



HIGH
SAFETY



LOW
FOOTPRINT



FLEXIBILITY &
MODULARITY



VERTICAL STORAGE: A REVOLUTION FOR HYDROGEN SUPPLY CHAIN

LARGE-SCALE STORAGE
ENABLES GREEN
HYDROGEN USAGE

INNOVATIVE TECHNOLOGY
OPTIMIZED FOR SAFETY

VERTICAL STORAGE SOLUTION
MINIMIZES FOOTPRINT

MODULAR SOLUTION FITS
SPECIFIC PROJECT NEEDS

WHY GREEN HYDROGEN NEEDS ROBUST STORAGE

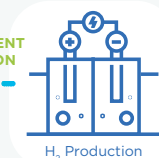
A key challenge in producing green hydrogen is that electrolysis runs intermittently, due to power sources such as wind and solar or to grid constraints. To offset these fluctuations and ensure continuous availability, hydrogen must be stored at scale as a reserve. But until now, hydrogen storage has focused on small capacity cylinders and bullet tanks, or mass salt caverns – either too small or too big for most hydrogen producers and users.

HYDROGEN PRODUCTION



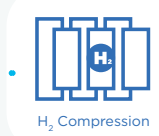
Renewable Energy

INTERMITTENT PRODUCTION

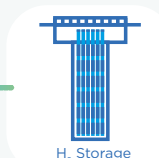


H₂ Production

HYDROGEN BUFFER STORAGE



H₂ Compression



H₂ Storage

CONTINUOUS DEMAND



Industry application

Aviation



Fuel for vehicles

DELPHY: PIONEERING UNDERGROUND STORAGE

Vallourec's Delphy is a breakthrough solution that enables compressed gaseous hydrogen to be stored underground in pipe assemblies. With its minimal surface footprint, modular design and optimized safety parameters, it delivers unique technical features:

- **STORAGE CAPACITY OF 1 TO 100 METRIC TONS OF H₂**
- **VERTICAL DESIGN UP TO 100 METERS / 330 FT DEEP**
- **WITHSTANDS HIGH PRESSURES UP TO 500 BAR / 7,500 PSI**

BENEFITS:

HIGH SAFETY



- Uses proven hydrogen-qualified alloys & connections
- Subsurface design engineered with state-of-the-art passive and active safety features

“SAFETY PERIMETER HALVED COMPARED TO ABOVE-GROUND ALTERNATIVES”

LOW FOOTPRINT

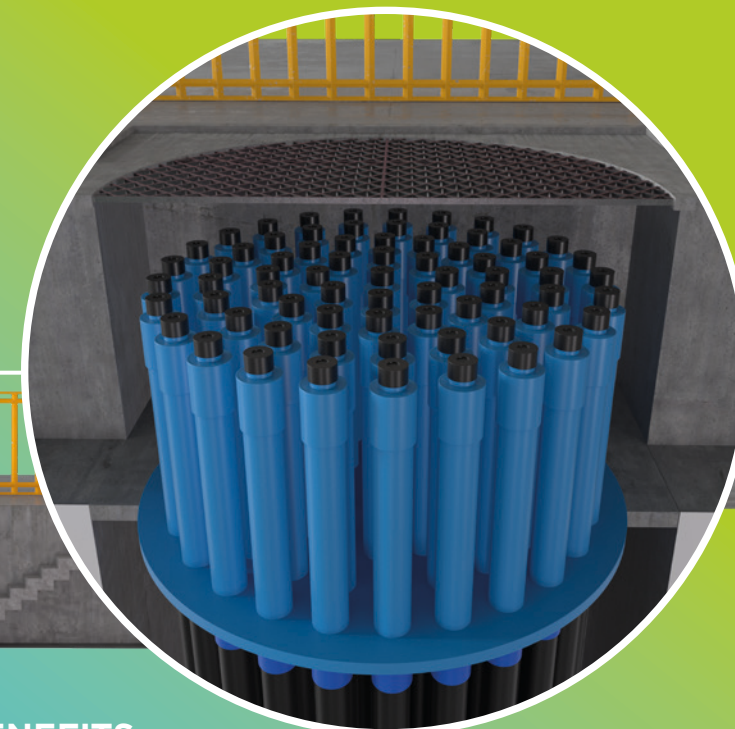


- Vertical design occupies up to 30 times less acreage than above-ground storage
- Underground design for reduced vulnerability and easier stakeholder acceptance

FLEXIBILITY & MODULARITY

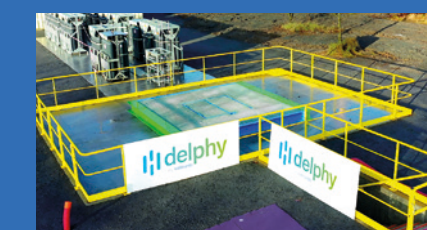


- Modular design for site-specific optimal configuration
- Inbuilt scalability enables future evolutions



TECHNOLOGY WITH AN IMPACT

Delphy storage is fully adapted to hydrogen production, industrial processes and heavy transport. Its use cases include the production of green hydrogen, and use for green ammonia, green steel, E-fuels like Sustainable Aviation Fuel (SAF), energy storage, and refueling stations. Storage offers added value and supports project economics, allowing lower energy costs and an optimized end-to-end value chain. A study with NextChem, a specialist in decarbonization technologies, showed a potential reduction of 15% of the Levelized Cost of Energy of green ammonia.



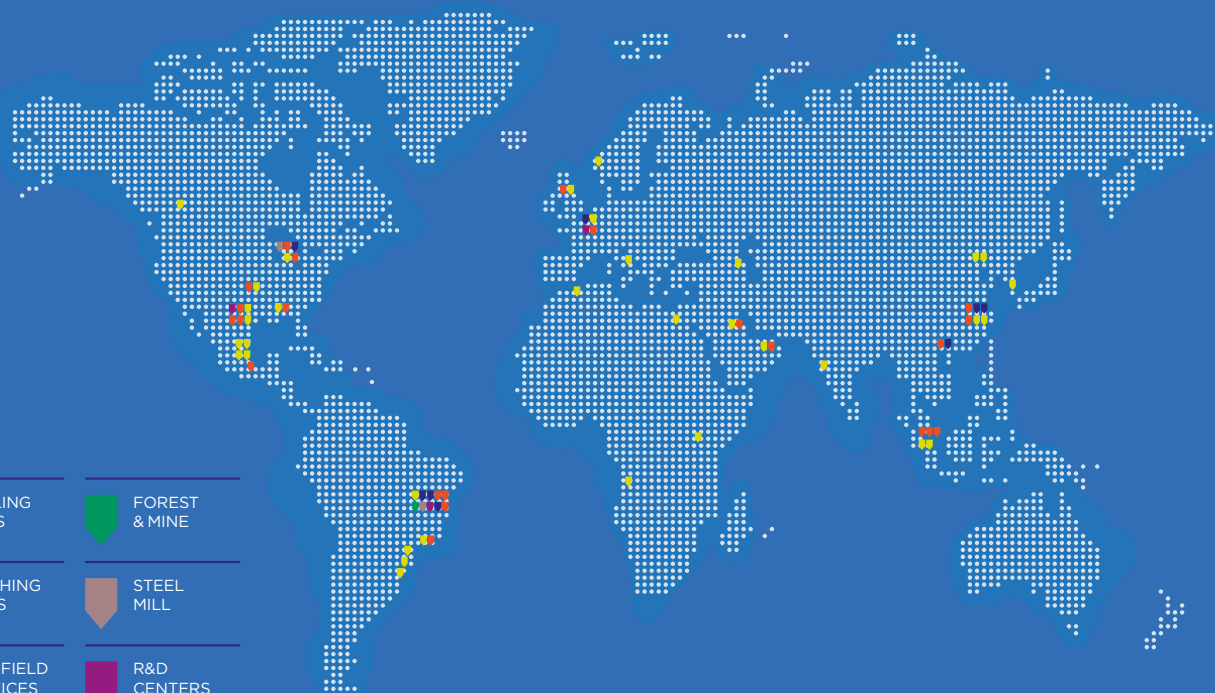
RIGOROUSLY TESTED & FULLY VALIDATED

Vallourec's fully-functional Delphy demonstrator in northern France has successfully undergone comprehensive testing for materials, functionality, safety, maintenance, and more.

- Entire solution validated by independent bodies
- Compliance with Pressure Equipment Directive
- Technology qualified according to DNV-RP-A203



YOUR PARTNER, SETTING THE PACE FOR INNOVATION AND PERFORMANCE EVOLUTION



NEED MORE INFORMATION?

Information is available online on
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