

**EcoPHIN**  
Sustainable and Future Eco-Friendly Propulsion Solutions

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# ECO PROPULSION SOLUTION

## Leading the Way to a Sustainable Future

Embrace a greener future with our eco propulsion solutions  
ensuring a cleaner maritime environment

ECO PROPULSION SOLUTION



# TOTAL PACKAGED SOLUTION FOR COMPLETE SYSTEM INTEGRATION

HD KSOE is determined to provide our customers with total packaged propulsion solution with Mechanical, Hybrid and Electric propulsion system to meet customer's demands.

## Single Contact Point

We enable customers to contact a single provider for a wide range of support services, including class approvals, equipment deliveries & installation, integration, commissioning, and any other forms of assistance.

## Competitive Cost and Flexibility

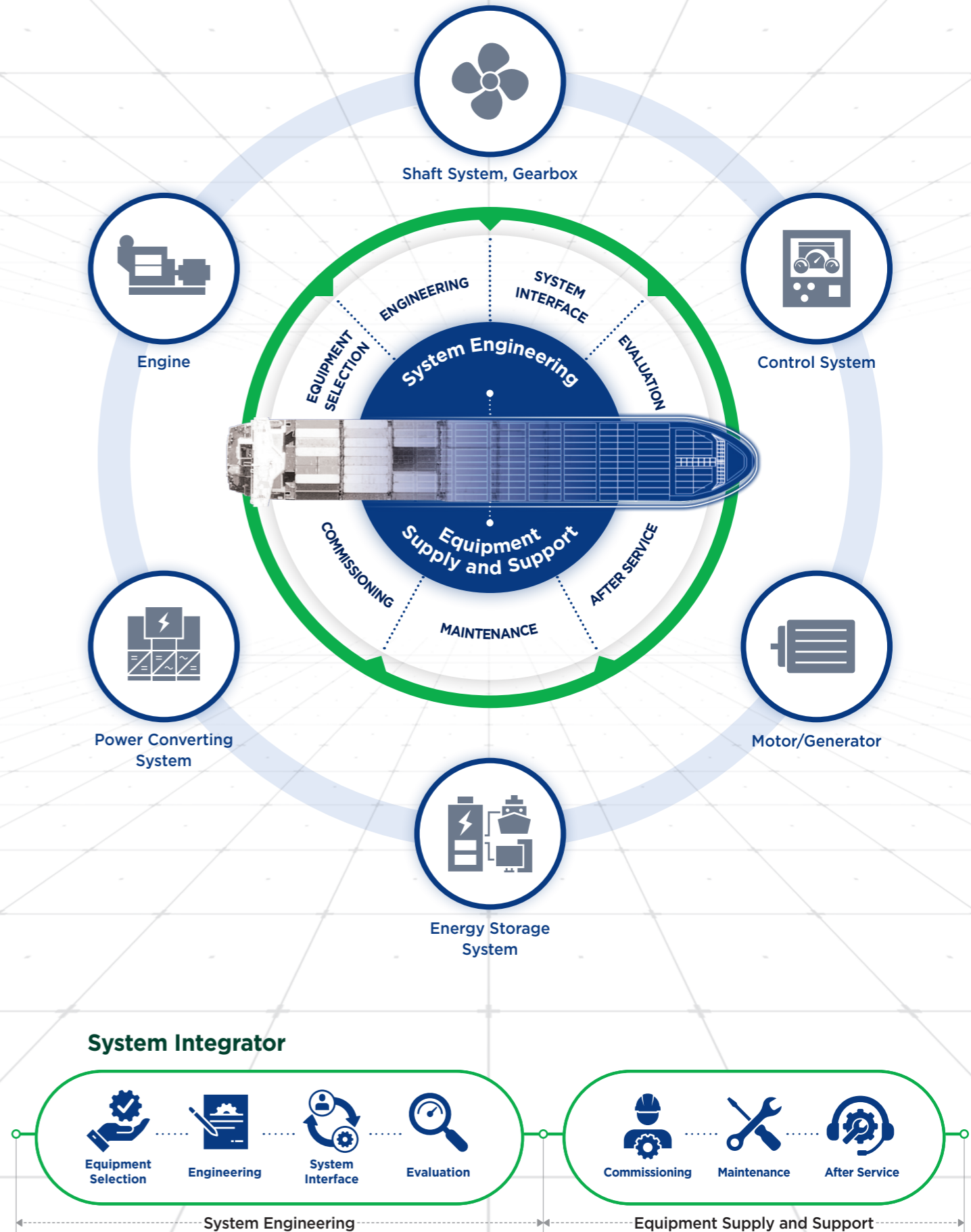
We minimize and simplify the overall system and the interfaces between equipment. The entire system can be custom-designed, ranging from the main power source to the propulsion unit.

## High Efficiency

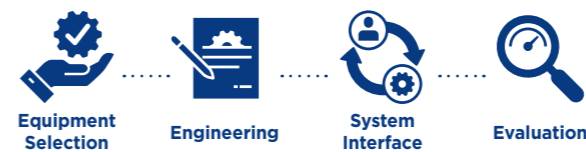
We provide efficient performances thanks to our guaranteed industry-leading engineering and evaluation systems.

## Low Risk with Product Care

We deliver the most robust and proven technologies, as well as products from carefully selected business partners. Our global network ensures total supports in terms of both commissioning and maintenance.



## System Integrator



System Engineering



Equipment Supply and Support

# SMARTER COMBINATION MORE FLEXIBILITY

## What we do offer

### 1 HiMSEN Propulsion Engine



High-efficiency dual-fuel/  
diesel propulsion engine

### 2 Gearbox



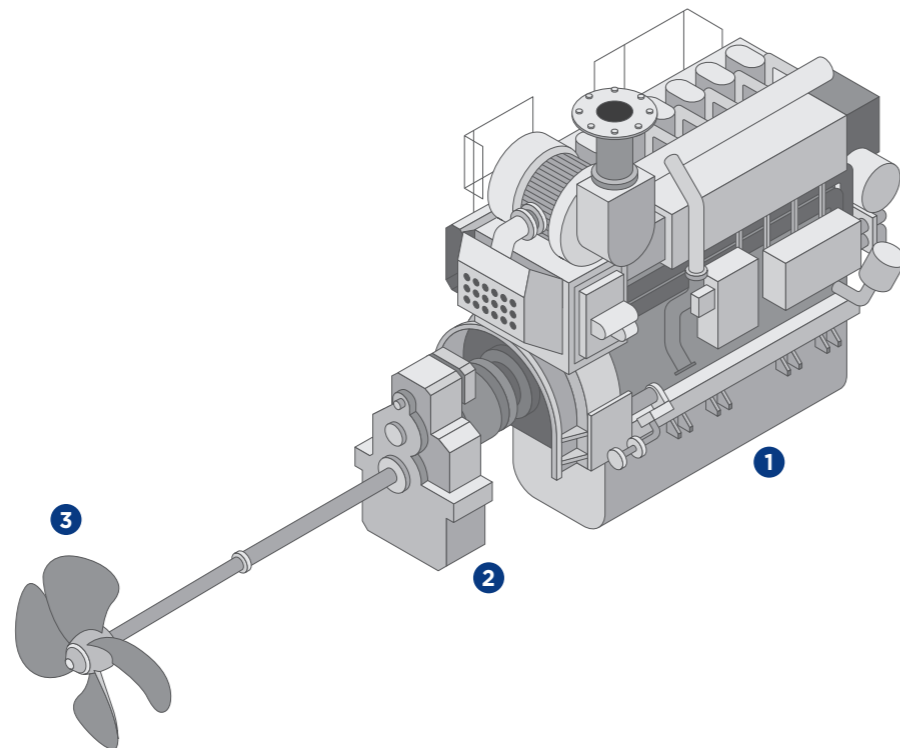
Speed control /  
power transmission

### 3 Propulsion Unit



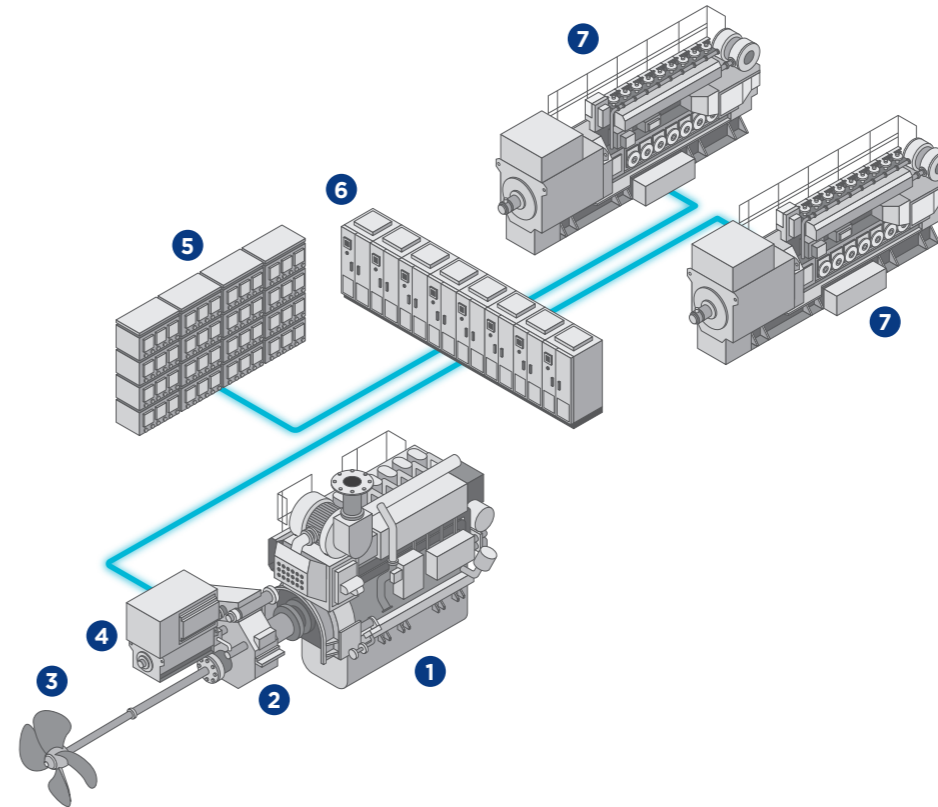
CPP / FPP  
(or azimuth thruster)

## Mechanical Propulsion System



We offer a comprehensive range of propulsion solutions, including hybrid and mechanical options, designed to revolutionize maritime transportation. Our hybrid propulsion systems combines electric and mechanical technologies, optimizing fuel efficiency, reducing emissions, and providing unparalleled operational versatility. For those seeking traditional yet reliable performance, our mechanical propulsion solutions incorporate advanced engineering to deliver powerful and efficient propulsion for vessels of all sizes.

## Hybrid Propulsion System



### 4 Shaft Generator / Motor



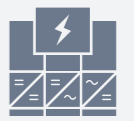
Optimized control with  
PTO/PTI/PTH system

### 5 Energy Storage System



Spinning reserve/  
peak shaving battery

### 6 Power Converting System



Motor drive/grid protection/  
power conversion

### 7 HiMSEN Generator Set

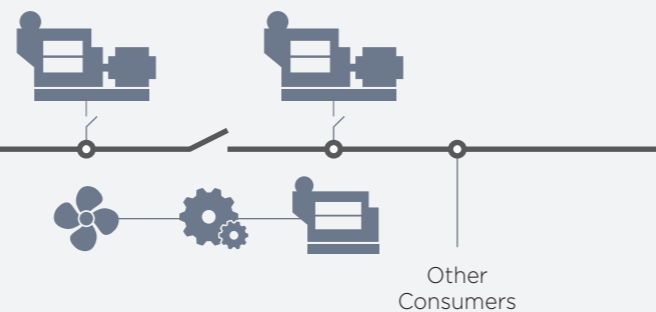


High-efficiency dual-fuel/  
diesel engine generator

~ = Power Converting System    ⊕ = Transformer

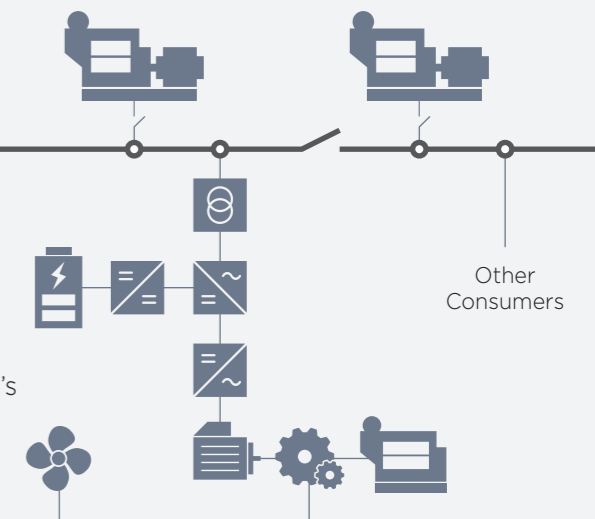
## Configuration - Mechanical Propulsion

Mechanical propulsion offers numerous advantages, revolutionizing the efficiency and performance of maritime transportation. Direct propulsion systems minimize energy losses, resulting in improved fuel efficiency and reduced operational costs.








## Configuration - Hybrid Propulsion

Hybrid propulsion is advanced solution for in terms of efficiency and economy. It can consist of shaft generator with gearbox, and even battery can be applied to give much more flexible grid design. PTO (Power Take Out), PTI (Power Take In), and PTH (Power Take Home) modes are available for shaft generator, battery and ESS (Energy Storage System) maximizes power grid's reliability.

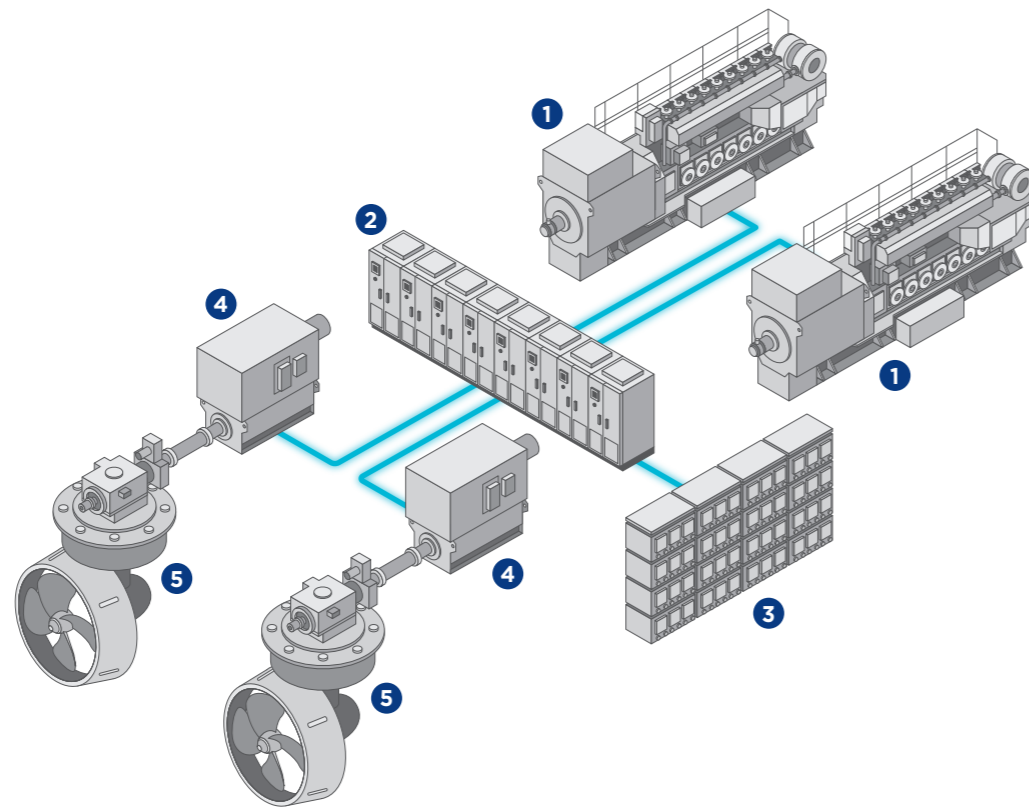


# HIGHER PERFORMANCE LOWER EMISSION

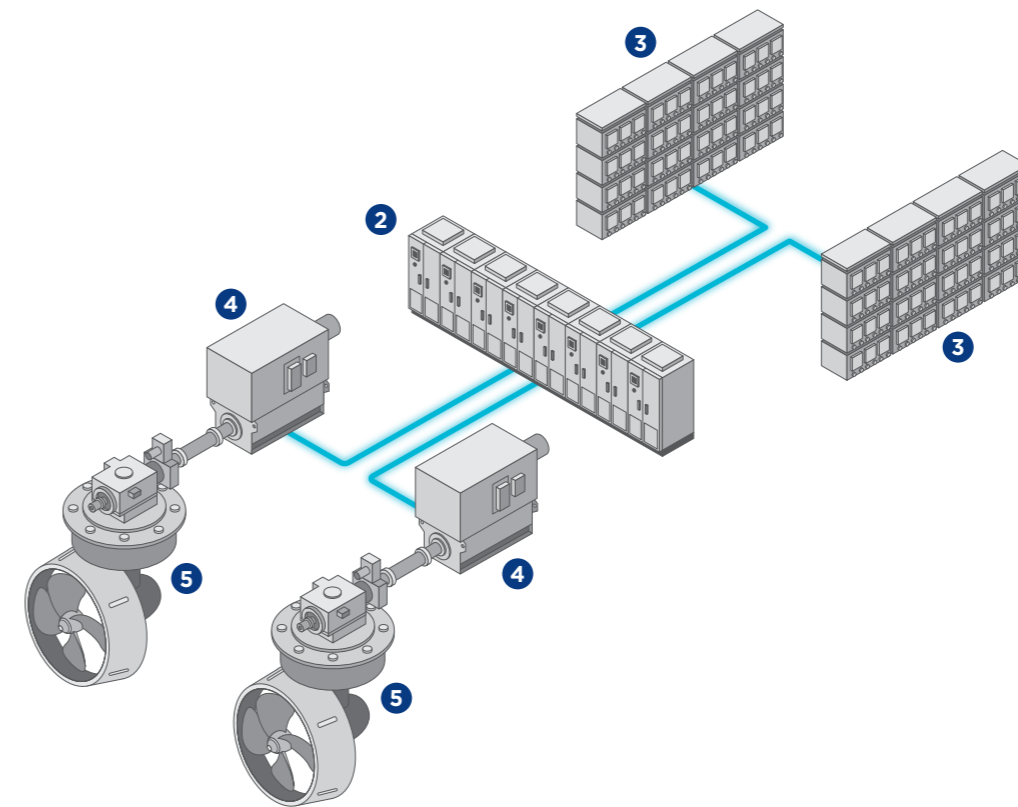
## What we do offer

- 1 HiMSEN Generator Set**  
  
 High-efficiency dual-fuel/  
 diesel engine generator
- 2 Power Converting System**  
  
 Motor drive/grid protection/  
 power conversion
- 3 Energy Storage System**  
  
 Spinning reserve/  
 peak shaving battery
- 4 Electric Motor**  
  
 Optimized control with  
 motor drive system
- 5 Propulsion Unit**  
  
 Thruster  
 (or CPP/FPP)






## Electric Propulsion System



## Pure Electric Propulsion System (without ICE\*)



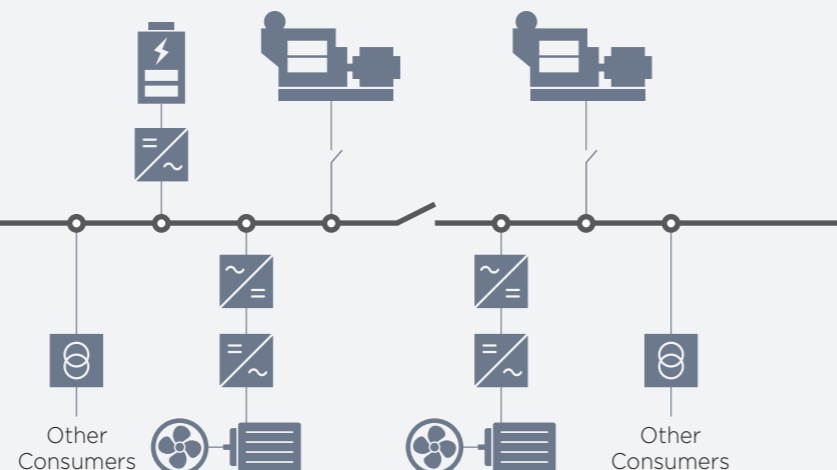
\* ICE : Internal Combustion Engine

- 1 HiMSEN Generator Set**  
  
 High-efficiency dual-fuel/  
 diesel engine generator
- 2 Power Converting System**  
  
 Motor drive/grid protection/  
 power conversion
- 3 Energy Storage System**  
  
 Spinning reserve/  
 peak shaving battery
- 4 Electric Motor**  
  
 Optimized control with  
 motor drive system
- 5 Propulsion Unit**  
  
 Thruster  
 (or CPP/FPP)

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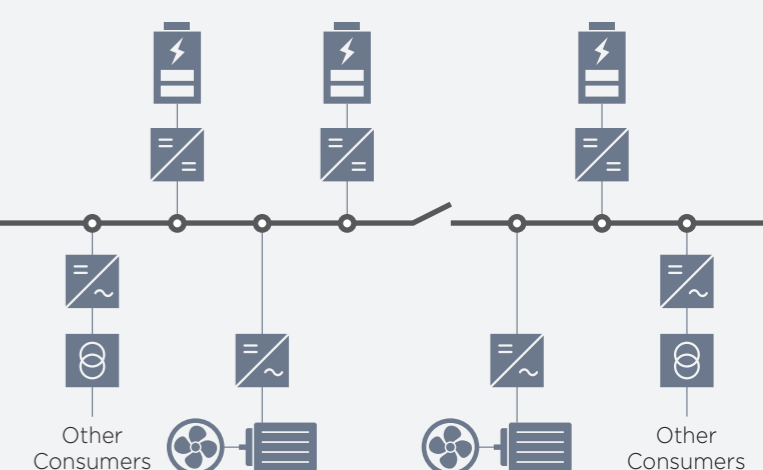
### Configuration - Electric Propulsion

We have various solutions for electric propulsion, from AC Grid to DC Grid. Battery hybrid could additionally give advantages such as high fuel efficiency, responsiveness and zero emission. According to customer's demands, HD KSOE will offer the best solution.



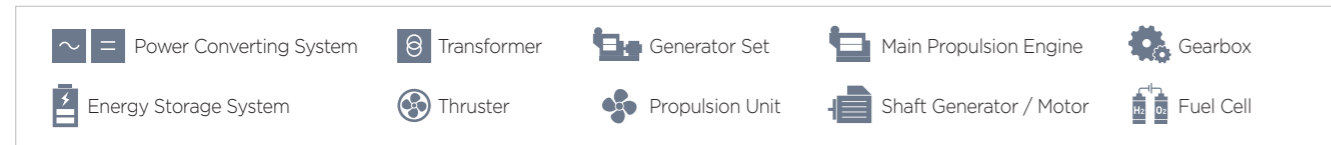
### Configuration - Pure Electric Propulsion

Engines are no longer required for pure electric vessels. Combining other energy sources such as battery, fuel cells or solar power gives operations added flexibility. There is no harmful gases coming out with this solution (zero emission).

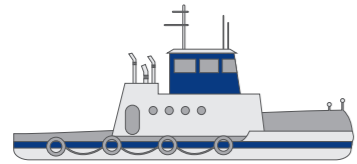


# FLEXIBILITY FOR A WIDE RANGE

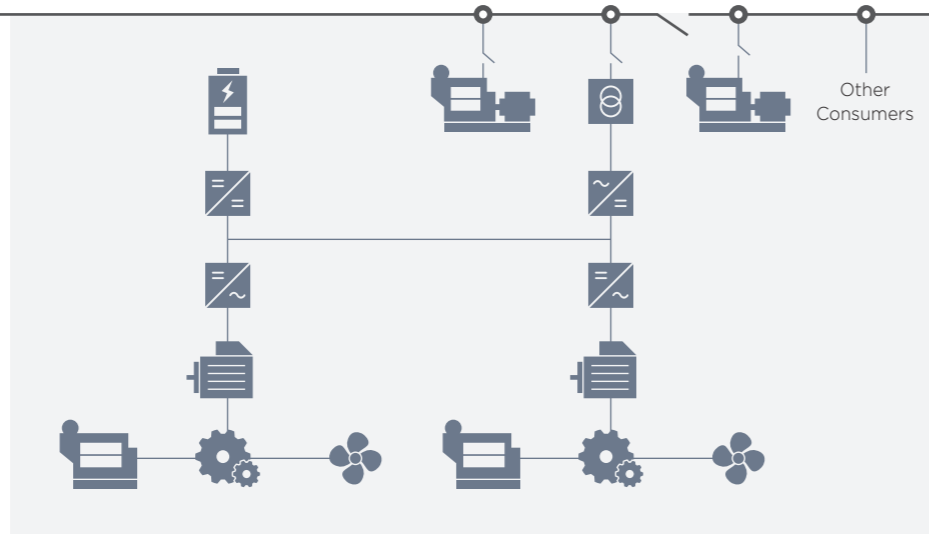
The ECO Propulsion Solution is designed for use with both electric propulsion and hybrid propulsion with a wide range of power. Applicable types of ships are included in the list below, but are not limited to it.



## Tugs / Dredgers



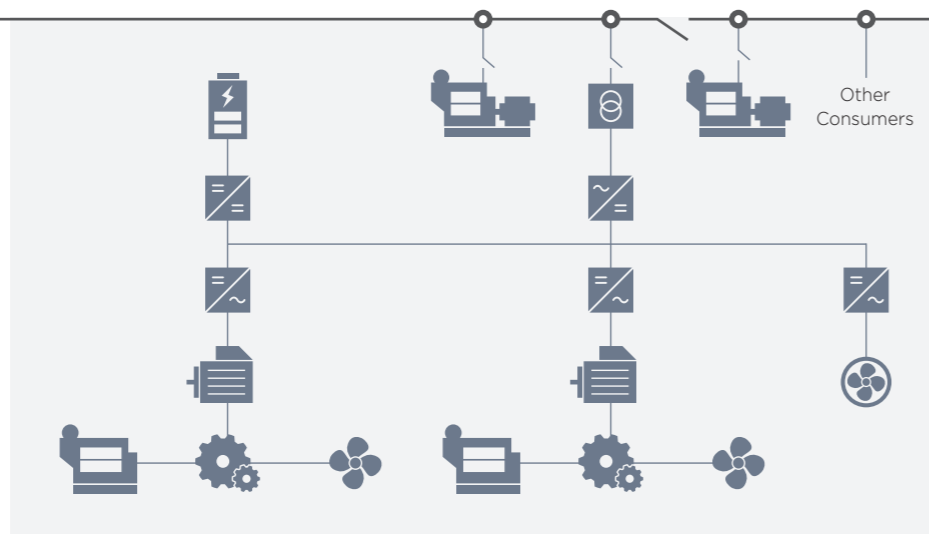
The ESS provides additional power for more bollard pull and power demand. Its features include cold starting, zero emissions, increased load acceptance, and enhanced reliability.



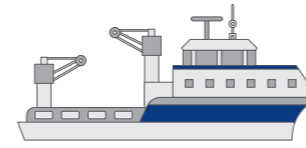
## Ferries / Passenger Ships



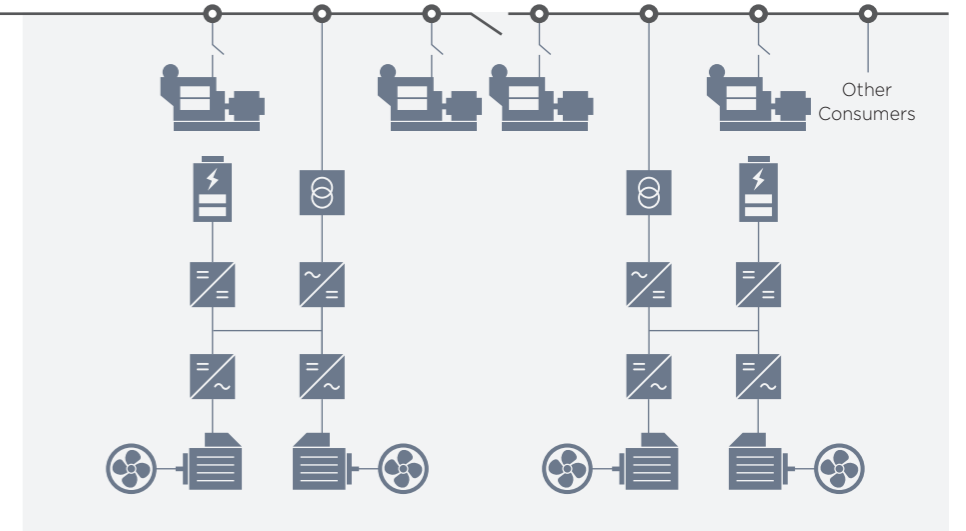
Boasts zero emissions due to full-electric power being driven by the ESS. Engine noises, vibrations, and smoke levels are all drastically reduced or eliminated when a vessel is in port and/or during short sailing routes. Additional features include excellent maneuverability, high fuel efficiency, and low operating costs.



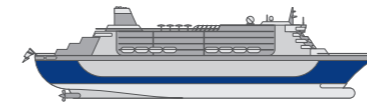
## Offshore / OSV



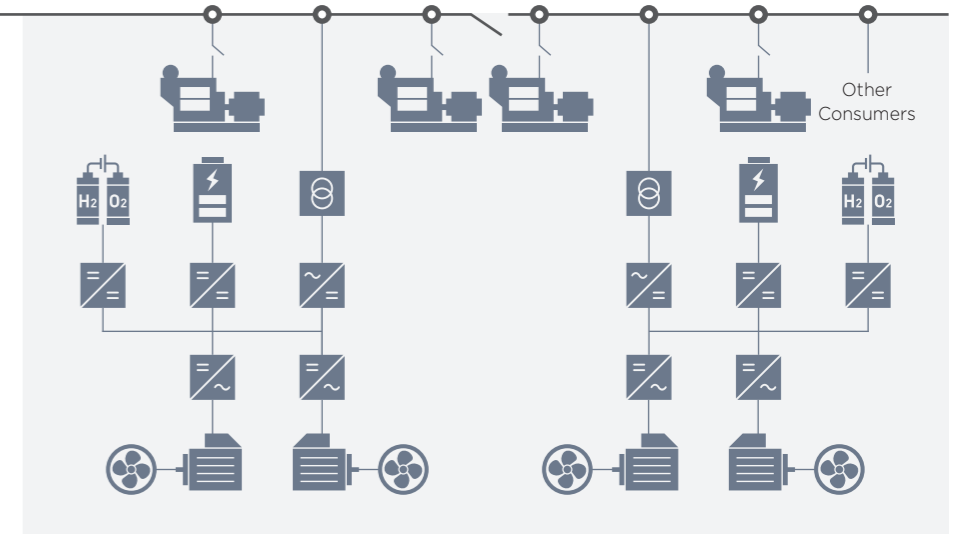
The ESS can handle load fluctuations easily, leading to stable operations of the machinery. It also features reduced fuel consumption, especially during dynamic positioning operations. The generator sets mainly provide the necessary power not only for propulsion but also for the crane/jacking system.



## Cruise Ships



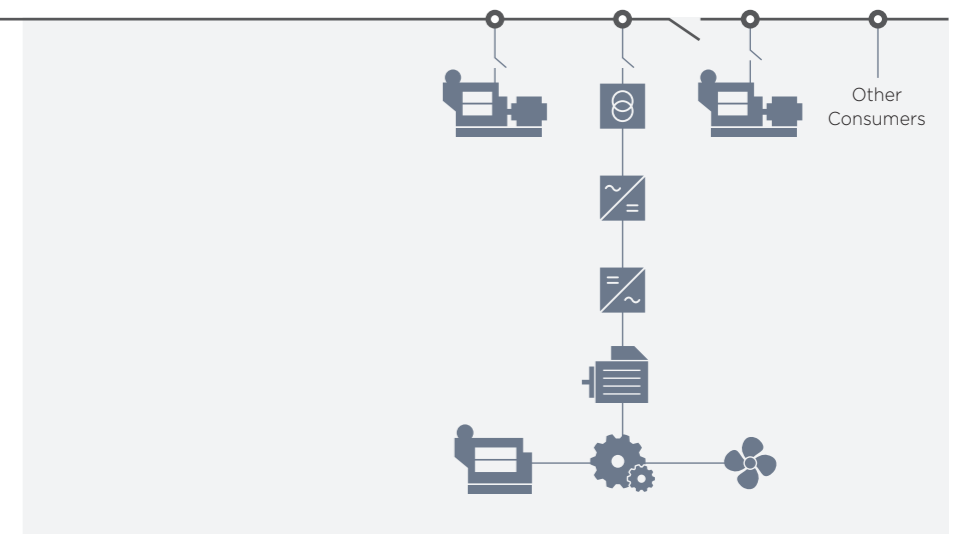
The ESS enables zero emission future and ultra-efficient way of powering cruise ships. Its ability to use fuels with different energy transformers make it a key element in creating eco-friendly cruise vessel boasting enhanced safety, flexibility, and versatility. The fuel cell also provides operators with the necessary power to deal with blackouts and restart the engines electronically.



## Merchant Ships



Installing a shaft generator in tandem with the main propulsion engine eliminates the need for an numerous generator sets. In addition, the main propulsion engine's operating level can be boosted by using the shaft generator in power-take-in mode. If main propulsion engine fails, the shaft generator ensures the vessel can return to the nearest port.



# MAJOR REFERENCES OVERVIEW

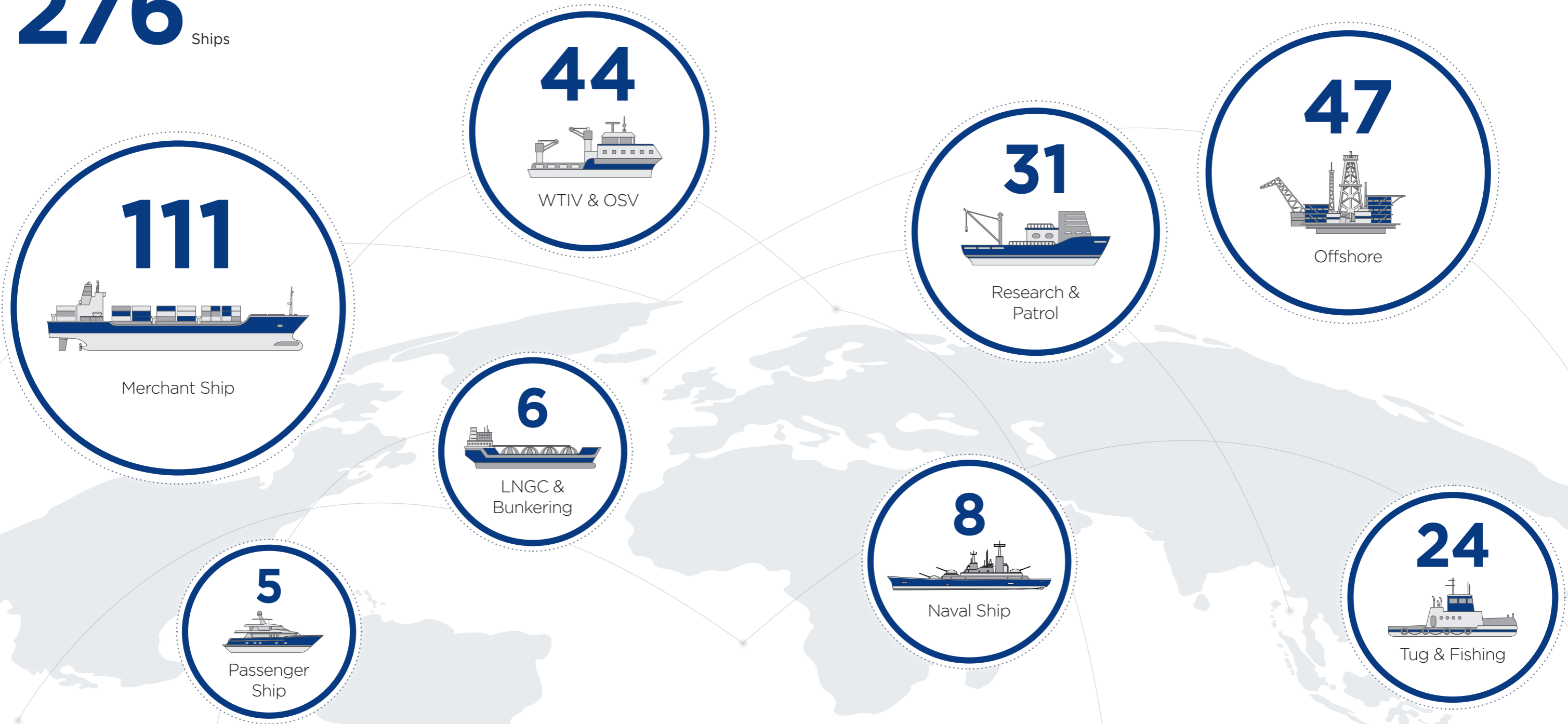
With a proven track record across diverse ship types, HD KSOE stands as a trusted leader in marine solutions. Whether it's offshore vessels, merchant ships, or passenger ships, our expertise spans across a wide range of maritime applications. Trust in our expertise to elevate your ship's capabilities and maximize your competitive advantage on the open seas.

Total (As of Nov. 2024)

(Unit: Ship)

# 276

Ships

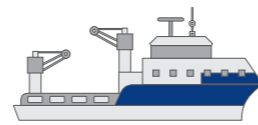


# MAJOR REFERENCES

## WTIV & OSV

### Denmark

#### Wind Turbine Installation Vessel



##### Contributing to a sustainable, greener future

With the demand for renewable energy is steadily increasing as per the global de-carbonization policies and investment in offshore wind power generation is increasing, HD KSOE receives the engine supply order for this project from Sembcorp Marine of Singapore reflecting the HiMSEN's durability.

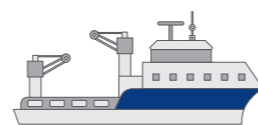
<b>Q'ty</b>	One (1) ship
<b>Ship Yard</b>	Seatrium (old. Sembcorp Marine)
<b>Ship Owner</b>	Maersk Supply Service
<b>Scope of Supply</b>	9H32/40 x 6 sets
<b>Propulsion</b>	Electric
<b>Ship delivery</b>	2025



## Offshore

### UK

#### Reel Laying Vessel



##### Advanced technology and precision engineering

It has been designed to deliver flowline technologies that address the growing market trend towards longer and more complex tie-back developments. The vessel's cutting-edge pipe lay system focuses on crew safety, operational efficiency and flexibility. This system will be capable of installing complex rigid flowlines including pipe-in-pipe systems and electrically heat traced flowlines in water depths up to 3,000 m.

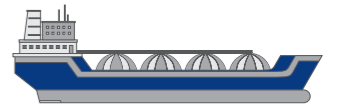
<b>Q'ty</b>	One (1) ship
<b>Ship Yard</b>	Royal IHC
<b>Ship Owner</b>	Subsea7
<b>Scope of Supply</b>	8H32/40 x 3 sets + 7H32/40 x 3 sets
<b>Propulsion</b>	Electric
<b>Ship delivery</b>	2018



## LNG Bunkering

### South Korea

#### LNG Bunkering Vessel



##### Building the future of clean energy transportation

KOGAS, a state-run company that operates LNG regasification terminals and natural gas pipelines, conducts an empirical test at the southern port of Busan by the end of 2022 for simultaneous operation, which performs cargo unloading and bunkering at the same time to save time.

<b>Q'ty</b>	One (1) ship
<b>Ship Yard</b>	HHI
<b>Ship Owner</b>	KOGAS
<b>Scope of Supply</b>	7H22CDF x 3 sets
<b>Propulsion</b>	Electric (AC-Grid)
<b>Ship delivery</b>	2023



## Passenger Ship

### South Korea

#### Ferry



##### Highest efficiency electric propulsion leisure ship

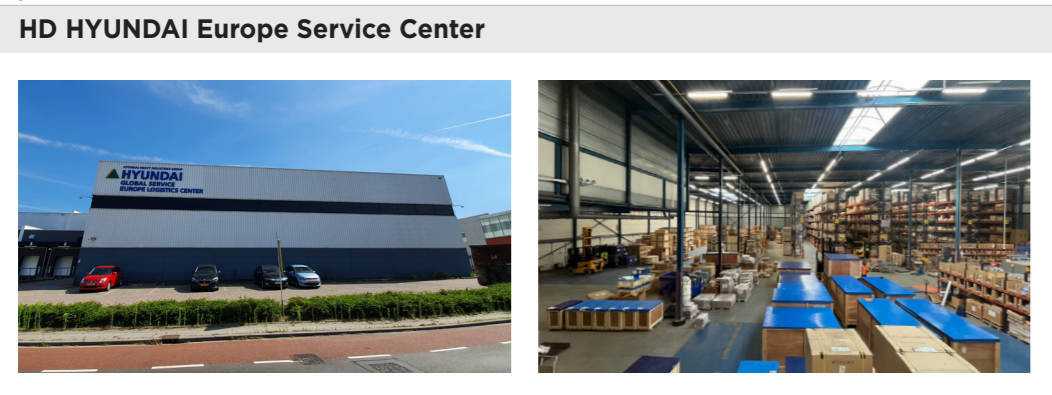
Ulsan Taehwa is the first vessel developed with HD KSOE DC-grid technology based electric propulsion. It gives better energy efficiency than conventional AC-grid based electric propulsion. The vessel also equips HD Hyundai integrated control system, smart navigation assistance system, and HiMSEN dual fuel engines.

<b>Q'ty</b>	One (1) ship
<b>Ship Yard</b>	HMD
<b>Ship Owner</b>	UIPA
<b>Scope of Supply</b>	9H22CDF x 2 sets
<b>Propulsion</b>	Electric (DC-Grid)
<b>Ship delivery</b>	2022



# ECO PROPULSION SYSTEM FOR TODAY AND TOMORROW

Our commitment to exceptional customer service extends worldwide, as we dispatch highly skilled professionals to cater to your needs. With our 24-hour response guarantee, you can trust that your inquiries and requests will be promptly addressed at any time, ensuring seamless operations and peace of mind. Experience the advantage of our global service network, delivering unparalleled support to customers across the globe. Partner with us and discover the difference of unforgettable service that's always by your side.



**Services**

**Nomination for service agent in Designated area**

- Technical supports / Clarification
- On board service including spare parts supply
- Communication channel between Owner and each equipment

**Dedicated organization for Non-stop service**

- 24/7, Immediate support
- Hot line is designated for non-stop service

**Special care for warranty service of HD Hyundai's products**

- Enhanced warranty service
- Global service network in the worldwide
- Life time service with technical information