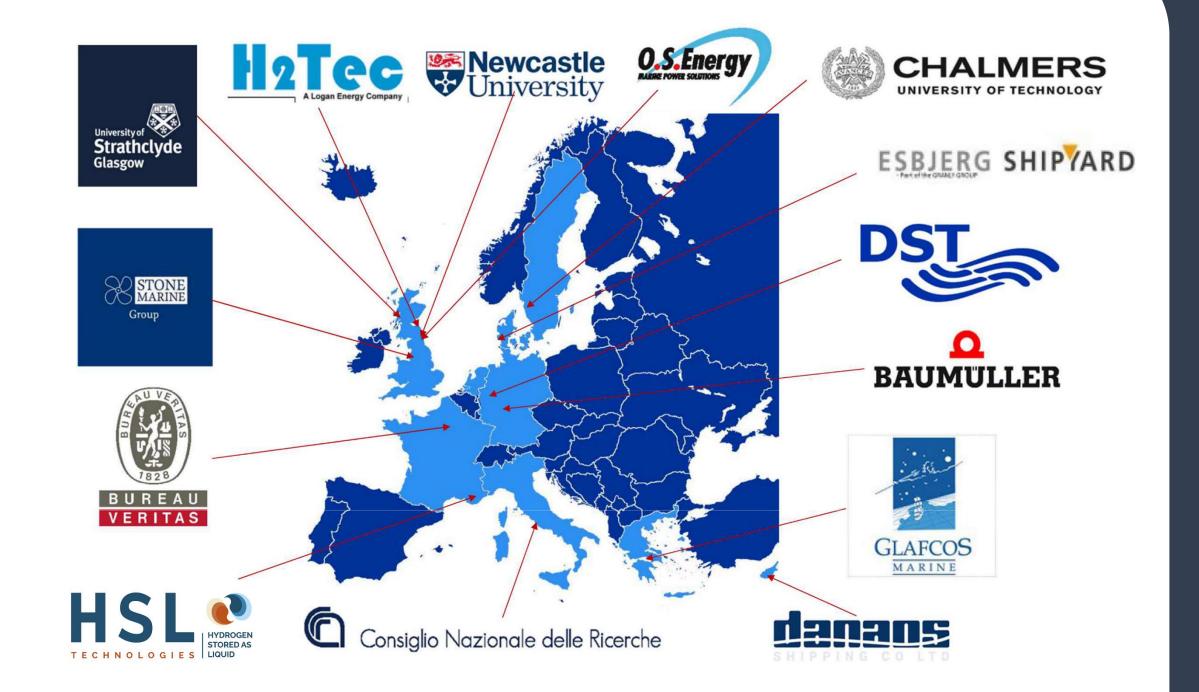


# What is **RESHIP** about

RESHIP is a three year Project that aims at enhancing energy efficiency performance and at addressing the current challenges for hydrogen usage onboard, including high energy demand, abrupt power spikes, demanding energy storage requirements.

RESHIP together brings world-leading а team of multidisciplinary experts from Universities and Research Center, Shipyards, Industry and Classification Societies including key patent holders from both shipping and hydrogen sectors.



Objectives

# Research structure

The current research and findings are encouraging for Tubercleassisted propellers (TAPs) and HydroSil technologies to be applied on hydrogen powered vessels. Further testing and validations are needed, together with a holistic design and optimisation study to maximise the technological impact. RESHIP project is organised in a three phased structure to step by step develop the technologies:

### Phase 1, Key technology development

The consortium will focus on technologies around TAPs and HydroSil, to develop ESD solutions for hydrogen powered vessels and energy efficiency measures for onboard hydrogen utilisation.

## Phase 2, System integration and demonstration

With the confidence built in Phase 1 studies, the consortium will focus on system integration study and demonstrator development.

#### PROPELLER

Redesign open and ducted propellers with novel bioinspired features, Tubercle Assisted Propulsors (TAPs), using multiobjective design and optimisation methods to be hydrogen compatible and widely applicable to different vessel types.



### RECOVERY

Develop energy recovery solution with combined heat and power to revalorise the energy output (waste heat) in the release process from the onboard carrier HydroSil.



#### ESD

Review the currently developed energy saving solutions and identify hydrogen preferred standalone and combined solutions for inland, short-sea and ocean-going shipping for both new builds and retrofits to reduce the energy & storage demand and smooth shaft power.



#### WATER

Validate the use of river/sea water as a reactant for the carrier at large scale; exploit the fresh water circulation onboard using the output from the fuel cell as the reactant for hydrogen release.



Investigate operational energy efficiency of developed energy saving solutions during manoeuvring and harsh sea conditions with development in the novel and hydrogen compatible automation and control strategy.



### CARRIER

Research novel onboard hydrogen solution with energy efficient liquid inorganic hydrogen carrier HydroSil, to reduce the energy consumption in the process of storage, release and utilisation.



### DEMONSTRATION

sea.

Investigate the impact on Perform prototype ship operation in development and ballasting and operational demonstration using the propulsion efficiency, due selected target vessel for a fullscale exploitation to to the weight changes of the investigate performance at hydrogen carrier during release, two times heavier after release.





BALLAST



#### IMPACT

Research the potential impacts in technical, environmental, economic, safety and regulatory for the applications to marine and inland waterway ships and fleets.



Phase 3, Wider impacts and economic feasibility The consortium will combine the work done in Phase 1&2 to further reflect the project findings and research outcomes to understand the potential impacts on the wider application of the developed technologies on new builds and retrofits for sea-going and inland vessels.



# **RESHIP INFO**

**Funding Programme**: Horizon Europe Framework Programme (HORIZON) Call: Clean and competitive solutions for all transport modes (HORIZON-CL5-2021-D5-01)

Action: HORIZON-RIA HORIZON Research and Innovation Actions **Topic:** Innovative on-board energy saving solutions (ZEWT Partnership) Duration: 3 years, September 2022 - August 2025 **Consortium**: 14 Partners from 9 Countries Scientific Coordination: UNIVERSITY OF NEWCASTLE UPON TYNE Coordinator for Italy: CNR (Dr. Mario Felli) **Project Coordination: HYSILABS** Total Budget: 3 758 912.50 €



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# www.reship-project.com

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