



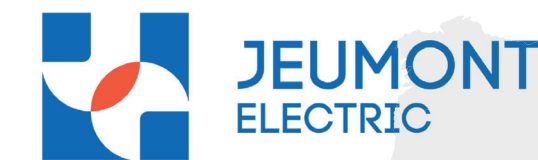
Sustainable HYdrogen
powered Shipping

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.

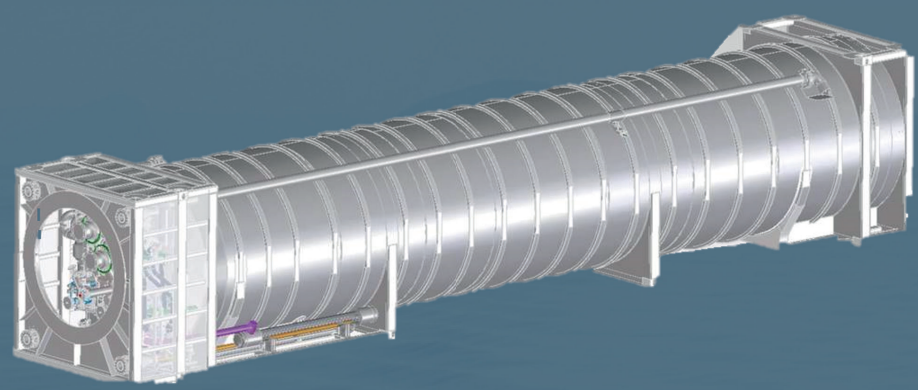
Hydrogen is one of few zero-emission solutions that is very promising, but the technology necessary to use it on board is not completely ready. To combine the tight application times (50 % reduction by 2050 of GHG emissions from shipping) and the technological gap, sHYpS is centered around the idea of 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.



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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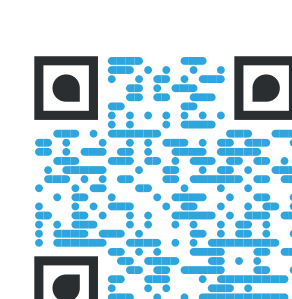
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