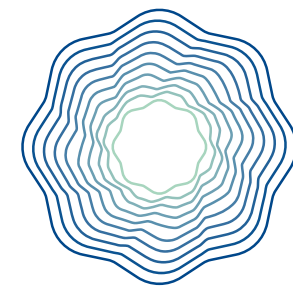


HYTER
NEW ENERGY ROUTES

A new path
towards green hydrogen





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Why Hyter

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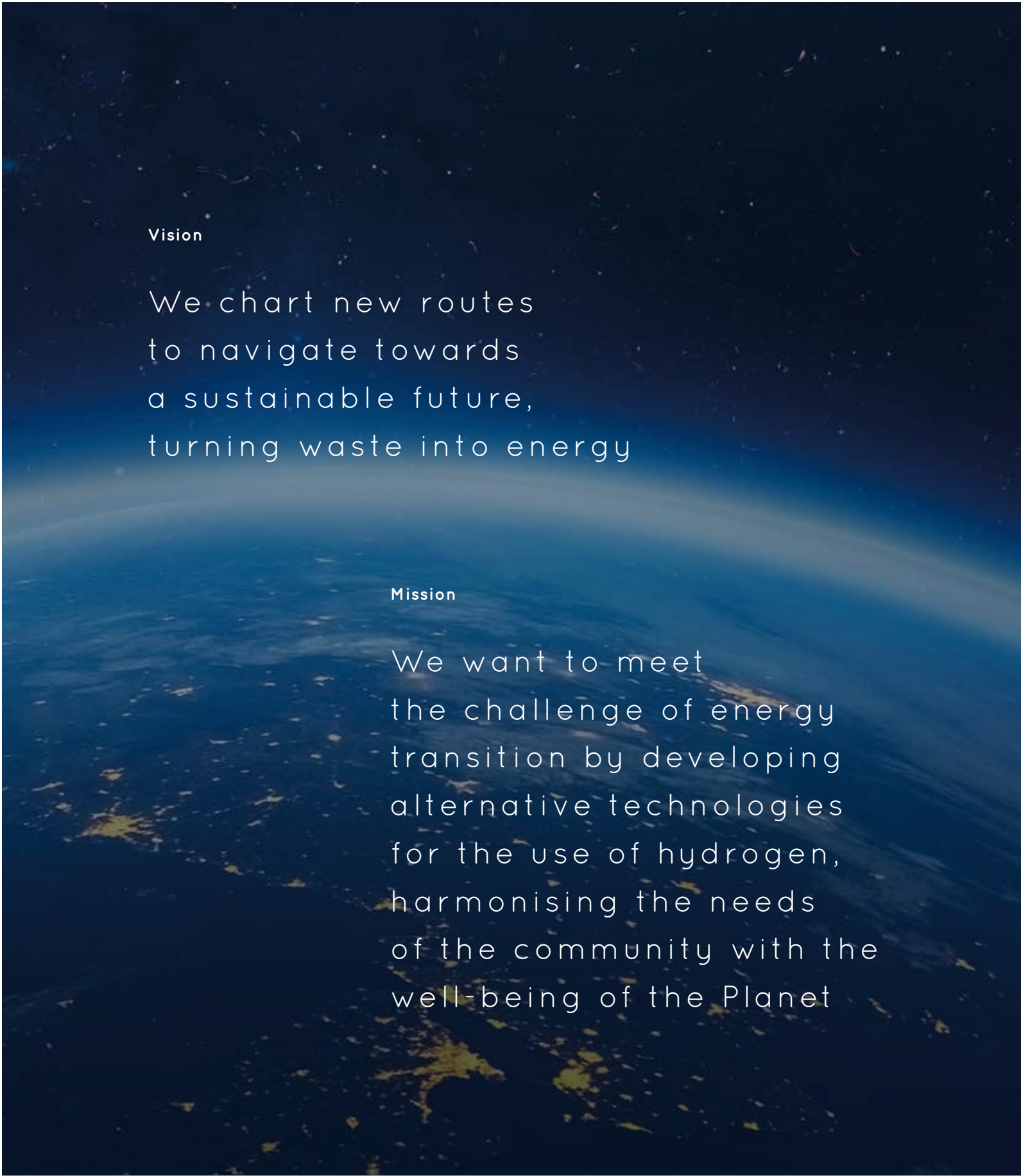
1.1 WHAT WE BELIEVE IN

Our commitment to building a better future with the use of hydrogen

Hyter is an **industrial company** based in **Desenzano del Garda** (BS) that operates in the **renewable energies** industry, with extensive knowledge of the hydrogen sector.

Our company manufactures a **range** of **electrolysers** for **hydrogen** generation, that use an **innovative technology** compared to those commonly used (AEMWE anion exchange membranes instead of an alkaline process or membrane with PEM protonic exchange membranes). It is a choice the **guarantees** a significant **series** of **technical and environmental** advantages, as well as a **reduction** in the **costs** of **plant management**.

The use of electrolysers **meets** multiple **requirements** in the **energy transition** process, in particular, the **need** to **stabilise** the **variability** of electricity production from renewable sources, which very often do not correspond to consumptions, **enabling** the **storage** and **consumption of the hydrogen produced** to **generate electricity** only when actually needed.



Vision

We chart new routes to navigate towards a sustainable future, turning waste into energy

Mission

We want to meet the challenge of energy transition by developing alternative technologies for the use of hydrogen, harmonising the needs of the community with the well-being of the Planet

OUR STRONG POINTS

EXPLORATION



We turn challenges into opportunities by exploring new technological solutions, in search of sustainable innovation.

EXPERIENCE



As a result of our across-the-board expertise regarding energy, we aim to ensure efficiency and satisfaction for all stakeholders.

AFFINITY WITH THE CUSTOMER



We work with determination to analyse the problems and seek the best solutions for our customers and our partners.

SUSTAINABILITY



Our solution integrates with renewable energy, ensuring clean regenerative energy.

INNOVATION



Innovation is a value that permeates all our activities, it is the driving force behind the change that is an indissoluble part of our DNA.

PEOPLE'S WELL-BEING



We want to contribute to building a better future for new generations, which ensures the well-being of people and the community.



Our commitment

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2.1 THE PURPOSE OF HYDROGEN

Hydrogen can be widely used in various applications, since it is easy to store and also transport

Hydrogen is finally gaining a **key role** in the energy sector. It is a valuable molecule that is easily produced and represents a complementary solution to other green gasses and the electrification process.

1 kg of hydrogen contains the same amount of energy as 2.4 kg of methane or 2.8 kg petrol

More importantly, green hydrogen will play a key role in the **reduction of emissions** within the **EU's decarbonisation** strategy. The goal of the European Green Deal is to achieve **zero emissions** by **2050**.

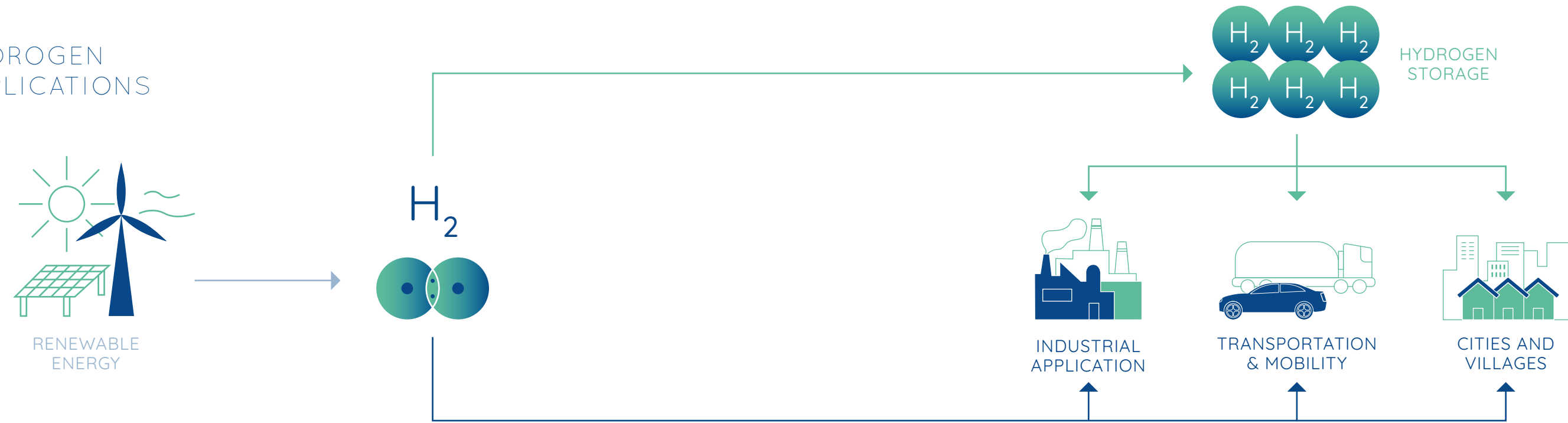
In 2050, cars, trucks, buses, trains, ships and planes will use direct electricity stored in batteries or produced by hydrogen in fuel cells

The plan anticipates that, through the transition to hydrogen, it will be possible to decarbonise entire sectors that currently rely on fossil fuels: from **transport**, to **heavy industry**, to **the heating of buildings**.

The European Commission has defined an operative strategy with a massive investment plan that aims to push production of green hydrogen up from 2% to 14% in 30 years, with intermediate production targets of one million tonnes by 2024 and ten million tonnes by 2030. By 2050, a quarter of the total renewable energies will be used in the production of green hydrogen to be used on a large scale.

Hyter's commitment is to contribute to a sustainable growth ensuring a clean energy supply for businesses and end users

HYDROGEN APPLICATIONS

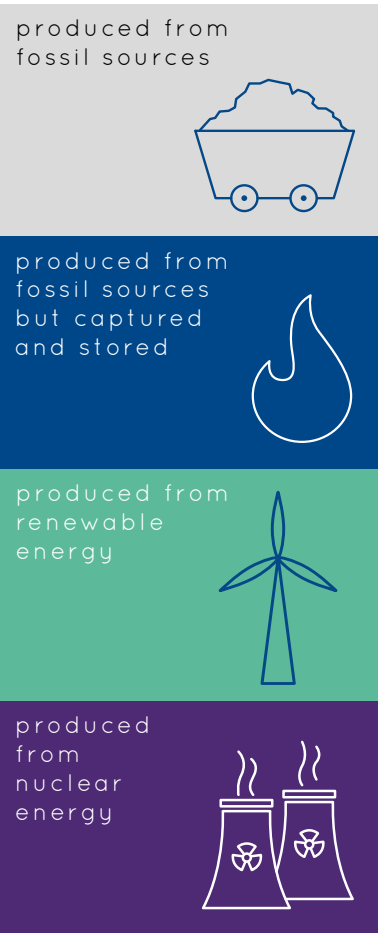


2.2 HYDROGEN

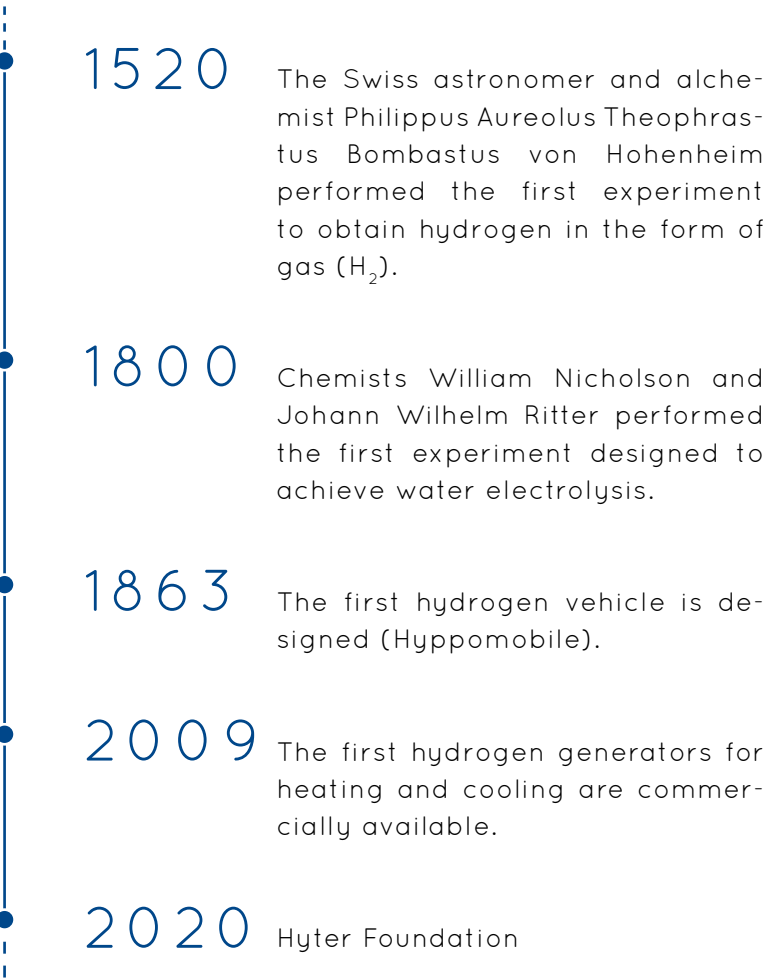
Hydrogen is the only fuel that does not produce any polluting emissions, but only water

Hydrogen is the **lightest** and **most abundant** chemical element **in the entire universe**. Compared to conventional fossil fuels, it totally eliminates CO₂ emissions and the associated climatic-environmental problems, as well as having the maximum content of energy per weight unit, **three times higher** than **petrol**.

THE VARIOUS TYPES OF HYDROGEN



THE HISTORY OF HYDROGEN



2.3 ELECTROLYSIS

Electrolysis enables zero-impact generation of green hydrogen

Despite being the most abundant element on Earth, **hydrogen in nature** is only found bonded to other elements, and it is thereby necessary to “**extract**” it artificially. In particular, as a result of an electrolysis process (which separates hydrogen from water) powered by **renewable energy**, it is possible to obtain the so-called “**green hydrogen**”.

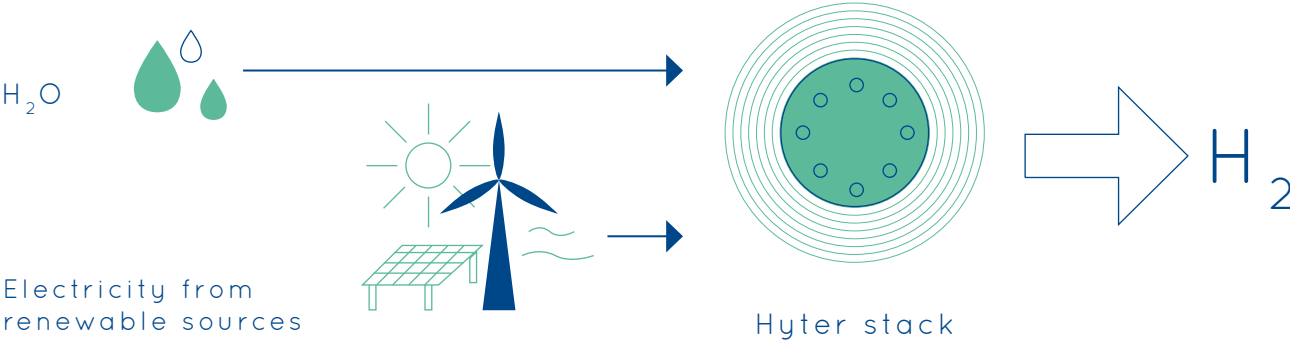
Using these technologies satisfies multiple needs in the energy transition process

Hydrogen is suitable for direct use (like a process gas or energy vector) but can also be easily stored for future use

This way, **polluting elements** are excluded and **natural resources are not consumed**, thereby obtaining a **zero-impact** process.

Hyter solutions use an electrolysis technology based on an **anion exchange membrane** (AEMWE), a choice that has numerous advantages from different points of view: environmental, technological and economical.

THE ELECTROLYSIS PROCESS





Our solution

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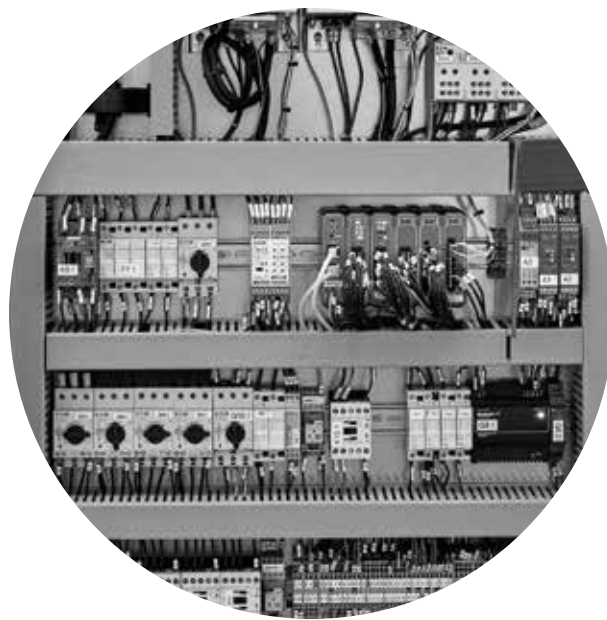
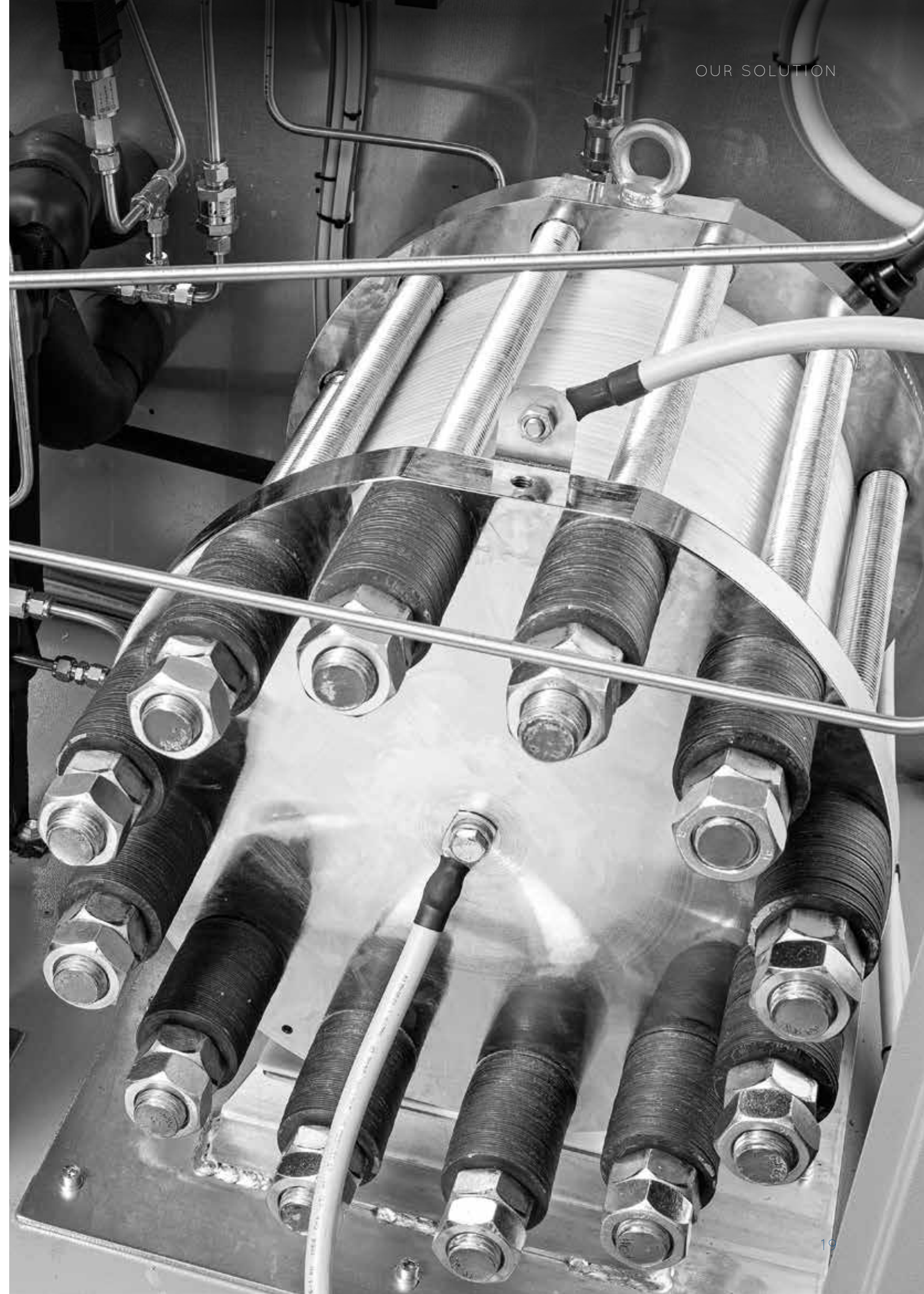
3.1 AEMWE TECHNOLOGY

A Hyter hydrogen generator uses the demineralised water process, enabling high performance with low maintenance costs

The AEMWE technology perfected by Hyter is one in which the **electrolyte solution** is in an **alkaline type of liquid form** with a concentration equal to a percentage ranging between 1 and 5%.

Hyter electrolytic cells use **catalysts** to speed up the splitting process made from much smaller amounts of PGM (Platinum Group Materials) than other technologies. This solution enables a significant reduction of investment costs and a low environmental impact. **Ionic exchange** occurs through a **polymer membrane, produced by Hyter** and containing **electrolytic substances** that **improve the splitting performance** of the water and also has the function of **separating the two gases, hydrogen and oxygen**, during production.

This technology is much **more cost effective** from a **chemical point of view** but, at the same time, is **very efficient**.



3.2 A COMPARISON OF TECHNOLOGIES

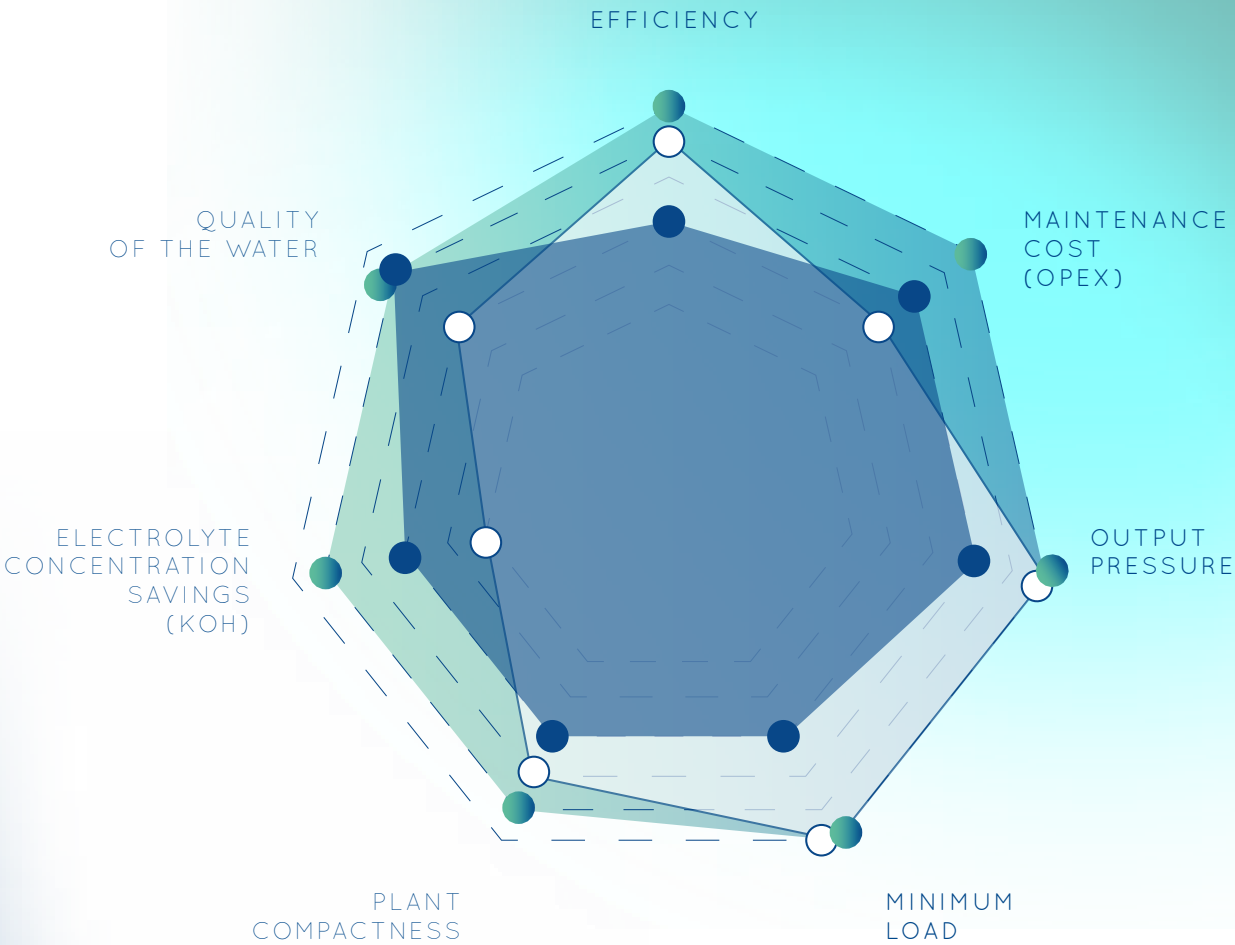
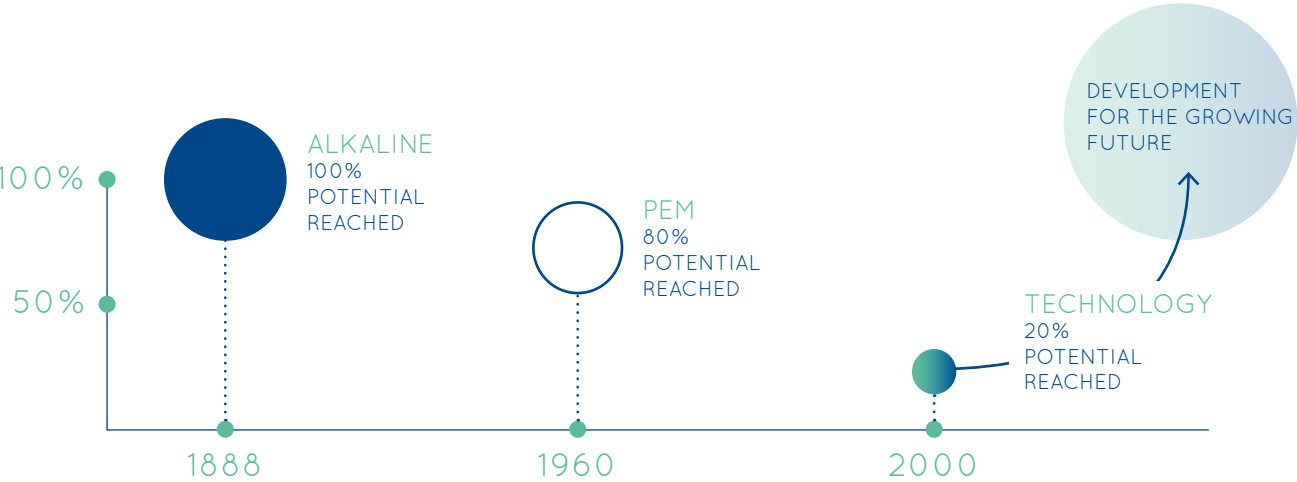
An alkaline hydrogen generator requires demineralised water and involves low investments, but the process does not enable high efficiency and performance is limited

A PEM hydrogen generator can reach high performance levels but requires pure water and large amounts of noble metals in order to work

In addition to AEMWE, the main technologies for generating gaseous hydrogen are the alkaline process and the PEM membrane, which differ in the electrolyte substance that makes up a cell, or equipment capable of splitting water into hydrogen and oxygen through electricity.

The **alkaline** technology uses an alkaline type of electrolyte solution whose concentration is above 10% (generally 25-30%). Conventional alkaline electrolytic cells use nickel-plated catalysts to speed up the splitting process. Anion exchange occurs through an inefficient porous septum, which makes this technology **cost effective** from a **chemical point of view**, but also **very limited in performance**.

The **PEM** technology is usually one in which the electrolyte solution is in an acid type of solid form. Electrolytic cells use catalysts based on platinum and other noble metals. Ion exchange occurs through a polymer membrane that contains the electrolyte and also has the function of separating the two gases on the production side. This technology is very **expensive** from a **chemical point of view**, but it is **very efficient**, even though the initial **investment** required is very **high**.



- AEMWE (HYTER)
- PEM
- ALKALINE

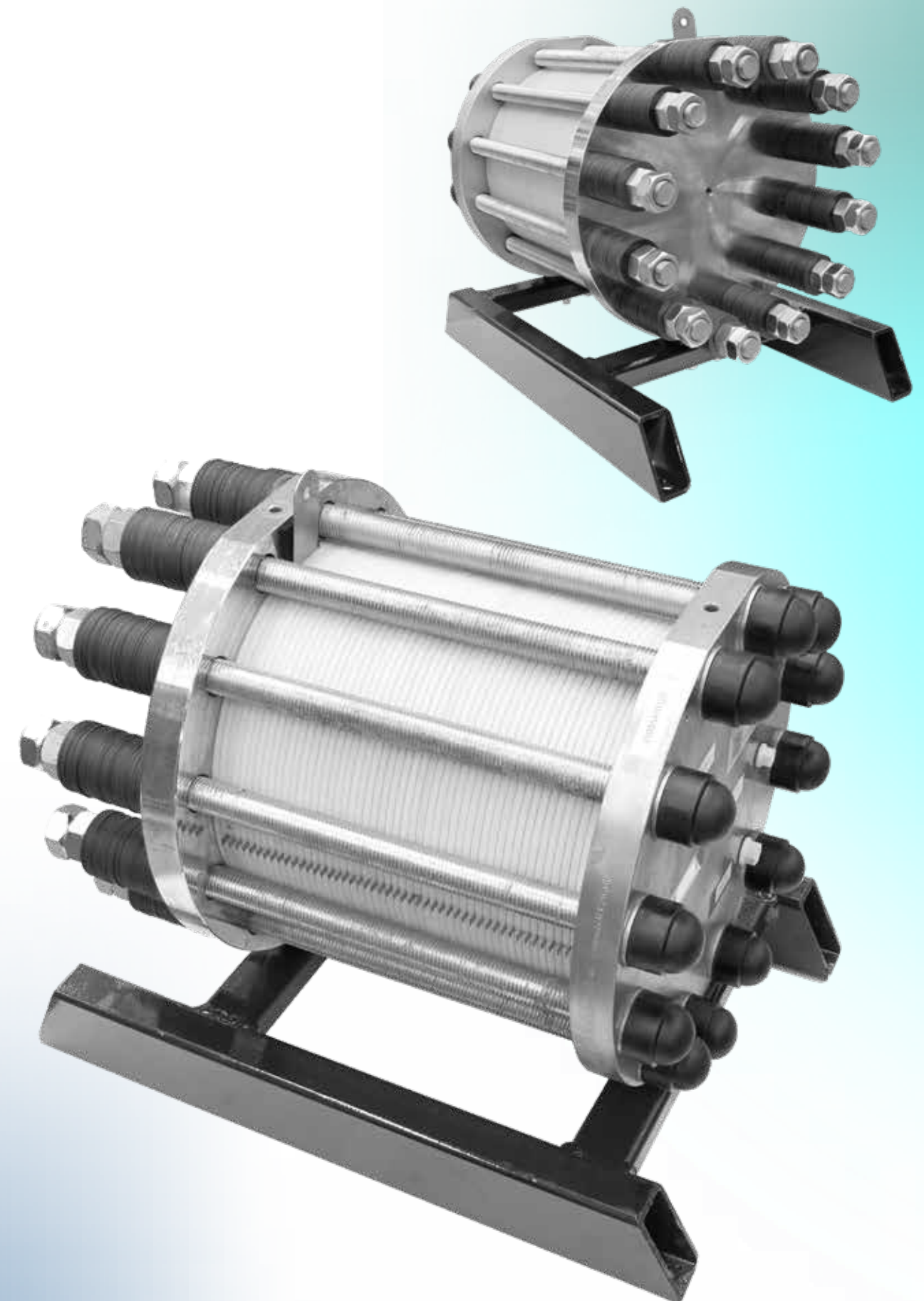
3.3 HYTER SOLUTIONS

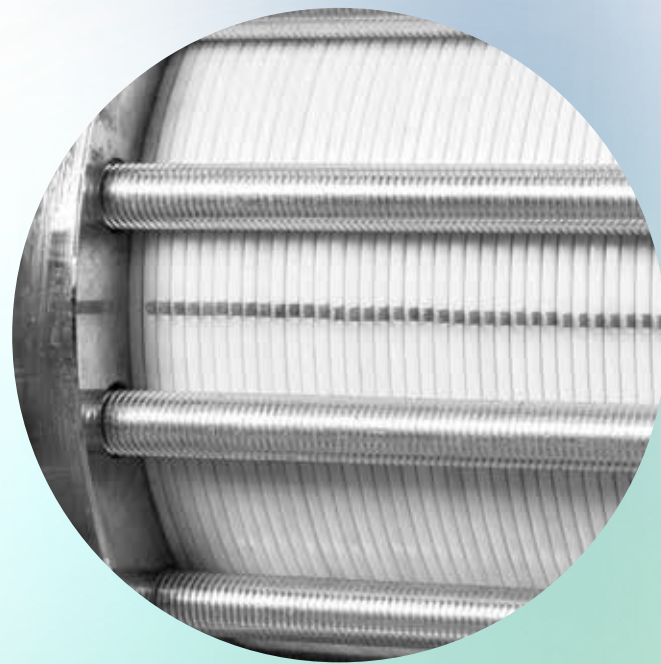
Our solutions can be designed according to the customer's requirements and end applications as a result of a modular architecture

Hyter electrolyte cells produce gaseous hydrogen and oxygen through the electrolysis of water.

A **special anion membrane** separates the two gases in the process stage, thereby making it possible to obtain a **differential pressure between the two poles** with a compression ratio of up to **25:1**.

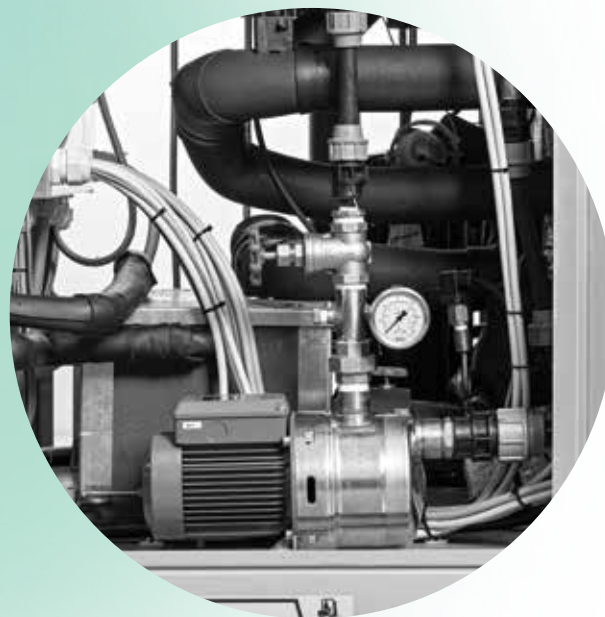
Hyter generators are made of AISI316 stainless steel and special plastic components.





Cell tested in
frame-by-frame
pressure

Use of
demineralised water
(ASTM grade 2)



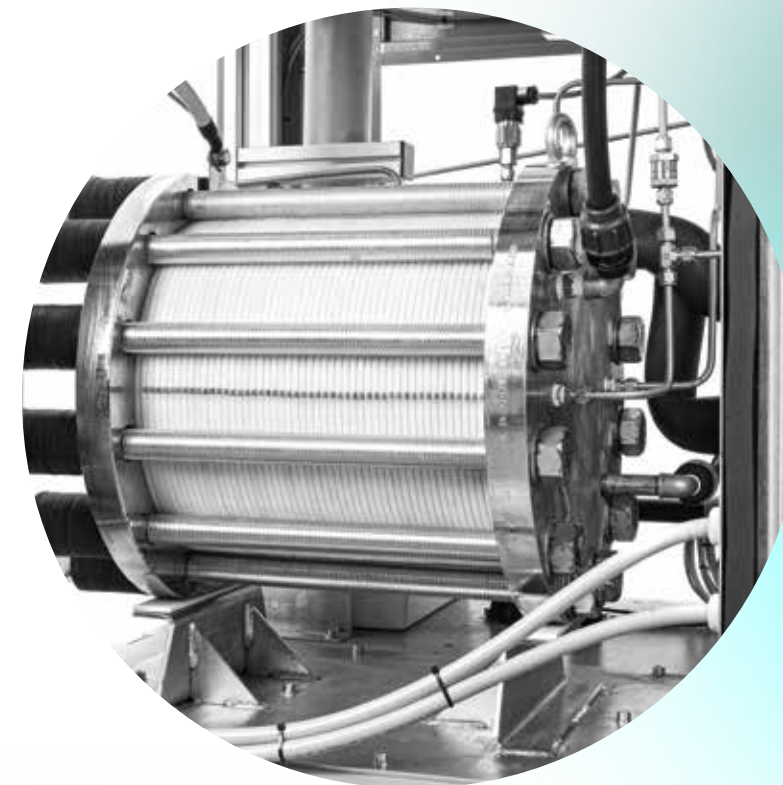
Process efficiency
above 85%

Remote electronic
control unit



Easy
to install

Direct connection to
the renewable energy
sources

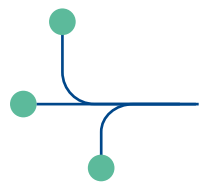


Metal parts made
of AISI 316 steel

Use of electrolytes (KOH)
between 3% and 5%

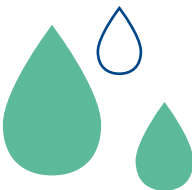
Outlet pressure
up to 25 bar





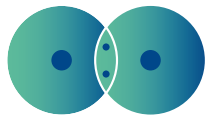
TECHNOLOGY

The AEMWE proprietary technology electrolyte cells are manufactured in-house and are patented.



WATER

The process liquid is a solution of 3-5% with KOH, using ASTM type II demineralised water, and can be produced directly without energy expenditure (using water mains pressure).



HYDROGEN

The hydrogen produced is 99.95% pure and is already produced pressurised up to an output maximum of 25 bar without the use of compressors.
The machine does not have a minimum operating range; it runs from 0% to 100% of its potential.



COOLING

The cooling system is sized with a chiller that cools the process water as well as cooling the hydrogen in order to increase its purity up to 99.95%.

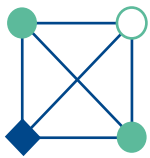


GRAPHIC INTERFACE

The graphic interface has a touch-screen monitor designed and customised based on the customer's requirements, with different menus in order to set the generator according to specific needs.

The main information is visually reproduced as follows:

- Production rates
- Operating pressure
- Process temperature
- Potential alarms



CONNECTION

Modbus, TCP / IP, and industry 4.0 communication ready.



SAFETY

The generator is designed and built according to current regulations:

- Machinery Directive
- Low Voltage Directive
- Electromagnetic Compatibility Directive
- ISO 22734 standard
- PED Regulation

The machine complies with EN 60079-10-1
Each project undergoes an FMEA analysis

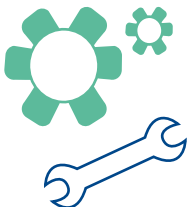
The safety devices are controlled by the PLC, programmed in-house, and regarding:

- Process liquid tank level
- Process liquid flow switch
- Hydrogen gas over-pressure
- Process liquid temperature
- Hydrogen presence
- Process liquid leak
- Forced ventilation inside the cabinet
- Sensors compliant with ATEX zone 2



PLUG & PLAY

The generator is designed to be plug & play. Once connected to the water and electricity sources, simply press a button to start the machine.



MAINTENANCE

Routine maintenance is based on the operating hours, however, approximately once a year, it is necessary to restore the electrolyte and perform a general overhaul.



Choosing Hyter

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4.1 OUR PATH

Scalable technology and modular dimensions to meet the various end applications

Hyter's innovation driving force is fuelled by a team of cross-disciplinary skilled experts focused on providing increasingly competitive solutions to the market.

The goal we have set our sights on is to continuously improve technology and performance.

Furthermore, as a result of the continuous investments in research and development, we aim to develop additional new applications for the valorisation of hydrogen, thereby contributing to building a new and more sustainable energy ecosystem. Also, from an industrial point of view, we aim to improve the efficiency of our processes, integrating high-tech equipment and organisational and production best practices.



BUSINESS MODEL



SALE OF ELECTROLYTE CELLS (component)



SALE OF HYDROGEN GENERATORS (complete plant)



SERVICE AND ASSISTANCE

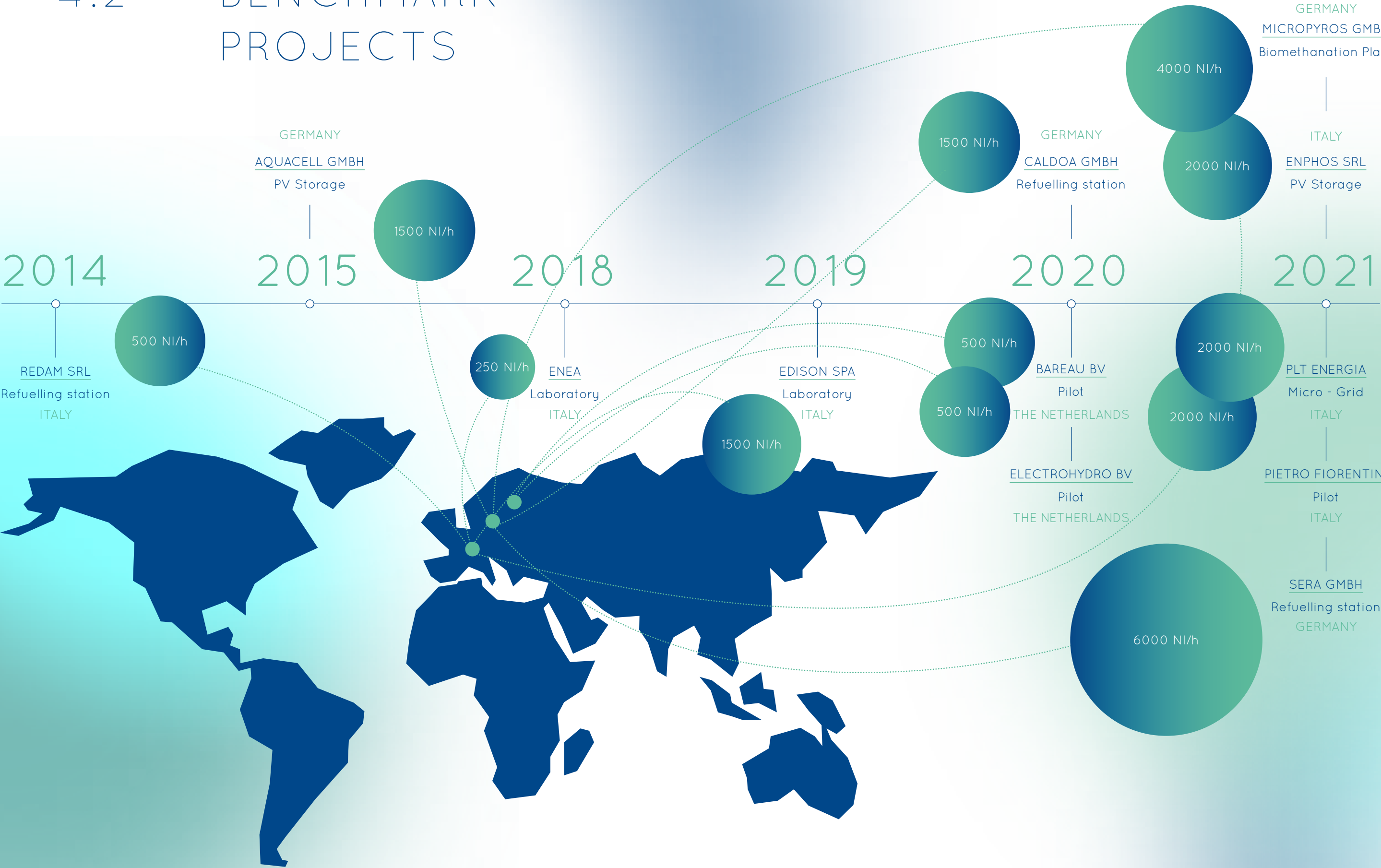


ECO-LEASING (in the future)



TAILOR-MADE

4.2 BENCHMARK PROJECTS



4.3 FOR A BETTER FUTURE

Our vision indicates the road for sustainable innovation that includes the wellbeing of future generations

As a company, we want to meet the challenges of the future of energy by taking concrete responsibility for the contribution that we can make with our solutions.

By always placing user safety in the forefront, we aim to guarantee a high return of investment while minimising the global impact of our products and processes.



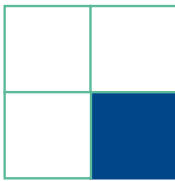
Absolute separation between hydrogen and oxygen throughout the entire process, guaranteeing maximum

SAFETY



Minimum use of PGM (Platinum group metals)

SUSTAINABILITY



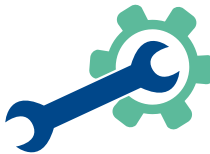
Tailor-made solutions for each customer, application or dimensions as a result of modular design components and accessories

MODULARITY



Perfect results at competitive costs

EFFICIENCY



Optimised design and low routine maintenance required

FEATURES

We want to play
a leading role in building
a better future for
new generations.

We consider challenges
as new opportunities
and we commit to producing
safe and sustainable energy
for the Planet.

April 2021
Board of Directors

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