonia into hydrogen through protonic electrochemical ceramic reactors, while Prof. Dr. Wilhelm A. Meulenberg (Forschungszentrum Jülich) delivered a keynote on the manufacturing of the proton-conducting ceramic cells at the core of the technology.

Together, both contributions covered complementary building blocks of the project: from the fabrication of the proton-conducting ceramic cells to their use in a Compact Membrane Reactor that converts ammonia into hydrogen.

These events provided an excellent platform to disseminate the project's progress, engage with the scientific community, and foster synergies with complementary initiatives across Europe. See more at: Link



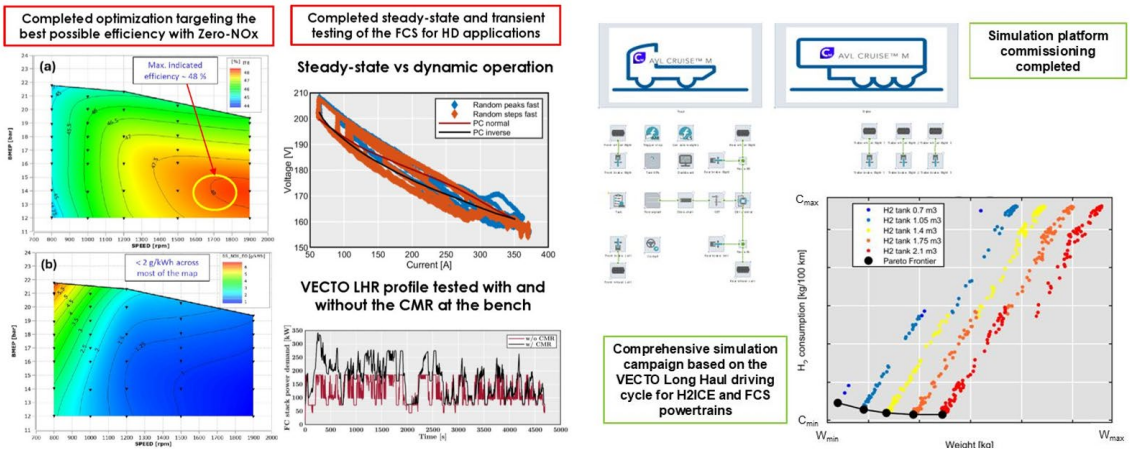


Conference Participation

During this final year, our partners actively participated as speakers in numerous national and international conferences to showcase the ALL-IN Zero project, including SMTP25 (Graz), ICE 2025 (Capri), SSPC-22 (Copenhagen) and the MEAsureD Workshop in autumn 2025, and EHEC 2026 (Seville) and ICIM-18 (Montpellier) in 2026. Explore the details of these events here: Link | Link | Link

Meet the ALL-IN Zero Partners

The success of the ALL-IN Zero project relies on the strength and synergy of its five partners, a carefully balanced consortium that brings together top-tier institutions, cutting-edge research, and industrial leadership. Follow these links to learn more about the driving forces behind the project: UPV | CSIC | AVL | FZJ



Final Technology Results — From Validation to Full Vehicle Simulation

During its final year, ALL-IN Zero moved from experimental validation of its individual technologies to their full integration into a complete vehicle simulation, confirming the feasibility of the multi-fuel, zero-emission powertrain concept:

Experimental campaigns (H_2ICE & FCS). The hydrogen internal combustion engine (a single-cylinder unit derived from a 13 L heavy-duty engine, provided by AVL) and the PEM fuel cell system were fully characterized and optimized at CMT (UPV), reaching high efficiency with near-zero NOx emissions. Vehicle-level simulation. High-fidelity digital twins of both power systems were integrated, together with the Compact Membrane Reactor (CMR), into a complete vehicle simulation platform in AVL CRUISE™ M. An extensive campaign of over 12,000 simulations on the VECTO Long Haul driving cycle was launched to identify optimal system architectures and operating strategies. Multi-fuel mastery. In the laboratory, the technology successfully achieved

multi-fuel operation, validated with ammonia (NH_3), methane (CH_4) and methanol (MeOH). Hydrogen production rates were outstanding, with ammonia standing out as a particularly promising hydrogen carrier and surpassing initial benchmarks.
Together, these results confirm that ALL-IN Zero is not just a theoretical concept, but a robust, integrated and flexible solution ready to power a cleaner, multi-fuel future. These achievements have also been shared with the scientific community through two peer-reviewed publications in Applied Energy and Energy Conversion and Management: X.
Learn more about these results: Link | Link | Link

KEY ACHIEVEMENTS & FUTURE PERSPECTIVES

A four-year journey, in summary

- ✓ All Work Packages successfully completed
- ✓ Three technologies (CMR, H_2ICE and FCS) validated and integrated into a full vehicle simulation
- ✓ Multi-fuel operation proven with ammonia, methane and methanol
- ✓ Presented at 6+ international conferences
- ✓ 2 peer-reviewed papers published, several more underway
- ✓ Over 90,000 impressions and 562 followers on LinkedIn

What comes next:

As ALL-IN Zero reaches its conclusion, the consortium is focused on the exploitation of its results and demonstrators and on completing the scientific publications currently under preparation.

The knowledge and technologies developed open the door to further research and to new collaborations at European level, building on a robust, multi-fuel and zero-emission powertrain concept ready to contribute to the decarbonization of transport and power generation.

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