

Eni, Fincantieri and RINA unveil study on maritime transport decarbonization

Developed with the support of Bain & Company, the study provides the first comprehensive global overview of the options, impacts and investments needed to enable a more sustainable maritime industry.

Rome, April 1st 2025 – **Eni**, a global energy company, **Fincantieri**, a world leader in complex shipbuilding, and **RINA**, a multinational group specializing in engineering consultancy, certification, and inspection, presented the “**Sustainable Maritime Transport Outlook**” in Rome — in the presence of the Minister for the Environment and Energy Security, Gilberto Pichetto Fratin. The study, focused on the maritime sector, was developed with the technical support of **Bain & Company Italy**.

The study aims to contribute to accelerating the decarbonization of the maritime transport sector, in line with the Net Zero target for 2050. It forms part of the broader framework of the agreement signed on March 25, 2024, by Eni, Fincantieri, and RINA, with the shared goal of establishing a global observatory to monitor and assess the medium- to long-term evolution of sustainable decarbonization solutions for the sector.

The maritime industry is responsible for approximately 3% of global CO₂ emissions and is committed to achieving carbon neutrality by 2050. To reach this goal, a clear and realistic roadmap is essential — one that minimizes uncertainty and risk for investors while offering practical, economically viable solutions for the entire industry. Addressing this need through a holistic approach, the study provides, for the first time, a global overview of viable decarbonization options tailored to different vessel segments and regions worldwide. It also integrates volume assessments with a comprehensive analysis of cost implications for shipowners and the investment requirements across the logistics and port infrastructure chain. In the short term, the energy carriers most capable of reducing CO₂ emissions include:

- LNG (liquefied natural gas) – a fossil fuel with lower carbon intensity, though it requires significant infrastructure investments for storage, handling, and bunkering at ports.
- Biofuels – including HVO, which can be used in its pure form without the need for infrastructure upgrades, and FAME which faces significant limitations when used in pure form.

Over the long term, biofuels — including the emergence of Bio-LNG and biomethanol — are expected to remain the primary solution for the merchant shipping sector.

Synthetic fuels derived from green hydrogen, along with hydrogen itself, are also likely to gain traction in specific applications — such as low- and medium-power cruise ships — as their competitiveness improves and supply chains continue to develop.

Giuseppe Ricci, Giuseppe Ricci, Chief Operating Officer for Industrial Transformation at Eni, commented: *“A year ago, together with Fincantieri and RINA, we committed to developing a global observatory focused on the evolving landscape of sustainable decarbonization solutions for the maritime sector. This study — the result of combined expertise, resources, and technologies from key industry players — has produced a clear and actionable framework that can guide the development and implementation of impactful initiatives to decarbonize maritime transport across various segments, while considering the full supply chain. As also recognized at the EU level, there is growing consensus that biofuels — particularly those already available and usable in their pure form, like HVO — are among the most effective solutions currently available to reduce GHG emissions in the maritime sector.”*

Pierroberto Folgiero, Chief Executive Officer and General Manager of Fincantieri, stated: *“Decarbonizing maritime transport is a challenge that demands industrial vision and the ability to turn innovation into real-world solutions. The Sustainable Maritime Transport Outlook presented today marks a strategic step in that direction — an integrated analysis grounded in real data and scenarios, developed with the support of leading players across the sector. This is also the foundation for our commitment to establish a global observatory, reinforcing our role in driving the transition toward lower environmental impact, while creating value and ensuring competitiveness throughout the entire ship lifecycle. With our Net Zero Ship goal set for 2035, Fincantieri is looking ahead — leading the change and integrating technology and sustainability to stay competitive in the long term.”*

Carlo Luzzatto, Chief Executive Officer and General Manager of RINA stated: *“Knowledge transfer is a key enabler in accelerating the energy transition. Our ability to bring together expertise and experience from different sectors — particularly energy and maritime, where we have a long-standing presence — allows us to develop effective decarbonization solutions. Partnerships like this one with Eni and Fincantieri are essential for turning innovation into practical applications, creating value for all players across the shipping and transport value chain.”*

Pierluigi Serlenga, Managing Partner Italy at Bain & Company, added: *“Industry stakeholders and investors need a clear vision to guide technological choices and investment strategies. With this first edition of the Observatory, we’ve delivered a valuable tool to help interpret the evolution of the fuel mix in both the short and long term. Starting from 2040, new solutions will gradually be adopted on specific routes and use cases, complementing biofuels and LNG — although the latter will need to come from bio-based sources. It’s therefore critical to develop a roadmap for upgrading Italy’s port infrastructure to ensure it remains competitive and central to*

future low-emission maritime routes. We estimate that by 2050, around €24 billion in investments will be needed across the European port system — a significant share of which represents a real business opportunity for the Italian maritime value chain.”

IN-DEPTH OVERVIEW

Today, the maritime sector remains heavily reliant on traditional fuels, which account for 93% of total energy consumption. The goal of achieving net-zero emissions by 2050 is driving a major transformation across the industry, with increasing adoption of alternative propulsion sources. In 2023, around 50% of new ship orders were designed for alternative fuels, reflecting a shift toward greater sustainability. Ports are beginning to adapt, developing infrastructure to support a range of new fuel and technology options — but progress remains insufficient.

The adoption of new technologies and alternative fuels will depend on a complex mix of factors, including national and regional energy strategies, consumer behavior, macroeconomic trends, geopolitical developments, supply chain risks, and the pace of technological advancement.

The Outlook presents three future scenarios, each based on varying levels of decarbonization ambition, technological progress, and availability of fuels and infrastructure. Projections suggest that decarbonization will advance more rapidly in the EU and the United States, while fossil fuels and LNG will continue to dominate in the Asia-Pacific region and other parts of the world — making up approximately 70% of the energy mix by 2050.

Between 2030 and 2040, Europe and North America are expected to see a major shift from fossil fuels to HVO biofuels — which will serve as the cornerstone of the transition — and to LNG, including its bio-derived form. HVO is already available at key ports and offers a degree of cost resilience, while LNG remains economically competitive in the near term, though it will face increasing regulatory penalties from 2040 onward.

To achieve carbon neutrality by 2050, the industry will also need to explore new alternative fuels, such as synthetic fuels produced from green hydrogen. However, these are not expected to become cost-competitive with fossil fuels until after 2040.

In the long term, biofuels derived from renewable feedstocks and synthetic fuels will be essential for decarbonizing medium- and long-range merchant vessels. For short-range ships, bioenergy solutions will be sufficient. In the cruise segment, small to mid-sized vessels (luxury and exploration classes) are expected to adopt both HVO biofuels and synthetic fuels, while larger vessels (upper premium and contemporary classes) will rely more heavily on bioenergy sources such as HVO, bio-LNG, and biomethanol.

Successfully managing this transition will require significant long-term investment in port infrastructure to accommodate the supply and distribution of alternative fuels. Within the European Union alone, investments of up to €24 billion are projected. In terms of infrastructure needs, HVO biofuels and LNG will require relatively limited investment (around 15%), due to their compatibility with existing systems. In contrast, synthetic fuels will demand substantial investment (around 85%), as the necessary infrastructure has yet to be developed.

Eni S.p.A. and Fincantieri S.p.A. are related parties. Any binding agreements between them will be executed in compliance with applicable regulations, including those governing related-party transactions.

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