



General Electric (GE) Development Overview in China

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About GE

At GE, we drive the world forward by tackling its biggest challenges in energy, healthcare, transportation, and more. By combining world-class engineering with software and analytics, GE helps the world work more efficiently, reliably, and safely. For more than 125 years, GE has invented the future of industry, and today it leads new paradigms in additive manufacturing, materials science, and data analytics. With more than 280,000 employees in more than 180 countries and territories, GE people are global, diverse and dedicated, operating with the highest integrity and passion to fulfill GE's mission and deliver for our customers. In 2018, GE's global revenues exceeded \$121 billion.

GE in China

GE started doing business in China as early as 1906, and was considered one of the most energetic foreign companies in the country at that time. In 1908, the first GE lighting plant was constructed in Shenyang. GE acquired Anderson, Meyer & Co. in 1934 and began to deliver installation and repair services of imported electric equipment in China. GE resumed trade with China and opened its Beijing office in 1979 at the onset of the country's reform and opening-up. GE's first joint venture in China, GE Hangwei Medical Systems Co., Ltd., was established in Beijing in 1991. Since China's Reform and Opening up, GE has participated in multiple key projects that have driven China's economic and social development, including the Three Gorges Project, the West-East Natural Gas Transmission Project, the Beijing Olympics, the Blue Sky Protection Campaign, the C919 large passenger aircraft project, and the "Belt and Road" Initiative.

For more than 100 years, GE has been adapting to market changes through constant business integration and transformation. At present, GE has nearly 20,000 employees in China, more than 30 manufacturing bases and more than 30 joint ventures in more than 30 cities across the country, 8 of which have R&D teams.

China is an important strategic market for GE and GE's largest single country market outside the US. All of GE's vertical businesses have a significant presence in the market, including energy, aviation, and healthcare, as well as horizontal business units including financing, advanced manufacturing, R&D, and digital. In 2018, GE's orders in China exceeded \$8 billion.

Looking to the future, GE's development in China is an important driver of GE's future global growth. As China pursues high quality economic growth, the national objectives of urbanization,



accessible healthcare, clean energy, Internet +, and the "Belt and Road" Initiative all represent significant opportunities for future development. GE's corresponding development strategies in China – comprehensive localization, global partnership, and full-speed digitalization, aim to seize this new round of market opportunities, with a focus on the three sectors of energy, aviation, and healthcare, as we grow together with our Chinese partners and support China's economic transformation and upgrading. This is how we build out our business plans in China. China's willingness to continue to expand and deepen its Reform and Opening Up give us confidence in helping to open up a new era of growth in China.

GE Energy Solutions

Energy transformation is of great significance to the high quality and sustainable development of China's economy. China's energy structure is affected by factors including economic restructuring, energy efficiency policies, and developments in urbanization. It is gradually transforming from fossil fuel to renewable energy and building a new era of energy generation and consumption that is "clean, low-carbon, safe and efficient." GE is a global leader in the energy industry and an important player in building China's energy ecosystem. Over the past 40 years, GE has actively participated in energy construction through China's different economic development stages, applying global resources and R&D results to provide Chinese customers with a comprehensive energy product and solutions portfolio that supports multiple energy types. In response to the current transformation challenges in the domestic energy sector, GE is providing local partners with full-value chain technology solutions from power generation to consumption.

GE Gas Power

GE Gas Power is the world's leading supplier of gas-fired power solutions, providing customers with gas-fired power generation equipment and life-cycle services based on local demand. In China, GE Gas Power provides China's power generation industry with the most efficient and environmentally-friendly products and services to help China's clean energy transformation.

After decades of service in China, GE Gas Power has continuously deepened its cooperation with local partners and established strategic partnerships with Harbin Electric, Nanjing Turbine & Electric Machinery, and Huadian Power Group. GE Gas Power has production facilities in Qinhuangdao, Shenyang, Shanghai, and Hangzhou, and a gas turbine manufacturing and service joint venture in Qinhuangdao. GE Gas Power has offices in Beijing, Shanghai, Shenzhen,



Guangzhou, Harbin, and Hong Kong, and has a professional team of more than 1,100 people in China.

A comprehensive localization structure effectively increases GE's responsiveness to customer needs and significantly reduces the cost of new units and services. Among the 35 maintenance plants of the same type for GE, the Qinhuangdao Energy Service Center ranks among the best in overall service. GE Asia's problem-solving technical support team based in China can achieve full coverage technical support with no-time difference, 24 hours a day, 7 days a week. The Beijing International Clean Energy Power Generation Training Center established by GE and Datang has trained more than 550 first-line talents for gas turbines. Harbin General Electric Gas Turbine Qinhuangdao Co., Ltd. was formally established in 2018 to accelerate the localization of 9H and 9F gas turbines.

In the context of accelerating the pace of energy transformation in China and upgrading to a clean, low-carbon, safe, and efficient energy ecosystem, GE Gas Power actively cooperates with power generation companies and local governments to develop the most customized products and services to meet local customers' needs. Over the past three decades, GE has supplied more than 300 gas turbines (25MW+ Gas Turbine) to the Chinese market. Among these, the two Guinness-world-record-holding H-class gas turbines for the Huadian Tianjin Junliangcheng Power Plant will achieve over 62% combined cycle efficiency for the plant upon its completion.

GE Renewable Energy

GE has a comprehensive portfolio of renewable energy products and services to provide customers with end-to-end renewable green energy solutions that feature leading-edge technology. Solutions including onshore and offshore wind power, LM Blades, hydropower, energy storage, grid solutions, hybrid power systems, and digital services, are dedicated to providing more affordable, reliable, and sustainable clean energy technology solutions for customers.

In the field of onshore wind power, GE has developed solutions that adapt to different wind conditions, regions, and environments. Through early wind resource assessments and site selection, GE provides customers with optimal selection and configuration, as well as full lifecycle digital services that guarantee availability and the continued decrease of LCOE. In response to the unique wind speed conditions of the China market, GE designed the 2.5-132 turbine with ultra-flexible high tower units for the low wind speed market. It also developed the world's leading



Cypress platform for medium and high wind speed conditions in locations with relatively scarce land resources that are well-suited to the northern regions of the Chinese market. Since the first GE wind power project was launched in China in 2004, GE has installed more than 1,700 units in China with a total installed capacity of more than 3 GW. In 2016, the GE Wind Energy Training Center was completed in Shenyang, becoming the first professional training center for wind energy in China. In 2019, GE and the People's Government of Puyang County, Henan Province signed an agreement for GE's investment in an Asian low wind speed wind power equipment production base in the industrial area of Puyang County. This is the second onshore wind investment by GE in China, more than ten years after the establishment of its Shenyang onshore wind power production base. The planned area of the Puyang base is 30,000 square meters, with an annual output of more than 200 units. It is expected to deliver its first unit in the first half of 2020.

In the field of offshore wind power, GE actively responded to the construction of the national Xinghua Bay offshore wind power demonstration farm, by providing three Haliade 6MW offshore wind turbines, which represented the largest single-unit capacity at the time of construction. In July 2019, GE announced the establishment of a GE offshore wind turbine factory in Jieyang City to produce the Haliade-X 12MW offshore wind turbine, which boasts the highest power generation capacity to date. The facility is expected to be completed in 2021 and begin assembly in the second half of the year. GE also invested to establish an “Offshore Wind Power Operation and Development Center” in the Guangzhou Development Zone to provide operational, technical, and service support for the assembly base. The assembly base and operation and development center will form a regional offshore wind power ecosystem based in Guangdong, serving local and regional markets in Asia-Pacific, while helping to drive Guangdong's energy structure optimization and manufacturing upgrading.

GE Hydro's global installed capacity accounts for 25% of the global hydropower business. Since its establishment in 1995, GE's hydropower base in Tianjin has been one of the leading suppliers of hydropower equipment and systems in the Chinese market. The Tianjin base is also GE's largest hydropower equipment production base in the world. In the past 20 years, GE has accumulated approximately 20% of the market share for large hydropower equipment in China, and signed deals for a total installed capacity of 55 GW. GE has participated in many well-known hydropower projects in China over the years, including the Three Gorges Power Station, the Xiangjiaba Hydropower Station, Wudongde Hydropower Station, and more. Meanwhile, GE and its Chinese EPC partners have actively participated together in “Belt and Road” infrastructure projects ,



providing hydropower products and technologies for Vietnam, Laos, Mexico, Canada, and Switzerland, and others.

As part of GE Renewable, GE Grid is committed to providing advanced design, reliable hardware and software equipment, and professional services to various end-users, including power grid companies, industrial end-users, design institutes, engineering companies, industrial parks, and schools, etc. In China, the Grid Solutions business has five manufacturing sites, a research and development center, and more than 600 employees, including front-line and management personnel from R&D, engineering, execution and production, sales, and services. The installed capacity of high-voltage combined electrical appliances, circuit breakers, generator outlet circuit breakers and transformers amounts to nearly 20,000 sets in China. As a world-leading equipment supplier, GE's advanced grid technologies, products and solutions are used in many important projects. As early as 1986, we provided power system equipment for projects such as the Daya Bay nuclear power plant. In addition, GE also provided GIL products for the Wudongde hydropower station with a total installed capacity of 10GW; and continuously provides power system turnkey solutions for the power plant projects of Macau Power.

GE Steam Power

GE is an advocate of global clean coal power and is committed to “cleaner, smarter” steam power generation. GE Steam Power has been involved in China's power construction for more than 50 years, and has strongly supported the rapid development of China's power generation industry. As an industry-leading equipment supplier, GE's advanced steam power generation technologies, products, and solutions are used in many important large-scale coal-fired power generation and nuclear power projects. As early as 1986, we provided power equipment for the conventional island of the Daya Bay nuclear power plant. Since then, we have participated in nuclear power projects such as Lingao Phase I and Phase II, Hongyan River, Ningde, Taishan, Fuqing, and Fangjiashan. In addition, GE also supplied steam turbines, generators and other equipment to many large-scale thermal power projects in China such as Pingyi Power Plant Phase II and Phase III, Dabieshan Power Plant Phases I and II, Longshan Power Plant, Pingliang Power Plant Phase II, Guixi Power Plant, and Shentou Power Plant Phase I and Phase II. GE Steam Power has world-class manufacturing bases covering large-scale power station boilers in Wuhan, and steam turbines and generators in Beijing.

In terms of technology for coal-fired power generation, GE Steam Power utilizes the industry-leading “Advanced Ultra-Supercritical Coal-fired Power Generation Technology” (SteamH), which



represents GE's customized optimization and improvement solution for coal-fired power plants. The efficiency of these coal-fired power plants is expected to be close to 50%, significantly reducing carbon emissions. It features the highest temperature and pressure parameters of a single machine, along with the best coal-utilization efficiency. Among these, the technical breakthrough of boiler design is the most critical. In November 2017, GE announced the world's first 1350MW ultra-supercritical double reheat coal-fired boiler for the second phase of Shenneng Anhui Pingshan Power Plant. With the application of SteamH technology in more coal-fired power plants, GE will help to achieve the efficient use of coal resources, and move towards a clean, efficient, new energy society to promote sustainable development.

For the retrofit of existing units, GE Steam Power offers advanced steam path (ASP) efficiency reduction technology for more than 90 different models of OEM equipment. To date, 42 GE and non-GE units at 19 coal-fired power plants in China have been successfully upgraded and feature upgraded advanced steam channels. A customized retrofit solution for non-GE steam turbines at Jiangsu Guoxin Yangzhou Power Generation Co., Ltd., one of the largest coal-fired power plants in Jiangsu Province, was provided in 2018.

GE EPC business

GE has worked together with Chinese EPC companies for more than 20 years. Our global footprint combined with our experience in risk control and investment and financing capabilities help us to provide technical support, local market expertise, and on-the-ground support to Chinese EPCs. As early as 1996, GE and Harbin Electric International (HEI) formed a consortium to cooperatively develop the Pakistan UCH Combined Cycle Power Plant Project. GE provided three 9E gas turbines, three HRSGs, one steam turbine, power plant Distributed Control Systems (DCS), and combined cycle power plant conceptual design for this project. GE also provided technical support to HEI and the Central Southern China Electric Power Design Institute (CSEPDII) for engineering design.

As a long-time partner of Chinese EPCs, GE has partnered with Chinese companies to bring to market more than 140 heavy-duty gas turbines, over 50 steam turbines, more than 200 wind turbines, power plant control, and oil/gas pipeline equipment, along with additional technologies and solutions. From providing equipment and technology, to jointly developing the market, GE has collaborated with over 30 Chinese EPC companies in more than 70 overseas markets.

Since the beginning of the "Belt and Road" Initiative, GE has been an active participant. Since 2014, partnering with Chinese EPCs along in "Belt and Road" markets has been an important part of



GE's growth strategy in China. In 2016, we proposed the creation of a "Belt and Road" ecosystem based on the sharing of knowledge and experience. GE hopes to join hands with more Chinese EPC companies to establish a "China for the World" global collaboration mechanism. Under this mechanism, equipment suppliers, contractors, builders, financiers, and operation and maintenance service providers participating in the entire industry chain complement each other in their respective fields to achieve mutual benefits. In 2017, we proposed the "three joint" cooperation strategy of "joint market development, joint financing and joint operations" to further promote and operationalize the "Belt and Road" ecosystem.

We work closely with Chinese partners to achieve full localization of the entire value chain while actively implementing the "China for the World" strategy to help Chinese customers achieve greater success in overseas markets. In past the 20 years of cooperation, GE and Chinese EPC companies have jointly delivered more than 38 GW of electricity to countries and regions along the Belt and Road. Together with the orders we signed at the end of 2018 and projects under construction, this number will reach 58GW in the future. In the "Guidelines and Cases of Third-Party Market Cooperation" issued by the National Development and Reform Commission (NDRC) in 2019, GE and China Mechanical Engineering Co., Ltd. (CMEC)'s collaborations in overseas markets have been recognized as a best case example for cooperation between Chinese and foreign companies. The two companies have deepened international cooperation, jointly developed third-party markets, and supported each other to achieve positive outcomes.

GE Aviation

As the world's leading provider of jet engines, components, aerospace digital, avionics, aerospace power, and mechanical systems for commercial, military, business, and general aviation aircraft, GE Aviation boasts a global service network to support these products for excellent customer value with high reliability, high usage rates, and controllable maintenance costs. Every 2 seconds worldwide, there is a plane that uses GE engine technology* to take off. (*Including engines produced both by CFM and EA. CFM is a 50/50 joint venture between GE and Safran Aircraft Engines; EA is a 50/50 joint venture between GE and Pratt & Whitney.)

GE Aviation has been doing business in China since 1980, and today has more than 900 employees in China the country. In 1985, the CFM56 engine was delivered to Chinese users with the first Boeing 737 aircraft. At present, GE and its joint venture, CFM International (joint venture between GE and Safran Aircraft Engines), have more than 5,800 engines in service in Greater China, and



more than 4,000 engines on order, serving more than 60 airline customers, with wide praise from China's aviation industry.

GE fully supports major projects of China's aviation industry. The ARJ21 aircraft powered by GE Aviation's CF34-10A engine has been successfully delivered to Chengdu Airlines and Genghis Khan Airlines, with stable operation history. Meanwhile, CFM's LEAP-1C engine was selected as the only western engine for the C919, and AVIAGE SYSTEMS, a joint venture between GE and the Aviation Industry Corporation of China (AVIC), is offering the advanced avionics system for the C919 program. We are currently working with the COMAC team to fully support the C919's flight testing.

In support of the growing Chinese aviation business, GE Aviation (Suzhou) Co., Ltd., the first supply chain factory of GE Aviation in China, was established in 2003. Its products include engine components and composite aircraft structural components, and today the factory has over 500 employees. In 2006, the China Fleet Support Center was established in Shanghai as the only team outside the United States that provides 24x7 support services.

GE Aviation has a strong engineering team of more than 180 employees in China, with engineering support services for the entire lifecycle of the engine. For more than ten years, it has provided comprehensive technical support for the development of domestic civil aircraft projects, the upgrading of aviation manufacturing capabilities, and the efficient and safe operation of airlines. There are also seven MRO (Maintenance, Repair, Operation) plants in Greater China providing extensive and in-depth repair services for GE and CFM engines. Committed to improving local engine maintenance capabilities, these MRO plants have now become an important part of GE Aviation's open global MRO service network.

In the field of digitization, GE Aviation is currently carrying out digital cooperation projects with customers including China Eastern Airlines, COMAC, Xiamen Airlines, Loong Airlines and AVIAGE SYSTEMS, and is committed to providing customers with digital solutions related to flight safety, flight management and fleet support.

In addition to the business in Greater China, GE Aviation is also committed to talent training in the aviation industry. For decades, GE Aviation has conducted various management, technical, and maintenance trainings for the Civil Aviation Administration of China (CAAC), airlines and COMAC.



GE Healthcare

GE Healthcare is the \$117billion healthcare business of GE. As a leading global medtech and diagnostics innovator, GE Healthcare enables precision health in diagnostics, therapeutics and monitoring through intelligent devices, data analytics, applications and services. With over 100 years of experience in the healthcare industry, GE Healthcare has approximately 48,000 employees across more than 160 countries.

GE Healthcare started doing business in China in 1979 and established its first office in Beijing in 1986. On June 8, 1991, Hangwei Medical Systems Co. Ltd., the first joint venture by GE in China, was established in Beijing. Today, GE Healthcare China operates multiple entities with more than 7,000 employees, including an R&D team of over 1,000 engineers who are developing products and technologies both for China and the rest of the world.

As one of the largest medical equipment provider in China, GE Healthcare operates five global manufacturing sites in the country, including a Computed Tomography (CT) and X-Ray plant in Beijing, a contrast medium facility in Shanghai, a filtration products facility in Tonglu, a Magnetic Resonance Imaging (MRI) plant in Tianjin, and a clinical care systems plant including ultrasound, anesthesia, ECG, patient monitor in Wuxi. Two out of every three CTs are made in Beijing, and one out of every two MRIs sold by GE originate from Tianjin plant. 90% of the contrast medium produced in the Shanghai facility is exported overseas. The Wuxi plant is GE's largest manufacturing site for ultrasound hosts in the world, producing more than 40 percent of the ultrasounds sold by GE worldwide.

With a mission to provide better healthcare for more people at a lower cost, GE Healthcare has strengthened its localization efforts through products, distribution, services and supply chain to address growing demands across three market segments: high-end, primary care, and private. GE Healthcare China develops and makes value products in China for the world. Since 2011, GE Healthcare has launched over 60 new China-developed products, with 70% tailor-made for the primary care market.

In 2013, GE Healthcare China launched its "Care First" marketing strategy, focusing on three areas – patient care, critical challenges, and early health. GE Healthcare China is committed to developing innovative new technologies and solutions for improved patient experiences and clinical outcomes, partnering with the industry to tackle critical challenges and promoting early health among the public.



GE Healthcare is advancing digitalization at full speed. Based on Edison ecosystem, GE Healthcare China's digital health offerings mainly focus on outputs of asset management, clinical outcome, and hospital capability development. Using clinical medicine, smart machines, big data and advanced analytics, cloud computing and AI, GE Healthcare helps hospitals and healthcare professionals make better clinical and operational decisions, improving the accessibility of quality medical care and accelerating the development of the hospital alliance and tiered medical system in China to reach the goal of "Healthy China 2030".

Horizontal Functions

In addition to GE's vertical business units, GE's horizontal functions provide high quality, efficient, and strong support for business development goals.

GE Capital

GE has nearly 100 years of global capital operations experience. GE Capital operates in all major markets around the world and covers project investment and financing, aircraft leasing, and structured financing for product transactions in infrastructure. In recent years, GE has formed a strategic concept of "integrating financial resources to focus on the core GE business" through re-integration of the Capital sector, and is committed to making better use of the company's financial resources to help China's EPC partners expand their businesses globally. Through this cooperation model, GE and China's EPC contractors will work together to integrate financial resources in China's domestic and overseas markets. In this way, GE Capital will greatly enhance the diversity, operability, and competitiveness of investment and financing solutions for the global infrastructure market with more customized investment and financing solutions.

GE China and GE Capital work together to make best use of the financing channels provided by China's export credit insurance companies and the Silk Road Fund, integrating global financing platforms to provide financing services for Chinese EPC companies building projects along the "Belt and Road." In 2017, GE and the Silk Road Fund announced the formation of a \$500 million joint investment platform to invest in and accelerate the development of long-term, critical energy infrastructure projects in "Belt and Road" countries and regions.

GE Digital

As the partner for digital industrial transformation at every stage of the journey, GE Digital is helping our customers build and manage industrial applications to fuel digital transformation and make the Industrial Internet more accessible and actionable. By offering our customers the



combination of industrial apps that will power the industrials of the future, GE Digital is leading the growth of the industrial app ecosystem.

The Industrial Internet represents an unprecedented opportunity for China's industry to upgrade and attain the national objectives of Internet+. As a world leading industrial company, with a global footprint and depth of localized capabilities in China, GE Digital is partnering with customers and helping them win both in China and worldwide by connecting machines, software, and data analytics to unlock industrial productivity. In 2016, GE announced the expansion of its digital presence in China and launched new partnerships and initiatives aimed at fostering the growth of the Industrial Internet in China.

Founded by GE Digital, GE Digital Foundries bring together a network of centers across the globe whereby GE Digital will enter into collaboration with customers on new application development and work to extend and promote GE's international developer ecosystem. The first foundries are located in Paris (France), Shanghai (China), and San Ramon, California.

Advanced Manufacturing

GE's advanced manufacturing concepts and technologies integrate GE's global resources and adhere to lean manufacturing principles to redefine product design, manufacturing, and service models. Through advanced manufacturing technologies, additive manufacturing and digital plant technologies, we are working to drive increased productivity. GE is pioneering six capabilities in China including robotics/automation, intelligent machining and assembly, smart soldering, 3D printing technology, advanced inspection technology, and digital virtual modeling. We are applying these capabilities to all aspects of our business, from design to engineering, manufacturing, supply chain, material handling, and service.

R&D

For more than a decade, GE has developed strong local R&D capabilities in China. At present, GE has nearly 2,500 R&D and engineering technicians in China, and has established world-class equipment laboratories in Shanghai, Beijing, Tianjin, Wuhan and Wuxi. The GE China R&D team provides comprehensive technical support for local businesses, focusing on technologies such as healthcare and life sciences, new wind power generation, gas turbine localization, aircraft engine and energy efficiency and emission reduction. The R&D team also covers advanced manufacturing, additive manufacturing, robotics, and digital. In response to local market demand and local customer pain points, the Chinese R&D team will also carry out industrial research and



development to develop corresponding solutions, and collaborate with customers in the medical, aerospace, energy, and oil and gas industries to continuously innovate and provide comprehensive solutions, to help customers increase productivity and operational efficiency.

GE Additive

GE Additive is a global leader in additive design and manufacturing, a pioneering process that has the potential to transform business. GE Additive brings together experts, advanced machines, and materials to help customers create innovative products, solve manufacturing problems, and improve business outcomes. GE Additive includes additive machine providers Concept Laser and Arcam, along with additive materials provider AP&C, with more than 1,200 employees worldwide.

At GE Additive, we are passionate about the transformative power of advanced manufacturing. And as a notable user of additive technologies, we recognize the value and potential it brings to modern design and manufacturing challenges. We have worked tirelessly to build an elite network of people who are advancing additive manufacturing every day. GE's relationships with Arcam and Concept Laser has complemented GE's existing material science and additive capabilities, enabling the development of new service applications across multiple GE businesses and allowing us to earn numerous patents. GE Additive is committed to leading the industry through world-class machines, materials and services—accelerating innovations across industries and helping the world work smarter, faster, and more efficiently.

Crotonville Leadership Institute, China Campus

The GE Crotonville Leadership Institute is the first corporate university in the United States, and a high-end platform for GE to work with partners to share global strategy, management experience, and industry knowledge. The Crotonville Shanghai Branch, established at the GE China Science and Technology Park in 2003, is the largest overseas campus for Crotonville, creating talent development programs for all levels of the company with the support of experienced internal and external lecturers. In recent years, we have developed tailored courses for Chinese partners who have gone global under the “Belt and Road” Initiative, covering topics such as leadership, project management, technology, project execution, compliance, and investment and financing. To date, Crotonville has provided more than 500 trainings to strategic partners in China. The partnership spans GE's various business groups and has become GE's advantage for connecting global customers to share industry insights and management experience.



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