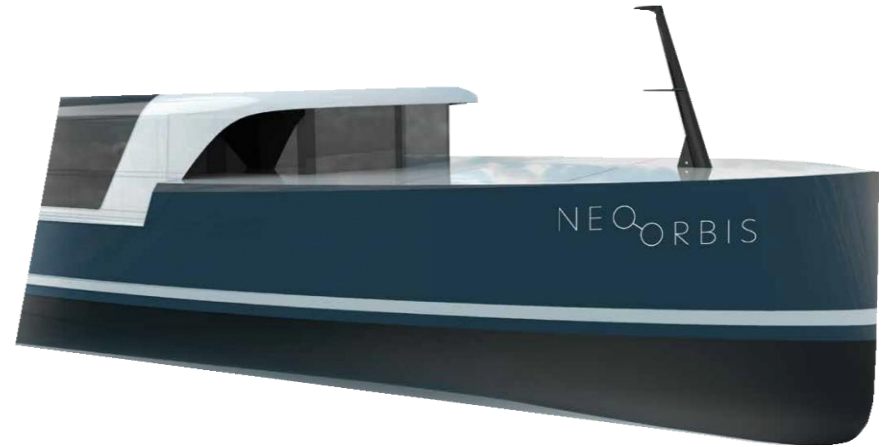


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Neo Orbis Amsterdam Demonstrator project

Patricia Haks
Projectmanager Port of Amsterdam
Schone Lucht Jaarcongres
07-06-2023

 **Port of
Amsterdam**
Port of partnerships

<http://www.nweurope.eu/H2SHIPS>
Project co-funded by European Regional Development Funds (ERDF)

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Neo Orbis, het eerste vaartuig ter wereld met waterstof in vaste vorm als energiedrager: een Europees innovatieproject van Port of Amsterdam

H2 SHIPS

Doel H2 Ships: de technische en economische haalbaarheid van een waterstof voorstuwing te demonstreren. Momenteel vaart bijna 100% van de binnenvaartschepen op diesel. Dit veroorzaakt grote emissies GHG (Co₂, Nox, Sox en PM's).

Een van de pilots is:

Vlaggenschip PoA met waterstof als vaste energiedrager



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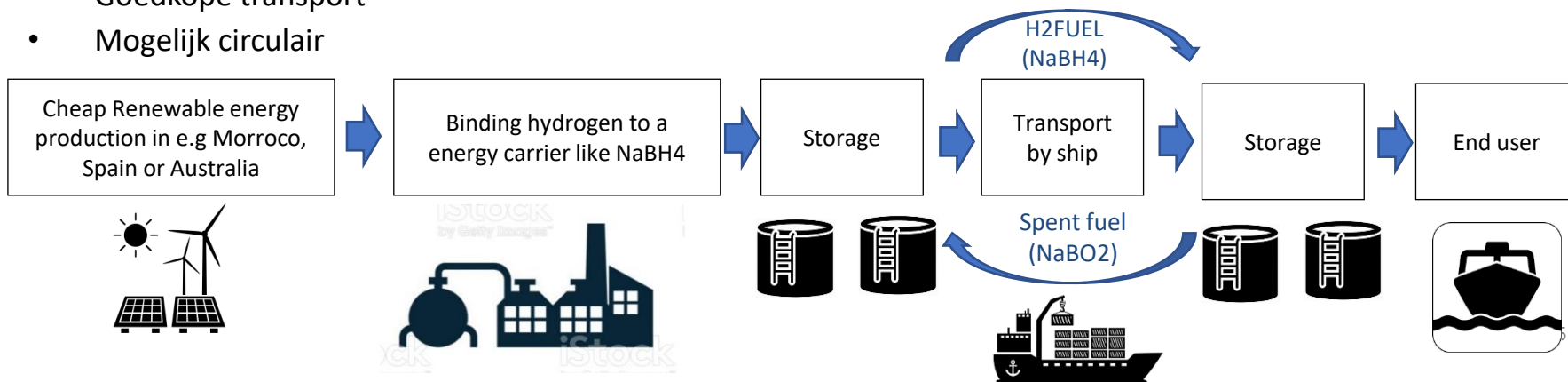
NaBH₄ in de maritieme sector als vervanger van diesel

Voordelen gebruik diesel:

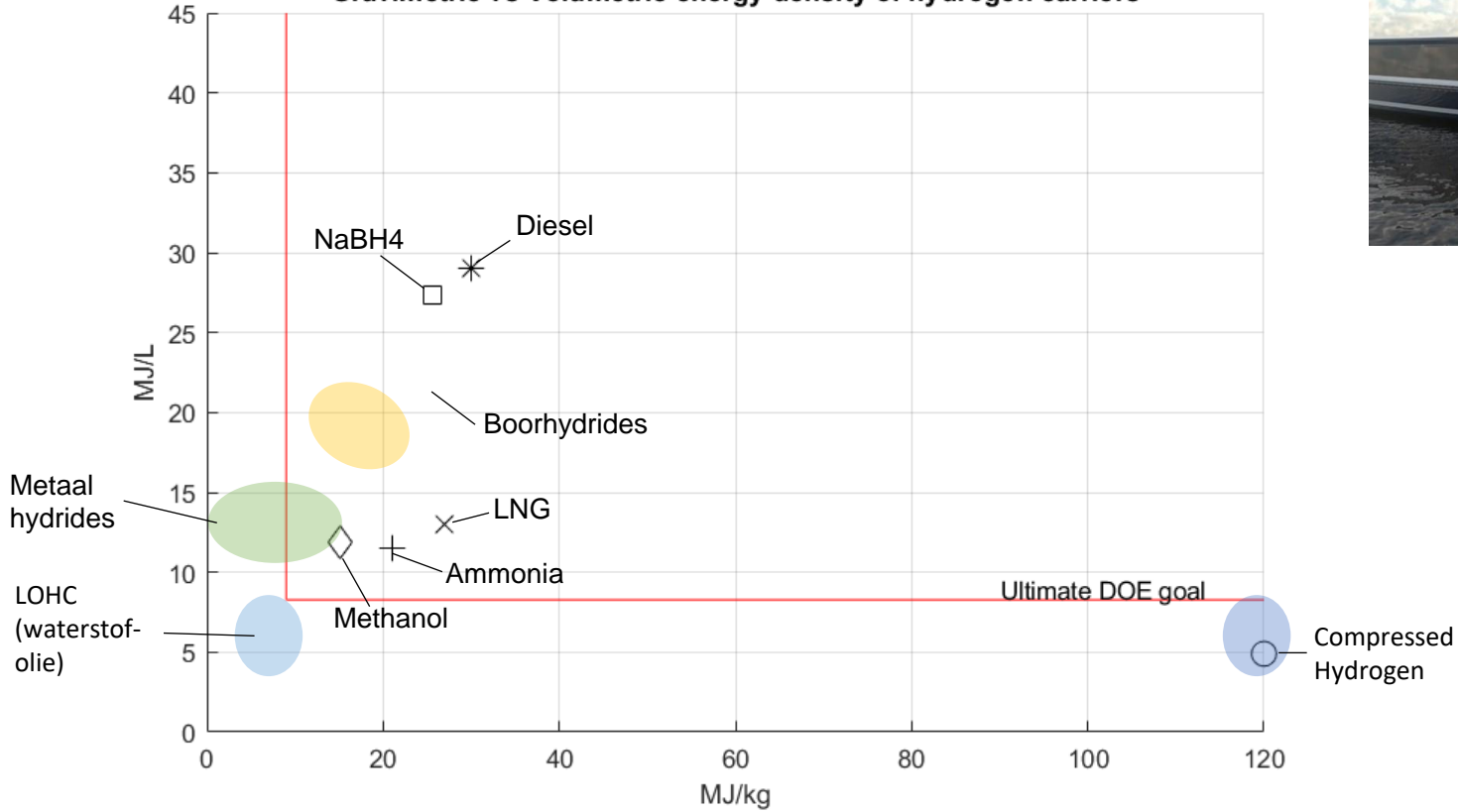
- Hoge energiedichtheid
- Makkelijk te transporteren
- Goedkoop

Hoe kan NaBH₄ concurreren?

- Hoge energiedichtheid
- Veilige en langdurige opslag
- Goedkope transport
- Mogelijk circulair



Gravimetric vs Volumetric energy density of hydrogen carriers



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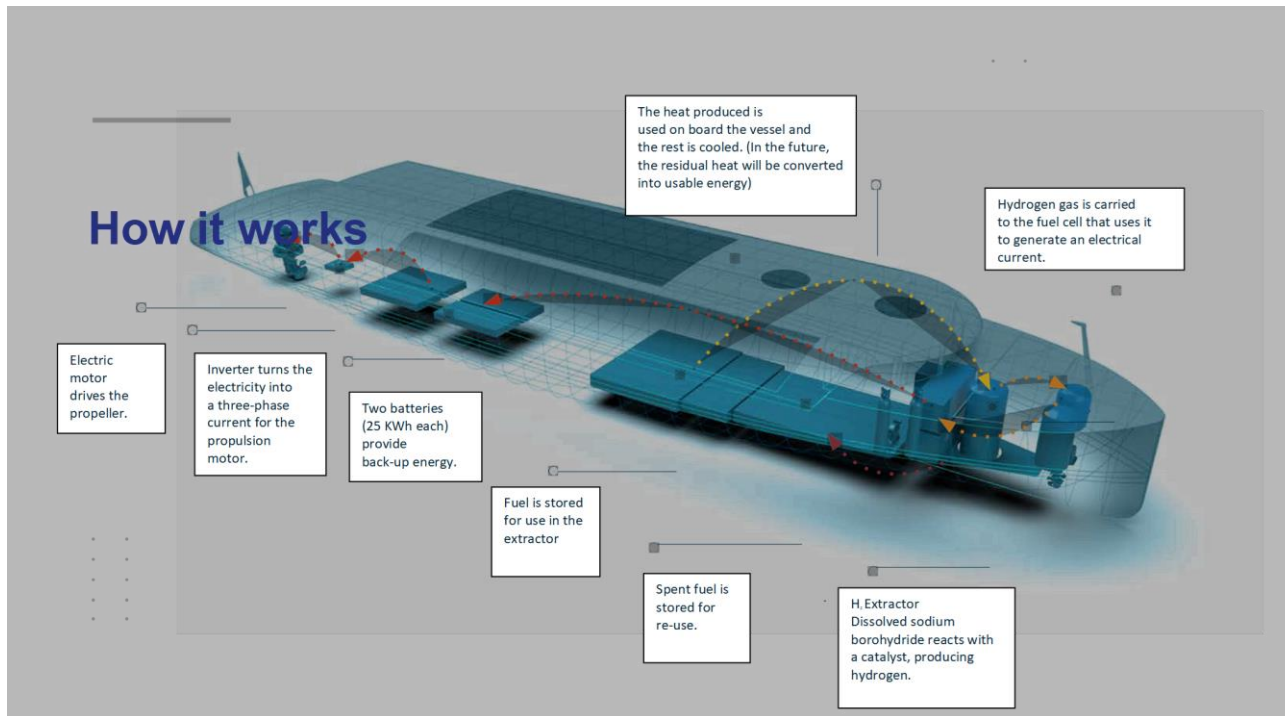


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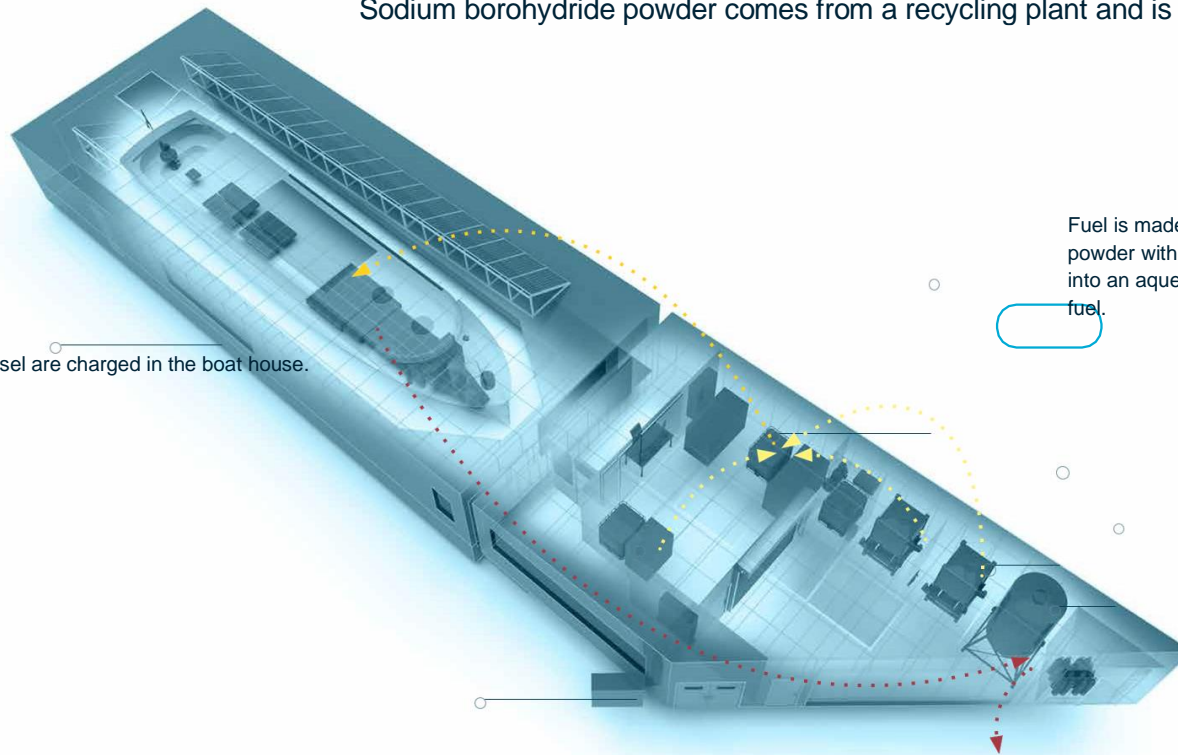


Botenhuis

Sodium borohydride powder comes from a recycling plant and is stored in the boathouse



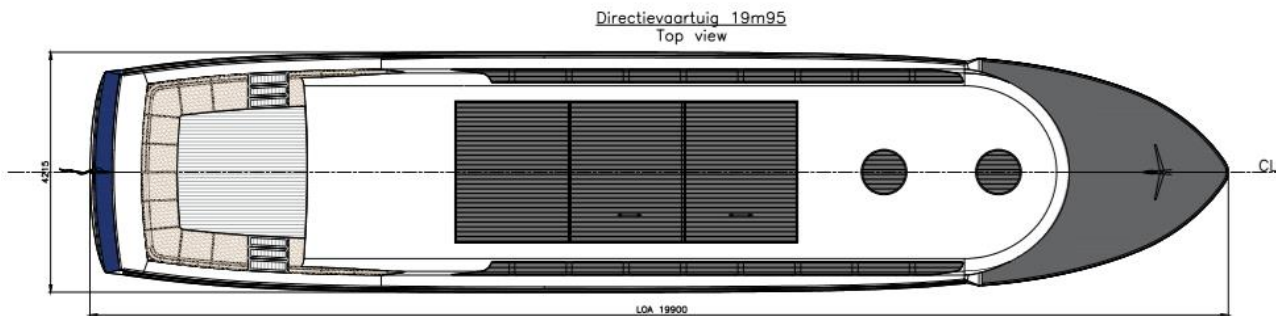
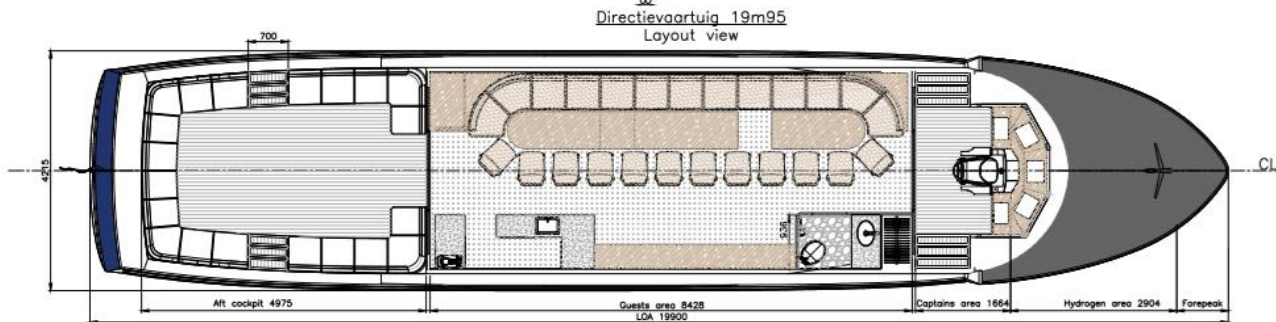
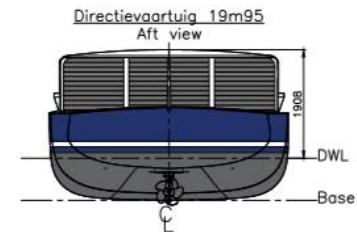
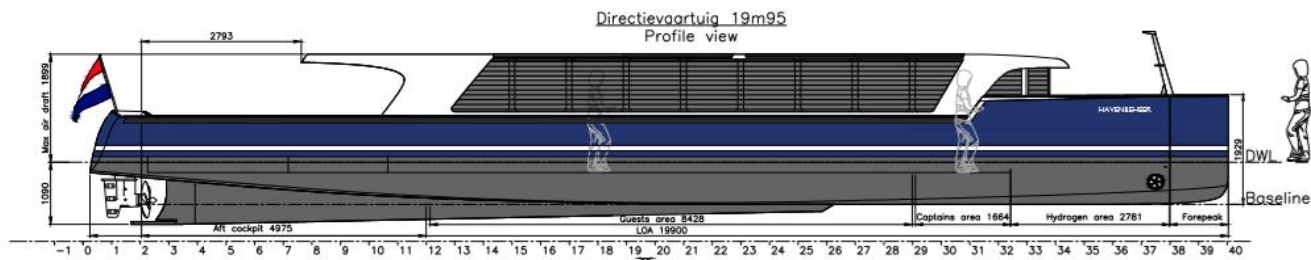
The batteries on board the vessel are charged in the boat house.



Fuel is made by mixing sodium borohydride powder with a stabiliser and ultrapure water into an aqueous non-combustible liquid: fuel.

We make ultrapure water from tap water.

Spent fuel is stored for transport to the site where it is regenerated into sodium borohydride (packing-in).



Veiligheid is essentieel

Certificering door Lloyd's dmv risk based analysis

- Veilig bunkeren
- 1 HAZID, 5 HAZOPS, Testfase
- Hyex onderzoek

Voortgang:

- Start bouw 2023 @ Next Generation Shipyard, Lauwersoog, NL.
- Sea Acceptance Test 2024
- FAT/SAT extractor @ KLIP
- Testen Lloyds en Marin @ Klip
- 2025: onderzoek naar scale up binnenvaart (H2CARGOSHIP) en regeneratie NBH4 (BORE2ACTOR)

Neo Orbis eind mei 2023

