



PRESS RELEASE

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Trade press release 18 October 2018 at 11:00 AM E. Europe Standard Time

FORWARD SHIPS TAKES THE LEAD IN MEETING IMO'S 2050 TARGETS

Project Forward paves the way for meeting IMO's reduction on CO2 emissions

The Project Forward initiative led by Athens-Based Arista Shipping, with Wärtsilä as one of the participants, demonstrates that with LNG as fuel, an advanced hull design, and highly efficient propulsion machinery, it will be possible to meet the IMO's target for a 40 percent reduction in carbon intensity by 2030.

Model tests of the Project's concept vessel indicate that the Energy Efficiency Design Index (EEDI) is well below the currently most stringent Phase III level. The EEDI reflects the CO2 emissions per transport work and is a measure of carbon intensity. EEDI Phase III is applicable to ships built after 2025 and signifies a 30 percent reduction from the 2008 reference level.

The IMO has also announced that efforts should be made for a possible further reduction in CO2 emissions per transport work of up to 70 percent by 2050. One commonly discussed way to reduce such emissions has been to limit the propulsion engine power, but this would require a significantly lower service speed, resulting in a serious impact on the chain of logistics.

Project Forward shows that this 70 percent reduction in CO2 emissions target can be met, even without lowering service speeds, through the use of carbon neutral fuels mixed with LNG. Such carbon neutral fuels can be transported, stored, and consumed in a similar way to that of fossil LNG.

"Through the advanced engine technology available today, LNG has a clearly superior well-to-wake emissions profile compared to liquid fuel. LNG appears not as a transition fuel, but the fuel of tomorrow and for many years to come," says Antonis Trakakis, Technical Director at Arista and Chief Technology Officer of Forward Ships.

The concept vessel's hull form has been optimised in cooperation with Finnish ship designer Deltamarin and classification society American Bureau of Shipping (ABS). "Deltamarin has a long history in energy-efficient ship designs where hull form development has always been one of the spearheads," says Tommi Hietamäki, Project Engineer at Deltamarin.

"The efficient propulsion design concept for Project Forward is based on a novel arrangement featuring just two highly efficient Wärtsilä 31 DF engines without auxiliary gensets. The project is totally in line with Wärtsilä's Smart Marine vision that foresees an era of concept solutions delivering optimal efficiency, safety, and environmental sustainability," says Johnny Kackur, General Manager, Wärtsilä Marine Solutions.

"As a global leader in gas, ABS is collaborating with innovative companies and organizations to support the delivery

of technologies that minimize the environmental impact of shipping,” says Elias Kariambas, ABS Regional Business Director, Greece. “The Project Forward vision to create an efficient, environmentally-protective, long-haul bulk carrier is perfectly consistent with the ABS mission, and we are proud to contribute to the joint effort.”

In addition to Arista Shipping, Deltamarin, ABS and Wärtsilä, the French LNG membrane containment system designer GTT is also involved in the project. The vessel is fitted with an LNG tank positioned midships.

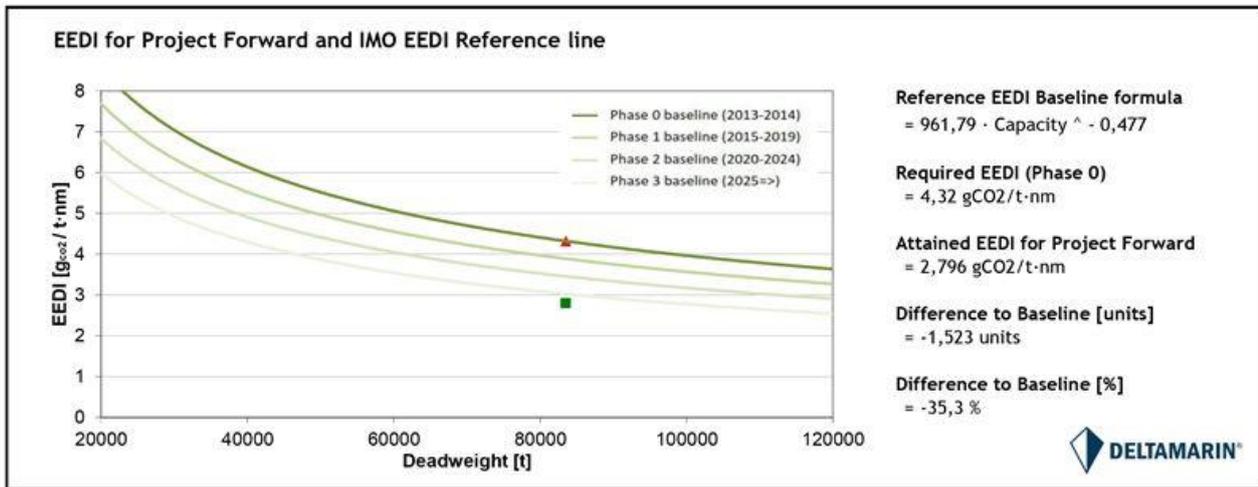


Table caption: This table demonstrates that with the Project Forward vessel concept and the use of LNG fuel, EEDI Phase III requirements can be met already today without reducing service speeds
(Table: Deltamarin)

EEDI reduction from Phase 0 baseline	Required actions	
	Service speed reduction	% of carbon neutral fuel in fuel mix
-40 %	0.3 kn	0
-50 %	1.8 kn	0
-70 %	5.7 kn	0
-70 %	0	55 %
-70 %	1.8 kn	40 %

Carbon neutral fuels mixed with LNG can achieve compliance with the IMO’s target of a 70 percent reduction in CO2 emissions.
(Table: Deltamarin)



Image caption: The Project Forward aim is to deliver the cleanest and most efficient fleet of cargo ships in the world
(image: Arista)

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Forward Ships in brief:

Forward Ships enables the adoption of liquefied natural gas (LNG) as the fuel of choice for ships at a global scale. Forward Ships has applied existing and tested technology to design a cargo ship that emits up to 35% less CO₂, 80% less NO_x, 99% less SO_x, 99% less particulate matter (PM) than conventional ships. Forward Ships is the result of Project Forward, a five-year R&D effort led by Arista Shipping. Forward Ships has committed to lead the way to the decarbonization of shipping.

www.forwardships.com

Project Forward in brief:

Conceived in 2013 and funded by [Arista Shipping](#), Project Forward is a Joint Development Project to combat global ship emissions by promoting the adoption of liquefied natural gas as a marine fuel. Since 2013, Arista has been joined in its R&D efforts by a prestigious and powerful group of industry leaders consisting of [ABS \(American Bureau of Shipping\)](#), one of the world's leading ship classification societies), [Deltamarin](#) (a ship design, offshore engineering and construction group operating in the marine and offshore industries worldwide), [GTT \(Gaztransport & Technigaz\)](#), the leading engineering company specialized in the design of membrane containment systems for the maritime transportation and storage of liquefied gas), [Wärtsilä](#) (a corporation which manufactures and services state of the art power sources and other equipment in the marine and energy markets) and Shell ([Royal Dutch Shell plc](#)) has also linked with Project Forward to assist in the global distribution of LNG.

www.forwardlng.org

