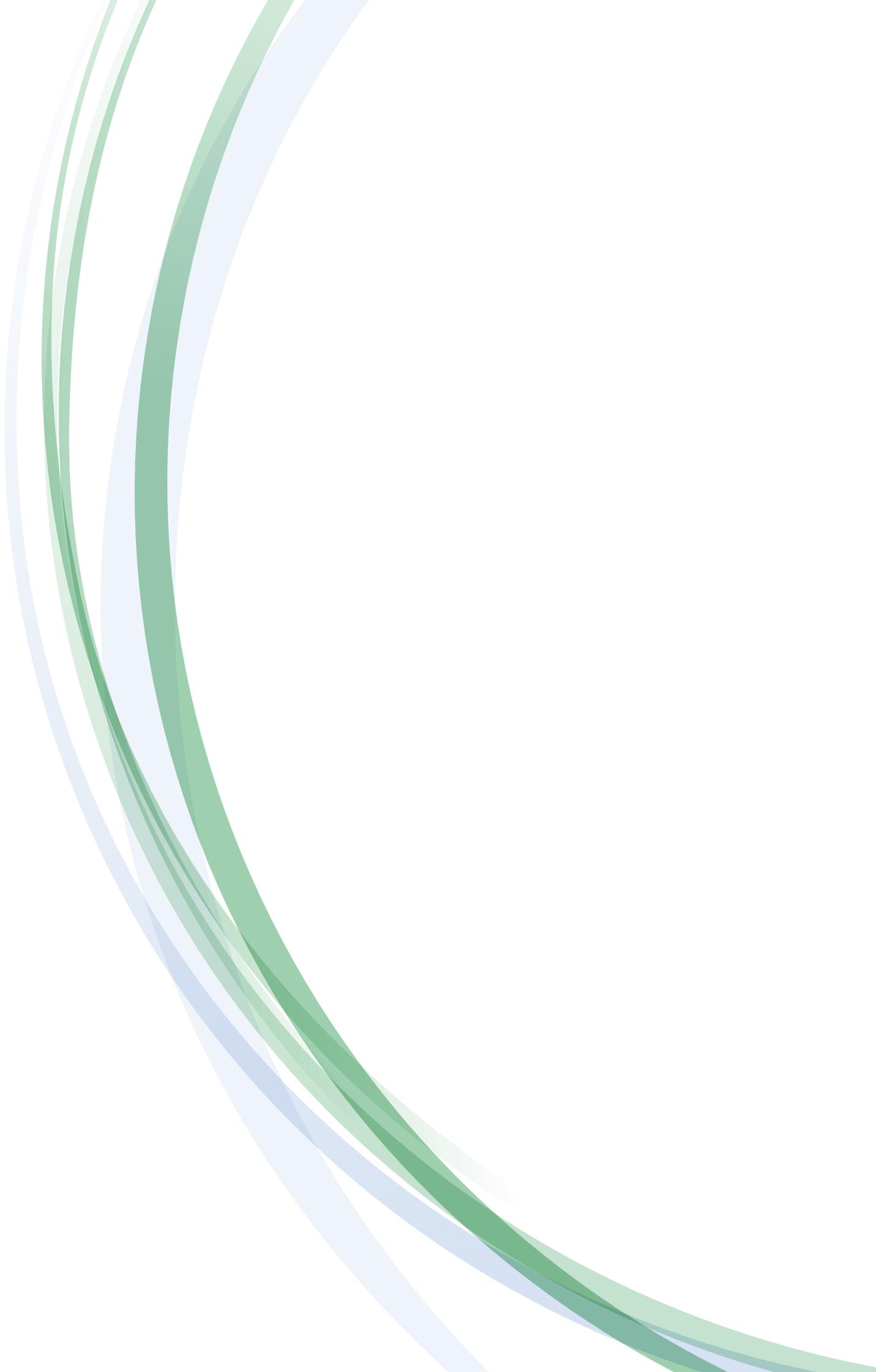


Catalog of Products
and Services of Members
of the Czech Hydrogen
Technology Platform
(2024 Version)

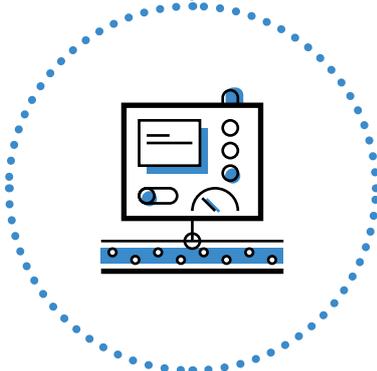


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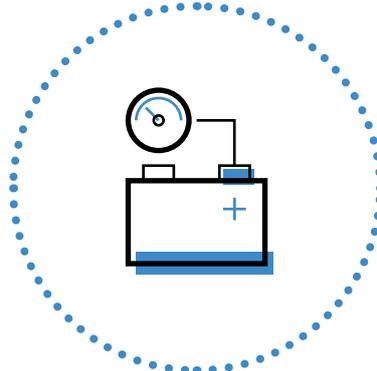


Overview of Products and Services



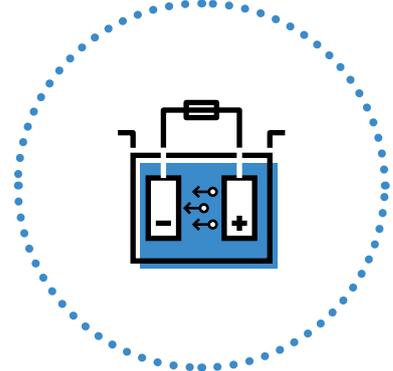
**POWER
ELECTRONICS**

ComAp
Kolibrik.net



**TESTING
EQUIPMENT**

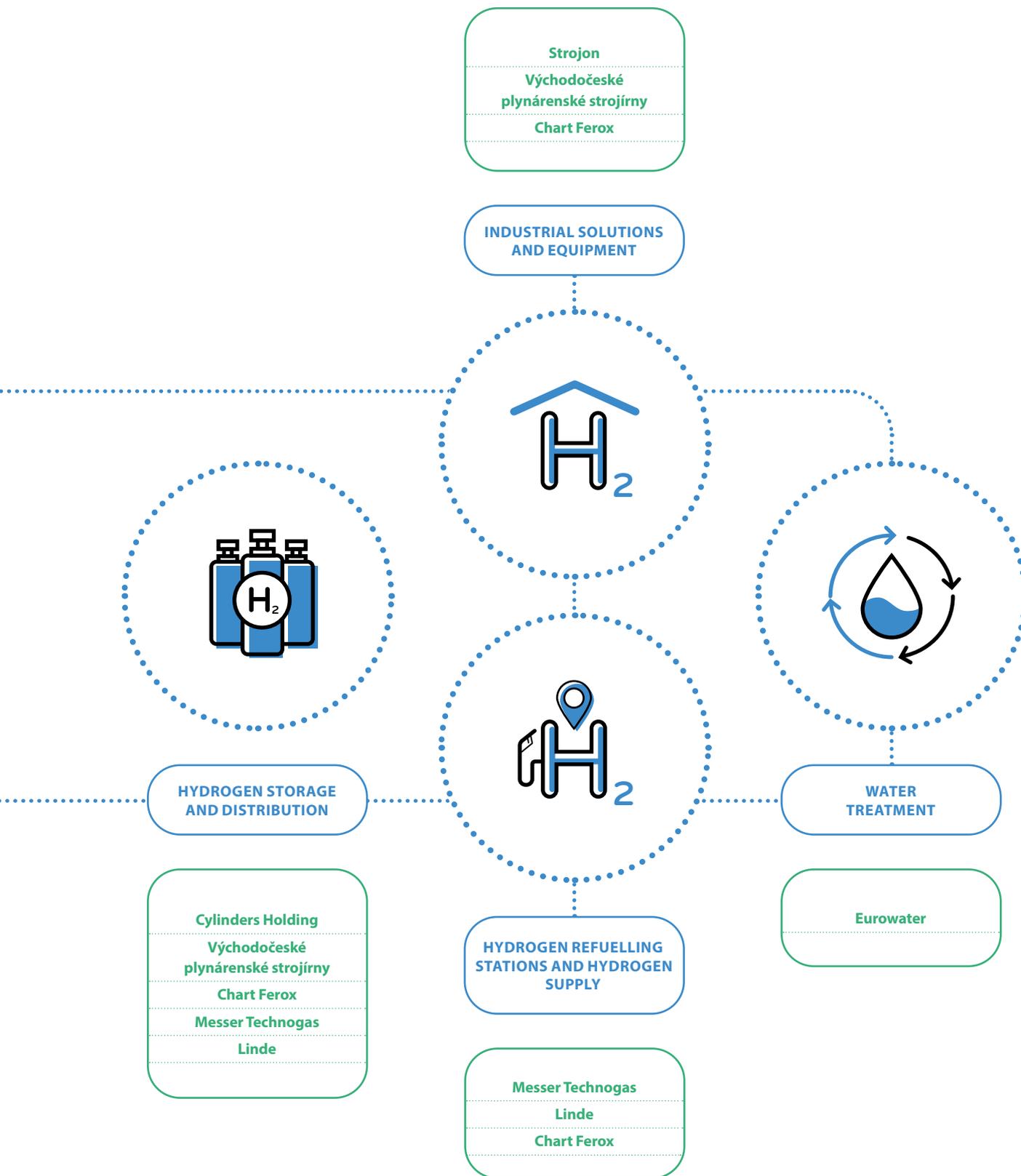
Kolibrik.Net
LEANCAT

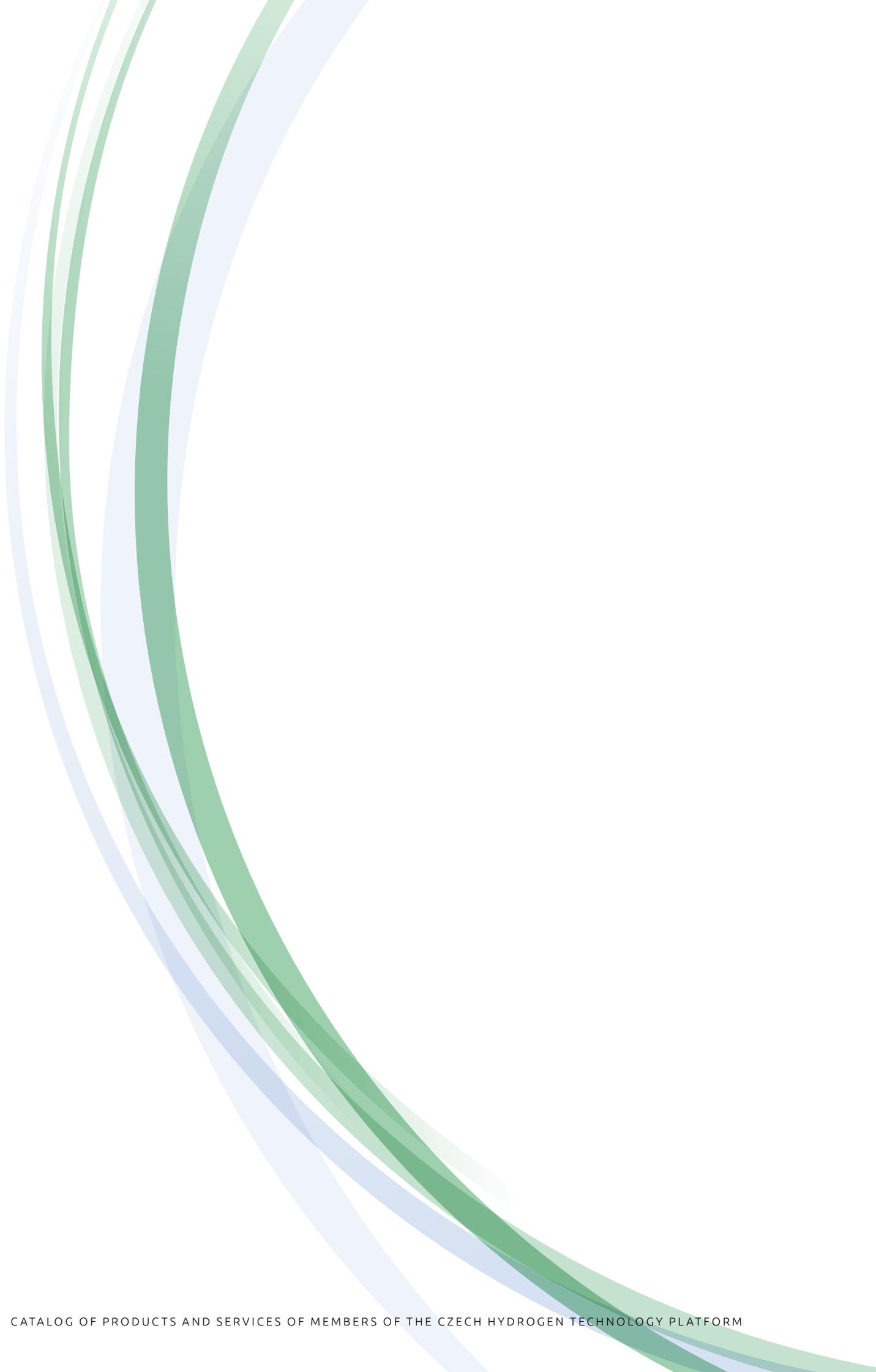


ELECTROLYSERS

LEANCAT
Valcon







Foreword



Dear Readers,

It is my honor, on behalf of the Czech Hydrogen Technology Platform (HYTEP), which proudly comprises over 80 members in 2024, to present our esteemed community's Catalog of Products and Services for the year 2024.

Within this comprehensive document, you will discover the turnkey solutions offered by various Czech companies, gaining insights into the array of products they provide. Should you have any inquiries, please do not hesitate to contact us through our website. Further details about HYTEP are also accessible online via your web browser. I extend my sincere gratitude to our valued members for their invaluable contributions. It is my hope that this catalog will serve as a valuable resource for disseminating best practices and showcasing outstanding products from the Czech Republic.

I trust you will find the contents of this catalog enriching.

Best regards,

Veronika Vohlídková

Executive Director of the Czech Hydrogen Technology Platform



www.hytep.cz



ComAp designs and delivers automation and smart control solutions for power generation, smart energy management and hybrid energy systems. With over 30 years of experience in the industry, ComAp is recognized as global market leader in smart controls, helping system integrators to develop robust solutions with preprogrammed controllers, specifically designed for complex applications. The company covers the full spectrum of energy systems, from traditional gen-set to hydrogen fuel cell gen-set, as well as bi-fuel (diesel engine retrofit) and hybrid microgrid.

1

PRODUCT

ComAp Hydrogen Fuel Cell Controller

ComAp hydrogen fuel cell controller IntelliNeo easily adds power management functions to your system: synchronization with the grid, grid code's compliance, and multiple machine's paralleling. ComAp controllers are respecting the highest cybersecurity standard by design and allow you to easily implement remote monitoring and control. You will be able to setup all these functions through an intuitive graphic user interface, without coding.





LEANCAT



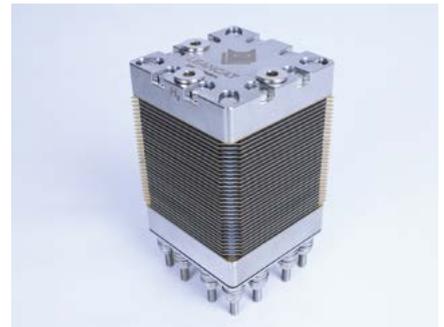
LEANCAT was founded in 2016 with the goal to commercialize the technology of lean-catalyst fuel cells and electrolyzers. Although company focus broadened significantly over the years, fuel-cell and electrolyzer technology is still at the core of their specialization. They offer variety of products such as fuel cells, electrolyzers or testing stations.

1

PRODUCT

Water Electrolyser Stack LCWE25

The bundle of the water electrolyzer LCWE25 with a proton-conductive membrane (PEMWE) is a device enabling the decomposition of water into hydrogen and oxygen through electrical current. The LCWE-HEX model is additionally equipped with a heat exchanger for bundle cooling and energy recovery. At an input of 55 A and 90 V, the bundle produces 1.1 Nm³ of hydrogen per hour. LCWE25 is intended for integrators producing hydrogen generators.





Kolibrik.net offers a complete range of electronic solutions and testing equipment for the hydrogen industry, specializing in H2 technology design, optimization, high-power fuel cell stack and electrolyzer testing, stack control system development, cell voltage monitoring, power conversion, and more.

1

PRODUCT

Potentiostat / Galvanostat

Potentiostat / Galvanostat is an invaluable tool of electrochemical research and development, quality control, electrolyzers, fuel cell and battery testing, corrosion research etc. It enables deep and precise insight into electrochemical processes of your desire.

Voltage	up to ± 10 V
Current	up to ± 100 A
EIS	1 mHz... 100 kHz

Booster option up to 2000 A with zero voltage capability



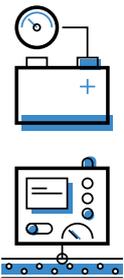
2

PRODUCT

MegaEIS System

Multi-channel electrochemical impedance spectroscopy analyzer is designed for high current and high power hydrogen applications. It enables testing of each individual cell as well as a complete stack simultaneously. It provides detailed information about the state of fuel-cell or electrolyzer stacks. It delivers information for detailed diagnostics to enhance fuel-cell or electrolyzer stack lifetime and efficiency.

Channels	Up to 1024
Voltage	up to ± 1000 V
Current	up to ± 2000 A
EIS	1 mHz... 100 kHz



3

PRODUCT

Cell Voltage Monitoring

Use of Cell Voltage Monitors helps to optimize operating conditions, detect errors and extend the life of your fuel cell stack, electrolyzer or battery. It is an essential method to prevent damage to individual cells in a stack in all operations. KolibriK offers a range of CVMs for a variety of applications as well as custom design to meet customer needs.

ADC resolution	24 bit
Cells	24...1280
Accuracy	0.05%
CAN/RS485/USB	



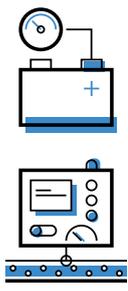
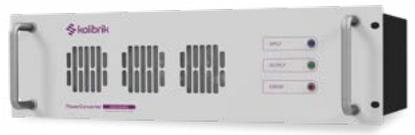
4

PRODUCT

Power DC / DC Converter

Kolibrik's DC/DC converter is a modular power conversion solution developed specifically for the voltage ranges of hydrogen fuel cell applications.

Voltage	90 V / 144 V
Power	up to 5 kW
Constant current / Constant voltage	
Analog / Digital control	





Cylinders Holding



Cylinders Holding a. s. is a Czech company that has been continuously engaged in the development and production of pressure vessels since 1905, holding the largest share in the European market for steel cylinders. Cylinders Holding is a manufacturer of seamless steel high-pressure hydrogen cylinders and containers with pressure ranges from 100 to 1000 bar. Simultaneously, the company provides solutions for product applications related to hydrogen storage and transport in modular systems. The company's exports reach all continents, spanning over 100 countries. Uniquely in the world, the company can produce reverse-drawn steel containers via back extrusion technology for hydrogen storage, capable of withstanding pressures of up to 1000 bars.

1

PRODUCT

Steel Cylinders

Seamless steel cylinders are the perfect solution for hydrogen storage and transportation. Thanks to unique technology, the company's cylinders are not only safe but also much lighter than cylinders commonly available on the market. Safety has been demonstrated multiple times under extreme mechanical or thermal stress conditions in real-world applications. The company's products are characterized by their long lifespan, and they are fully recyclable. Cylinders Holding manufactures hydrogen pressure cylinders in a wide range of volumes (0.8 l–245 l) and operating pressures (100–1000 bar).



2

PRODUCT

Bundles

High-capacity bundles for hydrogen transport, certified with the necessary TPED certification for the safe transportation of hydrogen on roads at pressures ranging from 200 to 300 bars, and in the coming months, even up to 500 bars. High-capacity bundles for hydrogen storage offer a wide range of applications tailored to specific customer requirements, with a variable operating pressure from 200 to 1000 bars. These bundles are utilized, for instance, as storage of hydrogen in hydrogen refueling stations, hydrogen production facilities, or research laboratories.



3

PRODUCT

Multi Element Gas Container (MEGC) 92 x 166 l

The Multi Element Gas Container (MEGC) is designed as a mobile or stationary unit for the transportation, storage, and distribution of hydrogen (H₂). It is certified for both domestic and international road transport (ADR) and railway transport (RID), eliminating the need to transfer the medium to another container. The MEGC consists of a self-supporting frame, and the cylinders are divided into multiple sections through a stainless-steel piping system to enhance safety. The pressure system comprises of 92 steel cylinders with a maximum capacity of 350 kg of hydrogen for each container. Filling and emptying are performed through threaded inlet/outlet, and their dimensions and type can be customized according to customer requirements.



4

PRODUCT

Hydrogen Trailer for up to 500 kg of Hydrogen Storage

Thanks to innovative pressure vessels and the trailer's design solution, trailer has a significantly higher transport capacity compared to commonly used solutions. The trailer is designed for transporting compressed hydrogen at an operating pressure of 200 bars. The total volume of all cylinders is 30,000 liters, equivalent to up to 500 kg of hydrogen at 200 bars. For maximum safety, the stainless-steel piping is welded and consists of 7 sections, each equipped with a thermal fuse and a pressure relief valve. The trailer's supporting frame is manufactured according to the ADR 2021 standard and complies with the EN 13087 standard.





Strojon manufactures pressure vessels, heat exchangers and filtration equipment from carbon, heat-resistant and corrosion-resistant steels operating over a wide temperature range and with a variety of media including hydrogen. Strojon secures both unit and batch production. Strojon supplies apparatus weighing up to 75 t. Strojon has completed several projects which are related to the hydrogen economy, from storage tanks to reactors.

1

PRODUCT

Columns

These columns were designed and manufactured for use in the Unipetrol refinery. The tallest reached a height of almost 40 metres and tested Strojon's production and logistical capabilities to the very edge.



2

PRODUCT

Reactor Vessel

The R901 reactor vessel was installed at the Unipetrol refinery. The heat-treated heat-resistant vessel operates at temperatures up to almost 400 °C.



3

PRODUCT

Column Dryer

This vessel with two control holes and consoles for service platforms is located on the premises of the chemical plant in Kralupy nad Vltavou. The cylindrical base consists of a skirting and two rings.



4

PRODUCT

Gas Separator

The cylindrical horizontal vessel for the Czech refinery was supplied with backing plates to connect the high bases at the installation site. The separator is equipped with process and service ports for servicing the installed equipment.



5

PRODUCT

Autoclave

High-pressure autoclave with steam heating, designed and manufactured for company VSK, commissioned in MCHZ, Ostrava.





Company

Chart Ferox



Description

Chart Ferox, a.s. is a part of the multinational company Chart Industries, which specializes in the development, manufacturing, and turnkey technological delivery of equipment for liquefaction, storage, and transportation of liquefied technical gases, natural gas, and hydrogen.

Products line

1

PRODUCT

Hydrogen Refueling Station

As a world leader in the development and manufacture of cryogenic equipment, Chart develops complete solutions for the transport, distribution and storage of clean energy, including a liquefied hydrogen filling station. Chart has developed a solution for quick and easy refueling of hydrogen-powered electric vehicles (FCEVs) that offers end users a similar experience to filling up with gasoline or diesel. Chart offers a wide range of hydrogen fueling stations to service hydrogen vehicle fleets of all sizes. All stations are designed for easy, lossless refueling with automatic shut-off.



2

PRODUCT

Hydrogen Energy Solutions

Chart's deep cryogenics experience and proven track record make it the ideal partner for hydrogen supply projects as a safe, clean, reliable and affordable alternative to fossil fuels. Chart offers a complete hydrogen energy infrastructure based on internally developed, engineered and manufactured liquefaction, storage, distribution and end-use equipment.



3

PRODUCT

Hydrogen Liquefiers

Chart supplies complete hydrogen liquefaction equipment designed and manufactured in-house. All major liquefaction components including special aluminum heat exchangers, cool boxes, turboexpanders, liquid hydrogen storage tanks, vacuum jacketed pipework and air-cooled heat exchangers are manufactured in-house. Thanks Chart's experience and expertise regarding the unique dynamic behavior of storage tanks and transport containers a Chart system is stable and efficient across a wide range of cold end conditions.



4

PRODUCT

Liquid Hydrogen Transport System

Engineered and built to address the challenges of optimizing payload, reliability and maintainability to meet growing market demand for liquid hydrogen. Chart USA has developed the industry's first 4,5 ton payload hydrogen trailer to improve efficiency and logistics in your delivery operations, helping to meet the increasing demand for LH2. This trailer has the largest payload in the industry. The double-insulated trailers meet the same high performance and operation standards that come with the Chart brand.





Východočeské plynárenské strojírný



Východočeské plynárenské strojírný, a. s. – manufacturer of steel pressure vessels for gaseous hydrogen (GH₂) with capacities up to 100 m³ and pressures up to 50 bar (depending on the combination of required parameters). Services include consultation, structural design, manufacturing, annealing, pre-shipment drying, and transportation. Operations span across the Czech Republic and Europe.

1

PRODUCT

5 m³ Vertical Tank for Honda R&D Europe in Germany

P355 NL1, ø 1600 mm, height including base 4 m, with a DN500 manhole for conducting periodic inspections on the tank shell. The maximum working pressure is 35 bar, and the working temperature ranges from -20°C to +50°C.



2

PRODUCT

13 m³ Vertical Tank for Axpo Power in Switzerland

P355 NL1, ø 1600 mm, height including base 8 m, with a DN500 manhole for conducting periodic inspections on the tank shell. The maximum working pressure is 35 bar, and the working temperature ranges from -20°C to +50°C. The tank is situated in the area of a hydroelectric power plant and is used for storing gaseous hydrogen produced through electrolysis from surplus electrical energy generated by the power plant.



3

PRODUCT

12,5 m³ Horizontal Tank for Devinn Česká republika

P355 NL1, ø 1400 mm, length 9 m, with a DN500 manhole for conducting periodic inspections at the bottom of the tank. The maximum working pressure is 50 bar, and the working temperature ranges from -20°C to +50°C.





Eurowater, spol. s r. o.



Eurowater delivers comprehensive solutions for water treatment across a wide range of industrial and application areas, including hydrogen production. The company offers proven and reliable equipment with high operational reliability. Eurowater provides suitable water treatment solutions regardless of the final technology used: AWE, PEM, SOEC, AEM. The standard units cover all stages of water treatment, from raw water to ultra-pure water. The core product range includes pressure filters, industrial water softeners, ion exchange demineralizers, mixed bed units, AC filters, reverse osmosis systems, mixed beds, and electro-deionization units (EDI), UV units, etc.

1

PRODUCT

Demineralisation System for Hydrogen Production

The water treatment system producing ultra-pure water for the reliable operation of a 5 MW PEM electrolyzer includes the following components: a water softening unit, reverse osmosis unit (RO B1-3), membrane degassing unit (MDU), and a mixed bed filter (EUREX 61). Basic specifications include: water source: chlorine-free water, water treatment capacity: 1200 L/h, and the conductivity of demineralized water: $< 0.2 \mu\text{S}/\text{cm}$.





Valcon International



Valcon International was founded in 2001 as a Czech Republic based company and is situated in Prague. Valcon is a team of experienced engineers with strong knowledge of processes control, advanced controls, automation, and project management. With ongoing green transformation, Valcon is currently focusing on hydrogen generation in order to take advantage of broad experiences to create competitive and safe products for hydrogen generation.

1

PRODUCT

Modular Electrolyser

Valcon cooperates with Enapter Group Company (producer of Anion Exchange Membrane electrolyzers) and offers various products such as modular electrolyser with hydrogen outlet pressure of max 35 bar, guaranteed purity of 99,9 % and basic production rate of 5 Nm³/h. One of the units was installed at the Czech Technical University in 2023.



2

PRODUCT

Flex 120 Unit

Valcon offers Flex 120 units with input power of 120 kW, maximum production rate of 25 Nm³/h, weight 3,7 tons, operational flexibility 3–100 %, scalable design, H₂ sensors and many more.





Messer Technogas



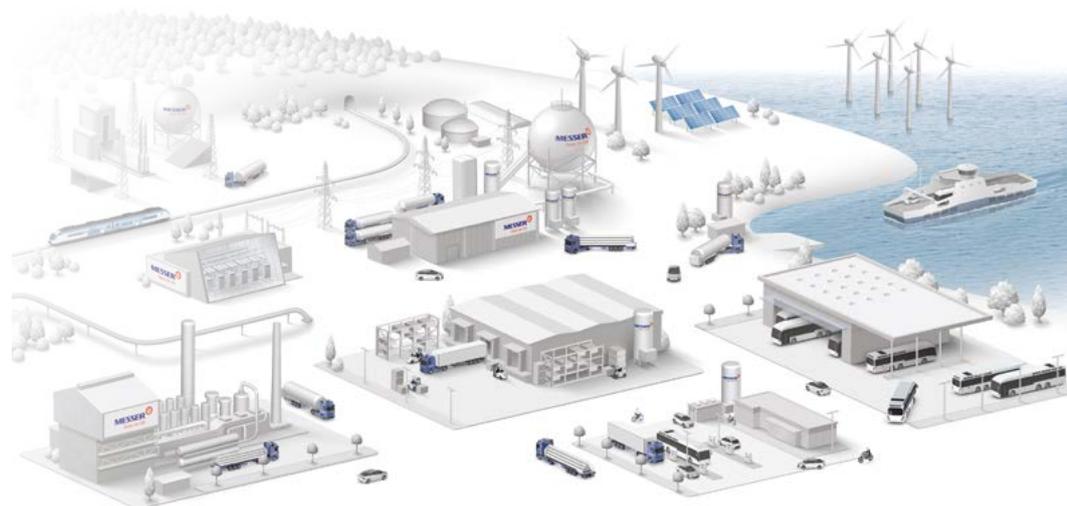
Messer Technogas s. r. o. is a subsidiary of the parent company Messer SE & Co. KGaA in the Czech Republic and stands as one of the leading players in the local market for industrial gases. The company has extensive experience in the planning and operation of supply systems for hydrogen deliveries. This also applies to the safe supply of hydrogen and refueling in large vehicle fleets.

1

PRODUCT

Comprehensive Services for Mobile Refueling

Messer Technogas provides comprehensive services including daily hydrogen, parallel on-site hydrogen production for larger fleets, 100% redundancy of critical equipment components at the workplace, on-site hydrogen storage capacity to cover at least a 2-day demand, an interconnected network of refueling stations for enhanced safety, a mobile 500-bar storage tank as a backup for the refueling station network, and the provision of backup sources and deliveries.





www.linde-gas.cz/en/

Company

Linde



Description

Linde Gas a. s. is part of Linde plc, a world leader in technical gases with operations in more than 100 countries. We are the largest producer and supplier of technical, medical and special gases in the Czech Republic. We provide our customers with innovative solutions, technologies and tailor-made services. Within project Linde Green, we offer our customers green hydrogen and other products with a zero-carbon footprint.

Products line

1

PRODUCT LINE

Linde covers the entire hydrogen value chain with an integrated offering of production, processing, distribution, storage and applications. We can help customers and industry stakeholders navigate the complexities of the transition to a zero-carbon economy. Our engineers work with customers to identify their path to zero emissions and support the design, construction and operation of that project every step of the way. Our expertise today comes from a pioneering past and a visionary future.



Global Market





www.hytep.cz