

„Green is not black and white”

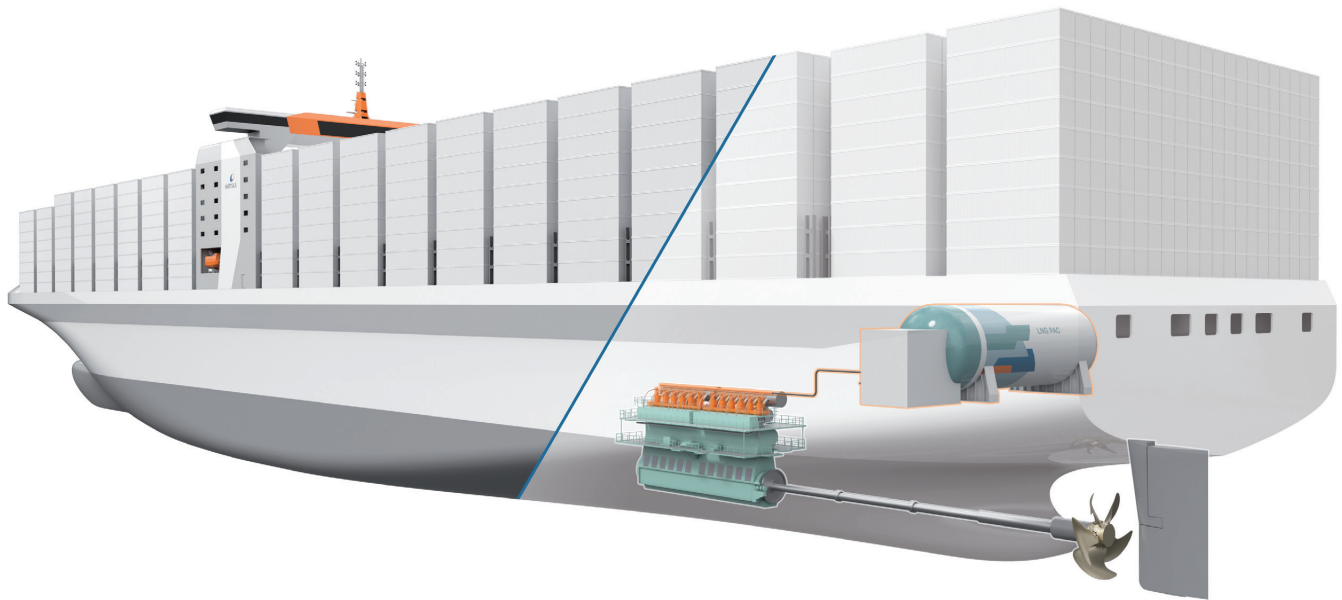


Illustration of the alternative fuels conversion platform for two-stroke engines with the Wärtsilä Fuel Gas Supply system on a container vessel

Source for both images: Wärtsilä Corporation

FLEXIBLE OPTIONS In order to work towards zero-emission shipping, various green fuels are currently under scrutiny. Technology group Wärtsilä is supporting the industry by providing flexible options for engine technology and required systems on board.

“We are entering into a new era,” said Håkan Agnevall, when asked what challenges for the industry he currently sees. Agnevall is the president and CEO of Finnish technology group Wärtsilä, which he joined in February 2021. He referred to the current discussion about e-fuels that is accelerating fast. “The interest of our customers in green solutions has increased in the past few months.”

However, there is not one main preference of green fuel. “Different fuels have different merits,” he continued, referring to the pros and cons of e-fuels, bio-fuels and hybrid systems. “Green is not black and white,” he added.

Fuel flexibility is required

According to Agnevall, there will still be demand for diesel and LNG for many more years to come. However, the future will be much more complex, and more flexibility will be required from shipowners over the lifetime of a vessel regarding the choice of

fuel. “It will be a highly strategic decision what fuel to choose,” he said, stressing that a multi-fuel capability of a vessel and its systems will be required.

For this reason, Wärtsilä has announced the launch of a two-stroke future fuels conversion platform during the first quarter of 2022. The platform will enable the operators of existing two-stroke main engines to convert them to burn clean-burning fuels in the future. The announcement follows successful tests with partner MSC Shipmanagement at the engine company’s two-stroke laboratory in Trieste.

Initially, retrofit conversions will enable two-stroke engines to switch to LNG fuel with negligible methane slip, Wärtsilä said, but the platform will evolve over time to enable the adoption of other fuels as they become commercially available. MSC has worked with the engine firm throughout the development process.

Conversions will be available for ships operating with two-stroke, electronically

controlled engines and can be combined with Wärtsilä’s Fuel Gas Supply System to provide a turnkey setup, the company said. The cryogenic fuel supply system incorporates an injection system capable of providing flexible and optimised operational performance under all conditions. The ability to comply with future environmental regulations, meanwhile, should extend the operating lives of assets.

MSC Shipmanagement’s CEO and Group managing director, Prabhat Jha, commented: “We have been following the development of this innovative conversion solution with high interest. Together with Wärtsilä, we have high expectations for the next steps of this initiative, which starts with technology demonstration on one of our larger container vessels with a Wärtsilä RT-flex96C-B main engine, and which will continue to make our existing fleet ready to meet future emissions needs.”

This engine is a two-stroke turbo-charged diesel unit. It was originally

designed for large container ships running on heavy fuel oil and was first deployed on the *Emma Maersk* in 2006. Roger Holm, president Marine Power and EVP Wärtsilä Corporation, said: “This pioneering conversion solution is one more prime example of our capabilities and commitment. Its flexibility means that the first step towards adopting the use of future fuels can be taken now, knowing that the investment will not become obsolete. The benefits, both economic and environmental, are significant.”

The first commercial conversion project will be completed by mid-2023. The conversion concept is applicable to both large- and small-bore engine types.

Partners aim to provide fast-track hydrogen fuel option

Wärtsilä will also collaborate with ABB, classification society RINA, Helbio (a hydrogen energy system specialist), the Liberian Registry, and an unnamed energy major, to pursue a fast track for providing independent hydrogen fuel systems for ships. The partners are aiming for a 70% reduction in carbon intensity without the need for large-scale infrastructure investment ashore.

They plan to combine LNG and steam to produce hydrogen and CO₂. The hydrogen will then be used directly in a mix with natural gas in engines or fuel cells, thereby eliminating the challenges associated with storing hydrogen aboard ship. The CO₂ can be liquefied by using the cryogenic stream for LNG that would be used as fuel anyway, and later disposed of ashore for carbon storage.

The project could circumvent the challenges of storing hydrogen on ships which,

the partners suggest, may be one factor that is limiting interest in the carbon-free fuel. However, producing hydrogen from LNG at sea, rather than at shore-based facilities, could make the fuel option available much sooner at lower cost, they believe. Meanwhile, by steadily increasing hydrogen production, the consumption of fossil methane and associated methane slip could be reduced.

Space-saving scrubber claimed to give same cleaning results

When it comes to the reduction of SO_x, scrubber technology is – depending on the profile of a ship – a suitable choice. Wärtsilä has now developed a new exhaust gas cleaning system that takes up 25% less space, is 30% lighter, and has 35% less volume, while giving the same cleaning results as a larger conventional unit. The space-saving design of its new IQ series of scrubbers will be particularly well-suited to container ships, the company said, where space is a key consideration.

Manufactured from 50% recycled steel, the scrubber range can be set up to use between 20 MW and 70 MW of power, depending on requirements, and is based on the same modular design as the company’s existing exhaust gas cleaning systems. It has also been developed to facilitate future upgrades that may become necessary in a ship’s funnel to limit other pollutants including NO_x, black carbon, particulates, or a de-pluming unit to cut visible steam.

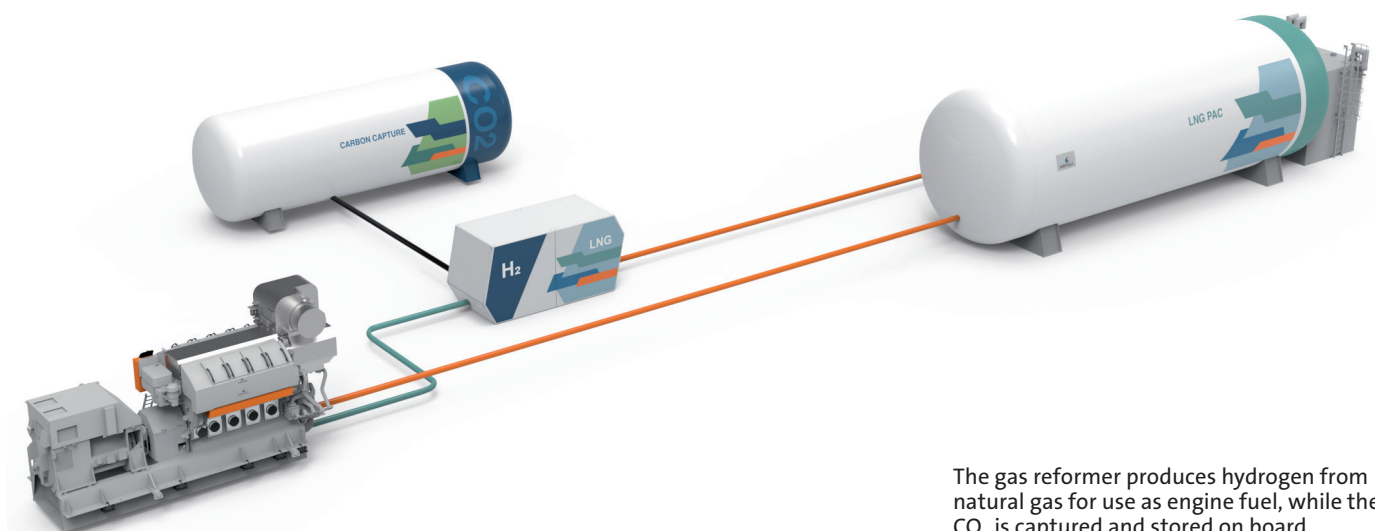
In future, Wärtsilä said, it will be possible to adapt the unit to include a carbon capture and storage (CCS) module that is currently under development at the company’s test facility in Moss, Norway. With

support from the Sustainable Energy Catalyst Center and Sintef Energy, the project will become part of endeavours on CCS development being undertaken by a wider group of cross-industry technology developers. Wärtsilä, meanwhile, is expanding the Moss facility so that CCS units can be piloted on a vessel at full scale.

Wärtsilä Exhaust Treatment director, Sigurd Jenssen, said: “We believe that this new scrubber features several technology improvements that make it an obvious and front-running compliance option for interested owners and operators. We have particularly designed IQ Series with our container segment customers in mind. There is huge demand in the container market for exhaust gas cleaning solutions that enable compliance and have a minimal impact on the profitability of the vessel. That’s why we have brought to market this new design that is lighter, smaller and less voluminous, enabling us to respond to what our customers are asking for.”

“We need to use all the tools in the toolbox”

These are just a few initiatives that are currently underway at Wärtsilä. Despite the move towards alternative fuels and the development of scrubber technology to clean other emissions including carbon capture, digital developments such as optimised port calls and autonomous and smart shipping to reduce congestions and emissions – especially in inland and coastal waterways – will contribute to a more sustainable shipping industry, according to Wärtsilä. “We need to use all the tools in the toolbox,” Agnevall concluded.



The gas reformer produces hydrogen from natural gas for use as engine fuel, while the CO₂ is captured and stored on board