

CIMC RAFFLES

深蓝赋能·零碳未来 ——中集来福士海上新能源创新探索实践

Ocean Technology Empowerments A Carbon-Neutral Future
-CIMC Raffles' Innovative Exploration and Pilot Project



CONTENTS

目录

01 中集来福士公司简介

Introduction of CIMC Raffles

02 海工技术低碳创新

Low-carbon Innovation of Offshore Engineering Technology

03 新能源创新发展

Innovative Development of New Energy

中集集团

CIMC Group

CIMC RAFFLES





工程能力——中欧协同

Engineering Capability – Synergy Between China and Europe

5 工程研究院, 1200 工程师 **5 Engineering Center, 1200 Engineers**

拥有全生命周期设计能力, 概念/FEED/基本/细节/生产设计, 现场技术支持

Full **Life Cycle Design** capability, Concept/FEED/Basic/Detail/Production Design, On-site technical support



烟台海洋工程研究院
Offshore Engineering Institute



上海研发中心
Shanghai Engineering Center



国家工程实验室
National Engineering Laboratory



瑞典创新中心
Sweden Bassoe Technology



挪威创新中心
Norway Brevik Engineering



高端海工
High-end Offshore Equipment



压缩天然气运输船
CNG Ship



漂浮式海上风电
Floating Wind



半潜技术
Semi-submersible



浮式生产储油船
FPSO

烟台中集来福士

Yantai CIMC Raffles

高端海洋工程装备总装建造基地

High-end Marine engineering equipment EPC base

- 占地面积51.9万平方米
- Area: 519,000 square meters
- 码头岸线长3369米
- Quay shoreline: 3369 meters
- 拥有国内唯一与船厂配套的-18米深水码头
- Water depth: -18 meters
- 20000吨“泰山”起重机
- 20,000-ton gantry crane - Taishan





海阳中集来福士

Haiyang CIMC Raffles

大型海工模块、海上风电装备、海上发射装备建造基地
Large offshore modules, offshore wind power equipment, offshore launch equipment construction base

- 占地面积43万平方米
- Area: 430,000 square meters
- 码头岸线长444.7米
- Quay shoreline: 444.7 meters
- 拥有1台700吨龙门吊、2台250吨龙门吊、3个船台生产线等
- It has one 700 tons gantry crane, two 250 tons gantry crane, and three berth production lines



龙口中集来福士

Longkou CIMC Raffles

滚装船、海洋渔业装备建造基地

Ro-ro ship, Marine fishery equipment construction base

- 占地面积44万平方米
- Area: 440,000 square meters
- 码头岸线长402米
- Quay shoreline: 402 meters
- 拥有1台600吨龙门吊、2台250吨龙门吊、3个船台生产线等
- It has one 600-ton gantry crane, two 250-ton gantry cranes, and three berth production lines

我们做什么-总览

What We Do- Overview

钻井

Drilling Rig



浮式生产储油 船 & 模块

FPSO & FLNG & Modules



特种船

Special Vessel



海上风能

Offshore Wind



海洋牧场

Ocean Farming



海洋旅游

Ocean Tourism



习近平总书记考察中集来福士船厂

President Xi Jinping inspected CIMC Raffles



2018年6月13日，习近平总书记考察中集来福士烟台基地

On June 13, 2018, President Xi Jinping inspected CIMC Raffles Yantai base

CONTENTS

目录

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全球最先进第七代超深水半潜钻井平台

The World's Most Advanced 7th-Generation Ultra-Deepwater Semi-Submersible Drilling Platform

两次成功完成南海可燃冰试采

Successfully completed two trials of natural gas hydrate extraction in the South China Sea



作业水深3658米，钻井深度15240米
平台配置全球领先的DP3闭环动力管理系统，可提升30%
作业效率，节省10%的燃料消耗

Maximum operational water depth 3,658 meters, drilling depth 15,240 meters.

Equipped with a DP3 closed-loop dynamic positioning system, enhancing operational efficiency by 30% while reducing fuel consumption by 10%.

全球首座10万吨级

The world's first 100,000-ton class

深水半潜式生产储油平台

Deepwater semi-submersible production and storage platform

“深海一号” 能源站

“Deep Sea One” energy station

型长 91.5米

Length: 91.5m

型宽 91.5米

Width: 91.5m

型深 59米

depth: 59m

年产能 32.5亿方天然气

Annual capacity of 3.25 billion cubic meters of gas

作业水深 1,422米

operating water depth: 1422m



17-2陵水深水大气田

17-2 Lingshui deep water gas field

跨越691公里海底管道

满足粤港澳大湾区1/4的民生用气需求

Spanning 691km of submarine pipelines, it meets one quarter of the people's gas needs in the Guangdong-Hong Kong-Macao Greater Bay Area

为粤港澳大湾区注入澎湃绿色动力

To inject surging green momentum into the Guangdong-Hong Kong-Macao Greater Bay Area

全球首艘

采用HISEP科技的浮式生产储卸油船 Mero3

Merp 3- The world's first FPSO using HISEP Technology

HISEP将有效分离回收油气中掺杂的CO₂,通过水下回注方式减少外排并达到增产目的

HISEP will effectively separate and recover the doped CO₂ in oil and gas, reduce the efflux and achieve the purpose of increasing production through underwater reinjection

型长 341.2米

Length: 341.2m

型宽 67.2米

Width: 67.2m

型深 29.7米

depth: 29.7m

日处理能力 180,000 桶原油

The daily processing capacity is 180,000 barrels of crude oil

1,200 万立方米天然气

12 million cubic meters of gas

储存能力 1,450,000 桶

Storage capacity 1,450,000 barrels

国内首个FPSO船体改装，加上部模块以及总装整合的EPC总包项目

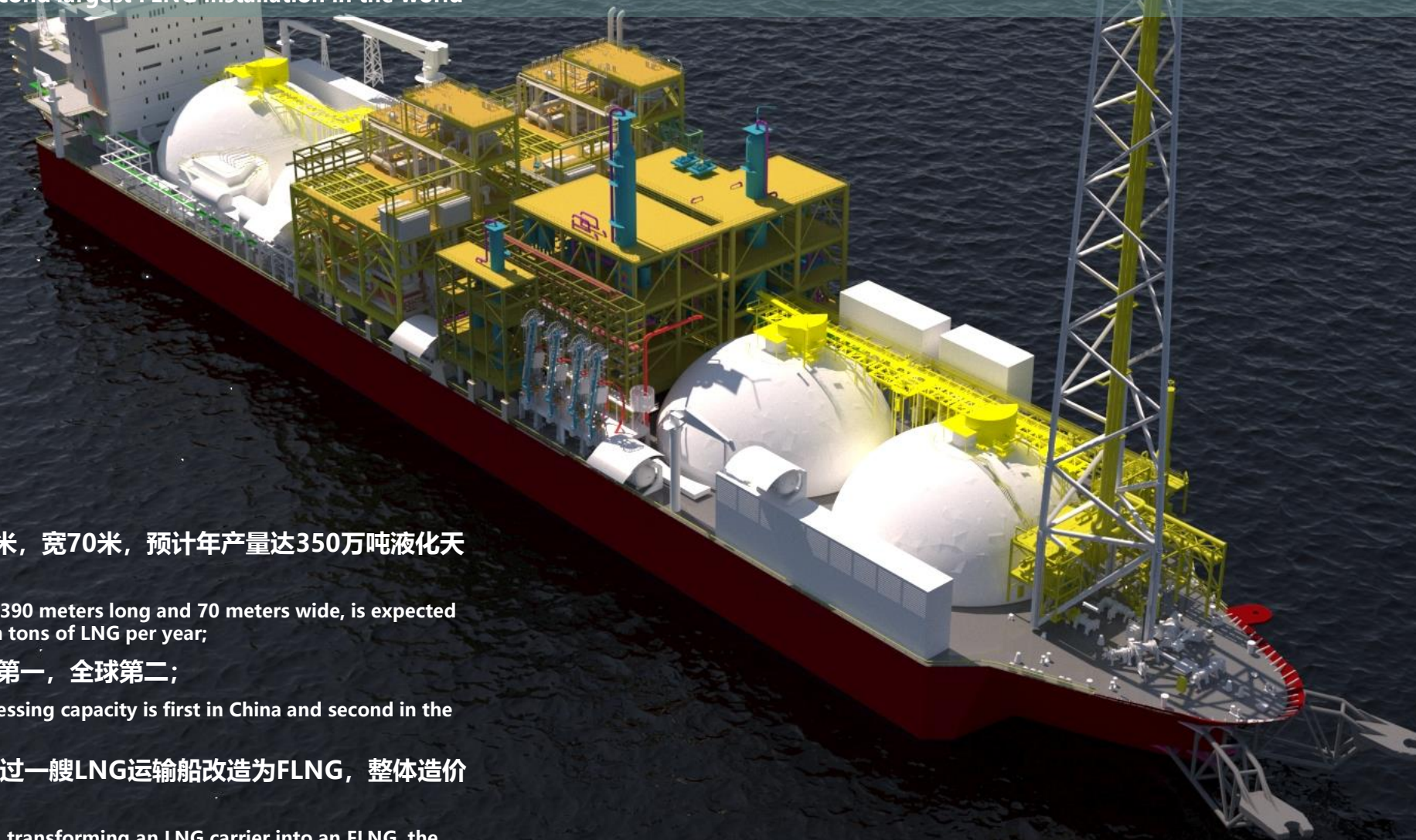
The first FPSO hull modification in China, plus part modules and EPC general contract project of final assembly and integration

抓住绿色装备机遇，由高端FPSO EPC进入FLNG EPC总包

Seize the opportunity of green equipment, and enter the FLNG EPC master package from high-end FPSO EPC

项目全球第二大FLNG装置

The project is the second largest FLNG installation in the world



- FLNG 全长约390米，宽70米，预计年产量达350万吨液化天然气；
- FLNG, approximately 390 meters long and 70 meters wide, is expected to produce 3.5 million tons of LNG per year;
- 液化处理能力中国第一，全球第二；
- The liquefaction processing capacity is first in China and second in the world;
- 使用LNG动力，通过一艘LNG运输船改造为FLNG，整体造价和工期大幅改善
- Using LNG power and transforming an LNG carrier into an FLNG, the overall cost and construction period have been greatly improved

国内首艘

The first ship in China

用于国产新能源汽车出口的LNG双燃料汽车运输船

LNG dual-fuel vehicle carrier for export of domestic new energy vehicles

比亚迪“探索者1号”

Byd Explorer 1

中集来福士已承建各类型LNG双燃料滚装船26艘

Cimc Raffles has undertaken the construction of 26 LNG dual-fuel RO-RO vessels of various types



型长199.9米

Length: 199.9m

型宽38米

Width: 38m

设计吃水8.6米

Design draft: 8.6 meters

设计航速19节

Design speed: 19 knots

装载量为7000台车

The loading capacity is 7,000 cars

最高续航里程可达15800海里

The maximum range is 15,800 nautical miles

交付全球首座绿色甲醇双燃料动力风电安装船

Delivered the world's first green methanol dual fuel power wind power installation ship



配备3000m³甲醇储舱及5台甲醇双燃料主机
可将船舶的碳足迹减少78%以上。

It is equipped with 3000m³ methanol storage tank and 5 methanol dual fuel main engines
Reduce a ship's carbon footprint by more than 78%

全球最先进的电池混合动力风电安装船

The world's most advanced battery hybrid wind power installation ship

采用电池混合驱动系统技术，搭载直流电网配电系统，配置4.1MW储能，每兆瓦安装的碳排放量减少70%以上。

Using battery hybrid drive system technology, equipped with DC grid distribution system, 4.1MW energy storage, carbon emissions per megawatt installed reduced by more than 70%.



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中欧浮动式风力发电机组设计

Sino-Europe Floating Wind Turbine Design



“D-FLOATER” 系列

洲际产能合作

“D-FLOATER” Series
Intercontinental production capacity cooperation



BASSOE TECHNOLOGY

低成本批量生产

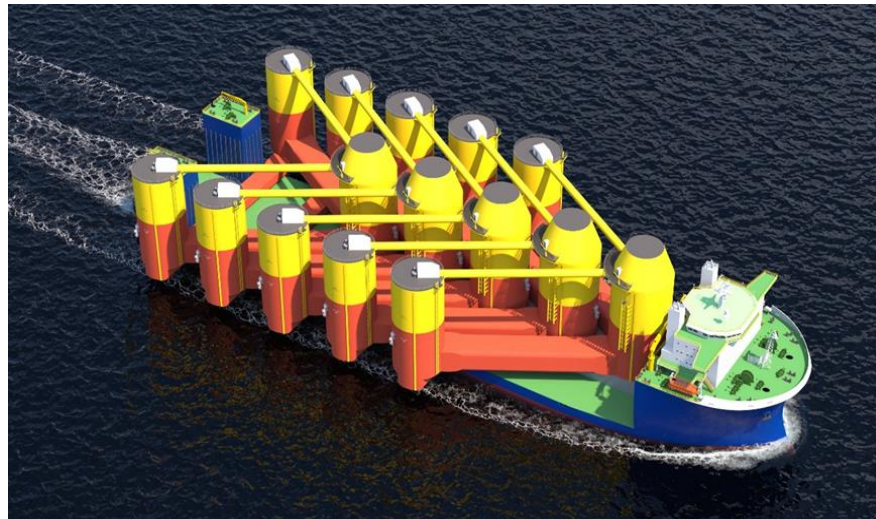
Lower Cost batch manufacturing

- 适用于自动化制造
- Suitable for automatic manufacturing
- 主要结构由四个模块组成
- The main structure is composed of four modules.
- 不需要大型干船坞
- No need for large dry docks
- 比其他设计占用建筑空间少
- Take up less construction space than other designs

高效运输:

Efficient Transport:

- 一艘船一次可以打多个地基
- One ship can take multiple foundations once time



海上风电运维服务

Integrated Offshore Wind O&M Service

运维培训
O&M Training

轮机运维
Turbine O&M

电气检查
Electrical Inspection

水下检验
Underwater Inspection

主要部件运维
Major Components
O&M

存储区域
Storage Area

轮机检验
Turbine Inspection

联网电视监测
CTV Service

基座运维
Foundation O&M

Gwind是中集来福士集团的子公司，提供海上风电运维整体解决方案。公司注册资本2亿元，经营范围包括海上风电运维船舶的经营和租赁；风电机组运行维护服务；防腐工程服务及防腐产品开发与销售；海洋勘探和测绘服务；水下工程服务等。

Gwind , the Subsidiary of CIMC Raffles which provides overall solutions for offshore wind power operation and maintenance. The registered capital of the company is 200 million yuan, and the business scope includes the operation and leasing of offshore wind power operation and maintenance ships; Wind turbine operation and maintenance service; Corrosion engineering services and anti-corrosion product development and sales; Marine exploration and mapping services; Underwater engineering services, etc.



浮式光伏创新

Floating Solar Innovation

2代光伏平台

2nd Gen Solar Platform

全球首个400千瓦半潜式浮动太阳能平台已在中国烟台安装

First 400kw semi-sub floating solar platform has been installed in Yantai China



国内首台半潜式光伏

The first semi-submersible photovoltaic in China

主体由八个系统组成

The main body consists of eight systems

2X2多体连接，总功率400kW

2X2 multi-body connection, total power 400kW

可扩展到任何额定功率 (MW) 与2XN阵列

Scalable to any power rating (MW) with 2XN arrays

3代光伏平台

3rd Gen Solar Platform

全球首个竹基光伏平台

The world's first bamboo-based photovoltaic platform



中集来福士
CIMC Raffles

氢能业务
Hydrogen Line

Hydrogen Institute (Shenzhen)

Advanced hydrogen equipment R&D
Offshore Wind to Hydrogen



Manufacturing (Yang Zhou)

- Large-scale electrolytic cell production base



Yantai Demonstration base

- Offshore hydrogen testing and verification base



碳捕集/利用/封存一站式解决方案

CCUS: One-stop Solution

二氧化碳注入平台

Offshore CO₂ Injection Platform

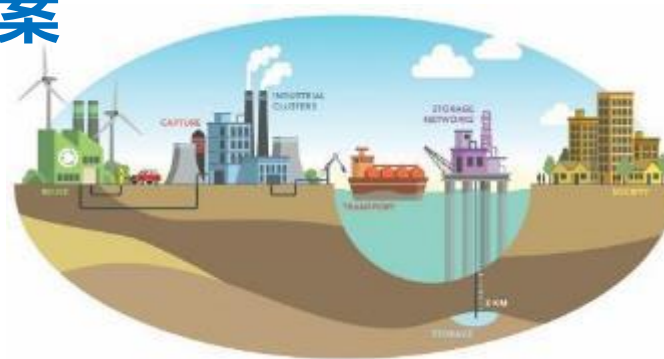
Jacket/Jack-up/Semi-sub



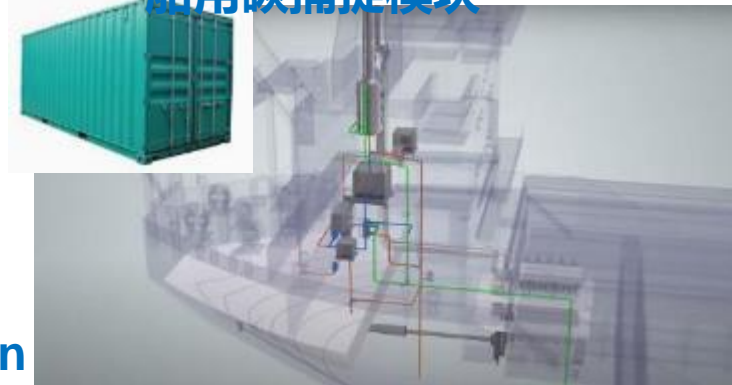
Storage
存储/封存

Utilization
利用

Transportation
运输



Marine Onboard Capture 船用碳捕捉模块



模块化碳捕捉撬块

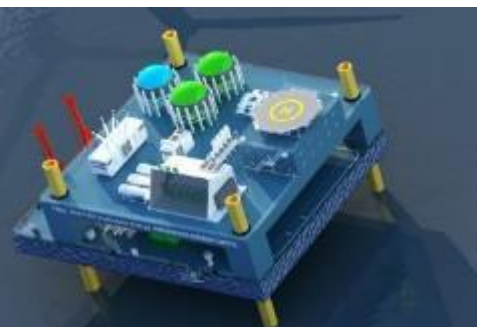
Modular Carbon Capture Solution

Container type

- Pre-build in factory
- On-site assembly
- Reduce time 30%
- Reduce area 70%
- Applicable to offshore and onshore

制氢&合成甲醇平台

Hydrogen & Methanol Platform



二氧化碳运输船

10K-80k m³ LCO₂ Carrier



系列化液化二氧化碳运输船

10K-80k m³ LCO₂ Carrier

- Type-C Tank
- Tank Pressure: 18Bar
- Storage Temperature: -35°C
- Dynamic Position: DP2
- Power: LNG Dual Fuel, Green Methanol Design Ready

全球首个海上氢醇氨能源岛平台

World's first Pilot Project-Floating Solar+H₂+Green Methanol + Green Ammonia Platform

CIMC RAFFLES



DCS控制撬块

集控室

储能

海水制氢

PEM电解槽

ALK碱槽

合成氨

合成甲醇

商业化海上风光制氢醇氨生产存储及传输方案

Floating H₂+Green Methanol or Ammonia FPSO

Methanol Powered SOV/CTV
海上运维船

living quarter
居住及多功能平台

Seawater Desalination
海水淡化装置

Battery Container
Transportation
储能电池中转站

Green Methanol Bunking
绿色甲醇加注转运

CO₂ Storage
二氧化碳储罐

Jetty & Pipe Rack
海上码头，管廊

Floating H₂+Green Methanol
FPSO
海上氢醇氨生产存储平台

LCO₂ Vessel
二氧化碳运输船





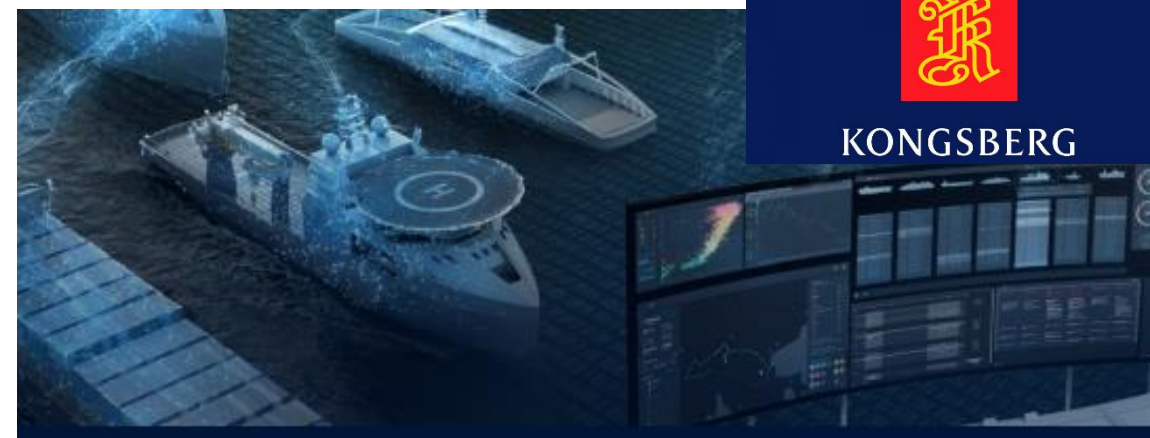
中集来福士新能源船舶解决方案

CIMC Raffles New Energy Powered Vessel Solution



2024年6月，中集来福士与康士伯海事公司和烟台长岛管委会，在烟台市委江成书记见证下，签订针对电动及混动船舶开发战略合作协议

In June 2024, CIMC Raffles, Kongsberg Maritime, and the Yantai Changdao Administrative Committee signed a strategic cooperation agreement on the development of electric and hybrid vessels, witnessed by Secretary Jiang Cheng of the Yantai Municipal Party Committee.



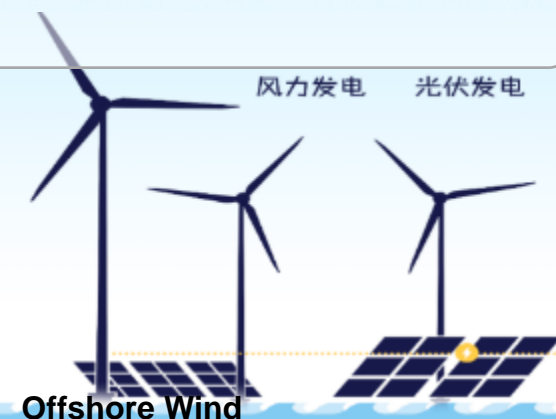
中集来福士新能源解决方案

CIMC Raffles New Energy Solution

海上风光 Offshore Wind&Solar

高端海上风电安装船、升压站、换流站、漂浮式风机、漂浮式光伏、海上运维服务

High-end offshore wind power installation vessels, booster stations, converter stations, floating wind turbines, floating photovoltaic systems, and offshore operation and maintenance services.



海上氢能 Offshore PV

设立中集集电氢能公司，开发两千方工业化电解槽，自主研发电极材料，开发适合风光绿电波动性强的配套电解制氢技术和装备，实现海上制氢

Establish CIMC Hydrogen Company, develop a 2,000m³ industrial electrolyzer, develop electrode materials, develop supporting electrolytic hydrogen production technologies and equipment suitable for the strong volatility of green electricity generated by wind and solar energy, and achieve offshore hydrogen production.

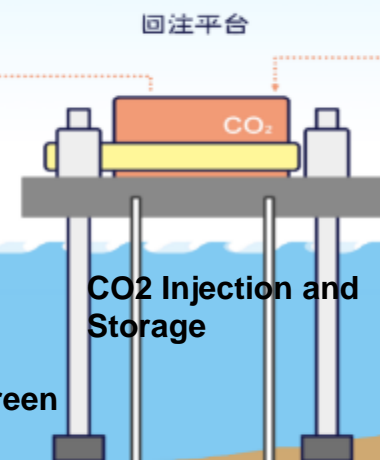


Seawater desalination
Hydrogen production by electrolysis
CO₂+H₂ Produce Green Methanol

碳捕捉利用及封存 CCUS

依托海工技术，实现从上游船舶甲板碳捕捉、二氧化碳海上运输船舶、二氧化碳制甲醇等再利用，以及海上加注装备，完成从油气开发到二氧化碳回收加注完整能源循环

Relying on offshore engineering technology, it realizes the reuse of carbon capture on the deck of upstream ships, transportation of carbon dioxide by offshore CO₂ carriers, production of methanol from carbon dioxide, and the development of offshore refueling equipment, thus completing a complete energy cycle from oil and gas development to carbon dioxide recovery and refueling.



CO₂ Injection and Storage

绿色能源转化 Power to X

开发全球首个氢醇氨能源岛，验证各类设备在海上孤岛条件下能源转化技术，真正实现绿电到绿色能源的转化和利用

Develop the world's first hydrogen-alcohol-ammonia energy island, verify the energy conversion technologies of various devices under the conditions of an offshore isolated island, and truly achieve the conversion and utilization of green electricity into green energy.



LCO₂ Carrier

全球首个海上氢醇氨能源岛平台

World's first Pilot Project-Floating Solar+H₂+Green Methanol + Green Ammonia Platform

感谢关注
Thanks

