



## Technical Webinar

Co-Organised by

The Joint Branch of the RINA and IMarEST (Singapore)  
The Society of Naval Architects and Marine Engineers Singapore  
Singapore Shipping Association

### **Hydrogen as a Source of Power for Marine Applications – Regulatory Aspects**

by



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**Date : 15 December 2020 (Tuesday)**  
**Time : Webinar will begin at 5:30 pm and ends at 7.00 pm**

**To register your attendance, please click the web-link below:**

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## Abstract

The IMO's ambitious strategy to reduce GHG emissions by 50% by 2050 (compared to 2008) presents a massive challenge to a world fleet that is expected to expand significantly by 2050. Maritime stakeholders are challenged to significantly reduce GHG emissions introducing low-to zero-carbon fuels and technologies, forcing strategic choices which are to be made well before 2030. This will impact on costs, asset values and earning capacity more significantly than in the past. The required changes in fuels and technologies will shape the future fleet. Shipping will not meet IMO carbon goals under current policies. Policymakers and the industry in general, focus on decarbonisation of the world fleet, while shipowners are facing difficult short-term decisions with long-term implications, requiring practical approaches for future-proofing assets.

The most widely discussed alternative energy carrier is hydrogen, preferably produced from carbon-neutral energy resources, such as electricity from renewables. Alternatively, carbon-neutral H<sub>2</sub> can be produced from natural gas (with carbon capture and storage).

This webinar will address the current regulatory framework, starting from the relevant IMO provisions and work plans, expanding the view to the even more challenging targets of the European Commission and presenting the recent classification rules issued by RINA Services S.p.A. on Fuel Cells.

Hydrogen can itself be the basis for different electro-fuels (sometimes referred to as e-fuels), an umbrella term for synthetic fuels produced from H<sub>2</sub> and CO<sub>2</sub> (carbon-based fuels), or H<sub>2</sub> and nitrogen (nitrogen-based fuels), and when renewable electricity powers the production.

There are still many regulatory gaps to be bridged when using compressed or liquefied hydrogen-rich fuels in fuel cells, as a realistic option for the different shipping segment in the medium term. Regulatory challenges, barriers and opportunities will be outlined for each of the links in the hydrogen chain on board – bunkering, storage, distribution, conversion – with due consideration of materials and technologies.

The most debated safety issues of hydrogen-rich fuels will be presented, outlining how R&D strategies are essential stepping-stones towards the decarbonisation and sustainability of shipping. Handling alternative fuels may require different energy converter systems on board, including gas- and dual-fuel engines, battery-electric propulsion systems, and marine fuel cells. The impact of the human element and training are other essential keys to the decarbonisation of shipping.

Currently, there is no silver bullet, but some solutions can be developed in synergy with other industrial fields and transport modes, which may share the same hydrogen distribution chain, logistic and network. Considerations on the design, retrofitting and operation of hydrogen-powered vessels will trigger the final conclusions on how



alternative fuels – to be cost-effective – need to be combined with additional energy efficiency measures and flexible changes in the fleet operation profiles.

### **About the Speaker**

Alessandro Maccari is a Senior Naval Architect and Marine Engineer, who developed multidisciplinary technical competences in ship design, shipbuilding and R&D activities applied to more than 60 passenger ships. His collaborative experience is shared within the RINA Global Fuel Excellence Centre and Passenger Ships Excellence Centre at international level. Adviser of the Italian Administration at the International Maritime Organization since 1994, Mr Maccari actively contributes to the development of the regulatory framework on marine environment protection and ship safety, being also a member of the Passenger Ship Safety Expert Group set by the European Commission. His current focus is on the strategic development of R&D activities, change and innovation management, set-up of EU / National / Regional Research and Innovation programs. Moreover, his academic and consultancy activities include specific training for the maritime sector, thematic lessons and seminars at post-graduate level.

Mr Maccari is currently Marine Research and Development Director at RINA Services S.p.A.