Driving global decarbonisation with H2GLASS hydrogen technology

Advancing Europe's glass sector by demonstrating green hydrogen combustion at industrial scale, the H2GLASS project is being led by partners across both industry and research - showing how its technology can cut emissions, enhance safety and deliver reliable production pathways toward deep decarbonisation in energy-intensive manufacturing processes Europewide.

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Funded by Horizon Europe, the H2GLASS project was launched back in January 2023 and has now reached mid-term. It unites glass manufacturers, research institutions and service providers from across Europe to develop technology that replaces fossil fuels with green hydrogen in production-facility combustion processes - thereby enabling decarbonised glass manufacturing with potential CO_2 reductions above 80 percent. The consortium includes more than 20 partners from industry and academia, among them glassmakers Hrastnik1860, OVC, Zignago Vetro, Vetrobalsamo and NSG, research institutions SINTEF, Aston University and NTNU, and glass and simulation specialists Stara Glass and Stazione Sperimentale del Vetro.

TECHNICAL CHALLENGES

The glass industry accounts for around 5 percent of Europe's CO_2 emissions, and the sector recognises the necessity of decarbonisation. While some of these emissions derive from chemical reactions during melting, the majority stems from combustion. Hydrogen combustion therefore represents a major opportunity for impactful emissions reduction. Introducing hydrogen into a new industrial sector poses challenges that the consortium is systematically addressing. Owing to hydrogen's hazardous properties, comprehensive safety strategies are essential. Beyond developing innovative burner and furnace designs, ensuring a reliable green hydrogen supply for on-site demonstrations is a central challenge. Another priority is optimising hydrogen combustion -such as mitigating NOx formation and managing high flame speeds- while maintaining premium product quality. A Digital Twin for predictive maintenance will further enhance efficiency and reliability. The project also transfers the technology to aluminium production for validation through a replicability demonstrator.

INDUSTRIAL MILESTONES

Since launch, H2GLASS has reached significant milestones. In late 2023, industrial demonstrator Hrastnik1860 executed two successful oxy-fuel combustion campaigns with high-quality flint container glass, including a single-day continuous trial and a three-day campaign - marking the first commercial hydrogen use in the glass packaging sector. In 2024, Owens Corning became the first to test industrial-scale glass-fibre production using only electrical boosting and oxy-hydrogen combustion. In autumn 2025, a portable 5 MWe PEM electrolyser will be commissioned at Owens Corning to supply green hydrogen for a long-duration combustion trial that was planned for either late 2025 or early 2026. The electrolyser will subsequently serve other H2GLASS demonstration sites - enabling further testing in varied industrial contexts.

FUTURE IMPACT

Additional project progress includes developing measurement protocols, quality-testing procedures and comprehensive safety plans for all demonstrators, as well as collecting data from initial trials to train Digital Twin models. Numerous publications and conference contributions have already resulted from this work. H2GLASS now stands at the forefront of sustainable innovation in the glass sector, demonstrating the transformative potential of green hydrogen combustion. Through cross-sector collaboration and systematic problem-solving, the project is proving the feasibility of hydrogen-powered glass production and creating a transferable model for other energy-intensive industries, paving the way toward a resilient, low-carbon industrial future. ■

H2GLASS
DECARBONISING OUR FUTURE

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