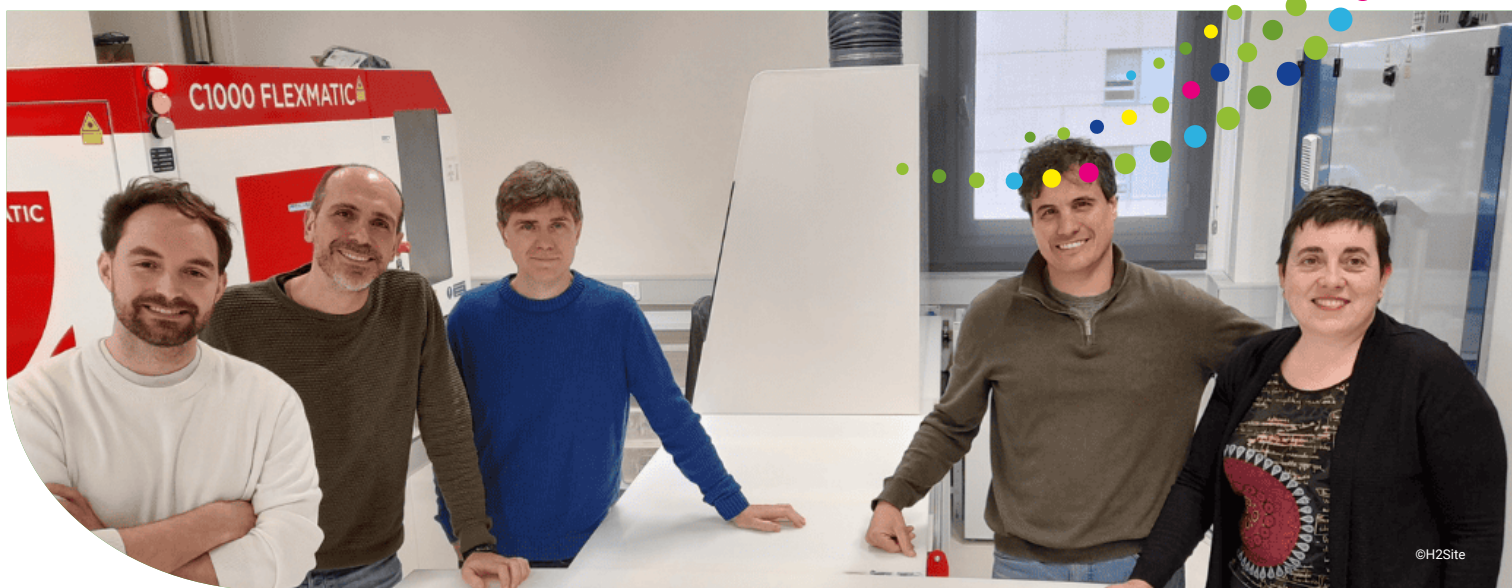


From award-winning innovation to commercial success: HyP3D paves the way for Oxhyd



Turning breakthrough research into commercially viable technologies is central to Europe's hydrogen ambitions. Oxhyd, a Catalan deep-tech spin-off, is commercialising advanced 3D-printed solid oxide technologies developed through the Clean Hydrogen Partnership-funded Cell3Ditor and HyP3D projects.

A new generation of solid oxide technology

Solid oxide fuel cells (SOFCs) and electrolysis cells (SOECs) could play a major role in clean power generation and renewable hydrogen production, but commercial deployment has been constrained by complex manufacturing, high costs and limited design flexibility.

HyP3D overcomes these barriers through additive manufacturing. By leveraging 3D printing, the project enables the fabrication of ceramic cells with corrugated electrolytes, integrated gas channels, and embedded sealing structures, perfectly suited for pressurised hydrogen production. The design freedom enabled by 3D printing constitutes a unique selling point, significantly increasing the active reaction area and enhancing the power density per unit of mass and volume. This results in more compact, high-performance stacks that reduce material usage and

make the technology cost-competitive with standard alternatives.

From EU-funded research to commercial reality

Our ambition was to demonstrate that advanced 3D printing could overcome some of the long-standing limitations of solid oxide technologies. Seeing those innovations become the foundation of Oxhyd is a powerful example of how collaborative European research can deliver real industrial impact."

Juande Sirvent, former HyP3D researcher and now CTO of Oxhyd

Building on more than a decade of research at the Catalonia Institute for Energy Research (IREC), HyP3D brought together research institutes, technology companies and industrial partners from across Europe to combine expertise in cell manufacturing, sealing, model-

ling and stack development. Through Cell3Ditor and HyP3D, the consortium demonstrated how 3D printing could transform solid oxide technologies through complex geometries, reduced material use and new cell architectures. These achievements earned HyP3D the 2025 Clean Hydrogen Partnership Best Innovation Award and led to the launch of Oxhyd in 2026 to commercialise the technology for renewable hydrogen production, maritime transport, data centres and the decarbonisation of energy-intensive industries.

HyP3D also contributed to the development of Merce Lab, IREC's pre-industrial pilot facility bridging laboratory research and large-scale solid oxide cell production.

Supporting Europe's hydrogen economy

Oxhyd demonstrates how sustained investment in research can create long-term industrial value. Through this company, the knowledge and expertise developed through Cell3Ditor and HyP3D have evolved into a commercially viable solution for renewable hydrogen production, transport and energy-intensive industries. Together, the projects show how collaborative European research can transform scientific excellence into industrial competitiveness.

The goal To develop next-generation 3D-printed solid oxide electrolysis technology that produces renewable hydrogen more efficiently, at lower cost and with greater design flexibility, accelerating commercial deployment.

Key results Building on Cell3Ditor, HyP3D demonstrated innovative 3D-printed solid oxide electrolysis cells with corrugated electrolytes, integrated gas channels and embedded sealing structures that improve performance while reducing material use and manufacturing costs. The project demonstrated key components and design concepts for pressurised hydrogen production, including pressure-resistant cells and sealing solutions, and laid the foundations for Oxhyd, helping transform award-winning research into a commercial hydrogen technology platform.

KEY ACHIEVEMENTS

AWARD-WINNING INNOVATION

Winner of the 2025 Clean Hydrogen Partnership Best Innovation Award

3D-PRINTED SOLID OXIDE CELLS

Advanced ceramic manufacturing enabling new cell architectures impossible with conventional methods

STACK DEMONSTRATION

Built and tested an 18-cell, 330 W solid oxide electrolysis stack

LOWER MATERIAL USE

Manufacturing approach designed to reduce raw-material consumption by up to 40% in costs and 63% in weight

LOWER INVESTMENT COSTS

Projected 44% reduction in initial manufacturing investment compared with conventional cell-production plants since the first MW/year

LARGER SPECIFIC POWER

Corrugated architecture increases 2.5x the volumetric power density and 6.5x the gravimetric power density

IMPACTS

ACCELERATED COMMERCIALISATION

Research results translated into a European deep-tech company

LOWER COST HYDROGEN

Reduced manufacturing costs and simplified system design improve competitiveness

EUROPEAN INDUSTRIAL LEADERSHIP

Strengthening Europe's position in advanced hydrogen technologies and additive manufacturing

NEW MARKET OPPORTUNITIES

Applications spanning Power-to-Gas, hydrogen refuelling, data centres and clean mobility

PUBLIC INVESTMENT WITH LASTING IMPACT

Successive Clean Hydrogen Partnership projects created an innovation pipeline from laboratory research to commercial deployment

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HyP3D
Oxhyd
Cell3Ditor
Clean Hydrogen Partnership projects repository



Co-funded by
the European Union