

INDUSTRY OVERVIEW

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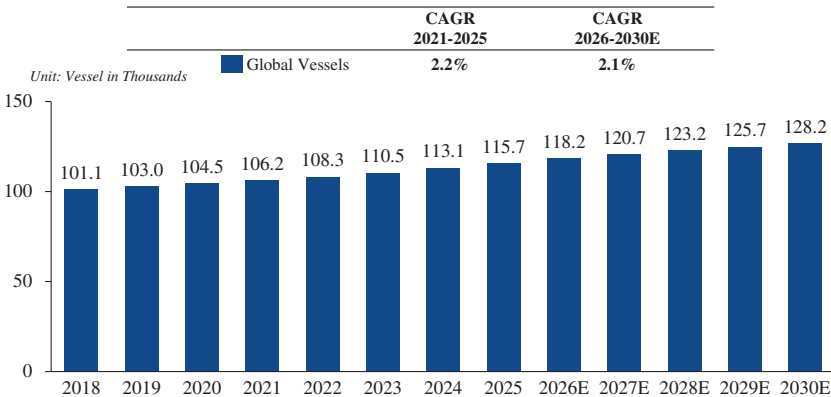
Facing intensifying global warming and more frequent extreme weather events, the role of shipping in climate action and the path toward carbon neutrality has gained unprecedented prominence. Many countries have incorporated marine and freshwater system resources into their top-level carbon-neutrality strategies, deepening the integration of ecological protection and climate governance, and positioning the green marine and inland waterway economy as a key pillar in achieving global net-zero objectives. Shipowners’ increasing emphasis on operating efficiency and sustainable economic performance is reinforcing the industry transition toward cleaner and more energy-efficient solutions.

OVERVIEW OF GLOBAL SHIPPING INDUSTRY

The global shipping industry refers to the transportation of goods and passengers through vessels and related services, forming a fundamental component of global trade and connecting economies around the world. According to the United Nations Conference on Trade and Development, over 80% of international commodity trade is conducted through maritime transport.

Global fleet size has continued to expand steadily in recent years, supported by resilient shipping trade demand. The number of vessels increased from 106.2 thousand in 2021 to 115.7 thousand in 2025, representing a CAGR of 2.2% from 2021 to 2025. In the future, the global fleet size is expected to maintain a stable growth trajectory, reaching 128.2 thousand vessels by 2030, representing a CAGR of 2.1% from 2026 to 2030.

Global Fleet Size (2018-2030E)



Sources: United Nations Conference on Trade and Development, Equasis, Clarksons, China Insights Consultancy

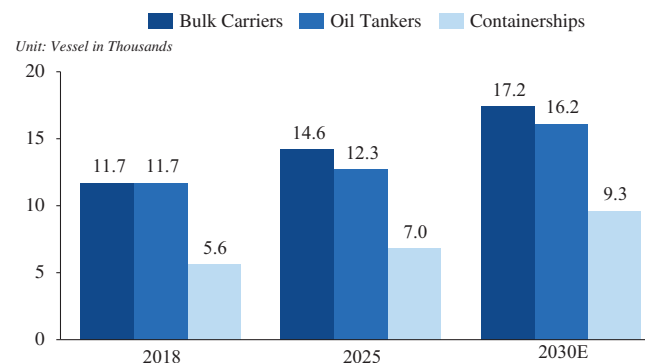
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Among the major large-vessel categories, bulk carriers, oil tankers, containerships are the core vessel types supporting global shipping, together accounting for over 80% of global fleet size by deadweight tonnage:

- **Bulk Carriers:** Vessels designed for the transportation of unpackaged dry commodities, such as iron ore, coal, and grain, typically loaded directly into cargo holds without requiring containers or packaging.
- **Oil Tankers:** Vessels designed to carry crude oil, refined petroleum products and liquid chemicals in bulk, equipped with segregated cargo tanks, corrosion-resistant structural features, and dedicated pumping systems to ensure safe loading, carriage and discharge of liquid cargoes.
- **Containerships:** Vessels configured for standardized container transportation, featuring cellular holds and securing systems that facilitate efficient loading, unloading, and terminal operations.

Supported by dry-bulk trade activity and ongoing fleet renewal, together with sustained growth in crude oil and petroleum product transportation and continued investment in larger and more advanced vessels, the number of bulk carriers increased from 11.7 thousand vessels in 2018 to 14.6 thousand vessels in 2025, and is expected to reach 17.2 thousand vessels by 2030. The number of oil tankers increased from 11.7 thousand vessels in 2018 to 12.9 thousand vessels in 2025 and is expected to reach 16.2 thousand vessels by 2030. The number of containerships increased from 5.6 thousand vessels in 2018 to 7.0 thousand vessels in 2025 and is expected to reach 9.3 thousand vessels by 2030.

Global Fleet Size of Bulk Carriers, Oil Tankers, and Containerships (2018-2030E)



Sources: United Nations Conference on Trade and Development, Equasis, Clarksons, China Insights Consultancy

Global Shipping Green Transformation Analysis

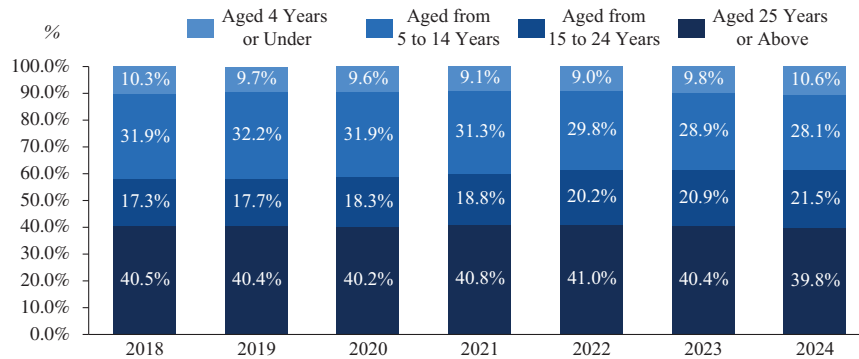
Aging Fleet

The global fleet is experiencing an aging trend. The percentage of young vessels aged under four years declined from 10.3% in 2018 to 9.0% in 2022, while the number of older vessels became increasingly prominent. Vessels aged from 15 to 24 years accounted for 17.3% in 2018, and the percentage increased to 20.2% in 2022. Meanwhile, the number of fleet aged above 25 years consistently grew. A modest improvement emerged in 2023 and 2024, with the percentage of young vessels aged under four years increasing to 10.6%, supported by resumed newbuilding deliveries and post-pandemic recovery in shipyard capacity. Nevertheless, aging remains a structural challenge, as the fleet aged above 25 years still represents nearly 40% of the market.

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As vessels age, technological obsolescence and physical wear lead to declining energy efficiency and higher pollutant emissions. By 2026, our 35% of the existing tankers, bulk carriers, and containerships may receive a CII rating of “D” or “E” if no retrofit is undertaken, underscoring the need for performance upgrades. As a result, green retrofit services are becoming increasingly important for ensuring compliance with environmental standards and enhancing operating efficiency.

Global Fleet Age Distribution in Terms of Fleet Size (2018-2024)



Sources: International Maritime Organization, China Insights Consultancy

Massive Emission

CO₂ emissions from global maritime transport continued to increase in 2024, reaching 972.8 million tonnes, accounting for 2.4% of global carbon dioxide emissions. Emissions are highly concentrated among containerships, bulk carriers, and oil tankers, together representing the core sources of maritime carbon output. In 2024, containerships generated 245.4 million tonnes of CO₂, followed by bulk carriers of 204.2 million tonnes, and oil tankers of 156.4 million tonnes. These vessel types are characterized by large fleet sizes, high fuel consumption, and long-distance operations, making them the primary focus of global shipping decarbonization efforts. Beyond carbon emissions, the industry is also a significant source of other air pollutants, such as sulfur oxides. Against the backdrop of tightening international environmental regulations, the shipping sector is facing increasing regulatory requirements to reduce both greenhouse-gas and air-pollutant emissions.

Stricter Regulation

Global regulations on the shipping industry is heightening as governments and international bodies incorporate maritime decarbonization into broader climate and energy-transition agendas. The International Maritime Organization has strengthened its policy framework by introducing progressively stricter controls on both air-pollutant and greenhouse-gas emissions. Representative measures such as the Global Sulfur Cap and the emerging Global Maritime Net-Zero Framework (NZF) reflect a shift toward more comprehensive emissions governance. Under the International Maritime Organization’s revised 2023 GHG Strategy supported by NZF, the industry is committed to reducing total greenhouse gas emissions by at least 20%, striving for 30% by 2030, and by at least 70%, striving for 80%, by 2040, compared to the emission level in 2008, and achieving net-zero emissions by around 2050. Meanwhile, regional regulatory support for electric vessels is growing, with policies aimed at accelerating the adoption of zero-emission technologies, further driving the sector’s transition toward cleaner operations.

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Date	Regulation	Content
2020	International Maritime Organization Global Sulfur Cap	From January 1, 2020, the International Maritime Organization lowered the global sulfur emission limits from marine fuels from 3.5% to 0.5%, resulting in a significant reduction in SOx emissions. In designated Emission Control Areas (ECAs), a more stringent sulfur emission limit of 0.1% applies. Vessels must either use compliant low-sulfur fuels or install approved exhaust gas cleaning systems (EGCS).
2023	Energy Efficiency Existing Ship Index (EEXI)	EEXI sets minimum technical energy-efficiency standards for existing vessels above 400 GT. Compliance is typically achieved through engine-power limitation or retrofitting energy-saving technologies to ensure alignment with the International Maritime Organization decarbonization objectives.
2023	Carbon Intensity Indicator (CII)	CII evaluates annual operational carbon intensity based on grams of CO ₂ emitted per cargo-capacity mile for vessels of 5,000 GT and above. Vessels are rated from A to E, and those rated D for three consecutive years or E in any single year must implement corrective action plans.
2024	EU Emissions Trading System (ETS)	Maritime transport has been incorporated into the EU ETS under the “Fit for 55” package. Vessels of 5,000 GT and above performing voyages to or from EEA ports must monitor, report and verify CO ₂ emissions and purchase allowances accordingly. The scope will gradually expand to cover more vessel types and greenhouse gases.
2025	FuelEU Maritime Regulation	Requires vessels above 5,000 GT operating within the European Economic Area to reduce the greenhouse gas intensity of their marine energy by 2% from 2025. Additionally, from 2030 onward, containerships and passenger vessels at berth in EU ports must use onshore power supply or alternative zero-emission technologies.
2025	IMO Net-Zero Framework (NZF)	Establishes a global greenhouse gas fuel-intensity standard for vessels above 5,000 GT, with progressive reduction requirements and supporting economic measures to accelerate low- and zero-carbon fuel adoption.

OVERVIEW OF GLOBAL GREEN SHIPPING EQUIPMENT AND SYSTEM INDUSTRY

The global shipping industry is facing increasing regulatory and environmental pressure, alongside shipowners’ growing focus on cost reduction and profitability enhancement, particularly in relation to exhaust-emission control and energy-efficiency improvement. The green industry encompasses economic activities dedicated to sustainability, clean energy, and environmental protection, and the term is widely used across industries. The green shipping equipment and systems industry is defined as shipping equipment and systems that reduce greenhouse gas emissions, limit pollutant discharge, improve resource efficiency, and protect marine ecosystems, in order to minimize the environmental impact from shipping activities. The green shipping equipment and systems industry can be further divided into vessel exhaust gas emission control and cleaning systems, vessel energy efficiency enhancement systems, vessel retrofit and servicing, intelligent vessel operating and maintenance system, and new energy vessel systems.

Value Chain Analysis

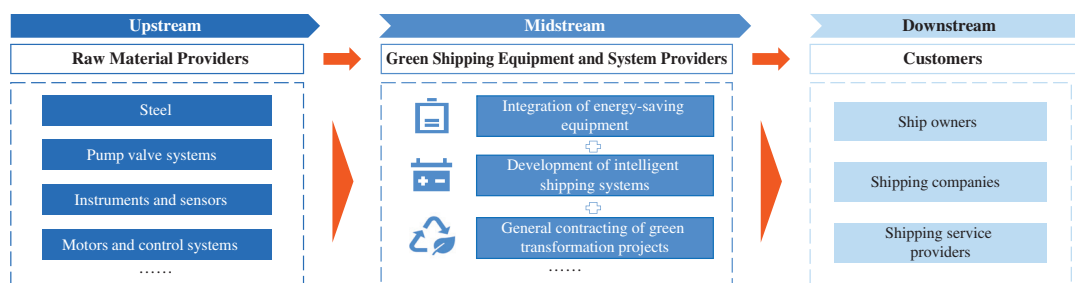
Upstream of the Value Chain. This sector primarily consists of suppliers of key components and raw materials for shipbuilding and maritime equipment manufacturing, including steel, pump and valve systems, instrumentation and sensors, and motors and control systems. As the shipping industry advances toward greener and more intelligent development, upstream materials are increasingly emphasizing lightweight and corrosion-resistant characteristics.

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Midstream of the Value Chain. This sector is responsible for the development and installation of green shipping equipment and systems as the link between upstream component suppliers and downstream operating entities. It functions as the technical and service hub for the green shipping equipment and system industry. Companies within this sector participate in solution design, equipment provision, system installation, and commissioning.

Downstream of the Value Chain. This sector primarily includes shipowners, shipping companies, and maritime service providers. Vessel operators improve energy efficiency and emissions performance through newbuilding activities or retrofitting existing vessels, while also maintaining and upgrading vessels to enhance lifecycle value.

Value Chain of Global Green Shipping Equipment and System Industry



Source: China Insights Consultancy

Benefits of Implementation of Green Shipping Equipment and Systems

Reduction of Fuel Cost

With international oil prices remaining volatile, shipping companies are facing rising fuel expenses. As the global maritime sector advances toward green transformation, reducing energy consumption while remaining compliant has become essential for sustaining competitiveness. Across the industry, the adoption of green shipping equipment and systems has demonstrated meaningful cost-saving effects. EGCSs typically reduce fuel costs by 10-35% by enabling the use of lower-priced high-sulfur fuel. Shaft generator systems deliver an additional 2-6% reduction through more efficient onboard power generation. These improvements materially lower energy consumption, enhance profitability, and support long-term operational resilience for shipowners.

Reduction of Emission

Global vessel emissions regulations are increasingly driving the development of energy-efficiency technologies. The International Maritime Organization has set a target to reduce greenhouse gas emissions from international shipping by at least 50% by 2050 compared with the level in 2008. A wide range of green shipping equipment and systems contribute directly or indirectly to the reduction of such emissions and help the industry meet regulatory requirements. For example, sulfur-reduction systems have become a key compliance technology, particularly under the global 0.5% sulfur cap, by directly removing sulfur oxides from exhaust gas.

Enhancement of Profitability

Adopting green shipping equipment and systems can enhance the operating profitability for vessels. For instance, based on the average daily profitability of ships in 2024, Very Large Crude Carrier (VLCC) vessels equipped with EGCS demonstrate an increase in average daily profit of over US\$8,000 compared to traditional vessel types. Similarly, VLCC vessels utilizing energy-saving system experienced an increase in average daily earnings of over US\$5,000 compared to traditional ship types.

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Optimization Asset Value

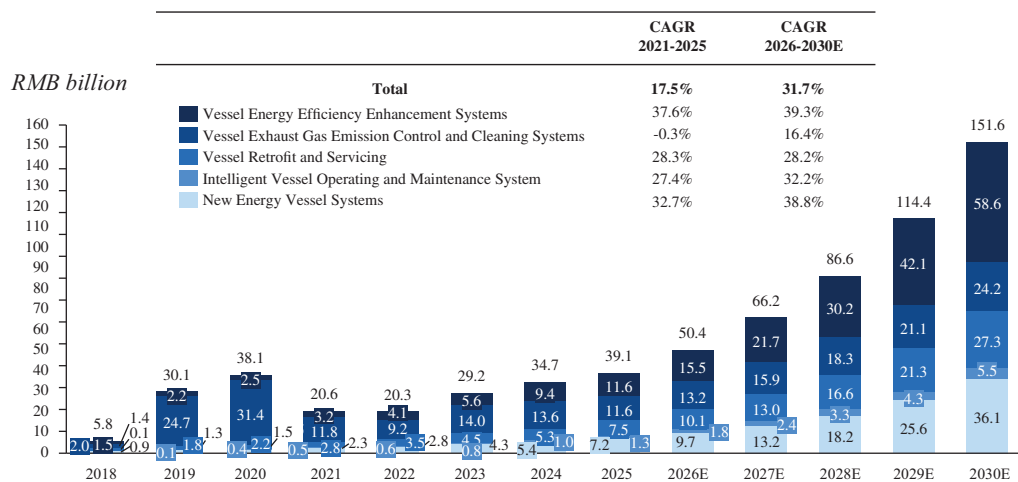
As energy efficiency and technical performance play an increasingly important role in vessel asset values, an energy-efficient bulk carrier aged five years is valued at approximately 21% above a comparable traditional vessel. This value premium becomes more prominent as vessels age. For instance, after eight years of operation, an energy-efficient bulk carrier of 180,000 DWT is valued at around US\$40 million, whereas a non-energy-efficient vessel of the same type is valued at only approximately US\$30 million. This premium is partly attributable to higher operating efficiency and lower lifecycle operating costs, which enhance long-term asset value. Facilities that modernize propulsion, power systems, and energy management help aged vessels remain compliant with environmental standards and operate more efficiently, thereby postponing decommissioning and potentially extending a vessel’s CII-compliant operating period by 3 to 5 years, ultimately enhancing long-term asset value.

Market Size Analysis

The size of the global green shipping equipment and system industry in terms of revenue grew from RMB5.8 billion in 2018 to RMB39.1 billion in 2025, with a CAGR of 17.5% from 2021 to 2025. There was strong growth in 2019 and 2020, primarily driven by the global 0.5% fuel sulfur limit under the International Convention for the Prevention of Pollution from Ships (IMO 2020 Sulphur Cap), which boosted EGCS retrofit demand. The market size is expected to reach RMB151.6 billion by 2030, representing a CAGR of 31.7% from 2026 to 2030, supported by the 2026 IMO NZF mid-term measures vote, the 2028 implementation of related GHG reduction rules, and the adoption of shaft generators, alternative fuel systems, and other advanced technologies as the industry shifts from compliance upgrades to systematic decarbonization and digitalization, enabling more diverse and stable growth.

Within the overall market, the vessel exhaust gas emission control and cleaning system sub-industry historically has been the dominant foundation, while the vessel energy efficiency enhancement system sub-industry is becoming the key driver of incremental growth. The market size of vessel retrofit and servicing in terms of revenue was RMB7.5 billion in 2025 and is expected to grow at a CAGR of 28.2% from 2026 to 2030. The market size of intelligent vessel operating and maintenance systems in terms of revenue was RMB1.3 billion in 2025 and is expected to grow at a CAGR of 32.2% from 2026 to 2030, while the market size of new energy vessel systems in terms of revenue was RMB7.2 billion in 2025 and is expected to grow at a CAGR of 38.8% from 2026 to 2030.

**Size of Global Green Shipping Equipment and System Industry (in terms of revenue)
(2018-2030E)**

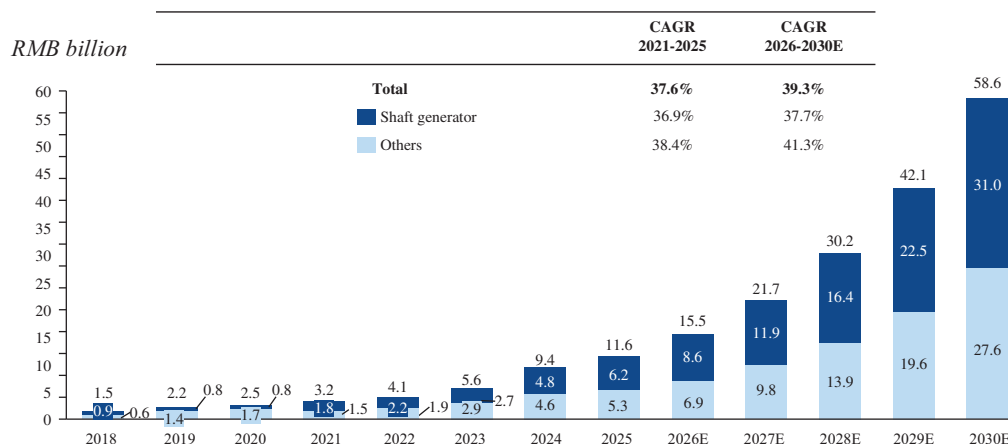


Sources: International Maritime Organization, Clarksons, China Insights Consultancy

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The size of the vessel energy efficiency enhancement system sub-industry in terms of revenue grew from RMB1.5 billion in 2018 to RMB11.6 billion in 2025, driven by accelerating adoption of fuel-saving and optimization technologies. It is expected to reach RMB58.6 billion by 2030, representing a CAGR of 39.3% from 2026 to 2030, as shipowners increasingly prioritize cost efficiency and performance optimization. As the most mature and largest sector in terms of revenue, the market size of shaft generator systems grew from RMB0.9 billion in 2018 to RMB6.2 billion in 2025, and is expected to reach RMB31.0 billion by 2030, representing a CAGR of 37.7% from 2026 to 2030.

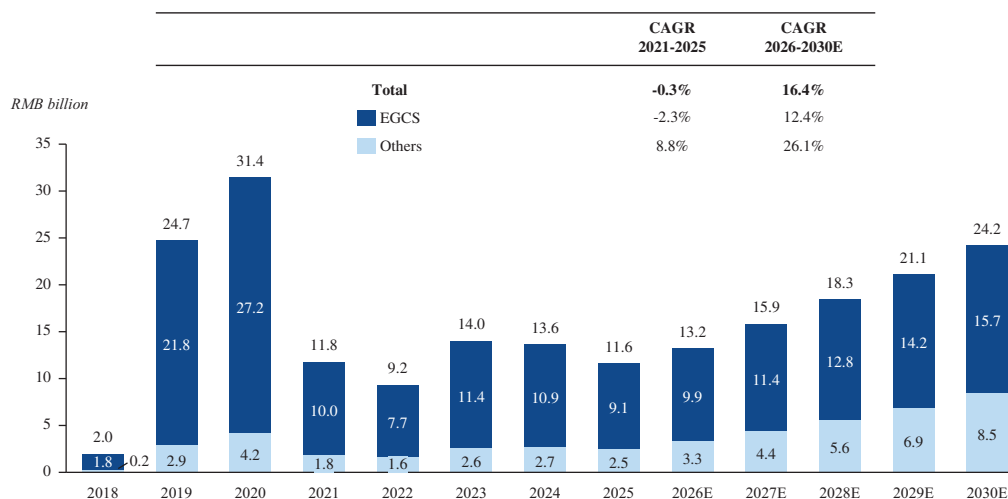
**Size of Vessel Energy Efficiency Enhancement System Sub-Industry
(in terms of revenue) (2018-2030E)**



Sources: International Maritime Organization, Clarksons, China Insights Consultancy

The size of the vessel exhaust gas emission control and cleaning system sub-industry in terms of revenue grew from RMB2.0 billion in 2018 to RMB11.6 billion in 2025, and is expected to resume growth from 2026 and reach RMB24.2 billion by 2030, supported by diverse emission control technologies and decarbonization solutions including carbon capture system and nitrogen oxide treatment equipment. As the largest sector in terms of revenue, the market size of EGCS expanded rapidly from 2019 to 2020 and then gradually slowed down due to moderate retrofit demand, reaching RMB9.1 billion in 2025 and expected to reach RMB15.7 billion by 2030. Going forward, growth is expected to be driven primarily by stable newbuild installations, supported by increasing shipbuilding activity and expanding emission control areas. The integration of carbon capture with scrubber systems may further enhance their long-term relevance, positioning EGCS as both a compliance solution and a platform for broader emission reduction.

**Size of Vessel Exhaust Gas Emission Control and Cleaning System
Sub-Industry (in terms of revenue) (2018-2030E)**



Sources: International Maritime Organization, Clarksons, China Insights Consultancy

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Key Market Drivers

- ***Economic and Cost-Driven Demand for Energy-Efficiency Investment.*** With rising fuel costs, shipping companies are increasing their investments in energy-efficiency upgrades and smart systems to reduce energy consumption, lower emissions, and manage long-term operating costs. Solutions such as propulsion-system retrofits, energy-recovery devices, and intelligent monitoring technologies can generate substantial fuel savings and deliver sustained improvements in operating efficiency. These upgrades not only enhance economic performance but also help companies meet increasingly stringent environmental requirements, reduce compliance risks, and maintain competitiveness in the market.
- ***Increasing Demand on Existing Aged Fleet Renovation.*** Global fleets are aging at a faster pace, while vessel new building capacity in major shipbuilding regions remains constrained, resulting in new vessel supply falling short of replacement needs. This supply-demand imbalance is increasing shipowners’ reliance on retrofit solutions to extend vessel lifecycles. Green and intelligent vessel upgrades enhance energy efficiency, reduce fuel consumption, and lower emissions, enabling vessels to meet the 2030/2050 requirements by International Maritime Organization. As regulatory pressure heightens and operating optimization becomes more critical, retrofit is becoming a key driver supporting the continued adoption of green and smart shipping technologies.
- ***Global Emissions-Reduction Policies and Regulatory Tightening.*** Growing concerns over climate impacts are prompting broader adoption of green and intelligent technologies in the shipping industry. The 2030 and 2050 emission-reduction targets by the International Maritime Organization, together with regulatory measures such as EEXI and CII, are strengthening efficiency and environmental standards across the sector. At the same time, the EU’s FuelEU Maritime regulation is further advancing the shift toward low-carbon fuels. These policies collectively encourage innovation in sustainable technologies and alternative fuels.
- ***Technological Advancement.*** Emerging technologies like motor control, AI, IoT, and advanced materials are transforming the shipping industry. Motor control innovations enhance energy efficiency and propulsion, while AI optimizes routes and IoT enables real-time equipment monitoring. Advanced materials support energy diversification and green development, aiding low-carbon and zero-emission goals. These technologies are shifting the industry from an equipment-driven model to a more efficient, flexible system-driven model.

Future Trends

- ***Product Diversification.*** The shipping industry is increasingly diversifying the product and service offerings to address environmental challenges. Clean energy sources such as liquefied natural gas, ammonia, hydrogen, and wind power are being integrated to reduce carbon emissions and fuel costs. For example, LNG reduces carbon dioxide and sulfur oxide emissions, while ammonia and hydrogen will reshape the industry’s energy landscape. In addition, green emission-control technologies and energy-saving technologies, such as EGCS, carbon-capture technologies, air lubrication systems and wind shields help vessels comply with relevant International Maritime Organization requirements.
- ***Business Model Innovation.*** As the technical complexity and coordination needs of green-transition requirements rise, shipowners are placing greater emphasis on delivery efficiency and project certainty, leading to a stronger preference for integrated delivery models. One-stop services are increasingly becoming the mainstream, as they unify design, equipment manufacturing, system installation, and full-lifecycle maintenance, streamlining project management, reducing coordination costs, and shortening vessel downtime. As the industry demands more comprehensive service capabilities, the value chain is concentrating toward service providers with system-integration capabilities.

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- **Continued Intelligentization.** Advances in intelligent technologies are making functions such as smart navigation, remote monitoring, and predictive maintenance increasingly standard. Supported by intelligent vessel management capabilities and integrated data systems, these tools improve operating visibility, optimize routing, and enhance vessel efficiency, thereby reducing costs and extending service life. With progress in autonomous navigation and intelligent decision-making, vessels are moving toward more automated and safer operating models that also support energy optimization and emissions reduction, facilitating the development of smart vessels and intelligent shipping systems.
- **Industrial Chains Consolidation.** With the acceleration of the green transition, collaboration across the upstream and downstream sectors of the shipping industry continues to deepen. Shipyards, fuel suppliers, equipment manufacturers, technology developers, and port operators are advancing resource sharing and process coordination through closer cooperation mechanisms, gradually forming a more integrated and efficient industry system. This trend helps improve product and system delivery efficiency, reduce overall costs, and promote the standardization and scaling of green product and system across a broader scope, further accelerating the industry’s sustainable development.

COMPETITIVE LANDSCAPE

The Company is the largest green shipping equipment and system provider in the world in terms of revenue in 2025. In 2025, the Company had a revenue of RMB3.50 billion with a market share of 8.9%.

Global Ranking of Green Shipping Equipment and System Providers (in terms of revenue) (2025)

Ranking	Company	Revenue	Market Share
(RMB in billions)			
1	The Company	3.50	8.9%
2	Company A	0.94	2.4%
3	Company B	0.92	2.4%
4	Company C	0.91	2.3%
5	Company D	0.88	2.2%

Notes:

- (1) Established in 1997 in Singapore, Company A is a non-listed company specializing in inert gas systems, EGCS, and sailing vessel parts and related services.
- (2) Established in 1989 in South Korea, Company B is a non-listed company specializing in EGCS and technologies.
- (3) Established in 1903 in Germany, Company C is a non-listed company specializing in the research, development, design, manufacture, sales, and service of medium and high-voltage motors, generators, drive systems, and their components.
- (4) Established in 2015 in China, Company D is a non-listed company specializing in marine greenhouse gas and pollutant emission reduction solutions.

Source: China Insights Consultancy

The Company is the largest vessel exhaust gas emission control and cleaning system provider in the world in terms of revenue in 2025. In 2025, the Company had vessel exhaust gas emission control and cleaning system revenue of RMB1.57 billion with a market share of 13.5%.

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Global Ranking of Vessel Exhaust Gas Emission Control and Cleaning System Providers (in terms of revenue) (2025)

Ranking	Company	Revenue	Market Share
(RMB in billions)			
1	The Company	1.57	13.5%
2	Company A	0.94	8.1%
3	Company B	0.92	8.0%
4	Company D	0.88	7.6%
5	Company E	0.41	3.5%

Note:

- (1) Established in 2003 in China, Company E is a non-listed company specializing in the research, development, design, manufacture, engineering, and project contracting of corrosion control and water treatment technologies.

Source: China Insights Consultancy

The Company is the largest EGCS provider in the world in terms of revenue in 2025. In 2025, the Company had EGCS revenue of RMB1.52 billion with a market share of 16.6%.

Global Ranking of EGCS Providers (in terms of revenue) (2025)

Ranking	Company	Revenue	Market Share
(RMB in billions)			
1	The Company	1.52	16.6%
2	Company D	0.86	9.4%
3	Company A	0.77	8.4%
4	Company B	0.76	8.3%
5	Company E	0.33	3.7%

Source: China Insights Consultancy

Against the backdrop of the global shipping industry’s wave of transition toward green and intelligent operations, the issue of fleet aging has become increasingly prominent. Enhancing the energy efficiency of existing vessels through technological retrofits has emerged as an option. This trend directly drives the sustained growth of the market for vessel energy efficiency enhancement system, with the retrofit sector establishing itself as a core driver of this market expansion. Aligned with industry trends, the company also focuses primarily on the vessel retrofit sector.

The Company ranked second among global energy efficiency enhancement system providers in terms of revenue in 2025. In 2025, the Company had energy efficiency enhancement system revenue of RMB0.85 billion with a market share of 7.4%.

Global Ranking of Energy Efficiency Enhancement System Providers (in terms of revenue) (2025)

Ranking	Company	Revenue	Market Share
(RMB in billions)			
1	Company C	0.91	7.9%

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Ranking	Company	Revenue	Market Share
(RMB in billions)			
2	The Company	0.85	7.4%
3	Company F	0.83	7.2%
4	Company G	0.59	5.1%
5	Company H	0.57	4.9%

Notes:

- (1) Established in 2006 in Finland, Company F is a non-listed company specializing in the research, development, manufacture, and sale of special electric machines and high-power converters for wind, marine, and industrial applications.
- (2) Established in 1963 in China, Company G is a non-listed company specializing in marine diesel engines, stirring engines, marine power system solutions, ship electrical and automation systems, and energy equipment and related engineering services.
- (3) Established in 2010 in England, Company H is a non-listed company specializing in the research, development, provision, and aftercare of hull air lubrication technology for the global shipping sector, aiming to improve vessel efficiency and reduce fuel consumption and emissions.

Source: China Insights Consultancy

The Company ranked third among global shaft generator providers in terms of revenue in 2025 with a market share of 8.3%.

Global Ranking of Shaft Generator Providers (in terms of revenue) (2025)

Ranking	Company	Revenue	Market Share
(RMB in billions)			
1	Company C	0.91	14.6%
2	Company F	0.83	13.3%
3	The Company	0.53	8.3%
4	Company G	0.51	8.2%
5	Company I	0.16	2.5%

Note:

- (1) Established in 1940 in Spain, Company I is a non-listed company specializing in the research, development, design, manufacture, and sale of rotating electrical machines, marine propulsion motors and generators, and electrical solutions for wind energy, hydropower, mining, and industrial applications.

Source: China Insights Consultancy

Key Success Factors and Industry Entry Barriers

- **Comprehensive Solution Delivery Capability.** As environmental protection and energy efficiency become increasingly important, industry leaders are integrating energy-efficiency enhancement, green emission-reduction, green-intelligent full-lifecycle management, smart-shipping solutions, and new-energy technologies into end-to-end offerings. Companies with strong one-stop delivery capabilities are able to provide full-lifecycle support from design to maintenance, thereby enhancing overall competitiveness. As green and intelligent shipping advances, retrofitting existing vessels requires extensive upgrades to propulsion, control, and intelligent systems, imposing high demands on research and development, design and

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engineering capabilities. Ultimately, only companies with mature engineering experience, proven technical capabilities, and strong supply-chain coordination are positioned to gain an advantage in this competitive landscape.

- ***Certification Barrier.*** Shipbuilding and retrofitting activities are subject to stringent certification requirements from major classification societies, ensuring compliance with technical, safety, and environmental standards under international conventions. The certification process is lengthy, costly, and highly technical, involving multiple rounds of design review, testing, and approval. New entrants without sufficient engineering strength, compliance experience, or financial resources face considerable challenges in meeting these standards.
- ***Customer Resource Barriers.*** In the global green shipping equipment and system industry, large shipowners tend to select partners with proven delivery records and reliable performance. Established companies provide stronger assurance in terms of technical execution, delivery certainty, and risk control. New entrants with limited experience face challenges building trust, particularly for high-value and high-risk retrofit or newbuild projects. The industry’s emphasis on long-term relationships further strengthens incumbents’ advantages, making it difficult for newcomers to enter key customer networks and secure large-scale orders without a solid track record.
- ***Strong Supply Chain and Cost Control Capability.*** The ability to source and integrate key components for green shipping technologies has become a core driver of competitiveness. Leading companies achieve lower procurement costs and more reliable delivery schedules through scale advantages and streamlined supply-chain management. China’s mature manufacturing base and comprehensive supply-chain ecosystem provide strong support for the efficient production and assembly of critical components, contributing to reduced costs, shorter lead times, and more predictable project execution. The robustness of this supply chain also allows companies to respond quickly to market changes and customer needs, strengthening their innovation capacity and market position.
- ***Capital and Scale Barriers.*** Green and intelligent shipping product and system require substantial capital investment in technology research and development, equipment procurement, and system integration, and rely on ongoing operational and maintenance support, which places higher demands on financial strength. Established enterprises benefit from scale procurement, supply-chain synergies and accumulated engineering capabilities, forming advantages in both cost and efficiency. In contrast, new entrants, limited by smaller procurement scales and weaker resource access, typically face higher unit costs and lower price competitiveness.

Market Challenges

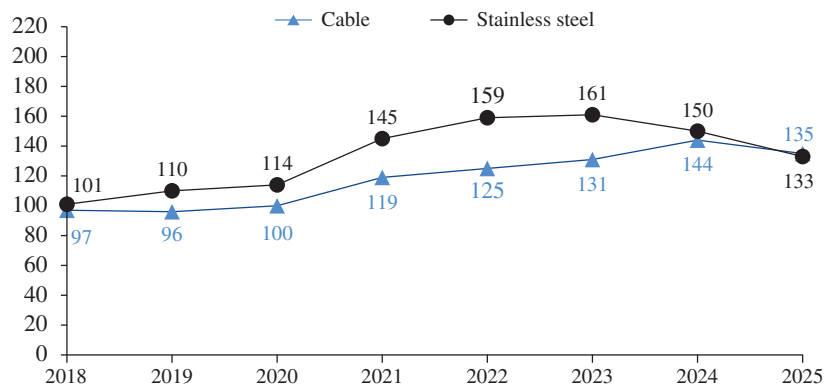
- ***Labor Shortage.*** The growing demand for green shipping equipment and systems faces insufficient multidisciplinary talents. Such talents need proficiency in maritime standards, environmental protection technologies, high-end equipment manufacturing, and international emission compliance. Given the relatively long training cycle required, the talent training system may require further optimization to keep pace with industrial development.
- ***Higher Research and Development Requirements.*** The rapid development of the green shipping equipment and system industry imposes higher requirements on the research and development capabilities of enterprises. With continued upgrades of market demands for technical performance, compliance standards, and economic practicality of equipment, enterprises must continually accelerate technological iteration and enhance the commercialization efficiency of research and development to better adapt to the industry’s development pace.

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Cost Analysis

Stainless steel and cable are key raw materials for shipbuilding and green shipping equipment. In China, the stainless steel price index increased from 101 in 2018 to 161 in 2023, before declining to 150 in 2024 and 133 in 2025, while the cable price index increased from 97 in 2018 to 144 in 2024, before declining to 135 in 2025. The upward trend from 2021 to 2023 was primarily driven by supply chain disruptions during public health incidents. Looking ahead, stainless steel price and cable price are expected to remain stable, influenced by upstream alloy metal price and copper price, respectively.

Price Index of Stainless Steel and Cable in China (2018-2025)



Note: The price index of stainless steel and cable in 2012 (base year) was 100.

Sources: Federation of Industry and Commerce, China Insights Consultancy

SOURCES AND RELIABILITY OF INFORMATION

CIC was commissioned to conduct an analysis of, and to report on global green shipping equipment and system industry at a fee of RMB900,000. The commissioned report was prepared by CIC independent from the influence of the Company and other interested parties. CIC’s services include, among others, industry consulting, commercial due diligence, and strategic consulting. Its consulting team has been tracking the latest market trends in multiple business sectors, including the consumer goods, enterprise services, transportation, internet, entertainment, environment, industry, energy, chemicals, healthcare, agriculture, and finance, and has the relevant and insightful market intelligence in the above industries.

During the preparation of the commissioned report, CIC conducted both primary and secondary research using a variety of resources. Primary research involved interviewing key industry experts and leading industry participants. Secondary research involved analyzing data from various publicly available data sources, such as National Bureau of Statistics of China and International Maritime Organization. The information and data collected by CIC have been analyzed, assessed and validated using CIC’s in-house analysis models and techniques.

The market projections in the commissioned report are based on the following key assumptions: (i) the global overall social, economic and political environment is expected to remain stable during the forecast period; (ii) there is no extreme force majeure or unforeseen set of industry regulations in which the market may be affected in either a dramatic or fundamental way; and (iii) relevant key industry drivers including economic and cost-driven demand for energy-efficiency investment and increasing demand for existing aged fleet renovation are likely to drive the market during the forecast period.