SHANGHAI ELECTRIC 上海电气

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SHANGHAI ELECTRIC

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COVER TOPICS

SHANGHAI ELECTRIC'S GLOBAL SMART GRID STRATEGY

EDITOR'S WORDS

SMART GRID: A NEW ENGINE POWERING THE FUTURE OF ENERGY

Amid the sweeping wave of energy transformation, the smart grid is rapidly emerging as the backbone of the modern energy system. Like a vast and intricate web, it integrates advanced sensing, communications, and computing technologies to achieve comprehensive, intelligent management across the entire electricity value chain from generation and transmission to transformation and distribution. It represents an unprecedented convergence of digitization, automation, and interactivity.

The appeal of the smart grid lies not only in its high technological integration but also in its powerful features. Specifically, self-healing ensures rapid fault recovery; reliability guarantees stable power supply; compatibility enables seamless integration of diverse energy sources; efficiency enhances energy utilization; and interactivity bridges the gap between grid and users.

From an industrial chain perspective, the smart grid spans all stages of energy flow: generation, transmission, distribution, and consumption. Upstream, diverse energy sources, from thermal and hydro to renewable energy, provide a continuous power supply. Midstream, smart transmission, substation, and distribution technologies ensure stable electricity flow. Downstream, smart energy services meet user demands with personalized, convenient solutions.

According to ASKCI Consulting, China's smart grid market was valued at CNY 97.94 billion in 2022 and is expected to grow to CNY 118.82 billion in 2024. Globally, the market is also booming, estimated at USD 66.1 billion in 2024, with projections to more than double to USD 151.1 billion by 2032. Smart meters, as a core component of the smart grid, are also seeing exponential growth.

Strong government policy support has given the industry a significant boost. Since 2015, a series of national directives have steered the smart grid toward intelligent, clean development.

In the context of China's carbon peaking and neutrality goals, the smart grid will play a critical role in integrating clean energy and enhancing energy efficiency. As power demand and emerging load challenges grow, the smart grid will continue to evolve with greater flexibility and user interaction. The smart grid is rapidly emerging as the driving force behind the energy revolution, paving the way for a greener and smarter tomorrow.

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NEWS LETTER

Shanghai Electric's Thermal Power Units Lead Efficiency and Green Innovation

According to the 2024 benchmarking results released by the China Electricity Council, Shanghai Electric's **1000MW** ultra-supercritical units, as well as **600MW** ultra-supercritical, supercritical and subcritical units, led across multiple performance categories, including efficiency, technical supervision, environmental performance, and reliability. Notably, Shanghai Electric accounts for **50%** of all nationally rated AAAA-class **1000MW** units (**14 total**), and **46%** of AAA-class units (**25 total**), demonstrating its industry-leading power generation technologies.

Shanghai Electric's Offshore Wind Power Project Recognized as Model Case for Marine City Development

Shanghai Electric's Donghai Bridge Phase II Offshore Wind Power Project was recognized as a model case in Modern Marine City Development during the 2025 World Oceans Day and China National Marine Publicity Day main event. Located west of the Donghai Bridge, the project deploys **27** offshore turbines (**3.6MW** each) with annual generation of **238** million kWh, equivalent to reducing **621,000** tons of CO_2 emissions compared to coal-fired power, while supplying clean electricity to **130,000** households. This marks a major milestone in Shanghai's green energy transformation.

World's First 500MW Fully Hydrogen-Cooled Generator Passes Technical Review

Recently, the Shanghai Electric Generator Plant of Shanghai Electric Power Generation Equipment Co., Ltd. has successfully completed a technical evaluation for its **500MW-class** GVPI fully hydrogen-cooled generator, conducted by an expert panel from the Shanghai Society for Electrical Engineering. The panel unanimously affirmed that the generator, entirely developed with independent intellectual property rights, has overcome critical technical bottlenecks in electromagnetic design, ventilation and cooling, mechanical integrity, insulation, structural optimization, and manufacturing processes. Its core performance indicators are globally leading, with overall capabilities reaching advanced international standards, providing crucial equipment support for the development of China's large-scale clean gas power industry.

China's First Multi-Source Thermal Storage Green Steam Project Enters Operation

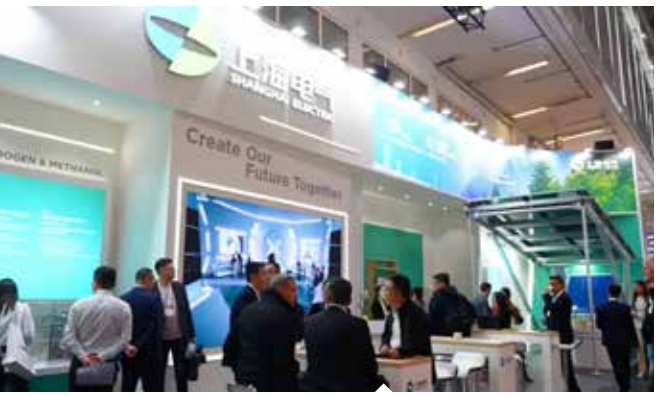
A demonstration project led by the Central Academe of Shanghai Electric Group, based on its proprietary "molten salt thermal storage coupled with high-temperature heat pump technology for green steam supply," has officially begun commercial operation. The **1.1MW/10.8MWh** multi-source thermal storage green steam system, installed at a plant in Shanghai's Fengxian District, successfully completed over two months of trial operation and passed all performance verifications. This achievement represents a significant breakthrough in multi-source thermal storage technology and offers a replicable, scalable model for low-carbon industrial transformation. The project features an innovative integration of a single-tank molten salt system with heat storage and exchange, coupled with high-temperature heat pumps. To date, the team has obtained **17** invention patents and **28** utility model patents.

Shanghai Electric Participates in Invention that Wins Gold at International Exhibition of Inventions Geneva

The "Electronic Power-Based Battery Unit Technology" project, led by Shanghai Jiao Tong University and co-developed with Shanghai Electric Power Transmission & Distribution Group and others, stood out among over a thousand innovations from nearly **40** countries and regions at the **50th** International Exhibition of Inventions Geneva, earning a prestigious Gold Medal. The project team has successfully tackled the global challenge of optimizing both safety and performance in energy storage systems. It has led to the development and mass production of electronic power-based battery units, providing critical support for the construction of next-generation power systems and driving the global energy transition.

Indonesian Weda Bay Industrial Park Demonstration Wind Power Project Successfully Connected to Grid

Recently, the demonstration wind power project at the Weda Bay Industrial Park in Indonesia, co-developed by Shanghai Electric Wind Power (a subsidiary of Shanghai Electric) and Eternal Tsingshan Group, was officially connected to the grid. Located in Maluku Utara Province, the project is Indonesia's first wind power project invested by a Chinese enterprise and operated with Chinese-made wind turbines. The initial demonstration phase features a total installed capacity of **5 MW**, utilizing two **2.5 MW** wind turbines supplied by Shanghai Electric Wind Power. Future phases will further expand the wind power capacity. Once fully completed, the project is expected to generate over **800 million kWh** annually, delivering stable green energy to the industrial park.



Shanghai Electric Showcases Full Portfolio of Solar, Storage, and Hydrogen Innovations at Intersolar Europe 2025

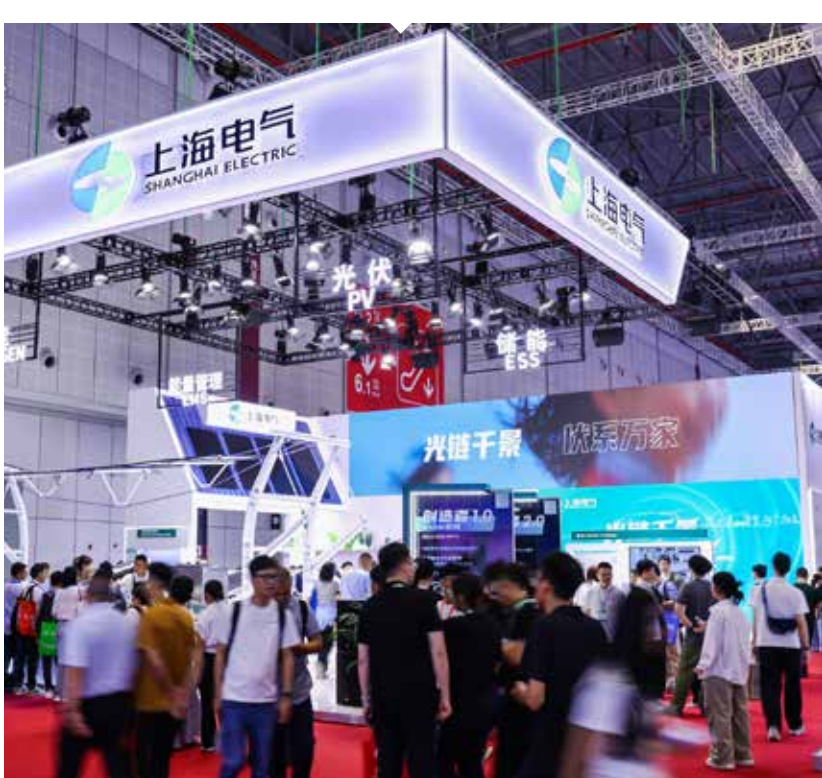
From May **7** to **9**, Intersolar Europe 2025, the world's largest and most influential new energy trade show, was held in Munich, Germany. Shanghai Electric made a high-profile appearance with its full-spectrum product lineup across solar energy, hydrogen energy, and multi-source energy storage, along with integrated one-stop solutions. The company's exhibit highlighted breakthroughs in synergistic technologies across solar, storage, and hydrogen, showcasing how coordinated innovation can accelerate the energy transition. By engaging global industry leaders, Shanghai Electric reaffirmed its commitment to driving clean energy innovation and contributing to the world's carbon neutrality goals.

Shanghai Electric Showcases Solar + Storage Breakthroughs at SNEC 2025

During June 11–13, the 18th (2025) International Photovoltaic Power Generation and Smart Energy Conference & Exhibition (SNEC) was held in Shanghai. Shanghai Electric showcased a full-scenario solution matrix spanning solar, energy storage, and hydrogen, demonstrating cutting-edge innovations in photovoltaic power generation, multi-type energy storage, hydrogen, and intelligent power transmission and distribution. The display highlighted the company's commitment as the critical infrastructure in driving the global energy transition.

Shanghai Electric Wind Power Europe Innovation Center was invited to attend the "China-Denmark Green Innovation Day"

Recently, the European Innovation Center of Shanghai Electric Wind Power Group Co., Ltd. ("Shanghai Electric Wind Power") was invited to attend the "China-Denmark Green Innovation Day" held in Copenhagen. During the event, the company signed a cooperation agreement with Bladena, a leading blade technology consultancy. The two parties will collaborate closely on overcoming technical challenges in long and flexible blade structures, load simulation and analysis, and robust blade design and testing methods. At the concurrent China-Denmark Clean Technology Forum, experts from Shanghai Electric Wind Power also shared case studies on Sino-Danish cooperation in wind power technologies.



Shanghai Electric Wins Contract for All-Vanadium Redox Flow Battery Energy Storage Project at Xinghuo Energy Base

Shanghai Electric Energy Storage Technology Co., Ltd. has successfully won the bid for the **10MW/40MWh** all-vanadium redox flow battery energy storage project at Phase I of the Xinghuo Demonstration Base in Fengxian, which aims to compare and test various new energy storage technologies. The project will offer a rare, large-scale real-world testing environment in China. Leveraging the industrial synergy of Fengxian's "New Energy + Energy Storage" hub, it will promote the localized development of the entire vanadium redox flow battery industrial chain from material R&D and equipment manufacturing to system integration.

Shanghai Electric Wind Power Hosts Customer Promotion Conference in Vietnam

On April 25, Shanghai Electric Wind Power Group Co., Ltd. ("Shanghai Electric Wind Power"), in collaboration with global certification authority UL Solutions, co-hosted the 2025 Vietnam Customer Promotion Conference in Hanoi. The event focused on wind power innovation, localized solutions, and multi-energy integration trends, offering industry leaders, technical experts, and corporate representatives from Vietnam and Southeast Asia a comprehensive view of Shanghai Electric's wind power achievements. During the summit, UL Solutions presented a type certification to Shanghai Electric Wind Power and signed a Memorandum of Understanding (MoU). The two parties will deepen cooperation in R&D, project certification, and market development to jointly advance the high-quality growth of green energy in Vietnam and beyond.

Shanghai Electric Debuts New Machine Tool Products at CIMT 2025

From April 21 to 26, the 19th China International Machine Tool Show (CIMT) was held in Beijing under the theme "Collaborative innovation on digital & intelligent manufacturing is embracing the future." Shanghai Machine Tool Works Co., Ltd., a subsidiary of Shanghai Electric, unveiled several cutting-edge products and technologies including **SK7420A** CNC screw grinding machine, **SK7620A/F** CNC internal thread composite grinding machine, and H392 CNC universal inner bore grinding machine. These products exemplify the company's commitment to empowering the next-generation high-end manufacturing ecosystem. The booth drew a global crowd of professionals and partners. The technical team conducted live demos and in-depth presentations, facilitating meaningful engagement and technical exchanges with customers.

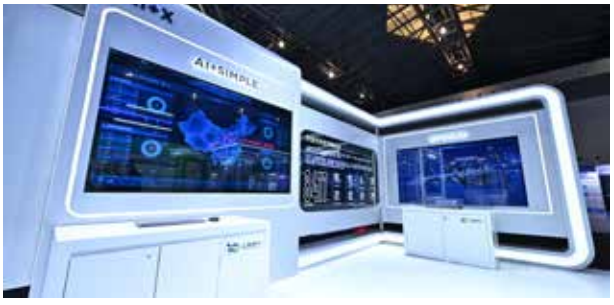
Spotlight on Tech Openness: Shanghai Electric at the 11th CSITF

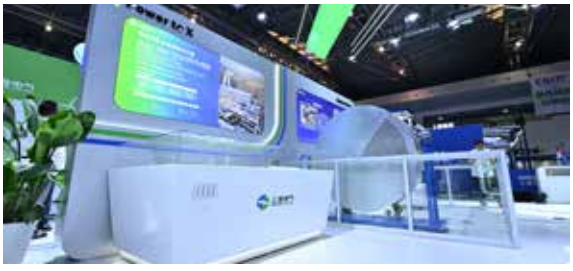
On June 11, at the opening day of the 11th China (Shanghai) International Technology Fair ("CSITF"), Shanghai Electric welcomed officials including Deputy Party Secretary and Mayor Gong Zheng, who visited the booth to learn about the company's latest technological advances in new energy, humanoid robotics, and AI. They were accompanied by Mr. Wu Lei, Secretary of the Party Committee and Chairman of Shanghai Electric Group, Mr. Zhu Zhaokai, Deputy Secretary of the Party Committee and President of the Group, Mr. Wang Chenhao, Deputy Secretary of the Party Committee and Chairman of the Shanghai Electrical and Mechanical Labor Union, and Mr. Jin Xiaolong, Member of the Party Committee and Vice President.

At this year's CSITF, Shanghai Electric presented its theme "X to the Future," showcasing forward-looking strategies across three key innovation fields. In the field of energy transition, the company highlighted its "Power to X" concept, displaying renewable energy conversion technologies such as green methanol system solutions, floating offshore wind turbines, and hydrogen electrolysis systems. In the field of intelligent robots, under the "Robot for X" theme, it introduced innovative robotic applications, including humanoid robot training scenarios for high-risk operations and vision-AI-integrated collaborative systems. In the field of artificial intelligence, the spotlight was on the "AI + X" strategic results, with platforms like SIMPLE for gas turbine intelligent operations and maintenance, demonstrating AI's deep integration into diverse industrial scenarios.

As a long-time participant in the CSITF, a vital platform for international technology exchange and cooperation, Shanghai Electric once again underscored its commitment to promoting technological trade and innovation. The cutting-edge products on display reflect the company's robust open innovation system, developed in recent years to support major national projects and critical technology breakthroughs through the deep integration of industry, academia, research, and application. During the exhibition, Shanghai Electric also received three key awards in recognition of its achievements in technological trade and innovation.

With more than a decade of active participation in CSITF, Shanghai Electric remains dedicated to advancing the industry through technological innovation. The innovations showcased this year not only reinforce its global competitiveness in new energy, humanoid robotics, and AI, but also highlight the company's ongoing contributions to China's dual-carbon goals and smart manufacturing transformation. Looking ahead, Shanghai Electric will continue to explore the boundless possibilities of technological innovation, delivering China's solutions for a greener and smarter world.





2025 Carbon Neutrality Expo Opens: Shanghai Electric Showcases Its Green, Low-Carbon Power

On June 5, the 2025 Shanghai International Carbon Neutrality Expo in Technologies, Products and Achievements opened at the Shanghai New International Expo Centre. Under the theme “Green & Low-Carbon: Powering the Future”, Shanghai Electric participated in the Expo.

Representing Shanghai Electric at the event were Zhu Zhaokai, Deputy Party Secretary and President of Shanghai Electric Group, Wang Chenhao, Deputy Party Secretary and Chairman of the Shanghai Electrical and Mechanical Labor Union, Vice President Xiao Weihua, and Party Committee Member and Discipline Secretary Fu Min.

Shanghai Electric showcased its latest innovations and solutions across green energy, industrial equipment, and dual-carbon digital technologies at the Expo. At this year’s expo, Shanghai Electric showcased a range of cutting-edge energy and industrial equipment, demonstrating the company's core capabilities in supporting China’s energy transition and industry-wide low-carbon upgrades.

Particularly noteworthy is Shanghai Electric’s “Management System of Carbon Emission” platform, which is built upon precise carbon accounting and covers the entire chain of energy management, efficiency optimization, and carbon data operations. Going beyond the traditional role of a data dashboard, the platform has evolved into a “carbon reduction brain” that provides governments, industrial parks, and enterprises with real-time monitoring, intelligent diagnostics, accurate forecasting, and optimal decision-making support. It is positioned to become the digital infrastructure that empowers carbon reduction and efficiency enhancement across all sectors of society and industry.

On the morning of the event, Zhu Zhaokai was invited to attend the opening forum and took part in the launch ceremony of the CN100 Green and Low-Carbon Supply Chain Case Collection. As for the CN100 Green Supply Chain Leading Enterprise Alliance, "CN" stands for China and Carbon Neutrality, and "100" represents 100 leading enterprises and the goal of achieving 100% carbon neutrality across the entire supply chain. As a member of the Alliance and its Decision Advisory Committee, Shanghai Electric played an active role.

Also on the first day, Shanghai Electric hosted a release conference at its exhibition area to showcase its achievements in ESG and dual-carbon digitalization. The event featured the unveiling of Shanghai Electric’s ESG outcomes and carbon reduction empowerment data platform, along with an award ceremony recognizing ESG best practices by the company.

Looking ahead, Shanghai Electric will maintain an open and collaborative approach, joining hands with global partners to move forward together. Driven by technological innovation, the company will accelerate breakthroughs in key green technologies; empowered by digital intelligence, it will enhance the efficiency of carbon reduction across all elements; with a strong sense of responsibility, it aims to shape a sustainable future.

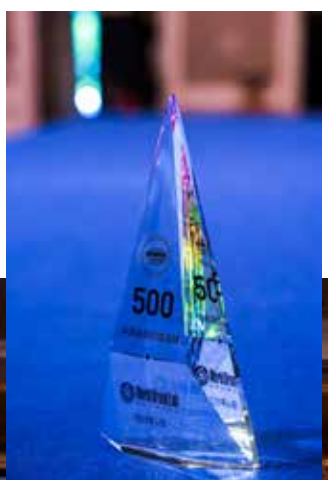
SHANGHAI-

228.5 Billion RMB!

Shanghai Electric Brand Value Hits New High, Decoding the High-Quality Growth Driven by Tech Innovation

At the recent 22nd World Brand Summit, World Brand Lab released its latest ranking of "China's 500 Most Valuable Brands". Shanghai Electric successfully made the list with a brand value reaching a historic high of 228.565 billion RMB.

This year's summit, themed "Global Brand Strategy and Digital Supply Chain Management in the Context of the Artificial Intelligence Revolution," marked the 22nd consecutive year of the report's release. The total value of the brands featured in the 2025 "China's 500 Most Valuable Brands" report reached 42.03 trillion RMB, representing a year-on-year increase of 8.97%. A record 135 Chinese brands achieved values exceeding 100 billion RMB, an increase of 27 brands from 2024. This significant growth underscores the vibrant vitality and robust momentum of China's brand economy.



Shanghai Electric and the Government of Sarawak, Malaysia Join Forces to Explore New Opportunities in Southeast Asia's New Energy Market

On June 10, Shanghai and Malaysia's Sarawak State marked a milestone in bilateral energy cooperation with significant parallel developments. That day, Mr. Gong Zheng, Mayor of Shanghai, held talks with a delegation led by Dato Sri Dr. Sim Kui Hian, Deputy Premier of Sarawak. The two sides exchanged views on deepening collaboration in trade, investment, and new energy development. During the visit, Dato Haji Ibrahim bin Haji Baki, Deputy Minister of Public Utilities and Telecommunications of Sarawak and Chairman of Sarawak Energy, led the Sarawak delegation to Shanghai Electric. There, he held in-depth discussions with Wu Lei, Party Secretary and Chairman of Shanghai Electric Group, on expanding future cooperation. Meanwhile, Shanghai Electric signed cooperation agreements with the Sarawak State Government and China Three Gorges International Limited, marking a new phase in China–Malaysia green energy cooperation under the Belt and Road Initiative.

Dato Haji Ibrahim bin Haji Baki extended greetings from Sarawak Premier Datuk Tan Sri Datuk Abang Johari Tun Openg and thanked Shanghai Electric for its ongoing contribution to Sarawak's energy transition. He noted that with abundant renewable resources and a strategic location, Sarawak is investing heavily in solar, hydrogen, natural gas, and hydropower. The government aims to build Sarawak into a clean energy hub in Southeast Asia and beyond. He emphasized that the Sarawak government regards Shanghai Electric as a trusted Chinese partner and looks forward to deeper cooperation in hydrogen, hydropower, photovoltaics, energy storage, and gas turbines to support Sarawak's green energy transformation.

Wu Lei extended a warm welcome to Dato Haji Ibrahim bin Haji Baki and his delegation, and briefly introduced the business scope and development of Shanghai Electric. He noted that Sarawak serves as a key base for Shanghai Electric's expansion into Malaysia and the broader Southeast Asian market. Over the years, the company has achieved fruitful outcomes through close collaboration with the Sarawak government and Sarawak Energy, particularly in the fields of interconnectivity and infrastructure. At this critical juncture, where the Belt and Road Initiative aligns with the development of the ASEAN Power Grid, Shanghai Electric is committed to advancing the goals outlined in the Joint Statement on Building a High-level Strategic China-Malaysia Community with a Shared Future. Mr. Wu expressed that the Sarawak delegation's visit to Shanghai presents a valuable opportunity to deepen cooperation. Leveraging its strengths in equipment manufacturing and technological innovation, Shanghai Electric is ready to engage with Sarawak's key stakeholders across various sectors to jointly write a new chapter in Southeast Asia's energy transition.

Earlier that day, Zhu Zhaokai, Deputy Party Secretary and President of Shanghai Electric Group, attended the opening ceremony of the 18th International Photovoltaic Power Generation and Smart Energy Conference & Exhibition (Shanghai), where he witnessed the signing of a Memorandum of Understanding (MOU) on Cooperation for the 1,000MW Bakun Reservoir Floating Solar Project in Sarawak among the Sarawak Ministry of Public Utilities and Telecommunications, China Three Gorges International Energy Investment Co., Ltd., and Shanghai Electric Power Transmission & Distribution Group Co., Ltd. Under the MOU, the three parties will leverage Sarawak's exceptional conditions for floating solar development to advance a floating solar power project with a capacity exceeding 1 GW at the Bakun Reservoir. The initiative aims to contribute to Sarawak's goal of achieving 10 GW installed capacity by 2030, and to support its ambition of becoming Southeast Asia's leading new energy generation hub.

Leaders from the Sarawak Ministry of Public Utilities and Telecommunications, Sarawak Energy, and relevant sectors of Shanghai Electric attended the event.

Shanghai Electric Powers Automotive Industry Upgrading with Breakthrough Innovations

The 21st Shanghai International Automobile Industry Exhibition (Auto Shanghai 2025) officially opened on April 23 at the National Exhibition and Convention Center (Shanghai). Shanghai Electric showcased a strong lineup through its key subsidiaries and affiliates, including: Shanghai Highly (Group) Co., Ltd.* ("Highly"), Shanghai Prime Mingyu Machinery Technology Co., Ltd. ("Prime Mingyu"), and Shanghai Ri Yong JEA, an affiliated company of Shanghai Mechanical & Electrical Industry Co., Ltd.

BREAKTHROUGH PRODUCT LAUNCHES

As a global leader in thermal management and core component manufacturing for new energy vehicles (NEVs), Highly Group* unveiled its latest high-performance thermal solutions specifically tailored for NEVs. At the media day event, Highly Group* launched several breakthrough products featuring eco-friendly new refrigerant, integrated, lightweight modular design, and extreme cold climate adaptability. Among the highlights was the R290 refrigerant side-integrated thermal management module, which achieved a 10% reduction in both volume and weight compared to the previous generation. Two additional innovations were revealed targeting low-temperature, high-latitude driving conditions: the self-heating heat pump compressor for cold regions and integrated heat pump compressor solution. These additions further expand the company's NEV thermal systems portfolio.

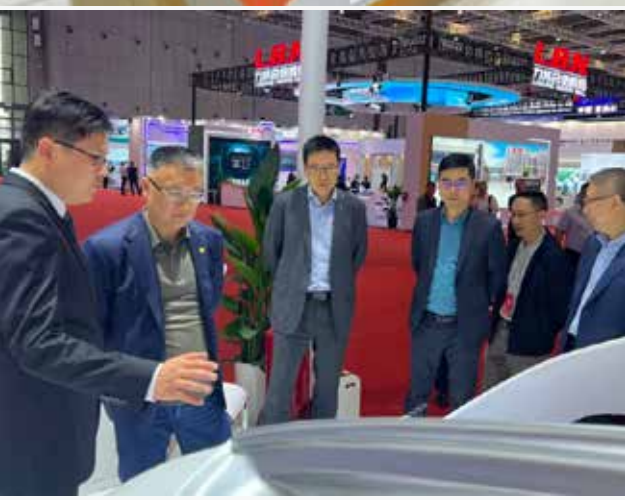
DIVERSE TECHNOLOGY MATRIX FOR E-MOBILITY

Prime Mingyu and its affiliated companies jointly showcased a multi-technology portfolio supporting the industry's transformation toward electrification, intelligence, and lightweight. Among them, Zhenhua Bearing introduced hybrid ceramic ball bearings for new energy vehicles, surface-coated insulated resin bearings, and high-speed bearings for reducers; Tian'an Bearing showcased product solutions such as engine system bearings and new energy powertrain bearings; Nedschroef Kunshan exhibited high-precision automotive seat adjustment gears and FDS flow-drill screws to support lightweight manufacturing; CP-Tech brought innovative products and solutions including F1-grade HALO driver protection systems, high-performance racing car roll cages, and structural components; Shanghai Tool Works highlighted high-precision tools such as PCD forming milling cutters and solid carbide forming tools for automotive engine housing machining; while Premier Tension Control introduced the latest generation of Greenkote coating technology, providing ultra-high corrosion resistance for commercial vehicle chassis bolts and other components.

SHOWCASING TWO FLAGSHIP THERMAL MANAGEMENT SOLUTIONS

Shanghai Ri Yong JEA, leveraging the resources and technological strengths of its major shareholder Johnson Electric Group, presented two core thermal management drive solutions: integrated thermal management module and 48V high-power cooling fan module. These solutions combine Johnson Electric's high-efficiency motor technology with Shanghai Ri Yong JEA's intelligent thermal systems, offering advanced capabilities for next-generation automotive thermal management.

Auto Shanghai 2025, themed "Embracing Innovation, Empowering the Future", spotlighted cutting-edge technologies and breakthroughs shaping the global automotive industry. Shanghai Electric and its subsidiaries fully demonstrated their latest innovations in new energy and high-performance vehicle technologies. On the opening day, the booth attracted numerous renowned automakers for in-depth exchanges. Through close collaboration and dialogue with industry peers and partners, Shanghai Electric is committed to driving continuous innovation and opening new pathways for a smarter, more efficient, and greener future for the global automotive industry.



Shanghai Electric Builds Multi-Link Cooperation Framework with Chery and SAIC

During the Auto Shanghai 2025, Wu Lei, Party Secretary and Chairman of Shanghai Electric Group, met separately with Yin Tongyue, Party Secretary and Chairman of Chery Automobile Co., Ltd. ("Chery"), and Jia Jianxu, Deputy Party Secretary and President of SAIC Motor Corporation Limited ("SAIC Group"), to discuss deepening industrial chain collaboration. Mr. Wu was accompanied by Zhu Zhaokai, Deputy Party Secretary and President of Shanghai Electric Group, and Jia Tinggang, Vice President.

COOPERATING WITH CHERY AUTOMOBILE ACROSS MULTIPLE DOMAINS TO BUILD A MULTI-CHAIN COLLABORATION SYSTEM

At this year's auto show, Chery showcased 53 innovative models across the fields of new energy and intelligent technologies, highlighting the transformation of China's automotive industry from scale expansion to technology leadership, offering new strategic opportunities for deepened cooperation between the two companies.

Since the high-level meeting in July 2024, Shanghai Electric and Chery have steadily advanced practical cooperation in areas including smart manufacturing upgrades, new energy technology innovation, and global industrial deployment. Building on previous achievements, both sides expressed during the meeting their intention to further expand cooperation. They aim to leverage local support capabilities, integrate industrial resources across the Yangtze River Delta, and jointly develop a multi-link cooperation framework encompassing smart manufacturing, automotive parts, and overseas supply systems to enhance their overall competitiveness within the NEV industrial chain.

STRATEGIC ALIGNMENT WITH SAIC GROUP TO DELIVER POWERFUL SOLUTIONS

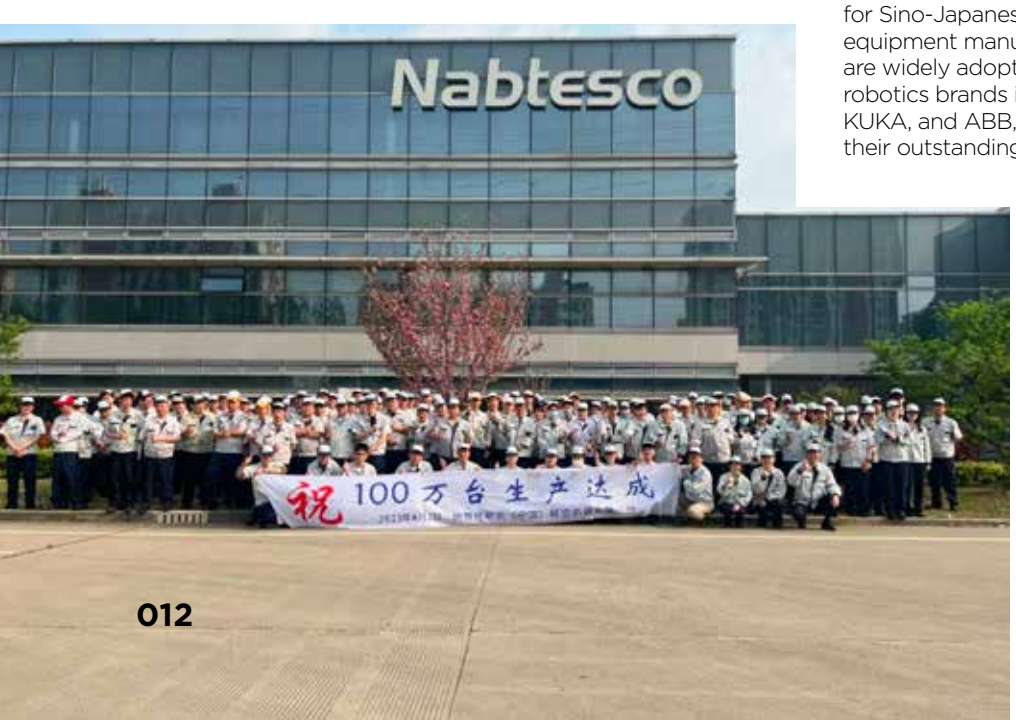
As the host enterprise of the auto show, SAIC Group showcased dozens of industry-leading technologies, demonstrating the innovation strength of Shanghai's high-end manufacturing sector. During discussions, both parties agreed that Shanghai Electric has accumulated solid technical capabilities in automotive thermal management. The newly released solutions, including R290 refrigerant side-integrated thermal module, self-heating heat pump compressor, integrated low-temperature heat pump compressor, and ultra-compact HVAC unit, strongly align with SAIC Group's needs for comprehensive vehicle thermal systems. The two sides are expected to deepen collaboration moving forward.

Milestone Achievement: Over One Million RV™ Precision Reducers in a Decade

Shanghai Electric has reached a major milestone in the field of precision transmission. Nabtesco (China) Precision Machinery Co., Ltd. (hereinafter referred to as "Nabtesco China"), an affiliate of Shanghai Mechanical & Electrical Industry Co., Ltd., announced that cumulative production of its core product, the RV™ precision reducer, has surpassed 1 million units. This achievement underscores the successful localization of foreign technologies within China's domestic industrial ecosystem.

The Ministry of Industry and Information Technology has designated precision reducers as key components under its "Industrial Foundation Enhancement" initiative. As a critical part ensuring the accuracy, stability, and lifespan of automation systems and industrial robots, the RV™ reducer plays a vital role in advanced manufacturing. Over the years, Nabtesco China has consistently enhanced product adaptability, increased production capacity, and improved quality yield. It now operates a nationwide service and manufacturing network, with solutions widely applied across automotive manufacturing, new energy, and electronic equipment industries.

As a China-Japan high-end equipment cooperation demonstration project, Nabtesco China accelerates efforts to fill critical gaps in China's precision transmission industry chain through technology introduction and localized innovation, strengthening and complementing the supply chain. Established in 2015 as a joint venture between Shanghai Mechanical & Electrical and Japan's Nabtesco Corporation, Nabtesco China built its first overseas RV™ reducer plant in Changzhou, Jiangsu Province in January 2016. Currently, the Changzhou base ranks as Nabtesco's second-largest global manufacturing site after its domestic plants in Japan. With a decade of consistent growth, Nabtesco China has become a model for Sino-Japanese cooperation in high-end equipment manufacturing. Its RV™ reducers are widely adopted by leading industrial robotics brands in China, including Yaskawa, KUKA, and ABB, and are well recognized for their outstanding quality and reliability.



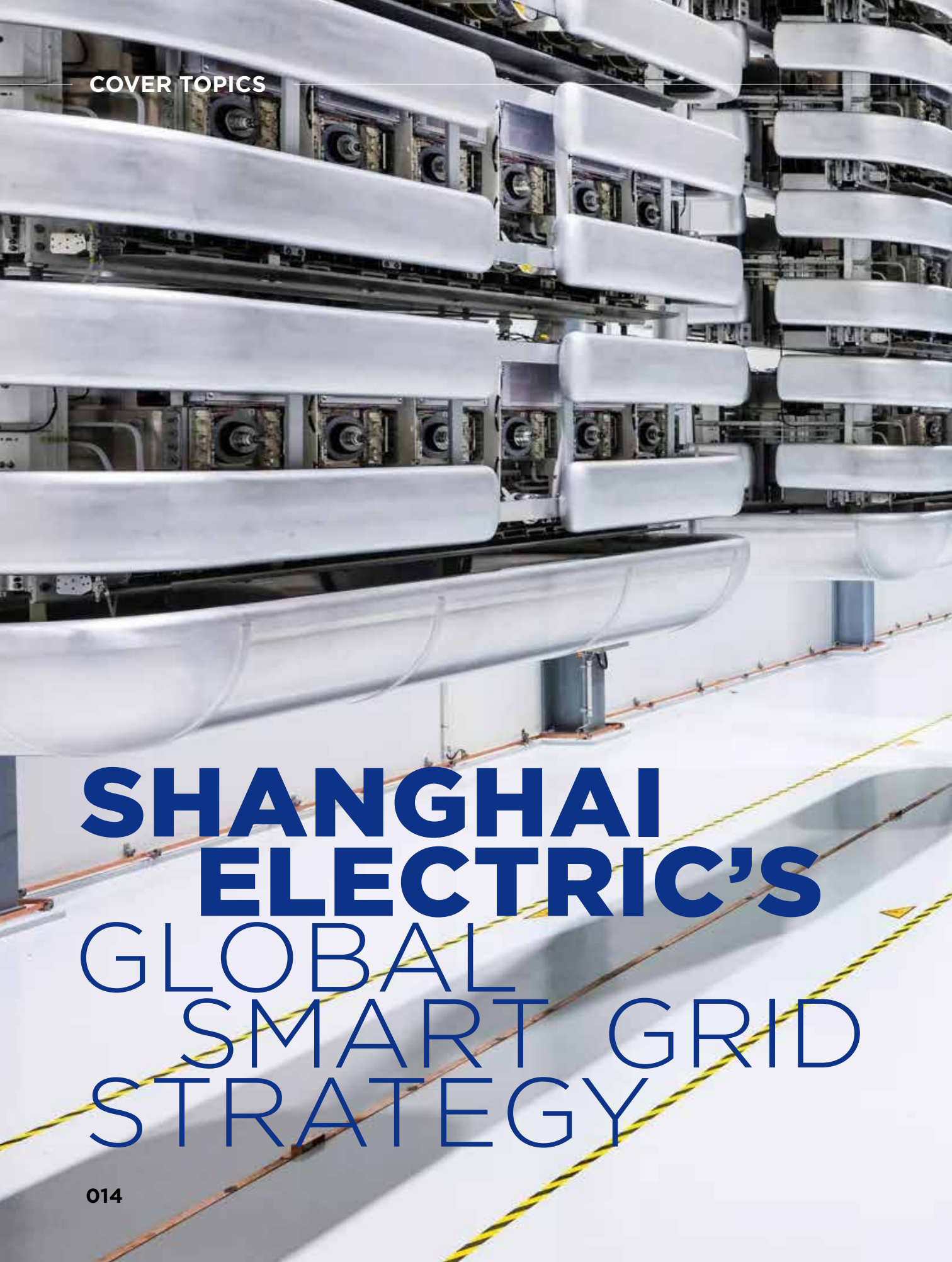
Shanghai Electric and Hitachi Energy Join Forces to Chart a New Path for Green Development

Recently, Shanghai Electric and Hitachi Energy (China) Co., Ltd. successfully signed a Green Certificate (GC) transaction contract, marking a solid step forward in their joint efforts to promote green electricity and contribute to China's dual-carbon goals.

Under the contract, Shanghai Electric will supply approximately 50,000 Green Power Certificates (2024–2025) for Hitachi Energy's 10 operations in China. The first batch of 4,200 certificates has already been successfully delivered. This collaboration will provide Hitachi Energy with an environmental advantage in State Grid bidding processes and support its goal of achieving 100% renewable electricity consumption in China.

The partnership builds on a long-standing relationship between the two companies. As early as 1994, Hitachi Energy (China) and Shanghai Electric jointly established Hitachi Energy Shanghai Electrical Transformer Co., Ltd., working closely in the development and production of power equipment and fostering deep mutual trust and collaboration. This latest green certificate initiative injects fresh momentum into their partnership, expands the scope of cooperation, and strengthens strategic ties.

Looking ahead, the two parties will take this cooperation as a new starting point to deepen collaboration in the field of green energy. By leveraging their respective strengths, they aim to broaden cooperation in green certificate trading, new energy project development, and green technology innovation, jointly exploring new paths for sustainable energy and making meaningful contributions to China's energy transition and carbon neutrality goals.



SHANGHAI ELECTRIC'S GLOBAL SMART GRID STRATEGY

Power transmission and distribution networks are the vital arteries of any power system, and at the same time, they act like capillaries that ensure efficient energy delivery. As a key player in this field, Shanghai Electric Power Transmission & Distribution Group (hereinafter referred to as the "Power Transmission & Distribution Group") has become deeply engaged in the construction and upgrading of global power infrastructure, backed by its profound technical heritage and engineering excellence. Over more than two decades of international expansion, the Group has extended its presence to over 30 countries worldwide. Since 2003, it has built over 60 substations at 220kV and above, and more than 2,500 kilometers of transmission lines at the same voltage level, ensuring stable and efficient electricity transmission to an ever-wider global landscape. Creating power grids that are not only highly reliable but also intelligent is central to the energy transition. The Power Transmission & Distribution Group is advancing its core competitiveness by focusing on high-end development, domestic innovation, integrated systems, and smart technologies. Currently, the Group is actively cultivating a suite of intelligent technologies and products, which range from smart transmission and distribution equipment to advanced sensing, energy storage, microgrids, new power quality solutions, and virtual power plants, offering key support for the deep transformation of the energy sector.

EMPOWERING SMART GRIDS WITH AI

Artificial intelligence is rapidly reshaping the global energy industry, providing a powerful boost for grid intelligence, optimized energy management, and low-carbon development. Through algorithmic innovation, the Group is pioneering intelligent dispatch, predictive maintenance, and energy big data analytics, driving revolutionary change in the global power sector.

- **Smart Dispatch & Load Forecasting: Real-time data analysis enables AI to predict power demand fluctuations and optimize power distribution, enhancing new energy integration and reducing energy waste.**
- **Predictive Maintenance: AI-based monitoring systems detect anomalies in grid equipment in advance, cutting failure rates, shortening outages, and enhancing reliability and stability.**
- **Energy Big Data Analytics: Grid data is analyzed to reveal energy flow patterns, improve pricing mechanisms, and boost operational efficiency, providing governments and enterprises with precise decision-making support.**
- **Smart Energy Trading: Integrating AI with blockchain enables peer-to-peer energy trading and flexible dispatch of distributed energy, accelerating the adoption and commercialization of clean energies.**

Upholding the vision of "Digitally Intelligent Power for a Brighter Life," the Power Transmission & Distribution Group aims to become an integrated, smart, and comprehensive solutions provider in power transmission and distribution. Its one-stop, full-lifecycle energy solutions span transmission, transformation, distribution, new energy, energy storage, and integral energy, covering planning, core equipment R&D, EPC (engineering, procurement, and construction), and intelligent operation and maintenance.

As an essential force in smart manufacturing for the power industry, the Group is continuously investing in R&D and deploying projects, driving product innovation to support the transformation toward next-generation power systems. The Group will continue to deepen technological innovation and practical application in the field of smart grids, accelerating the development of IoE. By promoting the efficient integration and optimized utilization of diverse clean energy sources, we aim to contribute to the creation of a safe, efficient, green, and intelligent modern energy system. The Power Transmission & Distribution Group remains committed to advancing the smart grid and driving the development of IoE.

Imagine a future grid that not only delivers electricity but also enables energy sharing and optimization, seamlessly integrating solar, wind, and other clean energies into a truly green energy network.

TRANSFORMATION AND UPGRADES: INTELLIGENT MODERNIZATION OF TRADITIONAL EQUIPMENT

In the new power system driven by new energy, key characteristics will include extensive interconnectivity, intelligent interaction, flexibility, security, and open sharing. In the realm of traditional transmission and distribution equipment, our focus is on developing new digital and intelligent products that meet the needs of next-generation distribution networks. At the same time, we are expanding into integral energy and energy storage, offering systems and solutions such as storage AC access systems,

edge controllers, E-cloud platforms, and virtual power plants. Faced with the evolving landscape of high-penetration new energy, the Power Transmission & Distribution Group continues to make breakthroughs along two key dimensions.

Smart Upgrading of Equipment: We deeply integrate sensors, communication modules, and edge computing units into core equipment such as transformers, circuit breakers, switch cabinets, and cables. This enables real-time monitoring, self-diagnosis, and remote control, significantly enhancing reliability, maintainability, and service life.

Cutting-edge Intelligent Equipment Development: We focus on flexible transmission technologies and equipment tailored to new energy characteristics, enhancing the grid's adaptability and flexibility.

In emerging areas such as energy storage and integral energy systems, we leverage advanced algorithms, expert systems, and operational data to strengthen self-learning and adaptive capabilities, optimize operational strategies, reduce lifecycle costs, and maximize value creation.

BUILDING A COLLABORATIVE AND EFFICIENT ENERGY NETWORK

As the core hub of energy transition, today's grid is evolving from a traditional one-way transmission system into a complex, multi-dimensional interactive network. The intelligent equipment and system solutions provided by the Power Transmission & Distribution Group form the backbone of safe, stable, and efficient operation of the new power system.

ADDRESSING KEY CHALLENGES IN THE GRID:

- **High Proportion of Renewable Energy Integration: Managing intermittency, integrating distributed sources, and optimizing forecasting and dispatch.**
- **Enhancing System Flexibility and Resilience: Enabling multi-timescale responsiveness, cross-regional resource sharing, and high-resilience network architectures.**
- **Deep Digitalization and Intelligence: Fully supported by smart sensing, digital twin, and artificial intelligence technologies.**

STRATEGIC LAYOUT OF POWER TRANSMISSION & DISTRIBUTION GROUP:

- **Enhancing Flexibility: Driving energy storage solutions through system integration and access, and building advanced virtual power plant platforms in integral energy.**
- **Supporting Cross-regional Synergy: Leading in ultra-high voltage (UHV) technologies with independently developed 1,100kV UHV shunt reactors, 1,000kV UHV transformers, and ±800kV DC converter transformers. Our landmark win in the Aba–Chengdu East 1,000kV UHV project demonstrates our world-class capabilities.**
- **Pioneering Future Distribution Networks: Breaking through in flexible interconnection technologies and developing key equipment to enable highly reliable, adaptable distribution grids.**

As vast amounts of new energy are integrated, the complexity of future power grids will increase dramatically. Leveraging AI and other advanced technologies, the Power Transmission & Distribution Group is empowering the grid to evolve toward intelligence and adaptability, transforming it into a key platform for efficient energy allocation, dynamic interaction, and shared value creation.

VIRTUAL POWER PLANT: A SMART AGGREGATION PLATFORM FOR DISTRIBUTED ENERGY RESOURCES

The Power Transmission & Distribution Group has developed a carbon-electric synergy microgrid platform, an operational management platform for virtual power plants (VPPs). Based on a "cloud-pipe-edge-terminal" system architecture, the platform efficiently aggregates over 50 industrial users and 12.95 MW of adjustable resources. It integrates diverse application scenarios, including digital empowerment, green and low-carbon initiatives, VPPs, behind-the-meter power sales, and carbon trading. Notable Results: Transformer load reduced by 15%; over 95% of photovoltaic power self-consumed; 43% reduction in the impact of orderly power consumption policies.

At the core of the VPP lies the intelligent aggregation and coordinated dispatch of vast distributed resources, such as electric vehicles, energy storage systems, and adjustable loads. The Group is committed to scaling and maturing the platform, making it a key flexible regulation unit and value creation hub within the new power system.

To tackle the intermittency of wind and solar power, the Group's intelligent solutions incorporate precise forecasting and optimized energy storage dispatch, ensuring the stable and efficient integration of renewable energy into the grid. For example, in the Shantou wind power project, the Group applied multi-power unit parallel PCS technology to enable China's first successful "black start" of an 8 MW offshore wind turbine, leveraging an energy storage system to independently establish internal voltage support and autonomously start turbine operations.

For industrial parks and remote regions, the Group offers integrated microgrid solutions that combine distributed energy, storage, and intelligent distribution. The Shantou Smart Energy Project stood as a benchmark and, at that time, was the largest zero-carbon industrial park demonstration in Guangdong. It integrates wind, solar, lithium and redox flow battery storage, EV charging piles, smart buildings, and microgrid control systems. Through advanced "source-grid-load-storage" coordination, it achieves reliable power supply while enabling self-organization, self-balancing, and self-optimization of energy flows, reducing overall energy costs by 15%. The project won the "High-Quality Energy Development Model Project Award".

With the deepening application of AI and the continuous refinement of electricity market mechanisms, virtual power plants are poised to cover more scenarios, aggregate increasingly diverse resources, and become a cornerstone of the next-generation power system.

GLOBAL PRESENCE: BUILDING A RELIABLE ENERGY FUTURE TOGETHER

Shanghai Electric recently has successfully completed the construction of the Zafarabad 220kV Digital Substation in Jizzakh Region, Uzbekistan—the nation's first-ever digital substation. As a milestone project in technical advancement, it stands as a key achievement of China-Uzbekistan cooperation under the Belt and Road Initiative.

Rewinding to April 2016, a hum marked the energization of the transformer at the 400,000-ton pulp mill project site in Belarus. Two and a half hours later, the main transformer passed its live commissioning test, and the 10kV switchgear was officially in operation, signaling the Group's first completed project in the Russian-speaking region.

SHANGHAI-ELECTRIC.COM

Just a month earlier, civil works had begun on three turnkey GIS (Gas-Insulated Switchgear) substations in Kuwait, where Shanghai Electric became the first Chinese company to secure a turnkey power T&D contract in that market.

A key force behind these achievements is Shanghai Electric Power Transmission & Distribution Engineering Co., Ltd., a third-tier subsidiary with just over 160 employees. Despite its compact size, it has maintained a steady growth trajectory, especially in overseas markets, where each year brings new highlight projects:

In 2006, the company undertook an EPC project for nine substations in an East African country. In 2007, it delivered a 230kV substation and transmission line project in Myanmar. In 2008, it contracted the transmission and transformation project for the Puttalam coal-fired power plant in Sri Lanka. In 2009, it executed the Lot 1 substation of a transmission project in Ethiopia. In 2010, it completed the urban power grid renovation project from Huambo to Caála in Angola. In addition, the company has undertaken projects in countries such as Cameroon, Malaysia, Bangladesh, and the Maldives.

The Group's BRI footprint extends further, with completed or ongoing projects in Saudi Arabia, Myanmar, Uzbekistan, and Malaysia. In 2015, it entered Pakistan, which is an essential node in the China-Pakistan Economic Corridor, partnering with K-Electric to upgrade Karachi's grid in a contract worth over USD 100 million. The fully commercial venture was carried out with Siemens as a consortium partner and financed by a syndicate led by Standard Chartered and Chinese banks, reflecting the Group's global financing and delivery capabilities.

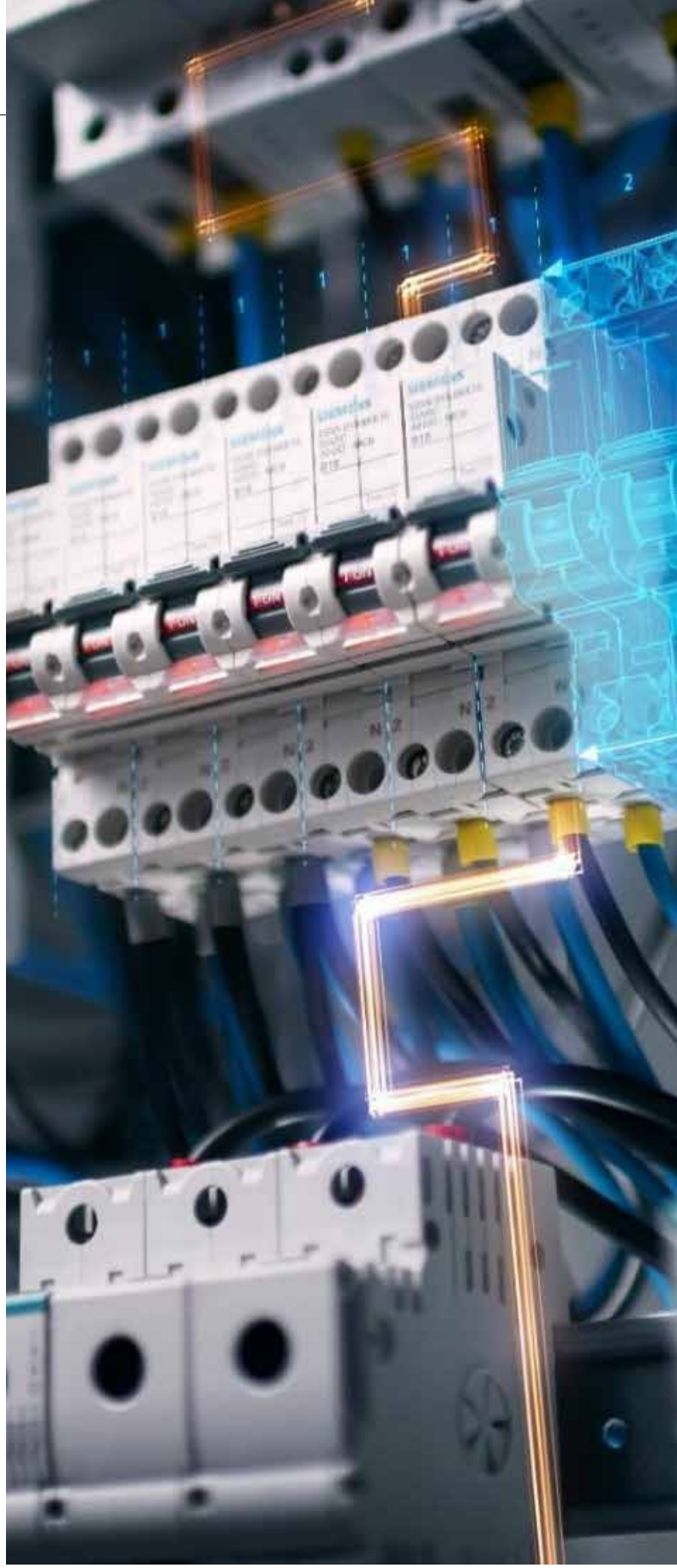
These successes demonstrate that Chinese firms have evolved from equipment suppliers to full-capacity EPC providers capable of global competition. Moreover, thanks to the efforts of strategic pioneers like the Power Transmission & Distribution Group in "going global," Chinese standards have taken root in overseas markets,

effectively mitigating implementation risks for certain projects. It is reported that key indicators such as accounts receivable for Shanghai Electric Power Transmission & Distribution Engineering's major overseas engineering projects have remained within a reasonable range, with currency exchange and settlement risks also well managed.

Behind every project is the dedication and persistence of Shanghai Electric's Power T&D professionals. Recognizing the strategic importance of global expansion, the Group has consolidated its presence in Southeast Asia and Africa while making inroads into developed markets. Currently, the Group is actively pursuing new energy projects in Australia, Spain, and other countries, expanding its global footprint.

This momentum is powered by a clear "1+2+N" strategy: Develop core competitiveness around high-end, localized, integrated, and intelligent solutions; propel innovation through technology and market reform. With annual sales exceeding RMB 10 billion and 27 affiliated or joint-venture enterprises, including partnerships with Siemens Energy, Schneider Electric, and Hitachi Energy, the Group leverages robust EPC capabilities to serve global markets under the BRI framework.

The Power Transmission & Distribution Group has established branches across Africa, the Middle East, Southeast Asia, South Asia, and Central Asia, bringing advanced and reliable power transmission and distribution technologies and system solutions to regions around the world. It has contributed to upgrading power grids in Southeast Asia, bringing electricity to remote areas in Africa, and building modern power infrastructure in Central Asia. This is not merely about project delivery, but a testament to the strength of China's power industry and its global commitment. The Group is making a tangible contribution to improving global energy accessibility and promoting sustainable development.



INNOVATION-DRIVEN: BUILDING A HIGH GROUND FOR TECHNOLOGICAL BREAKTHROUGHS

Innovation lies at the heart of the Power Transmission & Distribution Group's development strategy, serving as its core engine for sustained growth. In March 2025, the Group established the Transmission and Distribution Technology Research Institute in collaboration with Xi'an Jiaotong University. This joint institute focuses on tackling critical technical challenges under the framework of the new power system, deepening industry–academia–research collaboration for breakthrough solutions.

BUILDING AN OPEN AND COLLABORATIVE INNOVATION ECOSYSTEM:

- **Demand-Driven Innovation: The Group aligns closely with the real-world needs of grid operators and power generation enterprises. By co-defining application scenarios and co-developing solutions, it ensures technology serves market needs.**
- **Academia–Research Integration: Strategic alliances with leading universities such as Tsinghua University, Shanghai Jiao Tong University, Xi'an Jiaotong University, and Hunan University have enabled the Group to build a seamless innovation chain from fundamental research to applied development.**
- **Institutional Collaboration: The Group works alongside national-level R&D hubs including the Huairou Laboratory and the National Innovation Center par Excellence to tackle major research projects and accelerate the commercialization of research results.**
- **Internal Synergy: By integrating nuclear power, wind power, and new energy resources within the broader Shanghai Electric ecosystem, the Group has built a virtuous cycle of "technology–industry–capital," enabling efficient coordination across innovation resources.**

A STRATEGIC AND LAYERED INNOVATION ROADMAP:

- **Continuous Optimization: Improving existing product performance, reducing costs, and enhancing efficiency remain key priorities.**
- **Targeted Breakthroughs: The Group actively tracks emerging market and technology trends to expand application scenarios and develop new products.**
- **Foresight R&D: Guided by the "1+2+N" strategic framework, the Group is investing in cutting-edge technologies and future-ready products that will shape tomorrow's energy landscape.**

Over the past three years, the Group has consistently invested around 3% of its annual revenue into R&D, with smart technologies accounting for 40% of the 2025 R&D budget, demonstrating a strong commitment to innovation.

The Group's intelligence-driven approach aims to realize a power system that is more perceptive, more optimized in decision-making, more efficient in operation, and more resilient in structure.

Looking forward, the future power system is expected to exhibit "three-pole" characteristics: Centralized Supergrids powered by AI-optimized cross-regional transmission; Localized Microgrid Clusters autonomously coordinating distributed energy via AI; User-Side Resource Pools aggregating vast flexible loads through intelligent control. In this evolution, AI will act as the central nervous system of the power grid.

Now is the time for bold steps. The Power Transmission & Distribution Group is no longer just a power builder, but a dream architect for a green and intelligent grid. With innovation at its core and foresight in its vision, it is reconstructing the energy landscape and writing the future of electricity with algorithms, intelligence, and imagination, paving the way for a better, cleaner energy future.

WHERE LIGHT REACHES, HOPE GROWS

By Bian Yuefeng

As dusk falls, the steel structure of a 220kV substation carves out a resolute silhouette against the glow of the evening sky. The completion of this modern power hub marks the end of a long era of "diesel generators roaring and candle lights flickering" for 2 million residents nearby. At the project site, a young Chinese engineer converses fluently in French with local workers. He is Qin Yunlong, Project Manager of an Africa-based project of Shanghai Electric Power Transmission & Distribution Engineering Co., Ltd., who has spent twelve rainy and dry seasons in Africa writing his own story of bringing light to the continent.

THE PIONEER: LIGHTING A NEW PATH

In 2013, fresh out of university, Qin Yunlong set foot in Africa for the first time, driven by passion and a yearning for the unknown. As night fell, vast stretches of the city vanished into blackness—only faint kerosene lamps flickered in the slums. "The darkness here has weight," Qin wrote in his diary that evening. He stood on the future substation site, waist-deep in rustling grass, the rumble of diesel engines echoing in the distance. Despite the country's abundant hydropower resources, a broken grid left nearly 80% of the population without reliable power supply.

For the next three years, Qin and his team started from scratch. Local bureaucracy was dense, and every step forward was hard-earned. With no office, they operated from the state utility's makeshift workspace; with no living quarters, Qin spent three years in a bare, 10-square-meter basement. During the rainy season, dampness condensed on the walls, and the bedding constantly smelled of mildew.

As the project's liaison officer, he arrived at the client's office at 7:00 a.m. each day, tirelessly coordinating with design, procurement, and transmission departments. He often spent a whole day in the stifling conference room, just to finalize a single technical document. By 2018, when the project was officially launched, Qin had already led the team through feasibility studies, land approvals, and countless hurdles, transforming barren land into a site ready for construction.

THE PROBLEM-SOLVER: ADVANCING THROUGH ADVERSITY

By 2022, the project reached its peak construction phase, only to face severe supply chain delays, management changes on the client side, and mounting uncertainty. Qin quickly set up online coordination channels, mobilized global resources, and

implemented phased construction and local procurement strategies to ensure progress. When management reshuffling threatened to halt crucial funding, he coordinated with multiple government departments and secured payment disbursement by year's end.

From city centers to remote mountains, the project's distribution network posed many challenges, with the most perilous challenge being the transportation of two 100-ton main transformers. The Chinese team partnered with the local road authority to restore a long-dilapidated steel bridge at the border, facilitating the passage of a 150-ton convoy and reactivating a vital cross-border trade corridor between two nations. That five-minute crossing embodied months of planning and collaboration. It wasn't just a route for transformers but a pathway to shared prosperity.

THE SOWER: PLANTING SKILLS AND OPPORTUNITY

From day one, the project was designed not just to deliver power, but to cultivate local talent. Chinese engineers provided hands-on, end-to-end training for local staff. Over a thousand jobs sprouted like new shoots around the project's roots. Today, more than 80% of the project's workforce are local residents. What's more, this newly trained technical force can now independently carry out equipment maintenance and troubleshooting, embedding global standards and professional ethos into daily operations.

Qin's team has nurtured not only a skilled workforce but a torch-bearing generation, one that transforms Chinese know-how into resilient trees rooted in African soil, reaching skyward with the promise of growth through shared knowledge.

THE WATCHER: TWELVE YEARS ROOTED IN AFRICA

"Africa has become my second home," Qin says. Over twelve years, he has witnessed the transformation of a blueprint into a regional benchmark. Two 100-ton transformers finally concluded their epic journey. The project was lauded by Africa's Minister of Hydropower and the Chinese Embassy, hailed as a model of West African energy infrastructure.

Today, children no longer study under the scent of kerosene; surgical lights shine through the night in hospitals; mining equipment hums without interruption. These once-small but now life-changing shifts reflect Shanghai Electric's mission: "Progress for humanity, harmony for the world."

The equatorial rain tapping on steel beams is a rhythm Qin knows well. From trailblazer to bridge-builder in China-Africa friendship, Qin's odyssey embodies mirrors thousands of Belt and Road initiative pioneers, building barren lands with their prime years, solving crises with craftsmanship, and building not only transmission lines but also enduring ties of trust and mutual development. As the equatorial sun casts its glow on the substation's silver rooftop, the humming electricity bears witness to a shared vision between Chinese and African people: Where light reaches, hope grows.

INSIGHTS

SPARKS OF DEDICATION: JI FENG'S WELDING JOURNEY AND CRAFTSMANSHIP LEGACY

Senior Technician at Shanghai Power Station Auxiliary Equipment Plant, Recipient of the Shanghai Municipal May 1st Labor Medal

JI FENG

In the industrial workshops along the Huangpu River, the sparks that fly from the clash of welding torches and steel have illuminated half of Ji Feng's life. As a boy who once followed his welder father around factory floors, Ji has spent the past three decades transforming his childhood curiosity into professional excellence. From winning the city's top welding competition to becoming a senior welding technician, from overcoming titanium alloy welding challenges to localizing nuclear power tube bundle production, Ji has forged a legend, crafting both precision and pride into every seam.

Now, Ji takes on a new role to continue his passion for metal: In the training workshop, he is a mentor, gentle yet firm, passing on three decades of experience in heat, timing, and control. His knowledge becomes the invisible code within each weld, flowing into the hands of young welders, ensuring that the spirit of craftsmanship shines ever brighter across generations.

PASSING THE TORCH

As a child, Ji Feng was known for his playful and energetic nature. Though mischievous at times, his talent for working with his hands was unmistakable. With a welder father, Ji often roamed factory workshops, where the welding torches left a lasting impression. Captivated by the sparks erupting from his father's torch, he found himself wondering: What kind of magic can fuse two pieces of metal into a seamless whole?

Years later, Ji graduated with honors from the welding program at East China Electric Power Technical School and joined Shanghai Power Installation No.2 Co., Ltd., specializing in pipeline welding. After hours, he often stayed behind in the workshop to hone his skills of horizontal welds, vertical welds, 45-degree angles and 90-degree joints. No matter the material or angle, he practiced relentlessly until he met his father's exacting standards. At that moment, he realized that inheritance is more than skill. It is spirit and responsibility passed down through generations.

In 2010, Ji Feng took first prize in the Shanghai Vocational Skills Competition and earned the title of Senior Welding Technician. That same year, the Shanghai World Expo lit up the city skyline, a dazzling reflection of the fire that burned within Ji. He knew that accolades were merely the beginning. To reach the summit of craftsmanship, there could be no substitute for dedication and continued mastery.

BREAKTHROUGH WARRIOR

In 2012, Ji Feng joined Shanghai Power Station Auxiliary Equipment Plant located by the Huangpu River, and was assigned to the Welding Testing Laboratory under the Technology Department. By the end of that year, he participated in manufacturing a titanium container for a certain piece of equipment, taking responsibility for evaluating the titanium alloy's process technology and improving welding methods.

Ji Feng understood the high chemical reactivity of titanium, which often causes welding defects like porosity and cracks, and the formation of brittle microstructures that impair weldability. Given the product's structural constraints, he proposed an innovative approach: To weld directly using tungsten inert gas (TIG) welding without applying any additional protective measures on the front side, relying solely on mastering the right welding gestures and technique to ensure adequate gas shielding for the weld's front surface to meet quality standards. This proposal won unanimous approval. Ultimately, the welding was completed using this method, achieving a 100% pass rate in welding procedure qualification.

In 2015, Ji Feng faced his first major challenge at Shanghai Power Station Auxiliary Equipment Plant—participating in the on-site repair of tube-to-tube plate welds for a product. On site, Ji discovered that the internal space was extremely limited. To carry out repairs, they had to open a 400 mm manhole on the product, stacked in three layers with progressively smaller openings. Following this, six weld joints required continuous welding to ultimately replace two tubes inside the container.

To prepare, Ji Feng conducted multiple simulated welding exercises and only proceeded to actual welding after he felt fully confident in meeting the requirements. With superb skill and meticulous courage, Ji Feng leveraged years of experience: Standing outside the product shell, he inserted the welding torch through the openings into the interior. Using mirror reflections to observe the back side of the welds, he applied advanced techniques like alternating left- and right-hand welding to overcome the extreme constraints. The repair was completed flawlessly. All welds passed inspection on the first attempt, earning unanimous praise and recognition from both the client and company leadership.

TECHNICAL INNOVATION

In recent years, as China placed greater emphasis on environmental protection, the Technology Department at Shanghai Power Station Auxiliary Equipment Plant switched entirely from fused flux to sintered flux in welding processes. Ji Feng, together with the process team, formulated relevant test plans and carried out extensive experimental work. After six months of trials, Ji Feng successfully validated the replacement of fused flux with sintered flux. This not only ensured the manufacturing schedule but also, through performance comparisons from the tests, identified a cost-effective welding material, effectively reducing production costs.

At that time, with continuous improvements in the design and material selection of high-pressure heaters, the use of some new materials introduced many welding challenges in manufacturing. In every research and testing task, Ji Feng devoted substantial time to welding related test plates, striving to guarantee the quality of weld seams. Among these, the welding of the new high-pressure serpentine tubes' obstacles was a particularly difficult operation. Overcoming many difficulties posed by the environment and the welding process itself, Ji Feng completed the welding of approximately 8,000 weld joints on a single high-pressure heater, all passing radiographic inspection on the first attempt.

In the field of nuclear power projects, Ji Feng has also repeatedly achieved remarkable results. The key components of the moisture separator reheater (MSR)—the high- and low-pressure tube bundles—have high procurement costs. To fully master the core technology of MSR tube bundles and reduce manufacturing costs, Ji Feng led his team to take the Pakistan K3 project as an opportunity to conduct research on critical manufacturing technologies related to the tube bundles, focusing mainly on the tube sheet overlay welding process and the tube-to-tube sheet welding process. After several days of testing and analysis, they ultimately determined welding process parameters that met the standards, laying a solid foundation for the full domestic production of MSR tube bundles in the future.

Ji Feng seems born for welding. Beyond welding operations, modifying welding machines is also one of his specialties. On one occasion, due to product structural reasons, a project he was involved in required welding using an internal bore method, and the material was a new, difficult-to-weld type. Considering the unique structural and material characteristics, Ji Feng conducted repeated research and verification, communicating extensively with welding machine manufacturers. Together, they jointly developed a specialized internal bore welding machine. Through a large number of welding trials and iterative

improvements on both the equipment and welding process parameters, they ultimately mastered the critical technology of internal bore welding, providing strong support for the welding manufacturing of the final product.

OVERCOMING CHALLENGES

In the second half of 2019, the Dubai Solar Thermal SGS Project officially commenced production at Shanghai Power Station Auxiliary Equipment Plant's Lingang factory. This landmark project was the factory's first set of solar thermal equipment and played a crucial role in opening the solar thermal market for Shanghai Power Station Auxiliary Equipment Plant in the future. Ji Feng, together with a broad team of technical and production staff, devoted themselves fully to this unprecedented "Solar Thermal King Battle."

During the early technical preparation stage, Ji Feng was fully aware that the new product imposed fresh demands on welding materials and welding methods. He experimented with various welding techniques and, after some twists and turns, finally determined the welding method and welding material supplier to be used for the product. Moreover, the project's main material, the carbon steel preheater, required dissimilar steel welding, posing significant challenges to welding processes and temperature control during welding. To tackle this, Ji Feng led his team through extensive welding trials to identify suitable welding process parameters and to develop a precise preheating plan. Ultimately, the weld seams were successfully completed and met the design requirements.

As a brand-new product, the acceptance criteria for the solar thermal project were more stringent than traditional standards. Particularly for the tube-to-tube sheet welding, the client imposed numerous additional requirements on top of the ASME and EN standards. Furthermore, according to the technical conditions of the solar thermal project, the welding of tube-to-tube sheets for the preheater, reheater, and superheater had to undergo a MOCK-UP test, which was far more challenging than conventional tube-to-tube sheet welding. This test represented the greatest difficulty in product manufacturing; only after passing it could welding proceed.

Because the tube-to-tube sheet welding differed significantly from traditional products in terms of structural form, acceptance criteria, welding equipment, welder operation, preheating temperature, and fixation methods, many steps were attempted for the first time. To ensure superior product quality, Ji Feng collaborated closely with welding engineers to conduct detailed screening and optimization across six dimensions: personnel, equipment, materials, methods, environment, and measurement. Each detail was rigorously quality-controlled, with tight coordination alongside manufacturing and quality assurance departments. After a year of effort and more than a hundred tests, a complete and practical welding process scheme was finalized.

PASSING THE TORCH OF WELDING SKILLS

As a leading figure in the welding field, Ji Feng deeply understands the importance of passing on technical expertise. He firmly believes that the flame of welding craftsmanship must burn continuously and passed on. In recent years, the practical skills of newly recruited welders at Shanghai Power Station Auxiliary Equipment Plant have varied greatly, and their foundational welding knowledge is generally weak. In response, Ji Feng, despite his heavy workload, resolutely took on the responsibility of retraining these new welders.

In the eyes of his apprentices, Ji Feng is both a revered welding master and a supportive mentor. During every training session, Ji Feng remains fully engaged on-site, carefully observing each welder's current skill level and operational characteristics. Based on individual circumstances, he provides personalized improvement advice from both theoretical and practical perspectives, effectively enhancing their welding capabilities.

To better impart his skills, Ji Feng continuously studies new welding knowledge. Whenever he encounters new materials, processes, or methods in his work, he actively seeks relevant professional theories to support his approach and verifies them through hands-on practice. Through this relentless cycle, his theoretical and practical skills continue to grow.

Ji Feng often says welding is not only a technical craft but also a physically demanding labor. Becoming a top expert in the industry requires several times, even dozens or hundreds of times more effort than average. Therefore, he often spends long hours in the welding laboratory with his apprentices. In the sweltering heat without air conditioning, they frequently work drenched in sweat after training. Yet, Ji Feng knows that only by embracing hardship and deeply rooting oneself on the front lines can one have the chance to grow into an outstanding new-generation welder.

This is like an eternal, warm, and resilient cycle. Ji Feng's father used time as his pen and the welding torch as ink to solemnly pass down the welding craft to Ji Feng, a craft imbued with respect for the skill and love for life. Now, carrying this honor and mission, Ji Feng passes the craft on wholeheartedly. He believes that in the days ahead, more young welders will take up this torch of inheritance, forging ahead on their path in welding. They will write a brilliant new chapter belonging to the new generation of welders.

EDITOR'S NOTE

The International Maritime Organization (IMO) recently approved global net-zero emission regulations for the shipping industry, promoting the adoption of green fuels. In response, Shanghai Electric Group has launched a world-leading wind power-coupled biomass green methanol demonstration project in Taonan City, Jilin Province. The project's first phase, with an annual capacity of 50,000 tons, is scheduled to begin trial operations in June. This project breaks through traditional technological barriers by leveraging local wind and solar resources alongside biomass advantages to realize integrated green electricity-powered hydrogen production coupled with biomass gasification. It offers a cost-effective and sustainable Chinese solution for decarbonizing the shipping industry.

NEW PROJECT VALIDATES NEW MODEL

SHANGHAI ELECTRIC EXPLORES INNOVATIVE PATHWAYS FOR GREEN METHANOL INDUSTRY DEVELOPMENT

On April 11, the International Maritime Organization (IMO) announced the approval of the draft amendment to Annex VI of the International Convention for the Prevention of Pollution from Ships, mandating implementation of the IMO's net-zero emissions framework. This marks the world's first framework combining mandatory emissions limits across an entire industry with greenhouse gas pricing.

In recent years, the use of green fuels such as green methanol has increasingly become a primary means for the international shipping industry to meet IMO requirements and achieve carbon reduction. Against this backdrop, Shanghai Electric Group began construction in 2024 of an integrated wind power-coupled biomass green methanol demonstration project in Taonan City, Jilin Province. Leveraging the region's rich new energy resources, abundant land and water, and convenient transportation, along with independently developed core technologies, the project's first phase with an annual capacity of 50,000 tons of green methanol is scheduled to enter trial operation in June this year. The produced green methanol will be supplied as marine fuel to leading international shipping enterprises, validating a new technical pathway and business model for the green methanol industry.

RISING MARKET DEMAND AND STRONG GROWTH MOMENTUM

In 2023, the International Maritime Organization (IMO) adopted a new greenhouse gas reduction strategy, setting the ambitious goal of achieving net-zero emissions in international shipping around 2050. Using 2008 as the baseline year, the IMO established interim targets to reduce emissions by 20% to 30% by 2030 and by 70% to 80% by 2040.

Industry experts believe that in transport sectors like shipping, where electrification is difficult to achieve in the short term, green fuels such as green methanol will see increasingly widespread adoption. According to projections by the Methanol Institute and the International Renewable Energy Agency (IRENA), global methanol demand will reach 500 million tons by 2050, with green methanol accounting for over 300 million tons.

Zheng Chunlin, founding partner of AsiaChem noted that the green methanol market is policy-driven; international and national policies will play a decisive role in driving demand. Under the guidance of the "dual carbon" goal, the green methanol industry is poised for long-term growth.

Data shows that the current global annual production capacity of green methanol is approximately 500,000 tons, while China's planned capacity has exceeded 10 million tons, indicating strong industrial momentum.

"Shipboard green fuel production projects must meet two key objectives simultaneously: obtain green certification and maintain competitive costs. This places high demands on project location and resources, including biomass, wind and solar green power, and transportation conditions. Therefore, competitive green methanol production capacity will be limited in the future," Zheng said.

At the same time, existing green methanol projects generally have production method shortcomings that make it difficult to meet the rapidly growing market demand. Industry insiders point out that current green methanol production primarily relies on biomass fermentation to generate biogas followed by reforming. Production volume depends heavily on biomass availability, and production costs are tied to biomass prices, resulting in stringent raw material supply requirements. As a result, this technical route limits the ability to produce green methanol on a large scale with continuous and stable output, posing a key problem for the industry. New demonstration projects are therefore needed to pioneer innovative solutions.

SUPERIOR NATURAL CONDITIONS AND PIONEERING INDUSTRY FIRSTS

On-site production of green fuels is currently one of the key scenarios to promote the consumption of new energy. Since March 2024, Shanghai Electric has been constructing an integrated wind power-coupled biomass green methanol demonstration project (hereinafter referred to as the "Taonan Green Methanol Project") in Taonan City, Jilin Province. Leveraging the region's natural geographical advantages, the project explores a new model for large-scale green power consumption and green methanol industry development.

Taonan is located in the transition zone between the Songnen Plain in western Jilin and the Horqin Grassland. The terrain is flat and open, situated within the Songliao Clean Energy Base, one of China's nine major clean energy bases. The area is rich in wind and solar energy resources and features a dense river network, providing abundant resources to support green hydrogen production via water electrolysis for the project.

Meanwhile, Taonan is an important agricultural city with plentiful agricultural and forestry waste such as corn stalks, offering strong biomass energy development potential. The region is sparsely populated with ample land and environmental capacity, suitable for large-scale centralized deployment of green methanol projects and supporting new energy facilities. These conditions are conducive to establishing a "green electricity — green hydrogen — green fuel" zero-carbon circular system.

Geographically, the Taonan Green Methanol Project is located at a transportation hub connecting the three northeastern provinces and eastern Inner Mongolia. It is close to Yingkou Port and Dalian Port in Liaoning Province, enabling efficient rail-sea and sea transport to major coastal ports in China, thereby linking with the international shipping industry's decarbonization needs.

These superior natural and geographical conditions make Taonan an ideal location for Shanghai Electric's green methanol industry development. Reportedly, the Taonan Green Methanol Project is among China's first large-scale integrated demonstration projects coupling wind power and biomass for green methanol production. It plans an annual green methanol capacity of 250,000 tons with a total investment of approximately 6 billion RMB, including an initial phase capacity of 50,000 tons per year.

The project leader at Shanghai Electric's Taonan site stated that after commissioning, this project will become the industry's first practical implementation of large-scale green methanol production integrating wind power hydrogen generation with biomass gasification. It will serve as a positive demonstration and leading example for local new energy consumption.

PROJECT PROGRESSING SMOOTHLY, VALUE REALIZATION WITHIN REACH

This year's Government Work Report proposes accelerating the construction of a new energy base in desert areas, known as the "Desert-Gobi-Desertified Land" project, coordinating both local consumption and export channel development. As one of the nation's first demonstration projects for on-site green power hydrogen consumption, the Taonan Green Methanol Project converts new energy sources such as wind power into storable and transportable low-carbon fuels. It offers a new technical route and business model for large-scale green power utilization.

The project adopts a biomass gasification coupled with green hydrogen-to-green methanol technology pathway, significantly reducing reliance on biomass feedstock, while enabling large-scale production and green power consumption. All core technologies and equipment are independently developed and manufactured by Shanghai Electric, reaching internationally advanced levels. This marks a key strategic deployment in the hydrogen-based green fuel sector.

In December 2024, during construction, the project obtained three ISCC EU certifications covering biomass storage, biomass processing, and biomass gasification coupled with green hydrogen-to-biological methanol production. Combined with ISCC EU-certified storage and refueling ports, the project has established a comprehensive full lifecycle traceability system for its green methanol products. The ISCC EU certification, applicable to bioenergy entering the European Union, is a fundamental guarantee for realizing the project's commercial value.

In March 2025, Shanghai Electric, CMA CGM Group (France), and Shanghai International Port Group (SIPG) officially signed the "Long-Term Cooperation Framework Agreement on Green Methanol Supply, Transportation, and Bunkering". According to the agreement, Shanghai Electric will leverage the Taonan Green Methanol Project to provide CMA CGM Group with mid-to-long-term green methanol fuel supply. It will cooperate with Shanghai International Port Group to transport green methanol from Taonan to Shanghai Port via combined land-sea logistics, completing the refueling process and forming a "production-transportation-refueling" closed loop.

From the project's inception, economic viability has been a key decision factor. Shanghai Electric believes that a successful demonstration of new technology must come with a solid business plan that ensures positive commercial logic. Only then can the project be healthy, inspire industry confidence, and sustain long-term development.

According to a Shanghai Electric spokesperson, current practical experience shows that the initial phase of the Taonan Green Methanol Project can achieve cost control and commercial planning goals. Following the success of the initial phase, Shanghai Electric plans to actively expand, aiming to establish a concrete timeline and roadmap for subsequent projects scaling up to 200,000 tons per year, building on the initial 50,000 tons per year capacity.

01

BREAKTHROUGH IN INTELLIGENT MANUFACTURING AT NO.1 MACHINE TOOL WORKS EMPOWERS EFFICIENT AND SAFE NUCLEAR POWER PRODUCTION

Faced with growing national strategic and defense security demands, Shanghai No.1 Machine Tool Works Co., Ltd. (hereinafter "No.1 Machine Tool Works") urgently needs breakthroughs in intelligent transformation beyond the traditional discrete manufacturing model.

With the goal of "enabling multi-scenario interaction, unlocking data value flow, and achieving transparency of production elements," No.1 Machine Tool Works is advancing intelligent manufacturing solutions for nuclear energy equipment. By building this system, the company achieves coordinated internal production organization and leverages cutting-edge technologies such as the Internet of Things (IoT) to enable interconnectivity among CNC machine tools, robots, coordinate measuring machines, intelligent automated warehouses, and other smart equipment. This strengthens process control across planning, production, inspection, and warehousing, promotes efficient collaboration among production units and organizations, and drives business innovation.

Taking multiple measures, No.1 Machine Tool Works utilizes Shanghai Electric's independently developed Current Cloud Ring and data acquisition system to collect and analyze equipment current data. Combining big data analytics and artificial intelligence algorithms, it monitors real-time equipment operational status, calculates equipment utilization rates, and measures energy consumption levels. IoT technology is also applied for online measurement using digital gauges and other inspection tools, enabling precise traceability of product quality.

This intelligent manufacturing solution has achieved breakthroughs in product quality improvement, operational efficiency enhancement, employee working environment improvement, and greener manufacturing processes. Looking ahead, No.1 Machine Tool Works will expand its data-driven business model, continuously explore innovative technologies, and contribute to achieving safer and more efficient nuclear power production.

02

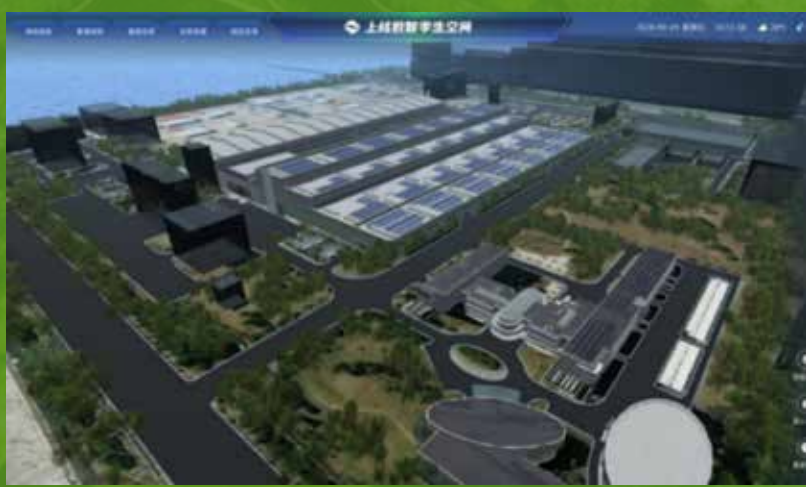
DIGITAL TWIN PLATFORM: SELECTED AS A DEMONSTRATION PROJECT AND WINNER OF INNOVATION AWARDS

Since 2021, Shanghai Electric Nuclear Power Equipment Co., Ltd. (hereinafter "Shanghai Electric Nuclear Power Equipment") has been advancing its digitalization strategy to address significant challenges such as ultra-large product dimensions, long production cycles, vast factory area, high dispersion of equipment, personnel, materials, and production tasks, as well as difficulties in monitoring task progress and tracking material status.

The Digital Twin Platform creates precise digital models of physical entities within a virtual environment using digital technologies. By integrating virtual and real spaces, it provides real-time reflection and analysis of on-site conditions and anomalies, assisting users in improving on-site management efficiency and accelerating problem response. Leveraging data object modeling technology, the platform successfully integrates with business systems, consolidating diverse enterprise data. Through digital twin technology, it enables full-process visualization and early warning prediction for the manufacturing of main equipment in the nuclear island—from order placement to delivery. Vertically, it achieves digital twin coverage from the park level to workshops and down to workstations, creating the "Shanghai Nuclear Intelligent Twin Space." Internally, this empowers business operations, management improvement, risk control, and operational simulation and forecasting. Externally, it supports market promotion and brand value enhancement.

The platform utilizes digital models, artificial intelligence, and other digital technologies to enable more accurate predictions and optimizations, providing higher-level decision support. This ultimately drives improvements in management efficiency, resource allocation, product quality, factory safety management, and supply chain management.

In 2023, the Digital Twin Platform was selected as one of the first demonstration projects for nuclear power digital transformation by the National Energy Administration, standing out as the only pilot project in the field of intelligent manufacturing. In 2024, the platform won the First Prize in the Manufacturing Intelligent Solutions Innovation Competition of the "Smart Craftsman" and "Leading Pioneer" selection events for digital intelligence integration in Shanghai.



03

"HH-70" PROJECT LEADS THE WAY IN CRAFTING A NUCLEAR-INTELLIGENT ENERGY BLUEPRINT FOR NATIONAL DEVELOPMENT

Amid the global energy transition, Shanghai Electric Nuclear Power Group Co., Ltd. (hereinafter "Nuclear Power Group") has partnered with Energy Singularity Energy Technology (Shanghai) Co., Ltd. to successfully develop and manufacture the world's first full high-temperature superconducting tokamak device, "HH-70," and its core components. This project aims to validate the feasibility and operational safety of building a high-temperature superconducting tokamak, laying a solid foundation for the commercial application of controlled nuclear fusion technology. It demonstrates the Nuclear Power Group's strong capabilities and innovative spirit in the field of clean energy technology. During the R&D and manufacturing process of the "HH-70" project, the Nuclear Power Group overcame numerous technical challenges, including the forming process of thin-walled special-shaped circular arc segments, high-precision machining of large cylindrical shell conical and cylindrical surfaces, and welding techniques for low-magnetic stainless-steel materials. These breakthroughs ensured the high-quality production and delivery of the three core components of the "HH-70" main system — the outer vacuum Dewar, vacuum chamber, and inner and outer cold shields. The manufacture of these components demands not only exceptional precision and quality but also outstanding reliability and durability to withstand the extreme conditions of fusion reactions.

The successful plasma discharge achieved by the "HH-70" project marks China's pioneering advantage in the field of high-temperature superconducting magnetic confinement fusion. It advances clean energy technologies and provides strong support for the global energy transition. Furthermore, the project has strengthened close cooperation between the Nuclear Power Group and partners including owners and suppliers, fostering mutual growth and prosperity and creating a win-win development scenario for all parties involved.

Looking ahead, the Nuclear Power Group plans to build on the success of the "HH-70" project, capitalizing on its expertise in high-end equipment manufacturing and technology commercialization. It will closely collaborate with enterprises, research institutions, and universities aligned with clean energy technology development trends, actively participate in the R&D and application of next-generation nuclear fusion technologies, and continue to uphold the principles of innovation, collaboration, responsibility, and mutual benefit. Through these efforts, the Group aims to promote the advancement and application of clean energy technologies, contributing to sustainable development for all.

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