



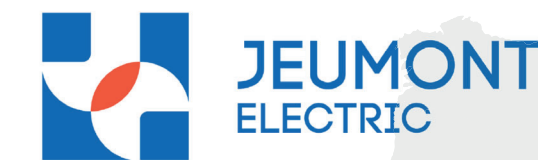
Sustainable HYdrogen  
powered Shipping

## THE PROJECT

The shipping industry is facing one of the most demanding challenges ever: to find the way to achieve zero-emission navigation. The time to achieve such goal is very short: the next big deadline imposed by the IMO is to reduce the total annual GHG emissions from international shipping by at least 50% by 2050.

Hydrogen is one of few zero-emission solutions that is very promising, but the technology necessary to use it on board is not completely ready. To combine the tight application times (50 % reduction by 2050 of GHG emissions from shipping) and the technological gap, sHYpS is centered around the idea of a swappable storage system for the liquid hydrogen, based on new c-type ISO containers. This solution can enable a full zero emission ship platform in the needed time.

sHYpS project, with a total budget of €14,295,314, has been granted €8,621,612.45 from the Horizon Europe Research and Innovation program of the European Union.

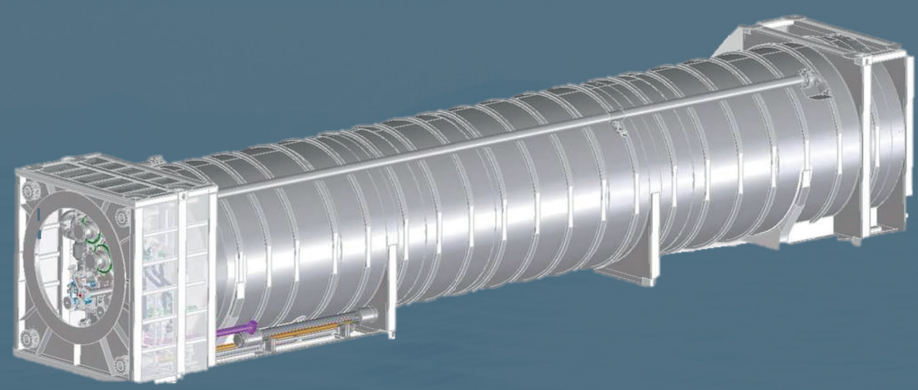


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## OBJECTIVES AND RESULTS

To pursuit its goals, the Specific - Technical and Industrial - Objectives (SOs) of the sHYpS are described below:



**Design, build and test a prototype of an intermodal ISO 45 LH2 container** and of its evaporator (by CHART). **Design and test the tank connection space** (to safely connect the container to the ship's power plant).

- ✓ Design finalized and approved for construction;
- ↻ Prototype manufacture in progress.



**Design the structural integration between the H2 fuel handling and the energy system** through the detailed design of a 6MW PEM fuel cell powertrain and have the system ready to be reviewed by Lloyd's.

- ✓ Design development and construction of a 375 kW PEM fuel cell module ready for the integration within a 40ft container;
- ✓ Power generation system design approval and risk assessment completed.

**Integrate the LH2 storage system, the fuel handling system and the electric connection to the ship backbone, onboard one Viking's newbuild cruise ship.**

- ✓ Design of GH2 and auxiliary systems (ventilation, vent, inert and cooling water) integrated with the ship plant.

**Complete extended testing at components level** to have Lloyd's review and **test the full system onboard.**

- ↻ Test campaign on a fuel cell module to demonstrate the efficiency target and to optimize the system at different loads;
- ↻ On-land test site for LH2 tank and fuel preparation system under development.

**Validate that an LH2 container supply chain is viable** (by PLP and PoB) and unlock a zero-emission operation model for large ships.

**Demonstrate the scalability of the LH2 system and its logistics.**

Develop a solution which is **fully adoptable by many kinds of ship with a conceptual design** (by NAV and K17) for 5,000 DWT and 8,000 DWT / 700 TEU cargo and containers vessels.

**Increase knowledge and expertise on hydrogen-as-a-fuel pertinent rules for marine application.**

## CONTACT US

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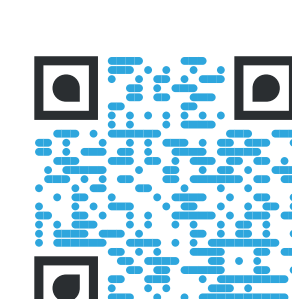
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