

European Hydrogen Emergency Response training programme for First Responders



Hydrogen Refueling Station

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Introduction



Blue Hydrogen



At least 50% of hydrogen energy produced through carbon-free processes by 2020

- *Renewable energy sources, water electrolysis and biogas reforming,*
- *Carbon capture and storage technologies with natural gas reforming*

- *A commitment to meet both environmental requirements and social and economic constraints.*



Upgrading biogas : AL's path to a sustainable industry

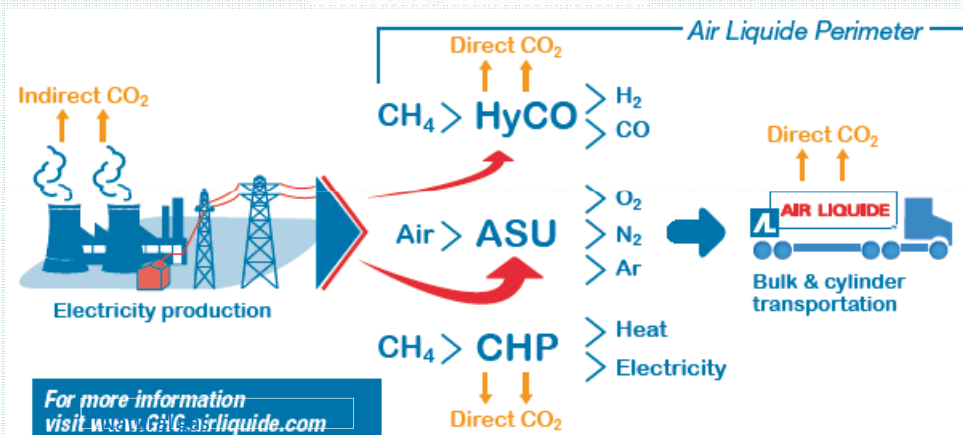
A need for green gas



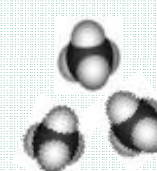
... and for green hydrogen



HyResponse

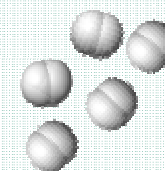


GHG emissions per production unit	Direct (ktCO ₂ eq/yr)	Indirect (ktCO ₂ /yr)
ASU (Air separation unit)	NA*	7 671
CHP (Cogeneration)	3 629	NA*
HyCO (H ₂ /CO plant)	3 795	144
Other	263	180
Transportation	413	NA*
Total GHG	8 100	7 995



Bio-CH₄

Sales of molecules



Blue-H₂

Blue H₂ production



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Our markets

Decentralized energies



BIOGAS

Combining several different technological bricks, Air Liquide devises a global solution that integrates every step in the process, from retrieval of biogas and its purification to liquefaction or injection into the network, ending with its transformation into Blue Hydrogen



→ Air Liquide, rising to the challenge of decentralized energy



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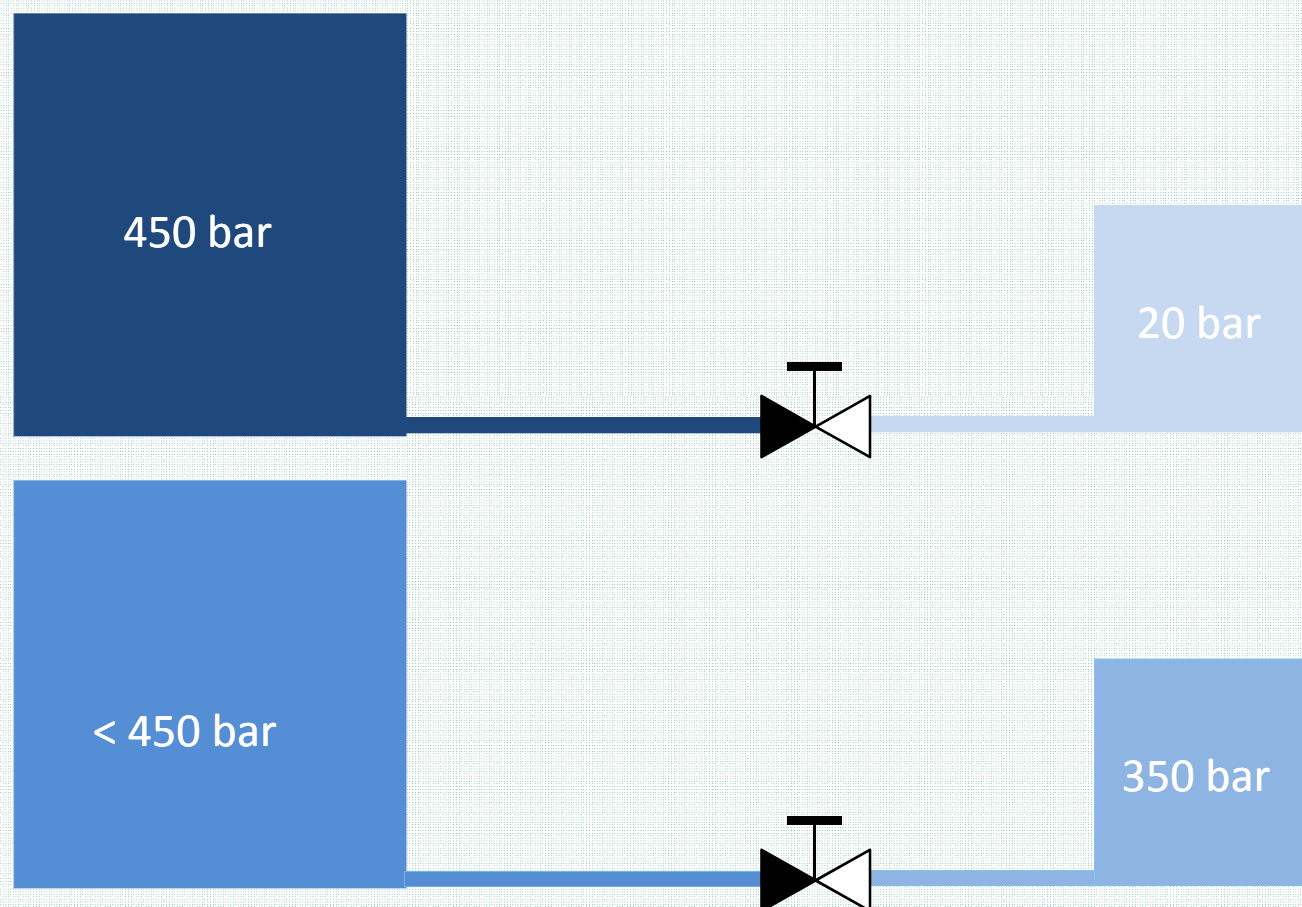
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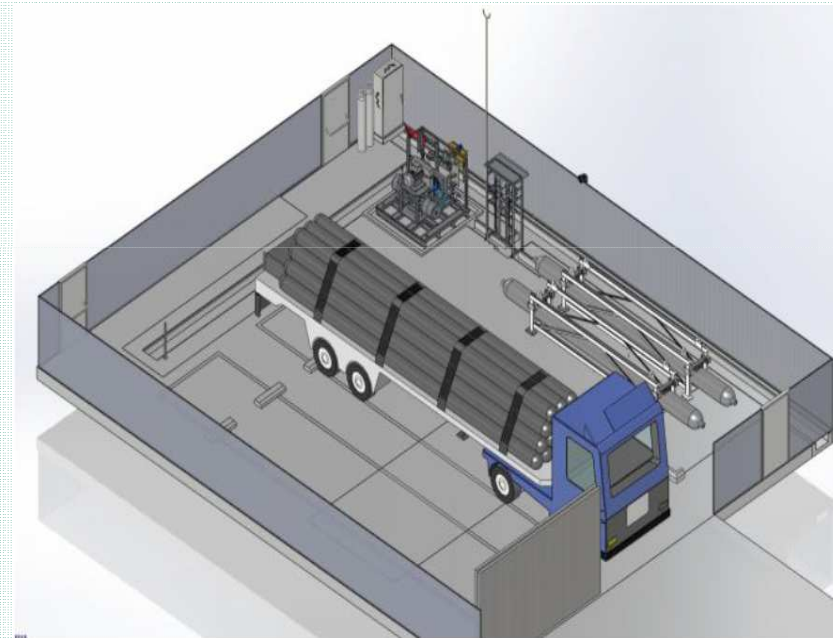
What is a refueling station



Principe of work



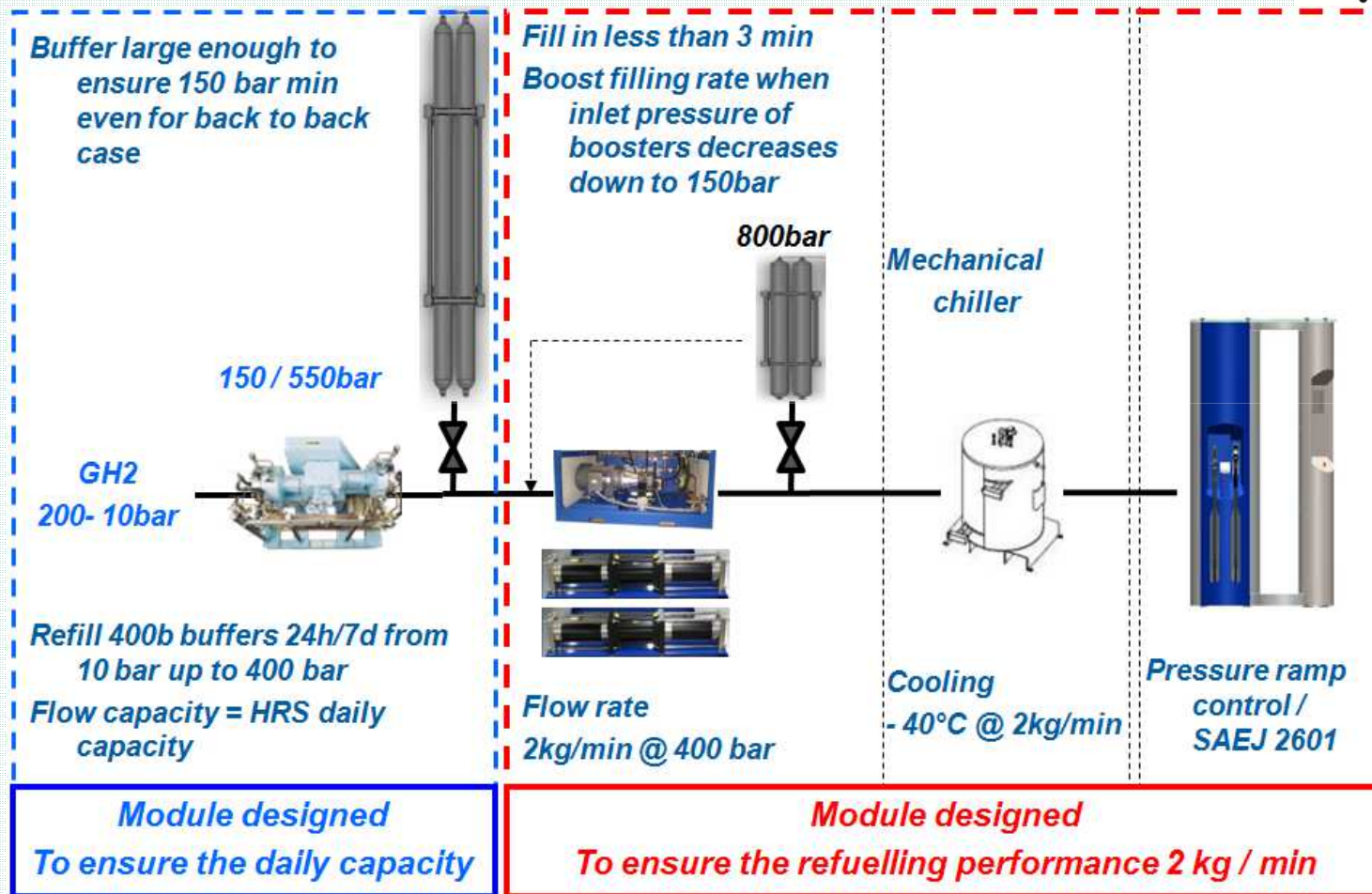
Principe of work



Principle of work



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Principe of work



Examples of H2 Stations Activity

Shows



Maxhyfill



HRS Cars

HRS Bus



HRS forklifts



Response



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Examples of H2 Stations Activity



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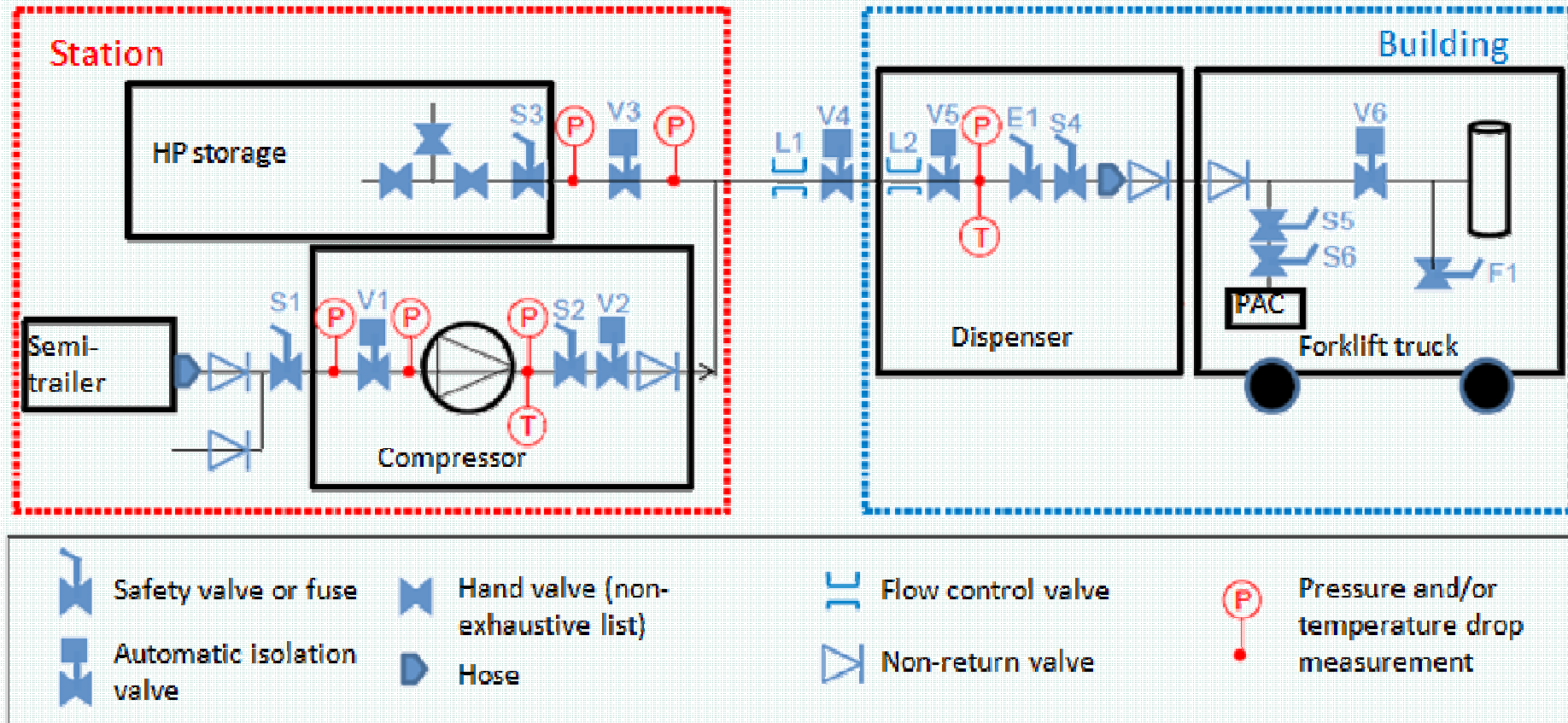
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Safety aspects



Safety aspects



Code and regulations



The HRS is designed and manufactured in accordance with :

- Air Liquide rules
- Pressure Equipment Directive 97/23/EC
- ATEX Directive 94/9/EC: Ex II 2 G T3
- Machinery Directive 98/37/EC
- Safety of Machinery EN 12100-2
- Low Voltage Directive 2006/95/EC
- EMC Directives 89/336/EC, Directive 2004/108/EC
- IEC 60079 standard series : ATEX harmonized standards
- EIGA IGC 15/06 Code of practice for gaseous hydrogen station
- Connection Device Machinery Directive (98/37/CE)
- SAE J2600 Compressed Hydrogen Vehicle Fuelling
- SAE J2601 for filling protocol



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The end

