

# MECHANICAL ENGINEERING

## MUR DM 117/Azimut Benetti - High hydrodynamic efficiency boat with hydrogen fueling

<b>Funded By</b>	AZIMUT - BENETTI S.P.A. [P.iva/CF:01390230462] MINISTERO DELL'UNIVERSITA' E DELLA RICERCA [P.iva/CF:97429780584] Politecnico di TORINO [P.iva/CF:00518460019]
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<b>Context of the research activity</b>	<p>The research is devoted to the study of a high efficiency boat with a hydrogen fueled propulsion based on the use of fuel cells. In order to reduce the size of the propulsion and of hydrogen tank, as well as to increase speed and comfort, the hydrodynamic efficiency of this kind of boat should be increased with respect to traditional hulls. The research will consider both the development of solutions to increase the hydrodynamic efficiency, such as active or passive hydrofoils and SWAT architectures, and the study of the hydrogen propulsion.</p> <p>Progetto finanziato nell'ambito del PNRR - DM 117/2023 - CUP E14D23002030004</p>
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<b>Objectives</b>	<p>In order to increase the sustainability of maritime mobility and to reach the target of carbon neutrality the electrification of propulsion is paramount. In order to avoid the need of excessively large energy storage this target requires the development of innovative architecture for the hull, in order to reduce the drag and so total energy consumption and the need for installed power. The use of hydrogen with a fuel cell can constitute a valuable alternative solution to a battery based propulsion, and can offer several advantages in terms of reduced weight and encumbrance and fast refueling. The aim of this research is to develop a design methodology for small boats, considering a total displacement included between 500 and 2000 kg, investigating possible solutions to increase the hydrodynamic efficiency of the hulls. Possible solutions to be analyzed are active or passive hydrofoils and/or SWATH layout.</p> <p>The first phase of activity regards the development of numerical models of possible solutions, considering the hull, its interaction with water and the hydrogen propulsion system. This will lead to the design of a prototype boat. In a second phase a prototype will be manufactured and tests will be carried out.</p>
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**Skills and  
competencies  
for the  
development of  
the activity**

Use of Matlab/Simulink; fluid dynamics; control of mechanical systems