NERA-H2

Conversion of an existing river cruise ship to green hydrogen

Modular hydrogen systems for safe integration and operation onboard electric ships.

NERA-H2 aims to facilitate the transition of the waterborne sector to climate neutrality by providing a comprehensive green concept for the electrification of river cruise ships.
This concept includes a Green Digital Twin (GDT) for designing targeted electrical grid architecture and integrating a hydrogen system in combination with battery capacity into an existing river cruise ship.
It features a simple, compact, modular system with a safe integration of existing onboard systems to ensure operational business continuity.

NERA-H2's goal is to develop, install, and validate safe, reliable, modular solutions for the electrification of the river cruise sector through the application of hydrogen-based fuel cells.

These solutions are suitable for the electrification of river cruise ships for distances where the power demand is 5-10 MW and for longer distances with a propulsion power of 10-20 MW.

THE NERA COMPANY

VISION

NERA-H2 offers a new energy system for the sustainability of the river fleet; a complete package of products and services for emission-free sailing based on refillable or exchangeable hydrogen containers, exchange stations, along with an innovative payment concept.

NERA-H2 aims to enable the river cruise fleet to sail clean and climate-neutral.

GOALS AND AMBITIONS

NERA-H2 will develop and validate innovations for the integration of large hydrogen systems in the river cruise sector and will advance the technology up the TRL ladder (Technology Readiness Levels), starting from the development phase (TRL 4, 5, and 6) and ending at the demonstration phase (TRL 7 and 8). The development will demonstrate innovations that go far beyond the current situation.

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NERA-H2 Project goals

The overall project goal will be achieved through the following specific objectives and project outcomes:

Objective 1
Design, verify, and validate onboard electrical grid and control architectures that are scalable and adaptable to the needs of operational conditions.

Objective 2
Develop a modular, scalable hydrogen and battery system that can be optimized for various operational conditions and that ensures high reliability and safety, long lifespan, and low weight.

Objective 3
Test, verify, and validate the onboard electrical configurations.

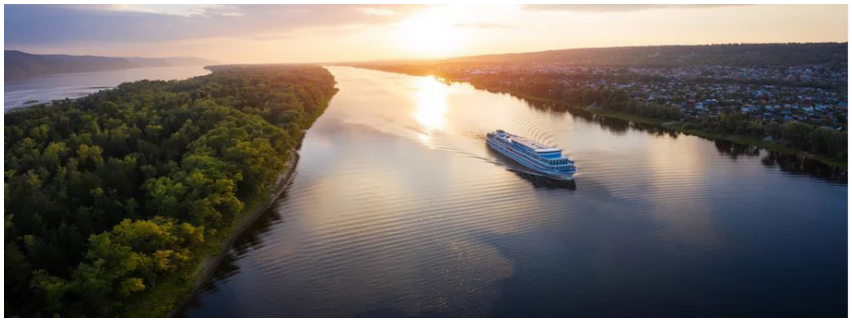
Objective 4
Demonstrate NERA-H2 solutions onboard a demonstration ship and evaluate the performance of a river cruise ship operating with a hydrogen-battery hybrid configuration with sufficient capacity on routes of 100 to 200 km.

Objective **5**
Evaluate the sustainable operation of the NERA-H2 solutions, including reduced noise and emissions, and develop a roadmap to fully hydrogen-powered operations on routes of 300 km by 2030.

Objective 6
Disseminate and exploit NERA's technology through a business plan and strategy for skill development and technology transfer.

TARGET AUDIENCES

- The maritime sector, including shipowners, ship operators, shipbuilders, suppliers, and maintenance and repair companies, will be able to use the NERA solution to retrofit their existing fleet and design new ships with hydrogen systems.
- The European public will benefit from NERA by having access to more sustainable river cruisers that do not rely on fossil fuels but are powered by hydrogen-electric systems with reduced noise and zero gas emissions.
- Research institutes and training centers will continue to develop their expertise in hydrogen systems and their applications, ensuring that Europe remains at the forefront of the green transition and can inspire the global community.



SUMMARY

- Green Digital Twin-schedule for the design and validation of electrical grid architectures for fully hydrogen and battery hybrid river cruisers.
- Safe integration of hydrogen and battery systems.
- Safe and reliable hydrogen systems that can be scaled to meet the ship's needs and space/weight constraints.
- Monitoring of the Power Management System (PMS) to ensure high efficiency, availability, redundancy, lifespan, and compliance with future requirements.
- Long-term strategy for skill development and technology transfer.

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