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SHANGHAI ELECTRIC
SMART ENERGY FOR A GREENER FUTURE

上海电气 SHANGHAI ELECTRIC

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EDITOR'S WORDS

NEXT BIG MOVE FOR SMART ENERGY

In this issue's cover story, we will focus on smart energy in light of Shanghai Electric's industrial characteristics. Smart energy is not only a concept but also an industry, which is a combination of energy, Internet and technology, and a practical overall solution for water, electricity, gas, heat, oil and other integrated energy.

For example, in the wind power field, to achieve unattended remote monitoring, through the remote intelligent control, balanced delivery and precise regulation can be achieved in the centralized control center. Additionally, it allows for timely detection and repair of wind turbine losses to ensure the safe operation and maintenance of wind farms.

Smart energy is an efficient, interactive, and integrated energy system, serving as the top-level framework that integrates with all kinds of energy management system. It adopts professional intelligent technology and means to achieve high efficiency, energy saving and cleanliness.

In the era of Internet of Everything, more and more traditional industries need to use data to connect. Built on the data base, the digital economy becomes the "engine" to drive economic growth and industrial transformation and upgrading. Actively embracing the Internet and effectively integrating the "Internet +" technology with energy development will undoubtedly yield many benefits.

In the future, Shanghai Electric's "Internet +" smart energy system will fully reflect the user demand, efficiently aligning supply with demand to quickly solve the user's pain points. It is conducive to making scientific decisions for enterprises. With efficient and convenient energy scheduling and management, it promotes the optimization of the energy structure and the efficient use of energy, and reduces energy consumption. In addition, it brings more space for the innovation of industrial and business models.

It is not difficult to imagine that "Internet +" smart energy will bring a change to the energy industry.

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NEWS OVERVIEW

Shanghai Electric Ships First Generator Stator for China-Russia National Collaboration Project

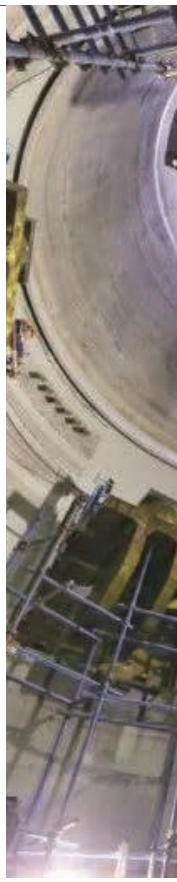
Shanghai Electric recently celebrated the completion and transportation of the first 1,300 MW steam turbine generator stator at the Tianwan Nuclear Power Plant. This important milestone marks the official start of mass production for Shanghai Electric's 1,300 MW nuclear power generators. The company has developed this advanced generator with independent intellectual property rights. The Units 7 and 8 of Tianwan Nuclear Power Plant represent a major collaboration in nuclear power between China and Russia. Since signing the procurement order of generator rotor forgings in June 2021, Shanghai Electric Generator Plant has been actively integrating design, manufacturing, and operational expertise from both nuclear power generators and million-kilowatt-class thermal power generators. This proactive approach has led to the successful development of products with complete intellectual property rights. It is noted that the installation of the stator for Unit 7 at the Tianwan Nuclear Power Plant is scheduled to start in May of this year, and its commercial operation is planned for 2026.

Shanghai Electric Digital Technology Receives Prestigious Annual Awards

Recently, the 2023 Industrial Internet Golden Purple Bamboo Conference took place in Beijing. Organized by Industrial Internet World and Communications Weekly, the summit is considered a premier event in the field of Industrial Internet. At the conference, the highly esteemed "Golden Purple Bamboo Award for Industrial Internet" was announced. Shanghai Electric Digital Technology Co., Ltd. was honored as the "Industrial Internet Contributor of the Year 2023". Their Smart Carbon Steward, instrumental in the development of a Zero Carbon Warehouse, was acknowledged as an exemplary case for the application of Industrial Internet in a lighthouse factory. Additionally, Mr. Fan Shiwang, Vice General Manager of Shanghai Electric Digital Technology, was listed into the "Top 10 Influential Figures in Industrial Internet" for 2023.

Project Undertaken by Shanghai Electric Automation D&R Institute Honored with Prestigious Luban Prize

The award ceremony for the 2022-2023 China Construction Engineering Luban Prize (National High-Quality Project) took place in Beijing on December 10, 2023. The Phase 1 project of Shanghai Metro Line 18, undertaken by Shanghai Electric Automation D&R Institute Co., Ltd and its partners, received the prestigious Chinese Construction Engineering Luban Prize. Shanghai Metro Line 18 is one of the first fully automated lines in China to be equipped with the GoA4 system. This system signifies the highest level of automation, allowing for operations without the need for human intervention. During the initial operation safety assessment, Shanghai Metro Line 18 accomplished a remarkable feat by becoming the first domestic metro line to pass the assessment without any Class A rectification items. This outstanding accomplishment has bestowed upon it the esteemed title of "Best Domestic Metro Line in History".



Shanghai Electric/Tsinghua University Collaborative Project Receives Grand Award for Excellent Industry-Academia-Research Collaboration

Recently, Shanghai hosted an award ceremony to celebrate excellent industry-academia-research collaboration projects in 2023. A project titled "R&D and Industrialization of 600 MW High-Temperature Gas-Cooled Reactor Main Equipment", jointly submitted by Shanghai Electric Nuclear Power Group and Tsinghua University, stood out among numerous projects and was honored with the Grand Award for excellent industry-academia-research collaboration in Shanghai. Between 2019 and 2023, the Nuclear Power Group provided key experimental verification equipment, including test pieces for helical tube bundle of intermediate heat exchanger, to Institute of Nuclear and New Energy Technology (INET) of Tsinghua University, which helped accelerate the theoretical research and equipment optimization of high-temperature gas-cooled reactors. The contribution was made possible based on Shanghai Electric's expertise gained from the manufacturing of 200 MW high-temperature gas-cooled reactors. As a result, Shanghai Electric has secured multiple orders for the associated equipment, with a total contract value of 3.7 billion yuan. The company has established the capability for large-scale production and comprehensive supply of main equipment for 600 MW high-temperature gas-cooled reactors.

Shanghai Electric's New Environmental Protection Technology Selected into Catalogue of Major Environmental Protection Technology and Equipment Encouraged by China

Recently, the 2023 edition of Catalogue of Major Environmental Protection Technology and Equipment Encouraged by China was released. The project titled "Integrated Ultra-low Emission Technology and Equipment Utilizing Tube-Shaped Catalytic Ceramic Fiber Filters", developed by Shanghai Electric Environmental Protection Group, has been successfully selected for inclusion in this catalogue. The technology, previously featured in the 2022 edition of Shanghai's Green Technology Catalogue, focuses on treating flue gas generated from waste incineration. The goal of this technology is to achieve ultra-low emissions. It utilizes integrated ultra-low emission technology and equipment with tube-shaped catalytic ceramic fiber filters, incorporating the short process cycle approach. These filters effectively remove pollutants like sulfur compounds, nitrogen oxides, particulate matter, and dioxins in a simultaneous and coordinated manner. This innovative technology ensures that the emissions of flue gas meet the stringent national requirements for ultra-low levels of pollutants.

NEWS OVERVIEW

Shanghai Electric Awarded Bid for Two Core Nuclear Power Components

Recently, Shanghai Electric Nuclear Power Group has won two consecutive bids for the Flat Actuator and Flat Actuator Calibration Platform projects led by the Institute of Rock and Soil Mechanics, Chinese Academy of Sciences, in Wuhan. This success marks a significant enhancement of Shanghai Electric's brand influence and core competitiveness in the field of scientific research.
The two projects represent critical components of the national major scientific and technological infrastructure for simulation of geological disturbances in deep engineering. This infrastructure is a part of the country's "14th Five-Year Plan" and aims to replicate authentic stress environments through experiments, providing a foundation for evaluation designs and practical applications.

Eastern Guangdong Sea Area's Offshore Wind Power Farm with Highest Single-Unit Capacity Commences Operation

Recently, the Huaneng Lemen (II) 600,000-kilowatt offshore wind power farm successfully connected to the grid, signifying the completion of the 10-million-kilowatt offshore wind power farm in eastern Guangdong. This national demonstration project is anticipated to produce approximately 2 billion kWh of electricity annually. With a total installed capacity of 600,000 kilowatts, the project comprises fifty-four 11 MW direct-drive offshore wind turbines developed by Shanghai Electric. It is a major undertaking under Guangdong Province's "14th Five-Year Plan" and serves as Huaneng Group's first offshore wind power project in Guangdong. Furthermore, it stands as the largest offshore wind power facility in terms of single-unit capacity in the eastern Guangdong sea area.

Shanghai Electric Successfully Delivered Pancevo Thermal Power Plant as EPC Project

In late 2023, Shanghai Electric received auspicious news about an overseas project. The Pancevo Gas-Fired Combined-Cycle Thermal Power Plant in Serbia, constructed by Shanghai Electric as the main contractor, was successfully completed and officially received the handover certificate from the owner. The Pancevo thermal power plant represented Shanghai Electric's inaugural foray into the high-end European market and was built following European standards. Throughout the project's execution, Shanghai Electric's overseas team successfully tackled obstacles such as differences in design, production, and manufacturing standards between domestic and foreign countries, as well as disparities in local construction practices and Chinese methods. They conducted a reliable 72-hour test in March 2022 and achieved temporary handover in October of the same year. Throughout the project warranty period, the project team worked diligently to address any remaining issues and successfully completed the official handover. This project has laid a solid foundation for Shanghai Electric to expand its presence in the high-end European market.

Shanghai Electric Energy Storage Technology Wins Bid for SPIC's Collective Procurement of Energy Storage System

Recently, SPIC's Material & Equipment Company and SPIC E-Commerce (Beijing) Technology announced the list of successful candidates for the 2023 energy storage system e-procurement tender. Shanghai Electric Energy Storage Technology Co., Ltd. (hereinafter referred to as "Shanghai Electric Energy Storage Technology") secured a place as a winning candidate for "Section 1" of the 1 GWh redox flow battery energy storage system. The total procurement scale for this project is 5.2 GWh, which includes 4.2 GWh of lithium iron phosphate energy storage systems and 1 GWh of redox flow battery energy storage systems. The procurement of the 1 GWh redox flow battery energy storage system is divided into four sections.

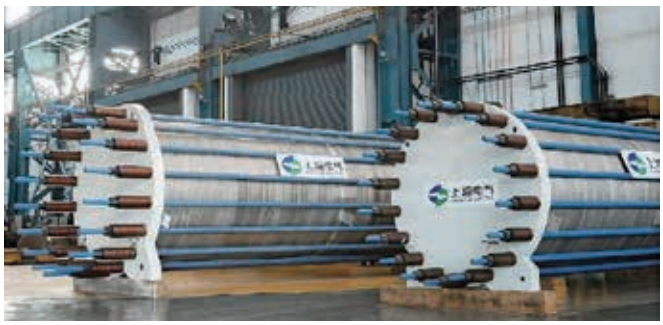
Phase II of Zhanatas 100 MW Wind Power Plant in Kazakhstan Successfully Connected to the Grid

The Phase II of Zhanatas 100 MW wind power plant in Kazakhstan, an important project in Central Asia under the "Belt and Road" initiative, achieved grid connection and commenced power generation 21 days ahead of schedule. Shanghai Electric Environmental Protection Group played a key role in the construction of this project. Despite challenging conditions such as extreme cold and strong winds, the project team successfully completed all wind turbine installations in November 2023. They tackled these difficulties in a systematic and organized manner, making significant progress in the project's grid connection process. Their efforts were highly appreciated by the project owner.

Shanghai Electric's Desalination Projects Selected for International GWI Rankings

The International Desalination Association's Global Water Intelligence (GWI) recently published the latest statistics and rankings for global desalination projects. According to the report, Shanghai Electric secured the 9th position globally for newly constructed desalination projects between 2022 and 2023. Additionally, the company ranked 11th globally for cumulative desalination capacity from 2013 to 2023. The desalination market is experiencing unprecedented levels of competition, as indicated by the global rankings of water companies in recent years by GWI. Despite this intense competition, Shanghai Electric has consistently maintained a leading position and remains stable in the top tier of the global desalination market.

Bright-H Technology Becomes a Candidate for Centralized Procurement Bid of Hydrogen Equipment by CEEC



At the end of 2023, China Energy Engineering Corporation (CEEC) released the list of winning candidates for the centralized procurement of hydrogen production equipment. Shanghai Bright-H Technology Co., Ltd, a subsidiary of Shanghai Electric, successfully participated in the bidding for the Alkaline Electrolyzer and PEM Electrolyzer supply. The centralized procurement is set to involve 125 sets of electrolyzers, including 110 sets of 1000Nm3/h alkaline electrolyzers and 15 sets of 200 Nm3/h PEM electrolyzers.

CEEC's recent centralized procurement tender for electrolyzers has garnered significant industry attention as the largest scale of its kind in recent years. The company has a strong presence in hydrogen production, power stations, and hydrogen applications. Additionally, they have established numerous green hydrogen demonstration projects globally. Being shortlisted signifies that Shanghai Electric and CEEC will enhance their collaboration to develop comprehensive energy demonstration projects in the realm of green hydrogen. These projects will encompass areas such as green chemicals and green transportation, guided by the "Power To X" concept.

Bright-H Technology is proud to be selected as one of the two candidates chosen for the Alkaline Electrolyzer and PEM Electrolyzer supply. This accomplishment is a testament to Shanghai Electric's two-pronged strategy integrating "hydrogen produced via water electrolysis and development of fuel cell technology" in hydrogen energy development. By focusing on both alkaline electrolysis and PEM electrolysis technologies and equipment, Shanghai Electric aims to push the boundaries of product performance and scale limits, leading the industry towards high-quality development.

Based on their extensive technology and experience in high-end equipment manufacturing, Shanghai Electric's alkaline electrolyzer production capacity has surpassed 1GW, while their PEM electrolyzer production capacity has exceeded 200 MW. Additionally, Shanghai Electric has established a state-of-the-art research and development center, a fully powered testing and verification platform for alkaline electrolyzers, and the largest PEM electrolyzer testing and verification platform in China, which can handle a capacity of 300Nm3/h. These facilities ensure the production of safe, reliable, and high-quality electrolyzers.

Shanghai Electric is dedicated to implementing China's carbon peaking and carbon neutrality strategy. They prioritize delivering excellent products and efficient services, promoting the development of hydrogen energy sector, fostering the coordinated development of both upstream and downstream industries, and supporting China's transition to a more sustainable and environmentally friendly energy system.

Shanghai Electric's First High-Efficiency Photovoltaic Product Rolled off the Line

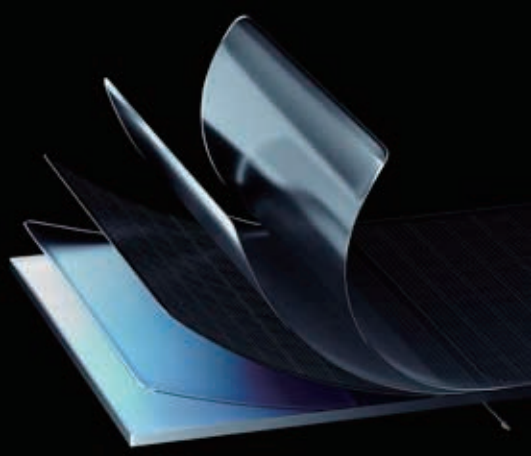
On December 28th, at 3 o'clock in the morning, the inaugural batch of components for the first phase of the high-efficiency PV cell produced by Hency Solar Technology Co.,Ltd. (hereinafter referred to as "Hengxi Photovoltaic"), a subsidiary of Shanghai Electric, was successfully rolled off the production line in Haimen District, Nantong City.

Since site construction began in August, Hengxi Photovoltaic has remained committed to the core concept of "high-quality development" and has collaborated closely with internal and external partners. They have efficiently and systematically advanced various construction tasks to meet the goal for the timely achievement of project milestones. It took just 27 days from the official installation of the production line on December 1st to the production of the first batch of products.

The first phase of the Hency Solar Technology project includes high-efficiency N-type PV modules. These modules have a power output of up to 630 W and an efficiency of 23.3%. They are known for their industry-leading performance in terms of efficiency, power output, bifaciality, reliability, temperature coefficient, LID, and PID. These features make them suitable for various application scenarios and cater to the diverse needs of customers. Hency Solar Technology is strongly committed to upholding excellence in all aspects of their operations. The company aims to propel forward from the successful production of its inaugural batch of components, viewing it as a new starting point. They plan to increase production capacity to achieve mass production efficiently, establish core advantages in talent, quality, and cost, and become a prominent player in the new energy industry.

The successful production of the first batch of components by Hengxi Photovoltaic is a significant milestone for Shanghai Electric's renewable energy strategy. It shows that Shanghai Electric now has complete independence in manufacturing photovoltaic (PV) products. This accomplishment strengthens Shanghai Electric's presence in the renewable energy industry and fosters synergies in the coordinated development of its various business divisions. Moreover, it enables Shanghai Electric to expand its influence in the PV sector.

At the "2023 China International Photovoltaic Industry Conference", the China Photovoltaic Industry Association announced the companies that signed the "Integrity Calibration and Traceability Self-discipline Convention for Standards of PV Modules and Components". Hency Solar Technology Co.,Ltd. was among the first companies to endorse the convention.



Wind Power's Zhuoyue Platform Achieves New Milestones

Shanghai Electric Wind Power Group Co., Ltd. has recently secured bids for two projects, both with a capacity of 500,000 kW. The first project is the Alukeerqin 1 million kW (1 GW) Wind and Energy Storage Base project, which is being developed by Inner Mongolia Energy Investment Group. The second project is the Xinjiang Bayingol 1 million kW source-grid-load-storage integration project by China Huadian Corporation.

The Alukeerqin project is included in Inner Mongolia Autonomous Region's third batch of large-scale wind-PV base projects. The project will utilize Shanghai Electric's advanced EW10.0-230 wind turbines developed based on Zhuoyue Platform. These turbines will be installed on 140-meter tall "3060 hybrid towers," specifically designed to withstand the challenging desert, Gobi, and arid region environments.

The Bayingol project is included in China's third batch of large-scale energy base projects. This project will utilize Shanghai Electric's reliable EW8.5-220 and EW10.0-230 wind turbines developed based on the Zhuoyue Platform. These turbines will be installed on 120-meter and 125-meter steel towers. Shanghai Electric Wind Power will provide tailored solutions to effectively handle the strong wind speeds in Xinjiang, ensuring optimal performance for the project.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FOCUS NEWS

Shanghai Electric Successfully Completes PV Energy Storage Projects in the UK

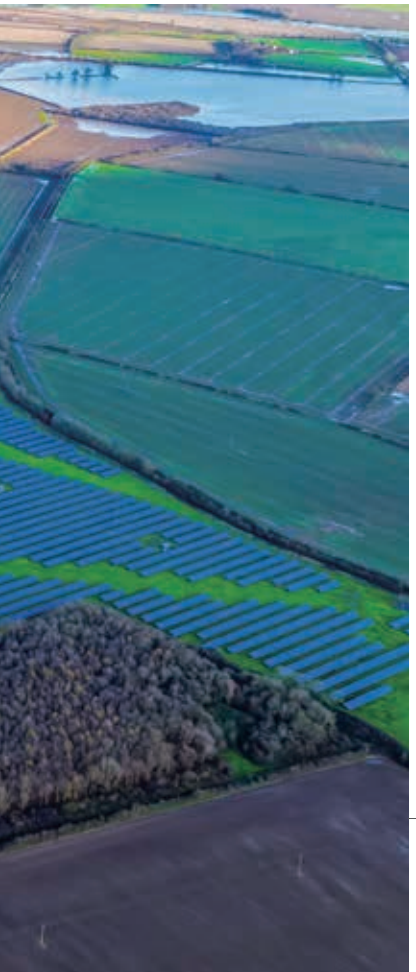
Shanghai Electric Gotion New Energy Technology Co., Ltd. ("Shanghai Electric Gotion") recently achieved a major milestone by successfully putting the 100 MW/100 MWh REP1&2 Energy Storage Station project in Kent, UK, into commercial operation. This project marks Shanghai Electric Gotion's first large-scale energy storage facility overseas. Operating in the UK's highly market-oriented power market, the project utilizes peak shaving and frequency regulation to guarantee profits, while improving the efficiency, reliability, and sustainability of the power system.

Furthermore, the Fiskerton II-A 15.752 MW project has achieved grid connection and started generating power. With the successful completion of this project, Shanghai Electric has now finished all eight turnkey PV projects it undertook in the UK. These projects represent a significant milestone for Shanghai Electric as they mark its entry into the overseas high-end market. Adopting the "investment and financing-construction-grid connection and power generation-operation" model, these projects set a great example for other Chinese companies aiming to develop renewable energy projects in the UK and European markets.

Shanghai Electric Wins Major Contract for Complete Main Equipment Package of Double Reheat Unit

Shanghai Electric Power Generation Group recently secured the contract for the supply of three main equipment of ultra-supercritical double-reheat coal-fired power plants, each with a capacity of 2x660 MW, for the Jiangling Power Plant Phase II Expansion Project by Hubei Energy Group. This project signifies an enhanced collaboration between Shanghai Electric and Hubei Energy Group in the energy sector.

The Jiangling Thermal Power Plant is situated in the Coal Power Port Chemical Industrial Park (incorporating the establishment of coal bases, thermal power plants, ports, and coal chemical enterprises), Jiangling Economic Development Zone, Jingzhou City, Hubei Province. The project involves the construction of two domestically-produced ultra-supercritical double-reheat coal-fired units, each with a capacity of 2x660 MW. Additionally, flue gas desulfurization and denitrification facilities will be installed simultaneously. Once finished, the project will meet the growing electricity needs in Hubei Province and help address power shortages during dry periods in the Yijiang-Jingzhou-Jingmen area. It will facilitate high-quality economic and social development in the region, taking advantage of its position as a "crossroad" power station. Additionally, it will improve the security, stability, and durability of the power grid.



SHANGHAI ELECTRIC
SMART ENERGY FOR A GREENER FUTURE

Environmental protection, low carbon and intelligence are key to a greener future. As a world-class, comprehensive high-end equipment manufacturer, Shanghai Electric considers digitalization a key focus for transformation and upgrading during the 14th Five-Year Plan period. Through the leadership of digital technologies, the Group aims to enhance energy management for precision and efficiency, making sustainable development the overarching theme.

In this context, how do we show our trump cards to customers and the market? In January this year, Shanghai Electric's E-Solutions was officially launched, which mainly includes three major areas of "smart energy, intelligent manufacturing, and digital intelligence integration", aiming to create value and improve service for every customer.

In this issue, we will focus on the top ten solutions in the field of "smart energy", including: efficient and flexible regulation of gas power, high-efficiency and clean coal power reform linkage, safe and advanced nuclear power units, clean hydropower generation and storage, intelligent and robust power grid equipment, excellent onshore-offshore wind power, 24-hour solar power generation, "diversified approaches to energy storage", integration of hydrogen production, storage, processing and utilization, distributed green energy supply. We hope to bring you a deeper understanding of the integration of smart energy, renewable energy and green energy through feature analysis, classic cases and other methods.

Now let's feel the charm of smart energy and build a new life powered by green energy.


H2

01

EFFICIENT AND FLEXIBLE REGULATION OF GAS POWER

Depending on different application scenarios and energy combinations, Shanghai Electric offers one-stop systematic solutions for comprehensive energy use. More importantly, we also bring customers diverse options and excellent economic returns.

Gas turbines, known as the "crown jewel" of the manufacturing industry, play an unrivalled role in today's power generation due to their cleanliness, environmental friendliness, speed and flexibility. Through cooperation with Ansaldo, Italy, Shanghai Electric now owns a complete set of technologies of heavy-duty gas turbines from R&D and design, processing and manufacturing to maintenance and upgrading, and has grown into the leader in China with the core technology of heavy-duty gas turbines.

With independently developed technology, localized supply and service industry chain, Shanghai Electric is capable of providing all-round, one-stop and autonomous services during the whole life cycle, which ensures energy security and autonomy for power plants. Together with the corresponding combined-cycle steam turbine, generator, waste heat boiler, condenser, and other equipment solutions, the three main gas turbines are AE94.3A, AE94.2 (or AE94.2KS), and AE64.3A, featured by cleanliness, reliability, high efficiency, and flexibility.

The gas turbine industry of Shanghai Electric is connected with the market through the integrated management platform of the Gas Turbine Division of Turbine Plant to provide one-stop user experience and optimal gas turbine combined cycle system solutions from market tracking, contract signing, project execution to after-sales service.

Project Case

Datang Foshan Cogeneration Project

The Guangdong Datang International Foshan Cogeneration Project adopts two 470 MW "1+1" F-class gas-steam combined cycle generator sets supplied by Shanghai Electric, including the AE94.3A F-class gas turbine, twin-cylinder triple-pressure reheat axial steam turbine and water-hydrogen cooled generator. The turbine island equipment is arranged on a split shaft, with a large platform mirroring the layout. Turbine 1 was commissioned on 11 July 2022 and turbine 2 on 25 November 2022 respectively. After the project is put into operation, the annual power generation of the turbines will be about 3 billion kWh, which can meet the rapid growth of regional power demand and the demand of heat-consuming enterprises within a 20-kilometer radius.

The project is the first large F-class project of Shanghai Electric that adopts the split-axis median large platform arrangement, which has flexible arrangement and high space utilization efficiency, and can save a lot of investment in plant infrastructure, and the gas turbine and steam engine are positioned on a large platform, which is streamlined, simple and convenient for overhauling and maintenance. The same type of turbines has been used in the projects of SPIC Sihui, Datang Gaoyao, and Zhangjiagang Huaxing.

02

HIGH-EFFICIENCY AND CLEAN COAL POWER REFORM LINKAGE

For different application scenarios, Shanghai Electric can provide users with efficient, flexible and intelligent integrated reform linkage solutions. Shanghai Electric is a leader and innovator in the field of efficient and clean coal power.

In terms of energy saving, Shanghai Electric uses product energy-saving technology, adopts a series of system integration solutions, and continuously optimizes the system to improve the efficiency of the turbines. Through various technical routes, it can achieve the energy-saving target of reducing the coal consumption of power supply to 300 g/kWh. By enhancing turbine temperature and efficiency, optimizing steam turbine flow, harnessing flue gas waste heat, implementing steam-electric dual-drive systems, and employing other comprehensive transformation technology routes, a number of the industry's first demonstration projects have been successfully executed. These initiatives aim to achieve the efficient and reliable operation of the turbine, fully demonstrating Shanghai Electric's industry-leading energy-saving concepts.

In terms of flexibility, Shanghai Electric combines the advanced design and manufacturing experience of main and auxiliary engines to achieve stable, efficient and environmentally friendly synergistic coupling of main and auxiliary engines within a broad load regulation range of 20-100%. By adopting system energy optimization and distribution technology, the Group ensures that the straight condensing unit can reach 20% of the rated load peaking capacity, achieve safe and reliable operation in all working conditions, and minimize energy loss under low load conditions. Shanghai Electric has also coupled the application of electrochemical energy storage, mechanical energy storage and many other new technologies, greatly improving the unit's operational flexibility through the thermoelectric decoupling.

In terms of heat supply, combining the actual application scenarios, Shanghai Electric provides diversified comprehensive solutions for heat supply to meet users' energy needs for cooling, heating, electricity, water and steam. Through the use of advanced technologies such as cold and hot re-pumping, middle connection valve pumping, connecting pipe pumping, high back pressure pumping and flexible operation of low-pressure cylinders, Shanghai Electric can provide high-quality heating renovation services to meet the needs for high- and low-pressure steam supply.

02

Project Case

Guoneng Taishan Retrofit Project

As a typical demonstration case, unit 2 of Guoneng Taishan Power Plant is the first project of Shanghai Electric to upgrade the steam engine parameters from N600-16.7 MPa /537℃/537℃ to N630-17 MPa/600℃/600℃, and the boiler and auxiliary engine systems are supported by the corresponding parameter upgrading and comprehensive renovation.

On the basis of conventional steam turbine unit through-flow modification, the project has significantly improved the performance of the unit by increasing the main steam and reheat steam temperatures, breaking through the energy consumption limitation of the conventional units. The temperature parameters of the existing sub-critical grade were raised to the level of supercritical or even ultra-supercritical grade parameters to significantly reduce the energy consumption level of the unit. The energy-saving optimization of the main and auxiliary equipment and thermal system of the power plant as well as the optimization of the mutual matching of various specialties were comprehensively considered, so as to achieve the optimal benefit of the power plant.

After upgrading the parameters of unit 2, the standard coal consumption rate of power supply was reduced from 314.52 g/kWh to 288 g/kWh. Considering this item only, after upgrading, unit 2 can save about 60,000 tonnes of standard coal per year, save about 50 million yuan of fuel cost per year, and reduce 130,000 tonnes of carbon dioxide.

03

SAFE AND ADVANCED NUCLEAR POWER UNITS

Since the 1970s, Shanghai Electric has become China's premier manufacturer of nuclear power equipment, boasting the longest history of experience, the highest delivery performance, the most extensive product portfolio, the most comprehensive technology routes, the largest equipment capacity, and the deepest global cooperation. Shanghai Electric's nuclear power products cover all nuclear power plants in China, and its comprehensive domestic market share continues to take the lead.

Starting from Qinshan Nuclear Power Plant ("Project 728"), Shanghai Electric is the earliest nuclear power manufacturer in China to be actively involved in providing complete sets of main equipment for nuclear islands for more than 50 years. By the end of 2022, the Nuclear Power Group has delivered a total of 194 sets of main equipment for nuclear islands, with a comprehensive market share of 40%, far exceeding major competitors such as Dongfang Electric, Harbin Electric, and CFHI, and continues to rank first in the industry.

The manufacturing technology of Shanghai Electric Nuclear Power Group covers key equipment of second-generation plus, third-generation pressurized water reactors as well as fourth-generation high-temperature gas-cooled reactors and fast breeder reactors, which comprehensively covers the existing mainstream nuclear power technology routes in China. It also carries out a variety of forms of cooperation in the fields of production, learning and research with a number of scientific research institutes such as the Chinese Academy of Sciences, design institutes, and colleges and universities. By the end of 2022, it has won more than 100 provincial, ministerial and social science and technology awards, and acquired 464 patents, including 223 invention patents.

Since the 1970s, it has carried out nuclear power business cooperation on a global scale, and has cooperated with more than 50 famous enterprises. The cooperation modes include joint venture, technology transfer, joint R&D, project subcontracting, supply chain cooperation, and so on.

Project Case

Shandong Rongcheng Shidaowan Project

Shandong Rongcheng Shidaowan High Temperature Gas-cooled Reactor (HTGR) Demonstration Project is the first high temperature reactor demonstration power plant in China and the first 200 MW HTGR nuclear power plant in the world with the safety features of fourth-generation nuclear energy system. The demonstration project is the result of Tsinghua University's follow-up research and development on the 10 MW high-temperature gas-cooled experimental reactor under the National Major Project, which has been at the forefront of the world, and units 1 and 2 have been successfully connected to the grid. Shanghai Electric has supplied the reactor pressure vessel, metal in-reactor components, and control rod system.

Shanghai Electric can also provide steam generators, main helium circulators and other equipment, and has independently developed 13 core patented technologies during the development of the main equipment for the 200 MW high-temperature gas-cooled reactor nuclear power plant demonstration project.

04

CLEAN HYDROPOWER GENERATION AND STORAGE

Pumped storage is like a "supercharger" that helps build a new energy system. **Shanghai Electric has joined hands with Voith, the world's largest hydropower equipment supplier, to establish a joint venture, which has been widely recognized in the industry for its excellent quality.**

In the new era of accelerating the green and low-carbon transformation of energy, pumped storage is the green, low-carbon, clean and flexible regulation power source with the most mature technology, economically optimal, and with the most favorable conditions for large-scale development, and it has the best effect of joint operation with wind power, solar power, nuclear power, etc. It can effectively compensate for the stochastic intermittency problem of wind power and solar power. Pumped storage provides 97% of the world's current energy storage capacity.

Voith Hydro Shanghai Co., Ltd. has been providing long-term, customized solutions and services for pumped energy storage power plants. Voith has installed more than 450 pumped storage units worldwide with a total output of more than 60,000 MW, with a head range of less than 50 m to more than 800 m and a single unit output range of less than 10 MW to more than 500 MW. The professional technical team in Shanghai makes full use of Voith's technical resources and platforms, including all the latest development results, cutting-edge intellectual property rights, etc., to create a safe, stable and reliable technical solution, and provides all services in development, design, production, control, project management, installation and commissioning.

Project Case

Changlongshan Pumped Storage Power Station Project

The Changlongshan Pumped Storage Power Station is located in Anji County, Zhejiang Province. There are 6 units installed in the power station with a total installed capacity of 2.1 million kW. The engineering features of the Changlongshan Power Station have set three "world's firsts" and four "China's firsts" records, setting a new benchmark for leading the construction of pumped storage power plant projects in the world. The speed of units 1 to 4 of the plant is 500 r/min. Voith supplied units 5 and 6, which are 600 r/min high-capacity, high-head units with industry benchmark features.

05

INTELLIGENT AND ROBUST POWER GRID EQUIPMENT

Shanghai Electric Power Transmission & Distribution Group prioritizes intelligent equipment with digital measurement, control networking, state visualization and functional integration, and has become an integrated, intelligent and comprehensive solution provider and industry benchmark in the field of power transmission and distribution. In the field of power transmission and distribution, Shanghai Electric has a complete industrial chain and a wide range of products, which gives it a great advantage in the industry.

Intelligent and robust power grids feature strong self-healing ability, high stability and advanced intelligence. In recent years, Shanghai Electric Power Transmission & Distribution Group has built a total solution service platform in the fields of smart grid system integration, engineering turnkey projects, complete equipment sets, maintenance, power sales and other integrated services. In domestic and international markets, it provides customers with turnkey solutions for power transmission and distribution, including investment and financing.

In terms of green upgrading of power equipment, it has developed a variety of energy-saving and environmentally friendly products, which significantly reduce greenhouse gas emissions. The first domestically pioneered PP cable made of eco-friendly polypropylene material, has been continuously put on the grid in the State Grid for nearly two years of trial operation. The process of preparing this material has reduced carbon dioxide emissions by 40%. In addition, through key technological breakthrough and innovation, digital and intellectual transformation has gained new vitality.

In terms of model innovation and application pilot, it implemented power sales and carbon-electricity synergy. Utilizing the substation intelligent maintenance user side data, we provided customers with integrated energy services of distribution network operation, energy saving services, distributed energy, energy storage, and power sales.

05

Project Case

Guangdong Yuedian Dapu Energy Storage and Frequency Regulation Project

In November 2021, the Guangdong Yuedian Dapu Energy Storage and Frequency Regulation Project, Shanghai Electric's first combined thermal storage and frequency adjustment project, passed the energy storage performance test, the test of the combined energy storage unit and the trial operation, and was formally put into commercial operation. It performed well during the two consecutive 30-day trial operation periods, with the comprehensive performance indicators of both units of the project entering the forefront of the market, and the net gain from frequency adjustment ranking among the top in the market.

In June 2020, Shanghai Electric won the bid for the Guangdong Yuedian Dapu Power Plant Energy Storage and Frequency Regulation Project. A set of 18 MW/9 MWh energy storage and frequency adjustment system is installed on the side of 2×600 MW coal-fired generating units in the plant, adopting advanced lithium batteries and EMS energy management technology, and responding to the grid AGC scheduling instruction jointly with one of the units in a "one + two" mode to achieve frequency adjustment revenue. The overall matching rate of the project is more than 50%. The subsequent operation and maintenance of the plant will also be entrusted to an in-house company.

The 2 x 1000 MW units of Dapu Power Station Phase II are scheduled for completion and operation in 2024. Phase II will adopt the world's most advanced ultra-clean emission technology and the most efficient ultra-supercritical coal-fired power generation technology, and will simultaneously follow the requirements of intelligent technology for thermal power generation enterprises to create a new type of high-efficiency, energy-saving and environmentally friendly intelligent demonstration power plant.

06

EXCELLENT ONSHORE AND OFFSHORE WIND POWER

As China's leading wind turbine manufacturer and service provider, Shanghai Electric Wind Power can provide optimal site solutions, environmental adaptability solutions, customized operation and maintenance solutions, energy management solutions, anti-typhoon solutions and other complete special solutions. **It has the largest offshore wind power sample library in the country, serving as a comprehensive snapshot of China's offshore wind power development history.**

Shanghai Electric Wind Power enhances competitiveness through core technology, empowers green and sustainable development with technology leadership, and achieves business linkage of wind power generation equipment development, manufacturing, sales, and services and wind resources development and investment.

At present, onshore wind turbine product family of Shanghai Electric Wind Power has covered 1.25 MW-10 MW models, which has achieved the full coverage of 4 MW to 16 MW+ wind turbine, sustainably providing advanced onshore and offshore products and complete special solutions.

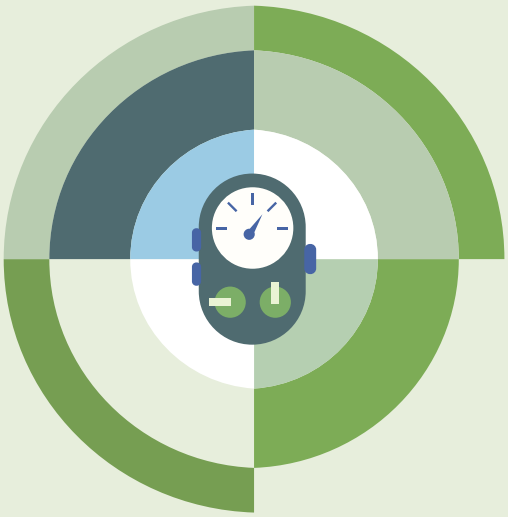
Through the vertical integration of the upstream and downstream segments of the wind power industry chain, wind power full life cycle solutions can be provided; the chain empowerment track and chain application scenarios result in a horizontal multi-chain symbiotic ecosystem, thus offering a complete energy asset life cycle solution. Shanghai Electric Wind Power adheres to the technology-driven approach, fostering an open R&D system. Providing customers with "highly reliable" total solutions, it promotes the prosperity and development of the new energy ecosystem through "energy of the future".

Project Case

Jiangsu Rudong Wind Power Project

The Jiangsu Rudong H7# offshore wind power project is located in Jiangsu Nantong Rudong sea. The entire facility operates 100 sets of 4 MW offshore wind turbines, with a total capacity of 400,000 kilowatts. It was initially hoisted into place in April 2021 and connected to grid with full capacity by December of the same year. Upon completion, it was the largest domestically constructed offshore wind power in terms of individual capacity, wind turbine quantity, offshore distance, and length of the 220 kV cable route.

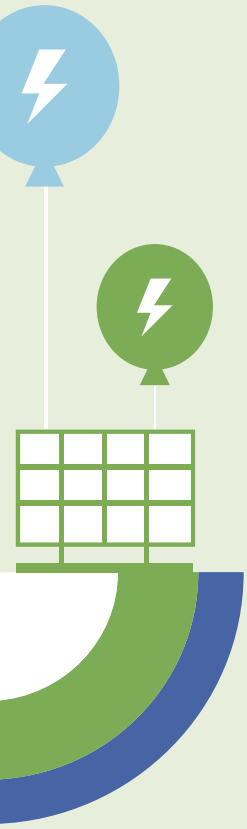
The project site center is 62 km offshore, which is one of the farthest offshore wind power projects Shanghai Electric Wind Power has participated in. In the process of reaching the full capacity of the project, Shanghai Electric Wind Power gave full play to its advantages of rich experience in offshore installation and mature technology of single blade lifting, creating a record of completing the lifting and commissioning of 100 units in 307 days and connecting 50 units to the grid in 10 days, which is a speed miracle in the industry. The project won the 2023 China Excellent Power Engineering Project Awards.



07

24-HOUR SOLAR POWER GENERATION

The solar power industry is an important part of Shanghai Electric's "4+2+X" strategy. It is committed to becoming the leader in pursuing the "dual carbon" goal, navigator of new energy equipment market, and backbone of independent high-end equipment. **Shanghai Electric's independently developed concentrating power technology, molten salt storage and heat exchange technology, and high-efficiency and low-cost photovoltaic power generation technology can provide customers with 24-hour solar power generation solutions through the coupling of photovoltaic and solar-thermal power generation.**



With advantages in energy equipment manufacturing, automation and semiconductor equipment research and development, Shanghai Electric can provide mature and reliable photo-thermal, PV cells and modules. Meanwhile, it can provide customers with project development, system solutions, equipment supply and EPC for the whole solar energy scenario.

In terms of concentrated solar power, with CT photo-thermal power generation technology as the core, supplemented by other key equipment for the system, it provides one-stop services, such as focusing on CT technology, concentrating light and heat collection system, molten salt storage and heat exchanger system, as well as R&D and manufacturing of key core equipment, engineering and construction, and operation and maintenance. In terms of photovoltaic energy, Shanghai Electric is actively laying out heterojunction and next-generation high-efficiency photovoltaic technology, and creating "PV+" systematic solutions.

Shanghai Electric participates in many CSP projects and PV projects at home and abroad, and provides customers with a package of engineering solutions through general contracting, core technology support, project operation and maintenance guarantee and other methods. It has a perfect supply chain and professional engineering team, and its technology and products cover every important link of the CSP and PV industry chain.

Project Case

Dubai CSP and PV Project

Dubai 700 MW CSP + 250 MW PV project is a four-phase solar power IPP project developed by Dubai Electricity and Water Authority (DEWA) of the UAE at the Mohammed bin Rashid Al Maktoum Solar Park. On 22 November 2018, Shanghai Electric signed the final EPC contract with the owner in Dubai. The total installed capacity of the project reaches 950 MW, including one 100 MW CT CSP molten salt thermal storage generating unit, three 200 MW PT CSP molten salt thermal storage generating units, as well as an additional 250 MW photovoltaic unit.

The project company is owned by Dubai Electricity and Water Authority (DEWA), ACWA Power, and Silk Road Fund. As one of the projects that General Secretary Xi signed in person in 2018, the project has the world's largest single CSP installed capacity, the world's largest single CSP photovoltaic footprint, and the world's leading CT wireless heliostat technology. The project is jointly invested by enterprises from the UAE, China and Saudi Arabia, and is a prime example of international production capacity cooperation and third-party market cooperation, and has been selected as a typical case study in the book "Promoting High-Quality Development of the Belt and Road Initiative" led by the National Development and Reform Commission.

After the completion of the project, it can provide clean electricity to more than 270,000 households in Dubai annually, and achieve emission reductions of 1.6 million tonnes of carbon dioxide, 110,000 tonnes of sulphur dioxide, 29 million tonnes of respirable particulates and 50,000 tonnes of nitrogen oxides. The construction and operation of the project will directly create about 4,000 jobs and indirectly create more than 10,000 jobs.

08

DIVERSIFIED APPROACHES TO ENERGY STORAGE

For different application scenarios and different energy combinations, Shanghai Electric can provide users with one-stop energy storage system solutions. **Shanghai Electric has advanced energy storage technologies, high-performance energy storage systems, and reliable safety measures.**

A one-stop integrated energy system solution refers to the integration of multiple energy resources through energy storage technology for flexible deployment and supply during periods of high and low energy demand, thus facilitating efficient use of energy and promoting sustainable development. Energy storage technology enables the storage of different forms of energy, which can then be converted into electricity or other forms of energy for supply to users when needed.

To meet the needs of users, Shanghai Electric has actively laid out multiple energy storage technologies such as molten salt, compressed air, pumped storage, lithium-ion, redox flow, and flywheel. This enables the provision of one-stop "optimized storage" system solutions catering to diverse needs across the power supply, power grid, and industrial and commercial sectors. In addition, with advanced energy storage technology, it can provide highly efficient and stable energy storage equipment, and carry out research, development, and innovation to provide customers with the latest technical solutions to meet the energy storage needs of various application scenarios.

Shanghai Electric's energy storage equipment demonstrates excellent performance, enabling rapid response to and balancing of energy fluctuations. Their high energy density and long-life design enable energy storage systems to have greater capacity and extended service life, ensuring a stable and sustainable energy supply. It focuses on the safety and reliability of the equipment and adopts multiple safety measures to protect the energy storage equipment and its users. Strict quality control processes and high manufacturing standards ensure the stability and reliability of the energy storage equipment during operation.

Project Case

Independent Energy Storage Power Plant Project in Jinzhai, Anhui Province

Jinzhai Project Energy Storage Plant is the first 100 MW energy storage plant funded by Shanghai Electric, the primary shareholder of Jinzhai Smart Storage. With a scale of 100 MW/200 MWh, it uses lithium iron phosphate batteries. The 80 energy storage battery systems, each with a capacity of 1.25/2.5 MWh, set up in the station area have an annual utilization time of about 1,500 hours. The project has been put into operation in August 2022.

It aims to build a new energy demonstration base in Jinzhai and promote the development of local industrial policy. The project adopts Shanghai Electric's advanced energy storage system integration solution, with the design concept of "strengthening, improving, reducing, and backup", i.e., strengthening grid operation safety, improving grid operational efficiency, reducing the grid loss, minimizing the investment in the thermal power plant for peaking, mitigating the waste power of the new energy power station, and providing backup power source.

INTEGRATION OF HYDROGEN PRODUCTION, STORAGE, PROCESSING AND UTILIZATION

Building upon its industrial clusters in the fields of new energy, energy storage, hydrogen energy, power generation equipment, chemical industry, etc., Shanghai Electric provides whole hydrogen industry chain solutions, helping customers to achieve the goal of carbon neutrality. Shanghai Electric has successful cases of providing system solutions for transportation, chemical and power plants, wind power bases, industrial parks, and other fields.

Hydrogen and electricity are common secondary energy sources, and hydrogen energy, with its high energy density and simple storage method, is ideal for large-scale and long-cycle energy storage, providing a solution for the widespread integration of renewable energy. Promoting the application of hydrogen energy in energy-using terminals can effectively reduce greenhouse gas emissions.

With its technical reserves and supply experience in the energy field, Shanghai Electric can provide onshore and offshore wind turbines and high-efficiency photovoltaic power generation equipment for renewable energy, and mature and reliable core equipment such as alkaline hydrogen production systems, proton exchange membrane hydrogen production systems, hydrogen storage devices, diaphragm compressors, fuel cells, hydrogen-doped power generation equipment and other related equipment for the hydrogen energy industry. For the chemical industry, it can provide chemical process packages and core equipment such as CCUS, synthetic methanol, synthetic ammonia and biomass gasification.

It can also provide the “integrated hydrogen" system solution for the hydrogen energy transportation field, the system solution of “green hydrogen + carbon capture + green chemical plant" for the chemical industry and power plant field, and the system solution of “green hydrogen + hydrogen storage + hydrogen doped gas turbine/boiler" for the large wind power base and “integrated wind-solar-storage-charging comprehensive energy supply" system solution for industrial parks.

09

Project Case

Anyang Shuncheng Carbon Dioxide Capture and Comprehensive Utilization Project

Anyang Shuncheng Carbon Dioxide Capture and Comprehensive Utilization Project has a scale of 160,000 tonnes/year of carbon capture and methanol synthesis. The project has been put into operation in 2022.

The project is characterized by the provision of "electricity + gas + chemical" solutions for traditional power plants to achieve power peaking shaving, carbon emission reduction and comprehensive utilization. The project provides "grey hydrogen replacement" solutions for traditional chemical plants, promoting carbon reduction in the chemical industry.

Shanghai Electric provides wind turbines, photovoltaics, electrolyzers and hydrogen production systems, CO_2 capture, synthetic methanol, synthetic ammonia and other leading chemical processes and core equipment. It also provides chemical engineering consulting, feasibility study, design, procurement, construction, commissioning, operation and maintenance full-life cycle services.

10

DISTRIBUTED GREEN ENERGY SUPPLY

Based on the energy demand of different regions and users, Shanghai Electric can provide users with one-stop green, low-carbon, energy-efficient distributed new energy supply solutions. **Shanghai Electric has established a complete industrial chain layout, comprehensive lifecycle intelligent management, and the ability to provide customized personalized data value-added services.**

Shanghai Electric provides technology, products and financial growth services covering the entire life cycle of pre-project planning and design, investment solutions, EPC general contracting, post operation and maintenance and asset operation and management, providing customers with turnkey services such as investment, design, construction, operation and maintenance.

With its strong equipment manufacturing advantages, the company develops and manufactures equipment for various aspects of distributed energy, such as high-efficiency heterojunction photovoltaic, lithium iron phosphate

batteries, all-vanadium redox flow batteries, energy management systems, and high-efficiency photovoltaic cleaning robots, so as to provide strong support within the project. It provides reliable integrated photovoltaic storage products and services, ensures product performance and quality, and builds high-quality projects with great service.

Through independent research and development of energy planning and design system, EMS energy management system, comprehensive energy intelligent management platform, etc., it provides intelligent whole life cycle energy management services, and realizes the closed-loop management and intelligent control of smart energy system. Through big data analysis, it provides users with customized value-added services of integrated energy system data, including investment assessment, load simulation, photovoltaic simulation scheduling and other customized data services.

Project Case

Minhang Industrial Zone Smart Energy Demonstration Project

Located within the Shanghai Electric Machinery Co., Ltd., the Minhang Industrial Zone Smart Energy Demonstration Project is the first industrial park smart energy initiative based on the green energy service model independently designed and developed by Shanghai Electric. Most of the equipment in the project, including CIGS thin-film photovoltaic, lithium iron phosphate battery energy storage system, and district energy management system, are independently provided by Shanghai Electric. The project started construction in November 2019, and in May 2020, it was connected to the grid.

On the power generation side, the project will provide diversified options and support for the park's energy supply and help enterprises reduce carbon emission and consumption. On the power distribution side, the project will optimize the energy structure in the region while meeting the consumption needs with new energy generation. On the power consumption side, the project is connected to the smart energy management system, which serves as the "brain" of the project, carries out unified control and management of the park's energy facilities, and reduces the park's carbon emissions and energy costs through the optimal operation mode, achieving intelligent control goals, including unmanned operation. The energy management platform also has the function of logging in on the webpage for monitoring and management, which realizes the friendly interaction between customers and microgrids, such as energy supply in the park and car charging.

It can be said that Shanghai Electric's smart energy system is a comprehensive service system based on the energy industry. It realizes the monitoring, control, operation and management of energy creation, storage, delivery and consumption systems through an open platform on the Internet.

In the future, Shanghai Electric's "Internet +" smart energy system will fully reflect the user demand, efficiently aligning supply with demand to quickly solve the user's pain points. It is conducive to making scientific decisions for enterprises. With efficient and convenient energy scheduling and management, it promotes the optimization of the energy structure and the efficient use of energy, and reduces energy consumption. In addition, it brings more space for the innovation of industrial and business models. D

VIEWPOINTS
INTERVIEWS

LIVING A LIFE WITHOUT LIMITS

INTERVIEW WITH FANG XIAOYAN

SHANGHAI'S YOUNG S&T TALENT FROM SHANGHAI MACHINE TOOL WORKS

With the progress of society, the importance of women in the workplace is growing. In the traditional manufacturing industry, we are witnessing the emergence of more female managers. They contribute their meticulousness, flexibility, and intelligence to drive the improvement of quality management. However, female managers with technical backgrounds are still relatively uncommon. In this issue, we feature Fang Xiaoyan, a remarkable female technical manager.

Fang Xiaoyan, a Ph.D. in engineering and senior engineer, joined Shanghai Electric in 2010, focusing on research and development of high-end CNC grinding machines. Currently, she holds the positions of Technical Director and Deputy General Manager at Shanghai Machine Tool Works. Fang is regarded by her family and colleagues as a steady, practical, and hardworking individual. However, what surprises them is that behind her quiet and studious demeanor, she possesses a strong personality and clear opinions. After graduating as a postgraduate from Harbin Institute of Technology in 2010, she bravely ventured to Shanghai, leaving her comfort zone behind.

"I studied mechanical engineering, and after graduation, most of my classmates aimed for big cities like Beijing, Shanghai, and Guangzhou. It's not that I am infatuated with the glamour of first-tier cities, but rather that I believe I can encounter more exceptional individuals and take on more challenging work here. I don't want to confine my potential; I want to unleash it to the fullest", Fang Xiaoyan candidly expresses her thoughts. Since joining Shanghai Electric, she has been like a joyful fish swimming towards the ocean, freely exploring the vast world of technology and innovation.

EXCELLING AS A FRONTLINE TEAM MEMBER

Let's go back 13 years ago.

Fang, fresh out of her master's degree program, was filled with ambition and enthusiasm. Even before arriving in Shanghai, she had heard about the renowned Shanghai Machine Tool Works. This manufacturing enterprise, specializing in machine tools, blazed a trail in the industry and served as the cornerstone of China's grinding machine manufacturing sector, accomplishing numerous industry firsts. Fang pondered: Over the years, how has Shanghai Machine Tool Works not only survived but also emerged as the domestic leader in precision grinding machines, boasting the highest brand value, the most extensive product line, and the strongest technical capabilities in such a fiercely competitive market? This state-owned manufacturing enterprise operated in a realm that perfectly matched her expertise, and it was situated in Shanghai, a bustling cosmopolitan city. She resolved, "I must go to Shanghai to discover how this company established its position!" This idea firmly took hold in her mind.

After spending some time at Shanghai Machine Tool Works, she discovered the answers she was seeking. Established even before the establishment of the People's Republic of China, Shanghai Machine Tool Works had undergone 70 years of growth, always staying true to its original aspirations and dedicated to its founding missions. Fang commented, "Our company has faced the difficulties of starting from scratch, evolving from imitation to independent development and finally embracing intelligent manufacturing. It has been a long and arduous journey to reach where we are today. Instead of being just a story of the company's growth, it is more about the unwavering determination and perseverance of generations of Shanghai Machine Tool Works employees. It is about setting goals, staying determined, and patiently waiting for the fruitful outcomes."

As time went on, Fang gradually became one of the key figures in the company. When she initially joined, she was assigned to the research and development department and dedicated herself to this role for 8 years. Throughout this period, she became more skilled in her expertise and developed a stronger commitment to this state-owned enterprise. From a young engineer to a core technical backbone of the company, she consistently stayed at the forefront of technical research and development. Her focus revolved around precision machining processes and equipment related to grinding technology, intelligent functions of advanced grinding machines, and intelligent inspection and control. Over the years, Fang achieved a series of remarkable accomplishments. She led a national-level research project, participated in an excellent technical leader project in Shanghai, and contributed to a key generic technology project within the enterprise. Additionally, she made valuable contributions to over 10 other national and

Fang Xiaoyan

Shanghai's Young S&T Talent from Shanghai Machine Tool Works

municipal research projects. Fang also applied for 15 invention patents, with 10 already granted, published over 10 papers, applied for 7 software copyrights, and played a role in formulating and revising 5 standards. She humbly acknowledges that these achievements would not have been possible without the support from the company. Shanghai Machine Tool Works places great importance on technical talents and has created a favorable working environment and development opportunities for the research team. Fang expresses her sincere appreciation for the company's investment in her growth, providing her with ample space to develop her skills. She considers it her good fortune to work at Shanghai Electric.

SUCCESSFUL TRANSFORMATION

Fang set high standards for herself - to be a warm, generous, and classy individual. When she started working at the company, her goal was to become an outstanding research scientist. However, due to her exceptional performance and the needs of the company, Fang underwent a remarkable transformation in 2018. She transitioned from being solely a researcher to taking on a managerial role in the company.

Being a researcher is known to be demanding, but when Fang assumed a leadership position, her workload increased even more. She excels in technical expertise and always aims for perfection, never compromising on quality. However, managing people is a more complex skill that requires ongoing learning and exploration. Fang follows a guiding principle: she wants the growth of each team member to align with the values of the team and the company. She believes that when everyone in the team shares unified goals and shows initiative and enthusiasm in their work, the whole organization can operate in a positive and productive manner.

After taking on a leadership role, Fang realized that being an exceptional leader requires both a big-picture perspective and attention to detail. The technical team is crucial to the company, and significant investments are made in research and development each year. Fang's primary concern is effectively leading the R&D team while optimizing resource utilization. Through the collective efforts of the team, Shanghai Machine Tool Works has made significant advancements in the development of high-end CNC grinding machines. They have achieved this by developing end-user software for key products and establishing a universal software and hardware platform compatible with different machine tools and CNC systems. As a result, a software technology division was formed within the company's research and development system. They have effectively sold close to 100 advanced CNC machine tools that include this cutting-edge software. Additionally, they have integrated virtualized and physically controlled virtual machine tools to accurately verify software, conduct electrical debugging, control machine tool motion, and refine grinding processes in the development of new products. These applications prove beneficial in pre-sales, during-sales, and after-sales services. Additionally, they actively participated in significant national projects, including the "Nano-level Precision Micro CNC Grinding Machine" led by Shanghai Machine Tool Works and the "High-performance Key Component Micro Machining Technology and Equipment for Inertial Navigation" as part of the 12th Five-Year Plan of the 863 Program led by Donghua University. Consequently, they successfully developed nanometer-level CNC ultra-precision processing equipment, such as 2MNK9810 and 2MNKA9820. They also successfully obtained invention patents for technologies like "High-speed Hydrostatic Post-positioned Electric Spindle and Dynamic Balance Method" and "Direct Drive High-precision High-rigidity Closed Hydrostatic Guide Rail."

The achievements and experiences Fang has gained have reinforced her belief that trees alone do not make a forest. She believes that talent is the most valuable asset of a company, and economic development and technological innovation rely on the abilities and creativity of talented individuals. Fang finds great joy in communicating with her team members because she believes that when everyone's thoughts and perspectives are aligned, they can experience

growth and progress together. Fang believes that passion is crucial for every employee, regardless of their role, as it enables them to stay focused and committed. "It is natural to experience confusion or weariness after being in a job for a long time. However, having passion helps us avoid wasting time and motivates us to find solutions to challenges. At last, we will discover a development path that aligns with our passions and strengths. I hope that when my team members reflect on their journey, none of them will feel ashamed or regretful because of past negligence", she said. It is evident that Fang has a deep love for each team member and is grateful for their efforts and support. She puts in every effort to ensure that no team member is left behind. Fang hopes that the tech workforce at Shanghai Machine Tool Works can generate innovative ideas that align with the company's needs, achieve significant technological accomplishments, and contribute to the sustainable development of Shanghai Electric.

FAMILY SUPPORT

Fang, born in 1985 and belonging to the Year of the Ox in the Chinese zodiac, embodies the diligent nature associated with this animal sign. Those who know her describe her as a steady, down-to-earth, patient, and highly trustworthy person. Fang's persistent nature became evident during her school years. She would tenaciously tackle difficult problems, often staying up late until she found a solution. This determination carried over into her work, where she consistently achieved remarkable results. Just this year, she was recognized as a "Shanghai Youth S&T Talent" and received the titles of "Youth Talent of the Municipal Economic and Information Commission" and "Outstanding Technical Leader in Shanghai".

"However, I find myself pouring all my energy into work, often neglecting my family life," Fang mischievously admits, while also mentioning that she has exceptionally supportive parents-in-law who take care of all the household chores, allowing her and her husband to focus on their careers without distractions.

When it comes to interacting with her family, Fang has her own perspective. She believes that the home is not a place for arguments, recognizing the inevitable clashes that arise when different generations coexist with contrasting educational and lifestyle beliefs. In such situations, she and her husband exercise patience and employ strategies to gently influence and gradually change the older generation's mindset. For example, when the elderly would collect and accumulate used plastic bags at home, causing clutter, the couple discreetly bought dedicated garbage bags and placed them in a conspicuous location. Over time, the older generation found the specialized garbage bags clean and convenient, ultimately adopting the habit of bringing cloth bags for shopping and buying groceries, inadvertently becoming "environmental advocates". The young couple also educate their son in a similar manner. Instead of preaching to him, they put on sports shoes and take him for a walk of a few kilometers. Through playful interactions, they incorporate education into leisure, embodying the truth that "those who play well learn well".

Fang Xiaoyan often adopts a managerial perspective when it comes to family relationships. She often recalls a metaphor that left a lasting impression on her, likening a family to a company, where the husband and wife function as supportive business partners, and the children are dynamic young employees in need of guidance. With their wisdom and experience, the elderly can independently manage and maintain stability within the family, deserving respect and responsibilities. "Applying business management principles to the family can yield unexpected rewards", Fang said with a smile.

After the conversation with Fang, the reporter understands why she always has a smile on her face. Fang Xiaoyan is deeply passionate about her career. She also has a loving and joyful family life that provides her with tremendous support, which gives her the strength and motivation to pursue her professional goals.

Fang is a person who refuses to be confined by definitions and refuses to set limits on her life. She wholeheartedly embraces the unknown. With this open mindset, her future is bound to be even more extraordinary!

OBSERVATION
INNOVATIVE APPROACH

ONLY BY BEING DEDICATED AND PRAGMATIC CAN WE LEAD A FRUITFUL LIFE

By Gu Jing

It has been said, "In life, what really matters is not where we are, but where we're heading." This seems to emphasize the necessity of goals and directions for moving forward, but it does not mean that ideals are supposed to be the only concern in our life, but that we should sometimes think beyond here and now to figure out what we really want.

It is true that goals and directions are indispensable guides on the way forward. Those who have lost their goals would only muddle along instead of moving forward for the future. However, with goals, we must also hold a deep understanding of our own situation and a pragmatic attitude, in order to achieve steady progress day by day.

Recognizing our situation does not mean that we would lose the courage to advance. On the contrary, such a sober understanding would transform our "empty courage" into a powerful combination of "wisdom and bravery".

Just like Nancy Roman, who by enriching herself broke down the barriers against female scientists as she had since childhood deeply experienced the stereotypes faced by women. Or the peasant writer in the TV show "I am a Speaker", who talked about how he balanced farm work and writing career, unlike the Mr. Writer in "Happy Family", who found the hardship of life unbearable and got used to daydreaming. The courage to achieve the goal is not a red-hot branding iron on fire, but a sword tempered by ice and snow.

A thorough comprehension of one's own situation helps to clarify one's direction. It is precisely because Mr. Yuan Longping had seen China in starvation that he kept working in fields to break records in the per mu yield of rice. Also in the new century, more and more college graduates from rural areas have chosen to return to bring hope and create a better future for their hometown. Does this kind of belief or even faith result from the simple question of "where to go"? Much more than that. Only when realizing that one is in the abyss can one develop such a strong desire to pursue the sun.

Advancement and progress invariably go along with self-breakthrough, and only by thinking of our own situation can we break off the restrictions imposed by it. Without knowledge of confessional poetry, Louise Glück wouldn't have transcended herself in her mythological writing. Li Cuili wouldn't have brought enlightenment to the impoverished mountainous areas through Shimmer Academy if she hadn't realized the dearth of rural education. Not to mention those grassroots cadres who work with villagers day and night for poverty alleviation, all of them have made brilliant achievements with their step-by-step efforts. Without the understanding of your own situation, you would find no way out of the predicament of real life, even when driven by lofty ambitions and goals as well as great confidence.

"Society is like a boat, where everyone shall be prepared to take the helm", and our preparation to take responsibility must rest upon a realistic and pragmatic attitude instead of empty ideals. Only by being realistic and adjusting to the situation can we not get stuck in the predicament. There is no point in standing on the edge of a pool and idly longing for fish. The only way to get the fish is to go home and weave a net. By finding out where we are and where to go, we would lead a fruitful life.


上海电气
SHANGHAI ELECTRIC
SHANGHAI ELECTRIC
CREATE OUR FUTURE TOGETHER