NYK Super Eco Ship 2050

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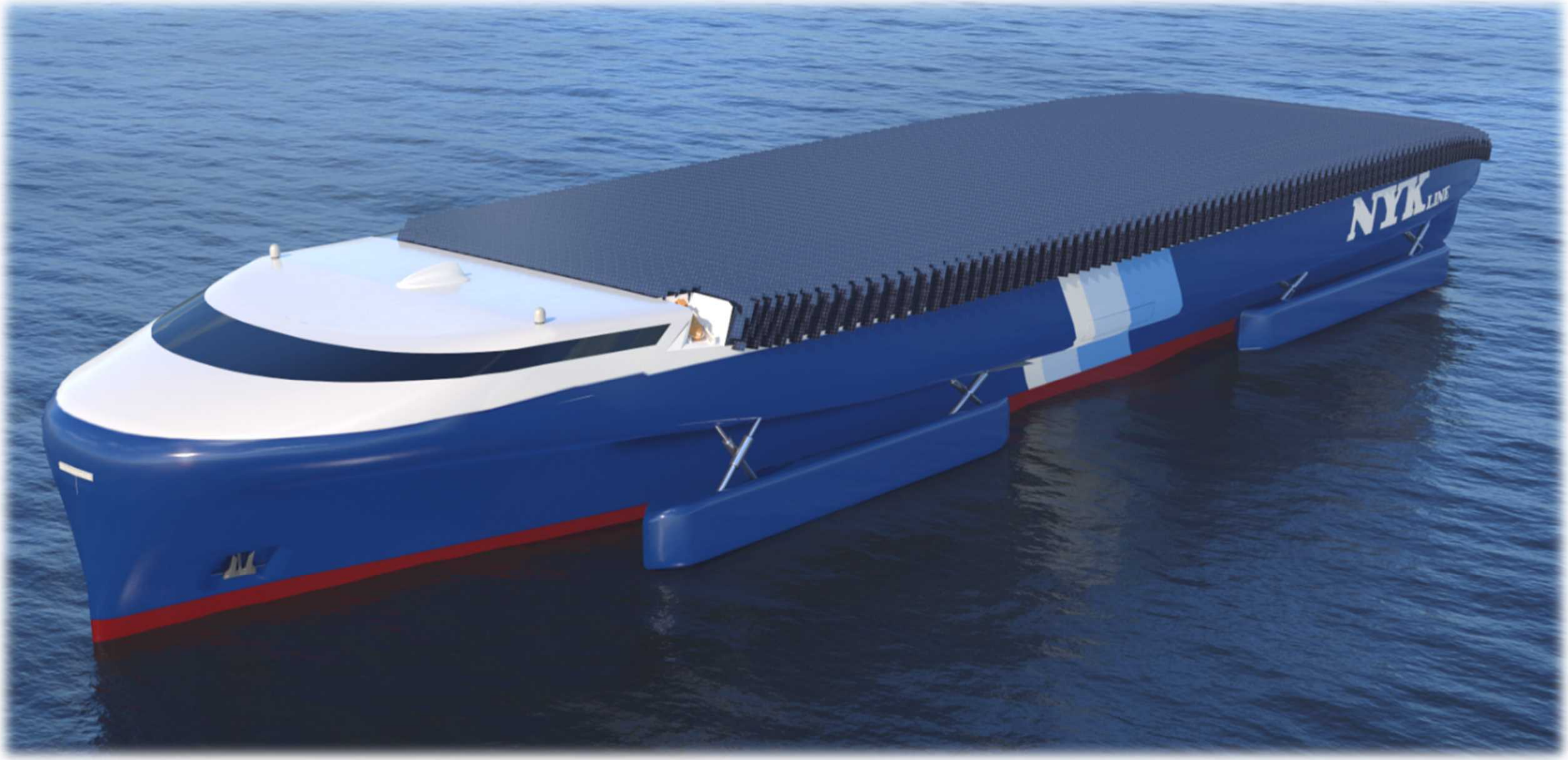
Join us on our journey to a carbon-free world



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Overview: NYK Super Eco Ship 2050

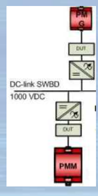
CO_2 Reduction 100%

67% reduction in energy derived from fossil fuels*

* Compared with a 2014-built vessel

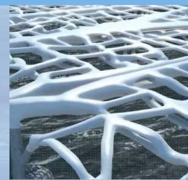
Improvement of Propulsion Efficiency 6%

Improvement of Electrical Power Distribution 1%

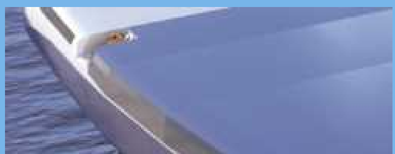


Fuel Cells 18%

Lightweight Hull — Minimal Resistance 34%



Reduction of Electricity Demand 8%



Solar Power 5%

Waste Heat Recovery 3 %

Comparison: Required Energy and CO_2 Emissions

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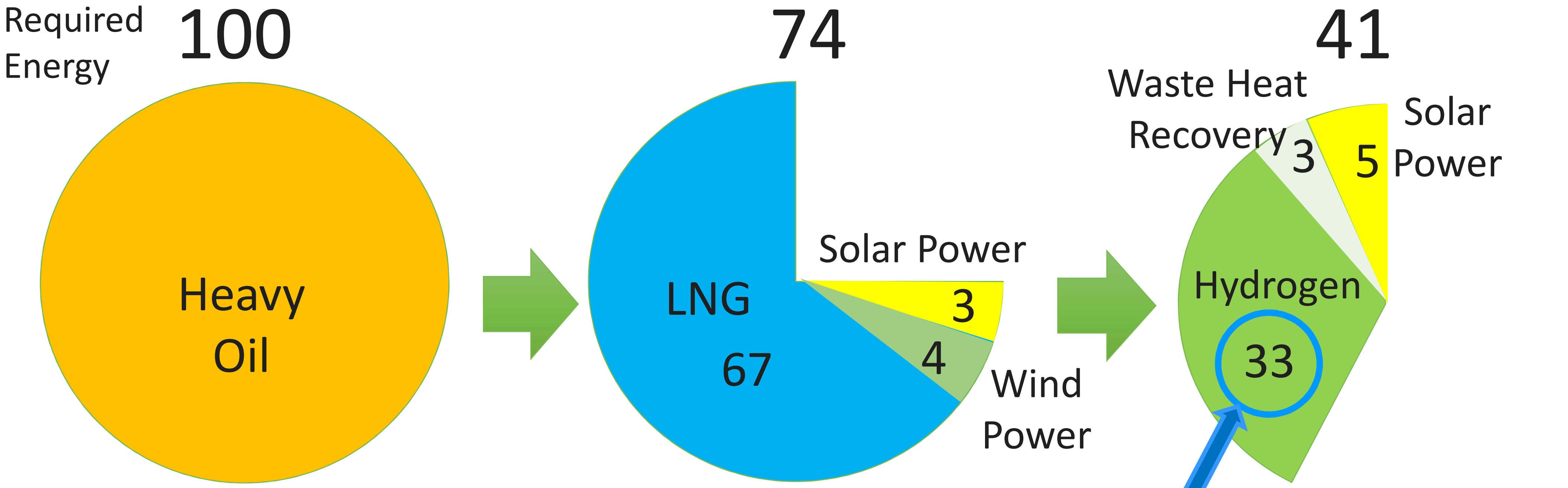


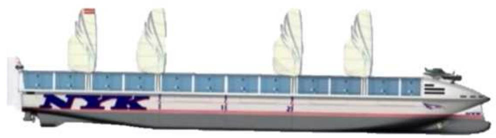
2006/2014 Built Vessel (Base Vessel)

NYK Super Eco Ship 2030

CO_2 Reduction 69%

NYK Super Eco Ship 2050

CO_2 Reduction 100%



67% reduction in energy derived from fossil fuels*

* Compared with a 2014-built vessel

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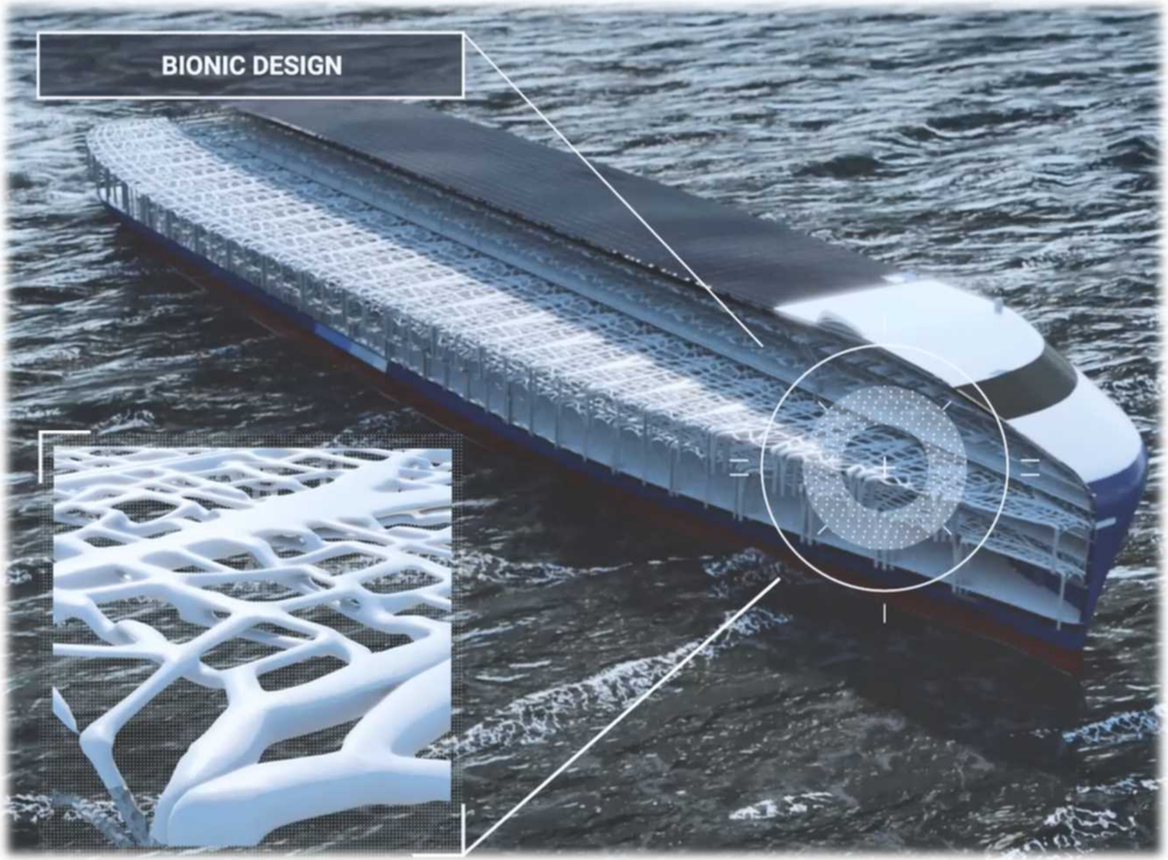
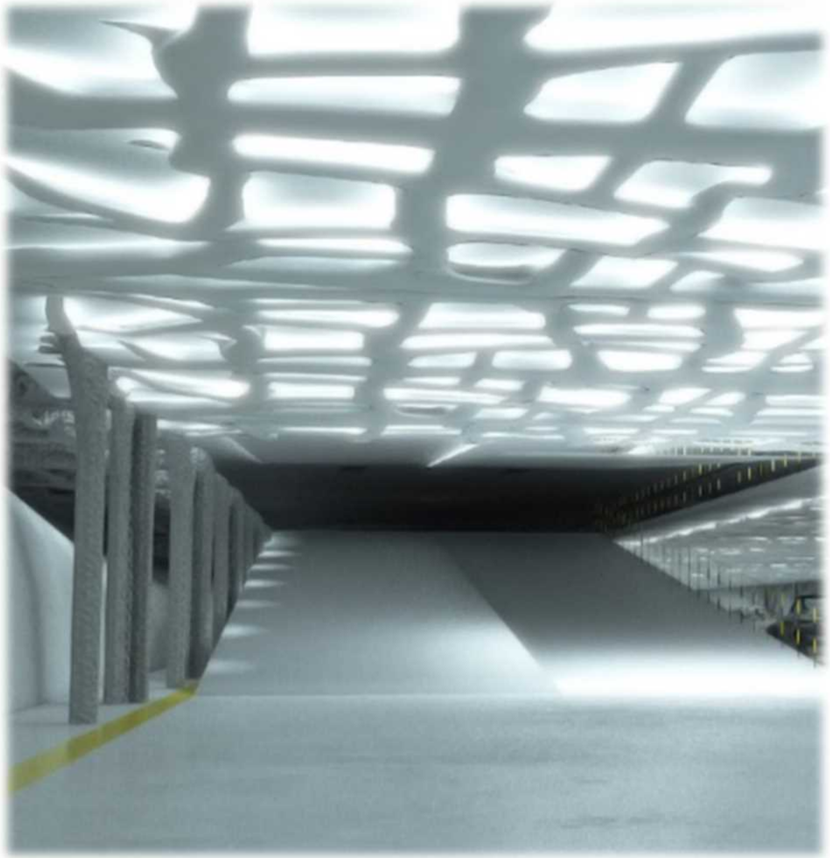
Lightweight Hull

The weight of the hull is reduced through a dynamic, mathematical design combined with topology optimization. In addition, usage of new lightweight material for the structure will become common.





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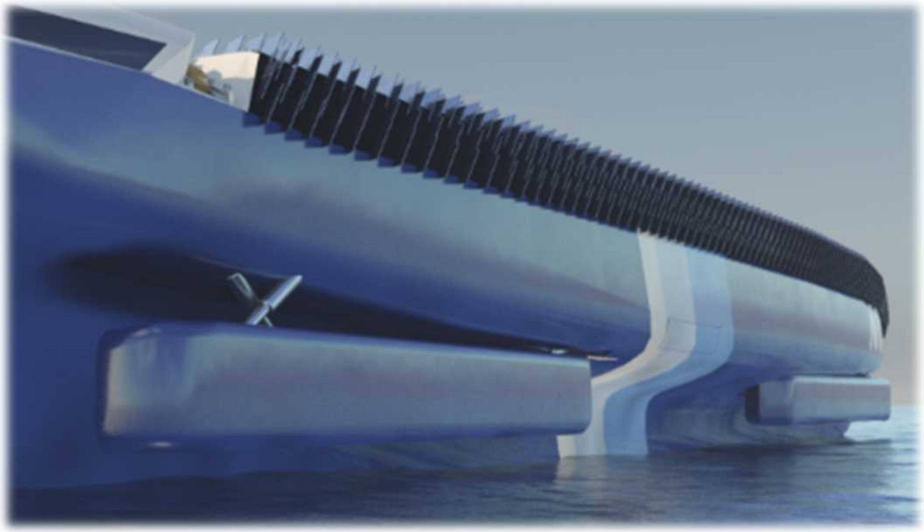
Features: NYK Super Eco Ship 2050

Vessel Stability

Weight reduction will allow vessel-hull optimization to focus on minimizing resistance. Vessel stability is ensured using the below active devices.

Pontoons

In normal condition, pontoons are stored above seawater to minimize resistance. But in the event of high seas or abnormal conditions, pontoons will drop to the water to provide additional stability.



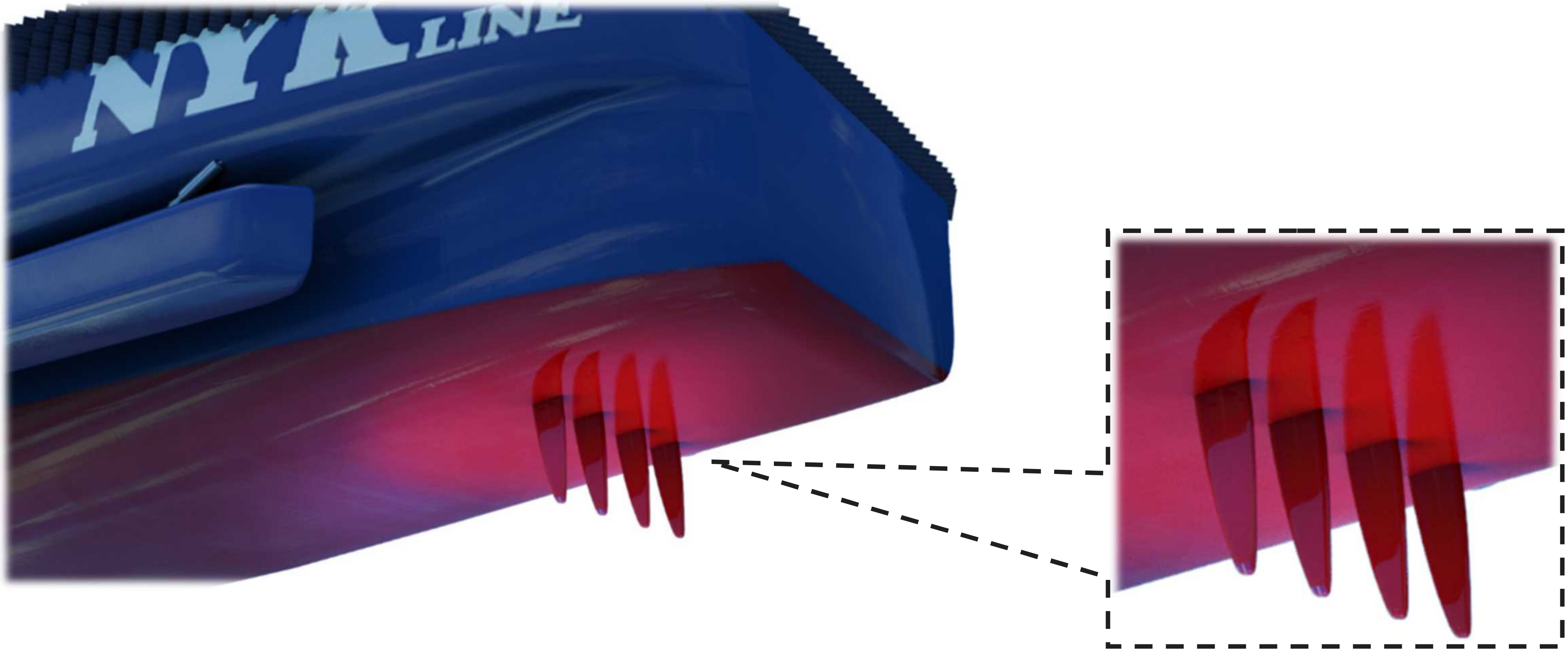
Gyro Stabilizers

Computer-controlled devices like gyro stabilizers will be installed on the vessel bottom to provide active stability.

Features: NYK Super Eco Ship 2050

Flapping Foils

Conventional propellers are replaced by flapping foils that mimic the movement of dolphins to deliver greater efficiency than screw-type propellers.



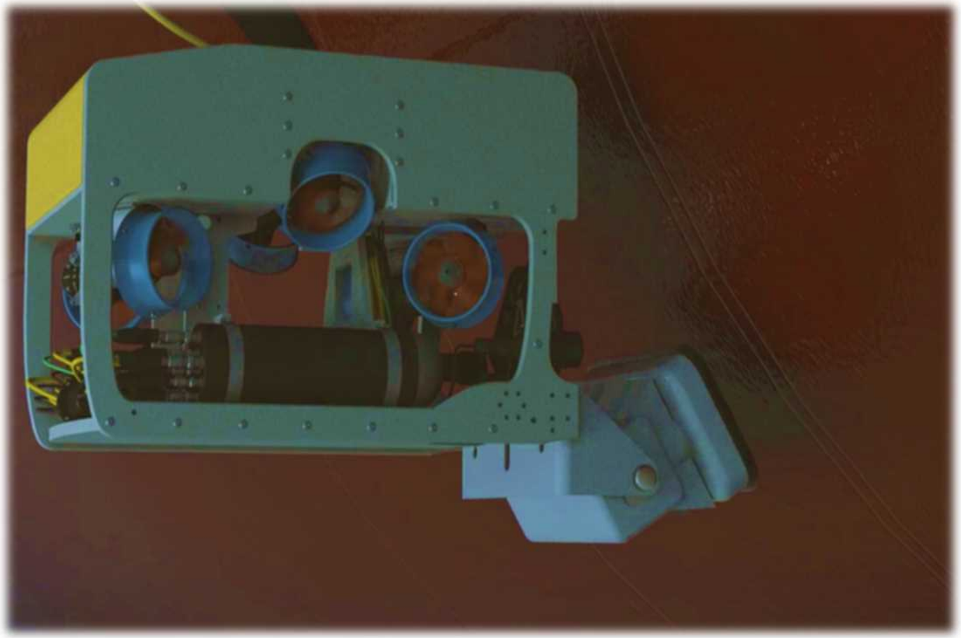
Features: NYK Super Eco Ship 2050

Air-lubrication System

During sea navigation, air bubbles are delivered to the vessel bottom to reduce frictional resistance between the vessel hull and seawater.

Hull-cleaning Robot

During port stays, automatic hull cleaning robots will clean the dirty hull to reduce resistance that could negatively affect vessel efficiency. These robots will also collect all debris to prevent pollution of ecological systems at port.



Features: NYK Super Eco Ship 2050

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Hydrogen Fuel Battery and Waste Heat Recovery

The vessel is powered by hydrogen fuel cells (SOFC), in which the hydrogen is produced by renewable energy sources.

・Power production efficiency: 69% through waste heat recovery

・Hydrogen tank capacity: 1,900 cubic meters / 21-day endurance

Solar Power

The storage of liquefied hydrogen on board the vessel will be expensive and require significant space, so fully utilizing power produced on board is essential.

・Energy conversion efficiency: 45%

・About 9,000 square meters of solar panels

・Covers 15% of total energy demand

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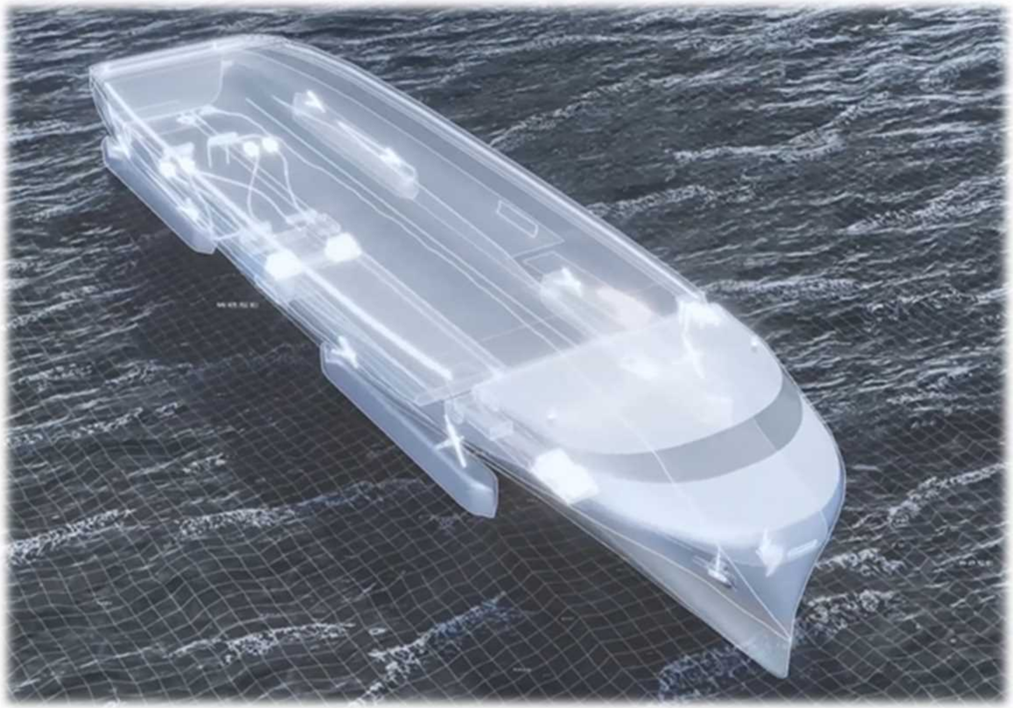
Features: NYK Super Eco Ship 2050

Digital Twin

Holistic digital twins enable access to shore-based expertise for the crew on board. Several scenarios can be evaluated to optimize planned and corrective maintenance to minimize accidents and troubles on board.



Optimized Fleet Operation

Thanks to advanced weather and performance optimization, route planning is no longer a ship-level activity. It is done at the port and fleet level, which enables just-in-time arrival throughout the supply chain.

Features: NYK Super Eco Ship 2050

Efficient Cargo Handling

Simultaneous ship-to-berth and ship-to-ship cargo work will minimize port stay hours. Shorter port stays will allow for slower sea navigation and result in energy savings.

Automatic Mooring & Berthing

Thanks to improvement of shore facilities, automatic mooring and berthing will be possible to minimize port stay hours.

Shore power is also supplied to the vessel.

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Comparison of Vessel Particulars

	2014-built Car Carrier	NYK SUPER ECO SHIP 2050
Length	199.9 m	199.9 m
Breadth	35.6 m	49.0 m
Design Draft	9.0 m	9.0 m
Air Draft	45.6 m	31.0 m
Main Energy Source	Diesel Engine (Heavy Oil)	Fuel Cells (Hydrogen)
Renewable Energy	Nil	Solar Power