



THE GLOBAL HYDROGEN SOURCE

24 MAY 2023

HYGEAR INTRODUCTION

ESTABLISHED IN 2002

- **HyGear's Experience**

- +20 year expertise in the field of Hydrogen technology with the mission to develop cost-effective gas supply
- Leader in On-site Generation, Recycling and Purification of Hydrogen gas
- Active in **18 countries** with **77 installations** operational worldwide
- 14 patents ensuring a competitive edge
- Continuous drive for innovations and new developments
- 60,000 kg CO2 reduction per system per year



- **Since 2023 part of the HoSt group**

- +30 year heritage in the field of renewable energy technology
- Accelerated growth since 2001: international expansion in >35 countries with more than 400 projects
- 450 employees in offices in the Netherlands, the US, UK, Latvia, Germany, France, Poland and Singapore



HYGEAR PRODUCTS & SERVICES

ON-SITE TECHNOLOGY



Steam Methane Reforming

Hy.GEN

HyGear's cornerstone product offering the highest overall efficiency and the potential for zero emission using carbon capture



Water Electrolysis

Hy.GEN-e

The future alternative for locations with renewable electricity sources offering zero local emission



Gas Recycling

Hy.REC

The circular option that allows recovery of waste gases at the end-users' site











Gas Purification

Hy.PURE

Reduction of emission and cost by creating the option to use the nearest available source



HYGEAR'S LEGACY MARKETS

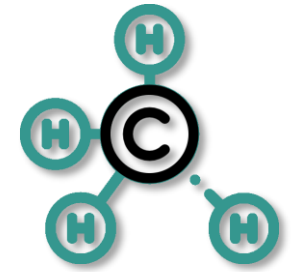
	Industry	Status	Location
	Glass manufacturing	7 sites in operation	Belgium, India, Russia, Spain, Turkey
	Metal annealing/sintering	4 sites in operation 1 site in construction	Czech Republic, Germany, Spain, Turkey
	Food processing	3 sites in operation	Bangladesh, Colombia
	Electronics/Semiconducting	1 site in operation	Belgium
	Refueling stations	6 sites in operation	Latvia, Netherlands, North America
	Hydrocracking	1 site in operation	Turkey
	Filling hubs	3 sites in operation	Netherlands, North America, UK
	Research & Development	4 sites in operation	Austria, Japan, Norway, South Korea, Taiwan, UK, Wales

TECHNOLOGIES PLATFORM



HYDROGEN GENERATION SYSTEMS

Hy.GEN: Steam Methane Reforming



41 - 300 Nm³/h
Capacity

99.5 - 99.9999 %
Purity

1.5 - 30 bar
Pressure

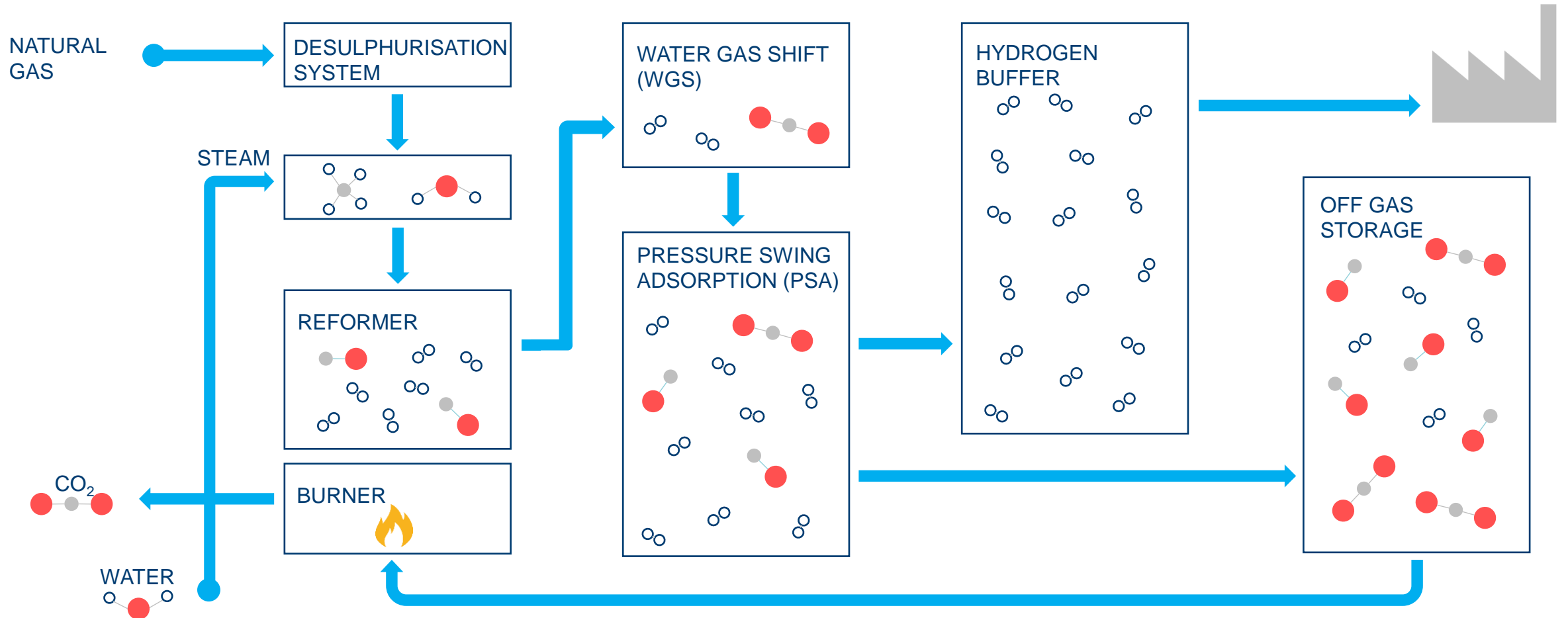
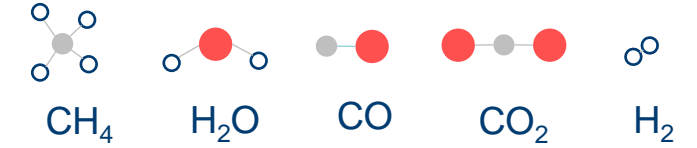
10 - 100 %
Modulation

It is the cornerstone product of HyGear, offering the **highest overall efficiency** by converting water (steam) with natural gas to **high purity hydrogen**. The Hy.GEN is available in 4 models: 50, 100, 150 and 300.



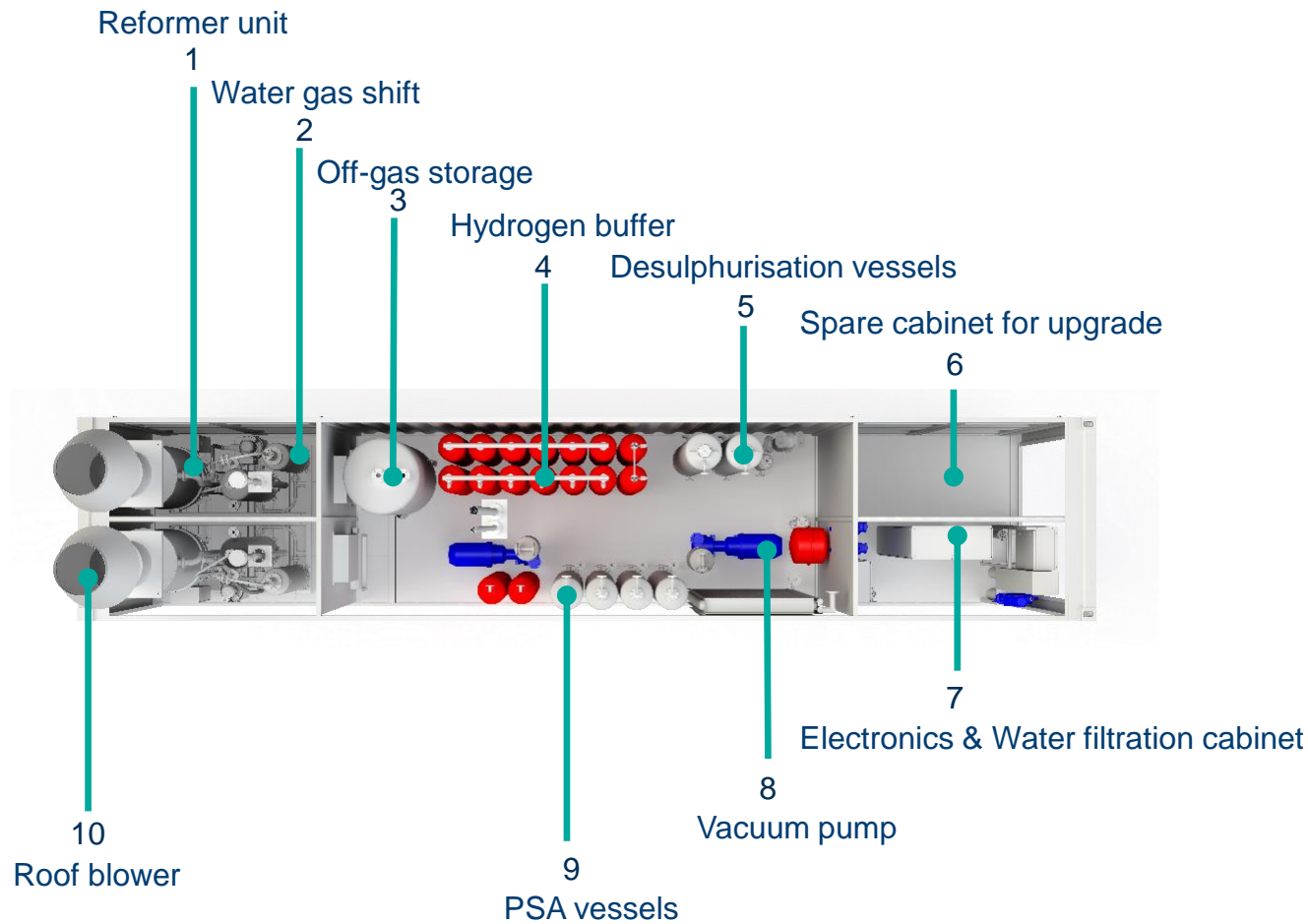
STEAM METHANE REFORMING TECHNOLOGY EXPLAINED

PROCESS FLOW OF THE HY.GEN



WHAT'S INSIDE

HY.GEN 100/150



CARBON CAPTURE SYSTEMS

Carbon Capture for Blue/Cyan Hydrogen production



7.5 – 15 ton/day
Capacity

80 - 99.9 %
Purity

Liquid
(l) CO₂ product

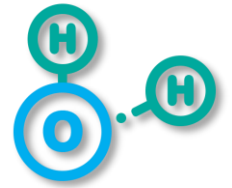
80-90%
Recovery rate

The Hy.GEN systems can be combined with **carbon capture** technology for **low and negative carbon emission hydrogen**. The carbon capture technology capture the flue gases from the Hy.GEN, purifies the carbon dioxide and then liquifies it to produce **high quality liquid carbon dioxide**.



HYDROGEN GENERATION SYSTEMS

Hy.GEN-e: Water Electrolysis



50 - 1000 Nm³/h
Capacity

99.9 - 99.999 %
Purity

3 - 30 bar
Pressure

20 - 100 %
Modulation

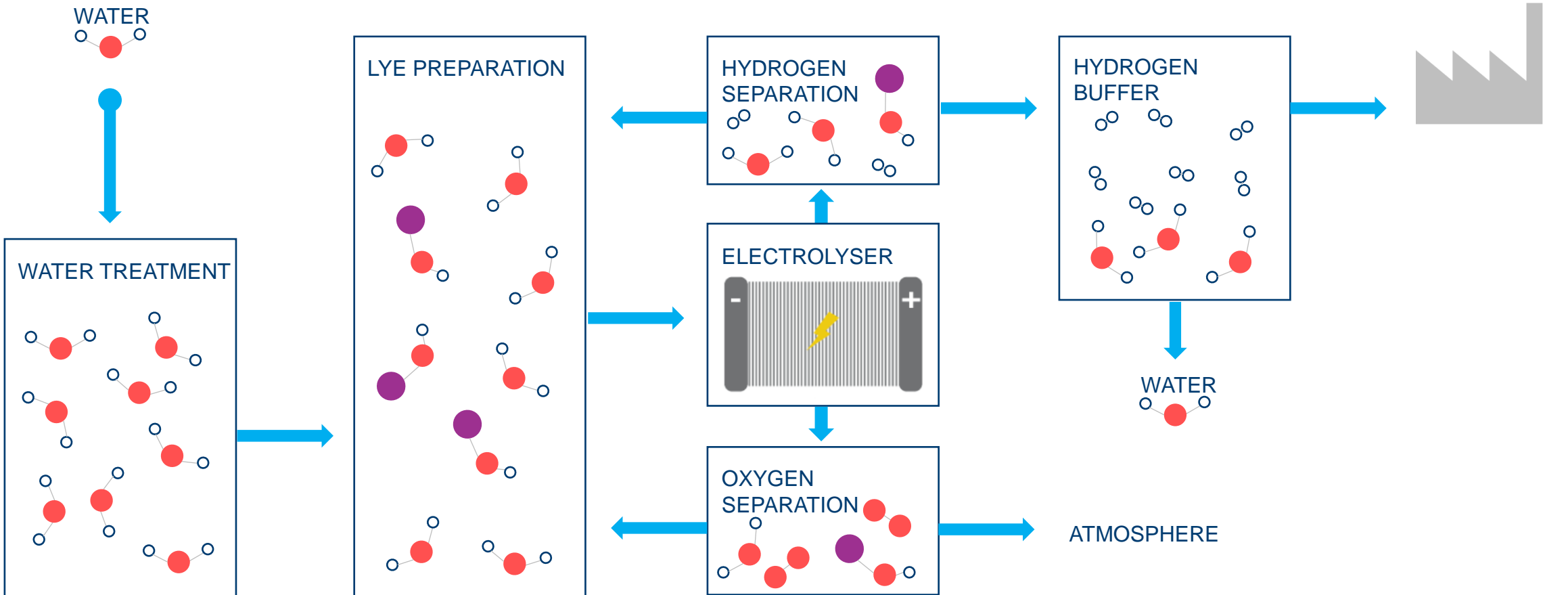


An alternative for locations with **sustainable** electricity sources or without natural gas connections offering **zero local emission**.

Mostly targeted towards **hydrogen fuelling** stations and **decarbonisation** of energy intensive industries

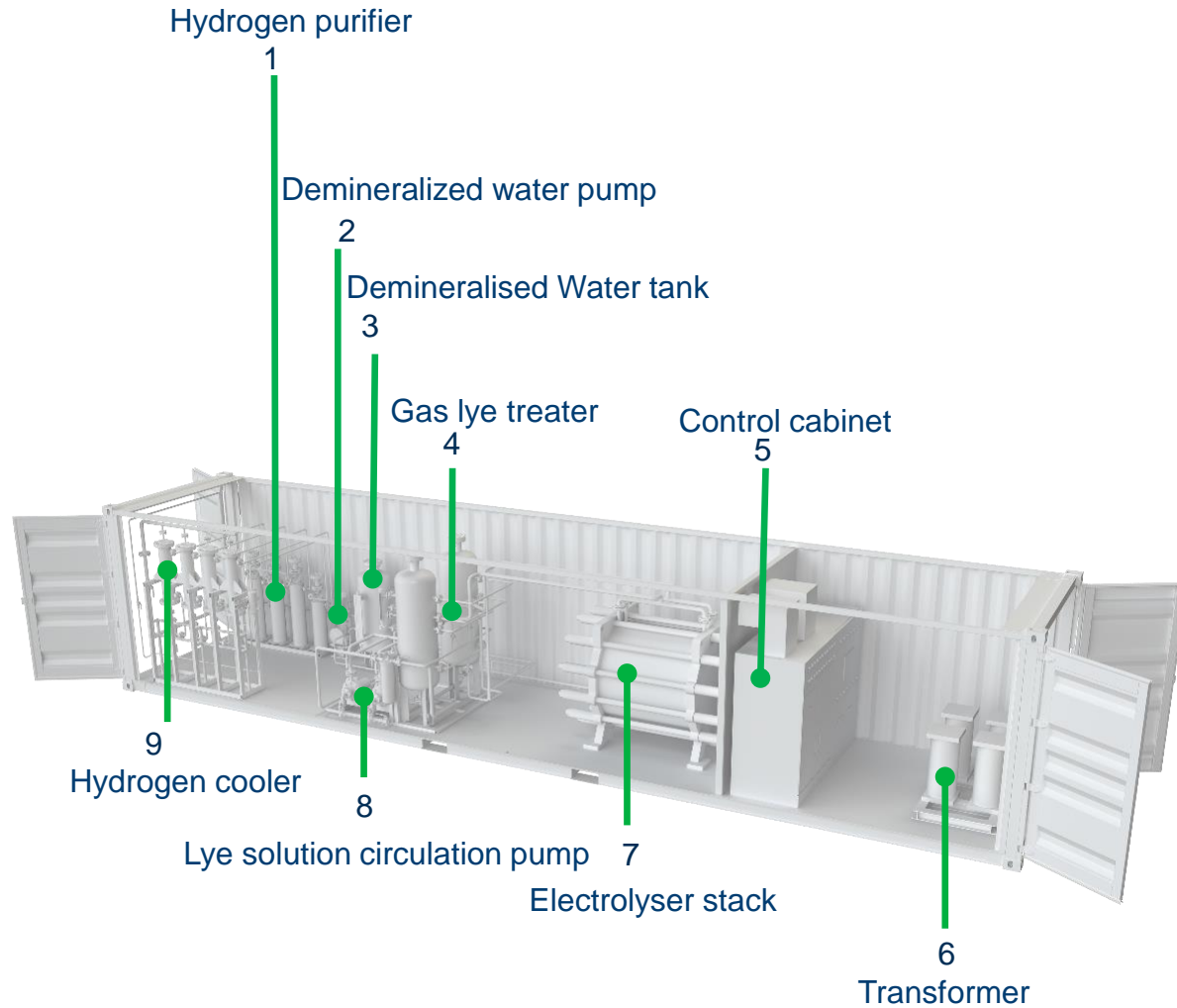
ELECTROLYSIS TECHNOLOGY EXPLAINED

PROCESS FLOW OF THE HY.GEN-E



WHAT'S INSIDE

HY.GEN-E 50/100



INDUSTRIAL GAS RECYCLING SYSTEMS

Hy.REC: Recovery of Nitrogen and Hydrogen Mixtures



99 %
Recovery

1 - 10 % H₂ in N₂
% of Hydrogen

0.1 – 0.4 bar
Pressure

< -58 °C
Dew Point

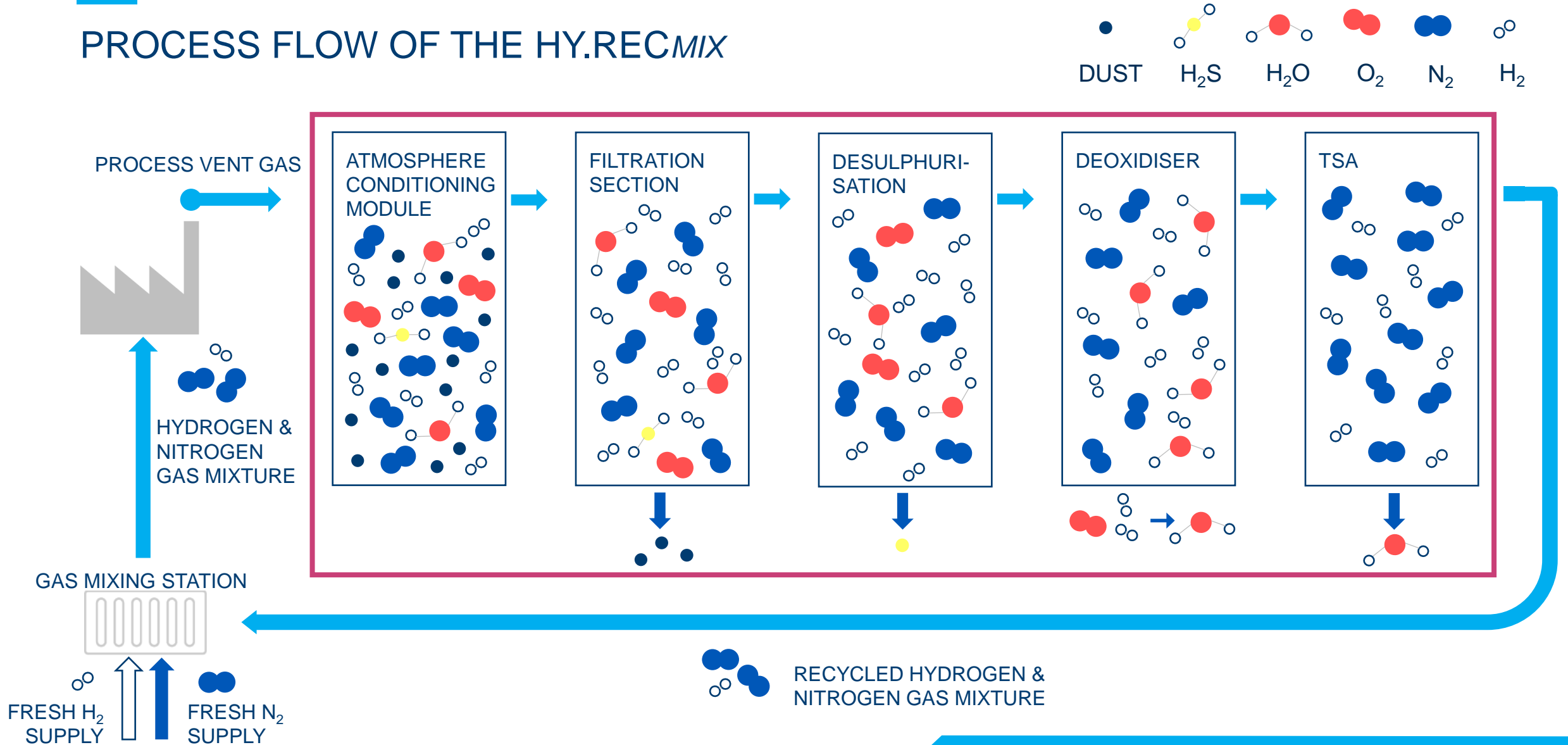
The circular option that allows **recovery of waste gases** at the end-users' site. Offering the most **cost-effective** and **environmentally friendly** form of gas supply.

Currently, it's being used in the **glass industry**



GAS RECYCLING TECHNOLOGY EXPLAINED

PROCESS FLOW OF THE HY.RECMIX



INDUSTRIAL GAS PURIFICATION SYSTEMS

Hy.PURE: Nitrogen or Hydrogen Recovery and upgrading

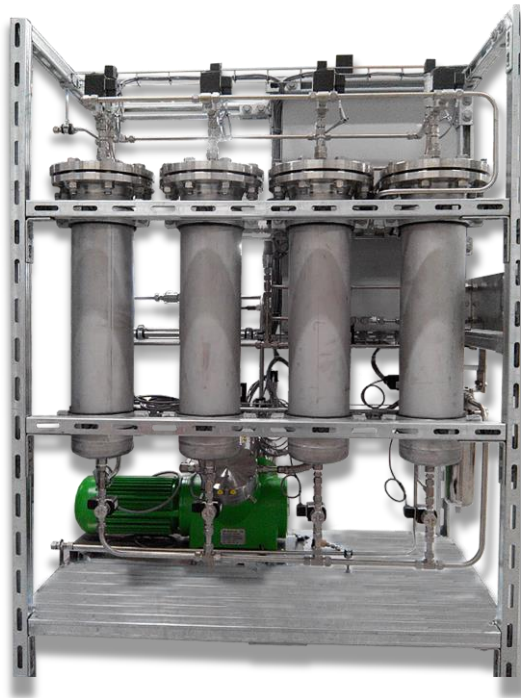


50 - 250 Nm³/h
Capacity

≤ 90 %
Yield

≤ 8.0
Purity

5 – 14 bar
Pressure

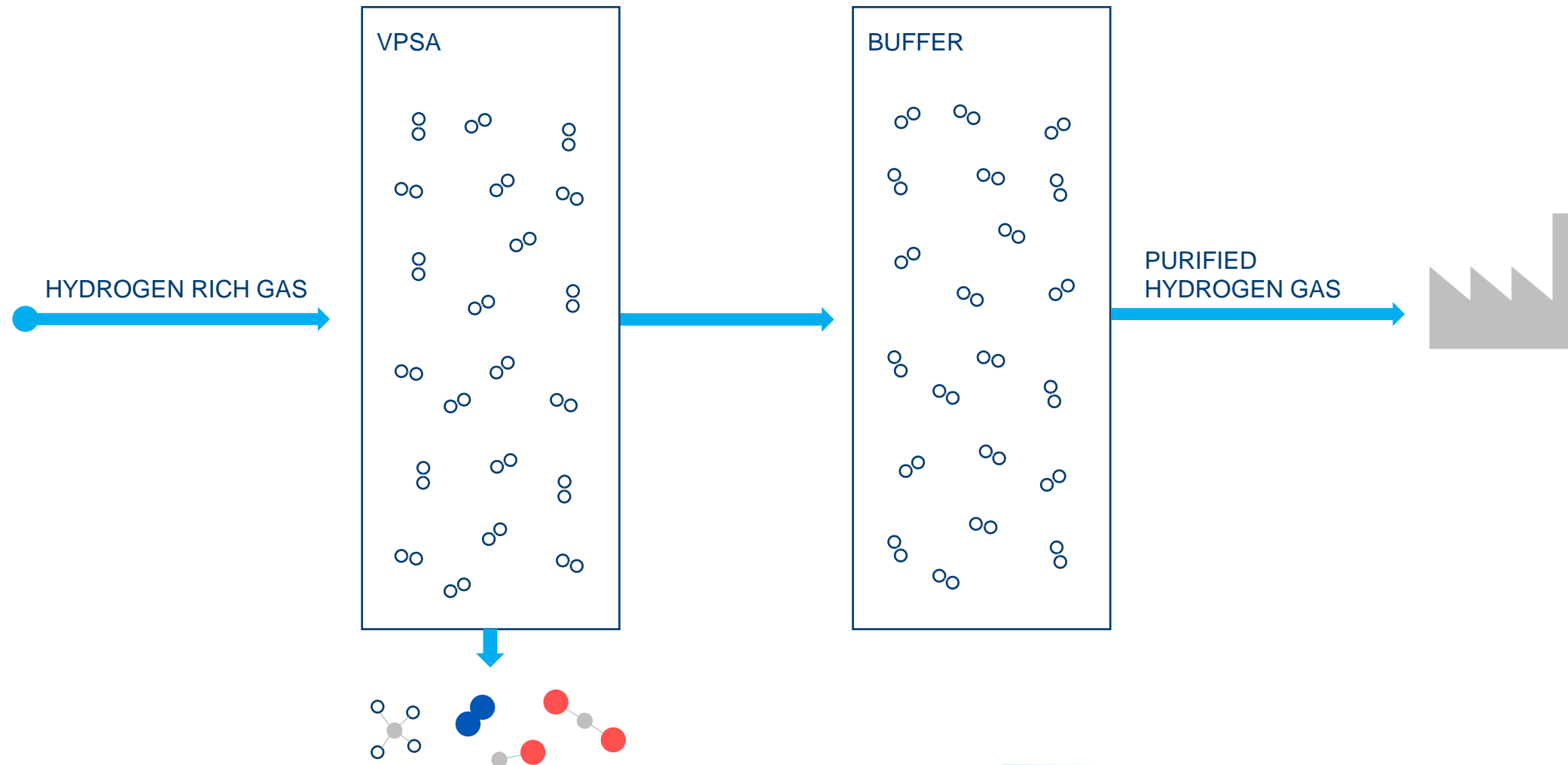
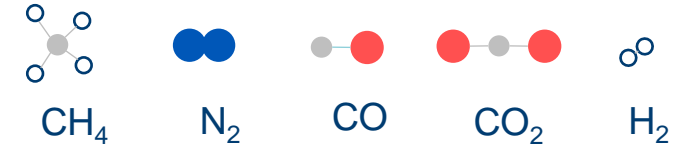


Uses hydrogen (or other gases) containing waste stream and **purifies** them to **higher quality**.

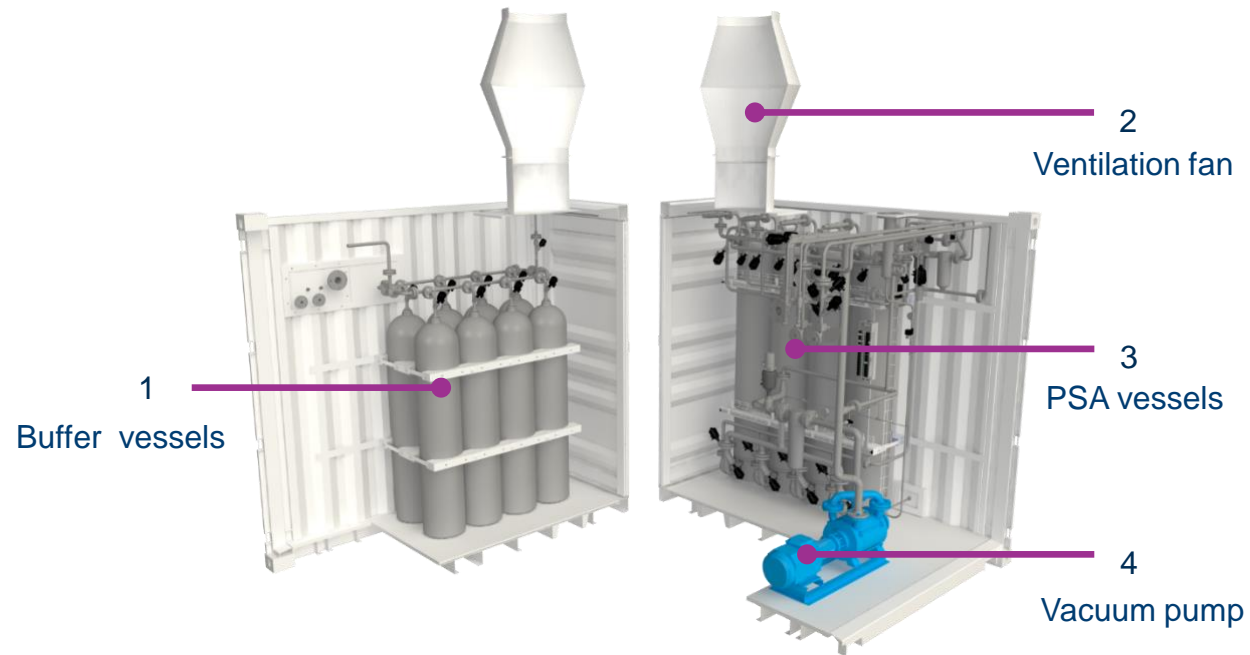
This **reduces emission and cost** by creating the option to use the nearest source available, even if this source offers lower purity.

GAS PURIFICATION TECHNOLOGY EXPLAINED

PROCESS FLOW OF THE HY.PURE



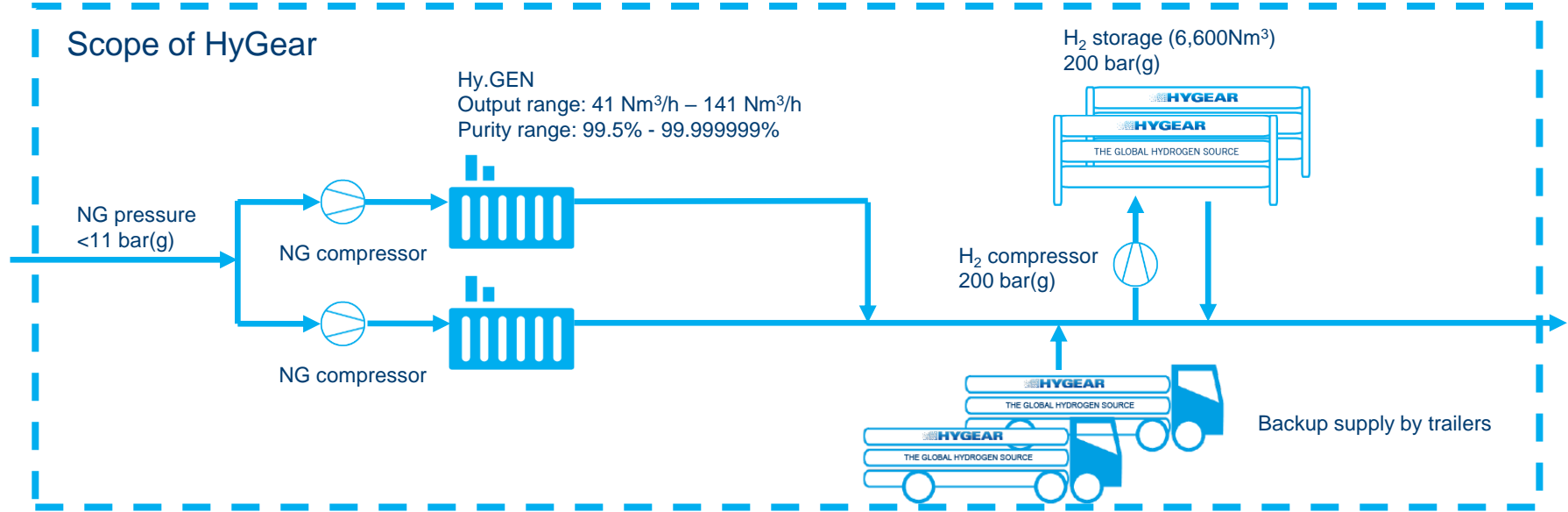
WHAT'S INSIDE HY.PURE



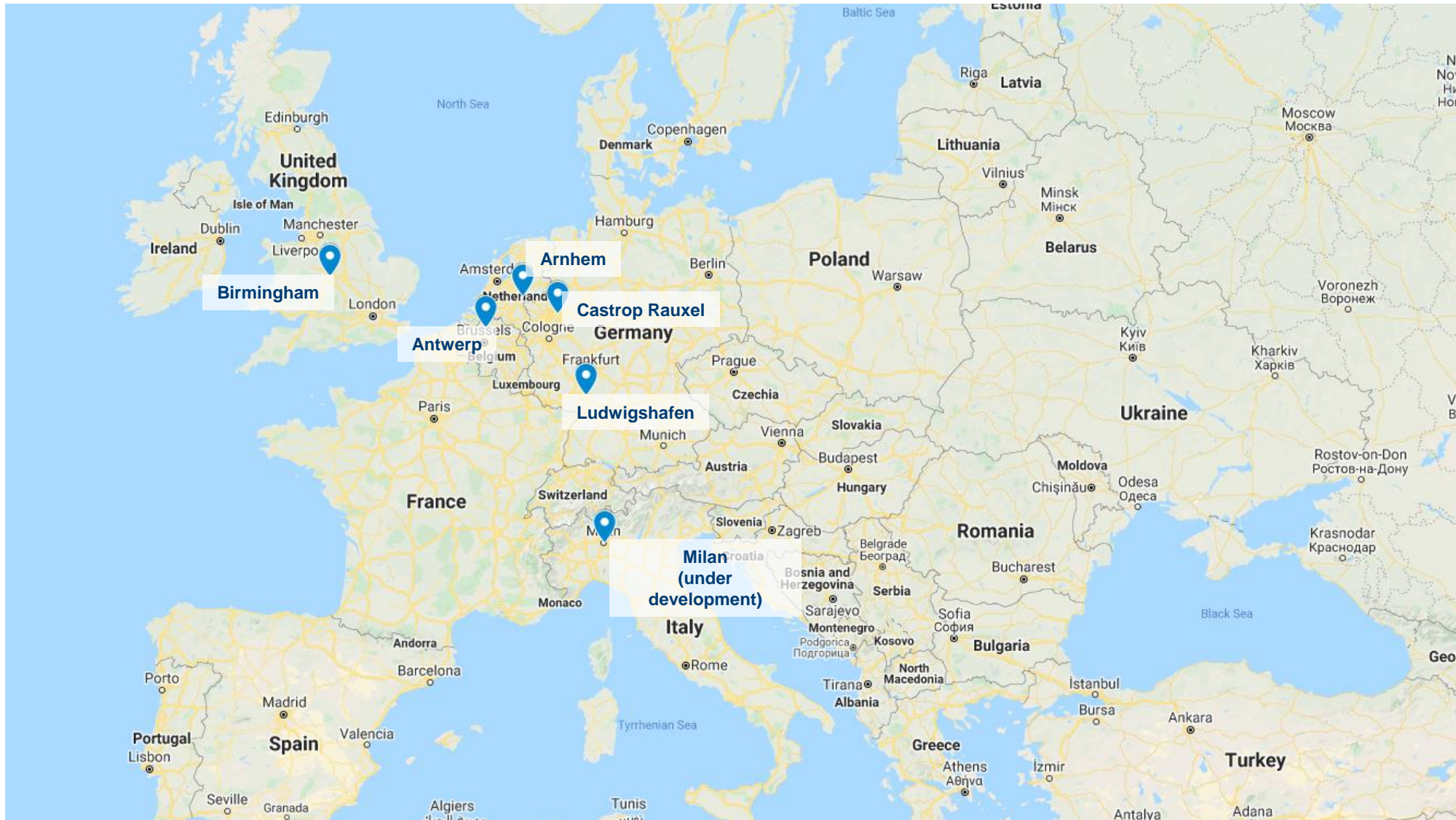
RELIABILITY OF SUPPLY

Three-layered approach

- Redundancy
- On-site backup
- Trailer backup



HYDROGEN SOURCES



REFERENCES



CUSTOMER REFERENCES



PHILIPS, TURNHOUT BELGIUM



2 units of Hy.GEN 50

- Hydrogen supply for cutting
- Additional capacity by trailer
- Compact footprint

SAINT GOBAIN, L'ARBOC SPAIN



2 units of Hy.GEN 50

- Hydrogen used for protective atmosphere in flat glass manufacturing
- On-site generation including back-up storage
- Fully utilising available space

DÜZCE CAM, TURKEY



2 units of Hy.GEN 50

- Hydrogen used for protective atmosphere in flat glass manufacturing
- On-site generation including back-up storage
- System's ability to operate in warm climate conditions

PMG, FÜSSEN GERMANY



2 units of Hy.GEN 50

- Hydrogen used sintering process in metal industry
- System's ability to operate in cold climate conditions

GUARDIAN GLASS, ROSTOV RUSSIA



3 units of Hy.GEN 50

- Hydrogen used for protective atmosphere in flat glass manufacturing
- Indoor installation

• ASAHI GLASS, BOR RUSSIA



4 units of Hy.GEN 50

- Hydrogen used for protective atmosphere in flat glass manufacturing
- 1 unit is used for redundancy purpose

WALMART, TEXAS USA



1 unit of Hy.GEN 50

- Hydrogen supply to refuel fuel cells forklifts in warehouse
- On-site generation including back-up storage
- Producing high purity hydrogen with low CO content that is required for fuel cell industry

HYGEAR'S REFUELING STATION, NETHERLANDS



- Hydrogen supply at fueling station for fuel cell vehicles
- Fueling station accessible to public
- Producing high quality hydrogen with low CO content that is required for fuel cell industry

HyGear DPH, Arnhem The Netherlands



2 units of Hy.GEN 50 + 1 unit of Hy.GEN 150

- H₂ pipeline to Total H₂ fuelling station
- 2 Trailer filling bays
- Cylinder filling
- 500 kg/day capacity



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