

# **Neo Orbis, the first electrical propelled hydrogen powered vessel on sodiumborohydrate from Port of Amsterdam**



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# Neo Orbis

**Assignment:** build a new port vessel: zero emission and as circular as possible.

Purpose vessel : trips with potentials clients and dignitaries

Sailing area: canals of Amsterdam, IJ, Amsterdam Port Area, North Sea channel up until IJmuiden

Challenge: sailing area is too large for solely electrical propulsion

Solution: electrically Propulsed Hydrogen Powered

The project was accepted in the H2 Ships program as demonstrator/ pilot



# H2 SHIPS

Purpose H2 Ships: demonstrate technical and economical feasibility of hydrogen propulsion. Currently close to 100% of the inland vessels are fuelled by gasoil. This results in the emission of large amounts of GHG (CO<sub>2</sub>, NO<sub>x</sub>, SO<sub>x</sub> and PM's).

One of the pilots is:

Hydrogen powered port vessel



# Activities, To-dos and Deliverables H2 Ships

| Activity/ Del.                                | Partner                          | Task   |
|---|----------------------------------|--|
| Design of ship                                | PoA                              | Design of an zero emission vessel  |
| Design H2 unit                                | H2 Fuel BV/<br>TU Delft          | Technical design of H2 unit( bunkering, storage, elektrolyser and motor) |
| Build of the vessel                           | PoA                              | Q 3 2021 tender to build, Q 3 2022 testing sailing                       |
| Testing H2 Fuel installation                  | PoA/Univers<br>ity of Delft      | 2021/2022  |
| Next phase: making NaBH <sub>4</sub> circular | Consortium<br>UvA en TU<br>Delft | 2020-2024  |

# Neo Orbis

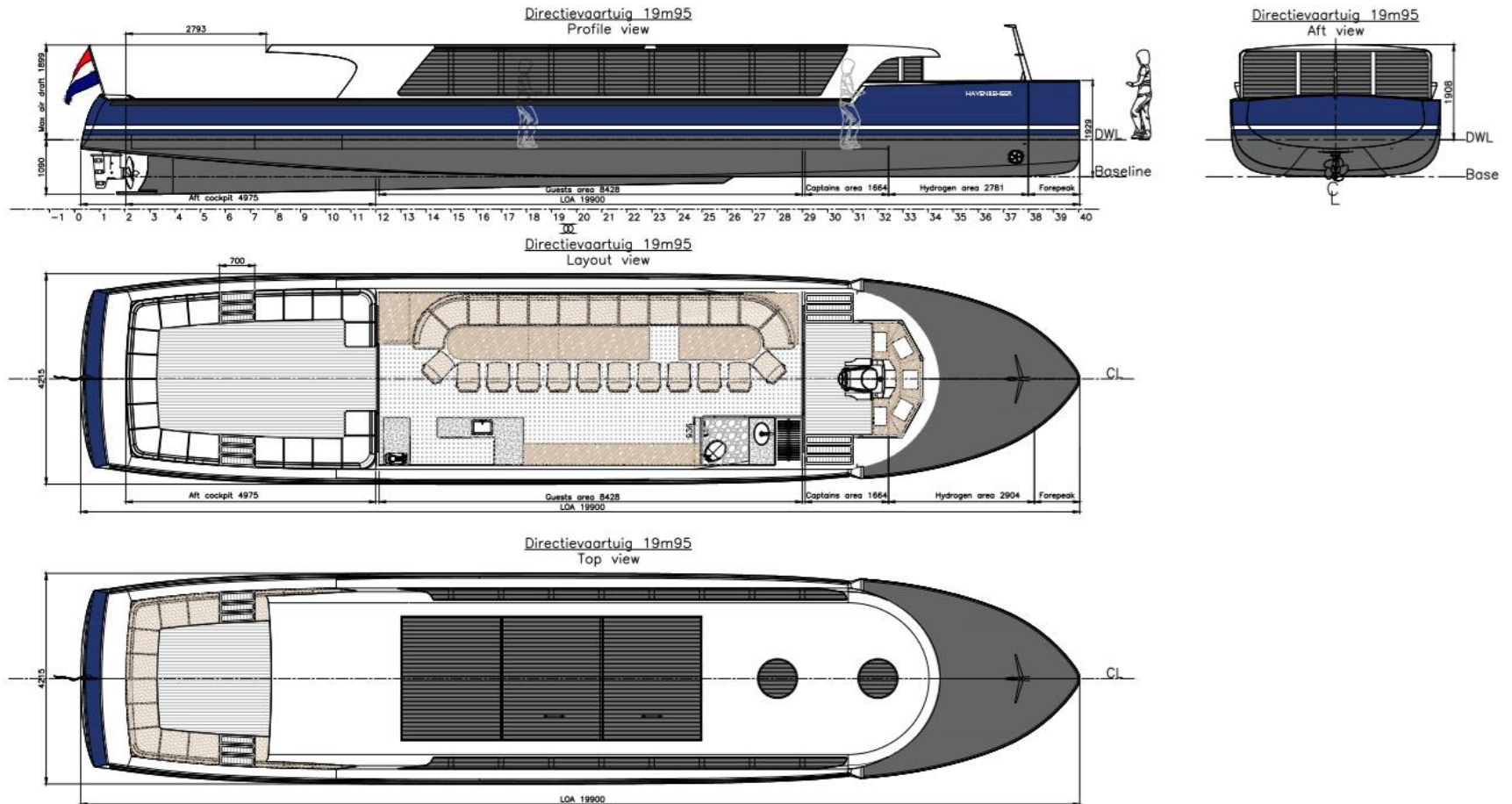
## Project approach:

- Interview users
- Functional Requirements PvE
- Power test current vessel
- Power calculation

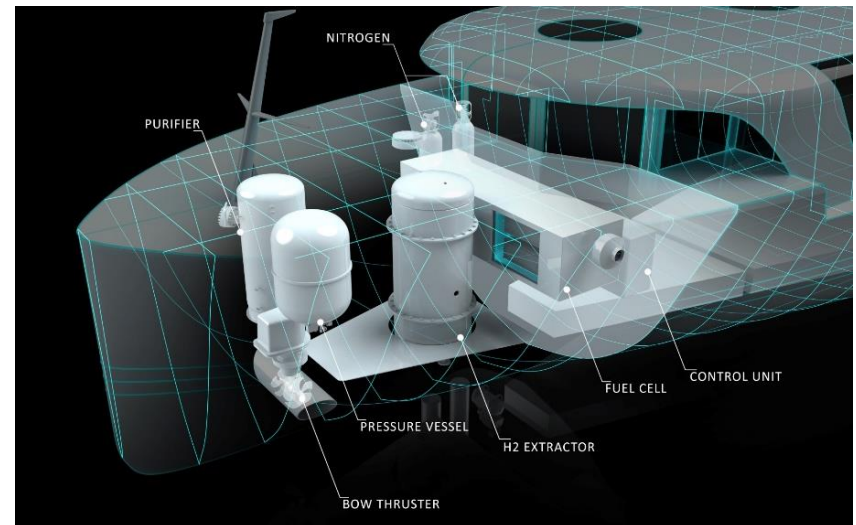
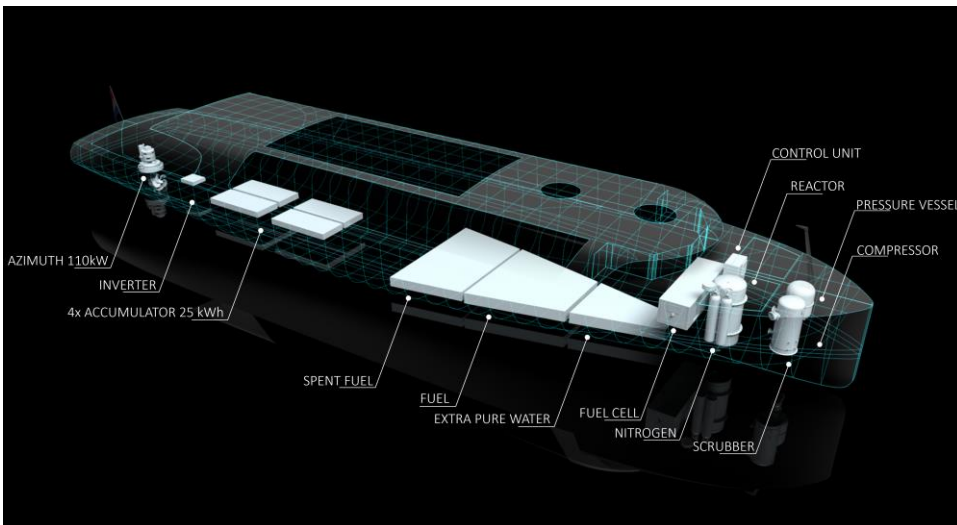
| Sailing time [hrs] | Speed [km/hr] | Energy Use /hr [kWh] | Energie use [kW] |
|--------------------|---------------|----------------------|------------------|
| 7                  | 12            | 48                   | 336              |
| 3                  | 15            | 95                   | 285              |

- Research battery power plus additional demand for energy.
- Design proces in multidisciplinary team (WYC, PoA, H2 Fuel, Marin, Baumüller, Lloyds)
- Pre scan, Hazid (risico analysis) Lloyds
- Certification Lloyds en IL&T

# Shipdesign and layout



# System design







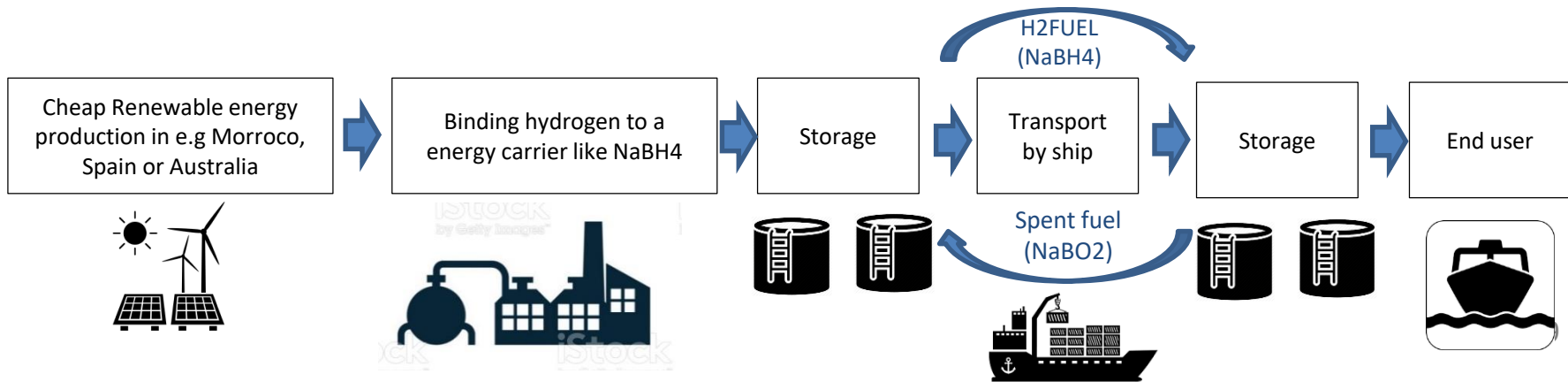
# NaBH<sub>4</sub> in the maritime sector as substitute for gasoil/diesel

Why use gasoil/diesel:

- High energy density
- Easy to transport
- Cheap

How can sodiumborohydrate compete?

- High energy density
- Safe storage for a long time
- Cheap transport
- Potentially circular



# Questions?

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