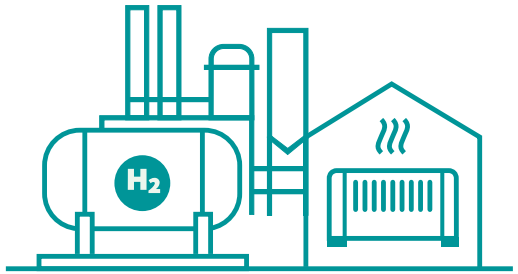
HYDROGENERA

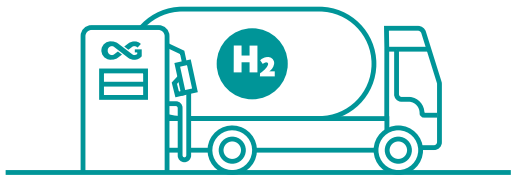
Unlocking the potential of H_2

HYDROGENERA

We are pioneers in developing hydrogen technologies. We're at the forefront of driving change from our advanced electrolyzers, known for their reliability and energy efficiency, to our solid-state hydrogen storage containers based on AB5 metal hydride alloys.

Our focus extends across the entire hydrogen value chain, encompassing production, storage, distribution, and final use, enabling us to contribute to decarbonizing diverse sectors, including heavy industry, transport, and energy.





First Bulgarian company to join the European Clean Hydrogen Alliance.

As a member of the Hydrogen Global Initiative, we collaborate with global partners to accelerate the adoption of hydrogen solutions.

Author of eleven projects for green energy, each listed and prioritized on the European hydrogen map.

As an active member, we help shape the policies and projects driving Europe's clean energy transition.

A publicly listed company on the Bulgarian Stock Exchange, offering a direct investment path into the future of green hydrogen.

As a member, we engage with Nordic's hydrogen ecosystems to exchange knowledge and drive industrial collaboration.

Team

Dragomir Ivanov

Founder/CEO

Inventor of utility model for Atmospheric Alkaline Electrolyser.
Inventor of a controlling system, managing the production of hydrogen and oxygen by pulsed water electrolysis method.
Over 15 years of experience in developing and integrating innovative products for the different operations of the hydrogen value chain.

Borislav Borisov

Chief Production Engineer

Engineer with over 10 years of experience in development, production, integration and installation of hydrogen facilities. Completed prototypes for electrochemical compressor for hydrogen, hydrogen internal combustion engine, control system of a hydrogen production process by pulsed water electrolysis method.

Dimiter Banov

CFO

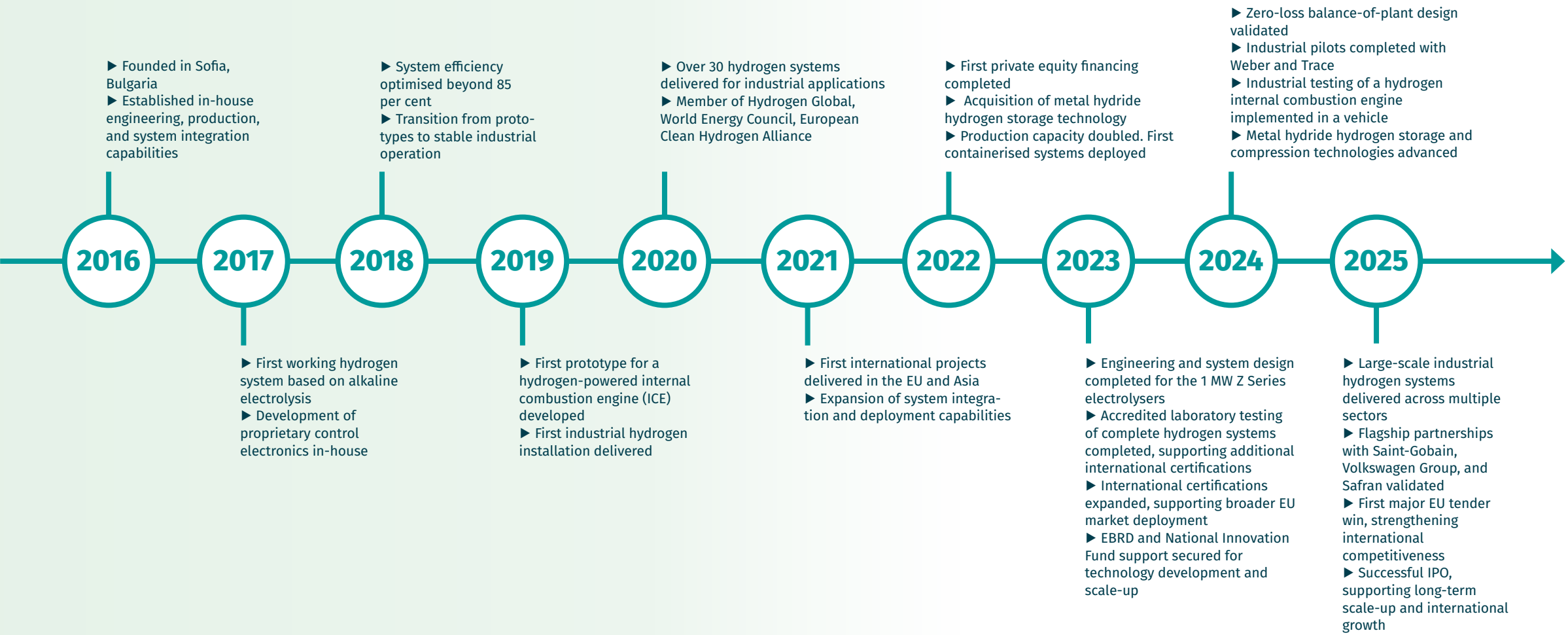
Over 17 years of experience in finance management and investment banking. Proven track record of generating value for companies at different stages of development - from start-ups to market leading listed companies.

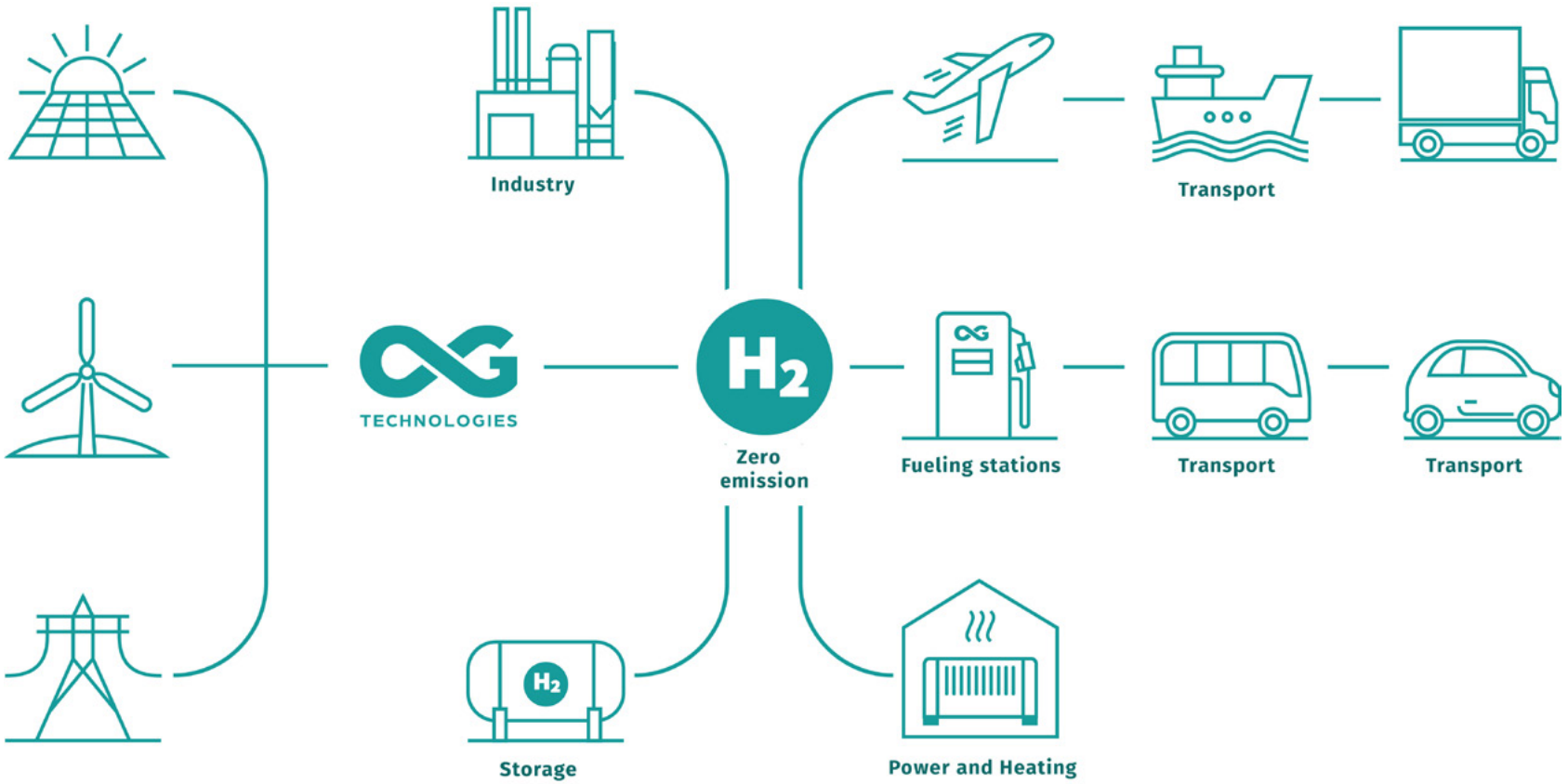
Angel Kasabov

Chief Electronics Engineer

Over 30 years experience in designing, programming and integrating industrial controllers. Senior Assembly language programmer for single-chip microprocessors.

Timeline


2016
► Founded in Sofia, Bulgaria
► Established in-house engineering, production, and system integration capabilities
2017
► First working hydrogen system based on alkaline electrolysis
► Development of proprietary control electronics in-house
2018
► System efficiency optimised beyond 85 per cent
► Transition from proto-types to stable industrial operation
2019
► First prototype for a hydrogen-powered internal combustion engine (ICE) developed
► First industrial hydrogen installation delivered
2020
► Over 30 hydrogen systems delivered for industrial applications
► Member of Hydrogen Global, World Energy Council, European Clean Hydrogen Alliance
2021
► First international projects delivered in the EU and Asia
► Expansion of system integra-tion and deployment capabilities
2022
► First private equity financing completed
► Acquisition of metal hydride hydrogen storage technology
► Production capacity doubled. First containerised systems deployed
2023
► Engineering and system design completed for the 1 MW Z Series electrolysers
► Accredited laboratory testing of complete hydrogen systems completed, supporting additional international certifications
► International certifications expanded, supporting broader EU market deployment
► EBRD and National Innovation Fund support secured for technology development and scale-up
2024
► Zero-loss balance-of-plant design validated
► Industrial pilots completed with Weber and Trace
► Industrial testing of a hydrogen internal combustion engine implemented in a vehicle
► Metal hydride hydrogen storage and compression technologies advanced
2025
► Large-scale industrial hydrogen systems delivered across multiple sectors
► Flagship partnerships with Saint-Gobain, Volkswagen Group, and Safran validated
► First major EU tender win, strengthening international competitiveness
► Successful IPO, supporting long-term scale-up and international growth



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With more than 100 projects for hydrogen systems, Hydrogenera is a recognized leader in the production and integration of alkaline electrolyzers in Eastern and Central Europe

Key customers:

weber SAINT-GOBAIN

SAINT-GOBAIN

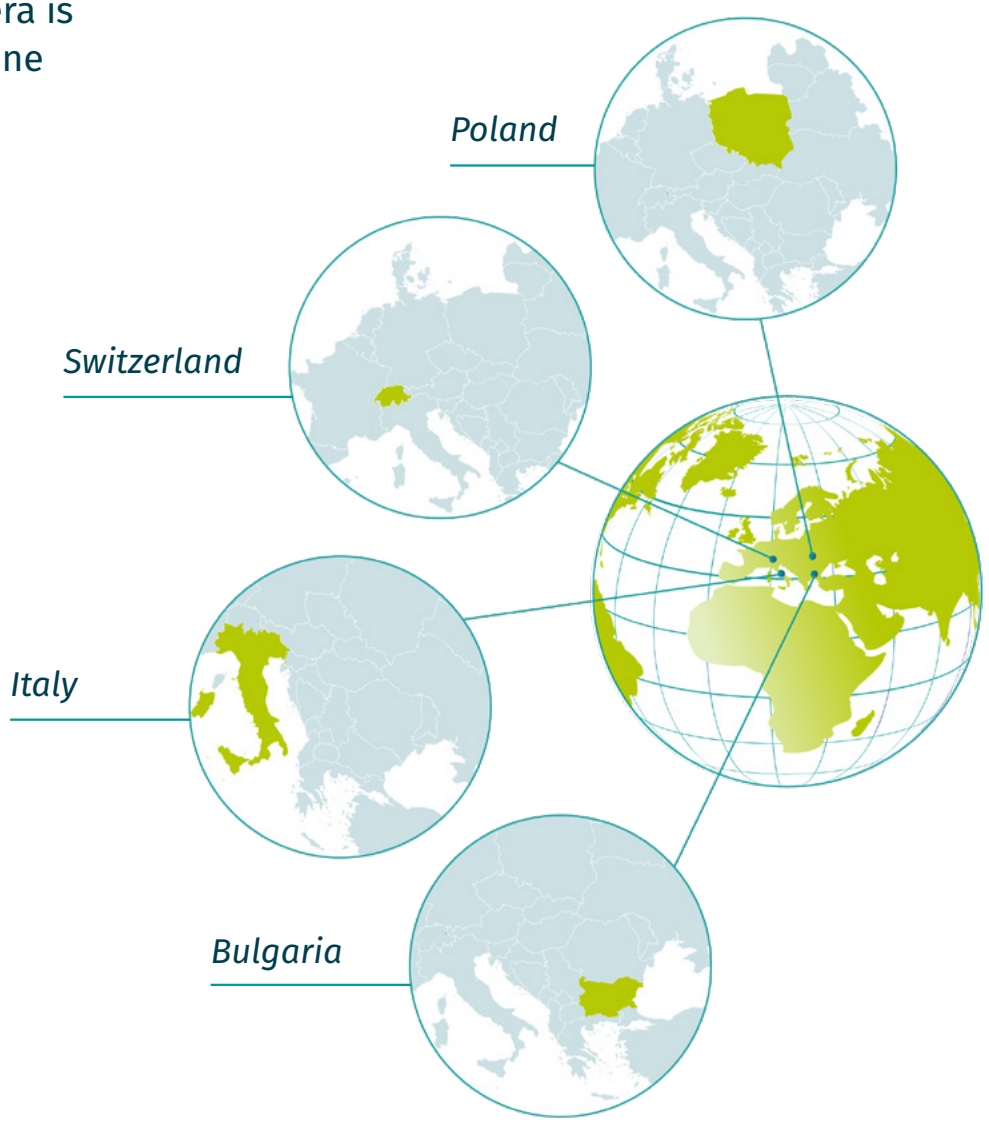
TRACE ТРЕЙС БГ ЕАД

POLLUTION ANALYTICAL EQUIPMENT

3
Years

100+
Projects

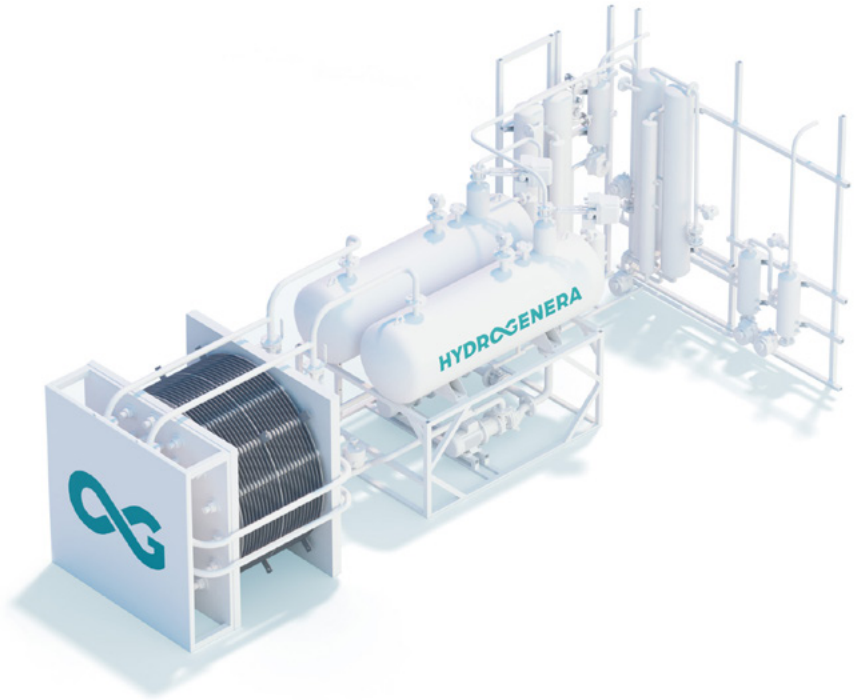
4
Countries



Alkaline Electrolyser - E Series

Tailored, Modular Energy Solutions

The hydrogen systems from the E series are customized solutions, tailored to meet the specific energy needs of each business. These modular systems produce clean, high-energy fuel (hydrogen and oxygen) on-site and integrate it into any combustion process of conventional fuels, achieving increased energy efficiency.



Key Features:

- **Customisation and Flexibility:** Each E system is tailored to meet the unique requirements of different businesses, ensuring optimal integration and performance.
- **Modular Design:** The system's modular concept allows for scalability, enabling businesses to adjust its size based on their energy needs and expansion plans.
- **On-Site Production:** E systems produce hydrogen and oxygen on-site, reducing the need to transport and store these gases.
- **Immediate Utilization:** The produced hydrogen can be immediately added to existing combustion processes, enhancing energy efficiency.
- **Increased Energy Efficiency:** When hydrogen and oxygen are blended with conventional fuels, E systems can achieve up to a 30% relative increase in energy efficiency.
- **Reduced Emissions:** E systems help reduce harmful emissions by adding hydrogen into combustion processes.
- **Sustainable Energy:** Utilizing hydrogen as a fuel supports the transition to sustainable energy sources, aligning with global environmental goals.

Applications :

Industry | Power and Heating | Agriculture | Greenhouses

Integration of E Series Electrolyser in Trace

Integration of E Series Electrolyser in Weber

For further information see the link below:

Saint Gobain Letter of Recommendation | Independant Lab Analysis

Integration of E Series Electrolyser in Polish Academy of Science

For further information see the link below:

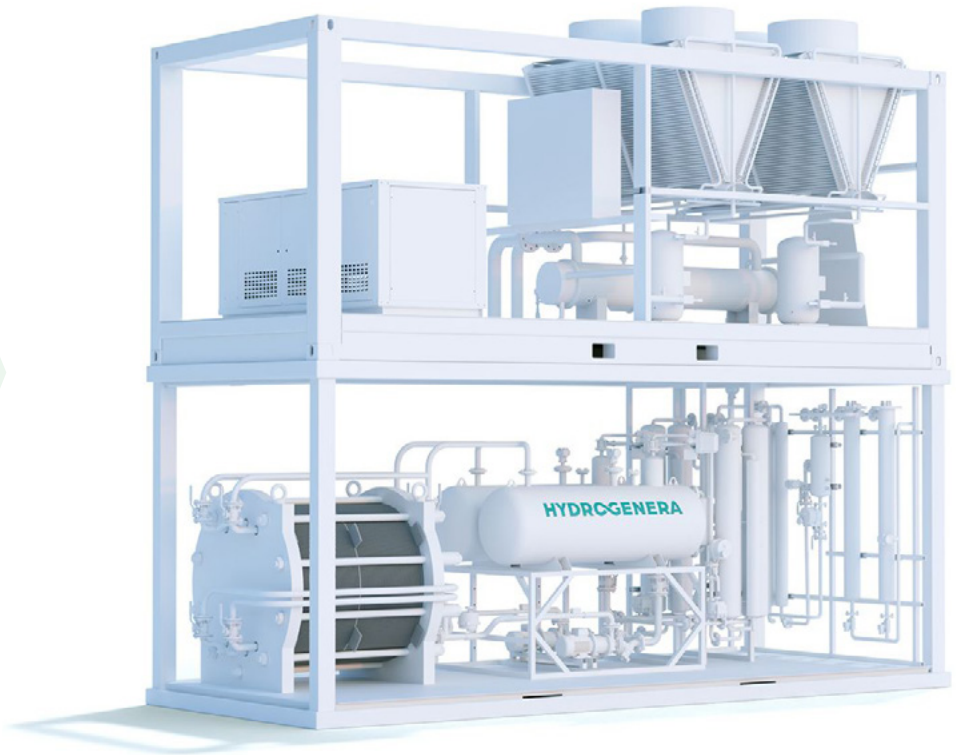
[Project Description](#) | [Independant Lab Analysis](#)

Alkaline Electrolyser - Z Series

Modular turn-key Hydrogen Solutions

Our alkaline electrolysers make a superior choice for Industry, Transport and Power-to-X applications. Modular, scalable, turn-key product ranges set to meet any customer requirements. Z hydrogen systems offer a cutting-edge solution for efficiently, safely, and reliably producing high-purity hydrogen.

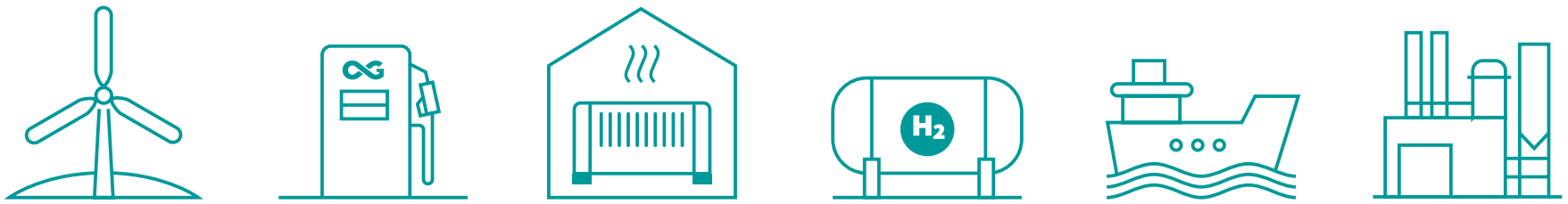
1 MW ▶ 200 Nm³/h ▶ 432 kg/24 h



Key Features:

- **High Efficiency:** Featuring a cell stack power consumption as low as 55,5 kWh/kg H_2. The Z 1 MW systems produce 200 Nm^3/h of hydrogen or 432 kg per day.
- **Hydrogen purity:** up to 99,999%
- **Custom Solutions:** Tailored BOP and stack designs for specific project needs
- **Durability:** The stack's lifespan is up to 15 years, ensuring reliability and reducing maintenance costs
- **Dynamic Response:** Quick adaptation to variable power demands from renewable energy sources
- **Versatile Applications:** Suitable for Industry, Transport and Power-to-X applications
- **Turnkey Systems:** Comprehensive, ready-to-use solutions
- **Scalability:** Easily expandable to meet growing hydrogen production needs
- **Compact Design:** Space-efficient modular system

Applications :



RES | Fueling Station | Power and Heating | Storage | Heavy Duty Transport | Industry

Photo Gallery - 0,5 MW

Metal Hydride-Based Hydrogen Storage Solutions

Metal hydride containers store hydrogen by absorbing it into the crystal structure of metal alloys, allowing efficient storage at low pressure and near room temperature. This method presents a safer alternative to high-pressure gas or cryogenic liquid storage. Using solid-state hydrogen storage metal hydride containers reduces the risks of leaks and other hazards. These storage systems are ideal for applications where safety and space efficiency are critical.

Additionally, metal hydrides provide higher volumetric hydrogen storage densities than compressed or liquid hydrogen, making them suitable for various industrial and marine applications.

Key Solutions We Offer:

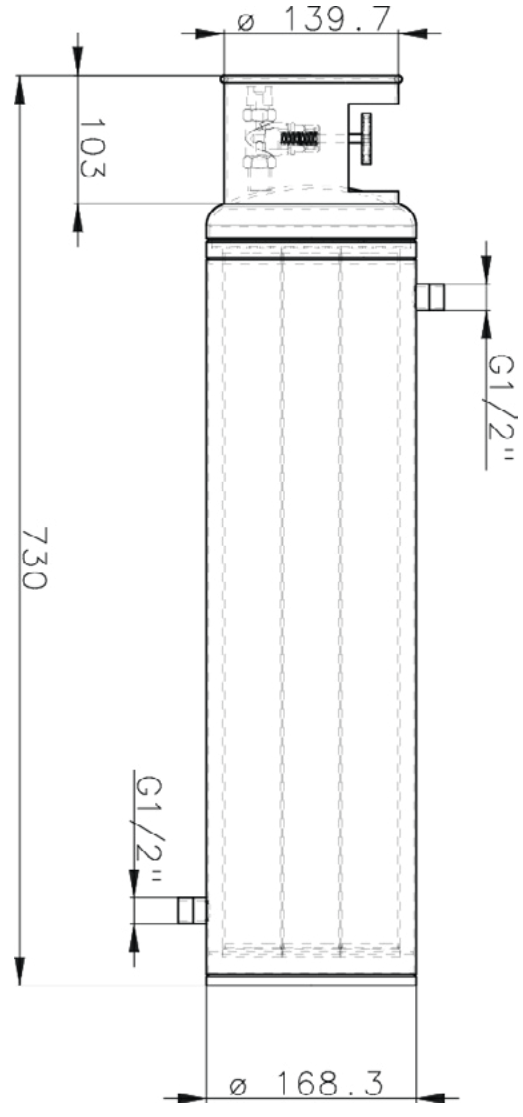
Small Demonstrative Canisters: These have capacities ranging from 10 to 1000 Nl and are designed for use in FID analysers, educational systems and hydrogen-powered RC cars.

Larger Hydrogen Storage Containers: Capacities from 1 to 150 kg are available for stationary and marine applications. These containers are flexible and modular, allowing customisation based on specific capacity needs. Their design makes them ideal for specialised applications where space and weight are key considerations.

Technical Data Sheet Metal hydride storage tank model GSH3000

Nominal Hydrogen Storage Capacity	3000 Normal liters
Charging Pressure	15 barg
Charging Temperature	≤ 20 °C
Nominal Hydrogen Charging Rate	50 l/min
Hydrogen Purity at Tank Inlet	≥ 99.995 %vol
Oxygen Content In Hydrogen At Tank Inlet	< 5 ppm
Nominal Hydrogen Discharging Rate[1]	50 l/min
Hydrogen Delivery Pressure	From 15 to 2 bar
Cooling Water Temperature	≤ 20°C
Fluid Temperature For The Tank Heating	30-50 °C
Cycling Capability	> 1000 cycles
Body Material	EN 1.4301 (AISI 304)
Internal Filter	Swagelok 2 µm
Heat Exchanger	Internal
Hydrogen Connection	Stainless steel valve
Hydride Material	AB5-type metal hydride, LaNi5 based
Outside Diameter	169 mm
Overall Lenght	755 mm
Weight	40 kg

1) Rated parameters are valid using the heating/cooling circuit with internal heat exchanger.



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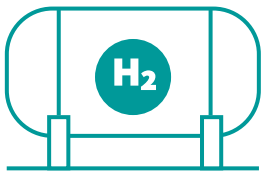
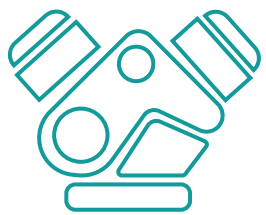
R&D

Since our founding, sustained R&D efforts have contributed to the continual improvement of our technology, setting the benchmark in the market



Metal Hydride high pressure compressor /up to 750 bar/ based on AB5 and AB2 metal hydride alloys.

By utilizing waste heat generated in hydrogen production, the metal hydride compressor helps increase the overall efficiency of the hydrogen systems. It reduces the reliance on energy-consuming electrical compression, while simultaneously decreasing the energy required for cooling. This approach not only improves energy efficiency but also significantly lowers operational costs.



Internal Combustion Engine Running on H2

The principle of operation is identical to the traditional gasoline engine. Hydrogen fuel means zero CO2 emissions for transport industry.

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