

ELECTRIC

SHANGHAI

上海电气

NEWS

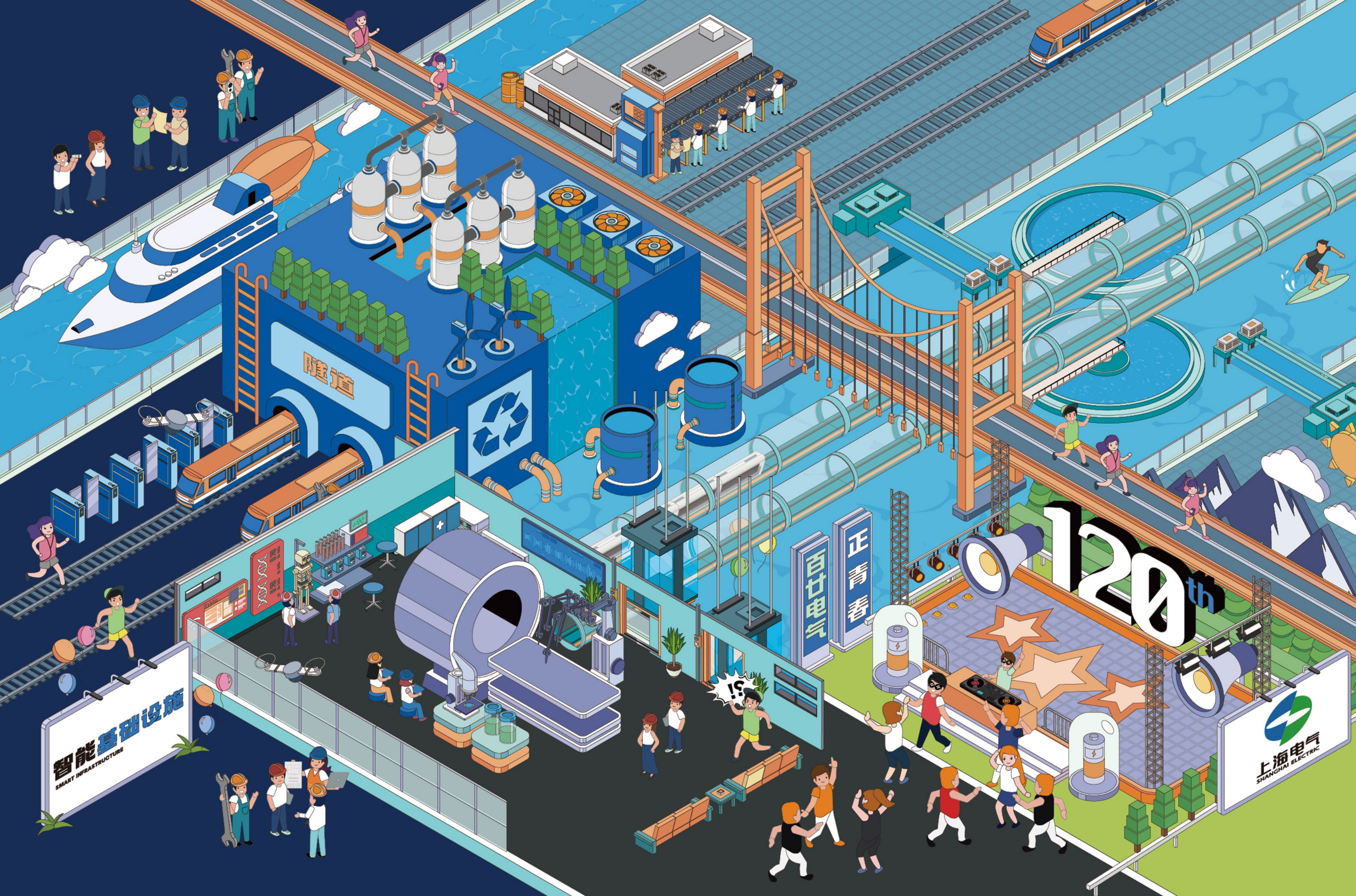
Shanghai Electric Elevated to 40th on ENR's List



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THE 120-YEAR-OLD SHANGHAI ELECTRIC

USHERS IN A NEW ERA OF PROSPERITY AND DEVELOPMENT



智能基础设施
SMART INFRASTRUCTURE

隧道

百廿电气
正青春

120th

上海电气
SHANGHAI ELECTRIC

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Shanghai Electric

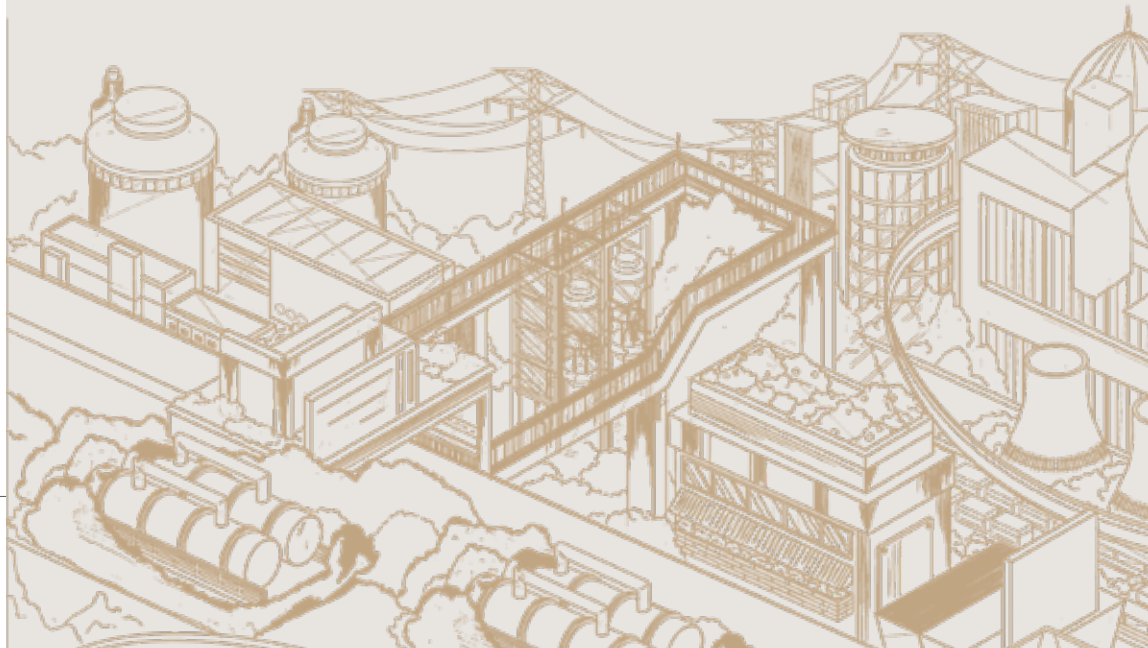
120 YEARS OF A GLORIOUS JOURNEY, CONCERTED EFFORTS TOWARDS FUTURE

We celebrate the 120th anniversary of the founding of Shanghai Electric in Autumn, a season of harvest and aroma. The past 120 years have witnessed major shifts. Some are heartbreaking, and some are inspiring. Carrying high hopes of leaders of our country, Shanghai Electric has progressed from striving to thriving together with its employees who devote themselves to and make creations for the enterprise wholeheartedly generation after generation. Motivated by expectation and commitment, we head towards a manufacturer of quality from one of quantity.

Looking back on our successes, we have a deeper understanding of the inherent needs and power for reform and development, which fuel our aspiration and confidence to vitalize Chinese high-end manufacturing. New needs and challenges create huge responsibilities for Shanghai Electric. We will seize strategic opportunities and seek new breakthroughs and development drivers to enhance technology, brand and performance. We are to deliver on the significant promise.

Heritage and glory achieved in the past 120 years will always drive us on the path of high-quality development for a new revival. In line with the missions and visions of a crucial enterprise for our country, Shanghai Electric will reinforce innovation and competitive edges by drawing energy from the past for a more brilliant tomorrow.

We, Shanghai Electric, believe in the future and join hands with creators to make our own future!



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SHANGHAI ELECTRIC

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上海电气
SHANGHAI ELECTRIC

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先进核能
系统



THE 120-YEAR-OLD SHANGHAI ELECTRIC

USHERS IN A NEW ERA OF PROSPERITY AND DEVELOPMENT

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Shanghai Electric Elevated to 40th on ENR's List

Shanghai Electric moved up to the 40th position, up by 11 places compared with its ranking last year, on the 2022 Top 250 International Contractors list that was recently released by the American magazine Engineering News-Record (ENR). The list ranks applicants mainly according to their annual revenues generated by overseas contracted projects. Shanghai Electric occupied a higher place thanks to a number of projects including the NE1-700MW CSP+250MW PV Hybrid Project in Dubai, Thar Block-1 Integrated Coal Mine Power Project in Pakistan, Phase 5 of Dubai Solar Park, Pancevo power plant at Serbia, Rupsha combined-cycle power project in Bangladesh and the Wassit power plant in Iraq. It is also worth mentioning that Shanghai Electric ranked third in the state-owned enterprises on electric power engineering, up by 1 place compared with 2021.

Shanghai Electric Ranked 15th in 2022 Top 100 Enterprises in Shanghai

Recently, Shanghai Enterprise Council and Shanghai Entrepreneur Association jointly released the list of 2022 Top 100 Enterprises in Shanghai. Shanghai Electric Holdings Group Co., Ltd. placed 15th in the list due to its revenue of over 160 billion yuan in 2021, and 5th in the sub-list "Top 100 Manufacturers in Shanghai". Standing up to difficulties and challenges in 2021, Shanghai Electric implemented principles of "seeking progress in stable development, making innovations while staying true to original aspiration, and promoting high-quality development" with unwavering efforts. Regarding talents as the most valuable asset, it strived to boost main businesses with innovation and invention as the biggest driver, which ensured that the company ran stably while fulfilling its primary duty-supporting national strategies.



BRIEF NEWS

Shanghai Electric's Two Industrial Software Awarded "Top 101 Gongfu Software"

The list of "Top 101 Gongfu Software" was announced on August 25th, which was evaluated by Shanghai Industrial Internet Association, Shanghai Information Services Association and other societies under the direction of Shanghai Municipal Commission of Economy and Informatization. Shanghai Electric's SEunicloud industrial internet platform and Shanghe smart supply chain platform were awarded. All the 101 winners were voted by the public and suggesters who believed that they deserved a score of 101, 1 higher than 100. The event aims at providing small and medium-sized enterprises in Shanghai with practical, innovative and targeted products and services to address their difficulties, and supporting their development with concerted efforts by mobilizing the whole society.

Shanghai Electric Machinery Obtained First Polyolefin Order

In the last few weeks, Shanghai Electric Machinery Co., Ltd. (hereinafter as "Shanghai Electric Machinery") won the tender from Shandong Xinshidai High Polymer Materials Co., Ltd. for producing 70 tons of high-end polyolefin annually, which was the first polyolefin order it received. Shanghai Electric Machinery has accelerated its expansion into new territories in the past few years, and this order, a big breakthrough in the polyolefin segment, will pave the way for the company to occupy more market shares in the petrochemical industry.

Tutepali, India Water Pump Station Constructed by Shanghai Electric Power Generation Group Completed Full-Load Commissioning Successfully

Recently, the first unit of electromechanical equipment for the water pump station at Tutepali in India successfully completed full-water-load commissioning with Shanghai Electric Power Generation Group as the supplier, and was recognized by the Indian property owner, local government and general contractor. What was more, Shanghai Electric refreshed its world record for the biggest capacity of a frequency converter in this project. While equipment began to be transported to India in the second half of 2020, the project team failed to conduct on-site installation and commissioning due to the pandemic. Engineers and technicians hence assisted a local installation company through online support in installing and commissioning equipment sets, ensuring the project commissioned as scheduled.



Shanghai Electric to Participate in Key Guohe Nuclear Power Equipment R&D

The Yangtze River Delta Integrated Development Forum was held in Shanghai on August 17, at which Party Secretaries of Jiangsu, Zhejiang and Anhui provinces and Shanghai shared in-depth views on new missions and visions for the regional integrated development in the new era together with experts. Shanghai Electric and China Power Investment Corporation, members of "Guohe No. 1" Industrial Chain Alliance, inked an agreement on jointly developing and manufacturing the reactor coolant pump for the Guohe series at the forum, which would drive independent development of science and technology, coordinated industrial development and the achievement of the "Dual Carbon Goals".

Shanghai Electric Automation Group's Project Awarded First Prize of Zhejiang Provincial Science and Technology Progress Award

In the past few weeks, the project "Life-cycle Internal Security Active Defense Big Platform for Industrial Control System" with Shanghai Electric Automation Group as one of developers was awarded the first prize of Zhejiang Provincial Science and Technology Progress Award, which was a new solution for ensuring the security of critical national infrastructure. This project realized a number of technological breakthroughs on internal security and active defense of an industrial control system including an internal security active defense architecture covering end, edge and cloud, vulnerability mining and association platform, threat situational awareness and emergency response platform, the first whole life-cycle process attack-defense model and behavior monitoring and security enhancement.

Shanghai Electric Unveiled New Super-Efficient Compact High-Voltage Motor

In the last few weeks, Shanghai Electric Power Generation Group unveiled its new product-YX3 super-efficient compact high-voltage motor-in a press conference at Suzhou City. The YX3 motor, a high-performance universal high-voltage asynchronous motor with external tendons developed by Shanghai Electric Power Generation, can be applied to a large number of areas including petrochemical industry, metallurgy, power, hydraulic engineering, public utilities, mining and construction materials, and a lot of universal equipment, such as blowers, compressors, water pumps, crushers and belt conveyors. The YX3 series features advantages of a high power density, compact structure, low vibration and low noise, high machine reliability and fast delivery with all products reaching grade-1 of energy efficiency.





2022 WAIC | Shanghai Electric Shared Industry Metacosm Outlook at Industry Intelligence Summit Forum

The Industry Intelligence Summit Forum with the theme "Combination of virtual and real, insight into the future" was held online and offline on September 2nd, which was a major event for 2022 World Artificial Intelligence Conference. Shanghai Electric, a leading high-end manufacturer in China, joined China Unicom Shanghai Branch, China Baowu Steel Group, Cmssemicon and other influential companies in the summit.

Shanghai Electric has boosted high-quality development of major businesses by leveraging the combination of digitalization and manufacturing. Cheng Yan, Executive Director and General Manager of Shanghai Electric Digital Technology Co., Ltd., exchanged insights and best practices in intelligent manufacturing with other enterprise representatives.

Chinese Ambassador to UAE Visited Shanghai Electric's NE1-700MW CSP+250MW PV Hybrid Project in Dubai

Not long ago, Chinese ambassador to UAE Zhang Yiming and counsellor Li Xiaodong visited the NE1-700MW CSP+250MW PV Hybrid Project constructed by Shanghai Electric in Dubai, especially CT and PT facilities, and listened to reports on project construction, COVID-19 containment and Party building work. Zhang Yiming recognized their progresses made against difficulties and stressed that this project was of unique importance to UAE as one of primary programs of the "Belt and Road" Initiative. He hoped that Shanghai Electric's team can press ahead with a stronger momentum, so it can get connected to grid as early as possible, operating as a new energy benchmark in the Middle East.

Shanghai Electric Awarded Environment Excellence Award by Pakistan Again for Project in Thar

In the past few weeks, Shanghai Electric was awarded the 19th Environment Excellence Award 2022 from National Forum of Environment and Health (NFEH) held in Karachi for a second year after 2021, which recognized its outstanding contributions to energy conservation and decarbonization amid the construction of the Thar Block-1 Integrated Coal Mine Power Project. The forum was organized by a national forum for environment protection in Pakistan and a social responsibility commission and supported by the Federation of Pakistan Chambers of Commerce & Industry with an aim to enhance local companies' awareness of green development and advocate the rebuilding of the "Green Earth".

Shanghai Electric Listed in Top 50 Chinese Companies Promoting Carbon Neutrality

Taiyuan Energy Low-Carbon Development Forum was held from September 1st to 3rd, where domestic and international participants shared advanced opinions and showed latest products and technologies under the forum theme "Energy, Carbon Peaking and Carbon Neutrality and Development". Among

awards honored during the forum, Shanghai Electric was rated "Top 50 Chinese Companies Promoting Carbon Neutrality", and Shanghai Electric Wind Power Group Co., Ltd., its subsidiary, was granted "Influential Green Brand for Carbon Neutrality" and "Global Top 500 New Energy Companies".

The 2022 edition of "Top 50

Chinese Companies Promoting Carbon Neutrality" list was a comprehensive ranking for energy enterprises updated from the 2021 list of low-carbon development contribution that was also the first edition. While adding six universal indexes of carbon emission level, science-based carbon reduction targets, carbon digital intelligence platform, green investment,



environment information disclosure, carbon inclusion and carbon-related practices of social responsibilities and modifying weights, it assessed energy companies by contributions they made to carbon neutrality in the following five aspects: carbon emission reduction and the quantity of carbon absorbed by carbon sinks, action plan for carbon neutrality, reduction technologies, carbon finance and corporate social responsibilities.

Jin Xiaolong, Member of the Party Committee and VP of Shanghai Electric, expressed his views titled "New Power Systems Shall Be Driven by Digital Technologies" in the roundtable dialogue of the Digital Intelligence Enabling New Power System Construction Forum with other participants on the theme "Digital Energy Ecology in New Power System". This edition is co-organized by the Ministry of Foreign Affairs, National Development and Reform Commission, Ministry of Science and Technology, Ministry of Natural Resources, Ministry of Ecology and Environment, Ministry of Commerce, National Energy Administration and Shanxi Provincial People's Government, and contained "1+3+N" activities held online and offline including the opening ceremony and summit forum, China (Taiyuan) International Energy Industry Expo, the 12th Global Top 500 New Energy Companies Forum, signing ceremonies, 13 sub-forums, roundtable meetings for foreign diplomats, and activities for Israel, the guest country of honor. **D**

Shanghai Electric Shared Experience on First National Great Craftsman Forum

The first National Great Craftsman Forum opened in Changsha City on September 2nd at which Zhu Zhaokai, Deputy Secretary of the Party Committee of Shanghai Electric Group and Chairman of Shanghai Municipal Mechanical Labor Union shared insights on the theme "Social Environment Building and National Great Craftsman Cultivation".

Zhu Zhaokai said during an on-site interview that Shanghai Electric was a Chinese high-end equipment manufacturer, and had set up Shanghai Electric Libin Technician College which was named after the National Model Worker-Li Bin. With a mission to become "a platform for cultivating and reinforcing technicians and specialists", the college adopts an education model characterized by "school + factory" and "certificate + skill", and provides programs according to needs of industry development and technicians by combining instruction with practices, fulfilling its responsibility as a major training organization. Based on technicians' development path, the college implements a series of innovative measures including the "3+3+3" training model and "Model Worker Training Class", and tries to develop systems for skill competitions, operation of chief technician's workshop and technician assessment. Therefore, it improves technicians' skills and helps them grow into excellent craftsmen by way of creating favorable systems and incentives centered on skill training, improvement and application.

Zhu Zhaokai stressed that as China transforms from a manufacturer of quantity to one of quality, and empowers technicians to "National Great Craftsman", Shanghai Electric will explore how to better implement talent cultivation and leverage existing platforms and systems to develop more specialists and "National Great Craftsman".

The forum themed "Pursuing Dreams with Craftsmanship and Contributing to Making China Stronger" was co-hosted by the CPC Hunan Provincial Committee and the People's Government of Hunan Province with an aim to offer an platform where National Great Craftsman and excellent technicians can share experiences and reinforce skills, and to encourage technicians to enhance competencies and make more contributions by forging an environment that adores diligence, techniques and creation. The forum invited National Great Craftsman, government officials, professionals, leaders of labor unions and commercial representatives to deliver keynote speeches and have dialogues in a wide range of activities. **D**



Shanghai Electric Interviewed by China Energy News

Amid the 2022 Taiyuan Energy Low Carbon Development Forum held on September 1st, Jin Xiaolong, VP of Shanghai Electric and President of Shanghai Electric Power Generation Group, was interviewed by China Energy News (hereinafter as "CEN") in the program "Energy Lounge" and introduced how Shanghai Electric promoted efficient and clean use of coal and low-carbon transformation through innovations.

CEN: Shanxi Province, which has a large reserve of coal, has strived to use it in a cleaner and more efficient way. In your opinion, how will the coal industry develop, and what are your suggestions for clean use of coal?

Jin Xiaolong: Concerning its "rich in coal, poor in oil and short of gas" situation, China has to figure out how to align carbon peaking and neutrality with the utilization of coal, China's major energy source.

First and foremost, we need to integrate coal and coal-based power to ensure low-carbon use. With our world-leading technologies for coal-fired power plants, Shanghai Electric develops the cutting-edge double reheat ultra-supercritical technology that increases power generation efficiency by large. The coal consumption of the latest 1-million-kilowatt-level ultra-supercritical generator is only 249.6 g/kwh (editor's note: the coal used to generate a kilowatt-hour of electricity in China was about 305g).

Secondly, we need to combine carbon use with decarbonization. Shanghai Electric is making every effort to develop CCUS (Carbon capture, utilization and storage) technologies to capture, collect and recycle CO₂ produced in the use of coal.

At the same time, we have done many researches on how to turn coal-fired power plants into peakers for ones powered by renewable energy. As per national regulations, Shanghai Electric upgrades coal-fired plants on energy conservation and emission reduction, heating performance and flexibility to make them cleaner, more efficient and effective in deep peak regulation.

Thirdly, we need to couple coal with new energy to realize efficient and low-carbon development. It is necessary to factor coal in attaining the "Dual Carbon Goals", national energy security strategy and digital technologies to

leverage its fundamental role in China's energy landscape.

CEN: In the backdrop of carbon peaking and neutrality, Shanghai Electric has made remarkable breakthroughs in improving flexibility of coal-fired power plant and CCUS. Could you please share with us some of your innovations and inventions of green technology, and key areas for energy transformation in the future?

Jin Xiaolong: Shanghai Electric used to take the lead with respect to technologies of coal-fired power generation, nuclear power and steam turbines. We plan to promote energy transformation through following measures.

Firstly, we have taken part in the construction of all new nuclear power projects initiated on a national level; secondly, we have been pushing forward researches on technologies of efficient and clean use of coal, such as the 650°C ultra-supercritical double reheat and CCUS, many of which have been applied in demonstration projects. The gas turbine powered by 10% to 100% hydrogen blended with natural gas is also under research.

What's more, we have put "wind, solar, storage and hydrogen" high on our innovation agenda during the 14th "Five-Year Plan" period. While our 11MW offshore wind turbines have been used in commercial projects and the world's longest wind turbine blade just rolled off the production line, we are developing offshore turbines with a capacity of more than 14MW. 





Shanghai Electric's First PV Project at Japan Accepted

Shanghai Electric's project team pressed ahead overseas projects as scheduled despite changing situations and difficulties brought about by the pandemic. In the last few weeks, the Yakai PV power generation project in Japan implemented by Shanghai Electric Power Generation Group was accepted by the local government with a high power generation efficiency. Prior to this acceptance, three PV projects in Bishaopu, Outwode and Yinggehamu got connected to the grid. With its technological edges and strong ability to perform agreements, Shanghai Electric has showed its muscles and commitment to expand into new and overseas markets and push new energy and traditional energy businesses in parallel.

The project located at Yatsu, Fukushima is Shanghai Electric's first large PV project in Japan with a total installed capacity of 28MW. It broke ground on July 15th, 2020, completed Reverse power transmission at the end of January, 2022, with one trial, got connected to grid at full load in the middle of April and received the project acceptance letter from local authorities not long ago, and is expected to produce 31,293MWhs annually.

Shanghai Electric made financial donations to build an agricultural well for local residents, which was appreciated by the regional government. Despite COVID-19 and earthquakes, Shanghai Electric still managed to complete the project construction successfully while improving public utilities for a green future in line with corporate social responsibilities.

Earlier than the security check, the power plant finished the performance test which showed a higher PV system efficiency than what was guaranteed in the agreement, and was highly acknowledged by the property owner. **D**



Recently, Shanghai Electric has won two bids for the supply of main equipment used in the turbine island and boiler island and their life cycle maintenance for the expansion project of Nanshan Power Plant's 2×460,000-kilowatt gas-steam combined cycle generator set. It is the second gas turbine project contracted between Shanghai Electric and Huaneng after the Huaneng Qingyuan 100MW gas-fired co-generation project in July this year, promoting the partnership between the two sides to a new level.

Equipped with Shanghai Electric's F-Class AE94.3A Gas Turbine and ancillary combined cycle unit, the net efficiency of the project will exceed 60% with significantly decreased CO₂ emissions. In addition, the single-shaft unit comes with a self-synchronizing clutch to support fast and frequent power peak regulation and start/stop operations.

Shanghai Electric has been collaborating with Huaneng Group on innovation-driven independent development and lifecycle support of gas turbines since 2020. Over the past two years, Shanghai Electric has fully met Huaneng's core needs for energy security and low-carbon generation units based on its key technologies, independent innovation capabilities and highly scalable services. Shanghai Electric has provided the best-in-class solution for Huaneng's new project, and has been praised by the partner for its open-minded attitude for win-win collaboration in terms of autonomous O&M.

Reportedly, the Nanshan Power Plant Expansion Project is the first gas turbine project publicly tendered by Huaneng's Hainan Branch during the 14th Five Year Plan period. Adjacent to two 5A-class tourist attractions, Daxiaodongtian (big & small fairyland) and Nanshan Temple, the power plant is expected to provide 2,469 million kWh of clean energy per year after being put into operation. 



COOPERATION RENEWED

**Shanghai Electric Obtained
Another Gas Turbine Order from
China Huaneng Group**



Shanghai Electric Obtained New Contract of 1000MW Turbines from Jiahuwan Power Plant

Recently, Shanghai Electric won the bid for supplying main and auxiliary equipment for the 2×1000MW electromechanical furnaces of Phase II of the Jiahuwan Power Plant at Lufeng City, Guangdong Province. Shanghai Electric renews its cooperation with Guangdong Baolihua New Energy Stock Co., Ltd. (hereinafter referred to as “Baolihua”) after the Heshuyuan Power Plant and Jiahuwan’s Phase I.

Jiahuwan Power Plant is designed with a total installed capacity of 8×1000MW, making it the largest efficient and clean energy base by planned capacity in China. The 2×1000MW units in Phase I have begun operation since April 2019, and Phase II adds another 2×1000MW coal-fired

units with 100% desulfurizing and denitrification facilities being built concurrently. After it is put into operation, it will meet Guangdong’s growing need for electricity, enhance grid security and stability, and mitigate regional power shortage, contributing to provincial economic development.

The Phase II project employs the new 1000MW ultra-supercritical reheat CT furnace that has better low-load stable combustion and deep peak regulation index. Coupled with new high-parameter 1000MW steam turbines which have higher parameters than regular ones at the same level, it makes a breakthrough for adapting to new markets by responding to clients’ specific needs. The project also uses the latest-improved



1000MW generator that has advantages of high reliability, efficiency and easy installation, operation and maintenance owing to multistage axial fans used, and can work as effectively as those of Phase I.

As a long-standing supplier for Baolihua, Shanghai Electric has provided main and auxiliary equipment for electromechanical furnaces in the Heshuyuan Power Plant 2X300MW project in 2006 and Jiahuwan Power Plant's Phase I 2X1000MW project in 2019. Since its operation, Phase I of Jiahuwan Power Plant has been recognized for its excellent stability, efficiency and cost-effectiveness by users. With such a successful collaboration made, both parties joined hands again in Phase II of Jiahuwan project. **D**

Shanghai Electric Wind Power Won Two Green Development Awards

Themed "Energy, Carbon Peaking and Carbon Neutrality and Development", the 2022 Taiyuan Energy Low-Carbon Development Forum opened in Shanxi Province on September 2nd. Shanghai Electric Wind Power Group Co., Ltd. (hereinafter as "Shanghai Electric Wind Power") won the "Company Excellence Award for Carbon Neutrality and Green Brand Influence", and ranked 52th in the "2022 Global Top 500 New Energy Enterprises" list. China Energy News and China Institute of Energy Economics Research aim to honor companies and organizations with excellent performance in areas of energy transformation and upgrading, green development, structure improvement, technological innovation and social responsibilities via both the award and list. **D**



INDUSTRY LEADER!

Shanghai Electric Wind Power Group's Turbines Awarded "2022 Advanced Clean Energy Equipment"

On August 27, the 2022 World Conference on Clean Energy Equipment was held in Deyang City, Sichuan Province. Shanghai Electric Wind Power Group Co., Ltd. (hereinafter referred to as "Shanghai Electric Wind Power") won the "2022 Leading Clean Energy Equipment" with its WG5.55F-172 turbine under the wind turbine category.

Chinese seas are characterized by a low average wind speed and hugely-different velocities between the north and south. The award-winning turbine is specifically developed for Chinese seas with low-to-medium wind speeds and can operate with higher efficiency and reliability by using the blade certified by both domestic and international organizations, an efficient cooling system with low energy consumption, a mature and reliable yaw system and a better electrical system. The turbine design is improved in an all-rounded manner through drive chain innovations which increases transmission efficiency and power generation profits and makes generator maintenance unnecessary.

Based on its largest archive of offshore wind turbines in China, Shanghai Electric Wind Power presents a panorama of China's development history in this regard. As China's offshore market matures, Shanghai Electric Wind Power has found its own product and technology path that places equal emphasis on product verification, secondary development, strategic cooperation and independent R&D, and created holistic solutions that suit China's offshore wind resources better.

China's wind power industry has evolved into a new era that advocates both large scale and high quality. More and more wind farm owners require farms established to yield a higher profitability, turbines to work with less failures and more fault-free farms to be built. Prioritizing customers' needs, Shanghai Electric Wind Power Group Co., Ltd. initiated the "Lead Goose" Program on August 18th, 2022, which aims at reproducing the successful story of the program on a larger scale by identifying necessary factors for the success through life-cycle tracking. 



230 METERS!

Shanghai Electric's First Wind Turbine with World's Biggest Rotor Hoisted

On September 8th, Shandong Energy Group Bozhong B offshore wind farm saw the successful hoisting of the first semi-direct drive EW8.5-230 turbine based on Shanghai Electric's Poseidon platform. So far, it has the world's largest rotor hoisted with a diameter of 230 meters.

Shanghai Electric Wind Power Group Co., Ltd. (hereinafter as "Shanghai Electric Wind Power"), a subsidiary of Shanghai Electric, develops the new EW8.5-230 turbine, a semi-direct drive product specifically made for Chinese seas with low-to-medium wind speeds, by exploiting the advanced know-how it has accumulated in decades on offshore wind power. The new turbine uses the highly-integrated semi-direct drive chain with goals of "high profitability and reliability", making it a "leading holistic resolution employing state-of-the-art technologies". Shanghai Electric Wind Power ensures the turbine's "high profitability and reliability" from the perspective of systemically-improved design thanks to its decades' mastery of and penetration into technologies of both key components and the whole turbine.

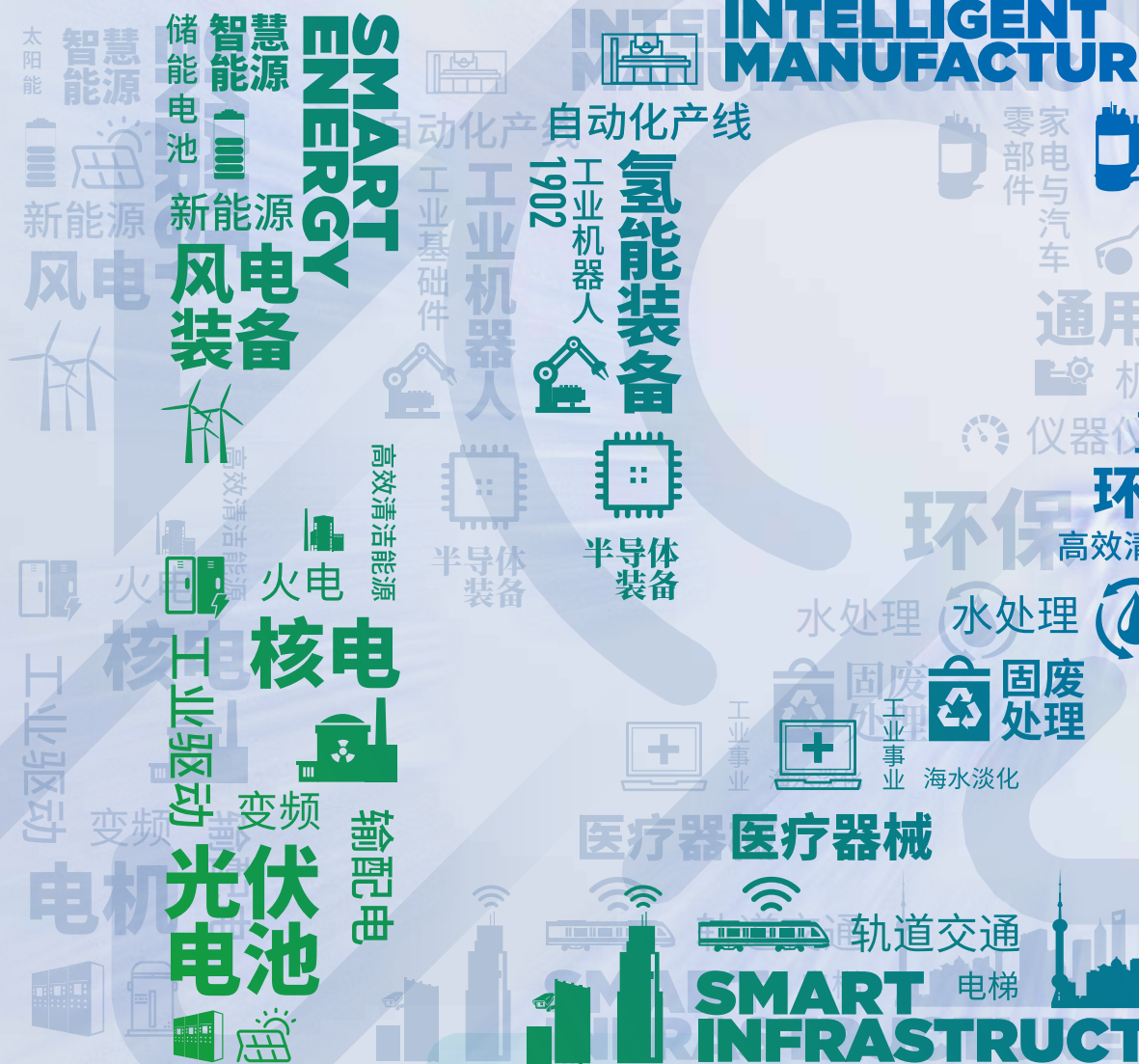
The swept area of the rotor is about 5.8 times of a standard football field. The turbine's power output stands at 28 million kWhs per year at an annually average wind speed of 7.5 m/s, which is enough for 14,500 households for the same time span, and can cut coal consumption by nearly 10,000 tons and CO₂ emission 24,000 tons. With many first-of-its-kind projects accomplished, Shanghai Electric Wind Power has created breakthroughs and milestones one after another in the cause of Chinese offshore wind power industry, which include the deployment of turbines with an installed capacity of 3.6MW, the project in line with the "double ten" criteria (an offshore wind farm shall be more than 10 kilometers from shore and in water deeper than 10 meters), the wind farm in an intertidal zone in far seas, the project honored the National Quality Engineering Gold Award, and the wind farm with a 7MW capacity. **D**



COVER TOPICS



COVER TOPICS





THE 120-YEAR-OLD SHANGHAI ELECTRIC

USHERS IN A NEW ERA OF PROSPERITY AND DEVELOPMENT



his year marks the 120th anniversary of Shanghai Electric. Since its inception, generations of Shanghai Electric employees have achieved numerous inspiring milestones. Knowing the past opens the door to the future. 120 years are insignificant compared with the evolution of Earth, but for an enterprise that strives for business excellence, it is long enough to make many radical changes. As a national leading enterprise with the lofty ideal of invigorating domestic manufacturing industry, Shanghai Electric has made constant and determined efforts and gained fruitful results. With our unlimited potential, we will strive to shape a shared future together with all stakeholders.

Let's recap the company milestones in chronological order to celebrate the glorious and inspiring history of Shanghai Electric.

1902

Shanghai Dalong Machinery Factory was established



COVER TOPICS

ORIGIN

1902

SHANGHAI DALONG MACHINERY FACTORY



he origin of Shanghai Electric can be traced back to 1902, when Shanghai Dalong Machinery Factory, the earliest large

firm under Shanghai Electric, was founded, representing the dawn of modern machinery industry in Shanghai.

When Yan Yutang, a Chinese entrepreneur, founded the factory, he rented two single-storey houses in Meijia Lane, Taihe Street, Yangshupu as workshops, and hired only seven workers to repair and replace small parts for foreign merchant ships. The following year, the factory moved to 25 Pingliang Road, occupying 12 single-storey tin house, and the number of workers were increased to 50. In 1914, the World War I broke out to involve all Western powers, and the

long strangled domestic industry was revived with the textile sector seeing particularly rapid growth. Aware that the Dalong factory should be divorced from foreign enterprises, Yan began to cooperate with domestic manufacturers. He gathered technical staff to produce textile machines, laying a foundation for China's independent manufacture of machines.

Yan aspired to establish a first-class machine manufacturing enterprise in China in terms of both technology and management. In 1922, Dalong launched its first weaving machine. The low price and maintenance cost of the machine enabled lower production costs than that of other textile factories, yielding good profits for Dalong year after year. As a result, other textile factories began to purchase machines produced by Dalong.

In 1925, the owner purchased 70 mu of land at 5 Guangfu West Road to establish the new plant of Dalong. By 1937, Dalong boasted total assets of 500,000 yuan (in fiat currency of the Republic of China), over 500 machine tools, over 1,300 workers, and an annual net profit of more than 200,000 yuan. A Shanghai newspaper commented: "In China, only Dalong Machinery Factory is capable of manufacturing textile machines on a large scale."

Comment:

The history of Dalong has deeply inspired Shanghai Electric in its development.





1906

Anderson Meyers
& Co.Ltd. was
established



1953

REVIVE THE GENERATORS THAT SERVED THE WAR OF RESISTANCE AGAINST JAPAN

The May 16, 2015 issue of the Xinmin Evening News published an article titled "A Power Plant That Served the War of Resistance Against Japan", which tells the story of two U.S. made hydroelectric generators at the Tianmen River Power Plant in Tongzi County, Zunyi City, Guizhou Province. Manufactured by GE, they have been providing power locally for more than 70 years. During the War of Resistance Against Japan, the two generators were airlifted to China through the Hump and became the power source of a local arsenal. In February 1953, the two generators received a major overhaul. Shanghai Electric Machinery provided coils to one of them and assisted in the overhaul. Both generators have been operating properly to date.

Comment:

The story shows Shanghai Electric's corporate responsibility as a stated-owned enterprise and the superb skills of older-generation technicians that inspire us every day.

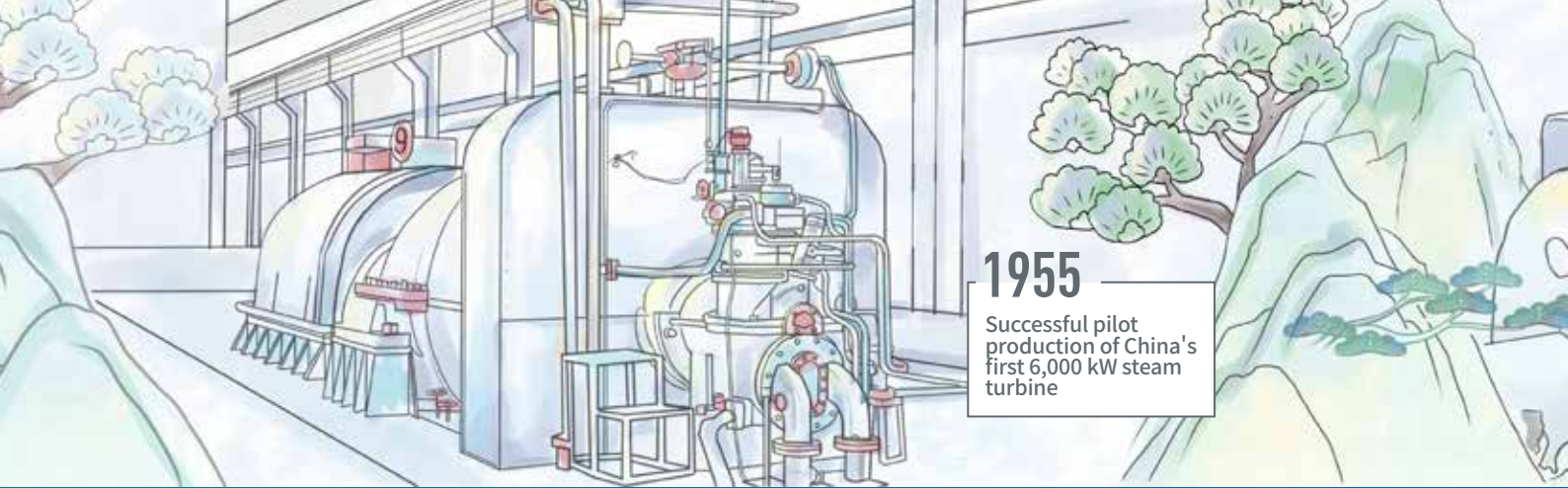
1916

Watson Electric
Manufacturing Plant
was established



COVER TOPICS





1955

Successful pilot production of China's first 6,000 kW steam turbine



DEVELOPMENT

1955

CHINA'S FIRST 6,000 KW STEAM TURBINE GENERATOR

After the founding of the PRC, the rapid development of the country has put forward a high demand for power supply. In 1953, when China launched its first five-year plan, the first domestic 6,000 kW steam turbine generator was independently developed to satisfy the power needs of production and construction. The state decided to install the unit in the then domestic-leading Huainan Tianjia'an Power Plant, which had more than ten years of experience in power generation, to guarantee the production and operation of the unit and to bring out the full potential of coal mines in Huainan.

In 1954, the plant was upgraded to boast four 6,000 kW units in its Phase-I expansion project. The new generators and boilers were produced by Shanghai Turbine Works, Shanghai Electric Machinery and Shanghai Boiler Works as the first equipment of its kind designed and manufactured by China independently.

Comment:

Shanghai Electric pioneered in the domestic manufacture of generator units, eliminating China's complete dependence on imported generators.



1958

World's first 12,000kW double water inter cooling turbo-generator was created



COVER TOPICS

1958

THE WORLD'S FIRST TURBO-GENERATOR WITH DOUBLE INTERNAL WATER-COOLED SYSTEMS WAS BORN

On October 27, 1958, the world's first 12,000-kW 3,000-rpm turbo-generator with double internal water-cooled systems was born in Shanghai Electric Machinery.

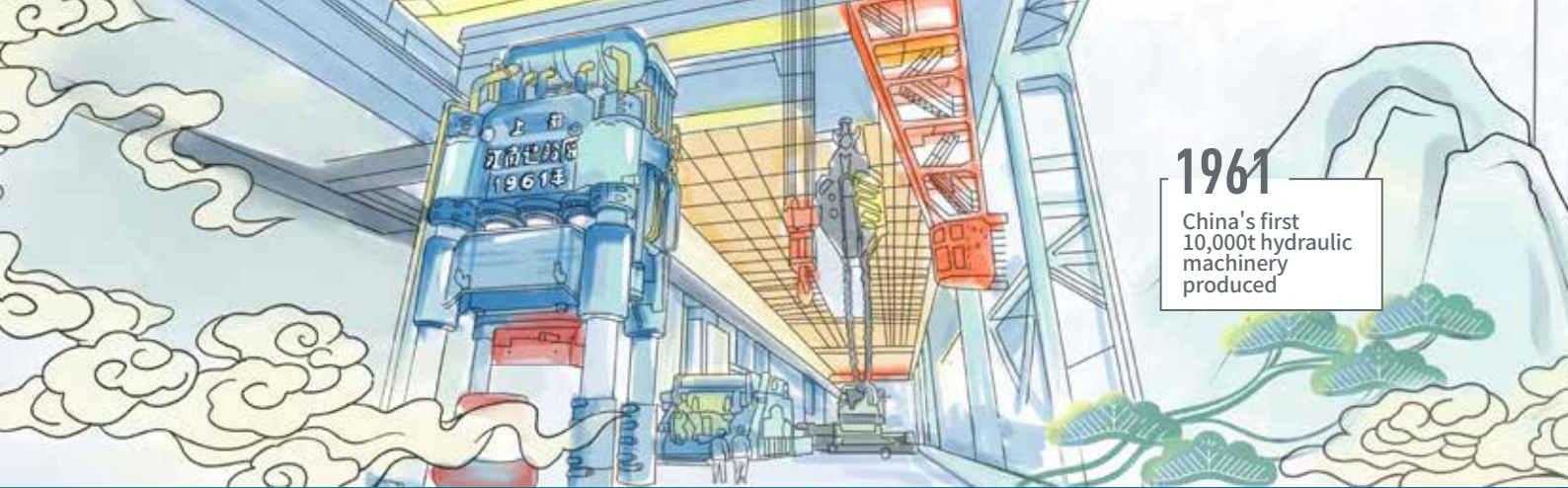
In December of the same year, the Soviet Union held a meeting at the Leningrad Power Plant to discuss issues concerning the cooling of large turbine generators. Besides representatives of major generator manufacturers and research institutes of the Soviet Union and related organizations from Poland and Hungary, Wu Tianlin, then deputy chief engineer of Harbin Electric Machinery and Wang Keng of Shanghai Electric Machinery were also present. Under the instruction of state leaders, Wu Tianlin announced at the meeting that China had successfully made the world's first 12,000-kW 3,000-rpm turbo-

generator with double internal water-cooled systems, which surprised all the attendees. Alekseev, president of the USSR Electrical Engineering Society and corresponding academician of the USSR Academy of Sciences, congratulated the Chinese delegates and included the news into the proceedings and minutes of the meeting.

Comment:

It was the first international report on China's production of a turbo-generator with double internal water-cooled systems. The major innovation greatly advanced China's manufacturing technology for turbine generators, outperforming the then world-leading manufacturers. It also gave birth to Shanghai Electric's "Spirit of Initiative".





1961

CHINA'S FIRST 10,000-TON HYDRAULIC PRESS WAS CREATED

In February 1959, the groundbreaking ceremony of the 10,000-ton hydraulic press was held, kicking off a fight to achieve major industrial breakthroughs.

The main parts of the hydraulic press need to be made of extra-large forgings and cast steel. But at that time, China was not able to produce large steel parts. They could only try to weld castings and steel plates together. There were four large steel columns, each 18 meters long and 1 meter thick, weighing 80 tons, and the classic arc welding techniques

were not up to the task. Then the team learned that a new technology from abroad could solve the problem. The R&D staff sought advice from the Soviet expert who worked as a consultant, but he said, "It is far beyond your capabilities." The team members were not discouraged. After numerous attempts, they mastered the then cutting-edge technology. Learning of their achievements, the Soviet expert exclaimed, "It's unbelievable."

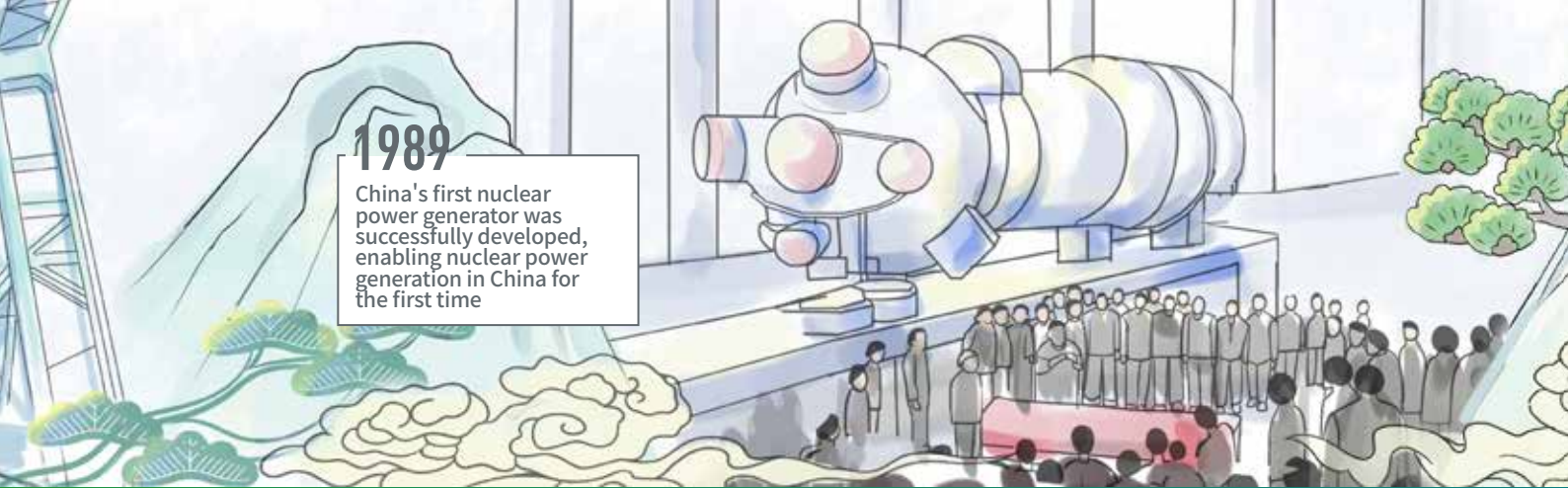
In December 1961, the installation of the 10,000-ton hydraulic press commenced, and more than 40,000 parts were transported into the spacious workshop of Shanghai Heavy Machinery Plant. On June 22, 1962, China's first 12,000-ton free forging hydraulic press was completed, which was 16.7 meters high, like a "steel giant".

In 1962, Edgar Snow, the renowned author of "Red Star Over China", came to Shanghai to see the hydraulic press. When he walked into the workshop, he saw the door of the huge furnace open and the big red hot steel ingots forged like dough. In sight of this, Snow probably would like to write another book for the workers of the PRC.



Comment:

The successful installation of the 10,000-ton hydraulic press in one single run reflected Shanghai's leading position in the then machinery manufacturing industry, and manifested Shanghai Electric's "Spirit of Accountability".



COVER TOPICS

1984

CHINA'S FIRST NUCLEAR POWER GENERATOR WAS BORN

The Phase I project of the Qinshan Nuclear Power Plant (project code 728) was commenced in 1984 and completed in 1991. Qinshan Nuclear Power Plant enabled mainland China to produce nuclear power from scratch. Phase I 300MW nuclear turbine of Qinshan Nuclear Power Plant, supplied by Shanghai Electric, is the first turbine with PWR to put into commercial operation in China. The design service life of the generator unit is 30 years. According to foreign practices, most nuclear power plants can extend their service life by 20 years with renovations. Qinshan Nuclear Power Plant and Shanghai Electric collaborated again to complete the renovation and capacity expansion milestone project of the nuclear power plant.



Comment:

The successful operation of Qinshan Nuclear Power Plant marked the start of nuclear power generation in China. It is an important achievement for the country. The successful renovation of the nuclear power plant demonstrated Shanghai Electric's advanced technical capability.

1987

Shanghai Mitsubishi Elevator Co., Ltd., a China-controlled Sino-Japanese JV, was established



R
REFORM AND
OPENING UP

80s

SHANGHAI MITSUBISHI ELEVATOR

Shanghai Mitsubishi Elevator was established in November 1987 by four companies including Shanghai Mechanical & Electrical Industry and Mitsubishi Electric of Japan. As a large elevator manufacturer, Shanghai Mitsubishi Elevator has maintained a leading position in the domestic market since 1941. It is also one of the largest 500 foreign-invested enterprises in China.

Comment:

Over the past 30 years, Shanghai Mitsubishi Elevator has produced more than 1 million elevators as the biggest elevator manufacturer in the world.



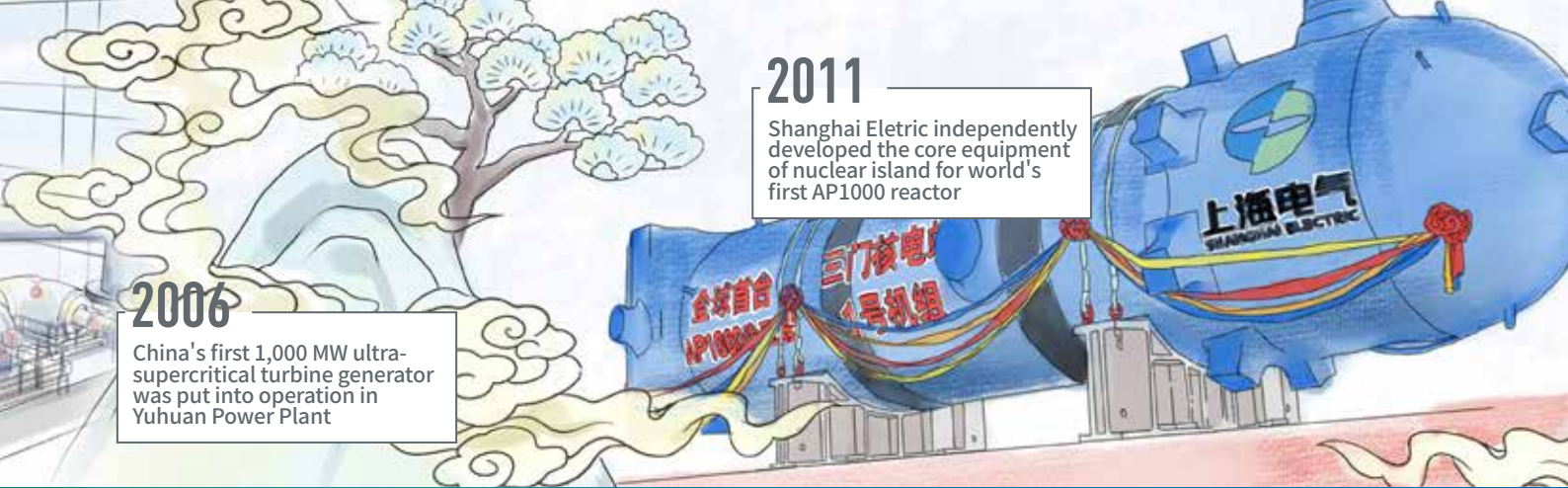
1994

Shanghai Electric and Westinghouse Electric established the largest joint venture in China's power generation industry



COVER TOPICS





2006

China's first 1,000 MW ultra-supercritical turbine generator was put into operation in Yuhuan Power Plant

2011

Shanghai Electric independently developed the core equipment of nuclear island for world's first AP1000 reactor

90s

SHANGHAI ELECTRIC POWER GENERATION EQUIPMENT

Shanghai Electric Power Generation Equipment's Turbine Plant, Generator Plant and Auxiliary Equipment Plant are all subsidiaries of the Shanghai Electric Power Generation Group, a joint venture established in the 1990s by Shanghai Electric and Siemens. As an industry leader, the Power Generation Equipment company has brought together Shanghai Electric's 40-year experience in power generator manufacturing and Siemens' advanced technology and management capabilities.

Comment:

Over the past 20 years, Shanghai Electric Power Generation Equipment has produced coal-fired power generators with an accumulated installed capacity of over 300 million kilowatts, making it one of the world-leading suppliers in the sector.

SHANGHAI HIGHLY (GROUP) CO., LTD.

Shanghai Highly Group, formerly known as Shanghai Refrigerator Compressor Company, was restructured into a joint stock company in 1992. The company's Class A and Class B shares were listed on the Shanghai Stock Exchange in November 1992 and January 1993, respectively. Highly Group has invested its funds raised in the manufacture of refrigeration compressors. Over the past decades, Highly has maintained a leading position in the domestic market. At present, Highly boasts a strong global presence with many factories and R&D centers in several countries and regions, forming a multi-faceted business landscape of refrigeration compressors, motors, drive control and heating-cooling integration.

Comment:

As a listed company, it has become a leading compressor manufacturer after years of efforts. The company will move towards a Zero Carbon future in big strides and contribute to the achievement of China's carbon neutrality goal through energy-efficient and low-carbon products.





2014

Shanghai Electric successfully acquired 40% equity of Ansaldo Energia

IN THE NEW
CENTURY

2006

WIND POWER GROUP WAS FOUNDED

In September 2006, Shanghai Electric Wind Power Group was founded, marking Shanghai Electric's entry into the wind power sector. Partnered with Siemens, the group gained a foothold in the offshore wind power market. In 2016, it ranked

first in the global market for new offshore wind power installed capacity; two years later, it came fifth in China as a wind turbine manufacturer.

The Wind Power Group has built a global R&D system through its six R&D centers in Shanghai, Beijing





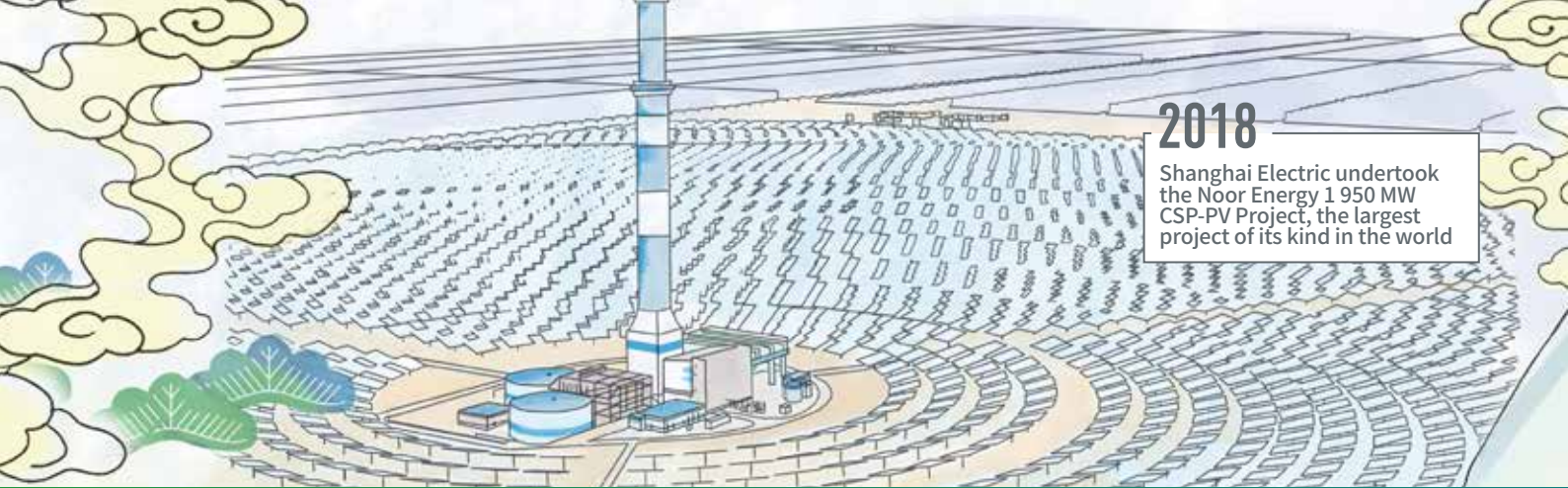
COVER TOPICS

and Denmark. It implements independent R&D while making secondary innovations to foreign technologies to lead the innovative development of China's wind power industry. The group boasts 12 manufacturing sites and 8 regional service centers in Putian, Fujian Province, Shantou, Guangdong Province, Xilingol League, Inner Mongolia Autonomous Region, and Jinchang, Gansu Province. The group specializes in the intelligent design and manufacturing of wind turbines, intelligent O&M of wind farms, wind resource assessment, investment and development of digital wind farms, intelligent assets management of wind farms, and smart energy. The company's product portfolio has covered all sizes of wind turbines from 1.25MW turbines to 8MW turbines.

Comment:

The Wind Power Group is striving to become the world's top 1 offshore wind turbine supplier and a top 3 enterprise in onshore wind energy. Shanghai Electric Wind Power Group has come to the top for new installed capacity of offshore wind turbines in China since 2015, and it was also the world's No.1 in 2016 and 2021 under the same category as a major wind turbine manufacturer.





2018

Shanghai Electric undertook the Noor Energy 1 950 MW CSP-PV Project, the largest project of its kind in the world



COVER TOPICS

2006

SHANGHAI PRIME MACHINERY LISTED ON MAIN BOARD OF HKEX

Shanghai Prime Machinery, a subsidiary of Shanghai Electric, specializes in the manufacture of fundamental mechanical components and related services. It was successfully listed on the main board of HKEX in 2006. The company is mainly engaged in the manufacture of fasteners, blades, bearings and metal cutting tools used in automobile manufacturing, industrial applications, energy equipment, aerospace and rail transportation. Currently, Shanghai Prime Machinery's business network covers 27 cities in 14 countries, with its overseas business accounting for 65%.

Comment:

As an industry leader, Shanghai Prime Machinery has provided high-quality products for the Shenzhou spacecrafts, commercial aircrafts, subways, etc.



2020

Shanghai Electric received the world's first award for industrial intelligence, "Zhanlu Award" for Growth Drivers

WORLD ARTIFICIAL INTELLIGENCE
CONFERENCE
世界人工智能大会

2020
云端
峰会
SUMMIT
ONLINE

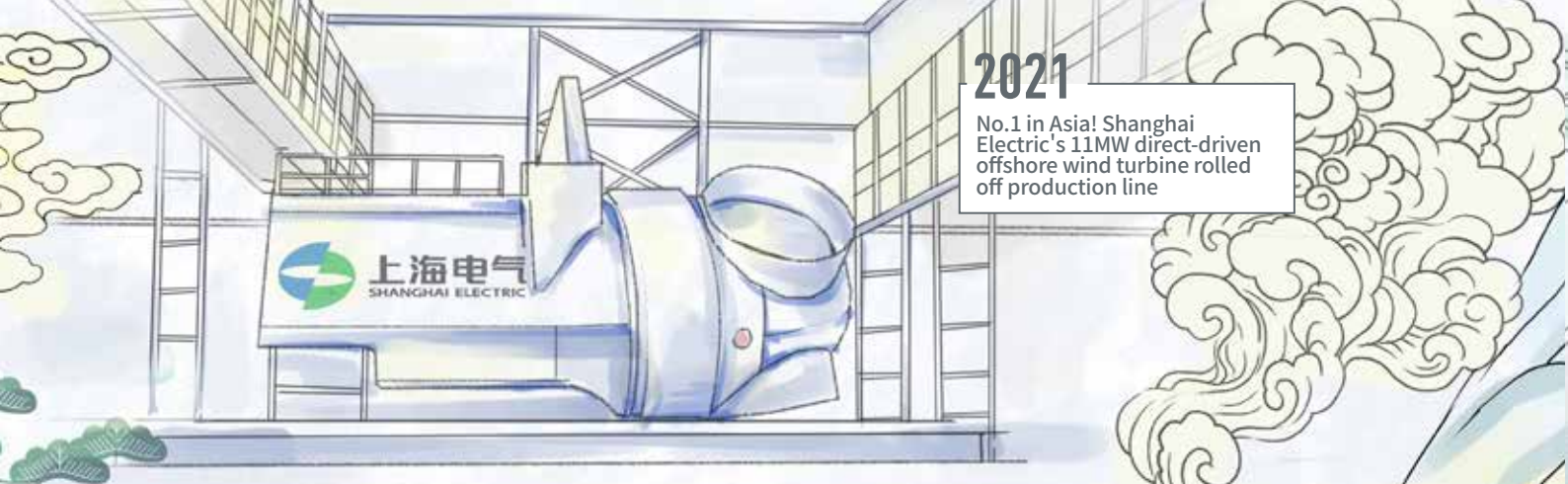
2011

SHANGHAI ELECTRIC POWER TRANSMISSION & DISTRIBUTION GROUP

Shanghai Electric Power Transmission & Distribution Group was established in 2011 by Shanghai Electric and State Grid Shanghai Municipal Electric Power Company (with a 50/50 share ratio). At present, the group boasts an annual sales of over RMB 10 billion and 28 affiliates, including joint ventures with Fortune Global 500 companies such as Siemens, Schneider and ABB. In 2020, it scored a total contract value of RMB 15.1 billion, a sales revenue of RMB 13.1 billion, and a net profit of RMB 580 million attributable to the parent company.

Comment:

As a domestic leader, the group strives to become a world-class supplier with integration capabilities and comprehensive solutions.



2021

No.1 in Asia! Shanghai Electric's 11MW direct-driven offshore wind turbine rolled off production line



COVER TOPICS

SHANGHAI ELECTRIC'S ENVIRONMENTAL PROTECTION GROUP, FINANCE GROUP AND AUTOMATION GROUP ESTABLISHED

Founded in 2015, Shanghai Electric Environmental Protection Group focuses on energy conservation, environmental protection, pollution control, comprehensive utilization of resources and green energy. In 2016, Shanghai Electric established its Finance Group as a comprehensive service platform to provide customers with integrated financial services on investment and financing. In the same year, Shanghai Electric established its Automation Group to develop automation solutions, products and equipment.



2015-2016

Comment:

As a service provider, the Environmental Protection Group has a customer-centric and entrepreneur-oriented corporate culture. In 2020, the Group grew by more than 40% for the second time, with an operating revenue of RMB 14.1 billion and a total contract value of RMB 17.8 billion.

The Finance Group is committed to enhancing integrated service value and driving industrial development with financial resources. It is a domestic leader following a global strategy. Geared towards digital transformation, the Automation Group integrates Shanghai Electric's strengths in equipment manufacturing and cutting-edge manufacturing technologies to continuously empower global industries and provide continuous creativity and high-end equipment solutions for a better urban future.





2021

World's first Generation-IV Nuclear Reactor, a major national demonstration project, connected to the grid

2022

161.7 billion yuan! Shanghai Electric Ranked Top50 China's Most Valuable Brands for a 6th Consecutive Year



2018-2019

THREE-WAY APPROACH TO SMART ENERGY, INTELLIGENT MANUFACTURING AND SMART INFRASTRUCTURE

In terms of smart energy, Shanghai Electric has achieved significant results in its heavy-duty gas turbine project, a national major project, the Smart Micro Grid in Sanxing Town, Chongming Island and the Smart Turbine project. Shanghai Electric's new energy orders has exceeded 1.7 GW in installed capacity, surpassing orders of traditional energy for the first time.

For intelligent manufacturing, Shanghai Electric has established the Digital Technology company, the Intelligent Manufacturing Engineering company and the SEunicloud IoT platform.

In terms of smart infrastructure, Shanghai Electric has entered the NEV market by producing motors, batteries and electronic control systems for the vehicles. It has set up the Shanghai Electric Rail Transit Group for the operation of Songjiang Tram Line T1.

Comment:

In recent years, Shanghai Electric has further optimized its business structure and gradually improved its intelligence capability by investing in smart energy, intelligent manufacturing industries and smart infrastructure.



THE GROUP IS EMBARKING ON A HIGH-QUALITY DEVELOPMENT PATH WITH FIRM STRIDES

It is actively promoting energy transition and implementing its new energy strategy. Embracing openness and innovation for mutual benefits, the group works closely with the government to improve the quality and efficiency of the industry, create more zero carbon application scenarios and facilitate the construction of a zero carbon community. Partnered with investors, it improves the resource efficiency and pioneers in green finance and green development; driven by innovative technology, it has co-created value with customers through enhancement of its competitiveness in integrated equipment manufacturing. After a century full of changes, China's electric power industry has become one of the pillars supporting its economic and social development. The century-old Shanghai Electric has opened up a new chapter for China's sustainable intelligent manufacturing through high-quality development, technological empowerment and win-win collaborations. **D**