SHANGHAI ELECTRIC 上海电气

NAVIGATING NEW FRONTIERS WITH NEW QUALITY PRODUCTIVE FORCES

STRENGTHENING COMMITMENT TO MARINE ENVIRONMENTAL PROTECTION IN THE ERA OF GREEN SHIPPING

EDITOR'S WORDS

EXPERIENCE IS THE BEST ARGUMENT

How popular is DL? In 2023, DL had a revenue of 10.7 billion yuan and a net profit of 140 million; in the first half of 2024, its turnover had reached 5.77 billion yuan. These two sets of data are evidence enough. The fundamental reason for DL's popularity is its meticulous service, exemplified by "draining the water before weighing the prawns" "lavish fruit cutting" "door-to-door return and exchange of goods" "18 free services" and so on.

Where does it choose to provide such elaborate service? Is it the wisdom of the company's top management or the suggestion of external consultants? The answer lies in the experience of frontline staff.

In 2008, DL set up the "job practice group", which is supported by the "job practice standards", to implement the fine management. To refine the standards, the group draws on the feedback of front-line staff and constantly makes revisions.

"Experience is the best argument," said British philosopher Francis Bacon, arguing that concrete experience gained through observation and experimentation is the basis for constructing and understanding knowledge. Over the next 400 years, companies have prioritized the accumulation and sharing of experience. As an intangible asset of enterprises, experiences play an irreplaceable role in improving efficiency, reducing costs and enhancing competitiveness.

The paths to success are varied. In the case of DL, it is its insight and understanding of "human nature", its unique business philosophy and culture, and its openness to learning, for example, the classic cases of the Harvard Business School or the management standards of Europe, the United States, Japan and South Korea. These have empowered its business.

Today, globalization has created new business models and market rules that require new, responsive and agile management and learning methods. With the emergence of AIGC, we need to re-examine the content and nature of work, and clarify which tasks are for AI, and which are for humans. Ultimately, organizations need more than just experience. It requires the engagement of each and every employee. Employees can make the most of their experience and turn these intangible assets into real productivity and creativity, and help companies achieve more breakthroughs.

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NEWS OVERVIEW

Shanghai Electric Take Parts in Pioneering R&D on Integrated Fast Reactor

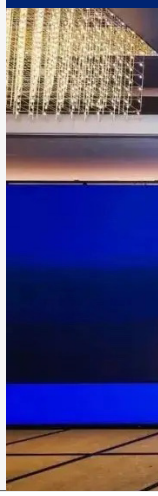
On August 27, the launch ceremony for the Integrated Closed-Cycle Fast Reactor Nuclear Energy System (Integrated Fast Reactor) Innovation Consortium was held at the China Institute of Atomic Energy, guided by the State-owned Assets Supervision and Administration Commission (SASAC) of the State Council. During the event, ten key consortium members, including Shanghai Electric, collectively signed a commitment letter to advance research and development on the integrated fast reactor. Following its establishment, the consortium will actively work to include the integrated fast reactor into the list of national major scientific and technological projects. The first demonstration project is slated for completion around 2035, with the goal of demonstrating its commercial application.

Shanghai Electric Wind Power Group Ranks First in Offshore Wind Power Operational Performance

In accordance with the Benchmarking and Evaluation Management Measures for Production and Operation Statistical Indicators of Wind Farms in China (2020), the China Electricity Council's Technology Center has recently released the 2023 benchmarking results for operational performance indicators within the wind power industry. Shanghai Electric Wind Power Group Co., Ltd. (Wind Power Group) ranked first in the offshore sector for turbine availability among the leading wind turbine manufacturers nationwide. Additionally, the company has expanded its reach into four new benchmarking sectors, marking an increase in turbine a ilability compared to the previous year, and now holds the fourth place. Furthermore, the number of Wind Power Group's wind farms recognized as top-performing farms has steadily increased since last year. The company now boasts nine 5A-rated wind farms, with 11 new sites added to this prestigious list, representing all nine major regions of the country.

Shanghai Electric Wins Contracts for Air-Cooled Units in Four Sections of Two Saudi Projects

SHANGHAI ELECTRIC-SPX Engineering & Technologies Co., Ltd. recently secured contracts for air-cooling systems in four sections of the Taiba 2 and Qassim 2 gas-fired combined cycle power plants in Saudi Arabia, with a total contract value exceeding 1 billion yuan. Each plant is designed with a generation capacity of 1,800 MW, with construction set to complete by 2027. This project represents the first application of W-Style ACC technology in large-scale power generation worldwide. Once operational, these plants will become flagship projects in the Middle East, further boosting Shanghai Electric's differentiated competitive advantage in the international market.



Shanghai Electric Maintains Position of Asia's Top 100 Brands

On September 25, the World Brand Lab unveiled its "Asia's 500 Most Influential Brands of 2024" list during the Asia Brand Summit. Shanghai Electric secured the 91st position on the list, marking a one-place improvement compared to the previous year's ranking. As a leader in China's advanced equipment manufacturing sector, Shanghai Electric has consistently prioritized brand building and value enhancement, solidifying its strong reputation. Through ongoing technological innovation, alignment with national strategies and market demands, comprehensive brand-building initiatives, and global development efforts, Shanghai Electric has secured a spot among Asia's 500 Most Influential Brands for nine consecutive years.

Shanghai Electric Recognized on Two Key Industry Rankings

On September 11, the China Enterprise Confederation (CEC) and China Enterprise Directors Association (CEDA) jointly released the "Top 500 Chinese Enterprises" list for the 23rd consecutive year. Shanghai Electric Holdings Group Co., Ltd. secured the 182nd spot, driven by its impressive 2023 revenue of nearly 143 billion yuan. Additionally, the 2024 "Top 100 Shanghai Enterprises" list was recently unveiled, where Shanghai Electric ranked 19th overall. The company also won the 7th place on the sub-list of the "Top 100 Manufacturers in Shanghai".

Shanghai Electric Contributes to the Commissioning of Two Major Power Projects

Shanghai Electric Power Generation Group recently achieved the successful commissioning of two major power units: Unit 3 of China Coal Xinji Energy's Banji Power Plant Phase II project and Unit 5 of CHN Energy Zhejiang Branch's Zhoushan Power Plant Phase III expansion project. Both units successfully completed their 168-hour full-load trial runs, demonstrating stable operation and satisfactory performance metrics. The Banji project is a key part of Anhui Province's "14th Five-Year Plan" aimed at securing reliable power supply. It plays a crucial role in addressing power shortages during both the 14th and 15th Five-Year Plan periods, ensuring consistent electricity for northern Anhui and supporting the region's high-quality economic and social development. Similarly, the Zhoushan project is a major initiative within Zhejiang Province's "14th Five-Year Plan" and part of the "1,000 Key Projects with 1 Trillion Yuan Investment" initiative. Once operational, it will significantly alleviate power shortages in the province and enhance electricity supply capacity across the Yangtze River Delta region.

NEWS OVERVIEW

First Batch of Wind Turbines for Hai Anh Wind Farm in Vietnam Successfully Shipped

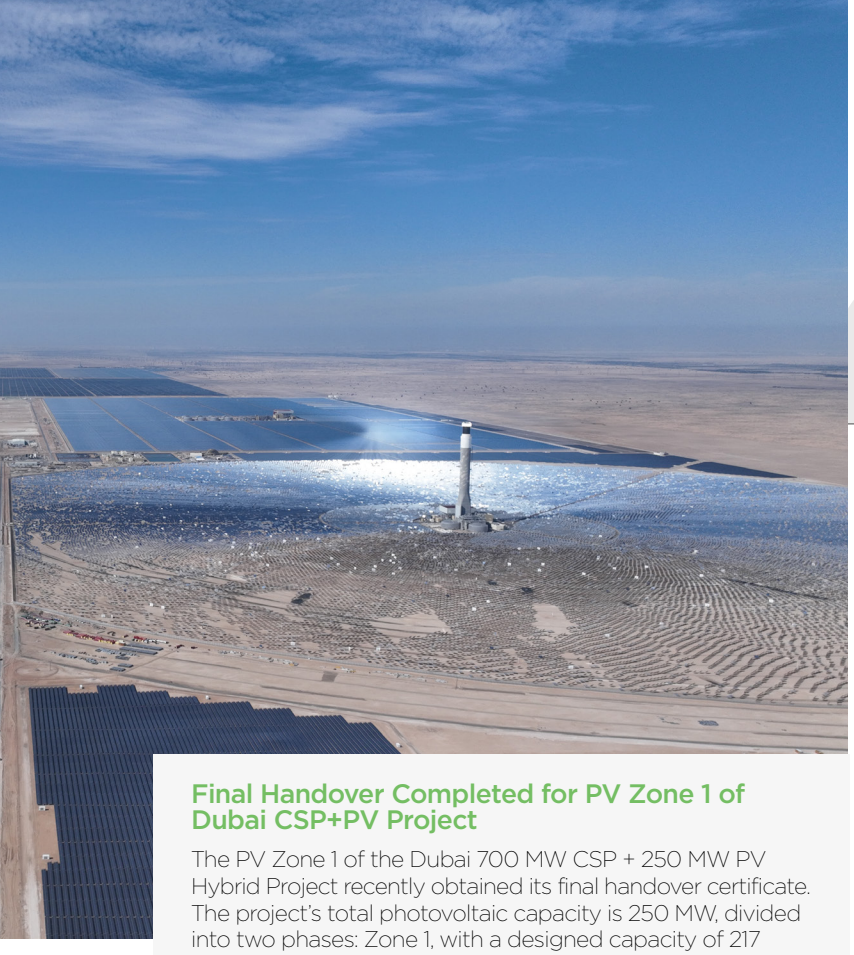
The first batch of wind turbines for the Hai Anh 40 MW Wind Farm in Vietnam, manufactured by Shanghai Electric Wind Power Group Co., Ltd., was recently shipped, marking a significant milestone as Shanghai Electric enters the Southeast Asian offshore wind power market. Following the successful delivery of the Senj Wind Farm project in Croatia, the Hai Anh project represents another major overseas order for the company. Shanghai Electric developed solutions tailored to the unique characteristics and needs of the Vietnamese market, incorporating the latest technological advancements. These turbines are designed to withstand Vietnam's challenging natural environment, ensuring reliable and efficient clean energy generation to support the country's efforts in optimizing its energy structure and promoting sustainable economic growth.

Shanghai Electric Wind Power Supports Launch of Gansu's First 10,000 t/a Carbon Fiber Project

Gansu Province's first 10,000 t/a carbon fiber project, invested by Gansu Nata New Materials Co., Ltd., officially broke ground in Zhangye. The project is jointly implemented by Shanghai Electric Wind Power Group Co., Ltd. and Guangdong Modern High-tech Fiber Co., Ltd. With a total investment of 6 billion yuan, the initial phase will use 3 billion yuan to build four production lines dedicated to automotive carbon fiber products. The project is expected to be completed by the end of the year, playing a pivotal role in establishing a globally competitive carbon fiber and related equipment manufacturing hub in Zhangye's "Carbon Valley" region.

Shanghai Electric Thales Secures Bid for Wuhan Metro Line 3 Signal Project

Recently, Shanghai Electric Thales SEC Transport Co., Ltd. ("Shanghai Electric Thales") secured the bid for the signaling system upgrade for the first phase, and the system integration project for the second phase of Wuhan Metro Line 3, employing its cutting-edge TSTCBTC® 2.0 technology solution. This success follows Shanghai Electric Thales' earlier achievement with the Shanghai Metro Line 6 renovation project, further demonstrating its strong position in urban rail system transformation. The market's continued recognition of the company's expertise in system upgrades highlights its growing reputation in this field. The TSTCBTC® system has been deployed on various lines in China, such as Shanghai Metro Lines 5 and 14, and Zhengzhou Metro Line 6, and has also been used in the full automation upgrade of sections of the Shanghai Metro. Renowned for its maturity, stability, and excellent overall performance, the system has received consistently positive feedback from metro operators across the country.

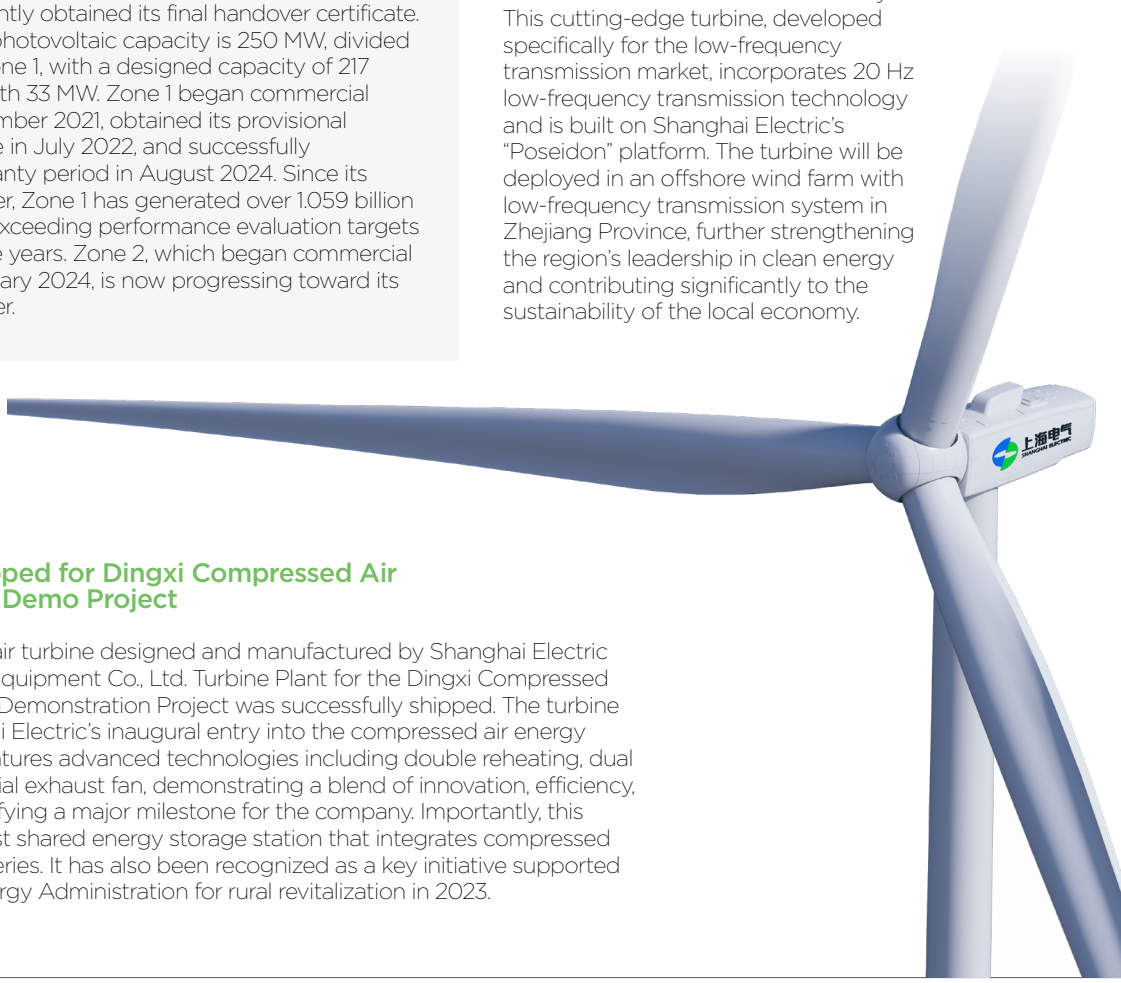


Final Handover Completed for PV Zone 1 of Dubai CSP+PV Project

The PV Zone 1 of the Dubai 700 MW CSP + 250 MW PV Hybrid Project recently obtained its final handover certificate. The project's total photovoltaic capacity is 250 MW, divided into two phases: Zone 1, with a designed capacity of 217 MW, and Zone 2, with 33 MW. Zone 1 began commercial operations in December 2021, obtained its provisional handover certificate in July 2022, and successfully completed its warranty period in August 2024. Since its provisional handover, Zone 1 has generated over 1.059 billion kWh of electricity, exceeding performance evaluation targets for two consecutive years. Zone 2, which began commercial operations in February 2024, is now progressing toward its provisional handover.

World's First 16 MW Offshore Low-Frequency Turbine Successfully Rolled Off Production Line

Recently, the world's first 16 MW offshore low-frequency wind turbine successfully rolled off production line at Shanghai Electric Wind Power's Shantou facility. This cutting-edge turbine, developed specifically for the low-frequency transmission market, incorporates 20 Hz low-frequency transmission technology and is built on Shanghai Electric's "Poseidon" platform. The turbine will be deployed in an offshore wind farm with low-frequency transmission system in Zhejiang Province, further strengthening the region's leadership in clean energy and contributing significantly to the sustainability of the local economy.



Air Turbine Shipped for Dingxi Compressed Air Energy Storage Demo Project

On August 30, the air turbine designed and manufactured by Shanghai Electric Power Generation Equipment Co., Ltd. Turbine Plant for the Dingxi Compressed Air Energy Storage Demonstration Project was successfully shipped. The turbine unit marks Shanghai Electric's inaugural entry into the compressed air energy storage sector. It features advanced technologies including double reheating, dual cylinders, and an axial exhaust fan, demonstrating a blend of innovation, efficiency, and reliability—signifying a major milestone for the company. Importantly, this project is China's first shared energy storage station that integrates compressed air with lithium batteries. It has also been recognized as a key initiative supported by the National Energy Administration for rural revitalization in 2023.

Shanghai Electric Earns A Rating in Hang Seng ESG Ratings and Joins Hang Seng Corporate Sustainability Index Series

Recently, the Hang Seng Indexes Company Limited released its latest sustainability ratings for listed companies, announcing that Shanghai Electric has been upgraded from an A- to an A rating in its Hang Seng ESG assessment thanks to its outstanding performance in sustainability. For A shares, Shanghai Electric has been included in the Hang Seng (China A) Corporate Sustainability Index, the Hang Seng (Mainland and HK) Corporate Sustainability Index, and the Hang Seng (China A) Corporate Sustainability Benchmark Index for two consecutive years. Additionally, for H shares, it has also been included in the Hang Seng (Mainland and HK) Corporate Sustainability Index and the Hang Seng Corporate Sustainability Benchmark Index. These changes will take effect on September 9 this year.

Shanghai Electric actively adheres to ESG principles, aiming to support national strategies such as the "Dual Carbon" goals for carbon peaking and neutrality and the Belt and Road Initiative. The company has established a robust ESG management system, enhanced ESG information disclosure, made significant breakthroughs in sustainable governance, and released ESG reports for eight consecutive years. Guided by the "Dual Carbon" goals, Shanghai Electric is focusing its efforts on emerging energy sectors, including wind, solar, storage, and hydrogen, thereby promoting development in sustainable energy and low-carbon technologies.

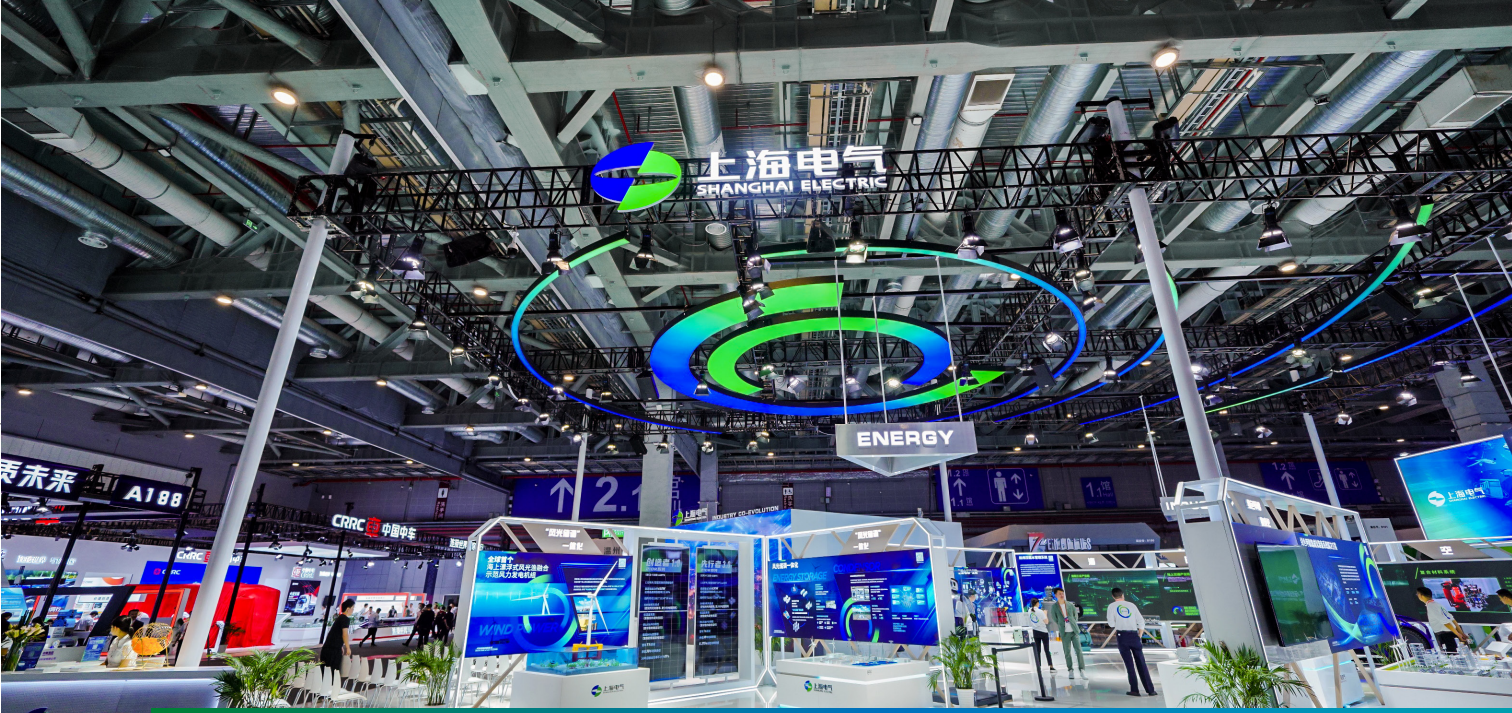
In the traditional energy sector, Shanghai Electric leads through continuous technological innovation, maintaining a world record for the lowest coal consumption in efficient, clean coal-fired power generation. The company is also accelerating the construction of new power systems and optimizing the integration of coal-fired power and new energy to promote integration of generation, grid, load, and storage. This approach aims to achieve coal savings and reduce carbon emissions in power generation, facilitate deep peak regulation, thermoelectric decoupling, and efficient heating, and assist coal-fired power plants in transitioning towards carbon reduction and efficiency enhancement.

Regarding corporate governance, Shanghai Electric emphasizes transparency and ethical practices, strengthens internal compliance, establishes clear and effective communication channels, and safeguards shareholder rights. The company adheres strictly to legal and regulatory requirements for corporate governance, creating an efficient governance structure composed of the General Meeting of Shareholders, the Supervisory Board, the Board of Directors, and Management. Several governance committees, including the Strategy Committee, Compensation Committee, Nomination Committee, and Audit Committee, are established under the Board to ensure compliance and transparency in corporate operations.

In corporate social responsibility, Shanghai Electric actively fulfills its commitment to social welfare through initiatives that support rural revitalization and improve living conditions in impoverished communities. For instance, the Wuhe Power Plant, which Shanghai Electric helped construct, processes biomass fuel, reducing CO_2 emissions by 150,000 tons annually while increasing local farmers' income by nearly 90 million yuan and creating job opportunities for over 1,500 people.

In recent years, Shanghai Electric's ESG achievements have garnered widespread recognition from the market and authorities. The company has maintained an MSCI ESG rating of A and has been featured in the "2023 ESG Excellent Practice Cases of Chinese Public Companies" by the China Association for Public Companies, as well as the "Yangtze River Delta ESG Pioneer 50 (2024)" list released by China Media Group.

Through ongoing efforts to advance ESG initiatives, Shanghai Electric not only enhances its social image and brand value but also strengthens its core competitiveness and social influence, achieving comprehensive value creation across economic, social, and environmental dimensions. Looking ahead, Shanghai Electric will continue to implement ESG principles, actively support China's "Dual Carbon" goals, enhance governance across various areas, steadily pursue high-quality development, and consistently increase corporate value to create greater value for society.



Shanghai Electric Spearheads "Industrial Evolution" with Breakthrough Technologies at the 2024 CIIF

On September 24, themed "New Industrialization & Advanced Productivity", the 24th China International Industry Fair (hereinafter referred to as "CIIF") kicked off at the National Exhibition and Convention Center (NECC) Shanghai.

Shan Zhongde, Vice Minister of MIIT, Gong Zheng, Deputy Secretary of Shanghai Municipal Party Committee and Mayor of Shanghai, and other leaders toured the exhibition halls and visited the exhibition area of Shanghai Electric SHANGHAI-FANUC Robotics Co., Ltd.* (hereinafter referred to as "Fanuc"). Accompanied by Wu Lei, Secretary of the Party Committee and Chairman of Shanghai Electric Group, they listened to the progress of Fanuc* in industrial robot research and development, intelligent manufacturing solutions, etc., and learned about the innovative achievements of Shanghai Electric in intelligent manufacturing.

As a key representative of CIIF, Shanghai Electric built three chapters of "ENERGY-INDUSTRY-FUTURE" at this year's fair, following its "Industrial Evolution", linking energy supply with industrial development and the future of science and technology. They reflected Shanghai Electric's insight into the new industrialization, its strategic layout and its practical action in promoting the continuous development and innovation of the global industry.

On the morning of that day, Jia Tinggang, Vice President of Shanghai Electric, attended the theme conference of Shanghai Electric and witnessed the release of SEunicloud industrial internet platform 5.0.

In the product release session, Shanghai Electric focused on the core products that serve the large-scale industry and the special and sophisticated industrial basic parts. It successively released the green methanol integrated equipment system solution, the world's largest capacity offshore floating platform generator, gas turbine big data center and Ai+SIMPLE intelligent operation and maintenance platform and environmentally friendly new refrigerant R290 high efficiency electric compressor for new energy vehicles, which are the four major industrial innovations.

To fully interpret the brand positioning of "the world's leading provider of industrial-grade green and intelligent system solutions", the comprehensively renewed E-solution branded system solutions released at this year's CIIF are an integrated and visual display of Shanghai Electric's solutions in all application scenarios.

At the Fair, Shanghai Electric also demonstrated its innovative achievements in various fields through special "hydrogen energy" media conference, product roadshows, livestreaming and other diversified means.

Six Shanghai Electric Innovations Earn Recognition from Leading Industry Organizations

Recently, six of Shanghai Electric's technological innovations were recognized by the Chinese Society of Power Engineering, underscoring the company's strong expertise in energy equipment and advanced integrated system technologies. Among the recognized achievements, the "Technical Conditions for Heat-Resistant Steel Castings for Ultra-Supercritical Steam Turbines (JB/T 14047-2021)" was rated as internationally leading. This breakthrough addresses a critical gap in both domestic and international standards, enhancing steam turbine technology and driving progress in China's high-end energy equipment industry, with significant economic and social benefits. The achievement was rated as internationally leading. Additionally, the "Energy-Saving and Carbon-Reduction Smart Ammonia Injection System" was rated as internationally advanced. Four other green and low-carbon technologies were also recognized by the expert panel, including the "Biomass Gasification Coupled Green Hydrogen-to-Green Methanol System", the "660MW Double Reheat Unit Intelligent Boiler Digital Twin System", the "600MW Ultra-Supercritical Double Reheat Boiler Technology for Efficient Byproduct Gas Utilization", and the "High-Parameter, Large-Flow Steam Supply Unit with Molten Salt Energy Storage for Deep Peak Shaving".

Successful Development of the First Set of Domestically Produced 1000 MW Nuclear Power Generator Retaining Ring Forgings

Recently, Shanghai Electric Power Generation Equipment Co., Ltd. Generator Plant (hereinafter referred to as "Shanghai Generator Plant"), together with China Nuclear Power Engineering Co., Ltd. and Deyang Wanxin, jointly developed the first set of domestically produced 1300MW nuclear power generator retaining ring forgings, which successfully passed the acceptance test of a group of experts composed of authoritative persons from CGN, Shanghai Jiao Tong University, and Shanghai Generator Plant.

They believed that the retaining ring forgings meet the requirements of the technical agreement for trial production under the strict testing of both the supply and demand sides, and some of the performance indexes significantly exceed the technical requirements, reaching the production level of imported retaining ring forgings, marking a great breakthrough in the localization of 1000MW nuclear power retaining ring forgings.

1000MW nuclear retaining ring forgings are the key for nuclear power units, the diameter of which is much larger than that of conventional thermal power retaining ring forgings, and its cold expansion deformation and uniformity control is much more difficult, which is the bottleneck problem in the localization of nuclear power units. In March 2023, Shanghai Generator Plant, China Nuclear Power Engineering Co., Ltd. and Deyang Wanxin set up a joint development team to carry out the research and development of 1300MW nuclear generator retaining ring forgings at CGN Lufeng nuclear power project.

The successful development of the first set of domestically produced 1300MW nuclear generator retaining ring forgings not only breaks the long-standing foreign technological monopoly in the field and promotes the independent development of China's nuclear power industry, but also lays the foundation for the development of 1500MW nuclear retaining ring forgings.

Double Bliss for Shanghai Electric's GAS TURBINE MARKET

Good news came from the gas turbine market. Shanghai Electric won the bid for two small F-class gas turbine island units and long-term maintenance services for the Wanxiang Xiaoshan natural gas-fired power plant, as well as two large F-class heavy-duty gas turbine island units and furnace island units and long-term maintenance services for the Huaneng Tai'an project.

The owner of Wanxiang Xiaoshan project is Wanxiang Group Shunfa Hengneng Corporation. The project is equipped with Shanghai Electric AE64.3A small F gas turbine and supporting generator, which can supply electricity and heat for Xiaoshan Jiangnan Science and Technology City's Innovation Center after completion, and it is estimated to save 220,000 tons of standard coal and 350,000 tons of carbon annually, which will greatly promote the local reduction of energy consumption and help achieve the "dual-carbon" goals.

The Huaneng Tai'an project is one of the first "14th Five-Year Plan" demonstration projects for heavy-duty gas-fired units in Shandong. Equipped with Shanghai Electric's AE94.3A F-class gas turbine and supporting combined-cycle equipment, with an efficiency increase of more than 60 percent, it reduces carbon emissions by 60 percent compared to ultra-clean coal-fired units of the same capacity. The unit features a median single-shaft arrangement with axial exhaust and a self-synchronizing clutch for fast and frequent peak shifts, and its special high-capacity vapor extraction technology supports large-capacity industrial vapor extraction.

Major Breakthrough for Domestic Equipment:

Successful Development of New-Gen High-Power Dual-Drive Mill Motors

On July 6, the "Shanghai Electric-Tsinghua University Industry-Academia-Research Integration and Innovation Forum on High-end Equipment" was successfully held at Shanghai Electric Group Co., Ltd. Central Academe. Mr. Dong Jianhua, member of the Party Committee and Executive Vice President of Shanghai Electric Group, and Ms. Yang Hong, Vice President of Shanghai Electric Group, attended the forum.

In line with the spirit of the National Science and Technology Conference, the National Science and Technology Award Conference, the Academician Conference of the Chinese Academy of Sciences and the Academician Conference of the Chinese Academy of Engineering, the forum aims to effectively implement the instructions of General Secretary Xi Jinping, to "strengthen the enterprise-led in-depth integration of industry, academia and research, clarify the goals, and improve the transformation of scientific and technological achievements and the level of industrialization." It will resolutely implement the demand of Chen Jining, Secretary of Shanghai Municipal Party Committee, to "be a good and resolute action party for deepening the reform, strive to take the lead in the transition to high-end, intelligent, and green development, boldly explore new paths in accelerating the development of new quality productive forces, and be a pioneer in achieving high-level technological self-reliance and self-improvement." With Shanghai Electric's rich industrial scene and industrial strength, supported by Tsinghua University's technology and talent advantages, the forum will promote the further integration in the industrial chain, innovation chain, talent chain and education chain.

China's First 300MW F-Class Heavy-Duty Gas Turbine Successfully Ignited

On October 7, China's first domestically developed 300MW F-class heavy-duty gas turbine was successfully ignited in Shanghai, marking a major breakthrough in the country's high-end energy equipment sector.

The 300MW F-class gas turbine boasts the highest power output and technological class among domestically developed turbines, with specifications on par with international mainstream F-class turbines. The project integrates cutting-edge technologies, materials, and processes, which are expected to drive advancements in the core disciplines of gas turbine technology and promote industrial progress. This achievement is of great importance for enhancing China's energy security and supporting its green development goals.

Specifically, Shanghai Electric Gas Turbine Co., Ltd. led the detailed design, supply, installation, commissioning and guidance of all auxiliary systems for the gas turbine. These systems, particularly the fuel system, lubrication and jacking oil systems, and industrial control design, incorporate groundbreaking innovations compared to the company's conventional units.

Six Shanghai Electric Companies Included in Shanghai's 2024 First Batch of Green Manufacturers

Green Factory

Shanghai Najie Complete Electric Co., Ltd.

Shanghai Huapu Cable Co., Ltd.

Carrier China Air Conditioning & Refrigeration (Shanghai) Co., Ltd.*

Hitachi Energy Shanghai Electrical Transformer Co., Ltd.*

Green Supply Chain Management Enterprise

Shanghai Electric Group Shanghai Electric Machinery Co., Ltd.

Siemens Circuit Protection Systems Ltd., Shanghai*

Recently, the Shanghai Municipal Commission of Economy and Informatization announced the first batch of enterprises selected for the 2024 Green Manufacturer List. Among the enterprises, four subsidiaries of Shanghai Electric were recognized as "Green Factories", while two others earned the title of "Green Supply Chain Management Enterprises".

As a key player in advancing new power systems in alignment with China's "Dual Carbon" goals for carbon peaking and neutrality, Shanghai Electric is committed to seizing new opportunities and fostering development momentum. In recent years, the company has prioritized green and low-carbon initiatives alongside digital transformation. By harnessing digital and AI technologies, it has been driving the evolution of the automation equipment, chemical machinery, and industrial infrastructure sectors toward high-end, intelligent manufacturing, making significant progress in modern industrialization.

With this latest recognition, Shanghai Electric now boasts a total of 29 green factories, including 18 recognized at the national level, 4 green supply chain management enterprises, and 8 green product series. Looking ahead, Shanghai Electric will continue to enhance its green manufacturing demonstration efforts and capabilities. By maximizing the impact of its green manufacturing model, the company aims to further contribute to advancements in the industry and the region's progress toward achieving carbon peaking and neutrality goals.

Major Breakthrough in the Localization of Marine Engineering Core Equipment: Delivery of Wind Power SOV

On August 16, ordered by Shanghai Electric Wind Power Group Co., Ltd.(hereinafter referred to as "Shanghai Electric Wind Power") to be built by ZPMC, Zhizhen 100 and Zhicheng 60, Asia's first wind power SOVs, were named and delivered in Qidong, Jiangsu Province.

Zhizhen 100 has a length overall of 93.4 meters, a beam of 18 meters, a depth of 7.6 meters and a design service speed of 12.3 knots; Zhicheng 60 has a length overall of 72.76 meters, a beam of 17.5 meters, a depth of 7 meters and a design service speed of 12 knots. These two special high-efficiency vessels can carry out continuous O&M operations in deep and distant sea wind farms in an efficient, green, intelligent and safe manner. Equipped with a DP2 power positioning system, they not only have large cargo space to store wind turbine spare parts and large loading capacity, but also possess a self supportability of more than 30 days in unrestricted navigation areas.

They also have an active wave compensation trestle, a key equipment which can overcome the impact of wave-induced hull displacement and attitude changes, realizing efficient transfer of personnel and O&M spare parts and wind farm maintenance operations under harsh sea conditions, and significantly extending the window period for vessel operation and maintenance. Furthermore, the two vessels are equipped with folding-arm offshore cranes, O&M submarines, boarding racks and aluminium alloy helicopter platforms. Adopting diesel-electric and lithium battery hybrid solutions, they are equipped with all-electric propulsion systems and DC bus distribution systems, and have obtained the hybrid and green ship classification from the China Classification Society (CCS). In addition, they are equipped with advanced intelligent O&M systems, which can effectively improve the efficiency of O&M and reduce the intensity of work.

It is worth mentioning that the active wave compensation trestle is the most critical core equipment for wind power SOVs. Through the joint efforts of the technical teams of Shanghai Electric Wind Power and ZPMC, Zhicheng 60 successfully applied the first retractable trestle with wave compensation function in China. It provides two connection modes, namely, top leaning and hovering, for the transfer of personnel or equipment and maintenance operations in harsh sea conditions, and the safety performance and working efficiency are much higher than those of conventional operation and maintenance vessels, which is a major breakthrough in the localized core equipment for marine engineering.

The offshore wind power SOV can greatly alleviate the pain points of the current Chinese mainstream offshore transportation vessels, such as short window period, operation interruption, frequent trips, low efficiency, poor applicability to harsh sea conditions, etc., and provide strong support for the operation and maintenance of deep and distant sea projects. It is currently one of the best solutions for deep and distant sea operation and maintenance in the world and a forward-looking step taken by Shanghai Electric Wind Power to exploit the deep and distant sea.

Shanghai Electric Wind Power's Turbines Successfully Withstand Super Typhoon "Yagi"

On September 6, around 16:00, Super Typhoon "Yagi", the 11th typhoon of the year, made landfall in Wenchang, Hainan, with maximum wind speed exceeding 65 m/s, representing the strongest autumn typhoon ever recorded to strike China. After landfall, the typhoon moved northwest, affecting areas across Hainan, Guangdong, and Guangxi provinces.

The GEG Wailuo Phase II Offshore Wind Farm, located in Xuwen County, Zhanjiang, Guangdong, successfully withstood the typhoon's powerful impact. The project deploys 32 offshore 6.25 MW typhoon-resistant turbines from Shanghai Electric Wind Power. Despite the typhoon's center passing less than 100 kilometers from the wind farm and maximum wind speed reaching 50 m/s, all turbines remained intact, demonstrating the advanced technology and high reliability of Shanghai Electric's wind power solutions.

In response to the typhoon, Shanghai Electric Wind Power mobilized an emergency response team 36 hours prior to landfall. Collaborating closely with the project management team and client, they developed a comprehensive response plan. Following the client's request, the turbines were switched to typhoon mode 24 hours in advance. The team also implemented additional safety measures, optimizing nacelle positioning to minimize load and ensure operational safety during the typhoon.

Throughout the typhoon, Shanghai Electric Wind Power's team monitored the turbines in real-time, using remote control to maintain typhoon mode, allowing the turbines to automatically align with the wind speed while staying connected to the grid. The turbines performed exceptionally, successfully completing their mission to withstand the typhoon.

Meanwhile, Shanghai Electric Wind Power's onshore turbines at the Guangxi Bobai Sheguangzhang Wind Farm, located within Typhoon Yagi's 10th-level wind radius, recorded maximum wind speed of 34.15 m/s. The 44 onshore turbines achieved a remarkable availability rate of 99.79% during the typhoon.

To date, Shanghai Electric Wind Power Group's turbines have successfully withstood more than 10 typhoons, including "Chanthu", "In-Fa", "Mawar", "Hinnamnor", "Saola", "Muifa", "Talim", and "Haikui", across coastal regions of Guangdong, Zhejiang, Jiangsu, and Fujian, underscoring the reliability and durability of its technology in ensuring uninterrupted operations during extreme weather conditions.

COVER TOPICS

With a highly competitive landscape and modern, comprehensive value chains, the shipbuilding industry is crucial to both the national economy and national security. Recently, the global shipbuilding market has shown signs of recovery. According to statistics from the China Association of the National Shipbuilding Industry, 2023 has seen increases in output, new orders, and holding orders. China's shipbuilding sector, a pioneer among Chinese industries in the global market and possessing notable competitive strength, has established itself as a leading force among the world's shipbuilding nations.

As technology advances and environmental awareness increases, the industry is transforming into a more advanced, high-end, and sustainable domain with a global perspective. This shift is driving upgrades across a diverse range of related technologies throughout the value chain. Capitalizing on the momentum of the shipping industry's green transition, Shanghai Electric is leveraging its robust industrial foundation and strategic positioning in key areas—such as heavy castings and forgings, marine engine crankshafts, pumps and valves, ballast water management systems (BWMS), ballast water treatment equipment, anti-corrosion and anti-fouling systems, marine sewage treatment devices, propulsion systems, and BOG re-liquefaction systems—to showcase its significant development potential.

NAVIGATING NEW FRONTIERS WITH NEW QUALITY PRODUCTIVE FORCES

STRENGTHENING COMMITMENT TO MARINE ENVIRONMENTAL PROTECTION IN THE ERA OF GREEN SHIPPING

CYECO'S ENVIRONMENTAL PROTECTION PROGRAMS PROMOTE "LOW-CARBON AND GREEN" DEVELOPMENT OF GLOBAL SHIPPING

Deeply involved in the marine environmental protection market, it has installed more than 2,000 sets of marine support equipment at home and abroad, with

49

independent patents.

News background

The International Maritime Organization (IMO) has developed and implemented the International Convention for the Control and Management of Ships' Ballast Water and Sediments 2004 (the "BWM Convention"). It aims to prevent, reduce and ultimately eliminate harm to the environment, human health, property and resources caused by the transfer of harmful aquatic organisms and pathogens through the control and management of ships' ballast water and sediments. It is the world's first international convention to address the invasion of alien species carried by ballast water. China joined the BWM Convention in 2018, and ballast water testing of ships helps protect the China's aquatic ecosystems and promote the healthy and sustainable development of the shipping industry.

China's accession to the BWM Convention is a new challenge for the country's ballast water inspection and for shipping companies in adapting to the new requirements. Effective management of ships' ballast water is becoming very important. Vessels use ballast water to regulate the ship's draught and center of gravity, ensuring the ship's safety. When ballast water is loaded, the pathogens in seawater and marine organisms are carried into the ballast tanks together. The discharge of ballast water during the ship's voyage to its destination can be a source of biological invasion and the spread of pathogens.

Against this backdrop, Shanghai Electric Cyeco Environmental Technology (hereinafter referred to as "Cyeco") has emerged. Founded in 2007 and guided by the corporate spirit of continuous pioneering, innovation and hard work", Cyeco has been tested by time and the market. With a wealth of experience, it is resolutely moving forward.

The year 2014 is a milestone for the company. Due to its outstanding market performance and development potential, the "small and promising company" attracted the attention of the Shanghai Electric Group, which acquired 65% of its shares to become its controlling shareholder. As an official member of the Shanghai Electric family, Cyeco specializes in the research, development, manufacturing and service of land-based and marine environmental protection equipment. Since then, with strong resource support and synergistic development, the company has entered the fast lane of development.

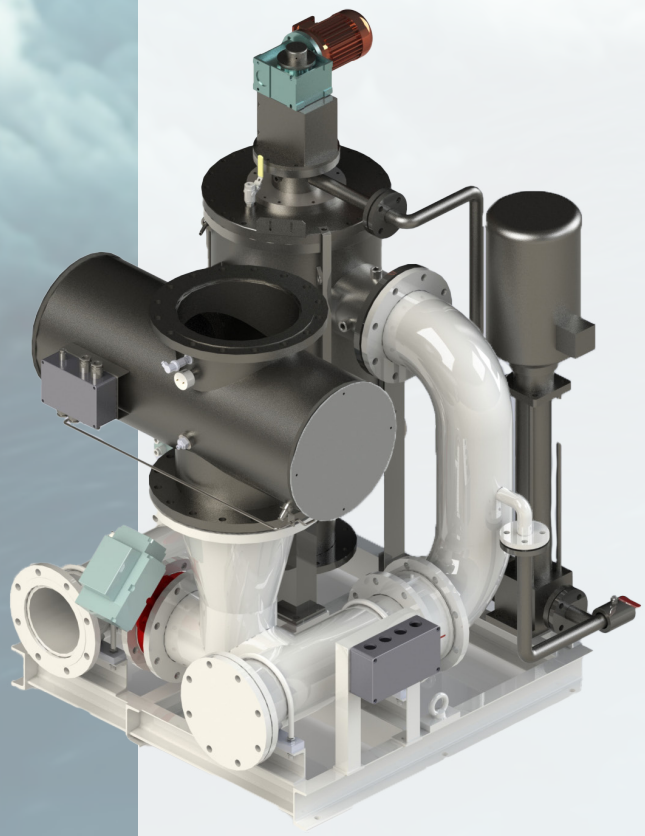
SHANGHAI ELECTRIC BALLAST WATER TREATMENT SYSTEM ON BOARD "XUE LONG"

Over the years, Cyeco has manufactured innovative and world-leading products in ballast water treatment. These self-developed technology-rich products, with superior performance and strong market competitiveness, are highly favored by customers, and meet their ever-changing needs.

The red and white Xue Long is one of the most well-known ships in China. It is China's largest polar research ship and the first ice-breaking ship in the polar region, responsible for polar scientific research and supply transportation. "Xue Long" has been to the South Pole 40 times and the North Pole 6 times, and has traveled over the five oceans.

The in-service "Xue Long" was originally a multi-purpose transport vessel for the Arctic region. After an upgrade, it has improved on-board automation, been equipped with multiple sets of scientific research equipment, adjusted the layout of laboratories, renovated communications and navigation equipment, and redesigned living facilities. In 2014, "Xue Long" participated in the search and rescue of Malaysia Airlines Flight MH370.

In November 2023, equipped with Shanghai Electric's self-developed Cyeco ballast water treatment system, "Xue Long" went to Antarctica to carry out its 40th scientific research mission. In fact, it is a torture for the workers of Cyeco to work in a stuffy and sweltering room, especially when the temperature reaches 40 or 50 degrees in the summer. "Fortunately, our equipment is small, compact and easy to install, which makes it particularly suitable for retrofitting to ships which have already been commissioned," a technician at Cyeco said.



Statistics show that, up to now, Cyeco has installed the Cyeco ballast water treatment system on many ships, including “Xue Long” and “XINJIANZHEN Liner”, and installed more than 2,000 sets of marine support equipment at home and abroad. It has obtained 49 independent patents. Users unanimously praise the equipment for its "safety, compactness, simplicity and reliability".

CYECO ATTENDED SMM AND WON IMPORTANT ORDERS

Last month, the globally-anticipated Shipbuilding, Machinery and Marine Technology trade fair (SMM) 2024 opened in Hamburg, Germany. Launched in 1963, it is the world's largest, most professional and influential maritime industry event. At this major event, Cyeco presented the latest technological innovations and marine environmental protection equipment,

And demonstrated its solutions for low-carbon and green development of shipping. Its great performance, solid work ethic, innovation strength and determination in the field of green maritime technology gained recognition from customers.

Cyeco received customers from India, Japan, Malaysia, Singapore, Greece, Indonesia and other countries and had in-depth communications with them, introducing the brand history, equipment advantages and after-sales service.

Cyeco's innovative solutions not only meet the current high environmental standards of the global shipping industry, but also contribute to the sustainable development of the shipping industry. On September 4 local time, Cyeco and a German shipowner signed an order for 10 sets of ballast water management systems (BWMS). The two sides also reached a comprehensive strategic cooperation agreement on shore power systems, carbon capture solutions and other areas. This cooperation marks the further enhancement of Cyeco's influence in the international market, and also lays a solid foundation for the future application of marine environmental protection technology.

Cyeco offers a full range of products as a comprehensive supplier of environmental

protection equipment. In addition to the flagship product BWMS, its CSWB, integrated distributed intelligent sewage treatment device, ICCP, MGPS, etc. are also favored by the industry.

"We offer promises, not just products." As a mixed-ownership enterprise, Cyeco only has more than 60 employees. However, it can generate 180-220 million yuan in annual sales as a "sophisticated and specialized" "little giant" enterprise of Shanghai.

SELF-DEVELOPED TECHNOLOGY RECOGNIZED BY 12 CLASSIFICATION SOCIETIES AROUND THE WORLD

Some people may ask: These compact and high-quality environmental protection products seem to have a technology route that is not overly complex and with a low industry threshold. So why are there not many companies that can enter this niche field? The answer is: Rigorous certification of the international shipping industry is needed.

The USCG Type Approval is regarded as one of the most prestigious certificates in the global marine industry. It requires the system to pass a rigorous testing and evaluation process and meet a series of stringent technical standards and performance requirements. By securing this certificate, the Cyeco system has demonstrated its compliance with the high industry benchmarks, making it a viable and dependable solution that can be widely adopted across the globe.

On June 29, 2023, DNV Group issued IMO and USCG type approval for Shanghai Electric's self-developed Cyeco BWMS. This is the world's first ballast water treatment system with UV technology to receive a T0 Zero Hour Holding Time USCG type approval.

The DNV Group, founded in 1864 and headquartered in Oslo, Norway, is a global leader in professional risk management services. Its purpose is to "safeguard life, property, and the environment" by providing comprehensive risk management and various types of assessment and certification services, including classification services, certification services and technical services. The DNV Group has about 300 branches in 100 countries around the world.

According to Cyeco technical staff, this T0 Zero Hour Holding Time BWMS is launched by Shanghai Electric on the basis of years of research and development and innovation. It achieves discharging ballast water without storage time during the loading and unloading of cargo on board through advanced technology. This not only improves the operational efficiency of ships, but also effectively reduces the pollution of the marine environment.

Cyeco's headquarters covers an area of more than 5,000 square meters, with professional R&D labs, testing platforms, service centers and product exhibition centers, as well as a "6S" manufacturing plant with an area of more than 2,000 square meters. At present, Cyeco has been approved by 12 authoritative classification societies such as IMO, CCS, ABS, USCG-

AMS, LR, etc., and has been successfully installed on offshore vessels, research vessels, bulk carriers, container ships, oil tankers and other types of vessels. The purely physical technology of “dual-stage filtration and ultraviolet inactivation device” is more environmentally friendly, and the innovative marketing model also provides users with more protection and service.

Cyeco, in addition to "safety, compactness, simplicity and reliability”, has achieved T0 Zero Hour Holding Time. It effectively controls the impact of ballast water discharge on the environment and improves the operational efficiency of the ships. The complete system consists of a coarse filter, a fine filter and a UV sterilization unit. The clever combination of compact and modular design concepts not only makes it easy to install on old ships, but also saves a lot of space in the nacelle of new ships. Its UV sterilization unit enables ballast water to be discharged at any time without holding time from the moment of intake or the compliance risk associated with holding time, to make the route operations more flexible, which is welcomed by the domestic and foreign shipowners.

TAILOR-MADE INTEGRATED DOMESTIC SEWAGE TREATMENT STATION FOR CHONGMING

A small “container” in colorful paint and covering an area of about 10 square meters stands quietly in the flowers of Huapiao Village, Chenjia Township. This is the tailor-made integrated domestic sewage treatment station for Chongming by Shanghai Electric Environmental Protection Group. Using this “container”, the water quality can achieve the highest standard.

In 2019, two articles, Chongming Promotes Sewage Treatment, Waste Sorting, Wetland Restoration to Build a World-Class Ecological Island published by The Paper and Chongming as an Example in Yangtze River Grand Protection Program: Clear River and Growing Rare Birds In Dongtan published by Shanghai Securities News, spotlighted Chongming’s construction of a world-class ecological island. The domestic sewage treatment in Huapiao Village, Chongming District by Shanghai Electric was a water treatment demonstration project for the report.

The project is the first rural decentralized water treatment demonstration project and effectively drives the rollout of a national rural decentralized water treatment initiative as part of the Group's market strategy. This “container” is the integrated distributed intelligent domestic sewage treatment unit independently developed by Cyeco.

The demonstration site adopts the new “Internet + Intelligent Pollution Control” model. After household takeover, pipeline network construction, treatment site installation and commissioning, landscaping and other processes, it can collect and

treat sewage from the surrounding 28 households, completely changing the past practice of discharging sewage water directly into the river, which caused the organic matter pollution and eutrophication of the water. As a result, the living environment of Huapiao Village has been improved.

The equipment adopts micro-power efficient biofilm technology and innovatively uses ion exchange resin adsorption phosphorus removal technology. The entire treatment process requires no chemicals, produces no chemical sludge or secondary pollution, recycles phosphorus resources, and improves river eutrophication.

In addition to advanced pollution reduction technology, Cyeco also uses intelligent operation and maintenance management system for unattended long-term trouble-free stable operation of the "container", which can withstand the test of winter temperatures and load surge during the Spring Festival. An intelligent regulatory platform covering the region can achieve automatic data integration, online monitoring and real-time monitoring of water quality.

The demonstration site in Huapiao Village, Chenjia Township has impressed local villagers, the government and the department in charge with great performance, which is a testament to the quality and strength of Shanghai Electric. Cyeco has deployed nearly two thousand sets of integrated rural domestic wastewater equipment, with great economic and social benefits.

IMPROVED TECHNICAL STRENGTH AND MORE ADVANCED PRODUCTS

On July 1, 2024, Wu Lei, Secretary of the Party Committee of Shanghai Electric Group and Chairman of the Board of Directors, pointed out during his inspection tour of Cyeco that Cyeco should continue to focus on scientific and technological innovation to research and develop more advanced, convenient, and excellent products that better meet customer needs in the fierce market competition.

Shanghai Electric is committed to providing China and the world with more efficient and greener energy equipment and industrial equipment through independent and integrated innovation. Furthermore, the Group's worldwide sales and service network provides customers with comprehensive after-sales protection.

As an innovative professional technology company in the field of environmental protection equipment, Cyeco specializes in marine equipment technology research and development. It combines its advantages in the water treatment industry over the past 20 years to provide leading green, low-carbon, intelligent and efficient equipment and solutions for the marine industry. At present, Cyeco's products have been widely used in many fields such as ballast water treatment, dock water treatment, domestic sewage treatment, industrial wastewater treatment, water reuse, new energy for docks, etc., forming a diversified product structure. This multi-field product coverage provides a broad space and strong support for the sustainable development of the enterprise, and meets the diversified needs of customers in different fields.

In the field of industrial wastewater treatment, for example, Cyeco has made a meaningful trial in Shanghai Electric Jiading bearing production base in the past two years, hoping to promote it within the Group. Innovations have also been made in carbon capture, desulfurization and denitrification, and other areas. The goal is to work with more sister units within the Group and achieve win-win results with complementary strengths.

This year marks the third five-year period that Cyeco has joined the Shanghai Electric family. Looking back at the company's development history, the core concept of the company is to focus on customers' needs, develop and innovate, and work hard. In the future, Cyeco will continue to uphold the corporate values, create innovative products that meet customer needs, strengthen Shanghai Electric's leading position in equipment manufacturing, and make greater contributions to technological progress in shipping and environmental protection.

Green shipping will have a still broader prospect. Cyeco, with strong strength in technological innovation, will take more social responsibility in the green and low-carbon development of global shipping.

BOLD AS EVER IN EXPLORATION

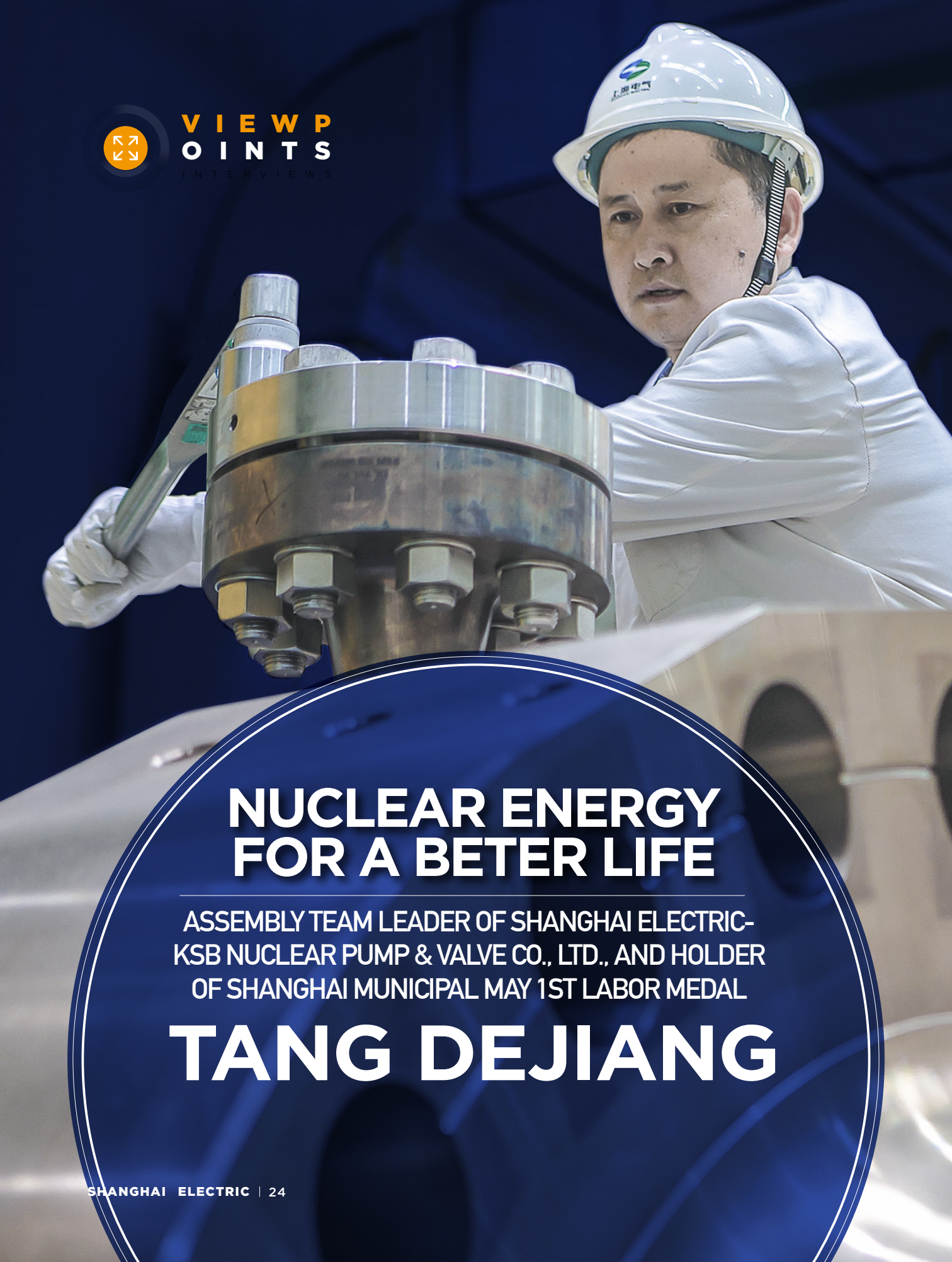
For Cyeco, the biggest pain point and difficulty lie in its late entry into the overseas market. In overseas markets, what it encounters is fierce competition from domestic counterparts. Having to compete with COSCO, SCIC and other large companies, the pressure on Cyeco's 60 or so employees can be easily imagined.

Although Cyeco has achieved good results in all aspects over the years, it never slows down. Cyeco believes that, in order to achieve sustainable development, it is necessary to be vigilant at all times and strictly control project risks. It strengthens technological research and development and enhances the degree of product digitization and intelligence, in order to be at the forefront of the industry. It establishes overseas market channels and actively expands the international business, in order to have a greater space for development.

It benchmarks Huawei in management improvement. It seizes the opportunity and moves the operational planning forward, adhering to the principle of "letting those who are in the thick of battle make decisions". With an iron triangle combat team, it teams up with comprehensive forces to achieve the goals. "Combat on the front line should be undertaken by small teams instead of account managers." The essence of the "Iron Triangle" is to break down the functional barriers between departments for the purpose of the goal, forming a project-centered team operation mode. The teaching of Huawei is that the key point is to learn how to hear the voices of the front line and the customers.

Soberly aware of its pain points and challenges, Cyeco actively listens to the voice of the users. Cyeco now has a global footprint and has partners in more than 50 countries. It is never absent at major exhibitions around the world. It also goes to the local shipyards to meet and negotiate, and has won a number of intent orders.

On the thank you letter from Cyeco to all employees, it is written: "In this life, we are all young and adventurous dreamer-chasers. We are bold as ever in our exploration, despite growing difficulties and obstacles. We get more courageous with every step we take. Solidarity for an ever-green business." Cyeco will surely have an even brighter tomorrow with unity of purpose and active exploration.



NUCLEAR ENERGY FOR A BETER LIFE

ASSEMBLY TEAM LEADER OF SHANGHAI ELECTRIC-KSB NUCLEAR PUMP & VALVE CO., LTD., AND HOLDER OF SHANGHAI MUNICIPAL MAY 1ST LABOR MEDAL

TANG DEJIANG

Shanghai Electric-KSB Nuclear Pump & Valve Co., Ltd. (hereinafter referred to as "KSB") is involved in the power, coal, nuclear and other energy-related sectors, with a strong performance in the water treatment business.

Two product diagrams are prominently hung in the conference room: One is of RUV, a tailor-made reactor coolant pump for the third generation AP/CAP nuclear power plants; and the other is of RSR, a reactor coolant pump for the fused third generation Hualong reactor type. These two products can be regarded as the "treasures of the enterprise" of KSB Nuclear Pumps, as reactor coolant pumps are described as the “pearl on the crown” in the industry. The success of RUV and RSR has been achieved through the dedication of several generations. An embodiment of calm, rigor and meticulousness, and a practitioner of "commitment, integrity, transparency, standardization", Tang Dejiang was involved in the entire development process of these two products.

“NUCLEAR” ENERGY AT THE CORE

A senior fitter, with 29 years of assembly experience and 24 years of experience in assembly production management, Tang Dejiang is a seasoned employee. However, this "assembly master" who has been in the assembly field for many years is actually a fitter who "converted halfway".

Tang Dejiang studied machine tool, and was assigned to the water pump sub-factory to engage in the production of petrochemical civil pumps. In 1995, Tang Dejiang saw the huge development opportunities in Pudong. He decided to leave his hometown and join the general pump division of Shanghai Water Pump Factory.

Here, Tang Dejiang met his “tutor” Ruan Minghui, a seventh-grade fitter in the factory, who led Tang Dejiang on the career path of fitters. Although the fields are different, the theories are similar. Tang Dejiang got started very quickly, as he followed the tutor's teachings, spent a lot of time on the go, doing maintenance, debugging and other service work, and accumulated a wealth of front-line experience.

In 2010, at the age of 35, Tang Dejiang came to KSB and started to engage in the assembly of nuclear pumps for nuclear power plants. With a technician certificate he had obtained earlier, he became the plant's urgently needed “scarce talent”. Tang Dejiang mainly dealt with “nuclear level-1 reactor coolant pump”, which is equivalent to the “heart” of a nuclear island and allows no negligence.

Tang Dejiang received professional training in nuclear safety as soon as he joined the plant, and he could memorize the "Four Principles" and "Two Zero Tolerances". He soon realized that this new job was not just about turning the water pump into a nuclear pump, but also required hardcore engineering and a strong sense of responsibility. “At that time, our factory had only been established for two years, and although the workers were well recruited, the technical talents were hard to find. Because of my experience and excellent skills, I was appointed as the leader of the assembly team.”

TANG DEJIANG

GOOD MANAGEMENT

Although being a team leader is a small leadership role, they had to make a lot of decisions and take on a lot of responsibilities. Tang Dejiang, as the team leader, like a magnet, tightly united everyone in the team, guiding the team in the right direction. Because of his excellent performance, he was also sent to KBS in Germany several times between 2013 and 2017 to participate in the trial production of RUV prototypes. Those several trips to Germany were eye-opening and made Tang Dejiang deeply feel the gap with foreign counterparts.

In Germany, a manufacturing power, instrumental thinking is engraved in everyone's work. For example, when German colleagues are handling things, they require to complete it in one go without being interrupted or discontinued. Their serious and rigorous attitude is admirable. "On their production site, layout management is great. To what extent? Production materials are neatly stacked, and the site is clean and hygienic, which is refreshing to see." After returning from Germany, Tang Dejiang put forward suggestions on the production site. He believed that the smooth production channel and the conspicuous safety signs can minimize safety accidents. As a modern management tool, layout management has long been accepted by KSB employees. With a well-managed shop floor, optimized processes, well-organized logistics and standardized operations, employees now work in greater comfort.

After studying and working abroad for a period of time, Tang Dejiang has made great progress in skills and management. "It is impossible to create a world-class enterprise without world-class management," Tang Dejiang said, "As a team leader, the enterprise's first-line commander, in addition to great technological skills, leadership, organization, coordination and communication skills are also very important. I still have a lot to learn.

Tang Dejiang was rather modest. We intuitively felt his charisma when he summoned the workers to take a group photo. At around 4 p.m., when Lingang shuttle bus was about to depart, many had begun to change work clothes and wash their hands, getting ready to leave work. When he suggested a group photo, everyone, without saying a word, put their work clothes back on and posed for the photo.

TACKLING DIFFICULTIES

Reactor coolant pumps are described as the "pearl on the crown" in the centrifugal water pump industry, and RUV is the brightest one. When Tang Dejiang joined KSB Nuclear Pump, the development of the RUV had just started its development, and he witnessed the whole process of this product evolving from scratch and from failure to success. "I don't know how many times we experienced frustration and disappointment. RUV is too demanding in terms of design, process and materials, and the prototype has been repeatedly tested and disassembled countless times. But I can proudly say that the pass rate of the products we assembled was 100%."

RUV, weighing 99 tons, is a daunting behemoth whether lying down or standing up. When operating, the assemblers often need to work at height, which brings great difficulty to the work. Tang Dejiang clearly remembers that at the end of 2014, after the first test of the RUV, the main bolts were removed as suggested by German

experts. During the removal process, the last set of main bolts could not be loosened. When everyone was at a loss, Tang Dejiang led the team members to continue working. He measured the elongation of the main bolts back and forth on the 9-meter-high scaffolding platform, and then reinstalled all the main bolts into the pre-disassembled parts according to the dismantling sequence, changing the German expert's "four-step dismantling method" into the "five-step dismantling method". In the end, the RUV was successfully dismantled from the test stand. Since then, the "five-step dismantling method" has been followed.

Around 2016, the development of the RUV entered its most critical stage, but for some reason its core component, the thrust bearing, was shedding after start-up. Repeated tests exhausted almost everyone, and in the assembly team, many employees had not gone home for more than 70 hours in a row, and were on the verge of a mental breakdown. Later, through technical argumentation, the experts felt that the carbon fiber material used for the thrust bearing was too light and suggested using a high-temperature sintered graphite disk instead. The carbon fiber material was selected by German experts, who denied the problem at first. "Why not try it?" At the insistence of the designers, the new material was finally adopted, a change that basically laid the foundation for the RUV's success. At the end of the test, when the smooth and shiny thrust bearing appeared intact, everyone cheered. This photo of the thrust bearing is still treasured by Tang Dejiang in his mobile phone album.

The RSR, mentioned earlier, took a completely different route from the RUV. As the trial product of Sino-German cooperation through trial and error, the RUV also represents the world's leading cutting-edge technology. RSR is a stereotyped product made in Germany. KSB Nuclear Pump introduced and innovated it, which eventually been localized. Now, the RUV and the RSR are both localized. "From now on, every part and every process will be localized," Tang Dejiang said with a smile, "By then, even the wet winding motors will be localized. I am preparing to go to the sister unit Shanghai Electric Machinery Co., Ltd. to learn motor manufacturing technology."

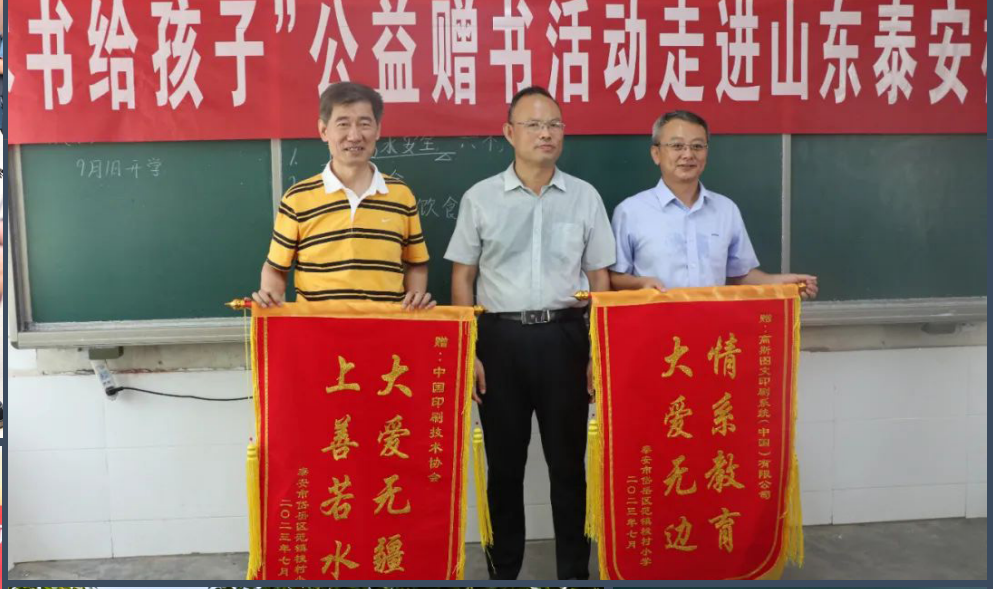
This year KSB introduced a new brand concept "solutions for a better life". "KSB sells pumps and valves, but they do not represent our core value. Our values are about solving people's water problems, giving them a clear view, and ensuring 24-hour communication. These are the values and the solutions we want to create to solve the challenges and difficulties that arise in people's lives." These products can generate electricity, transport water, treat sewage, brew beer, grow flowers, irrigate land, light up the dark, heat homes, and so on. They are all for the benefit of human life.

Tang Dejiang and his team are the epitome of Shanghai Electric and the backbone of better living. They represent the cutting edge of technology and the vigor of innovation, and they are the guardians of people's firm belief in a better life.

Goss China Launches “A Book for Every Kid” Donation Campaign, Filling Shanghai with the Fragrance of Books

By Xu Luyao

Across China, the landscape of book donations continues to expand. The “A Book for Every Kid” campaign is a key part of Goss China’s social responsibility initiatives. Since its inception in 2016, the campaign has been held for nine years, covering regions such as Inner Mongolia, Hebei, Yunnan, Shaanxi, and Shandong. Over the years, it has donated more than 20,000 books and exercise books to schools, SOS Children’s Villages, and other charitable organizations. The campaign aims to use books as a bridge to inspire children to cultivate a passion for reading, equipping them with



knowledge to become valuable members of society.

Particularly, most of the exercise books and textbooks for children are meticulously printed using high-quality machines from Goss China. Through these book donations, Goss China nurtures a deeper passion for reading among children, guiding them to explore the rich cultural and spiritual resources found within books.

Books, as a means of sharing knowledge, carry infinite potential to shape young minds. Goss China embraces this philosophy by not only focusing on technological innovation and improvement but also considering social responsibility as a fundamental commitment. The company takes concrete actions as a responsible corporate citizen. Goss China translates its values into practice by promoting green printing methods that minimize environmental impact, illustrating the synergy between compassion and sustainability. Looking ahead, Goss China plans to expand its network of collaborators, inviting like-minded partners to join this meaningful cause. Together, they aim to pave a solid way for children toward a vast ocean of knowledge and wisdom.

Goss China enriches Shanghai with the fragrance of books, radiating the joy of reading across countless miles. In the future, Goss China intends to explore diverse and innovative educational aid models, including building online reading platforms and promoting digital libraries through cutting-edge technology. By leveraging modern tools, Goss China aims to overcome geographical barriers and ensure that high-quality educational resources reach children in remote areas, illuminating the beacon of knowledge in every corner.

Through continuous effort and dedication, Goss China is well positioned to make a lasting impact in its mission to foster a nation of avid readers and sow the seeds of hope, allowing the light of knowledge to shine on every child, no matter where they are. D

VIEWPOINTS
DEPTH REPORTS

Seeing Shanghai Electric's Transformation of Energy Equipment on China National Highway 318 (G318)

Editor's note

To celebrate the 75th anniversary of the founding of the People's Republic of China, Jiefang Daily launched the "Road of Faith Ⅱ - The Way of a Great Power" themed interview activity, with nearly 100 young editors and writers being dispatched to nearly 60 counties and cities in 16 provinces and regions across the country to conduct in-depth interviews along the representative national highways, such as G219, G318, G228, G312, G109, G310, G215 and G104.
On September 30, Jiefang Daily "Road of Faith Ⅱ - The Way of a Great Power" special issue published a report entitled "Seeing Shanghai Electric's Transformation of Energy Equipment on China National Highway 318 (G318)", detailing Shanghai Electric's focus on the key technologies and major demands as well as its exploration in green transformation of the traditional energy industry.

Aligatse has ample sunshine. In Sangzhuzi District, a 110-hectare park is covered with photovoltaic panels, which can generate 100 million kWh of electricity per year, equivalent to the thermal power generation capacity of 30,600 tons of standard coal. This is the 12.5 MW/100 MWh integrated solar storage demonstration project in Langming-Sangzhuzi District, Shigatse, Tibet, in which Shanghai Electric participated.

Shanghai Electric is based in Shanghai, the most developed city in eastern China, and Shigatse is located on the plateau on the southwestern border of China. Connecting the two places is a highway, G318, which is almost as old as the People's Republic of China.

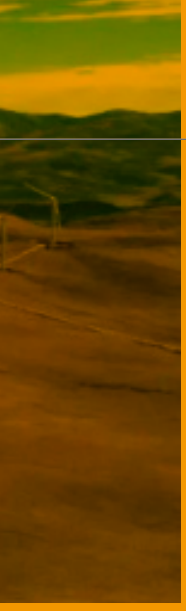
As the "cradle of the PRC's industry" enterprise, Shanghai Electric has a widespread layout along the G318. These energy projects with the combination of the old and the new promote the green transformation and development of China's energy sector, witnessing Shanghai Electric's focus on the key technologies and major demands and its exploration in the green transformation of the traditional energy industry.

STRATEGY OF CHINA

The G318, also known as Shanghai-Nyalamu Highway, starts from Huangpu District, Shanghai, which happens to be the headquarters of Shanghai Electric. Shanghai Electric has worked on countless projects on the G318, the most famous of which is perhaps the Qinshan Nuclear Power Plant in Jiaxing, Zhejiang Province.

The plant pioneered the peaceful use of nuclear power generation in China. In 1970, in order to solve the electricity supply problem in Shanghai and East China, the nuclear power pioneers began to explore nuclear power technology, carried out a lot of key technology research and experience summary, and the research and development cycle lasted for more than ten years.

At that time, China's nuclear power unit research and development technology was not developed, and the design and manufacture of the first-phase main equipment of Qinshan Nuclear Power Plant fell on the shoulders of Shanghai Electric. The reactor vessel internals of the nuclear island were manufactured by Shanghai No.1 Machine Tool Works, the magnetic lifting control rod drive mechanism by Xianfeng Electric Manufacturing Works, the steam generators and pressurizers by the Shanghai Boiler Works, the steam turbine and steam-water separator of the conventional island by Shanghai Electric Power Generation Equipment Co., Ltd. Turbine Plant, the generators by Shanghai Electric Machinery Co., Ltd., and the condenser by Shanghai Power Station Auxiliary Equipment Plant.



Through the pioneering efforts of Shanghai Electric, the first phase of Qinshan Nuclear Power Plant was completed and put into operation in 1991, and the national technical acceptance was formally passed in 1995, enabling China to make the first breakthrough in nuclear power generation and become the seventh country in the world capable of independently designing and constructing nuclear power plants. After the first phase of the project was fully operational, the Qinshan Nuclear Power Plant was able to supply 1.5 billion kWh of nuclear power annually to the East China Power Grid (including Shanghai, Zhejiang, Jiangsu, Anhui), greatly easing the power resource tension in the region.

In 2016, the first phase of the Qinshan Nuclear Power Plant had safely operated for 25 years, nearing its 30-year design life, and the nuclear power plant's capacity expansion and refurbishment were on the agenda. Once again at the forefront of exploring technology for nuclear power plant capacity increase and renovation, Shanghai Electric undertook the Qinshan Nuclear Power Plant Phase I Unit 1 Renovation Project, which mainly includes steam turbine unit flux replacement and renovation, turbine generator replacement and renovation EPC, No. 1 high-pressure heater replacement and renovation, and turbine generator unit lubricating oil system cooler replacement and renovation, and so on.

The transformed No.1 unit of Qinshan Nuclear Power Plant Phase I is also the first nuclear power plant capacity expansion and transformation unit in China. Through technical upgrading and equipment replacement, the capacity expansion and renovation work has eliminated the problems, safety hazards and risks of the equipment. It meets the requirements for the renewal of the unit's operating license and ensures that the design life of the replaced equipment and components (excluding wear parts and consumables) will be no less than 40 years, after the Qinshan Nuclear Power Plant Phase I Unit 1 has operated for 30 years after its original design life, except for the DEH and RTC systems.

Starting from Qinshan Nuclear Power Plant, Shanghai Electric has gradually developed into one of the group enterprises with the most complete nuclear power equipment manufacturing industry chain in China. As of 2023, Shanghai Electric Nuclear Power Group Co., Ltd. has supplied more than 200 sets of key nuclear power equipment, covering second-generation, second-generation plus and third-generation pressurized water reactors (including Hualong I, Guohe I, AP1000, CAP1000 and EPR, etc.), fourth-generation nuclear power technology (including high-temperature gas-cooled reactors, thorium molten salt reactors, etc.), the core equipment technology of controlled fusion systems and the manufacturing technology of large scientific equipment, which covers the existing nuclear power technology routes in China and helps China's nuclear power technology to become an international leader.

Serving the national strategy is the aspiration of Shanghai Electric in its brand development. Committed to filling the gaps in key components of large equipment, from Qinshan Nuclear Power Plant units to Hualong I units, Shanghai Electric has created many domestic firsts and even world firsts, and is currently undertaking national strategic tasks, including advanced nuclear power, heavy-duty gas turbines and large marine crankshafts.

HIGH-END MANUFACTURING

In the 21st century, China's rapid economic growth has accelerated the demand for electricity, especially in the Yangtze River Delta region, where the G318 starts, and it is crucial to guarantee the energy security in East China.

As we all know, coal power occupies a very important role in China's power structure, known as China's electric power "ballast". It plays a role in ensuring supply and providing a foundation in the power system. In this field, the 1000MW units symbolize the most advanced level of domestic coal power. Due to their high energy utilization rate, high efficiency, and high technology, they are known as China's

"crown" in coal power.

In 2003, Shanghai Electric won the bid for China's first ultra-supercritical coal-fired power generation project - Huaneng Yuhuan Power Plant 4×1000MW ultra-supercritical coal-fired power unit main equipment supply (including the first phase of two units to supply mechanical and electrical complete equipment, and the second phase of two units to supply mechanical and electrical auxiliary equipment). This project is the support project of "Ultra-supercritical coal-fired power generation technology" of the National "Tenth Five-Year" 863 Program and the demonstration project of ultra-supercritical localization.

In 2006, China's first 1000MW ultra-supercritical unit was commissioned at Yuhuan Power Plant in Zhejiang Province, making it the first power plant in China to be equipped with domestically produced 1000MW ultra-supercritical coal-fired power units. In the following year, two 1000MW units of Yuhuan Power Plant Phase II project were also put into operation.

Power experts pointed out that the national key projects of energy saving, environmental protection, water-saving advanced technology represent the development direction of China's coal-fired power plants, and serve as pioneers in the sustainable development of electric power.

Since then, more 1000MW units have been introduced along the G318. In 2015, the world's first 1000MW ultra-supercritical double reheat power unit independently designed and manufactured by Shanghai Electric was put into operation at Taizhou Power Plant in Jiangsu Province. This project is a national coal-fired power generation demonstration project, and a project under the National Science and Technology Support Program for Energy Conservation and Emission Reduction in the 12th Five-Year Plan as determined by the Ministry of Science and Technology. Representing the world's leading coal-fired power generation technology, the project adopts double reheat technology, with the world's highest comprehensive parameters at the time of commissioning, a power generation efficiency of more than 47.9%, a coal consumption of 14 grams per kilowatt-hour lower than the average level of conventional 1000MW units in China, with ultra-low emissions.

In 2020, the world's first 1350MW double reheat biaxial unit was installed at Pingshan Power Plant in Anhui Province, with a complete set of main equipment provided by Shanghai Electric. This project is also the world's largest single unit capacity high-low split-axis arrangement of ultra-supercritical double reheat unit. It was approved by the national "251" thermal power demonstration project in 2016, and was selected in the 2024 edition of the "Electric Power Industry, Major Technical Equipment and Engineering Directory".

From technology introduction and absorption to independent innovation, in the field of steam turbine technology, Shanghai Electric Power Generation Group has formed a rich range of products, covering wet cooled, air cooled, straight condensing, steam extraction, dual unit reheat, double reheat and other types of models. On this basis, the steam inlet parameter has been continuously improved, and the performance of the unit has been continuously optimized. It has long been a leader among the best units in the CEC's Thermal Power Generator Energy Efficiency Benchmarking Competition. By 2021, the number of 1000MW units put into operation by Shanghai Electric Power Generation Group has reached 100, achieving a market share of 2/3 and gradually embarking on a path of coal power technology development from technology introduction to independent innovation, and then to continuous technological upgrading and replacement for the Chinese.

At present, under the guidance of the national "dual carbon" goal, Shanghai Electric Power Generation Group continues to promote the clean and efficient use of coal, and sets new records of the world's lowest coal consumption of coal power generation units. Achieving technological self-revolution, innovation and upgrading, we continuously create value for users and consolidate technical strength and market position with 1000MW coal power technology.

GREEN TRANSFORMATION

The G318 winds through the Sichuan Basin to the Tibetan Plateau, where the altitude gradually increases and the climate is characterized by strong sunshine and high wind speeds. But such a harsh environment, in the eyes of the power experts, is a valuable resource.

In recent years, China has accelerated the transformation of its energy structure, vigorously developed renewable energy, and gradually built a new type of power system in the face of energy shortage and climate change to promote the transformation of its energy structure. As of the first half of 2024, the country's installed power generation capacity reached 3.07 billion kilowatts, and 1.653 billion kilowatts of new energy accounted for 53.8% of the total, surpassing coal power for the first time.

China's new energy power generation is rising to a new level, but the new energy operation and consumption is facing a new set of problems. In order to ensure grid security, energy storage will become a crucial part in the connection among the generation side, the grid side and the demand side, and it has a broad demand space. A wide range of energy storage routes are entering the fast lane of development.

The previously mentioned Shigatse project is a classic case of energy storage and application. In 2020, the 50MW/100MWh integrated solar storage demonstration project in Langming-Sangzhuzi District, Tibet, was completed and connected to the grid, and Shanghai Electric provided the project with an intelligent photovoltaic storage solution from the energy storage battery system to the real-time monitoring system. Through the integrated implementation of solar power generation project and energy storage project, it can effectively improve the reliability of power supply, smooth the output power of optical energy, reduce the curtailment of wind power and solar power, and improve the economic benefits of new energy power generation.

In April 2024, settled along the G318, the Yingcheng 300MW compressed air energy storage power plant demonstration project in Hubei was connected to the grid for the first time. The energy storage power plant uses the 300MW compressed air energy storage series of large-capacity motors independently developed by Shanghai Electric. It is the world's first 300MW class compressed air energy storage demonstration project, and it also sets world records in the stand-alone power, the energy storage scale and the conversion efficiency in the field of non-supplementary combustion compressed air energy storage.

Compressed air energy storage is considered one of the most promising large-scale energy storage technologies, and the completion of this project opens a new chapter in Shanghai Electric's energy storage design.

At present, Shanghai Electric has a system integration equipment solution with 10-350MW compressed air energy storage systems to meet a variety of application scenarios of air energy storage projects. The synergistic optimization of equipment parameters can further improve the efficiency of the energy storage system, providing a series of mature and reliable drive motors, heat storage system products, heat transfer system products, turbine power generation products, digital power transmission and distribution and centralized control instruments and meters. In recent months, Shanghai Electric has won the compressed air energy storage projects in Dingxi in Gansu, Jiuquan in Gansu, Tai'an in Shandong and other such projects on the strength of its advantages, achieving a major breakthrough in this new field.

In the future, with the continuous progress of energy storage technology, the installed capacity of compressed air energy storage is expected to continue to increase under the continuous improvement of efficiency and cost reduction. Shanghai Electric will firmly adhere to the innovation-driven development strategy, provide customers with more efficient compressed air energy storage system solutions, and contribute to the industrial restructuring and upgrading of the green economy.

INDUSTRY OF THE FUTURE

At the just-concluded 24th China International Industry Fair, Shanghai Electric showcased a series of future-oriented new industrial technology products from power supply to industrial development, demonstrating its all-round plan for new industrialization.

It may be hard to imagine that Shanghai Electric, which started out as a generator manufacturer, has become one of the largest comprehensive high-end equipment manufacturing companies in China, with a long history in the fields of new energy equipment, industrial robots, aerospace, shipbuilding and automotive parts.

In green industrial upgrading, Shanghai Electric has unique advantages. Relying on years of rich experience in the energy sector, in December 2016, Shanghai Electric entered the new energy vehicle sector, and Highly New Energy was established in Wuhu, Anhui Province, by Shanghai Highly (Group) Co, Ltd, a subsidiary of Shanghai Electric, to manufacture new energy electric compressors. At present, the electric compressors for new energy vehicles produced by Highly New Energy have a leading position in the market, and the company has become the main supplier of compressors for new energy vehicles in China, with a market share of more than 10%. Obtaining the Nissan contract, it has entered the international market.

Since then, Shanghai Electric has established multiple enterprises to produce new energy vehicle parts and components in Anhui. Highly Marelli Automotive Thermal Management System Co., Ltd., for example, started mass production in 2022, and the equipment localization rate of the factory reached more than 80%, with a planned annual production capacity of 7 million pieces of heat exchangers and 800,000 sets of automobile air conditioners. Highly New Energy has also started the construction of a new energy compressor project with an additional capacity of 650,000 sets.

Shanghai Electric is committed to independent research and development in the field of new energy automotive parts. On January 19, 2022, the R&D Center of Anhui Highly Precision Casting Co., Ltd. was officially inaugurated to enhance the independent R&D capability of the enterprise. Anhui Highly Precision Casting Co., Ltd, originally a manufacturer of single compressor parts, is now engaged in diversified technology integration of automotive parts, engineering machinery, intelligent buildings, semiconductor equipment castings and so on.

At present, in the field of new energy vehicles, Shanghai Electric already has the whole industry chain service capability, including low-carbon industrial plant design, new energy vehicle power battery cell production equipment, battery and vehicle assembly and intelligent production line, as well as thermal management system production, automotive cable and component production.

Shanghai Electric's rapid progress in future industries is due to its emphasis on science and innovation. Data shows that Shanghai Electric's R&D investment has increased for five consecutive years, and the annual implementation of 796 R&D projects in 2023 are supported by an R&D investment of 5.381 billion yuan and an R&D investment rate of 4.71%. In terms of innovation system formation, at present, Shanghai Electric has a science and technology innovation system with 15 technical directions and 38 subdivisions. Through systematic construction, leadership and synergy, it has formed an innovation system and operation mechanism of major scientific research project synergy, generic technology co-research, scientific and technological innovation talent sharing and scientific research resource sharing.

Growing up with the PRC, Shanghai Electric has always adhered to science and technology innovation to drive development, accelerate the realization of high-level scientific and technological self-reliance and self-improvement, and build a solid foundation for high-quality brand development. Along the G318, Shanghai Electric is creating more glorious achievements in the great industrial development of the new era.

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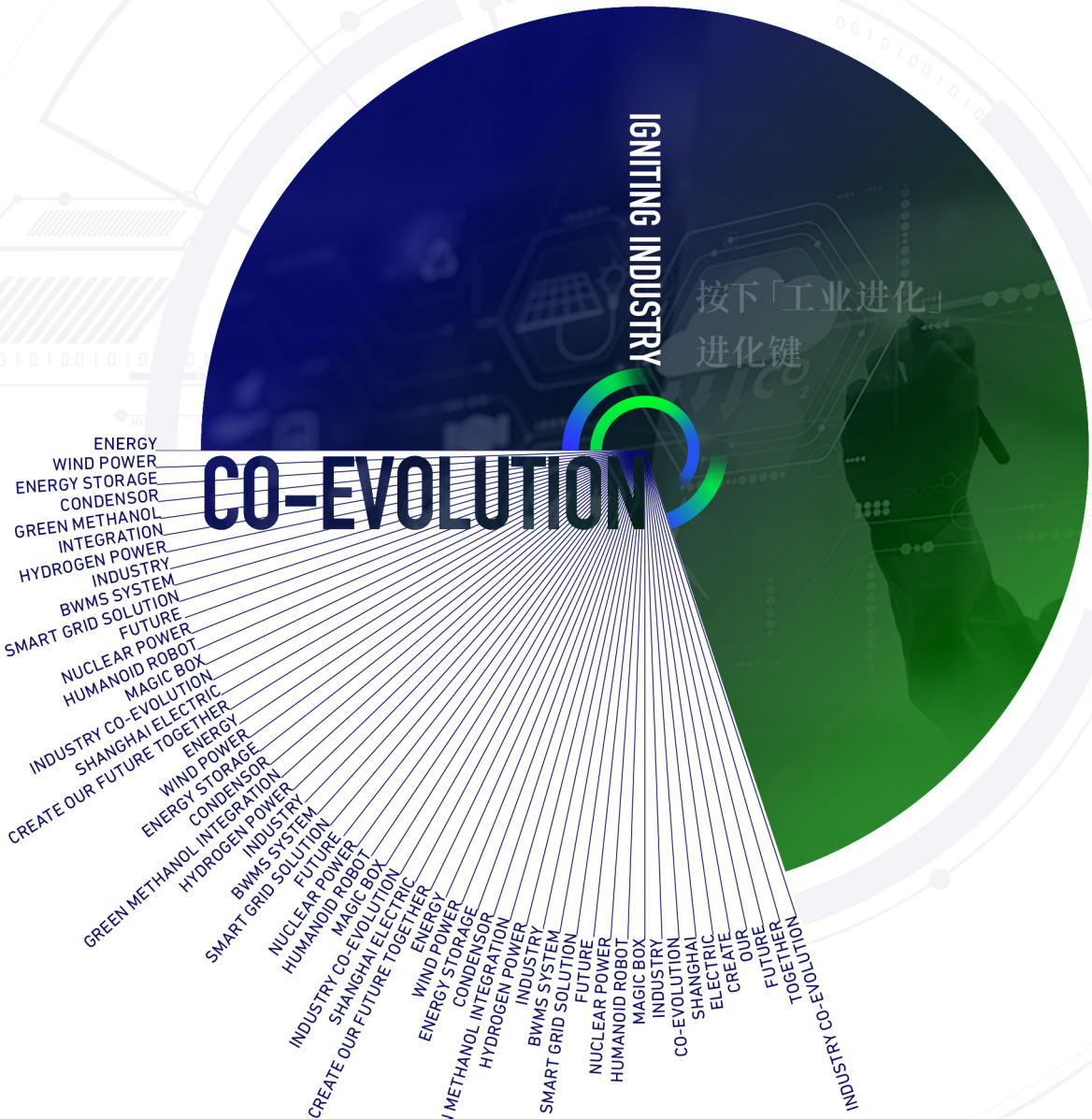

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