

AI to accelerate emission reductions across Europe's existing fleet

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Most of today's ships will still be operating in 2050. A new EU initiative aims to unlock immediate emission reductions by helping the existing fleet sail more efficiently.

The new European project AIMPERES (AI-driven Modular Platform for Emission-Reduction & Efficient Shipping) aims to help shipowners cut fuel consumption and emissions from the vessels already sailing today. Coordinated by Fraunhofer IEM and supported by €4.17 million in funding from Horizon Europe, AIMPERES will develop and demonstrate an AI-powered energy management system designed to make shipping more efficient, competitive and sustainable.

The initiative brings together ten partners from six European countries across research, industry, maritime education and vessel operations.

Turning data into lower emissions

At the heart of AIMPERES is a modular Energy Management System that combines real-time emissions monitoring, artificial intelligence, hybrid digital twins and crew decision-support tools. Designed to work with existing onboard systems, the solution provides a practical and cost-effective way to optimise vessel performance and reduce emissions.

“Decarbonising shipping requires solutions that can be deployed across the existing fleet, not only on the vessels of tomorrow,” says Tobias Seidenberg, coordinator of the project at Fraunhofer IEM. “AIMPERES combines emissions monitoring, artificial intelligence and decision support into a practical solution that can help shipowners reduce fuel consumption and emissions while improving operational performance.”

The system combines low-cost exhaust monitoring, advanced vessel models and AI-based optimisation to transform operational data into actionable recommendations for crews and operators. By supporting better decisions both onboard and onshore, AIMPERES aims to deliver immediate improvements in efficiency and environmental performance.

Reducing emissions from the ships already at sea

Shipping is under increasing pressure to reduce emissions and meet ambitious climate targets. Yet most vessels operating today are expected to remain in service well beyond 2040, making retrofitting and operational improvements essential to achieving meaningful emission reductions in the coming decade.

The technology will be validated on inland, coastal and deep-sea vessels, with a target of at least five per cent fuel savings and emission reductions across CO₂, NO_x, SO_x and particulate matter.

By enabling rapid and cost-effective retrofitting across different vessel types, AIMPERES seeks to demonstrate that meaningful emission reductions can be achieved without major vessel modifications. The demonstrations will provide valuable insights into how AI-driven optimisation can be deployed across different vessel segments, helping shipowners improve efficiency, reduce emissions and comply with increasingly stringent environmental requirements.

“The existing fleet has to deliver if we are to meet climate targets. This partnership puts AI to work to help shipowners make better decisions every day and turn that into measurable emission reductions, and we are pleased to address this together with the strong partnership and the EU”, says interim CEO Håvard Tvedte in Maritime CleanTech.

About AIMPERES

AIMPERES is a Horizon Europe project coordinated by Fraunhofer IEM. Over three years, the project will develop and demonstrate an AI-powered energy management system for inland, coastal and deep-sea vessels.

The consortium consists of Fraunhofer IEM (Germany), Universiteit Antwerpen (Belgium), Antwerp Maritime Academy (Belgium), École Centrale de Nantes (France), STC Group (Netherlands), Navalprogetti Srl (Italy), Nestra BV (Netherlands), NAVTOR (Norway), Transtal Shipping BV (Netherlands) and Maritime CleanTech (Norway).

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