

# Energy storage on ocean-going cargo ships





## Overview

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Electric and hybrid marine vessels are marking a new phase of eco-friendly maritime transport, combining electricity and traditional propulsion to boost efficiency and reduce emissions. The industry's advancements in charging infrastructure and strict regulations help these vessels lead the way.

Electrification is seen as a crucial pathway towards decarbonization throughout all sectors, as it offers a higher efficiency of tenergy conversion combined with a potential to reduce greenhouse gas (GHG) emissions through increased deployment of low-GHG energy sources. 1 Apart from.

Carbon capture and storage (CCS) technologies have shown promise in reducing maritime carbon emissions, although their high-energy requirements have often been neglected in previous research. This study introduces a novel system integrating a natural gas engine, CCS, an Organic Rankine Cycle (ORC).

South Korean company develops new ESS technology for large ocean-going vessels The most recent acquisition by South Korea-based technology and engineering conglomerate Hanwha Group has had a rocky start. Formerly known as Daewoo Shipbuilding and Marine Engineering (DSME), the newly rebranded Hanwha.

Even more emission reductions can be expected from the usage of alternative energy sources and carbon capture and storage. Electrification and battery usage are important for the global energy transition and are also mentioned in the context of deep-sea shipping. That is why CIMAC and the Maritime. Can thermal energy storage be used on ships?



Implementation of thermal energy storage on ships Thermal energy storage technologies have been applied in many other fields, where balancing of mismatch between energy production and demand is required.

How does energy storage work?

Energy storage, both in its electric and thermal forms, can be used both to transfer energy from shore to the ship (thus working similarly to a fuel) or to allow a better management of the onboard machinery and energy flows. This chapter is made of two main parts.

How does maritime traffic affect energy storage?

On heavily trafficked routes in Western Europe (for example Hamburg–Antwerp) and East Asia (for example, Shanghai–Busan), high maritime traffic allows for immediate utilization of offshore electricity, thus reducing the need for energy storage at an average of 28.7% of total cost.

Which energy sources are infeasible for shipping?

Based on the figure, it is evident that batteries and hydrogen are infeasible as the primary energy sources for the majority of shipping. Most of the potential alternative fuels occupy the middle region of the graph, just below 20 MJ/l. Figure 5.1.

Can batteries support propulsion of a large ocean-going vessel?

e domain of large ocean-going vessels. A thorough case study of battery-electric propulsion of a large ro-ro vessel operating between mainland Euro is explained, including the auxiliaryIn “Hybrid propulsion with a two-stroke main engine”, it is evaluated if and how batteries can support propulsion of the vessel by a traditional two-s.

How do offshore battery energy storage systems manage supply and demand?

Any mismatch between supply and demand is managed by offshore battery energy storage systems (BESSs), which accumulate excess renewable energy for use during periods of low wind or solar availability (Extended Data Fig. 2) 38. Other economic and technical assumptions are listed in Supplementary Tables 1 – 3.



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### [Wind and Solar Power for Zero Emissions Shipping](#)

This system includes an Aquarius MAS CPU/AGU, ILS unit, MPPT charge controllers, an energy storage solution (from The Furukawa Battery Company) ...

### [Understanding the potential of battery-electric ...](#)

Based on analyses of the global fleet in container, tanker, and dry-cargo segments, we derive case studies that enable us to explore the ...



### [Containerized Maritime Energy Storage , ABB Marine ...](#)

ABB's containerized maritime energy storage solution is a complete, fireproof self-contained battery solution for a large-scale marine energy storage.



## **An Action Plan for Maritime Energy and Emissions Innovation**

To identify potential fuel and energy solutions, this action plan segments U.S. maritime sector vessels into three broad categories (Figure ES-3):



ocean-going vessels, or OGVs; harbor ...



### The application of hybrid photovoltaic system on the ...

The constant development of electronic inverter technology has played a key role in promoting the exploration and development of solar ships.

...



### Containerized Maritime Energy Storage , ABB Marine & Ports

ABB's containerized maritime energy storage solution is a complete, fireproof self-contained battery solution for a large-scale marine energy storage.



### Investigation of Diesel Hybrid systems for fuel oil reduction in slow

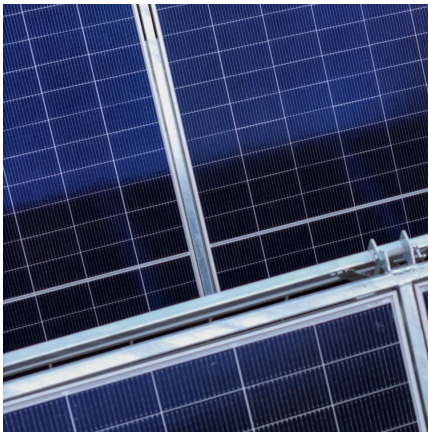
This paper is focused on the potential of Diesel Hybrid power systems to increase fuel efficiency for ocean going slow speed ships.

[The Rise of Wind-Assisted and Solar-Powered](#)



## Vessels

While solar energy alone may not fully power large ocean-going vessels, it can significantly reduce fuel consumption by supplying electricity for onboard systems and hybrid ...



## [New whitepaper addresses use of batteries in deep ...](#)

The discussed examples of battery use cases proof that there is a potential for batteries on board ocean-going cargo ships to reduce their ...

## **Accelerating green shipping with spatially optimized offshore**

This research considers their optimal placement and sizing, extending the economic range of renewable ships to 9,000 km without compromising shipping efficiency.



## [Batteries on board ocean-going vessels](#)

The integration of batteries into the electric grid on board a large ocean-going vessel seems to be the area where batteries and hybridisation can bring the largest benefits.



### Electrification in Maritime Vessels: Reviewing Storage ...

Electric and hybrid marine vessels are marking a new phase of eco-friendly maritime transport, combining electricity and traditional propulsion ...



### [Battery Energy Storage Systems in Ships' Hybrid](#)

Marcin Kolodziejcki 1,\* and Iwona Michalska-Pozoga 2 Citation: Kolodziejcki, M.; Michalska-Pozoga, I. Battery Energy Storage Systems in Ships' Hybrid/Electric Propulsion Systems. ...

### Review of ship energy efficiency

Energy efficiency has become increasingly relevant in the current economic and environmental situations. This paper aims to create a map of the state of the art of the energy ...



### A fully-electric, 50,000 kWh container ship has begun ...

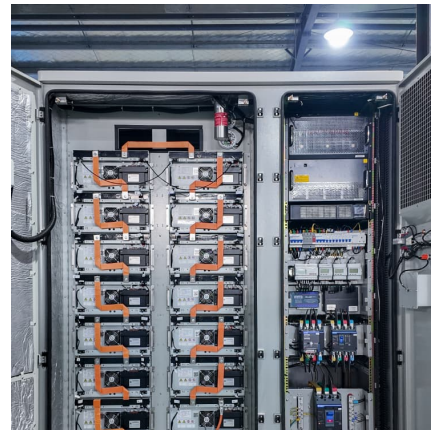
Chinese state-owned company COSCO Shipping has launched what it calls the "world's largest" river-to-sea electric container ship. The Green ...



### [Eco Marine Power Testing Solar Sails For Ocean](#)

...

Eco Marine Power will conduct a study in 2018 of its EnergySail system that can help power large cargo ships with renewable energy, reducing ...



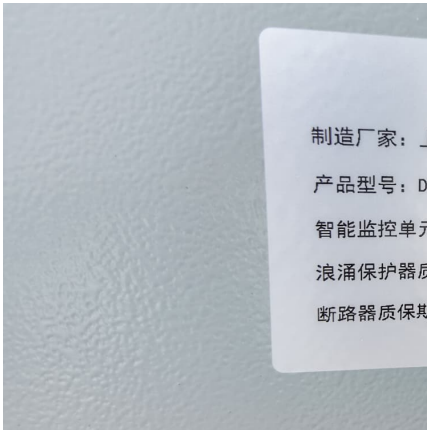
### **Ocean-going vessels**

Ocean-going cargo vessels navigate international waters under all conditions, requiring energy systems that are not only robust but also fully certified to meet the demands of global shipping ...

### **(PDF) Energy effectiveness of ocean-going cargo ship under ...**

The increasing economic cost and environmental impact of maritime transportation necessitate the reduction of fossil fuel consumption of ocean-going cargo ships. ...





### Research progress on ship power systems integrated with new energy

The summary of the utilization of new energy sources in ships is not enough. In this article, the current progresses made on ship power systems integrated with solar energy, ...

### [Understanding the potential of battery-electric ...](#)

The Center has launched a pre-feasibility study to explore pathways for direct electrification of ocean-going vessels. The investigation ...



### (PDF) Impact of Battery-Hybrid Cargo Ship Propulsion on Fuel

Hybrid or even fully battery-powered (harbour) propulsion systems on ocean-going cargo ships are however not so common, while application of such solutions may reduce ...

### Ammonia as Maritime Fuel

When burned at high temperatures, ammonia produces NOX emissions, currently under strict regulations, requires the addition of an SCR. Industry has limited little operating experience ...





### [A Review of Hybrid Energy Management Systems for Ships](#)

However, the storage of green electricity highly depends on the energy storage system (Hassan, 2025), making the energy storage system the core part of the hybrid power energy ...

### **Entering a new era for battery-powered ships , Marine ...**

Battery power is an increasingly popular option for the transportation sector, with electric cars already commonly seen on the roads. ...

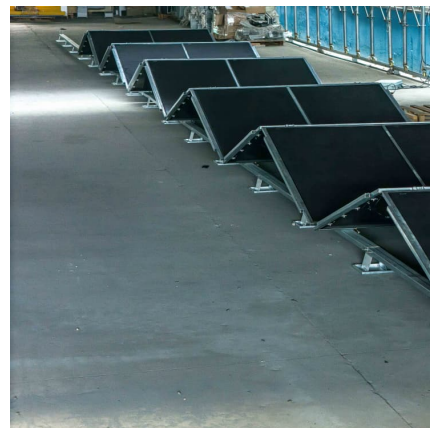


### [Unveiling the Power Behind Cargo Ships](#)

Explore cargo ship propulsion: from internal combustion engines to eco-friendly alternatives. Dive into the future of maritime technology and sustainable shipping practices.

### [Autonomous ships: Next wave in sustainable shipping?](#)

The global autonomous ship market is set to reach USD 12.25 billion by 2032 but its long-term success hinges on addressing regulatory, economic, and labour challenges ...



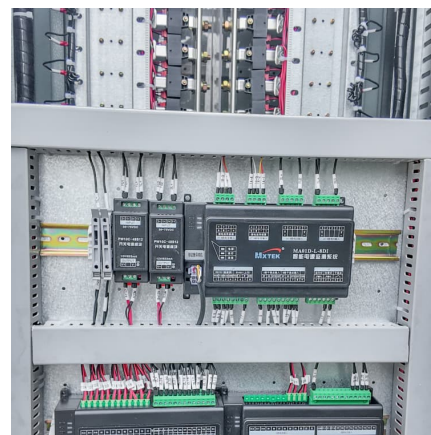


### [INSIGHT: A Comparative Analysis of Alternative Fuels ...](#)

Factors Influencing Energy Consumption: The energy consumption of small ships is influenced by their operational profile, including ...

### **Utilizing the thermal energy from natural gas engines and the cold**

Carbon capture and storage (CCS) technologies have shown promise in reducing maritime carbon emissions, although their high-energy requirements have often been ...



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