

Stargate Hydrogen

enabling the industry of tomorrow

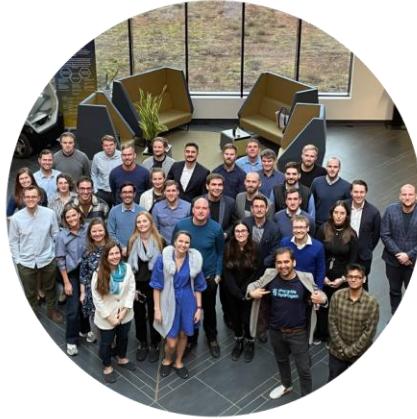
Stargate Hydrogen



Unique electrolysis technology (9 patent families) using ceramic-based catalyst materials and proprietary stack design, making the technology more scalable than competitors.



One of the few electrolyser manufacturers that received **IPCEI support from the European Commission** for its scale-up project.



Team of 65+ top professionals with previous experience from Haldor Topsoe, Volvo Trucks, McPhy Energy, GenCell, Nel Hydrogen and Mitsubishi Heavy Industries.



Strategic partners include **ABB, fortum, Utilitas, Repsol, Neom** and many others beyond European Union.



Stargate Hydrogen has **50+ mEUR** of committed funding to realise its scale-up plan. Starting with the new Megafactory which has **140MW** yearly capacity.

Product portfolio

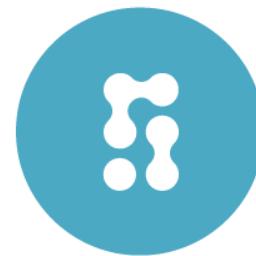
stellar EDGE

0.5 MW Alkaline
Electrolyser Stacks
for system integrators



gateway SERIES

1MW Turn-key H₂
production systems
for project developers



starbase SERIES

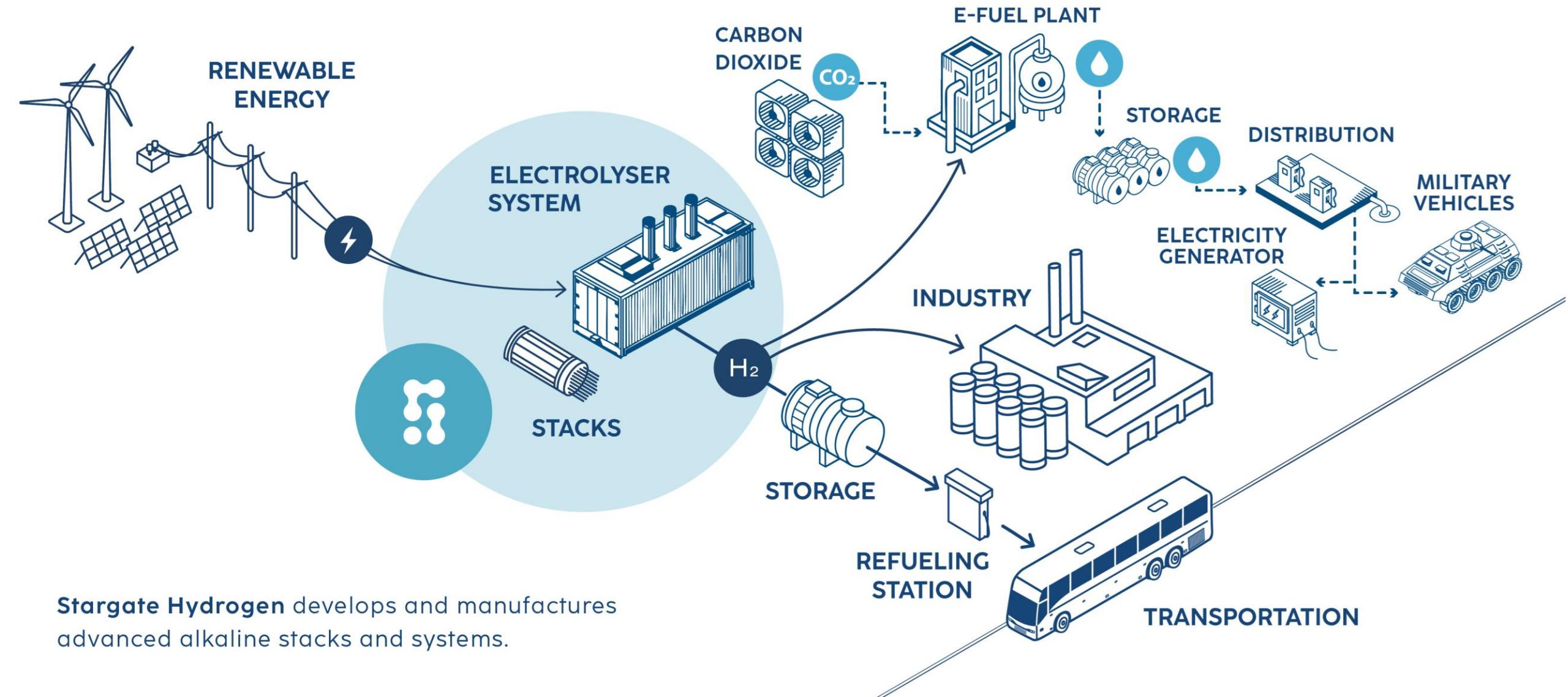
5 MW Alkaline
Electrolyser Stacks
for system integrators



aurora SERIES

10 MW Alkaline
Electrolyser Systems
for project developers

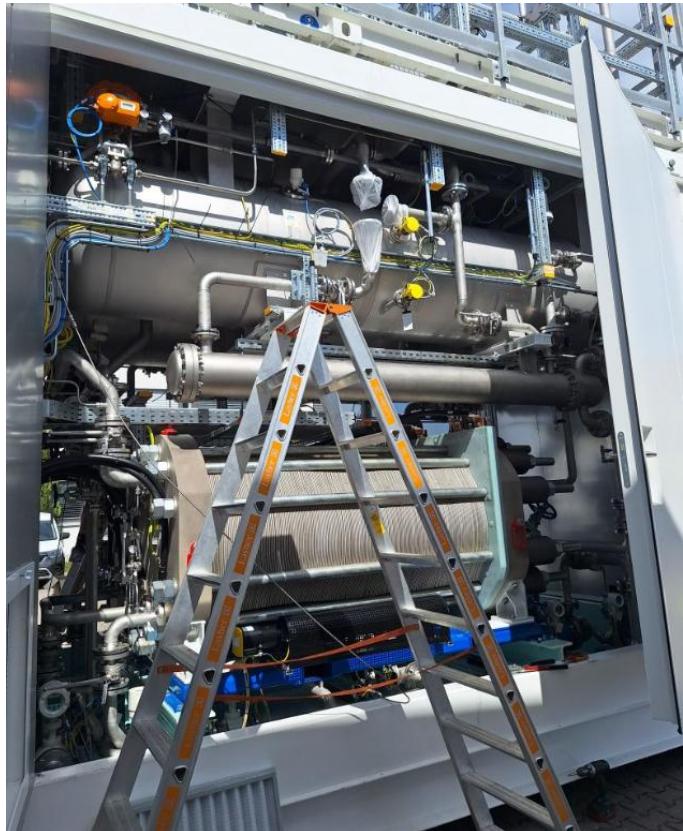
Stargate Hydrogen value chain



Customer stack deliveries

2x STR70

Installed in a system in Germany



STR35

Installed in a system by Rockfin



Customer system deliveries

 UTILITAS

Estonia, 1 MW



Status: Commercial operations

 fortum

Finland, 1 MW



Status: Site Acceptance Testing



Electrode technology



Bringing down the cost of green hydrogen

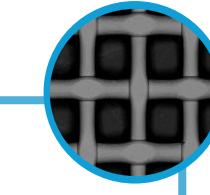
The cost of H₂ depends on:

1. Electricity price
2. **Electrolyser efficiency**
3. **Electrolyser capital cost**
4. **Lifetime/reliability**
5. Electrolyser utilisation



Stargate solution:

Novel electrode material



Electrode Level

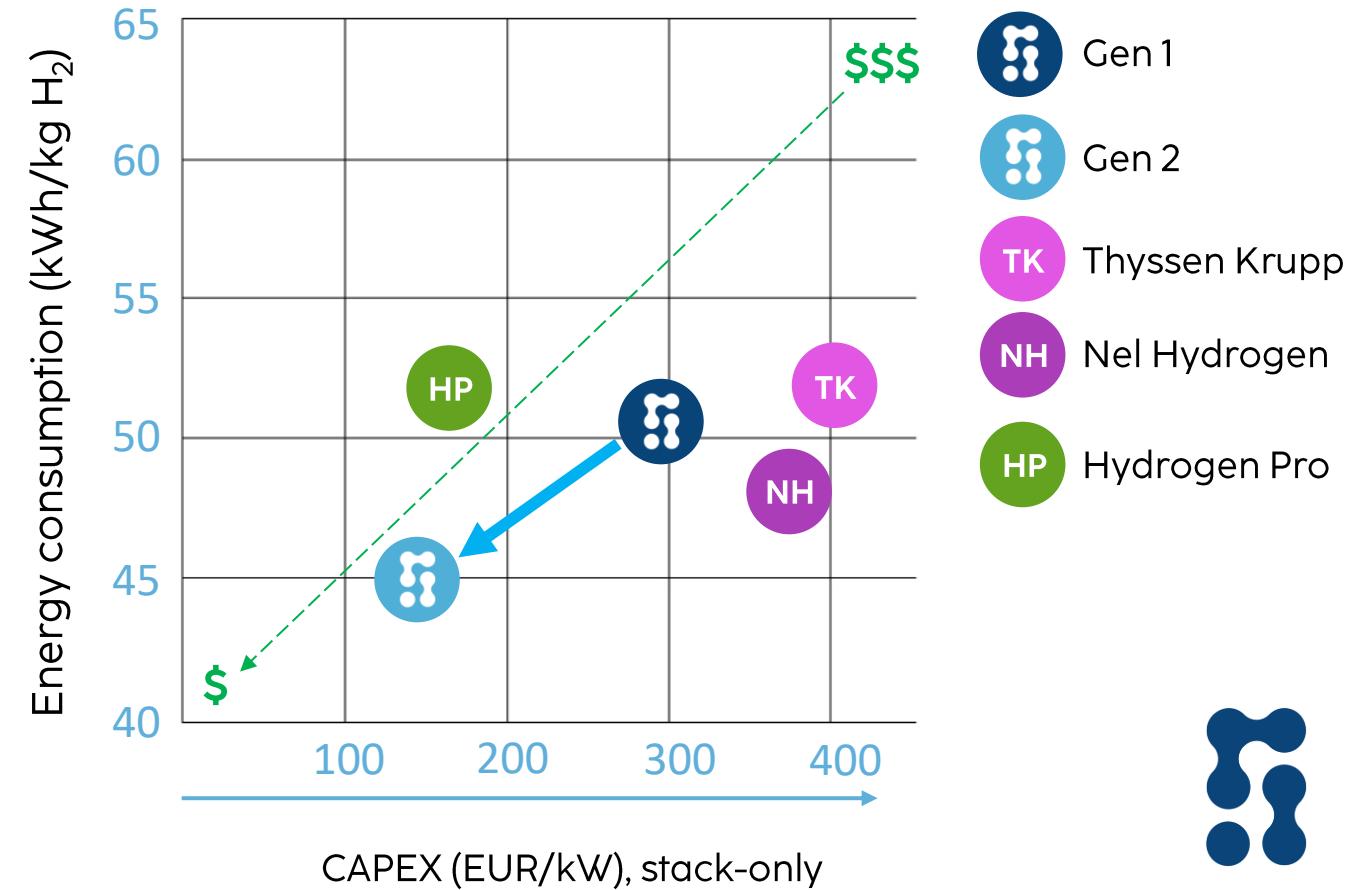
Optimised for manufacturability

Higher reliability

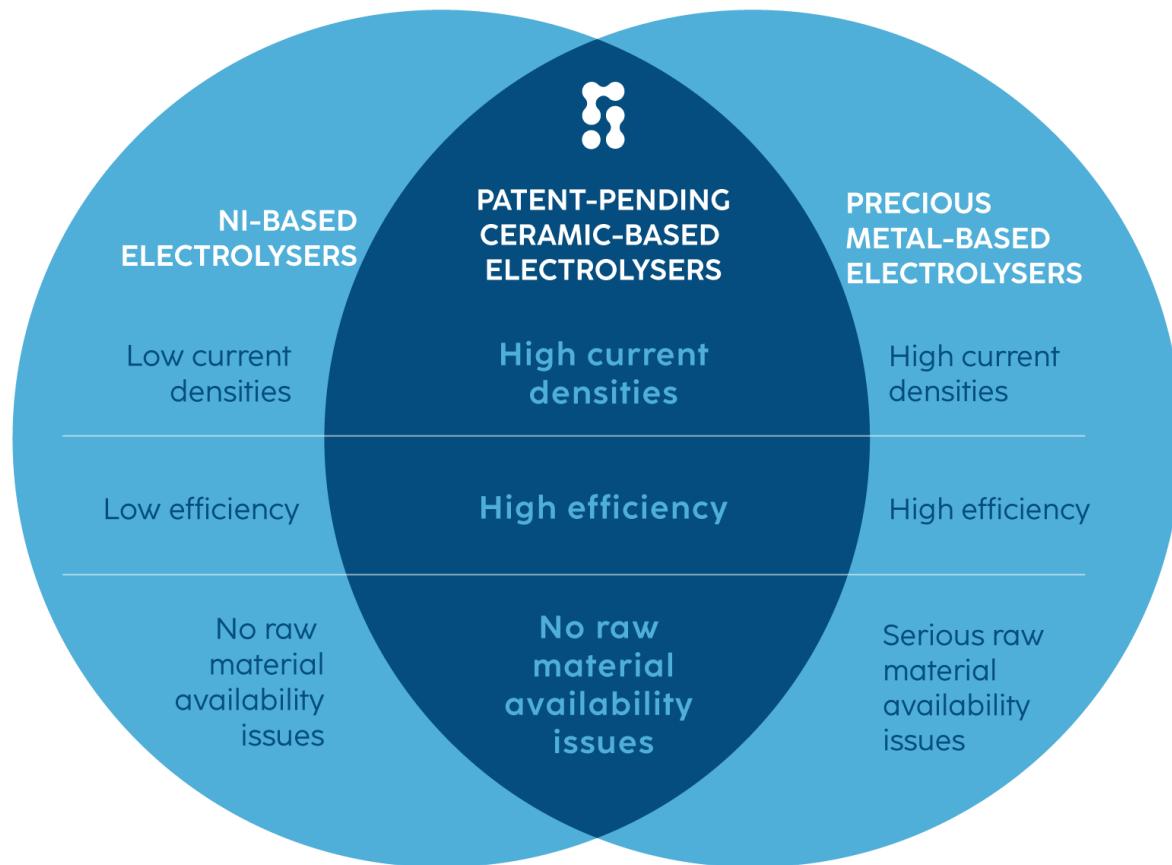
Fewer components



Stack Level



Beyond the state-of-the-art technology





100+ different active materials screened

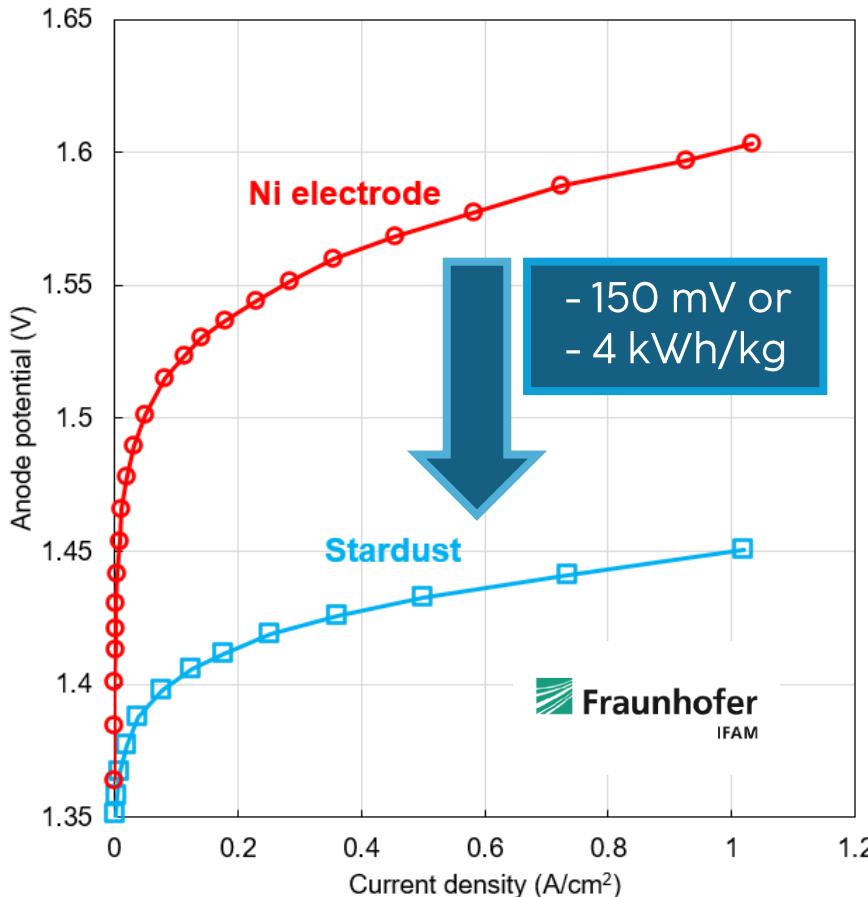
500+ electrodes tested

Most tests carried out at elevated temperature and pressure, in **30% KOH**, in a stack-like flow cell

Validation tests done by **Fraunhofer IFAM**



Electrode performance validation by Fraunhofer Institute



Dr. rer. nat. Christian Immanuel Bernäcker
Group Manager Electrochemical Technology
Fraunhofer Institute for Manufacturing Technology and Advanced Materials

“ The results of the 3-electrode measurement of the coated electrode are impressive.

The reason for the higher activity could be due to both: intrinsic activity (lower Tafel slope) or larger surface area (higher capacitance).

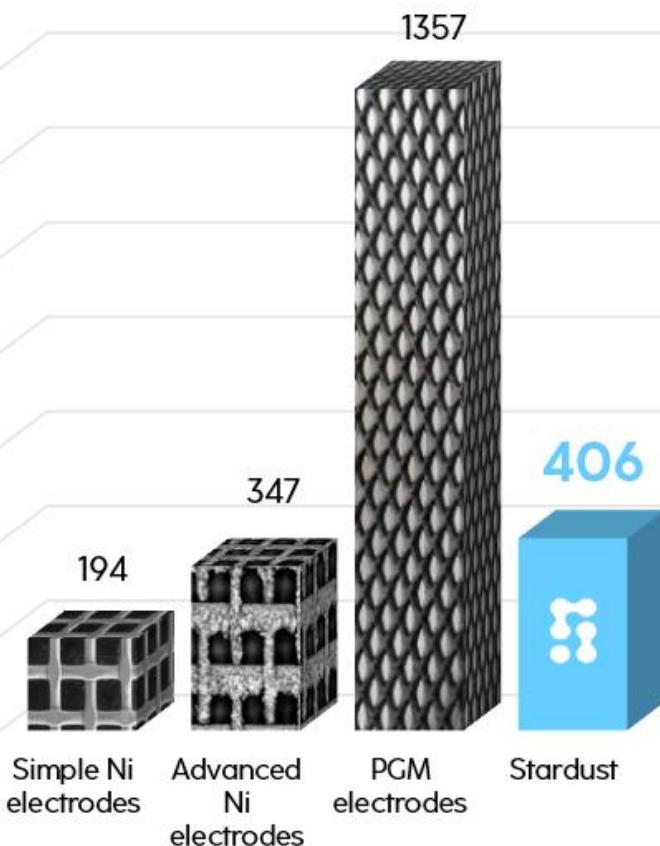
Source: e-mail dated 26/7/2023

Test conditions: 30 wt% KOH, 80°C, 1 atm, two-compartment cell, three-electrode setup, Stardust or regular Ni electrode used as anode, Pt sheet used as counter and reference electrodes (via Luggin capillary).

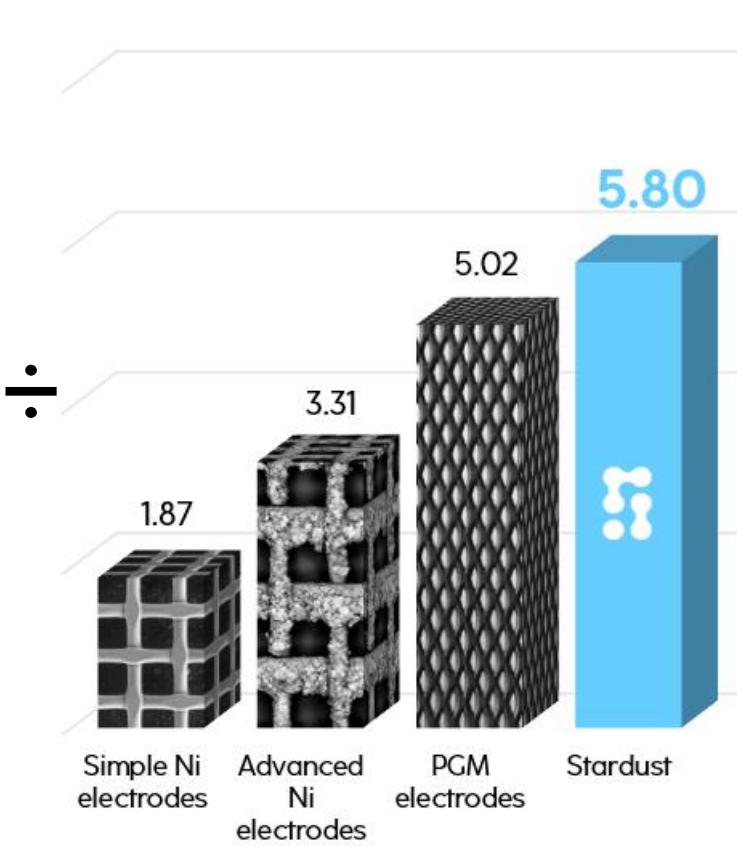


Stardust electrode technology: Value proposition

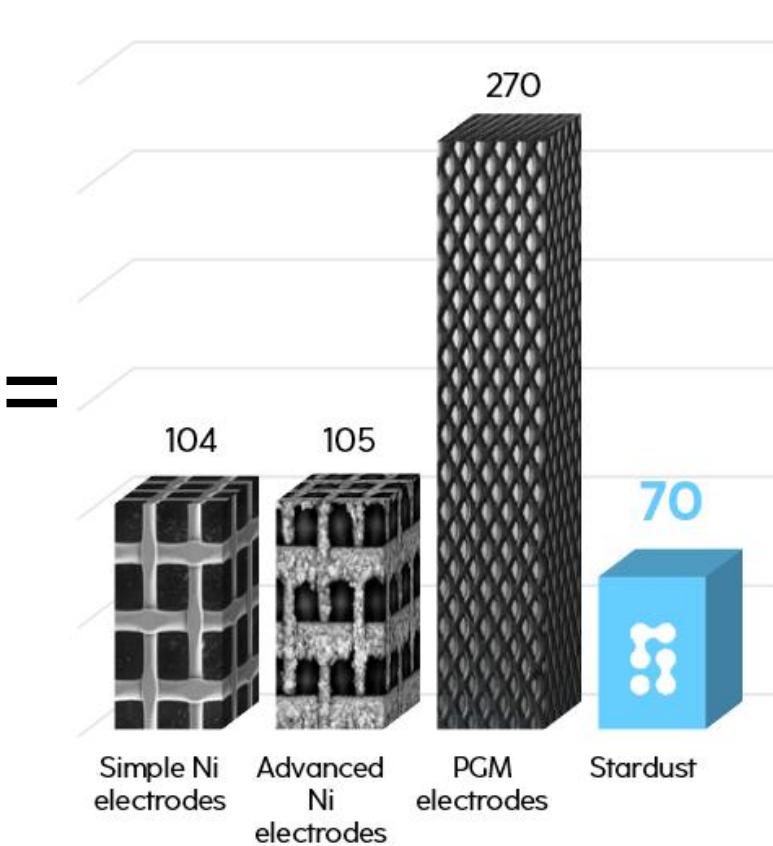
Electrode cost* (EUR/m²)



Electrode current at 1.8V (kA/m²)**



CAPEX intensity* (EUR/kA)**



* Based on commercial quotations for 4000 cm² electrodes

** Electrode current is directly proportional to H₂ production. Measured at 5 barg, 80°C, 30% KOH, Zirfon diaphragm, Simple Ni as cathode. 1.8 V/cell = 47.9 kWh/kg H₂.

*** How much investment is needed at fixed H₂ production rate?





Products & Commercial progress



Alkaline electrolyser stacks for system integrators

stellar
SERIES



Improved stack robustness



100 Nm³/h hydrogen production



Six-month delivery time



Comprehensive integration support



Alkaline electrolyser System for project developers

gateway
SERIES



Modular approach: 1 MW container



System efficiency of 74% HHV



Six-month delivery time



Suitable for direct integration
with renewables



Commercial progress

Product	Client	Country	Timeline
 10 kW Stack	 ROCKFIN® TRUSTED BY INDUSTRIES	Poland	Delivered – July 2023
 10 kW Stack (mock-up)	Non-disclosed customer	Austria	Delivered – Sep 2023
 100 kW Stack	 MILANI IMPIANTI ELETTRICI E TECNOLOGICI SPA	Italy	Delivered – Nov 2023
 50 kW Stack	Non-disclosed customer	France	Delivered – Dec 2023
 Engineering support services	 NextHeat	Germany	Delivered – Feb 2024
 10 x 5 kW Stacks	 ABB	Finland	Delivered - Nov 2024
 2 x 0.5 MW Stack	Non-disclosed customer	Germany	Delivered – March 2025
 1 MW Gateway System	 UTILITAS	Estonia	Delivered – Nov 2024

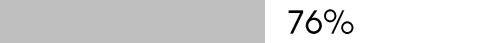


Commercial progress

Product	Client	Country	Timeline
 0.5 MW Gateway System	 PLCCAN	 Spain	Delivery – May 2026
 0.5 MW Stack	 Biga H ₂	 Turkey	Delivered – June 2025
 6 kW Stack	 VTT	 Finland	Delivered – Nov 2024
 1 MW Gateway System	 fortum	 Finland	Delivered – Oct 2025
 50 kW Stack	 MASMEC	 Italy	Delivered – July 2025
 100 kW Stack	 BGR TECH	 India	Delivered – May 2025
 6 kW Stack	 HORIBA	 Germany	Delivered – Jan 2025
 2x0.5 MW Stack	Non-disclosed customer	 Germany	Delivery – Jan 2026



Benchmarking Stargate Hydrogen's stack technology

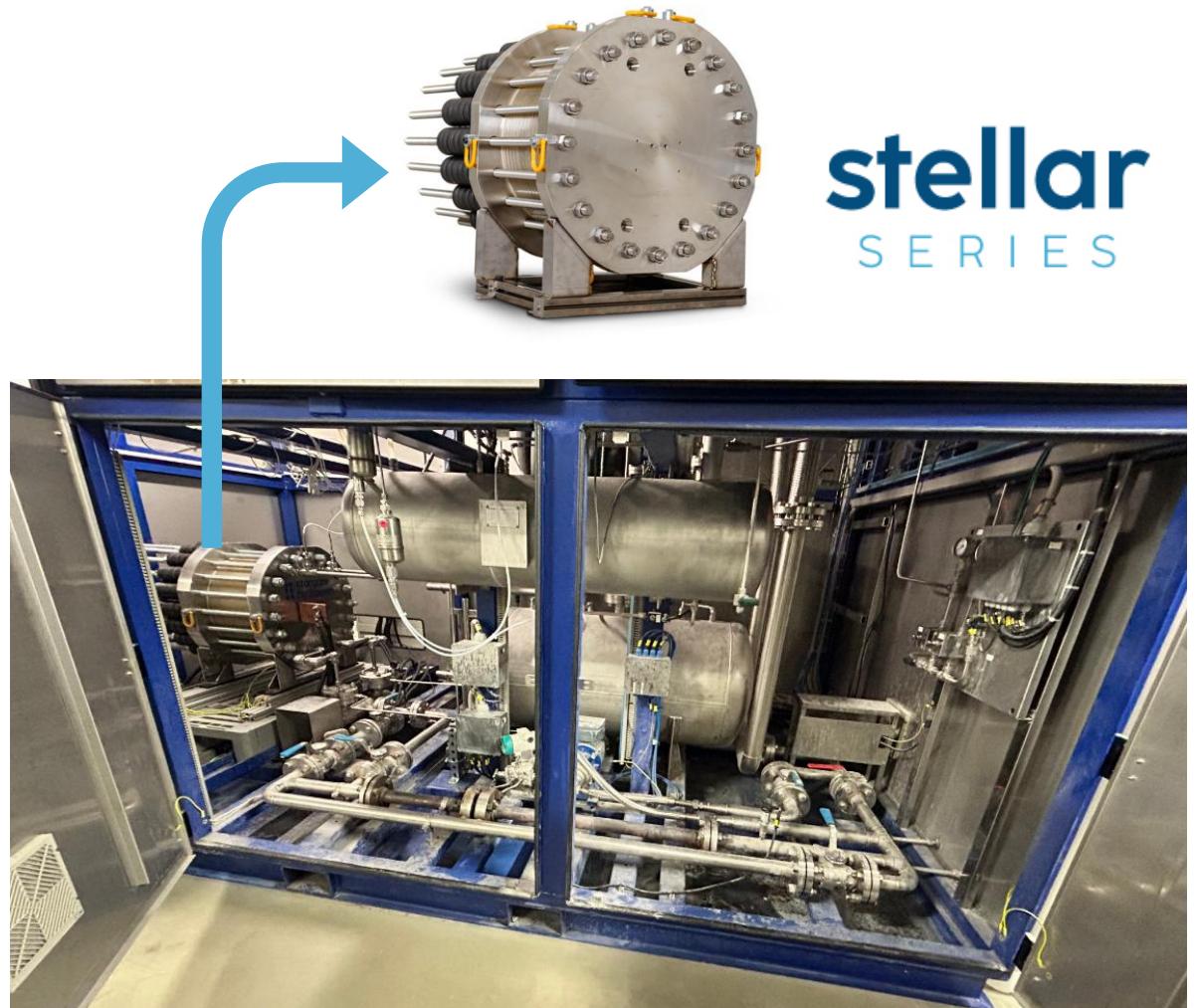
Company	Technology	Product	Efficiency (HHV)	Pressure (bar)	PGM free?	Customisable?
 stargate hydrogen	Alkaline	Stellar 100	 77% Gen1 88% Gen2	 40		
 nel	Alkaline	A485	 80%	 1		
 thyssenkrupp nucera	Alkaline	Scalum	 79%	 1		
 nel	PEM	MC500	 79%	 30		
 sunfire	Alkaline	HyLink 10 MW	 76%	 30		
 John Cockerill	Alkaline	5 MW	 72%	 30		
 ITM POWER	PEM	HGAS3SP	 72%	 30		
 H-TEC SYSTEMS	PEM	ME450	 71%	 30		
 McPhy	Alkaline	McLyzer 800-30	 67%	 30		
 Cummins	Alkaline	HyStat100-10	 66%	 10		



Independent performance validation of Stargate Gen1 stack

Stargate Stellar 10 stack has undergone rigorous performance testing at **ZSW**, Zentrum für Sonnenenergie und Wasserstoff-Forschung Baden Württemberg, an independent electrolysis test center near Stuttgart, Germany.

Stack performance was within specifications and no signs of degradation were identified during a 160 hour test.



stellar
S E R I E S

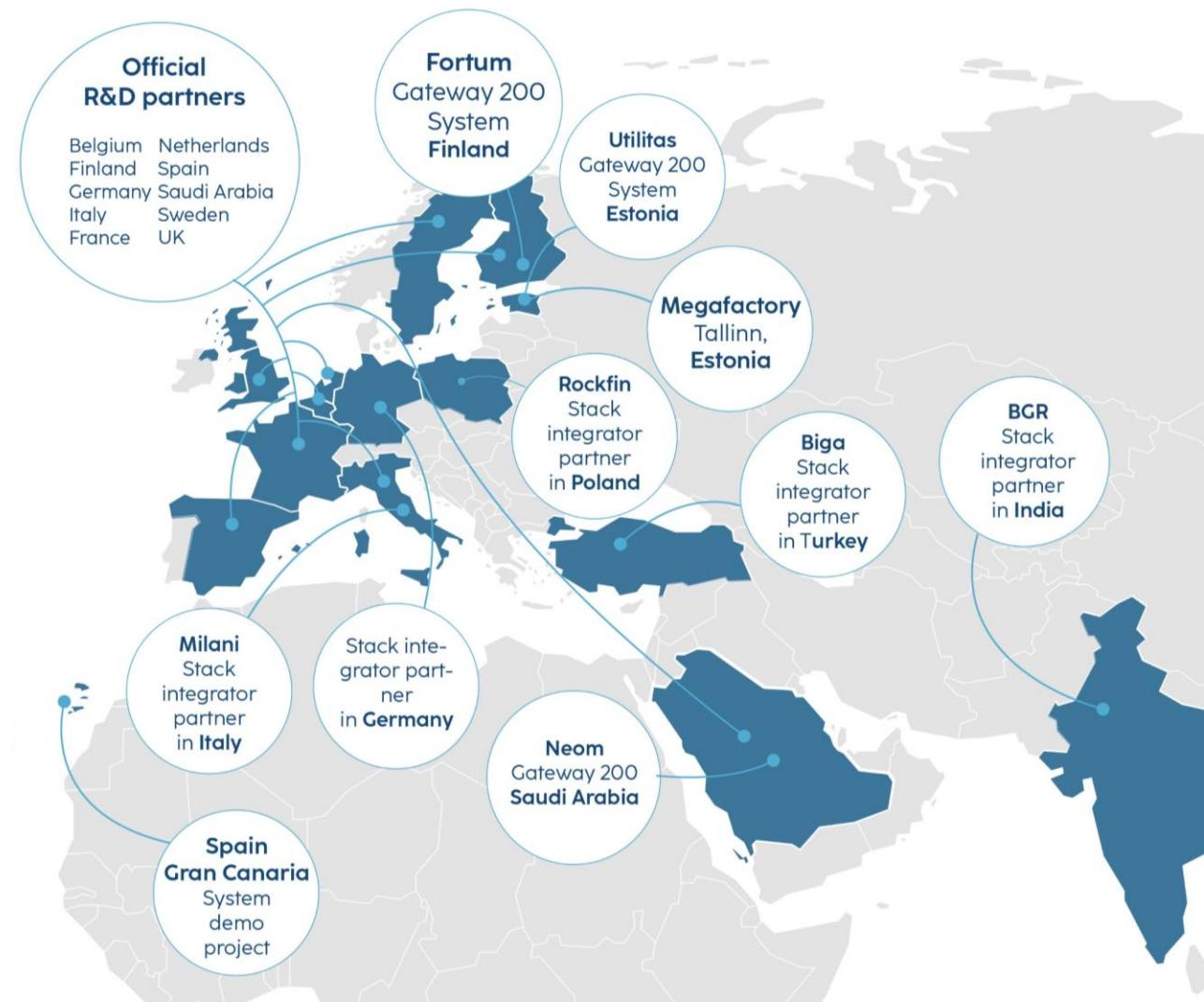


Commercial and R&D partnerships

Commercial Partners



R&D Partners

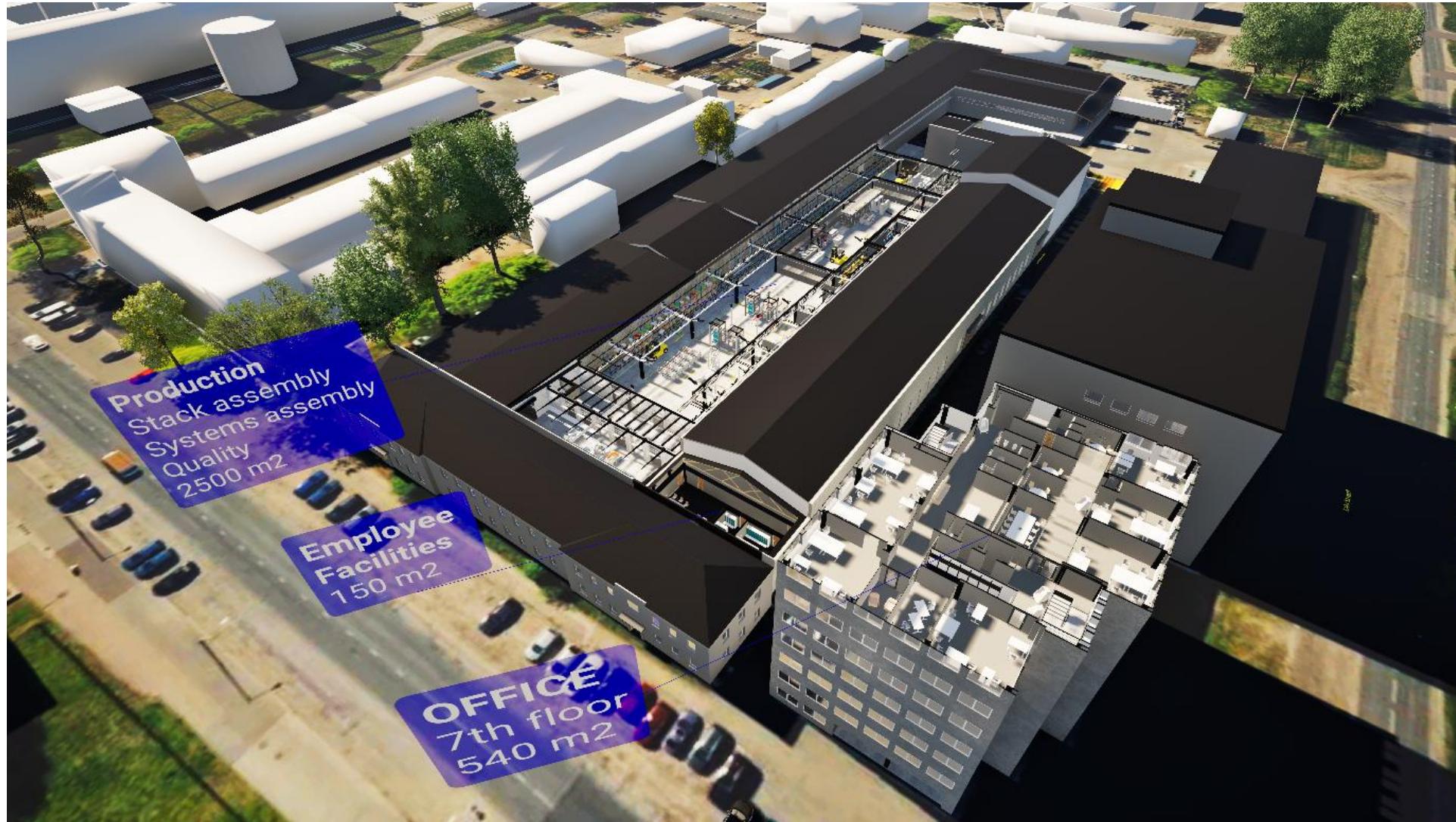




Stargate facilities



Production layout



Meet our team



65+ Talents



16 Nationalities



7 PhDs



31 Masters

9 Patent families

7 Patents granted



Our team has gained **prior experience** from such companies

Bolt

Autoliv

AIRBUS

TAL
TECH

HOOB



FILTER | POWERING
YOUR INDUSTRY
ENERGY WATER SOLUTIONS

HEXIS

ETS NORD

skeleton⁺

SIGMA
POLYMER
GROUP

VOLVO

veriff

STARSHIP

TOPSOE

Enapter

MITSUBISHI
HEAVY INDUSTRIES, LTD.

MILREM
ROBOTICS

GENCELL

ESTAND



Selected Partnerships



Selected partnerships



Selected partnerships



- Independent validation of Stargate electrode performance
- Partner in two EU projects focusing on next generation electrodes



- Independent validation of Stargate stack performance
- Partner in an EU project focusing on electrode and short stack testing



- Bilateral collaboration on next-generation diaphragms
- Partner in an EU project focusing on catalyst-coated diaphragm structures



- Co-operation in setting up a MW-scale demonstration project at Neom and developing Hydrogen Innovation & Development Center



- Pilot project for validating novel transformer-stack configurations (together with LUT)
- **Joint development program for 10 MW system module**



- Collaboration with the group of Prof. John Irvine
- Partner in an EU project focusing on development of next-generation electrode materials



- Bilateral collaboration on stack testing, validation of Stargate stack performance
- Partner in an EU project focusing on seawater electrolysis



- Partner in EU project on seawater electrolysis, as well as in an EU project on stack development
- Collaboration on stack-level simulation activities





Go to Market Strategy



Go to Market Strategy – 0.5MW Stacks

Product

0.5 MW Alkaline Stacks

stellar
E D G E



references →

Target customer:

Engineering companies

- With in-house process engineering experience.
- Limited in-house experience with electrolyzers.
- Interested to enter hydrogen value chain.
- Need to replace existing stack supplier.

Unique selling points:

- Made in Europe
- Comprehensive integration support.
- Configurable stack design.
- Pressurized high-efficiency stack technology.
- Lower risk of leakages due to novel sealing solution.

ABB


ROCKFIN®

 **MILANI**
SP.A
(IMPIANTI ELETTRICI E TECNOLOGICI)

Go to Market Strategy – 1MW System

Product

1 MW Electrolyser System

gateway
SERIES



roadmap

Target customer:

Utility / RE Developer

- Interested to become hydrogen producer & seller or producer of hydrogen derivatives.
- Limited experience of installing electrolyzers or has a small in-house team.
- Industrial player interested in replacing grey hydrogen with green hydrogen.

Unique selling points:

- Made in Europe
- Modular turn-key systems
- Dynamic operation for RES
- Lowest levelized cost of hydrogen
- 12-month lead time

 UTILITAS

 fortum

Go to Market Strategy – 5MW Stack

Product

5 MW Alkaline Stacks

starbase
SERIES



roadmap

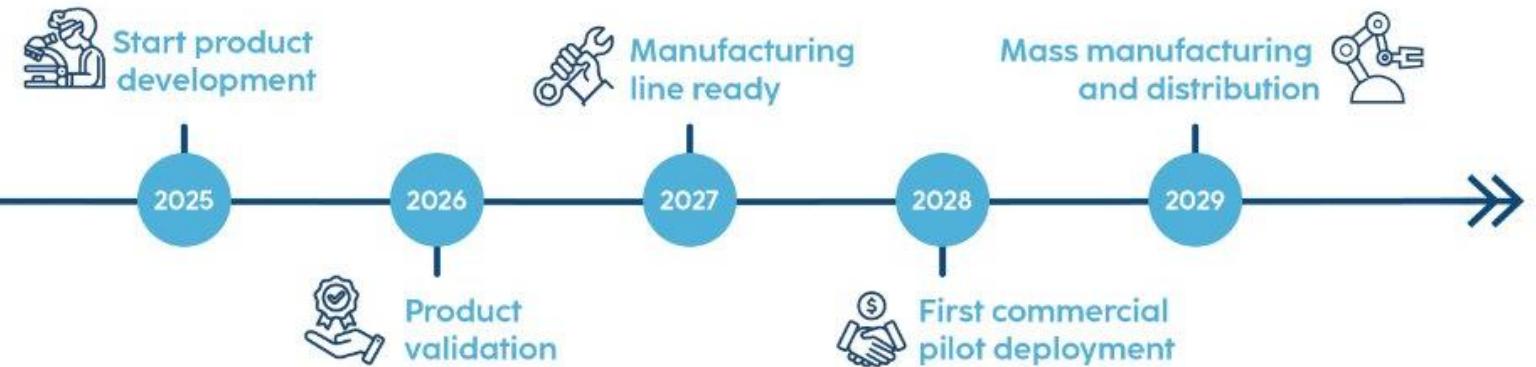
Target customer:

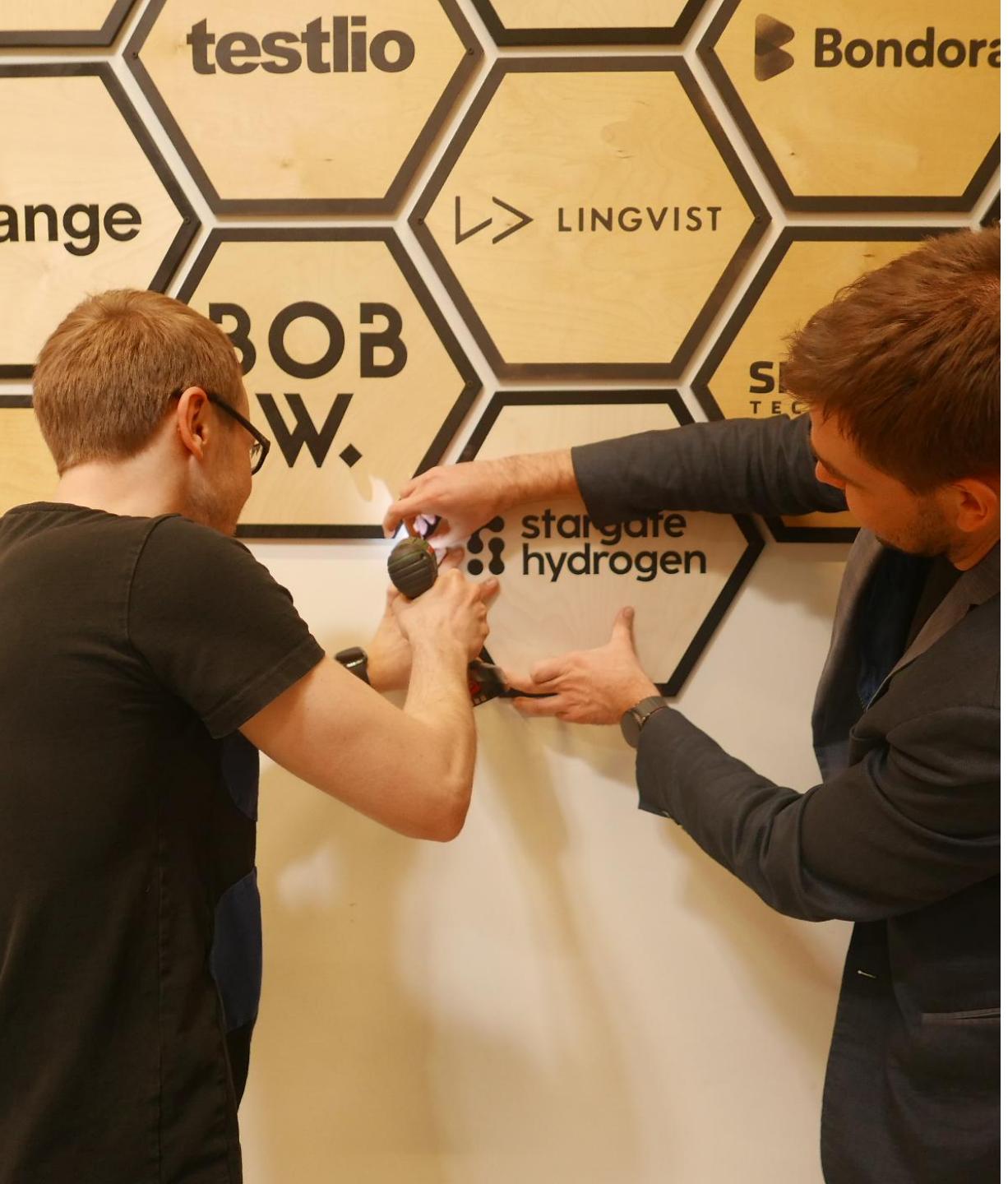
Stack Integrators and EPC Companies

- With in-house process engineering experience.
- Interested to enter the hydrogen value chain or needing to replace existing stack supplier.

Unique selling points:

- Pressurized high-efficiency stack technology.
- Comprehensive integration support.
- Lightweight design, easy installation and transport.
- Optional compact Balance-of-Stack design.
- Can be installed in a container.
- European manufacturing.





Funding



Stargate Hydrogen is backed by strong investors



One of the leading family offices in the the Baltics, focused on energy and sustainability-related investments.



SmartCap is a state-backed Venture Capital fund, investing into funds and Greentech scale-ups with global ambitions.



Repsol is a global multi-energy company, present across the entire energy value chain and operating in nearly 100 countries.



Giga is an Estonian family office, investing into manufacturing companies, real estate and growth companies with global ambitions.



Taavi
Madiberk
skeleton⁺

CEO and Co-Founder of Skeleton Technologies, the global leader in graphene-based supercapacitor and battery energy storage.



Stargate Hydrogen's Grants

Stargate has been extremely successful with EU financing:

- 29 million Euro IPCEI grant (54% support rate)
- 6 million Euros of other grants (70-100% support rates)

Selected list of partners

SKELE+ON
TECHNOLOGIES

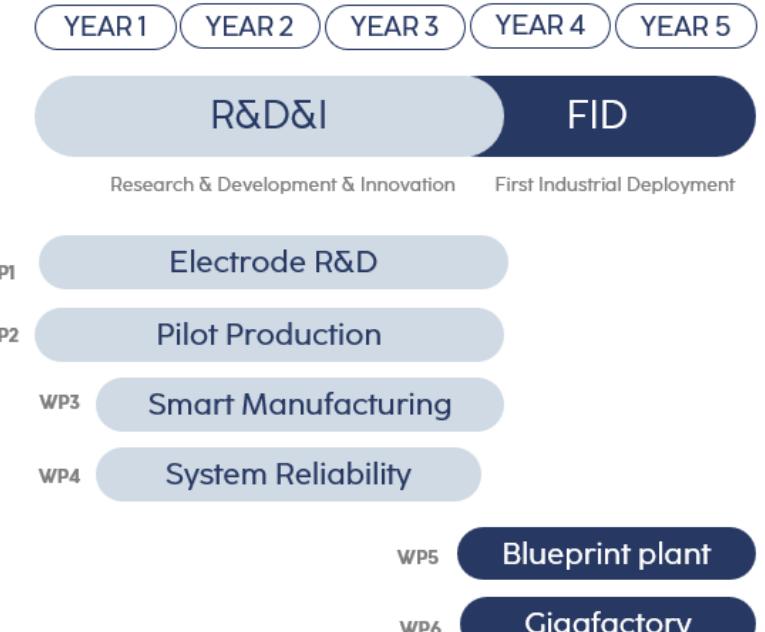
enel
Green Power

AGFA 



Fraunhofer
IFAM

TAL TECH  **reposol**



Stargate IPCEI



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