



HYDROGEN ON-SITE GENERATION



HYSYTECH is an engineering company founded in 2003, specialized in the design, development and industrial implementation of new turn-key process technologies and equipments, customised as well as standardised units ...

With skills covering from the know-how in chemical and process engineering, up to commissioning, monitoring and maintenance ...

In 2022, joined **NIPPON GASES**



In 2024, 70 employees of which 25 engineers, for a budget of 30 Mln€



HYSYTECH acquired **STIRLING Cryogenics** in 2018.

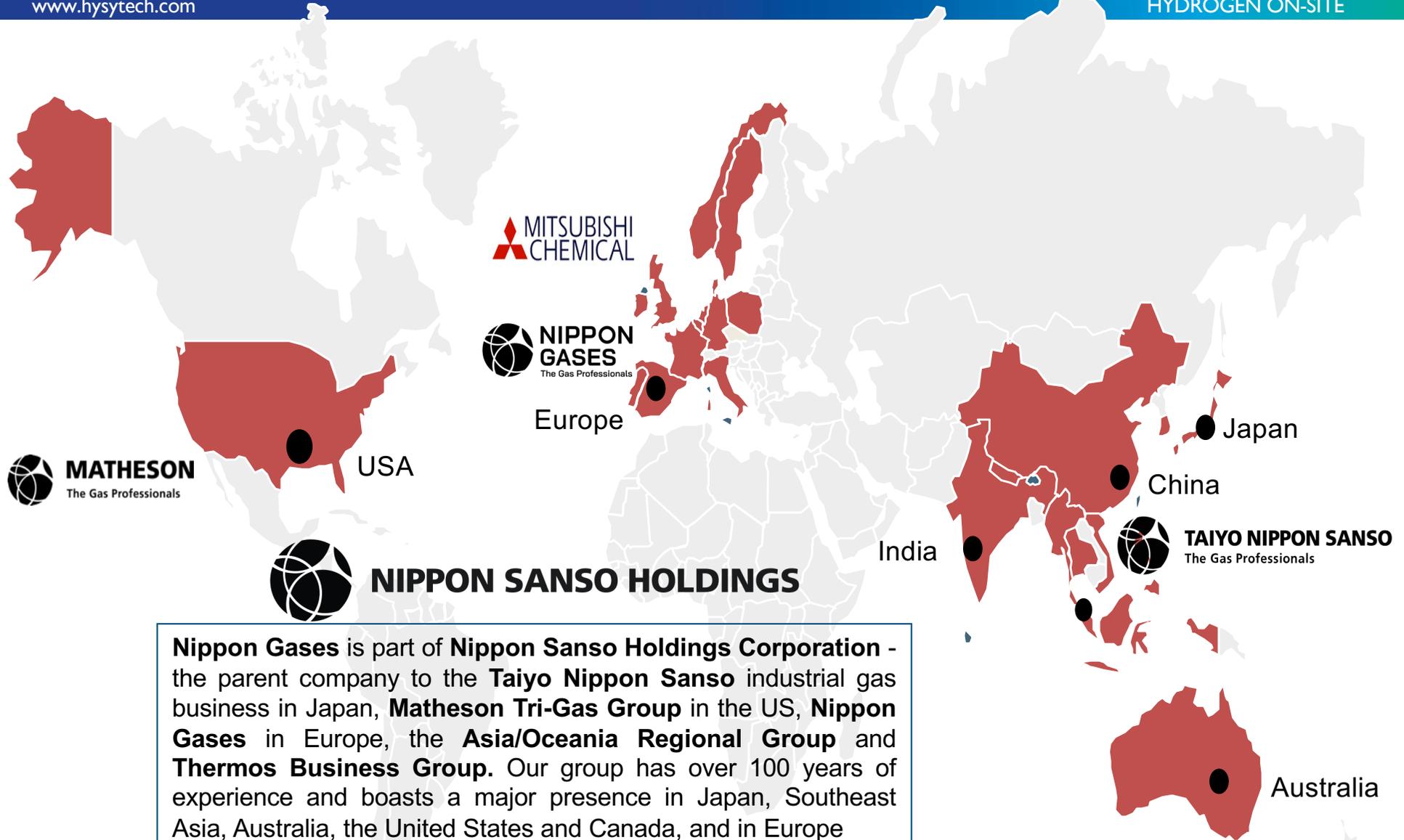
Specialist in cryogenic generators, founded in 1954 by Philips in Eindhoven (NL)

Over 4000 active units worldwide on all kinds of cryogenic applications ...

In 2024, celebrates its 70th anniversary
35+ employees for 9 Mln€ TO.



STIRLING
CRYOGENICS

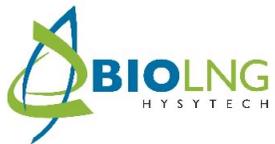


Nippon Gases is part of **Nippon Sanso Holdings Corporation** - the parent company to the **Taiyo Nippon Sanso** industrial gas business in Japan, **Matheson Tri-Gas Group** in the US, **Nippon Gases** in Europe, the **Asia/Oceania Regional Group** and **Thermos Business Group**. Our group has over 100 years of experience and boasts a major presence in Japan, Southeast Asia, Australia, the United States and Canada, and in Europe

STANDARD UNITS



Biogas separation plants (2 Patents)



Liquefaction units for (bio)LNG (1 Patent)



CO2 recovery and liquefaction plants



CUSTOMISED INDUSTRIAL & SPECIAL APPLICATIONS



LNG BOG recovery



On-site cryogenic plants



Special plants and pilot plants

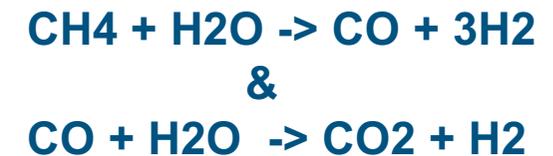
- HY stands for Hydrogen in HYSYTECH

H2genio produces Hydrogen on sites of users



from natural gas or biogas,

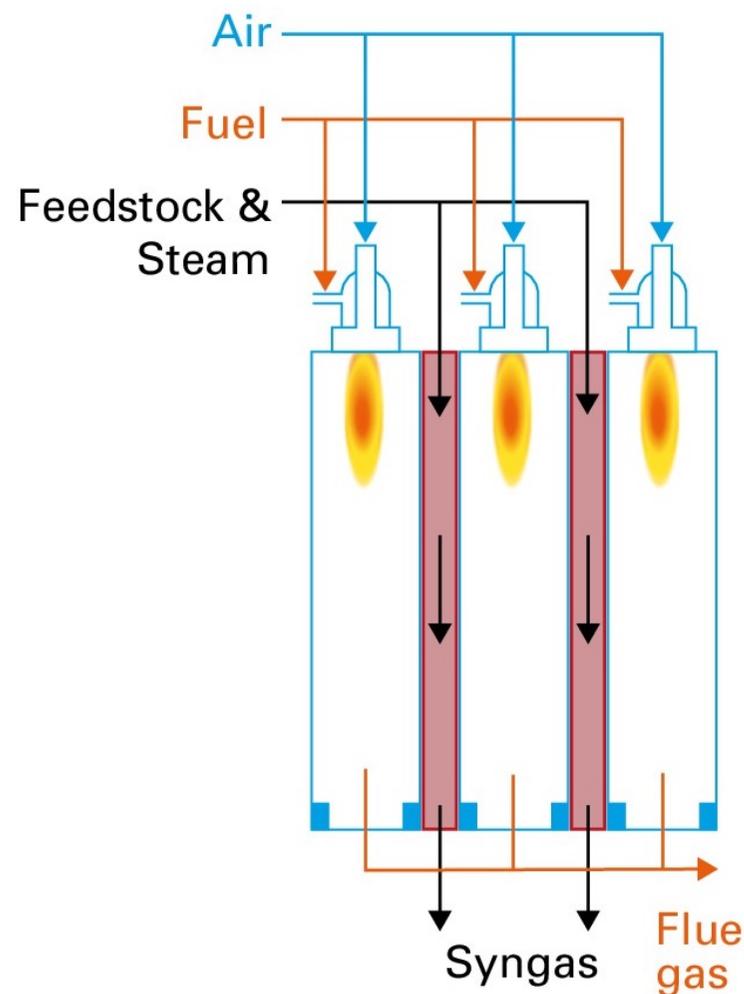
based on Steam Methane Reforming (SMR) process



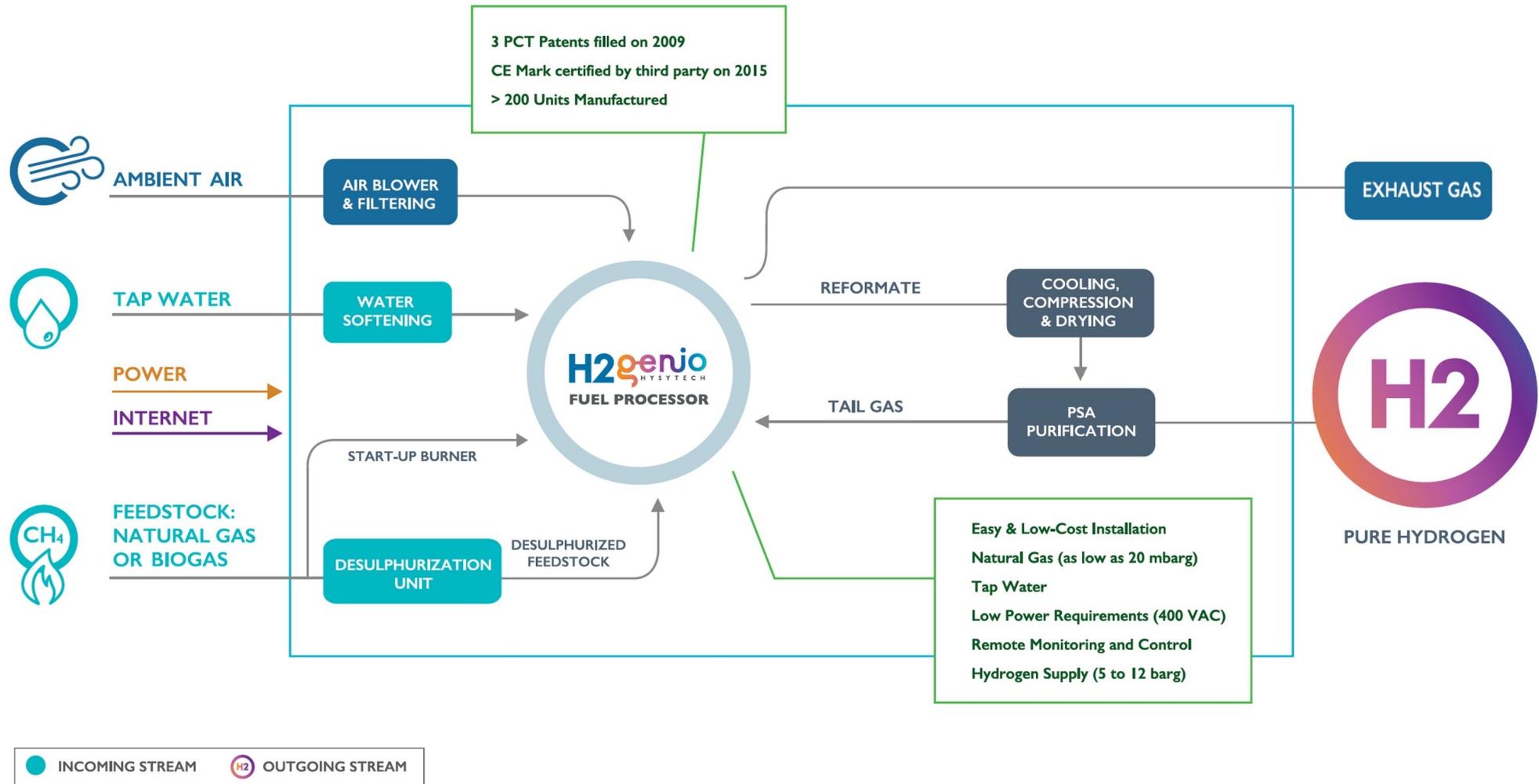
• SMR reactor

Process	Steam Methane Reforming – SMR
Carbon feedstock	Natural gas, refinery gas or naphtha
Oxygen feedstock	Air for fuel combustion to heat the process (not used for hydrogen generation in the SMR reactor tubes)
Steam feedstock	Yes
Catalyst required	Yes, Nickel
Target chemical reactions	$\text{CH}_4 + \text{H}_2\text{O} \rightarrow \text{CO} + 3\text{H}_2$
Additional side reactions	$\text{CO} + \text{H}_2\text{O} \rightarrow \text{CO}_2 + \text{H}_2$
Energy required/released	Endothermic, requires heat input
Hydrogen content in syngas	~70%
Syngas pressure	15 to 40 bar
Syngas temperature	850 °C

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Fuel Processor® (3 Patents)



Capacities

DESIGN DATA		CONSUMPTION DATA			FOOTPRINT
Capacity [Nm ³ /h H ₂]	Capacity [kg/day H ₂]	Natural Gas [Sm ³ /h CH ₄]	Electrical Power [kWe]	Water [liters/h]	ISO [ft]
40	86	16,8	18	30	20
80	173	33,6	34	60	30
120	259	50,4	40	90	40

SPECIFICATIONS	
Hydrogen purity:	Standard design for 99,99% - 99,9999% (grade 4.0 - 6.0). Other upon request
Hydrogen Delivery Pressure:	Standard design 5-12 barg. Others upon request
Natural Gas Supply Pressure:	Standard design 0,020 - 0,500 mbarg. Others upon request

• Ultra High Purity Hydrogen for fuel cells (40 Nm³/h)

Features:

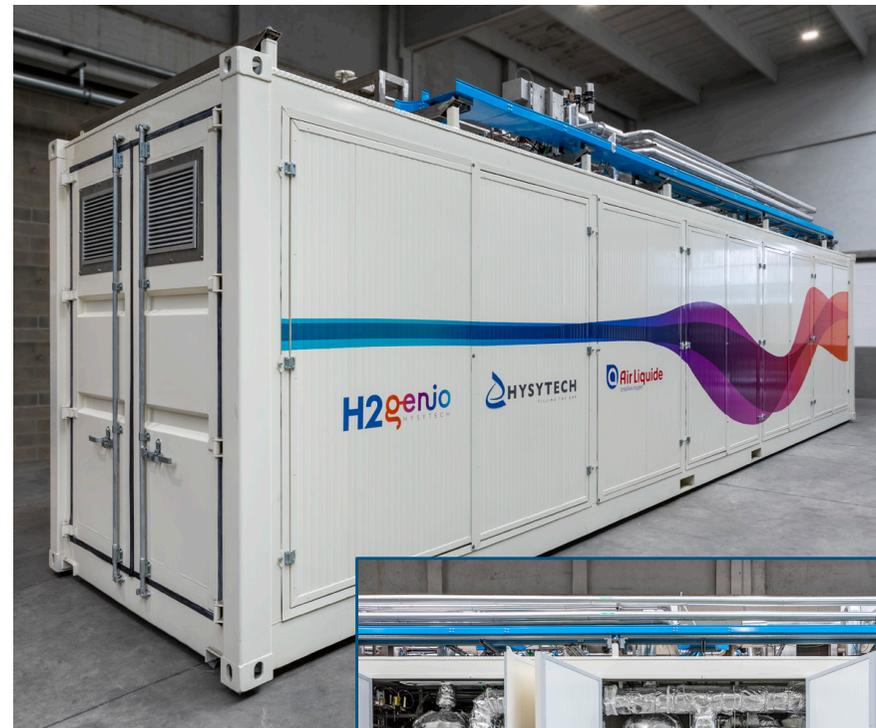
- Ultra High Purity Hydrogen
- > 99,9999 %vol
- continuous production up to 40 Nm³/h
- power consumption < 18 kW
- delivery pressure 6 barg
- Natural Gas feed:
 - pressure < 0,020 mbarg
 - odorized gas
- fully automatic & unmanned



• High Purity Hydrogen for steel industry (120 Nm³/h)

Features:

- High Purity Hydrogen > 99,995 %vol
- continuous production up to 120 Nm³/h
- power consumption < 40 kW
- delivery pressure 11 barg
- Natural Gas feed:
 - pressure < 0,350 mbarg
 - odorized gas
- fully automatic & unmanned



- 200+ units running

- Industrial & manufacturing sector + transport (both mature & innovative sectors) :
 - heavy steel industries
 - metal components
 - chemicals
 - electronics
 - R & D labs
 - pharma & biotech
 - paper
 - food
 - aeronautics
 - HGV
 - trains
 - ...

• To summarize

HYSYTECH's Steam Methane Reforming technology produces **high-purity Hydrogen**, on site of users :

- from natural gas or biogas
- energy efficiency with low electrical requirements
- minimal installation and limited operating costs
- linear and continuous production
- multiple modules can be installed in parallel to achieve higher capacities and redundancy.

HY stands for Hydrogen in HYSYTECH





HYSYTECH

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