

# 新能源动力系统集成

New energy power system integrate

03

## 产品概述 Product overview

公司自主研发和集成的新能源动力系统产品包括：混合动力推进系统（并联式混合动力推进系统和串联式混合动力推进系统）、纯电动力推进系统、燃料电池动力推进系统等型式。

依托于船用发动机领域深厚的技术实力，我们从单一的发动机匹配扩展到整船动力系统的优化，实现经济性、操控性、排放性等多方位优化提升。通过自主研发和实验室建设，承担国家重大科研攻关任务，参与国内外相关法规的制定和完善，掌握了从系统级到部件级的核心技术。可以根据客户在船型、航线、经济性、操纵性、运维等方面的不同需求，提供动力系统技术咨询、系统设计、设备供货等一体式定制化方案。

The new energy power system products independently developed and integrated include: : Hybrid power propulsion system (Parallel hybrid power propulsion system and Series hybrid power propulsion system), pure electric power propulsion system, fuel cell power propulsion system and other types.

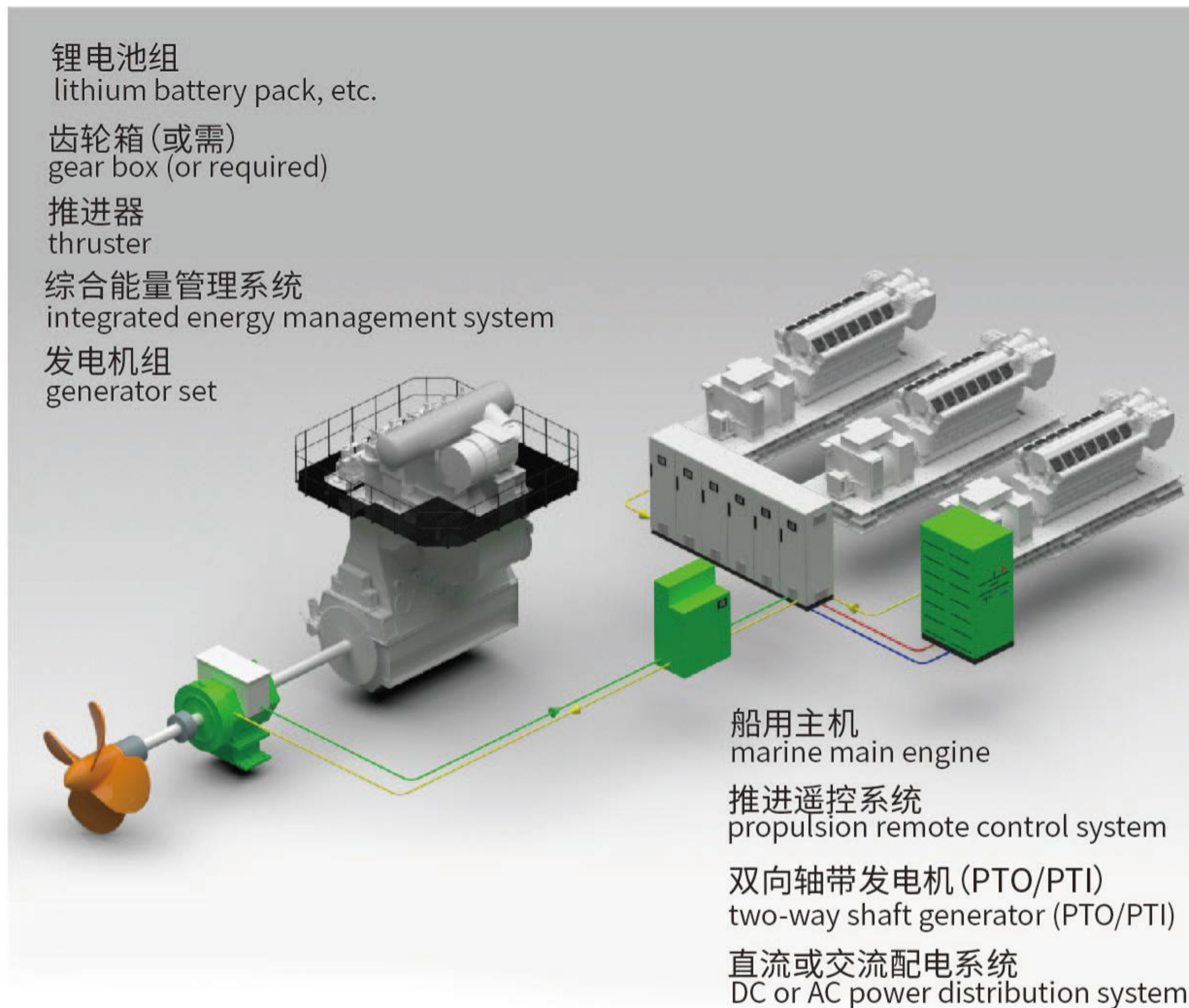
Relying on the deep technical strength in the field of marine engines, we have expanded from a single engine matching to the optimization of the entire ship's power system to achieve multi-directional improvements in economy, maneuverability, and emission control. Through independent research and development and laboratory construction, we have undertaken major national scientific research tasks, participated in the formulation and improvement of relevant domestic and foreign laws and regulations, and mastered core technologies from the system level to the component level. According to the different needs of customers in terms of ship type, route, economy, maneuverability, operation and maintenance, etc., we can provide integrated customized solutions such as power system technical consultation, system design, and equipment supply.

## 产品竞争优势 Product competitive advantage

- 超低排放/零排放** Ultra-low emission/zero emission  
用户根据个性化需求选择系统型式，可以满足不同排放法规要求  
Users can choose the system type according to their individual needs to meet the requirements of different emission regulations
- 智能高效** Intelligent and efficient  
通过综合能量管理系统，实现能量的高效利用和智能控制  
Through the integrated energy management system, the efficient use and intelligent control of energy are realized
- 经济效益高** High economic benefits  
经济效益受制于系统的型式和使用场景，但总体而言，与传统动力型式相比，燃油消耗率可节省5%~30%，从客户实际应用场景出发，定制最优投入产出方案，缩短客户的投资回报期  
Economic benefits are limited by the type of system and usage scenarios, but overall, compared with traditional power types, fuel consumption can be reduced by 5% to 30%. Starting from the actual application scenarios of customers, the optimal input-output plan is customized to shorten the customer's payback period
- 操纵性好** Good maneuverability  
相较于传统的动力系统型式，操控性得到极大提升，运营维护成本低且更为便捷。  
Compared with the traditional power system type, the controllability has been greatly improved, the operation and maintenance cost is low and more convenient

# 混合动力推进系统(并联式)

Power propulsion system (parallel hybrid)



## 主要优点

本系统改变了传统的推进系统和电力系统分离的结构,将两套系统有机结合成一套系统,在不增加配置的情况下提高了系统的冗余度,降低了综合能耗。系统配备的综合能量管理系统,能够在实现“主机推进/混合推进/电力推进/轴带发电”等基本功能的基础上,达到能量转换策略更加完善、综合能效更加优化的效果。

## Main advantages:

This system changes the separation of the traditional propulsion system and the power system, organically combines the two systems into one system, improves the redundancy of the system without increasing the configuration, and reduces the overall energy consumption. The integrated energy management system equipped with the system can achieve the effect of more perfect energy conversion strategy and more optimized comprehensive energy efficiency on the basis of realizing the basic functions of "main engine propulsion / hybrid propulsion / electric propulsion / shaft power generation".

## 应用领域及案例 Application fields and cases

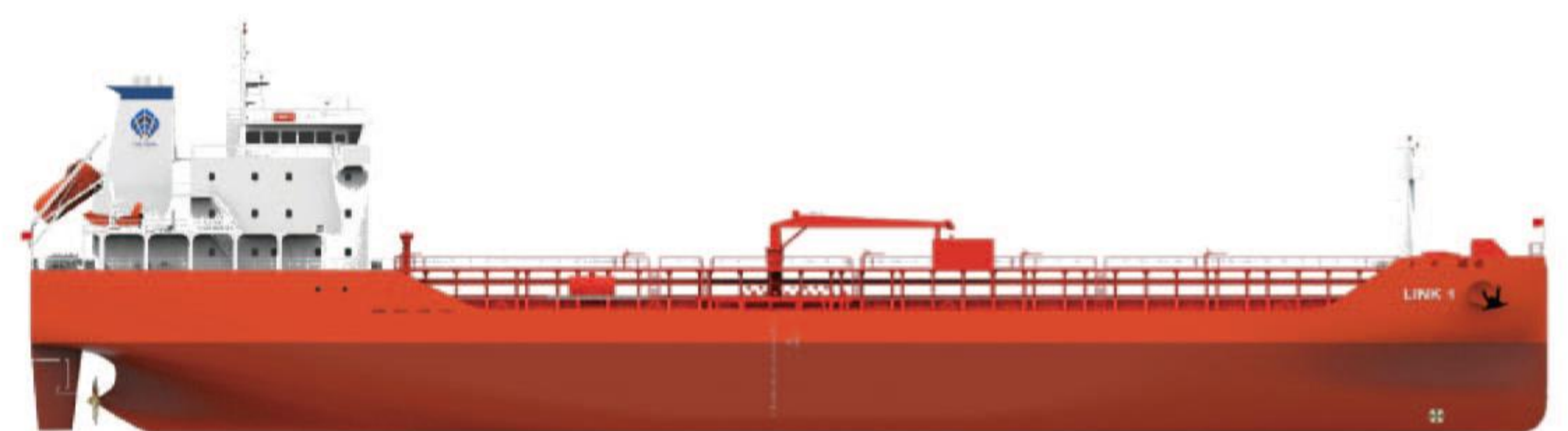
### 混合动力推进系统(并联式)适用于江海联运、远洋运输等大中型船舶。

Power propulsion system (parallel hybrid) is suitable for large and medium-sized ships such as river-sea combined transportation and ocean transportation.

### 9000DWT远洋化学品船

9000DWT ocean-going chemical tanker

交流组网440V AC networking 440V	主机约3300kW Main engine about 3300kW
发电机组475kW*3 Generator set 475kW*3	锂电池组630kWh*4 Lithium battery pack 630kWh*4
可实现控制排放区零排放运行 Realize zero emission operation in the controlled emission area	PTO500kW/PTI1500kW



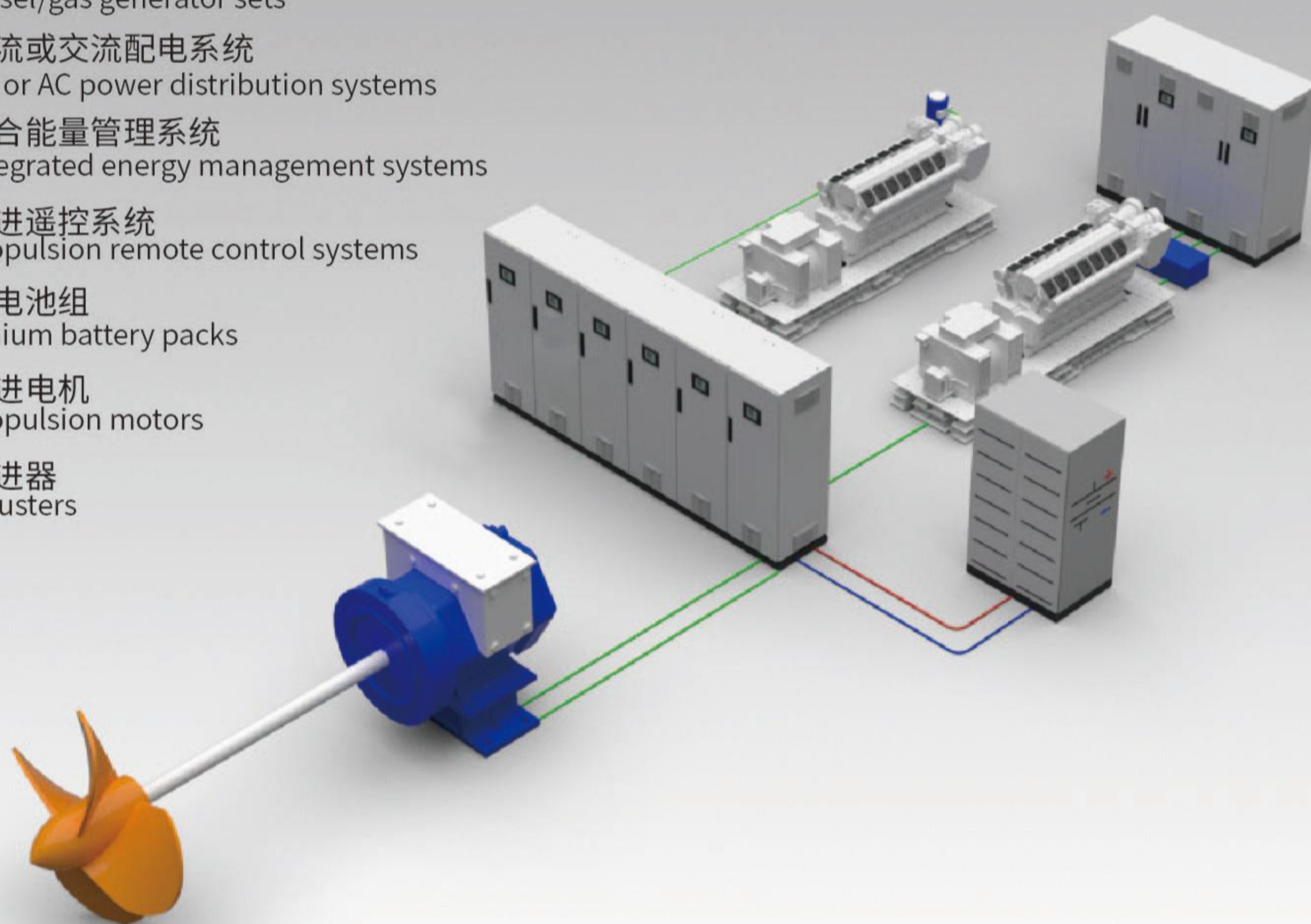
船舶大部分时间航行在沿海及近洋区域,有时进入内河航行,全航行过程综合能耗降低5%以上。在沿海排放区时采用全电池动力运行,减少发动机低负荷运行时间,降低能耗,提升操纵性能,实现零排放。船舶进入内河时,采用配置有SCR的发电机组电力推进型式,既满足了功能需求,符合排放法规规定,又减少了整体成本。

Ships sail in coastal and offshore areas most of the time, and sometimes enter inland waterways. The overall energy consumption during the entire navigation process is reduced by more than 5%. In the coastal emission zone, it adopts full battery power operation to reduce the low-load operation time of the engine, reduce energy consumption, improve handling performance, and achieve zero emissions. When the ship enters the inland river, the electric propulsion type of the generator set equipped with SCR is adopted, which not only meets the functional requirements, meets the emission regulations, but also reduces the overall cost.

# 混合动力推进系统(串联式)

Power propulsion system (series hybrid)

柴/气发电机组  
diesel/gas generator sets  
直流或交流配电系统  
DC or AC power distribution systems  
综合能量管理系统  
integrated energy management systems  
推进遥控系统  
propulsion remote control systems  
锂电池组  
lithium battery packs  
推进电机  
propulsion motors  
推进器  
thrusters



## 主要优点

系统兼容分布式电源能力强,可接入锂电池、光伏、风帆等多种电源型式。通过各类能源的配合使用,提高电能使用效率,降低综合能耗,减少污染物排放,系统结构紧凑、系统简洁、布置灵活、节约空间。

## Main advantages:

The system is compatible with distributed power sources, and can be connected to multiple power sources such as lithium batteries, photovoltaics, and sails. Through the coordinated use of various energy sources, the efficiency of electric energy use is improved, the overall energy consumption is reduced, and the emission of pollutants is reduced. The system has a compact structure, simple system, flexible layout, and space saving.

## 应用领域及案例 Application fields and cases

### 混合动力推进系统(串联式)适用于江海联运,内河运输船、邮轮等中小型船舶。

Power propulsion system (series hybrid) is suitable for small and medium-sized ships such as river-sea combined transportation, inland water transport ships, cruise ships, etc.

### 蓝藻打捞处理船

Cyanobacteria salvage and treatment ship

交流组网400V  
AC networking 400V

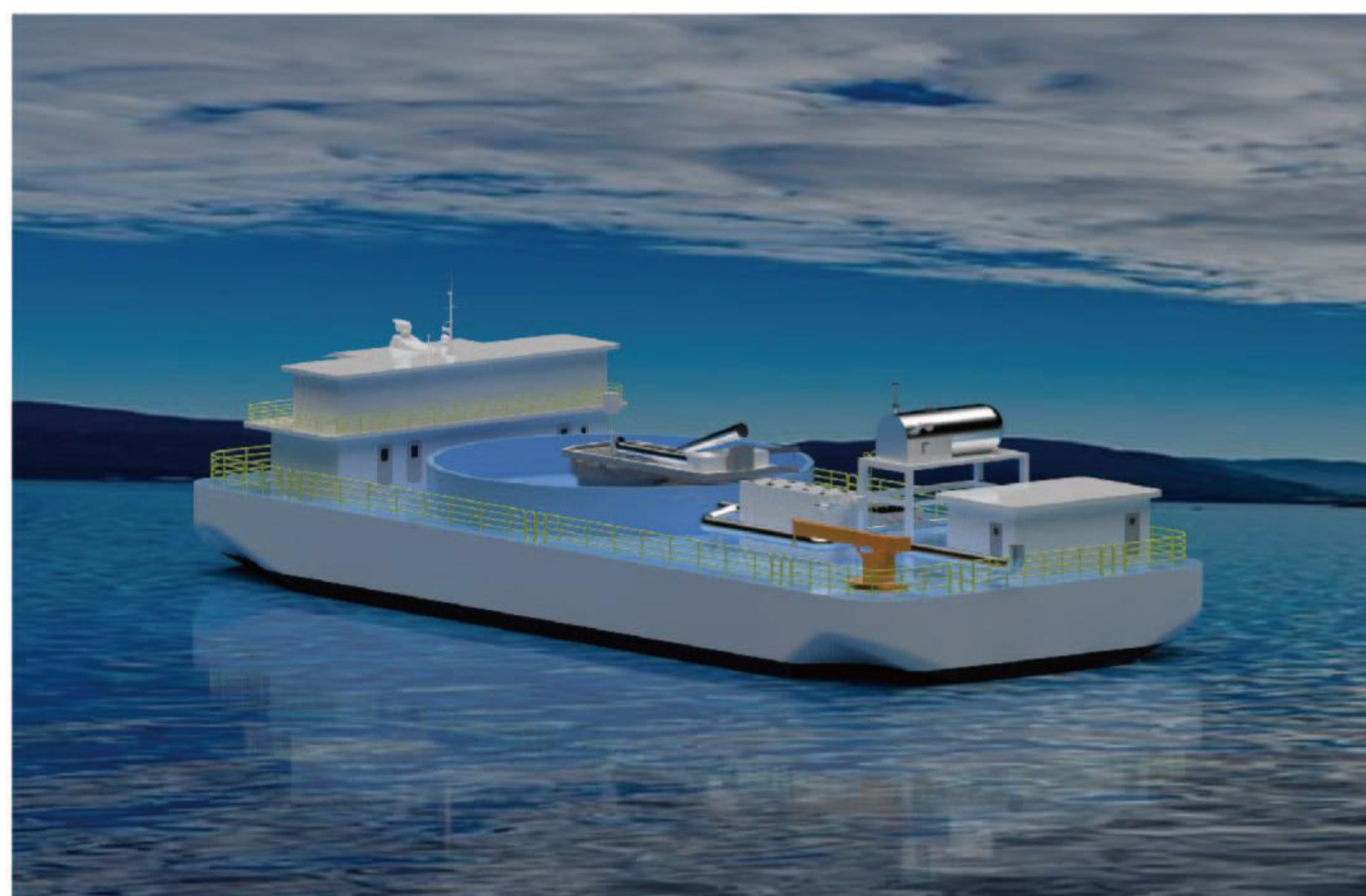
发电机组+锂电池+光伏+浮管发电机组成主电源  
The main power source is composed of generator set + lithium battery + photovoltaic + floating tube generator

燃气发电机组400kW  
Gas generator set 400kW

锂电池组2\*300kWh  
Lithium battery pack 2\*300kWh

光伏组件160kW  
PV module 160kW

浮管式发电机12kW  
Floating tube generator 12kW



船舶运营于滇池水域,进行蓝藻打捞处理工作。航行过程全电池动力运行,大幅降低能耗,并实现零排放。蓝藻打捞过程中使用LNG发动机,满足大功率用电需求的同时实现了更优的排放。

The ship operates in the waters of Dianchi Lake to carry out the salvage and treatment of blue algae. The navigation process adopts full battery power operation, which greatly reduces energy consumption and achieves zero emissions. In the process of cyanobacteria salvage, LNG engines that meet the C2 standard are used to meet the demand for high-power electricity and achieve better emissions.

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# 纯电力推进系统

## Pure electric power propulsion system

推进遥控系统  
propulsion remote control system

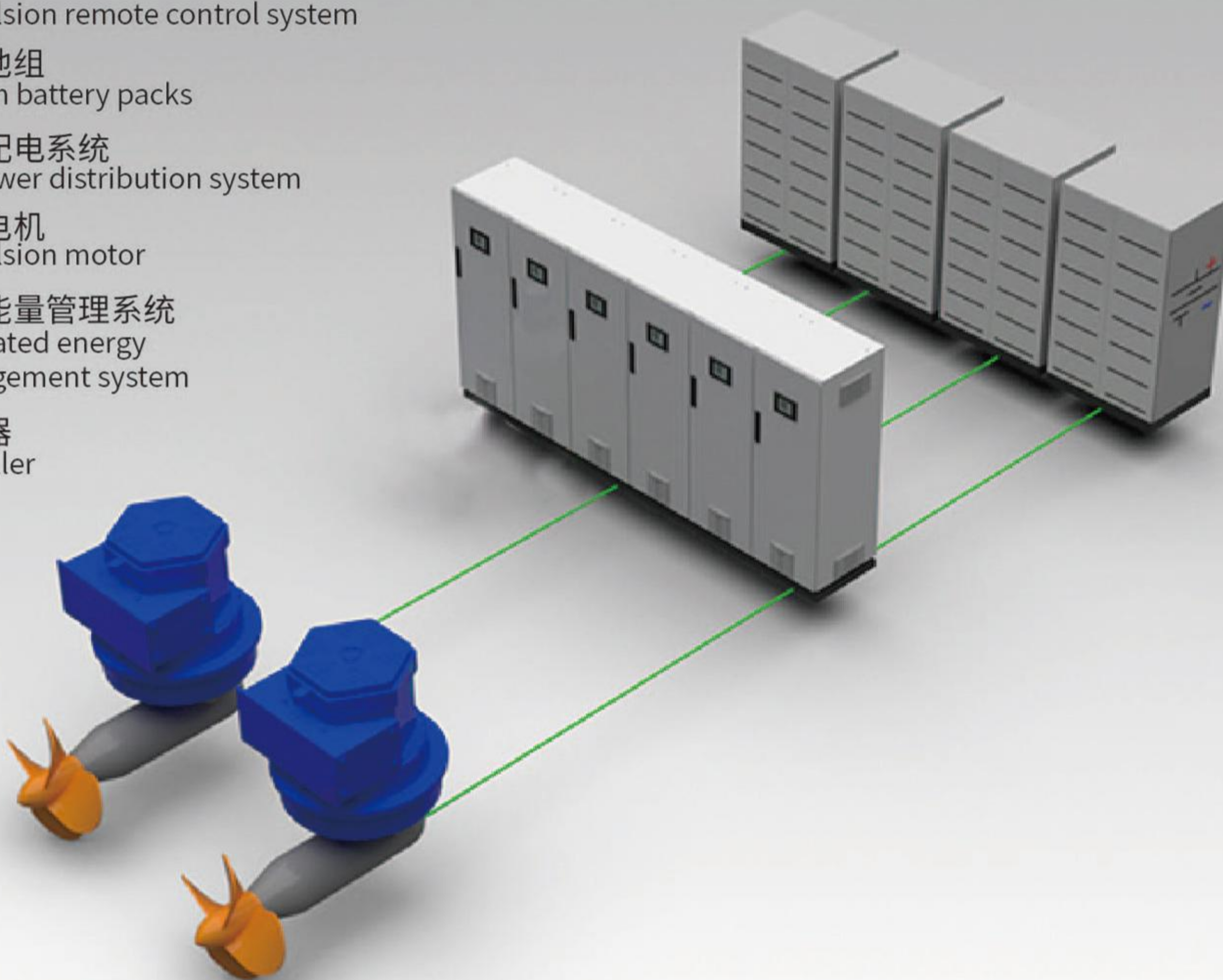
锂电池组  
lithium battery packs

直流配电系统  
DC power distribution system

推进电机  
propulsion motor

综合能量管理系统  
integrated energy management system

推进器  
propeller



### 主要优点

全船电力负荷均通过电池系统供电, 零排放, 安静舒适; 锂电池组以簇为单位接入电网, 冗余性高; 智能化程度高, 操作简便, 维护工作量小。

Main advantages:

The whole ship power load is supplied by battery system, zero emission, quiet and comfortable; Lithium battery packs are connected to the power system in clusters, and the power system has high redundancy. High degree of intelligence, simple operation, small maintenance workload.

## 应用领域及案例 Application fields and cases

### 纯电力推进系统适用于公务船、内河运输船、游轮等中小型船舶。

Pure electric power propulsion system is suitable for small and medium-sized ships such as official ships, inland water transport ships, and cruise ships.

### 24m观光游览船

24m sightseeing cruise

纯电力推进模式

Pure electric propulsion mode

满足一天8小时的工作模式

Meet the working mode of 8 hours a day

全寿命经济性分析

Life cycle economic analysis

锂电池组2\*340kWh

Lithium battery pack 2\*340kWh

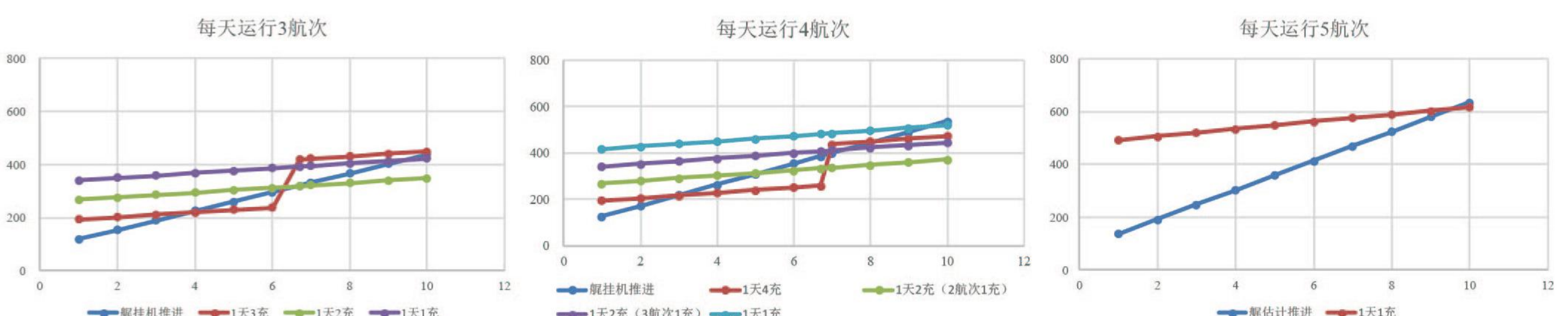
无轴推进器200kW

Shaftless thruster 200kW



船舶航行于湖泊/内河中, 全航程使用纯电池动力运行, 无污染零排放, 振动噪音小, 没有油气味, 舒适性高, 投资回报率高, 综合收益高于传统燃油发动机。

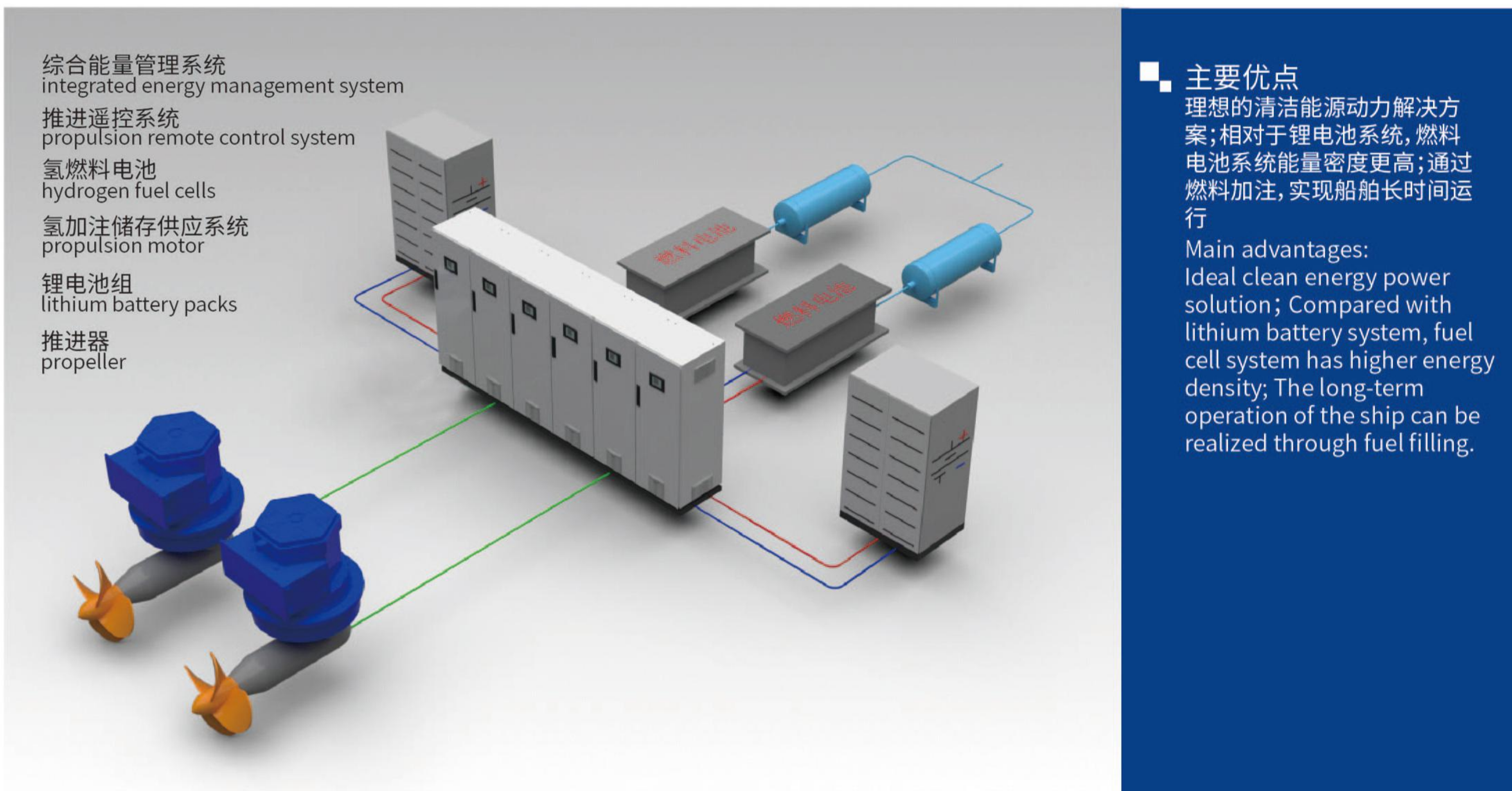
The ship sails in lakes/inland rivers and runs on pure battery power throughout the entire voyage. It has no pollution and zero emissions, low vibration and noise, no oil smell, high comfort, high return on investment, and higher comprehensive income than traditional fuel engines.



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# 燃料电池动力推进系统

Fuel cell power propulsion system



## 应用领域及案例 Application fields and cases

- 燃料电池动力推进系统适用于大中型船舶的电站系统, 也适用于科考船、公务船、内河运输船、游轮等中小型船。

Fuel cell power propulsion system can be used in the power station system of large and medium-sized ships, as well as small and medium-sized ships such as scientific research ships, official ships, inland river transport ships and cruise ships.

- **2100DWT散货船**  
2100DWT bulk carrier

系统采用燃料电池+锂电池混合动力模式  
The system adopts fuel cell + lithium battery hybrid power mode

燃料电池+锂电池组成主电源  
Fuel cell + lithium battery constitute the main power source

采用电力推进方式, 航程可达140km  
Using electric propulsion, the range can reach 140km

直流电网750V  
DC grid 750V

燃料电池4\*135kW  
Fuel cell 4\*135kW

锂电池组4\*315kWh  
Lithium battery pack 4\*315kWh

推进功率为2\*160kW  
Propulsion power is 2\*160kW

储氢量为280kg  
The hydrogen storage capacity is 280kg



船舶航行于珠江水域, 比纯电动船舶具有更长的续航里程, 氢气质量能量密度大, 燃料电池效率高, 实现无污染物排放。

Ships sailing in the Pearl River waters have a longer cruising range than pure electric ships. The hydrogen mass and energy density are high, the fuel cell efficiency is high, and no pollutant emission is achieved.

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