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COVER TOPICS

SOARING DREAMS IN AZURE SKIES

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DEEPSEEK: A CHINESE-STYLE OPEN-SOURCING REVOLUTION

What was the hottest topic during this year's Chinese New Year holiday?

Just before and after Chinese New Year, several large AI models were released, and discussions about artificial intelligence expanded beyond tech circles to social groups, personal networks, and even during the Chinese New Year meal. One specific open-source model, DeepSeek-R1, emerged as the highlight of these discussions.


Just before the holiday, Chinese AI company DeepSeek launched the DeepSeek-R1 model. Its performance nearly matched that of the models developed by OpenAI, founded by Sam Altman, but at a fraction of the cost.

On January 27, the DeepSeek application soared to the top of the free app download charts on Apple's App Store in both China and the United States, surpassing ChatGPT in the U.S. rankings. This significant turn of events was described by The Wall Street Journal as "Eastern wisdom overtaking Western innovation." In Silicon Valley, a forum discussion on "How to Restructure Business Models Using the DeepSeek Framework" gained over 100,000 views in just 24 hours. Some comments jokingly referred to this event as "one AI stealing another AI's job."

Regardless of whether the feedback positive or negative, these reactions had no impact DeepSeek's ongoing development nor constrained the progress of its industry peers.

The phenomenon illustrates a distinctive path of Chinese innovation: embracing technological inclusiveness through an open-source ecosystem, fostering rapid iteration grounded in real-world scenarios, and building ecosystems centered on practical value. In contrast to the "walled garden" strategy adopted by Western AI giants, DeepSeek opted to open its core algorithms to the public. This "collective intelligence" approach mirrors the innovative methodologies cultivated during China's internet era.

Interestingly, Western observers have likened the AI competition between China and the U.S. "Kung Fu vs. Boxing". The former values collaborative strategies akin to Tai Chi, while the latter focuses on single-point breakthroughs, similar to a knockout punch. As DeepSeek-R1 amassed over 30,000 stars on GitHub, it showcased new possibilities for Chinese innovation— demonstrating that openness is not a sign of weakness but rather a robust strategy for building stronger ecosystems.

China's ability to innovate is undeniable, and DeepSeek has proven this beyond a doubt: true technological democratization is not the endeavor of a single laboratory but an open-source saga penned collectively by developers worldwide. 

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C O V E R
T O P I C S

P16



SOARING DREAMS IN AZURE SKIES

As the C919 passenger jet cuts through the sky, the trajectory of China's aviation industry becomes ever clearer. This cutting-edge field, involving more than 70 disciplines and requiring the coordination of millions of parts, is not only a symbol of national strength but also the crown jewel of the manufacturing industry.

N E W S
L E T T E R

P02

T R E N D I N G

P06

I N S I G H T S

P26

PIONEERS

fang kai:
From the Basketball Court
to the Lab

POLICY INTERPRETATION

Leading Green
Manufacturing into the
New Era

C U L T U R E

P32

WORKPLACE

The Spiritual Resilience
Amid Algorithmic Frenzy:
Refusing to Become a
"One-Dimensional Man"

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Shanghai Electric Ranked among China's Top 500 Energy Companies Again

China Energy News and the China Institute of Energy Economics Research have just released the "2024 China's Top 500 Energy Companies" list. Once again, Shanghai Electric Holdings Group Co., Ltd. has secured a spot in the list, ranking **38th**, thanks to its robust market performance and significant contributions to the industry. The ranking employs international standards, basing its evaluation on annual revenue to establish an authoritative and unbiased benchmark for the energy sector in China, highlighting the market standing of its key players. **D**



Shanghai Electric Wind Power Clinches Multiple "Wind Power Leader" Awards

The 2024 (4th) Wind Power Leader Technology Innovation Forum and Awards Ceremony, hosted by China Wind News, was recently held in Beijing. For the fourth year in a row, Shanghai Electric Wind Power Group Co., Ltd. has been recognized, receiving seven awards in the "Wind Power Leader" category for its technological advancements. The accolades include the full-power nacelle test platform, the Shanghai Electric Wind Power SOV, and the **2MW** aerial blade replacement tooling for Best Service Products; the Zhuoyue Platform **EW8.5-220** for Best Onshore Wind Turbine; and the Poseidon Platform **EW14.0-270** and **EW18.0-260** for Best Offshore Wind Turbines. The Main Shaft Relocation Management Solution, developed in collaboration with CGN and Schaeffler, also earned the Best Service Product Award. **D**

Shanghai Electric Subsidiaries Again Recognized for Excellence in Green Manufacturing

The Ministry of Industry and Information Technology recently unveiled the 2024 Green Manufacturing List, highlighting leaders in environmental responsibility. Among the awardees, Shanghai Renmin Electrical Apparatus Works Co., Ltd. and Shanghai Huapu Cable Co., Ltd., subsidiaries of Shanghai Electric, were upgraded to the status of National-Level "Green Factories", while Shanghai Electric Machinery Co., Ltd. was designated a National-Level "Green Supply Chain Management Enterprise." Furthermore, the Shanghai Minhang Economic and Technological Development Zone, a Shanghai Electric project, was recognized as a "Green Industrial Park." Shanghai Electric now boasts **29** green factories having earned recognitions, with **20** recognized at the national level, alongside four entities honored for green supply chain management and eight green product lines. **D**

Final Handover Completed for Dubai Phase V Solar Project Block B

Recently, the Dubai Phase V **900MW** Photovoltaic Project Block B, EPC contracted by Shanghai Electric, received its Final Handover Certificate from the project owner, marking the successful completion of construction and warranty tasks of Block B. This **900MW** project is divided into three blocks (A, B, and C). Block A was handed over in July 2023, and Block C is in the final correction and handover phase. **D**

Shanghai Electric Wins Major Overseas Transformer Orders

SEC Zhangjiagang Transformers Co., Ltd., thanks to its professional technical strength, complete service system and good market reputation, recently secured a significant order in an overseas national grid's first large-scale bidding process. The company won a contract for **22** power transformers (**110kV** and **220kV**), strengthening its first-quarter revenue targets. **D**

Secures Tugboat Order from Singapore's Greenbay Marine Technologies

Recently, Wuxi Hongqi Shipyard Co., Ltd*, a subsidiary of Suzhou THVOW Technology Co., Ltd*, secured an order for a **32m 5,000BHP** tugboat from Singapore's Greenbay Marine Technologies Pte. Ltd.

The tugboat is **32 meters** long, with a beam of **11.5 meters** and a depth of **5.3 meters**. Its draft is **4.95 meters**, with a maximum speed of **12 knots (23.15 km/h)**. The **360-degree** azimuth thruster equipped at the stern of the tugboat, provides powerful and stable propulsion, ensuring safe and efficient operation in complex sea conditions. In terms of practical application, this tugboat can effectively assist various types of ships in entering and exiting ports, as well as docking and undocking. It performs exceptionally well in pushing and towing operations in coastal and offshore navigation areas. Additionally, the tugboat features firefighting capabilities up to FIFI-1 standard, independent stern winch for offshore oilfield towing and monitoring, emergency response, firefighting, and oil spill recovery near tankers and LNG carriers, providing comprehensive and multi-layered safety protection for offshore operations. **D**

Main Equipment for APP (Asia Pulp & Paper) Substation All Arrived

The **150kV** substation at the APP OKI Pulp Mill in Indonesia has recently reached a significant milestone. The main equipment supplied by Shanghai Electric has all arrived. All nine main transformers have been positioned, while other equipment will be installed once the civil construction is completed. The smooth implementation of the project will provide APP with a stable and reliable power supply, and will further strengthen the company's business capacity in Indonesia, laying a solid foundation for the Group's business expansion in Southeast Asia. **D**

Bangladesh Substation Project Entered Critical Stage of Civil Construction

The Charfasson **230/33kV** GIS substation project in Bangladesh, co-constructed by Shanghai Electric Power Transmission & Distribution Group Co., Ltd., has now reached the critical phase of civil construction. The project includes the construction of a new **230kV** GIS substation and the expansion of a **230kV** GIS substation. The project team has adopted a "two-end work with a break in the middle" and "rotational shift" approach, strategically arranging construction sequences to make prudent progress. In the fourth quarter, the project has successfully completed site leveling, transformer foundation piling, and the first-floor pouring of the GIS control building, ensuring readiness for equipment installation and keeping the overall schedule on track. **D**

Securing a Major Order in the Lithium Battery Sector

Shenzhen Yinghe Technology Co., Ltd. (hereinafter referred to as "Yinghe Technology") recently secured a mass production project super-order from a leading global lithium battery client.

The project includes several flagship Yinghe Technology products such as double-layer extrusion coaters, roll-slit integrated machines, ultra-high-speed multi-position cutting and stacking machines, and aluminum-shell battery assembly lines. Among them, the ultra-high-speed multi-position cutting and stacking machine, a 2024 new release, has set multiple industry benchmarks. This equipment boasts high efficiency, precision, and intelligence, achieving a stacking efficiency of just **0.1s** per piece. It also features fully automated electrode strip splicing function, separator strip splicing function, and oil injection systems, providing robust support for the intelligentization of lithium battery cut-stack production. **D**



Winning a CGN 252MW Offshore Wind Power Project

Shanghai Electric Wind Power Group Co., Ltd. (hereinafter referred to as "Shanghai Electric Wind Power") has successfully secured the wind turbine generator procurement project for CGN New Energy's Zhejiang Shengsi **7# 252MW** offshore wind power project.

This project will utilize Shanghai Electric Wind Power's Poseidon platform products, which incorporate over a decade of offshore wind turbine design and operation experience. Designed for "high returns" and "high reliability," these turbines inherit proven blade designs, robust pitch and yaw systems, an efficient low-energy cooling system, and an optimized electrical system. Innovative designs have been made in carbon fiber blades, the design of double TRB main bearings, three-phase medium-speed permanent magnet synchronous generators, compact drive chain structures, etc., providing the most suitable solutions for local conditions. **D**





Successful Bidding for CHN ENERGY Xiaolongtan Phase IV Expansion Project

Shanghai Electric Power Generation Group has successfully won the order of steam turbine, generator, condenser and low pressure heater equipment for the Phase IV **1×700MW** unit expansion project of CHN ENERGY Yunnan Company's Kaiyuan Xiaolongtan Power Plant. This marks another collaboration between Shanghai Electric Power Generation Group and CHN ENERGY following the Xiaolongtan Phase III **2×300MW** unit project in Yunnan. Construction is scheduled to commence in March this year, with the project expected to be operational by December 2026, establishing it as a benchmark project for Shanghai Electric in Southwest China. **D**

Securing Bulk Order for MagLev High-Speed Motors from CSSC

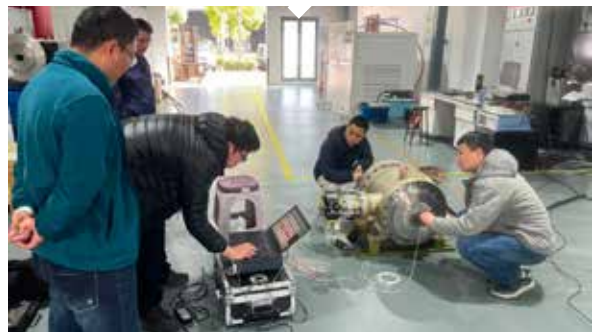
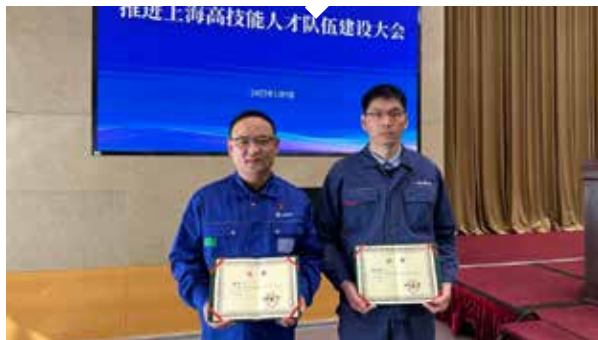
Shanghai Electric recently secured a bulk order for high-power magnetic levitation high-speed motors from a subsidiary of China State Shipbuilding Corporation Limited (CSSC).

Through industry-academia-research collaboration, Shanghai Electric co-developed a magnetic levitation high-speed compression-expansion integrated machine with full independent intellectual property rights. This product is a key component of the reliquefaction system in cryogenic LNG transport vessels. With a rated speed of **30,000** rpm, the motor employs a five-degree-of-freedom fully magnetic levitated bearing system. It integrates compression and expansion functions, meeting the demanding sealing and explosion-proof requirements of ocean-going LNG transport ships. Shanghai Electric's team collaborated closely with CSSC for three years, achieving breakthroughs in high-power high-speed motor design, magnetic levitation control in maritime environments, and high-efficiency impeller mechanics. The product has already been successfully applied in a domestic small-scale LNG refueling vessel. **D**

Increasing to 19! Shanghai Electric Adds Two More "Shanghai Craftsmen"

Recently, the Conference on Promoting the Construction of High-skilled Talents Team in Shanghai was held at the Shanghai Party Institute of CPC. At the conference, the 2024 "Shanghai Craftsmen" list was announced, with Zhang Yi and Zhang Zhengrong from Shanghai Electric being honored. This recognition brings Shanghai Electric's total number of "Shanghai Craftsmen" to **19**.

The conference also recognized the 14th batch of Shanghai Model Worker Innovation Studios and the 2024 Shanghai Craftsman Innovation Studios, and awarded the gold medal winners of the 36th Shanghai Outstanding Invention Selection Competition. **D**



Shanghai Electric's 2025 Group Technology Innovation Conference, New Year's First Meeting, Held

Innovation and practical action should start early. On the afternoon of February 10, Shanghai Electric held its 2025 Group Technology Innovation Conference, New Year's First Meeting. The meeting re-mobilized and re-deployed the company's commitment to high-level technological self-reliance and strength as it enters a new phase. Mr. Wu Lei, Party Secretary of the Party Committee and Chairman of Shanghai Electric Group, attended the meeting and delivered a speech.

Mr. Wu emphasized that the Group would align closely with the directives of the Central Committee and Shanghai Municipal Party Committee and Government, focusing on unwaveringly pursuing high-level technological self-reliance, supporting industrial high-quality development, and deepening the construction of an organized technological innovation system. The Group's work on technological innovation would be integrated into the construction of a technology-driven nation and Shanghai's role as a technological innovation center, ensuring Shanghai Electric plays a leading role in the new wave of technological revolution and industrial transformation. Over the past year, Shanghai Electric has actively explored organized scientific research, achieving notable progress and laying a solid foundation for further improvement in the future.

Regarding the next phase of technological innovation, Mr. Wu emphasized the need to accelerate the establishment of an efficient technological innovation system. He highlighted the importance of seizing development opportunities, speeding up reform and

innovation, improving the technological innovation system, and enhancing the efficiency of technological innovation. Shanghai Electric's technological innovation system must be self-driven, capable of efficient "self-rotation" to continuously create forward-looking and advanced innovative products, while also "revolving" around the Group's industrial development needs to generate core technologies with market influence and competitiveness. Mr. Wu stressed the need to deepen the organized mechanism for technological innovation. This includes ensuring the implementation of major scientific projects, with each project having specific leaders and executors, along with defined goals and milestones to form a highly collaborative working mechanism. The "2+X" open innovation system should be systematically built, accelerating the formation of landmark scientific projects through collaborations with universities. Additionally, universities that can substantially advance specific industries or disciplines within the Group should be carefully selected to leverage external expertise to accelerate the development of core capabilities. The construction of innovation platforms should be systematically advanced, with a focus on building and utilizing these platforms to continuously enhance their functions. These platforms should attract more innovative elements and resources to help solve practical problems, while deepening collaborative cooperation with universities and research institutes to share scientific achievements and form an innovation ecosystem that



integrates industry, academia, and research. The construction of technological innovation mechanisms should be systematically promoted, exploring the establishment of mechanisms for supporting research funding, tolerating innovation failures, fostering innovation collaboration, and incubating scientific and technological achievements. The status of scientific and technological talents within the Group should be further highlighted. The mechanism for cultivating scientific and technological talents should be optimized to build a workforce that is systematic, professional, specialized, and capable of practical application, aiming to cultivate more academician-level and industry-leading talents. Specialized training for high-level talents should be strengthened, the selection and appointment of Group technology experts should be optimized, the reserve of young scientific and technological talents should be reinforced, and the core functions of the "Outstanding Engineer Academy" should be fully utilized to comprehensively enhance the professional level and innovation capabilities of technical talents. The incentive mechanism for scientific and technological talents should be further optimized, establishing a scientific evaluation system to promote the healthy flow of talents and create incubation conditions for outstanding talents. Market-oriented incentive mechanisms should be explored, combining immediate and medium to long-term incentives to highlight the Group's rewards for major scientific and technological achievements.

Mr. Wu emphasized that a strong

technological foundation leads to a thriving enterprise. Technological self-reliance and self-improvement are essential for the future development of Shanghai Electric. In this new historical period, the majority of scientific and technical personnel must maintain resilience, strive for excellence, and pursue the highest standards. They should realize their maximum value by continuously driving the iterative upgrading of the Group's technological innovation, jointly shouldering the mission of Shanghai Electric as a "national pillar," and making new and greater contributions to the new industrialization.

Mr. Zhu Zhaokai, Deputy Secretary of the Party Committee of Shanghai Electric Group and Chairman of Shanghai Electrical and Mechanical Labor Union presided over the meeting and announced the list of projects winning the award of "2025 Shanghai Electric Group Outstanding Contribution to Technological Innovation". The conference presented honorary certificates to representatives of the 30 winning projects. Ms. Yang Hong, Vice President of Shanghai Electric, delivered the 2024 technology work report.

The meeting was attended by Group leaders and senior executives, heads of headquarters functions, leaders of industrial groups, directly affiliated units, and key enterprises, technical leaders, scientific and technological experts, project leaders, and young technical backbones. **D**



RECOGNIZED!

Shanghai Electric's Digital and Green Transformation Project Selected

Shanghai Municipal Commission of Economy and Informatization recently released the "First Batch of Shanghai Manufacturing Digital and Green Transformation Application Scenarios." Shanghai Electric Nuclear Power Equipment Co., Ltd., in collaboration with Shanghai Electric Digital Technology Co., Ltd., successfully made the list of the first batch of 16 application scenarios with its project "Energy-Saving and Carbon-Reduction in Nuclear Power Equipment Manufacturing via Industrial Internet Platform."

This initiative, a demonstration project of Shanghai Electric's extreme energy-saving program, integrates IoT-enabled energy

metering, upgraded solutions, and the implementation of the Energy-Carbon Smart Manager software, establishing an energy-carbon management system for Shanghai Electric Nuclear Power Equipment Co., Ltd. that links production processes. It enables real-time energy data collection and monitoring, optimizes energy consumption, enhances precise energy-carbon management, and ensures the stable operation of production. Additionally, the platform provides carbon quota management, carbon accounting, and emissions tracking, laying the foundation for carbon footprint calculations.

Shanghai Electric continues to align with national green development strategies, expanding its energy-carbon management services across corporate, regional, and national levels. Its customized carbon management service platform has provided carbon management services to over 60 enterprises within the Group. Additionally, the Shanghai Industrial Carbon Management Public Service Platform, which it has undertaken, actively supports the digital carbon management of Shanghai's industrial sector and promotes green industrial development. Meanwhile, Shanghai Electric also continues to support the construction of the national industrial carbon management system and the industrial digital carbon management public service platform, and actively carries out the construction and optimization of the national industrial carbon database.

Looking ahead, Shanghai Electric will remain committed to China's "dual-carbon" goals, accelerating the integration of digital and green transformation. It will extend its services across the supply chain, offering comprehensive energy-carbon management solutions—including consulting, products, implementation, operations, and transactions—to key enterprises, suppliers, local governments, and industrial parks. By doing so, it aims to drive the industry toward a high-quality, sustainable, low-carbon, and economically efficient future. **D**

Shanghai Electric's First Supply Chain Collaboration Product Achieves Carbon Footprint Certification

Recently, Shanghai Electric's first supply chain collaboration product based on its production and manufacturing advantages, the "HEA-25(D)NR Elevator Air Conditioner," obtained a carbon footprint service certification. This marks the 20th product from Shanghai Electric to complete carbon footprint certification.

To actively implement the national carbon peak and carbon neutral strategy and accelerate the green and low-carbon transformation of industries, Shanghai Electric has been carrying out product carbon footprint management, following key policy documents such as the Shanghai Action Plan for Accelerating the Establishment of a Product Carbon Footprint Management System and Promoting Green and Low-Carbon Supply Chains and Shanghai Electric's Dual Carbon Action Plan White Paper.

As a demonstration project for supply chain carbon management at Shanghai Electric, the certified elevator air conditioner is designed by Shanghai Highly Automatic Electric Co., Ltd.* for Shanghai Mitsubishi Elevator Co., Ltd. to regulate the temperature in elevator models with a load capacity of 1,350 kg or less. This product integrates Highly Automatic Electric's high-efficiency energy-saving air conditioning compressor and SEDT's "Management System of Carbon Emission" service, which explores new service models in the industrial production system. This lays a solid foundation for building a green and low-carbon supply chain for Shanghai Electric.

Looking ahead, Shanghai Electric will remain committed to China's "dual-carbon" goals, accelerating the integration of digital and green transformation. It will extend its services across the supply chain, offering comprehensive and intelligent energy-carbon management solutions—including consulting, products, implementation, operations, and transactions—to key enterprises, suppliers, local governments, and industrial parks. By doing so, it aims to drive the industry toward a high-quality, sustainable, low-carbon, and economically efficient future. **D**



Shanghai Electric Kicks Off the Chinese New Year with Strong Momentum



On the first business day of the Chinese New Year, despite the cold weather in Shanghai, “full steam ahead” scenes were already playing out across the city. The “First Meeting of the Chinese New Year” focused again on optimizing the business environment, inspiring a city-wide enterprising spirit. In various sectors including economy, finance, trade, shipping, and technological innovation, businesses were taking proactive steps to accelerate Shanghai’s construction of the “Five Centers”, and add momentum toward achieving a successful Q1.

As the leader of the first domestically commercialized green methanol project, Shanghai Electric Group’s Shanghai Boiler Works Co., Ltd. was bustling with activity yesterday. In Shanghai, the management team went to the frontline, visiting operations while setting goals and tracking progress; in Taonan, Jilin, the green methanol project maintained construction progress throughout the Spring Festival holiday, with full momentum. The Taonan project is a landmark initiative for Shanghai Electric’s “dual carbon” strategy, integrating the entire industrial chain from wind power, hydrogen production via electrolysis, biomass gasification, to methanol synthesis. Shanghai Boiler Works’ self-developed biomass gasification equipment, hydrogen production devices, and methanol synthesis technology form the integrated “Wind-Solar-Hydrogen-Methanol” innovation chain. “Green methanol, as marine fuel, is not only the key to decarbonizing global shipping industry but also a new quality productive force supporting the transformation of industrial power.” According to Ni Jianjun, Deputy General Manager of Shanghai Boiler Works, this year

is crucial for the project’s development. The first phase is expected to complete by June, producing the first barrel of green methanol, which will then be transported to Yangshan Port for fueling, thus forming a closed loop from research and production to application of domestic green fuel. That will mark Shanghai’s entry into the global first tier in this field. The progress of the green methanol project directly aligns with the construction of Shanghai as an international economic center. At present, the city is actively cultivating new quality productive forces, and improving the modernization of its industrial system, giving priority to green, low-carbon, and future energy sectors. As a leader in domestic equipment manufacturing, Shanghai Electric is actively contributing to green methanol, green ammonia, and green aviation fuel industries. This serves not only as proactive support for national strategies but also as a pivot towards transitioning from traditional energy equipment manufacturing to low-carbon industries. Currently, global green methanol production capacity cannot meet the needs of the shipping industry, and its high cost remains a



challenge. Shanghai Electric has been quick to seize this opportunity, using its technological and industrial experience to lay the groundwork early, aiming to assist Shanghai in becoming a global leader in green fuel technology and industry. The first phase of the Taonan project, with a capacity of 50,000 t/a, and the upcoming second phase with a capacity of 200,000 t/a, will be pivotal in Shanghai's transition to a leader in green fuel technology and industry.

"Before the Chinese New Year, everyone from management to frontline workers was assigned 'homework' for the holiday," Ni Jianjun told the reporter. During the holiday, many employees

worked overtime to prepare for the crucial year ahead. "A week later, the entire management team will visit Taonan site for an on-site meeting."

Once the Taonan project is operational, it is expected to provide a stable supply of green methanol fueling for shipping companies at reasonable prices. This means Shanghai has the potential to become a global hub for green fuel and green shipping, attracting major international players to the city. This initiative will effectively promote synergy between the construction of Shanghai into an international economic center, an international shipping center, and an international innovation hub. **D**

Shanghai Electric Wind Power Wins Multiple "Wind Power Leader" Awards

The 2024 (4th) Wind Power Leader Technology Innovation Forum and Awards Ceremony, hosted by China Wind News, was recently held in Beijing. Shanghai Electric Wind Power Group Co., Ltd. won awards for the fourth consecutive year, securing seven technological achievements in the "Wind Power Leader" category.

The award-winning projects include the Full-power nacelle test platform, the Shanghai Electric Wind Power SOV, and the 2MW aerial blade replacement tooling for Best Service Products; the Zhuoyue Platform EW8.5-220 for Best Onshore Wind Turbine; and the Poseidon Platform EW14.0-270 and EW18.0-260 for Best Offshore Wind Turbines. The Main Shaft Relocation Management Solution, developed in collaboration with CGN and Schaeffler, won the Best Service Product Award. **D**



China's First Full-Process ISCC EU Certification for Green Methanol Development of Hydrogen-Based Energy Accelerated

On December 23, 2024, Shanghai Electric reached a significant milestone by obtaining ISCC EU certifications for the entire process—from biomass collection and storage to biomass processing, and the production of bio-methanol through biomass gasification and green hydrogen production. This accomplishment positions Shanghai Electric as the first green methanol supplier in China to earn full-process ISCC EU certification, covering every stage from raw material collection to final production.

The certification applies to the integrated wind power and bio-methanol demonstration project in Taonan, Jilin Province, solely invested by Shanghai Electric's subsidiary Lvyuan Technology (Jilin) Co., Ltd. This groundbreaking project collects agricultural biomass residues, processes them through cutting-edge pretreatment, and converts them into green methanol using advanced gasification, integrated wind-to-hydrogen systems, synthesis, and distillation technologies. The result is green methanol fuel that meets stringent maritime standards. Additionally, the project incorporates ISCC EU-certified intermediate storage and refueling facilities, creating a fully traceable lifecycle system for

green methanol production from raw materials to end users.

The International Sustainability and Carbon Certification (ISCC) is a globally recognized certification system for sustainability and carbon accountability. ISCC EU certification, in particular, is a mandatory requirement for green energy products entering the European Union's energy market. It ensures compliance with the EU's Renewable Energy Directive II (RED II) for biofuels, bioliquids, and biomass fuels.

Securing ISCC EU certification marks a significant breakthrough in China's green methanol sector. The Taonan project becomes the country's first large-scale green methanol production initiative to utilize biomass and green hydrogen as raw materials, meeting international sustainability standards across the entire value chain. This certification also validates Shanghai Electric's comprehensive technical solutions for large-scale green methanol synthesis, which are underpinned by proprietary core technologies and equipment. The accomplishment underscores the company's technological leadership and lays a solid foundation for promoting green methanol production across China. **D**

Shanghai Electric Launches a Large-Scale High-End Equipment Manufacturing Site in Penglai

On December 17, 2024, Shanghai Boiler Works Co., Ltd., a subsidiary of Shanghai Electric, officially launched its large-scale high-end equipment manufacturing site project in the Penglai Wind Power Industrial Park in Yantai City, Shandong Province. The groundbreaking ceremony was attended by Shen Jian, Member of the Standing Committee of the CPC Yantai Municipal Committee and Vice Mayor, along with Jin Xiaolong, Member of the CPC Committee and Vice President of Shanghai Electric. Together, they officiated the commencement of the project.

The project has a total investment of CNY 2 billion, with the initial phase allocated CNY 310 million. This phase will focus on the production of power plant boilers and systems, large high-end pressure vessels, and solutions for new energy. Upon reaching full operational capacity, the facility is expected to achieve an annual output of 13,400 tons, including FPSOs (Floating Production Storage and Offloading units), reactors, and CO₂ storage tanks, generating an estimated annual revenue

of CNY 500 million. The launch of this project also establishes the Penglai Wind Power Industrial Park as Shandong Province's first fully integrated offshore wind industrial hub. The park now covers a complete value chain, encompassing upstream research and testing, midstream manufacturing of critical components such as turbines, blades, towers, monopiles, and subsea cables, and downstream construction and operational services.

In his address, Mr. Jin expressed gratitude to the local government, project teams, and other stakeholders present for their support and contributions. He reaffirmed Shanghai Electric's commitment to implementing the Framework Agreement on Deepening Shanghai-Shandong Cooperation, and highlighted the company's dedication to aligning with Yantai's broader economic and social development goals, fostering closer collaboration between Shanghai and Shandong, and playing a key role in Yantai's green transition and sustainable, high-quality growth.

As part of the launch activities, Shanghai Boiler Works hosted a conference titled "Shanghai-Shandong Partnership for Green Transition and Sustainable Low-Carbon Growth". The event brought together more than 100 representatives from Yantai's government, Shanghai Electric subsidiaries, industry partners, and academic institutions. The attendees exchanged insights on cutting-edge green technologies and explored strategies to accelerate the transformation and upgrading of the high-end equipment manufacturing sector. **D**

SHANGHAI ELECTRIC



蓬莱大型高端装备制造基地项目现场推进会

主办单位：上海锅炉厂有限公司



热烈庆祝蓬莱大型高端装备制造基地项目启动

服务国家战略推进高端化智能化绿色化转型



Shanghai Electric Partners with Humanoid Robot Innovation Center to Build an Embodied Intelligence Training Ground for Humanoid Robots

On January 21, the launch ceremony of the “Qilin” Embodied Intelligence Training Ground, established by the National and Local Co-built Embodied Artificial Intelligence Robotics Innovation Center (hereinafter referred to as the “Humanoid Robot Innovation Center”), was held in Shanghai. Government officials from the Shanghai Municipal People’s Government and the Shanghai Municipal Commission of Economy and Informatization, as well as leaders from China North Industries Group attended the event, jointly activating the facility to mark the official operation of China’s first heterogeneous humanoid robot training ground. This milestone signifies a new chapter in China’s humanoid robotics industry.

At the ceremony, the Humanoid Robot Innovation Center signed operational cooperation agreements with ten research enterprises, including Shanghai Electric Group Co., Ltd. Central Academe and INESA. Additionally, cooperation agreements on humanoid robot ecosystem development were signed with ten research institutions and enterprises, such as Shanghai Electric Nuclear Power Group and Haier Group. These partnerships demonstrate Shanghai Electric’s commitment to supporting major national strategies and advancing new quality productive forces.

Under the guidance of the Ministry of Industry and Information Technology, which prioritizes humanoid robots for specialized applications, the Humanoid Robot Innovation Center and Shanghai Electric Group Co., Ltd. Central Academe will begin exploring practical applications of humanoid robots in extreme and high-risk nuclear power operations starting March 2024. Centered on three demonstration application scenarios within Shanghai Electric Nuclear Power Group, the project aims to replace traditional high-intensity and hazardous repetitive tasks, thereby enhancing the efficiency and safety of nuclear power manufacturing and injecting strong impetus into the intelligent transformation of the nuclear power industry.

After extensive technological research and joint

testing, the first humanoid robot tailored for nuclear power production was successfully deployed on December 1, 2024. This robot features unique structural design and force control technology, excelling in data collection and training while efficiently handling industrial tasks such as inspection and material loading/unloading. It significantly reduces workers’ labor intensity and safety risks.

With the successful deployment of this humanoid robot at the training ground’s nuclear power zone, the Humanoid Robot Innovation Center will continue its close collaboration with Shanghai Electric’s technical team. Leveraging Shanghai Electric’s nuclear power production demands and technological expertise, both parties will push forward humanoid robot applications in the nuclear power sector, driving China’s nuclear industry to higher levels.

The National and Local Co-built Embodied Artificial Intelligence Robotics Innovation Center, established in November 2023, is China’s first dedicated innovation hub for embodied intelligence robots. Focused on core technologies, product development, and ecosystem construction, it aims to lead industry advancements through two key platforms: the general-purpose robot platform “Tiangong” and the multifunctional embodied intelligence platform “Kaiwu”. The center aspires to become an industry resource integrator, a driver of industrial development, and a catalyst for real-world applications in the field of embodied intelligence, striving to build a globally influential hub for embodied intelligence innovation and a leading demonstration zone for its applications.

With the training ground now operational, it can initially accommodate up to 100 humanoid robots for simultaneous training. The newly signed industrial chain partners will facilitate collaborative operations, customizing training programs for over ten industries, including equipment manufacturing, automotive production, and home appliances. By deploying robots in real-world scenarios and collecting diverse high-quality data, the center will continuously enhance their intelligence and application scope. By 2027, the training ground is expected to expand significantly, accommodating up to 1,000 humanoid robots in simultaneous training to meet the growing needs of China’s humanoid robotics industry. **D**

Shanghai Electric showcases innovative technologies and achievements at the World Energy Summit

The 17th World Future Energy Summit (WFES 2025) will be held in Abu Dhabi, the capital of the United Arab Emirates, from January 14th to 16th.

Shanghai Electric, with the theme of "Green Innovation Empowering the Future", made a heavyweight appearance at the summit with cutting-edge technology and innovative achievements, showcasing its strength and determination to help global energy transformation to visitors from all over the world.

During the exhibition, Shanghai Electric also presented several exciting roadshows, promoting its own construction of Dubai solar thermal photovoltaic integrated power generation project, UK REP 1&2 energy storage project, and Mexico Peniasco phase-shifting camera project, demonstrating the integration ability of Shanghai Electric's universal and customized solutions through performance cases.

It is understood that the World Future Energy Summit is considered the largest platform for energy security, water resource security, climate change response, and sustainable development in the Middle East and North Africa region. This summit attracted over 600 exhibitors from more than 100 countries around the world to showcase the latest technologies and products, and invited government officials, representatives of international organizations, and numerous energy experts from around the world to share their opinions and prospects. **D**



COVER TOPICS

SOARING DREAMS IN AZURE SKIES

A

s the C919 passenger jet cuts through the sky, the trajectory of China's aviation industry becomes ever clearer. This cutting-edge field, involving more than 70 disciplines and requiring the coordination of millions of parts, is not only a symbol of national strength but also the crown jewel of the manufacturing industry. Amid the global restructuring of the aviation supply chain, Shanghai Electric, as part of the "national team," has built a comprehensive "smart manufacturing" ecosystem in aviation—from the millimeter-level precision of automated assembly lines to groundbreaking advancements in high-temperature turbine blades that can withstand 1,700°C flames. From breaking down data silos with industrial software to pioneering green aviation through electric propulsion technology, Shanghai Electric is repositioning itself in the world's aviation industry with cutting-edge technology.



Shanghai Electric Powers the Growth of China's Aviation Industry

DECODING SHANGHAI ELECTRIC'S COLLABORATIVE INNOVATION IN THE AVIATION SECTOR

In the industrial sector, the aviation industry serves as a mark of a nation's rise and overall national strength, with a profound impact on other industries of the national economy. Unlike other equipment manufacturing industries, the aviation equipment sector features high entry barriers, as it falls within the realm of high-end equipment and new materials. Therefore, developing aviation equipment is of great significance to the overall enhancement of a nation's manufacturing capabilities.

In response to the accelerating shift toward intelligent and domestic aviation manufacturing, Shanghai Electric has relied on its rich experience in equipment manufacturing and cross-disciplinary collaboration to build an ecosystem covering the entire aviation manufacturing value chain. As part of China's "national team" for high-end equipment manufacturing, Shanghai Electric, through multiple key subsidiaries, has made significant strides in key areas such as automation equipment for aviation, critical components manufacturing, and electric propulsion systems, injecting strong momentum into the autonomy and controllability of China's aviation industry.





STRENGTHENING THE AVIATION INDUSTRY'S CORE THROUGH TECHNOLOGICAL INTEGRATION

To meet the needs of the times, China's aviation industry is adopting an innovation-driven approach, mastering key technologies independently, building advanced manufacturing systems, and creating aviation products that cater to national development needs and embody Chinese characteristics. The goal is to gain a voice in the global aviation supply chain.

The 2024 edition of the "Civil Large Passenger Aircraft Industrial Chain Supplier Map" includes over 250 suppliers in the large passenger aircraft industrial chain. From a breakdown of the industry chain, 59% of suppliers are manufacturers, followed by 9% distributors, 8% professional service providers, and 7% aviation maintenance enterprises, etc. The map outlines a major trend: the Chinese civil aviation industry is making investments across the entire lifecycle.

Shanghai Electric understands that the aviation manufacturing industry is a knowledge and technology-intensive sector with a long value chain and many related industries. Since announcing its entry into aviation manufacturing in 2016, Shanghai Electric has leveraged its advanced manufacturing capabilities and integrated equipment expertise, making breakthroughs in domestic aviation manufacturing through the introduction and absorption of advanced technologies.

"If you are flying on a commercial aircraft, we can proudly say that at least one structural component of that aircraft was manufactured using Shanghai Electric's equipment." This was a remark by a booth representative of Shanghai Electric at the 2023 China Aviation Manufacturing Equipment Expo. Currently, Shanghai Electric has become an important supplier in the civil large passenger aircraft supply chain, with primary business areas covering: aviation industry automation equipment, smart factory software and solutions, and aviation production supply chains.

In the industry, experts divide an aircraft into components such as the "nose, front fuselage, mid fuselage, rear fuselage, horizontal tail, vertical tail, wings," akin to a giant Lego model where

thousands of parts are assembled using specialized equipment. This transforms individual parts into a fully functioning aircraft.

In aircraft manufacturing, the assembly of aviation structural components accounts for 50%-70% of the direct manufacturing workload. Therefore, the assembly of structural components is a key part of aircraft manufacturing. Shanghai Electric Automation Group has defined its positioning and development strategy in the aviation equipment sector through strategic alignment, resource integration, and cultural synergy. In the field of aircraft structural assembly, this strategic framework has empowered the Group not only to deliver cutting-edge automated assembly equipment, production lines, and comprehensive solutions but also to play a key role in establishing automation standards for large components and structures.

With the development of materials for aviation structural components, Shanghai Electric Automation Group has also laid the groundwork for automated composite material fiber placement equipment, which will become key tools for the manufacture of composite aviation structures.

By combining technological advantages with supply chain strengths, Shanghai Electric is creating new synergies that drive business growth, continuously enhancing its competitiveness in the aviation equipment field and meeting the requirements for independent, autonomous, and controllable aviation automation solutions.

In the key national project of thermoplastic carbon fiber placement machines, Shanghai Electric leveraged the national key research and development program to make key breakthroughs in critical composite manufacturing, developing gantry-style and robotic-style FPTL machines to serve the large-scale manufacturing needs for composite parts of the C929 aircraft. In the aviation supply chain sector, Shanghai Electric holds manufacturing strengths in aviation forgings, finished parts, bearings, fasteners, cutting tools, and electrically excited starter generators.



AVIATION EQUIPMENT FIELD: UTMOST PRECISION AND EFFICIENCY

On December 9, 2022, Commercial Aircraft Corporation of China, Ltd. (COMAC) officially delivered the world's first domestically produced C919 aircraft, B-919A, to China Eastern Airlines. This marks a new milestone in the development of China's domestic large aircraft industry.

The C919 is renowned for its complete independent intellectual property and is the world's next-generation single-aisle mainline airliner. However, constructing large aircraft like the C919 is far from simple and requires collaboration among numerous companies at home and abroad. Top manufacturers like Boeing and Airbus also rely on a vast network of upstream and downstream industry partners, including companies that produce parts like aircraft fuselages and engine components, all of which possess industry-leading expertise. This ensures the aircraft's safe and reliable operation.

In the C919 project, Shanghai Electric delivered the automation assembly line for the mid-fuselage and a fully automated robotic drilling and riveting line for the flaperon, which played a key role in ensuring process quality and construction precision during the manufacturing of China's large domestic aircraft. This marked Shanghai Electric's first major project in the aviation industry, showcasing external recognition of its technical strength and laying the foundation for future expansion in aviation

markets at home and abroad.

After successfully securing the C919 aircraft's flap tooling project, Shanghai Electric also won the contract for AVIC's commercial aircraft automatic drilling and riveting machine project, providing automation solutions. This marks another milestone for Shanghai Electric in the field of aviation smart manufacturing.

"This equipment is our flagship product. It is currently the world's most efficient gantry-style multi-panel automation drilling and riveting equipment, specifically used for the assembly of the front, mid, and rear fuselages and cabin doors of certain passenger aircraft. Compared to traditional riveting equipment, it offers a wider processing range, better maintainability, and higher riveting efficiency", explained a technician from the company. The drilling and riveting assembly is fixed and non-detachable, effectively ensuring the safety and stability of the aircraft.

It is worth noting that during the COVID-19 pandemic, Shanghai Electric successfully won and delivered an aviation engine automation assembly project on time. It was Shanghai Electric's first domestically designed, produced, and delivered project in China's aviation engine field. The project used pulse transport mode widely applied in the global aviation engine industry, combined with the company's unique automation lifting system. Shanghai



Electric optimized and upgraded China's traditional aviation engine manufacturing assembly lines with efficient, safe, and modular technical solutions, significantly improving quality, safety, and efficiency.

The pursuit of precision and efficiency is endless. Shanghai Machine Tool Works Co., Ltd. (hereinafter referred to as "Shanghai Machine Tool Works"), a subsidiary of Shanghai Electric Automation Group, is a leader in the precision grinding machine field in China. It has been hailed as one of China's "Eighteen Arhats" and "Two Pearls" in the machine tool industry, creating multiple "China's firsts" in the precision grinding machine sector.

Dedicated to solving key problems for aerospace users in precision machining, Shanghai Machine Tool Works provides critical equipment for spacecraft fairings, missile bodies, inertial navigation systems, engines, structural components, and other sectors. Moreover, it has achieved independent and controllable domestic production.

Aviation equipment is a highly complex, technology-intensive industry that plays a crucial role in driving national economic and social development and ensuring national security. From aircraft to aviation engines and onboard systems, each domain represents the frontier of technology and innovation, together forming the core competitiveness of the industry.

PRODUCTION AND SUPPLY CHAIN: FROM "SINGLE BREAKTHROUGH" TO "SYSTEM STRENGTHENING"

On May 28, 2023, China Eastern Airlines successfully operated flight MU9191, marking the first commercial operation of the C919 large passenger aircraft delivered by COMAC. This event signaled the official entry of China's civil aviation into the era of domestically produced large passenger aircraft. Every component of this large aircraft embodies craftsmanship and innovation, with the high-temperature turbine blades—often known as the "heart and artery" of the aircraft—being especially critical. For a long time, the core manufacturing technology of these blades has been monopolized by foreign companies, becoming a key problem for the development of China's large passenger aircraft industry.

Shanghai Electric's vision is to equip China's large aircraft with a "Chinese heart," allowing them to soar freely in the airspace of China.

Wuxi Turbine Blade Co., Ltd. (hereinafter



referred to as “Wuxi Turbine Blade”) has developed high-temperature turbine blades withstanding temperatures of up to 1,700°C in the combustion chamber. While these are small components, they are essential to the manufacture of turbine engines and involve complex processes such as precision casting, thermal barrier coating, and film hole machining, earning them the title of “components of national importance”.

Some have likened the high-temperature blades of the aeroengine and the combustion turbine in harsh conditions to an ice spoon stirring hot soup—ensuring even mixing while preventing the spoon from melting.

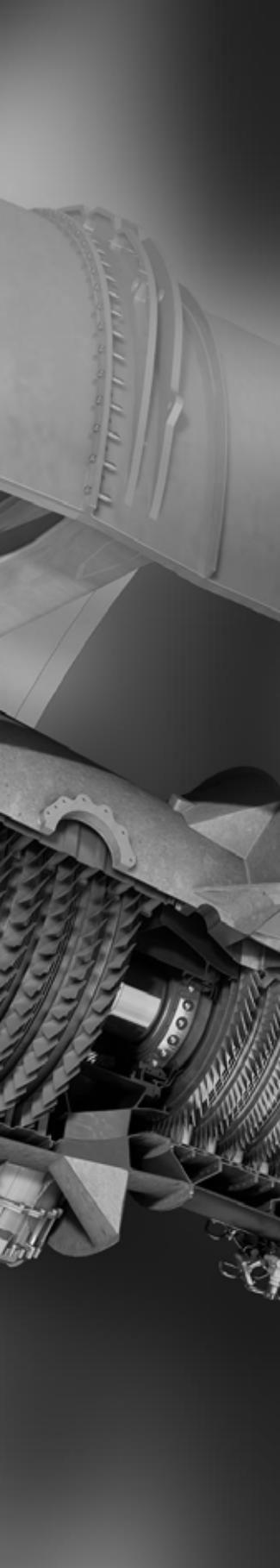
Founded in 1979, Wuxi Turbine Blade was China’s fifth blade manufacturer during the Fifth Five-Year Plan, taking on several key national infrastructure projects. After nearly 40 years of development, it has become the largest blade manufacturing center in China. In 2012, as the traditional energy equipment market became saturated, Wuxi Turbine Blade made a strategic transition to high-end aviation engine manufacturing. As a core component of large aircraft, aviation engines represent not only a country’s technological peak but also national defense strength.

To support this transition, Wuxi Turbine Blade increased its investment in research and development, establishing an academician workstation focusing on the development of large blades for nuclear power and a postdoctoral workstation focusing on processing technology for forming and modifying difficult-to-deform materials in aviation. The company also invested nearly RMB 100 million in the National Energy Turbine Blade R&D Center and has begun collaborating with technical teams at home and abroad to enhance engine capabilities.

If Wuxi Turbine Blade represents Shanghai Electric’s precision in aviation, then Shanghai Tool Works Co., Ltd. (“Shanghai Tool Works”) represents Shanghai Electric’s speed. Shanghai Tool Works reduced the production cycle of tools for difficult-to-machine materials for the C919 aircraft from six months to one month—accelerating the process sixfold.

At the time, Shanghai Tool Works collaborated with COMAC Shanghai Aircraft Manufacturing Co., Ltd. in hole machining for the C919 wings. This was an unprecedented challenge as the fuselage of the C919 is





composed of more than 60% composite materials like carbon fiber and glass fiber, which are difficult to machine. The machining process was more complex, requiring manual machining, conventional machining, CNC machining, and virtual five-axis machining. Each process had different requirements for tool design, even influencing choices for tool materials and coatings. This greatly increased the uncertainty of tool testing.

"These drills are designed for the C919 aircraft, mainly for drilling holes in the wings. The wings are made from multiple layers of different materials, such as titanium alloy, aluminum alloy, and carbon fiber, which must be tightly fitted together using rivets. Special drills are required to drill over 20,000 precision holes in the wings," explained a technician from Shanghai Tool Works.

Shanghai Tool Works can supply 80% of the tools used in C919 aircraft manufacturing. Since November 2017, the company has successively received orders from COMAC Shanghai Aircraft Manufacturing Co., Ltd.

The two companies are part of Shanghai Prime Machinery Co., Ltd. Similarly, another company owned by Shanghai Prime Machinery Co., Ltd., Shanghai Tian An Bearing Co., Ltd., plays a unique role in the aviation field. As China's largest manufacturer of high-end precision miniature bearings, Shanghai Tian An Bearing manufactures various aerospace and civilian precision miniature bearings with inner diameters from $\phi 0.6\text{mm}$ to $\phi 45\text{mm}$, covering more than 3,000 types and 5,000 products.

Under the umbrella of Shanghai Prime Machinery Co., Ltd., another key player, Koninklijke Nedschroef Holding BV (hereinafter referred to as "Nedschroef"), manufactures nuts, bolts, rivets, inserts, and studs required by aviation manufacturers and maintenance service providers. The company is an official supplier of fasteners to Airbus and has supplied over 700 types of rivets, screws, and bolts to Airbus and Airbus Helicopters.

From Wuxi Turbine Blade's groundbreaking high-temperature turbine blades to Shanghai Tool Works drilling holes in large aircraft wings, from being a leading manufacturer of high-end precision miniature bearings to producing aviation fasteners and components, Shanghai Prime Machinery has built a comprehensive supply chain system covering "materials-components-tools".



GREEN AVIATION: SEIZING THE HIGH GROUND OF ELECTRIC PROPULSION TECHNOLOGY

The development of green aviation manufacturing is essential for combating climate change and ensuring the sustainable growth of the aviation industry. It also represents a pivotal direction in the ongoing technological revolution and industrial transformation of aviation, serving as a key strategic move to strengthen the future competitiveness of the aviation manufacturing sector.

The shift to hybrid or all-electric propulsion has become a growing trend in green aviation development. Electric propulsion technology is based on the electrification of secondary energy in multi-electric aircraft, aiming for the electrification of primary energy to further enhance the efficiency of energy conversion in propulsion systems. Currently, hybrid-electric propulsion aircraft have clear advantages over traditional fuel-powered aircraft in terms of efficiency, energy conservation, emissions, and noise. This trend is an inevitable step towards initiating a new round of transformations in aviation, leading technological innovation, and driving green aviation development.

Based on global green aviation development routes and national key research programs, Shanghai Electric Generator Plant has developed an aviation electric propulsion electrically excited starter generator, marking a key step in the electrification of aviation power systems. The advanced insulation design technology can meet the operational requirements of thin-air environments at high altitudes, and the use of innovative oil-cooled winding solution is a world-first in high-speed motors.

Based on the geographical distribution of companies in the green aviation manufacturing industry chain, Shanghai, Guangdong, Jiangsu, Sichuan, and Zhejiang are the top five regions, with private companies accounting for 57% of the green aviation manufacturing sector. This fact is closely linked to China's supportive aviation policies, technological progress, and market demand.

With continuous policy support and the expanding market, the green aviation manufacturing industry will usher in more investment opportunities and growth space.



FUTURE OUTLOOK: SHANGHAI ELECTRIC'S CONTRIBUTION TO A STRONG AVIATION NATION

The Zhuhai Airshow saw a record-breaking turnout with 1,022 exhibitors, 1,195 aircraft sold, and a total deal value of RMB 285.6 billion, with overseas exhibitors increasing by 104% compared to the previous year. Airbus forecasts that China will become the largest aviation service market in the world in the next 20 years. Meanwhile, the expansion of Indian airlines is also noteworthy, particularly in their international and wide-body aircraft business.

Good news come in succession. In October 2023, Shanghai Electric Automation Group won its first contract for a domestic wide-body passenger aircraft fuselage assembly line. The contract for the first C929 production line project was another testament to Shanghai Electric's technical strength, after its participation in the C919 fuselage assembly project.

Aviation manufacturing is at the top of the industrial pyramid, showcasing a nation's overall industrial capabilities and development pace. In terms of frontier industrial technology in aerospace, Shanghai Electric is actively engaging in global industrial development, contributing new products and solutions to "intelligently link" the world.

In line with the 20th National Congress's directive to focus on the real economy and promote new industrialization, Shanghai Electric will continue focusing on its core business during the 14th Five-Year Plan period. By centering on aviation and serving the nation, it will further contribute to breakthroughs in high-end aviation equipment manufacturing, accelerating the progress and transformation of national aviation manufacturing. In the future, Shanghai Electric will place technological innovation at its core, accelerate the development of new quality productive forces, and collaborate with creators worldwide to drive global industry toward a green future. **D**

Exploring the Low-Altitude Economy: Unlimited Potential in a Trillion-Yuan Industry

Imagine taking a helicopter ride to the airport, taking an "air taxi" across the Yangtze River, or having a coffee delivered by a drone along the Great Wall. The low-altitude economy is rapidly emerging and is gradually becoming part of our daily life.

In 2024, the "low-altitude economy" was proposed in the government work report, underscoring its growing significance in the national economic development. Over the past year, policy and industry actions have been in sync, with many regions actively participating, and new segments for the low-altitude economy opening up across the country.

Statistics show that 30 provinces and cities have developed clear plans for the low-altitude economy in 2025. For instance, Beijing plans to establish a pilot zone for low-altitude technology innovation and industrial development, enhancing the functionality of the first 10 incubation bases to secure a forefront position in the low-altitude economy; Shanghai will methodically advance the construction of the Hongqiao International Low-Altitude Economy Industrial Park and the East China UAV Base, fostering industrial clustering through these efforts; Inner Mongolia plans to establish the Inner Mongolia Low-Altitude Economy Research Institute, focusing on three critical areas: low-altitude aircraft manufacturing, low-altitude flight service support, and diversified low-altitude applications, to comprehensively drive the growth of the low-altitude economy. Meanwhile, Guangxi will actively develop emerging and future industries, including the low-altitude economy, and vigorously promote the large-scale application of the BeiDou Navigation Satellite System, leveraging its unique advantages to explore new paths for low-altitude economic development.

According to CCID Consulting's "China's Low Altitude Economy Development Research Report (2024)", "by 2026, the market size of low-altitude economy is expected to reach the trillion-yuan milestone, at 1.06446 trillion yuan." 2025 marks the conclusion of the 14th Five-Year Plan and the planning phase for the 15th Five-Year Plan. Comprehensive deployment of the low-altitude economy and early planning of related industrial projects have become key parts of the 15th Five-Year Plan.

The low-altitude economy is far more than a simple "revolution in air transportation". At its core, it represents a paradigm shift in the development of spatial resources. Shanghai's "Action Plan for

Promoting New-Type Infrastructure Construction" explicitly includes the low-altitude economy as a key area for urban digital transformation, reflecting a precise anticipation of a new economic growth engine: Low-altitude logistics could improve urban supply chain efficiency by over 30%. The eVTOL (electric vertical takeoff and landing aircraft) network will redefine the radius of the one-hour economic circle. Hydrogen-powered aircraft could potentially stimulate a trillion-yuan clean energy market. The construction of this three-dimensional economic model will unleash multiplier effects that traditional infrastructure cannot match.

If 2024 is considered the inaugural year of the low-altitude economy, then 2025 will be pivotal for the development of its infrastructure, marking a critical moment for the commercialization of eVTOL operations.

However, the development of the low-altitude economy also faces numerous challenges. Technological bottlenecks, regulatory hurdles, and marketing difficulties are key factors constraining its growth. As the primary regulatory authority, the Civil Aviation Administration of China is engaging in in-depth communication and collaboration with market players to identify optimal solutions. The lengthy certification process for airworthiness undoubtedly increases investment risks for businesses. Yet, like all nascent industries on their path to maturity, the low-altitude economy is undergoing this inevitable evolution. The enthusiastic market response has not only raised external awareness of the industry but also attracted more orders and competitors.

Ultimately, every industrial revolution begins with breakthroughs by cross-boundary innovators. The low-altitude economy is reshaping the global industrial landscape at an incredibly fast pace. When aircraft soar over the Huangpu River, what we witness is not just a technological leap but also the strategic choice of a city and a nation amid the tide of industrial transformation. **D**







FANG KAI

 Shanghai Mitsubishi Elevator
 Chief Engineer

FANG
KAI

FROM THE BASKETBALL COURT TO THE LAB:

THE JOURNEY OF FANG KAI, CHIEF ENGINEER OF SHANGHAI MITSUBISHI ELEVATOR

At the LEHY Straight Up product launch event held by Shanghai Mitsubishi Elevator Co., Ltd. (hereinafter referred to as “Shanghai Mitsubishi Elevator”), an innovative 12.5 m/s ultra-high-speed elevator was unveiled, drawing widespread attention. Among those applauding was Fang Kai, a key figure behind this technological breakthrough.

“Innovation is the key to advancing technology, and striving for perfection in technical precision is my guiding principle,” said Fang Kai. As a post-70s professional, he always fulfilled his job responsibilities with great dedication. Standing at 1.85 meters tall, Fang Kai exudes confidence and determination. Beyond his expertise in elevators, he is also an exceptional basketball player known for his agility and precise shooting.

His ability to seamlessly blend teamwork from the basketball court with scientific rigor makes him a role model for integrating sportsmanship and technological excellence. He is a perfect example of the seamless fusion of technology and sports, showcasing a brilliant and multifaceted life journey.

A JOURNEY FROM NOVICE TO EXPERT

Since earning his master’s degree in electrical machinery and appliances from Shanghai Jiao Tong University in 2001, Fang Kai has dedicated his career to Shanghai Mitsubishi Elevator. Over the years, his relentless pursuit of excellence has laid a solid foundation in elevator technology and product development. Thanks to his outstanding work performance, he has rapidly grown into a leader in the field.

Rising through the ranks from an electrical development supervisor in 2008 to Chief Engineer in 2023, Fang Kai has remained committed to continuous learning, seeking greater but achievable goals. Fang Kai firmly believes in the principle that “among three people, there is always one who can be my teacher.” He dedicates his spare time to delving into cutting-edge knowledge of elevator development, often poring over

professional books at his desk.

"No matter what you do, if you choose to do it, you must do it to the best of your ability." This is not only Fang Kai's motto but also the guiding principle behind his actions. His dedication to his craft is evident in his work in technology development. Leading the technical management team, he stays at the forefront of elevator technology, conducting in-depth research, embracing bold experimentation, and collaborating with leaders, experts, and colleagues to tackle technical challenges in elevator development. He has accumulated extensive expertise in areas such as the independent development of permanent magnet synchronous gearless traction machines, core control software, the construction of IoT-based remote elevator service systems, the establishment of the company's elevator technology development framework, and ultra-high-speed elevator technology innovation. His efforts have continuously enhanced the technological capabilities of the company's elevator products, ensuring that Shanghai Mitsubishi Elevator remains a leader in the industry.

STEERING SHANGHAI MITSUBISHI ELEVATOR TO THE FOREFRONT

As the only Sino-foreign joint venture in China's elevator industry with a majority Chinese stake and management control, Shanghai Mitsubishi Elevator relies on technological innovation to navigate the waves of industrial advancement. To maintain the company's leadership position, Fang Kai has demonstrated extraordinary vision and courage, pushing the boundaries of research and development.

Personally overseeing key projects, he spearheaded the independent development of permanent magnet synchronous gearless traction machines from the ground up, establishing Shanghai Mitsubishi Elevator's research and evaluation systems in this field. His innovations cover all major specifications, from low-speed to high-speed elevators. Additionally, he led the development of the company's core control software, bridging a crucial gap in the independent development of electrical systems. Under his leadership, the team successfully developed a range of products, including cost-effective elevators, mid-to-high-speed elevators, and IoT-based remote elevator service systems.

As the driving force behind the

company's technological advancements, Fang Kai closely aligns with the "Technology-Driven Enterprise" strategy, implementing a competitive approach focused on cost-effective and differentiated quality. He actively explores new product development strategies, balancing technological pre-research with system integration to create more competitive solutions while improving cost efficiency. He emphasizes durability as a core product value while pioneering smart elevator innovations to enhance overall quality and appeal.

To better support these strategies, Fang Kai has continuously strengthened the company's technology management capabilities, with a particular focus on enhancing research and development (R&D) systems and capabilities. He led the implementation of the Integrated Product Development (IPD) model at Shanghai Mitsubishi Elevator, emphasizing customer-driven innovation, optimizing product development processes, fostering cross-departmental collaboration, increasing technical and component reuse, accelerating time-to-market, and reducing manufacturing and maintenance costs. In R&D capability enhancement, he optimized organizational structures to align with the research rhythm of "pre-research one generation, develop one generation, launch one generation." By leveraging both internal and external resources, he facilitated industry-academia-research collaborations, accelerating fundamental research and commercialization. He also introduced a guest expert system to push the boundaries of knowledge in niche yet crucial technological areas. With the effective support of product strategies and technology management, under Fang Kai's leadership, the company's technology center has delivered impressive results in cost reduction, efficiency improvement, intelligent development, and secondary marketing product innovations, significantly enhancing product competitiveness.

One of Fang Kai's most remarkable achievements was leading the development of Shanghai Mitsubishi Elevator's independently designed and manufactured 12.5 m/s ultra-high-speed elevator—a milestone that set a new speed record for Chinese-made elevators and ranked as the fifth fastest elevator globally. This innovation not only meets the diverse needs of modern super high-rise buildings but also enables the company to provide comprehensive, localized, and professional pre-sales, sales, and after-sales services for ultra-high-rise users.

Developing the 12.5 m/s ultra-high-speed elevator was an unprecedented technical



challenge, demanding superior traction drive capabilities, safety mechanisms, and vibration and noise reduction. This project tested the limits of Shanghai Mitsubishi Elevator's R&D, manufacturing, and testing capabilities. Faced with these challenges, Fang Kai led his team in tackling critical technical hurdles, continuously innovating in three key areas: traction drive, safety protection, and vibration and noise reduction. At the same time, he leveraged three supporting technologies—digital simulation, intelligent manufacturing, and advanced evaluation and testing—to achieve superior product performance, ultimately securing Shanghai Mitsubishi Elevator's leadership in high-speed elevator technology within China.

RESPONSIBILITIES AND COMMITMENT OF A CHIEF ENGINEER

As the Chief Engineer of Shanghai Mitsubishi Elevator, Fang Kai deeply understands that this role transcends a mere "position"—it is a "profession" and, more importantly, a lifelong "mission."

With years of experience at the

forefront of elevator technology, Fang Kai has a profound grasp of the challenges and obstacles on the path of technological innovation. Since assuming a leadership role, he has consistently prioritized collective wisdom as the cornerstone of decision-making. He firmly believes, "The strength of a team far surpasses that of an individual, and everyone's wisdom has the potential to spark exceptional ideas." At the same time, he always keeps the growth and value realization of employees at heart. Fang Kai introduces that the company adheres to a "people-oriented" philosophy, committed to discovering innovative talent. While driving corporate development, it also ensures the interests and growth of employees, enabling those who "want to achieve, can achieve, and dare to innovate" to thrive in technical roles and shine brightly.

Guided by the principle of "daring to tackle tough challenges and venture into uncharted waters," Fang Kai has gained confidence and courage in areas such as technical talent cultivation, dual-track development models, and enhancing the capabilities of the technical team. As a Party member, he consistently integrates Party building into technological development. Under his leadership, the technology and marketing centers' Party branches collaborate closely, hosting themed seminars on "standardizing non-standard processes" to promote technological empowerment and strive for dual excellence. They also organize joint Party-building activities, encouraging technology center Party members to engage with market realities, understand customer needs, and provide valuable insights for product development through market research.

When asked about receiving the Shanghai May 1st Labor Medal, Fang Kai humbly stated, "This honor does not belong to me alone but is the result of the collective efforts and innovative achievements of all employees at Shanghai Mitsubishi Elevator. I am merely an ordinary member of this great team, working in a modest technical role."

Diligent, innovative, selfless, and dedicated, Fang Kai embodies responsibility and commitment. His down-to-earth, relentless drive and pioneering spirit are the driving forces behind transforming "Made in China" into "Created in China," "China Speed" into "China Quality," and "Chinese Products" into "Chinese Brands." Through his actions, he deeply inspires everyone around him. **D**

2024 is a critical window period for achieving the dual carbon goals of the 14th Five Year Plan. Shanghai Electric Group actively responds to the national "dual carbon" strategy, taking the ten actions as the fulcrum, driving the energy revolution with technological innovation, and promoting carbon neutrality goals through the synergy of the entire industry chain, contributing to the global climate governance with the ten "green electricity" dual carbon management cases.

LEADING GREEN MANUFACTURING INTO THE NEW ERA

2024 "GREEN SHANGHAI ELECTRIC" TOP 9 DUAL CARBON MANAGEMENT CASES

By Meng Jie

1 THE CARBON MANAGEMENT PLATFORM GOES LIVE TO SUPPORT CARBON PEAK AND NEUTRALITY GOALS

The carbon management service platform provides one-stop carbon emission calculation services for enterprises by using preset carbon emission factors and accounting formulas that match the Group's businesses, quickly generating annual carbon emission reports and promoting internal information sharing and cooperation across Shanghai Electric to ensure effective implementation and monitoring of energy-saving and emission reduction plans.

1

4 3 ENTERPRISES SELECTED FOR MIIT'S 2024 GREEN MANUFACTURING LIST

The Ministry of Industry and Information Technology (MIIT) recently announced the 2024 Green Manufacturing List. Shanghai Renmin Electrical Apparatus Works Co., Ltd. and Shanghai Huapu Cable Co., Ltd. were recognized as National-Level "Green Factories", while Shanghai Electric Machinery Co., Ltd. was recognized as a National-Level "Green Supply Chain Management Enterprise". Shanghai Minhang Economic and Technological Development Zone, a Shanghai Electric project, was recognized as a "Green Industrial Park."

With this latest recognition, Shanghai Electric now boasts a total of 29 green factories, including 20 recognized at the national level, 4 green supply chain management enterprises, and 8 green product series.

4

2 JOINING CN100 ALLIANCE TO PROMOTE GREEN AND LOW-CARBON TRANSFORMATION OF THE SUPPLY CHAIN

Shanghai Electric joined the CN100 Green and Low-Carbon Supply Chain Leader Alliance and was invited to join the Alliance's decision-making advisory committee, aiming to drive the green and low-carbon transformation of key supply chains. The Alliance, supported by leading enterprises, makes joint efforts to promote this transformation, effectively assisting key industries in achieving carbon neutrality goals.

2

5 SHANGHAI ELECTRIC'S FIRST SUPPLY CHAIN COLLABORATION PRODUCT WINS CARBON FOOTPRINT CERTIFICATION

Shanghai Electric's first supply chain collaboration product, the "HEA-25(D)NR Elevator Air Conditioner", won the carbon footprint service certification. This marks the 20th product from Shanghai Electric to win carbon footprint certification. This product integrates Shanghai Highly Electrical Appliances' high-efficiency energy-saving air conditioning compressor and SEDT's "Management System of Carbon Emission" service, representing a new service model in the industrial production system. This lays a solid foundation for building a green and low-carbon supply chain for Shanghai Electric.

5

3 MINHANG ZERO-CARBON INDUSTRIAL PARK DEMONSTRATION PROJECT LAUNCHED BUILDING A MODEL FOR GREEN INDUSTRIAL PARKS

Shanghai Electric Group, in collaboration with multiple parties, launched the Minhang Zero-Carbon Industrial Park and the Minhang Development Zone Demonstration Project. Based on the "1+9+1" overall planning path, the Project uses "1 digital platform" as the management foundation for the zero-carbon industrial park, "9 implementation paths" as the technical support for key areas, and "1 integrated generation-grid-load-storage project" as the carrier for overall implementation. Adhering to the principle of "overall planning and phased implementation," the Project dynamically adjusts and optimizes emission reduction paths and specific measures with the concept of "achieving maximum emission reduction at minimum cost," continuously iterating and upgrading to ultimately achieve the park's carbon neutrality goal.

3

6 SHANGHAI ELECTRIC DIGITAL TECHNOLOGY SECURES MULTIPLE CARBON MANAGEMENT PROJECTS

Shanghai Industrial Carbon Management Public Service Platform, which was built by Shanghai Electric Digital Technology Co., Ltd. ("Shanghai Electric Digital Technology"), actively supports the digital carbon management of Shanghai's industrial sector and promotes green industrial development. In addition, Shanghai Electric Digital Technology has won bids for the second phase of the National Industrial Digital Carbon Management Platform project of the China Academy of Industrial Internet and the carbon footprint model research project of the State Grid Jibei Electric Power Research Institute. These projects will contribute to the construction of a national industrial digital carbon management system and promote the green and low-carbon development of the electrical equipment industry.

6

SHANGHAI MITSUBISHI ELEVATOR WINS ENERGY MANAGEMENT SYSTEM CERTIFICATION AND EMBARKS ON A GREEN JOURNEY

At the end of last year, Shanghai Mitsubishi Elevator successfully won ISO 50001 Energy Management System certification from LRQA (formerly Lloyd's Register), demonstrating that its establishment, implementation, and continuous improvement of the energy management system have met international high standards. This achievement represented a continuous decline in total energy consumption and energy consumption per unit of output, providing strong momentum for the company's new journey toward green development and quality enhancement. Its outstanding performance in energy management has laid a solid foundation for sustainable development.

7

SHANGHAI ELECTRIC'S DIGITAL AND GREEN COLLABORATIVE TRANSFORMATION PROJECTS MADE THE APPLICATION SCENARIO LIST

Shanghai Electric Nuclear Power Equipment Co., Ltd., in collaboration with Shanghai Electric Digital Technology Co., Ltd., successfully made the list of the first batch of 16 application scenarios with its project "Energy-Saving and Carbon-Reduction in Nuclear Power Equipment Manufacturing via Industrial Internet Platform." Specifically, the platform provides carbon quota management, carbon accounting, and emissions tracking for Shanghai Electric Nuclear Power Equipment Co., Ltd., laying the foundation for carbon footprint calculations.

8

CENTRAL ACADEME ASSISTS HIGHLY ELECTRICAL APPLIANCES IN CARBON FOOTPRINT ASSESSMENT

The Central Academe conducted a comprehensive inventory and analysis of Highly Electrical Appliances' carbon emissions, completing the organizational carbon inventory for three factories and carbon footprint certification for a typical product. This effort clarified the goals for achieving carbon peak and carbon neutrality, outlined the path to carbon neutrality, and formulated emission reduction measures and organizational support mechanisms, providing a scientific foundation for the company's green transformation.

Moving forward, the Central Academe will collaborate closely with ecosystem partners to further advance digital energy and carbon management, as well as energy-saving and emission-reduction initiatives, in order to enhance the company's competitiveness.

9



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THE SPIRITUAL RESILIENCE AMID ALGORITHMIC FRENZY: REFUSING TO BECOME A "ONE-DIMENSIONAL MAN"

When DeepSeek-generated movie reviews receive 8.5 out of 10 on Douban, and AI-written financial analyses are used by fund managers for decision-making, the entire content industry is experiencing an existential tremor. This technological revolution is not merely about efficiency but raises fundamental questions about human cognitive privilege: In an era where algorithms can infinitely approximate human thought, can artificial intelligence replace human thinking? Can AI achieve the richness of spiritual life? How can we safeguard our ability to think independently and avoid becoming "one-dimensional men"?

Recent research from an international think tank shows that AI-generated economic forecasts have surpassed 68% of human analysts in short-term trend predictions. In sports commentary, Microsoft's Xiaolce has created an "AI commentator" capable of real-time tactical analysis across 200 emotional dimensions. These seemingly perfect information products are constructing dangerous cognitive comfort zones—while algorithms weave seamless logical chains, humans are losing their instinctive vigilance against cognitive flaws.

Undeniably, AI brings convenience to life and thought through efficiency, diversity, and speed. AI is fed vast databases, learning extensively through deep learning and continuous trial and error, thus advancing. Its broad data sources and spiral-shaped iterative learning provide more comprehensive and diverse perspectives and paths, injecting a continuous flow of intellectual vitality, including critical thinking. Thus, AI's richness of thought seems to

enrich human spiritual life to some extent.

However, behind AI's "perfect" logic lies a perilous cognitive comfort zone. The richness of spiritual life does not rely on the accumulation of external information but stems from independent thinking and the pursuit of meaning. As Ji Xianlin aptly put it, "self-sufficiency and self-realization"; this concept best encapsulates a "rich spiritual life"—it is the pursuit and embrace of meaning and value, as well as the effort to understand one's inner needs through active thinking and the drive to move forward.

Relying on AI to replace one's own thinking not only fosters over-dependence and intellectual laziness but also traps individuals in a state of technological alienation and objectification, signifying the absence of human thought. This runs counter to the active, independent thinking required for a rich spiritual life. As Marshall McLuhan warned, "Every medium or technology amplifies certain human faculties while simultaneously numbing others." Albert Borgmann, a Philosopher of Technology, also noted that as technology becomes more "user-friendly" or humanized, people increasingly "lie flat" within it. Letting AI replace one's thinking may dull one's edges, impoverish thought, and risk becoming what Herbert Marcuse termed a "one-dimensional man." How, then, can one achieve a rich spiritual life?

Thus, a thoughtful and critical approach to AI, coupled with a call for the return of active thinking and meaning, is essential for individuals to firmly grasp the initiative of their spiritual lives and truly enrich their inner worlds. Li Ziqi refuses to be a worker trapped by algorithms, instead dedicating herself to preserving intangible cultural heritage and protecting a pure spiritual realm. Yuan Ling resists being swept away by digital trends, instead chronicling the lives of humble individuals, inspiring the disheartened and enriching her own inner world.

In a performance-driven, burnout-inducing society, people are often pushed forward by one-dimensional economic narratives, not actively engaging but passively floating. The rise of AI exacerbates fears of symbolic reduction and the loss of inner meaning. Yet, AI remains a human creation and tool, never replacing humanity's dominant role in the spiritual realm. Therefore, the richness of the spirit lies within us, within each unique human individual.

As Apple CEO Tim Cook once said, "I don't worry about AI thinking like humans; I worry about humans thinking like AI." Let us always remember: the richness of the spirit lies within us! Harness the powerful instinct of life, seek your own meaning and value, and achieve a rich spiritual life through active thinking. **D**

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