

From research collaboration to industrial scale: Stargate Hydrogen's growth story



Building a competitive European electrolyser industry requires continuous innovation from laboratory research to industrial manufacturing. Founded in 2021 in Tallinn, Estonia, Stargate Hydrogen has evolved into a growing European electrolyser manufacturer through its own technology development and participation in seven Clean Hydrogen Partnership-funded projects.

Advancing next-generation alkaline electrolysis

Alkaline electrolysis has long been recognised as one of the most reliable technologies for renewable hydrogen production, but further gains in efficiency, durability, safety and sustainability are needed to reduce costs.

Participation in seven complementary Clean Hydrogen Partnership-funded projects has enabled Stargate Hydrogen to address every major aspect of alkaline electrolysis, from catalyst development and diagnostics to durability, safety and next-generation electrolyser concepts. Together with continued industrial scale-up, this has established the company as an emerging European manufacturer of advanced alkaline electrolysers.

From collaborative research to industrial scale-up

Rather than focusing on a single technological breakthrough, Stargate Hydrogen has built its innovation strategy around the complementary Clean Hydrogen

Partnership-funded projects that together address the full range of challenges facing advanced alkaline electrolysis. Together, these projects have received over €28 million in grant funding from the Joint Undertaking, of which approximately €3.6 million has been allocated to Stargate Hydrogen.

Each project addresses a different aspect of alkaline electrolysis. AELIOS supports improvements in advanced alkaline electrolyser technologies. DELYCIOUS is developing innovative diagnostic and monitoring tools to improve electrolyser reliability and reduce operating costs. GUESS-WHY promotes Safe and Sustainable-by-Design methodologies for hydrogen technologies. EXSOTHYC is developing novel catalyst materials to reduce the cost of green hydrogen production.

ELECTROLIFE focuses on understanding degradation mechanisms and extending electrolyser lifetime. ENDURE seeks to improve durability, current density and stack performance using innovative electrode structures, and Sea4Volt is developing a new generation of low-temperature electrolysers capable of producing green hydrogen directly from seawater.

"At Stargate Hydrogen, we leverage scientific innovations to fundamentally change the economics of green hydrogen projects. Participation in successive Clean Hydrogen Partnership projects has allowed us to tackle every major aspect of alkaline electrolysis, from performance and durability to safety and sustainability. This collaborative approach has helped to transform innovative research into industrial technology ready for large-scale commercial deployment."

Marko Virkebau, CEO, Stargate Hydrogen

Together, these projects have enabled Stargate Hydrogen to strengthen its technology portfolio while accelerating its transition from research-intensive start-up to industrial manufacturer. This progress is reflected in the opening of its Tallinn factory, with an initial annual production capacity of around 140 MW, and further expansion plans through a recently initiated EU Innovation Fund project.

Supporting Europe's hydrogen economy

Stargate Hydrogen demonstrates how collaborative European research can accelerate scientific progress and company growth. Through the seven multi-beneficiary projects, the company has built a network of 51 partners across Europe. This network includes research organisations such as ZSW, VTT Technical Research Centre of Finland and Tecalia, as well as several Fraunhofer institutes, including Fraunhofer IFAM; universities such as UCLouvain, Eindhoven University of Technology, the University of St Andrews, Gdańsk University of Technology and FAU Erlangen-Nürnberg; and companies including Agfa, Loccioni, Horiba, Elicron and Air Liquide.

These active collaborations give Stargate Hydrogen access to complementary expertise, help it remain at the forefront of innovation and create opportunities for further partnerships and joint activities. They have also generated commercial orders from project partners. As Europe scales renewable hydrogen production, the company shows how research collaboration can strengthen industrial competitiveness, support technology commercialisation and contribute to a resilient European hydrogen value chain.

The goal To advance next-generation alkaline electrolysis by improving efficiency, durability, safety and sustainability while reducing the cost of renewable hydrogen production through collaborative European research, ultimately enabling hard-to-abate industries to reduce their CO₂ emissions.

Key results Participation in seven Clean Hydrogen Partnership-funded projects has expanded Stargate Hydrogen's expertise across catalyst development, diagnostics, durability, safety and next-generation electrolyser concepts. Together with continued industrial scale-up, this has established the company as an emerging European manufacturer of advanced alkaline electrolyzers.



Stargate Hydrogen
AELIOS
Sea4Volt
DELICIOUS
GUESS-WHY
EXSOTHYC
ELECTROLIFE
ENDURE



Co-funded by
the European Union

KEY ACHIEVEMENTS

SEVEN EU-FUNDED PROJECTS

Building expertise across diagnostics, durability, safety, sustainability and performance optimisation

ADVANCED ALKALINE ELECTROLYSIS

Developing next-generation alkaline electrolyser stacks and systems

HOLISTIC TECHNOLOGY DEVELOPMENT

Research spanning catalyst innovation, diagnostics, degradation mitigation and system optimisation

INDUSTRIAL SCALE-UP

Factory established in Tallinn with an initial annual production capacity of approximately 140 MW

EU-13 SUCCESS STORY

Growing an advanced hydrogen technology company from Estonia into an emerging European electrolyser manufacturer

IMPACTS

ACCELERATED TECHNOLOGY DEVELOPMENT

Successive research projects addressing complementary technological challenges

LOWER-COST GREEN HYDROGEN

Innovations targeting improved efficiency, durability and reduced production costs

EUROPEAN INDUSTRIAL COMPETITIVENESS

Strengthening Europe's manufacturing capacity for advanced electrolyzers

KNOWLEDGE TRANSFER

Research results translated into manufacturing capability and commercial technology development

LONG-TERM INNOVATION PIPELINE

Demonstrating how sustained participation in Clean Hydrogen Partnership projects supports company growth from start-up to industrial scale

¹The 13 Member States that joined the European Union in or after 2004.