October 28, 2025

New Energy and Industrial Technology Development Organization (NEDO)

Kawasaki Heavy Industries, Ltd.

Yanmar Power Solutions Co., Ltd.

Japan Engine Corporation

World's First Land-based Operation of Marine Hydrogen Engine Achieved by Consortium

— Three companies combine technologies to lead global decarbonization of ships —

Ribbon Cutting Ceremony

Kawasaki Heavy Industries, Ltd., Yanmar Power Solutions Co., Ltd. and Japan Engine Corporation announced they have successfully conducted the world's first land-based operation of marine hydrogen engines. The demonstration took place at Japan Engine's headquarters factory, where a newly installed liquefied hydrogen fuel supply system was utilized.

The project is a part of Green Innovation Fund Projects / "Next-Generation Ship Development" of the New Energy and Industrial Technology Development Organization (NEDO), commissioned under the "Development of Marine Hydrogen Engine and MHFS [*1] [*2]."

Background: The Green Innovation Fund Projects

In October 2020, the Japanese government declared its goal of achieving carbon neutrality by 2050. To accelerate innovation and structural transformation in the energy and industrial sectors, the

Ministry of Economy, Trade and Industry (METI) established a JPY 2 trillion Green Innovation Fund Projects, managed by NEDO.

The fund supports companies taking on ambitious decarbonization initiatives, from R&D and demonstration to social implementation. Priority is given to areas identified in the government's Green Growth Strategy[*3]. Additional budget allocations of JPY 300 billion in FY2022 and JPY 456.4 billion in FY2023 have since been made.

NEDO operates a dedicated website[*4] to share updates, activities and related technologies on the fund.

Project Results

Under the "Development of Marine Hydrogen Engine and MHFS," Kawasaki Heavy Industries manufactured the new liquefied hydrogen fuel supply system, that stores and gasifies liquid hydrogen, supplying it at both high and low pressure to engines developed by the three companies. This enables testing across a range of applications, including low-speed two-stroke main propulsion engines, four-stroke auxiliary engines and four-stroke main generator engines for electric propulsion ships.

Kawasaki Heavy Industries and Yanmar Power Solutions successfully demonstrated hydrogen combustion in medium-speed four-stroke engines, confirming stable operation at rated output, with the aim of reaching zero emissions. Development will continue to further refine engine performance.

Japan Engine is progressing with the development of a low-speed two-stroke hydrogen engine, scheduled to begin operation in Spring 2026.

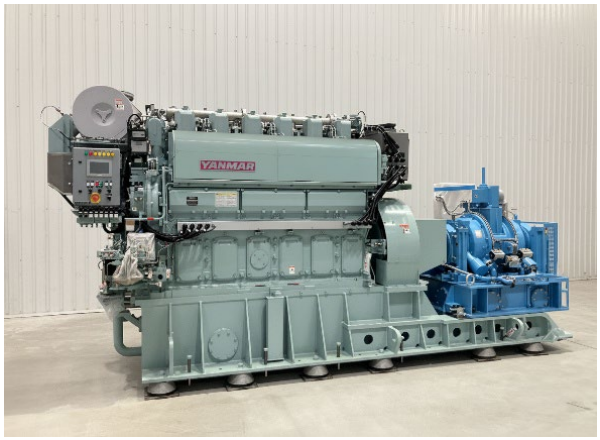
A shared feature of all three engines is the ability to significantly reduce greenhouse gas emissions while maintaining redundancy through a dual-fuel system that can switch between hydrogen and diesel fuel as needed.

Key Features of Marine Hydrogen Dual-Fuel Engines

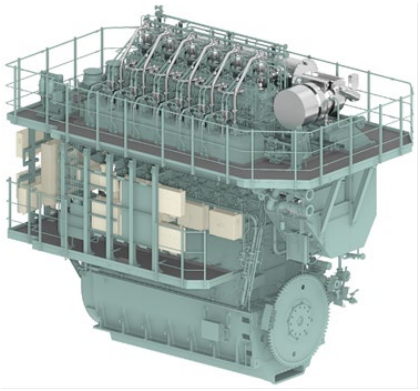
Manufactured by	Kawasaki Heavy Industries	Yanmar Power Solutions	Japan Engine Corporation
Type	Medium-speed four-stroke engine	Medium-speed four-stroke engine	Low-speed two-stroke engine
Model	8L30KG-HDF	6EY22ALDF-H	6UEC35LSGH
Engine speed	720min^{-1}	900min^{-1}	Max. 167 min^{-1}
Rated output	2600kWm	800kWm	Max. 5610kW

Exterior view of the liquefied hydrogen fuel supply system

Exterior view of engine manufactured by Kawasaki Heavy Industries



Exterior view of engine manufactured by Yanmar Power Solutions



The engine under construction by Japan Engine

Next Steps

Following land-based demonstrations, the three companies plan to work with shipowners and shipyards to conduct onboard trials and move toward the practical implementation in society.

By uniting the technologies of Japanese manufacturers, Kawasaki Heavy Industries, Yanmar

Power Solutions and Japan Engine aim to lead the global adoption of hydrogen-fueled ships and contribute to achieving carbon neutrality by 2050.

Notes

*1 MHFS: Marine Hydrogen Fuel Tank and Fuel Supply System

*2 Reference: Green Innovation Fund Projects / Next-generation Ship Development (METI)
https://www.meti.go.jp/shingikai/sankoshin/green_innovation/industrial_restructuring/pdf/022_05_00.pdf
(Japanese)

*3 Green Growth Strategy: An industrial policy announced in June 2021 to align economic growth with Japan's carbon-neutral target.

*4 NEDO Green Innovation Fund Projects website: https://green-innovation.nedo.go.jp/en/

Note: Information contained in the news release is valid at the time of publication and may differ from the most recently available information.

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