

MAGPIE project demonstrates that safe ammonia bunkering in ports is possible

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A new demonstration project in the Port of Rotterdam shows that ship-to-ship ammonia bunkering can be carried out safely within an active port environment. The demonstration is part of the EU-funded MAGPIE project, and the report is now available, providing concrete learnings that industry can use to guide future ammonia bunkering and accelerate global port permitting.

The shipping sector must transition away from fossil fuels to meet climate targets. Ammonia is considered a promising alternative fuel, but its specific hazards pose significant safety, operational, and regulatory challenges. Without competent operators, fit-for-purpose equipment and robust safety and regulatory frameworks, ammonia bunkering cannot take place safely in ports.

Within the MAGPIE project, a full-scale simulation of a ship-to-ship ammonia bunkering operation was conducted in the Port of Rotterdam on 12 April 2025. The demonstration showed that ammonia bunkering within port limits is operationally feasible when carefully planned and executed within a robust safety and regulatory framework.

The learnings from the demonstration have now been consolidated by the Mærsk Mc-Kinney Møller Center for Zero Carbon Shipping and project partners in a comprehensive ammonia bunkering demonstration report. This publication provides the industry with practical lessons and a validated port safety framework and tools that other ports can use as a blueprint for ammonia bunkering.

A key outcome of the project is the validation of the Port of Rotterdam's port safety framework for ammonia as a fuel, as well as the International Association of Ports and Harbours' (IAPH) Port Readiness Tool. The results demonstrate that these frameworks are fit-for-purpose instruments for ports considering the introduction of new alternative fuels.

"The project delivers practical learnings, validation sheets and recommendations that can be used by ports globally to build confidence in ammonia bunkering and to inform future port permitting and regulatory processes. The results support the EU's ambition for green ports and the safe deployment of alternative fuels in the maritime sector." Said Bo Cerup-Simonsen, CEO, Mærsk Mc-Kinney Møller Center for Zero Carbon Shipping.

"The energy transition requires new, integrated value chains. This ammonia bunker pilot is an important step in developing a complete value chain for alternative fuels, from import to application in shipping. Together with our partners, we demonstrate that innovation, safety, and scalability can go hand in hand. Rotterdam plays a connecting role as an energy and logistics hub for Northwest Europe." Said Boudewijn Siemons, CEO, Port of Rotterdam.

The learnings from MAGPIE contribute to a broader effort to accelerate sustainable, smart and multimodal port systems and results will be shared with the wider industry to support the global transition of the shipping sector.

About MAGPIE

MAGPIE (sMArt Green Ports as Integrated Efficient multimodal hubs) is a European project focused on developing, testing and demonstrating solutions for sustainable and smart port logistics. By demonstrating and implementing smart solutions in the realm of digitalization and automation, we facilitate the decarbonization of port related transport.

About Fonden Mærsk Mc-Kinney Møller Center for Zero Carbon Shipping

The Mærsk Mc-Kinney Møller Center for Zero Carbon Shipping (MMMCZCS) is an independent, not-for-profit research and development center established in 2020 with funding from the A.P. Moller Foundation. Our purpose is to guide and accelerate decarbonization of the global maritime industry.

Working with our partners, governments, authorities, public sector bodies, scientists, and organizations across the global maritime industry we aim to inform, de-risk decision-making, and spark real climate action.

We are technology agnostic and have no vested interest in specific decarbonization solutions. We explore free of commercial considerations and independent of partner strategies. As a result, we deliver independent analyses of how the transition is progressing and clear, data-driven recommendations for accelerating maritime decarbonization. On top we are maturing solutions to the most pressing problems across the maritime value chain, from fuels to onboard solutions, regulations, and financing.

For more information and overview of partners, please visit www.zerocarbonshipping.com

About Port of Rotterdam

The port of Rotterdam creates significant economic and social value in the Rotterdam-Rijnmond region, the Netherlands and Europe through employment and security of supply of energy, food and other products needed in society. Thanks to the favourable location, excellent infrastructure and hinterland connections, the port serves as an important hub for industry and global trade.

The Port of Rotterdam Authority's core tasks are the sustainable development, management and operation of the port and industrial complex and maintaining the effective, safe and efficient handling of shipping in the port and the offshore approaches to the port. The aim of the Port of Rotterdam Authority is to strengthen the port's position as a future-proof logistics hub and industrial complex. Quality is central to this. The Port Authority's ambition is to develop a climate-neutral port that is in harmony with its surroundings.

Facts and figures from the Port of Rotterdam Authority and the port of Rotterdam (2025): Port of Rotterdam Authority: approximately 1,440 employees, revenue approximately €940 million and gross investments €291 million. Port area: 12,500 ha of port area (land and water, of which over 6,000 ha is industrial sites). Length of the port area: over 40 km. Cargo throughput: approximately 428 million tonnes of freight a year.



Shipping: approximately 27,384 seagoing vessels and 93,680 inland vessels annually. Employment: approximately 182,000 jobs (directly and indirectly in Rotterdam-Rijnmond). Added value: €23.3 billion, 2.2% of the Dutch GDP.

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