PRESENTATION:

JÉRÔME LACAPÈRE, GENERAL DIRECTOR

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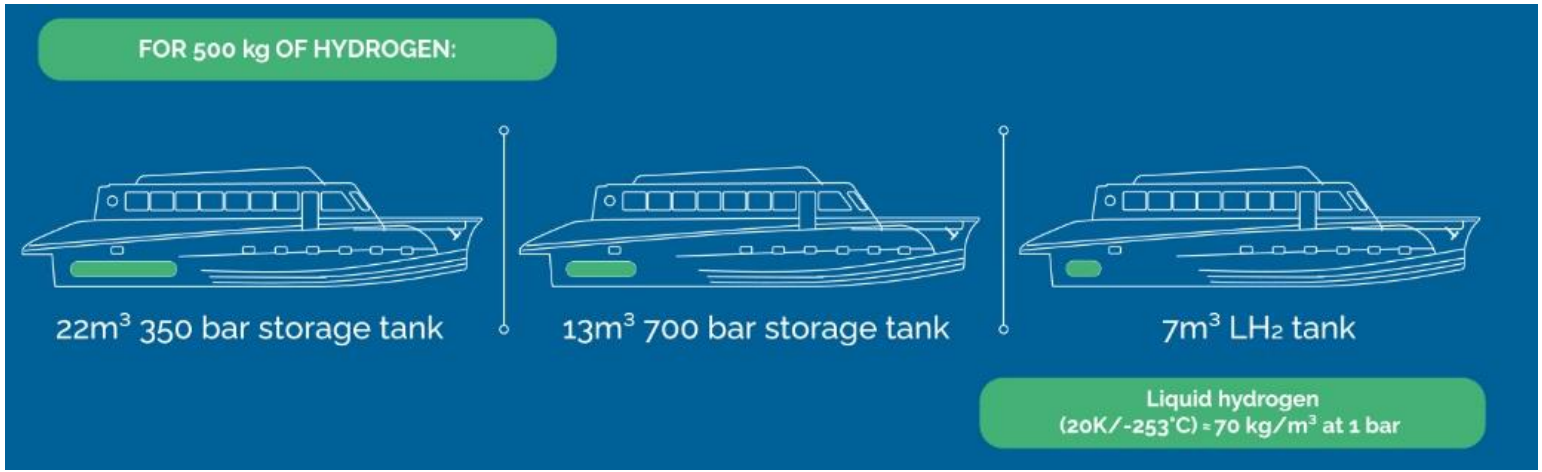
THE BENEFITS OF LIQUID HYDROGEN

Liquid hydrogen is an energy carrier for the decarbonization of transport.

Distance travelled x3
compared to GH2

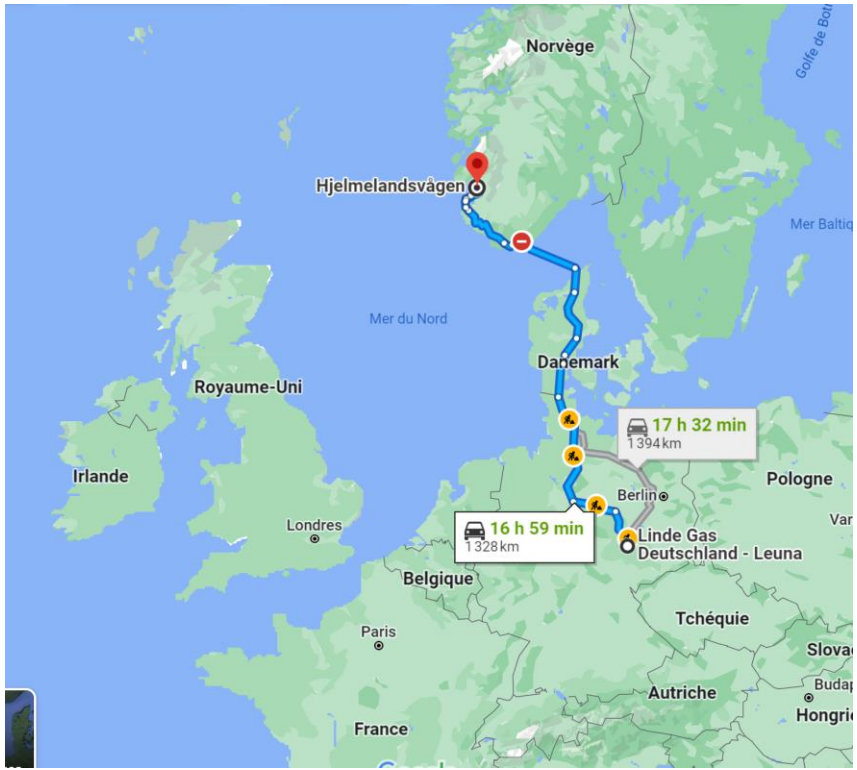
Space saving on board
(volumetric energy density
(scheme below)

Cost reduction
Production on site
CAPEX & OPEX reduced
(less maintenance)



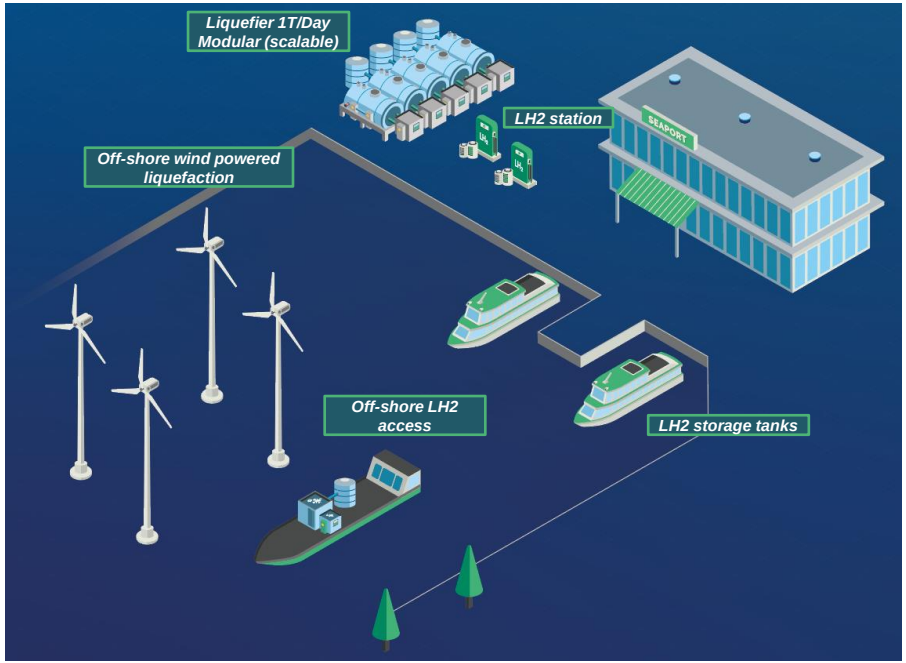
AN EXAMPLE WITH THE FIRST LH2 HYDROGEN FERRY

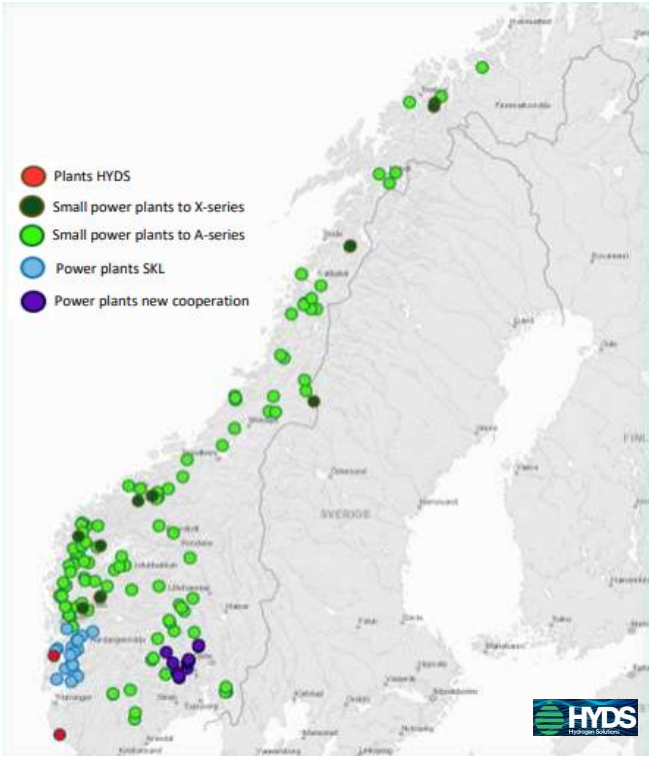
In order to accelerate the energy transition, Norway is turning to decarbonized energies such as liquid hydrogen, particularly for its ferries.



OUR SOLUTION: LOCAL LIQUEFACTION OF H2

Maritime: liquefaction on site





A PROVEN KNOW-HOW

Providing liquid hydrogen management systems with precise know-how and innovative technologies

OUR EXPERTISE







ABSOLUT SYSTEM
INNOVATIVE CRYOGENIC SOLUTIONS

Absolut Hydrogen benefits rom 13 years of cryogenic expertise of its sister company Absolut System (60 engineers and tech), especially in the field of turbomachines, such as the turbo-Brayton cryocooler

Jérôme L.
LH2 expert
in launchers and
space cryogenics

Julien V.
Expert
Turbomachines

Arnaud G.
Large turbo-Brayton
cryocooler expert


Elias R. et Diyaa C.
Experts Process

AN EXPERIENCED CORE TEAM

INDUSTRIALIZATION

12 million euros provided by Vol-V group to support industrialization

VOL-V

Acquisition of new premises
Plant infrastructure

ABSOLUT SYSTEM → ABSOLUT Hydrogen

Transfer of industrial property

Our local liquefaction systems

100kg/DAY LIQUEFIER

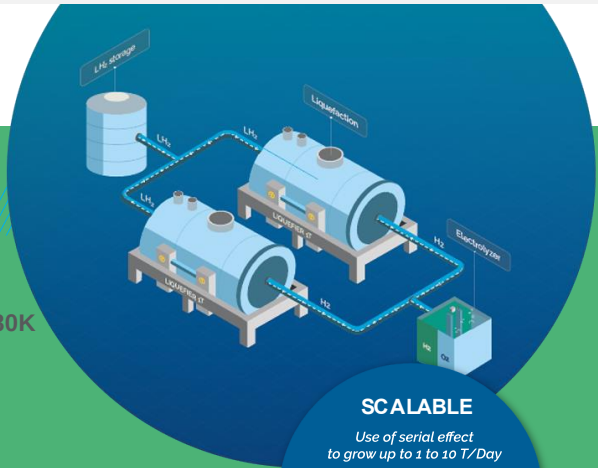
Hydrogen liquefaction plant & transfer system.
Ideal for transport hubs, demonstrators and adapts to logistical constraints.

TECHNICAL INFORMATIONS

- **Precooling using LN2:**
  liter/hr
- **Electrical consumption:**
  85 kW
- **Industrial water cooling:**
  1350 liter/hr or install. of 80 kW chiller
- **Fits in a 5x2x2m container**
  (mobile in a truck)

1T/DAY LIQUEFIER

Hydrogen liquefaction plant & storage system.
Decentralized access to energy allowing for on-site storage: energy on demand. Suitable for airfields, logistics hubs and captive fleets.



TECHNICAL INFORMATIONS

- **Precooling using**
  Turbo-Brayton cooler at 80K
- **Electrical consumption:**
  < 500 kW
- **Efficiency:**
  ~ 12 kWh/kg
- **Scalable:**
  Use of serial effect to grow up to 10 to 20T/day

KEY COMPETITIVE ADVANTAGE: MAINTENANCE-FREE COMPONENTS

COMPETING PRODUCTS AVAILABLE ON THE MARKET

1. Low-capacity liquefiers

Opérating with screw compressors and oil removal systems

⇒ **Higher CAPEX & OPEX and high maintenance**

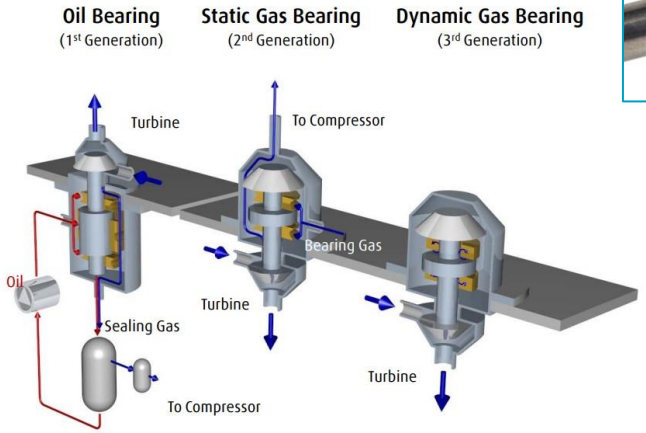
2. Very high-capacity liquefier – too centralized

Same unit cost / no economies of scale or efficiency gains
Additional OPEX: distribution (transport) and transfer losses

⇒ **Large infrastructure needed**
⇒ **Dependent on large provider**
⇒ **Not so interesting on the global picture**

Hydrodynamic gas bearing: a unique know-how

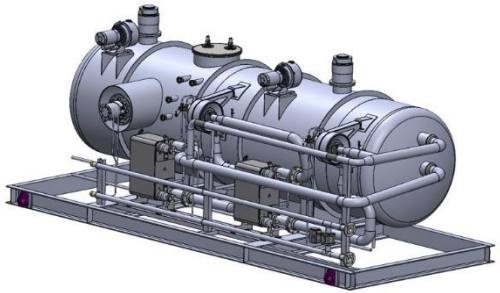
High performance and reliability (oil free & low maintenance)



TIMELINE

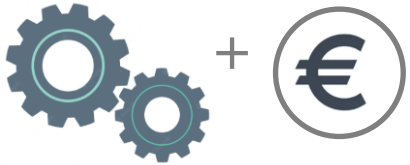
2023: Demonstration of our liquefier technology 100kg/day based on Turbo-Brayton @20K
2024: Finalization of a large scale liquefier plant 1-5T/day based on similar turbomachines technologies

2023



System under manufacturing
to be qualified

2024



Ready to start
manufacturing & installation
of large scale liquefaction plant
1 T/days

2026

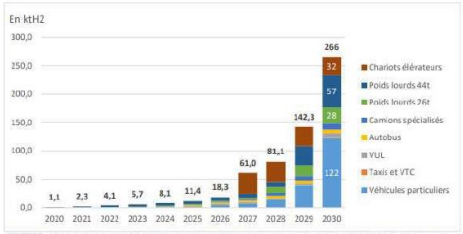


Figure 6 : Volumes des marchés techniquement et économiquement adressables sur 2020-2030, en France, dans la mobilité routière.

Deployment of 10T - 20T / day
Liquefaction plant