



**TBEA 特变电工**  
Always Reliable 全球信赖

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## TBEA

As a globally well-known energy equipment manufacturing group, TBEA provides customized system solutions for the global energy industry. With 18 bases in China and 2 overseas, the pioneering equipment conglomerate energizes the industry and the worldwide community by delivering green, innovative, intelligent, reliable and efficient technologies and services. Organized into three business areas: high-end innovative power transmission and distribution equipment manufacturing, renewable energy and new material, TBEA is adept at providing customized solutions. In addition, it has three publicly traded companies: TBEA Co., Ltd. (Shanghai600089), Xinte Energy (HK1799) and Xinjiang Joinworld Co., Ltd. (Shanghai600888).



TBEA Headquarters R&D Base (Changji)



World Top **500** Machinery Manufacturers  
**228<sup>th</sup>** place



China Top **500** Enterprises  
**353<sup>rd</sup>** place



China Top **500** Private Enterprises  
**150<sup>th</sup>** place



Global Ranking of Transformer Production  
**1<sup>st</sup>** place



Top **100** Machinery Industry Companies of China  
**6<sup>th</sup>** place



ENR Top **250** Contractors  
**93<sup>rd</sup>** place

## Domestic Bases (18)



Wuqing Industrial Park (Tianjin)



Beijing Headquarters (Beijing)



Xiong'an Science & Technology Park (Xiong'an)



Northwest China Industrial Park (Changji)



Northeast China Industrial Park (Shenyang)



South China Industrial Park (Hengyang)



YUNJI 5G Science and Technology Industrial Park (Hengyang)



North China Industrial Park (Tianjin)



East China Industrial Park (Xintai)



Southwest China Industrial Park (Deyang)



Smart Electrical Engineering Industrial Park (Changji)



Nanjing Smart Electrical Engineering Industrial Park (Nanjing)



New Energy Industrial Park (Urumqi)



Polysilicon Industrial Park (Urumqi)



Xi'an Electrical Sci&Tech Industrial Park (Xi'an)



New Material Industrial Park (Urumqi)



Zhundong Coal Power Energy Base (Changji)



International Logistics Park (Changji)

## International Bases (2)



India High-end Manufacturing Base



Dushanbe Mining Company of Tajikistan

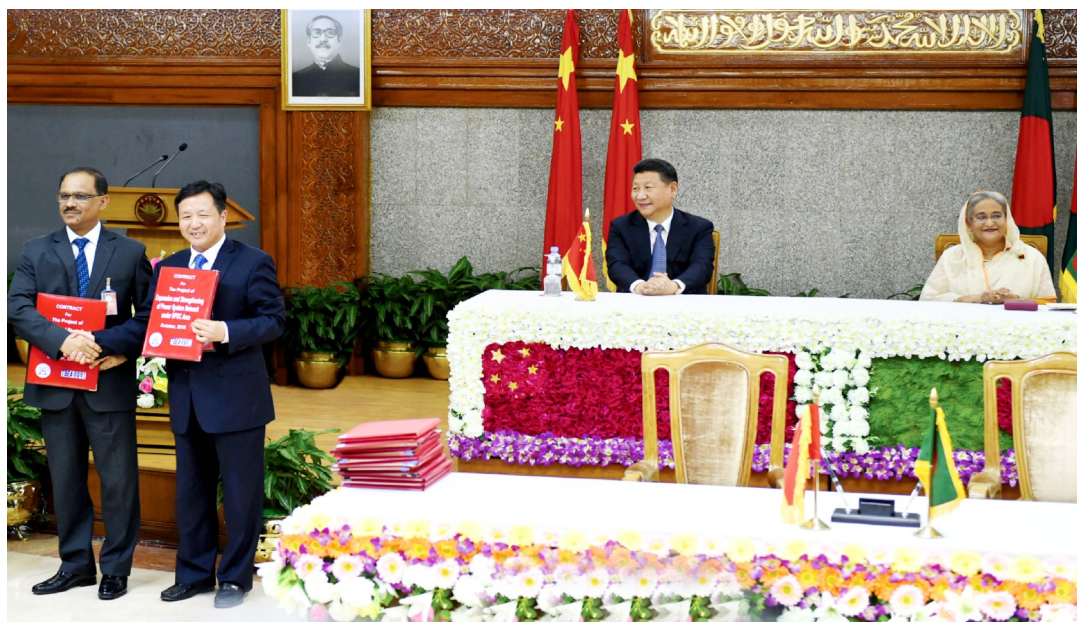


## Worldwide Recognition

Chinese President Xi Jinping and Premier Li Keqiang have visited TBEA factories and toured company project sites multiple times.



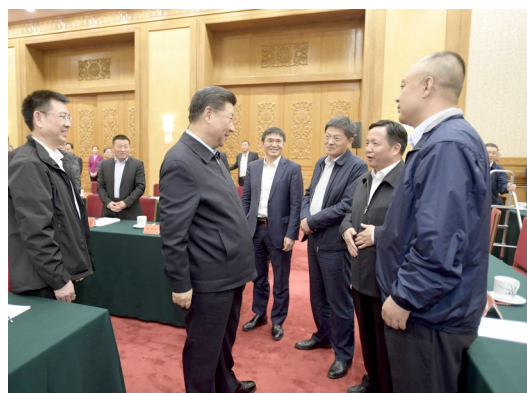
Chinese President Xi Jinping and Tajikistan's President Emomali Rahmon attend the ceremony for the first-phase completion and second-phase groundbreaking of the Dushanbe No. 2 Thermal Power Plant. Xi speaks highly of the project as a flagship project of the practical cooperation of China and Tajikistan and a symbol of the friendship between the people of the two countries. He encourages the builders of TBEA to catch the good opportunity and make greater progress to bring more warmth and light to the people of Tajikistan, September 13, 2014.



Chinese President Xi Jinping and the Prime Minister of Bangladesh Sheikh Hasina witness the contract signing between TBEA and Dacca Distribution Company in Bangladesh on smart grid and upgrading project for Dacca, the capital of Bangladesh, amounting to over 1.65 billion US dollars, October 14, 2016.



On August 27, 2018, the symposium on the fifth anniversary of the Belt and Road Initiative is held. Zhang Xin, Chairman of TBEA, attends as one of the eight representatives of private entrepreneurs in China. After the meeting, President Xi Jinping has a cordial exchange with Zhang Xin. Xi requests TBEA to make more efforts to build good projects that can benefit local people's livelihood and make more contributions to the economic development and people's happy life of the countries along the Belt and Road.



On November 1, 2018, the symposium on private enterprises is held in Beijing. More than 50 private entrepreneurs including Zhang Xin, Chairman of TBEA, are invited to attend the meeting. After the meeting, President Xi Jinping has a cordial exchange with Zhang Xin. Xi praises TBEA for its contribution in delivering Chinese technologies and Chinese standards to the countries along the Belt and Road to help them develop energy and economy, promoting the energy revolution and innovative development, and enhancing the friendship with the Belt and Road countries.



On June 20, 2009, when he inspects the renewable energy and new materials industry of TBEA, Xi says with great expectation, “You have transformed the advantage of western China from coal power into high technology. I hope you can play a key role in innovative development to promote industrial upgrading and make special contributions to the economic development of our country.”



Xi Jinping, shakes hands and has a cordial exchange with Zhang Xin, deputy to the National People’s Congress (NPC), also Chairman of TBEA, while attending to the Fifth Session of the 11th National People’s Congress, March 9, 2012.



President Xi Jinping attends the symposium on promoting the construction of the Belt and Road Initiative and delivers an important speech. During the period, Xi shakes hands and talks with Zhang Xin, Chairman of TBEA, August 17, 2016.

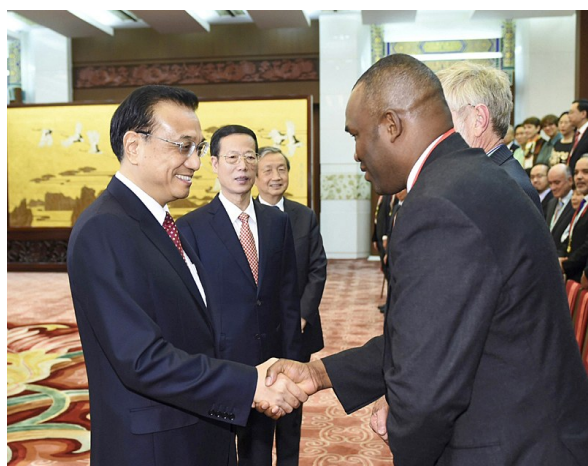




Li Keqiang, then Vice Premier, tours TBEA's Northeast Power Transmission and Distribution Science and Technology Industrial Park on April 16, 2010.



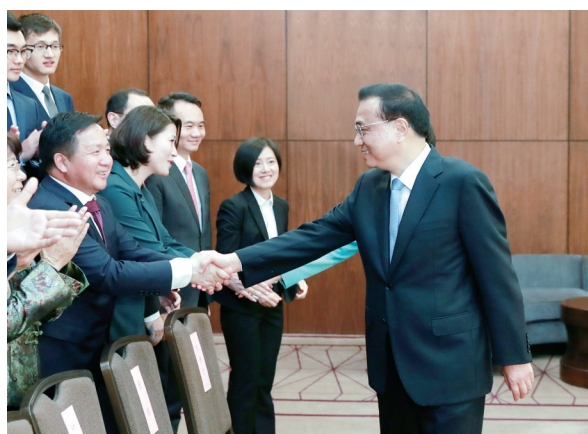
Premier Li Keqiang meets with Li Bianqu, General Manager of TBEA International Engineering Contracting Co. in May 2014.



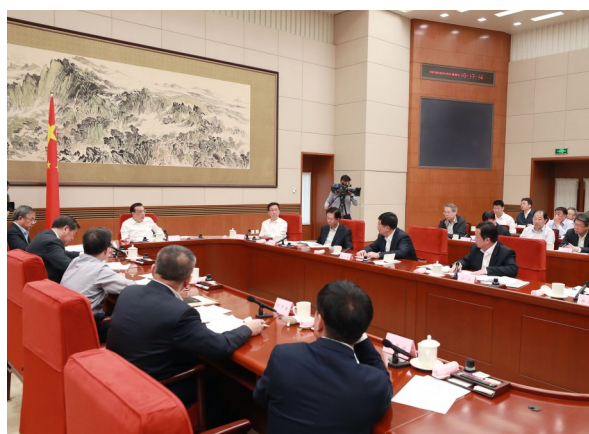
Premier Li Keqiang, shakes hands with TBEA Hengyang Transformer Company's foreign employee GARBA INOUSSA, a 2015 Chinese Government Friendship Award laureate, on September 30, 2015.



Premier Li Keqiang meets with Chinese business delegates including TBEA Chairman Zhang Xin on the sidelines of the 17th meeting of the Council of Heads of Government of the Shanghai Cooperation Organisation member states in Tajikistan on October 14, 2018.



Premier Li Keqiang meets with Chinese business delegates, including TBEA Chairman Zhang Xin, during his visit to Tajikistan on October 14, 2018.



Premier Li Keqiang holds a session on tax and fee deductions for businesses on May 10, 2019, where TBEA Chairman Zhang Xin delivers remarks.



## Worldwide Recognition

Drawing inspiration from its solemn commitment to a sustainable future, TBEA is actively involved in China's Belt and Road Initiative and earnestly shares China's advanced power construction experiences and standards with the rest of the world. To date, TBEA has provided green, smart, reliable and highly efficient energy equipment to more than 70 countries and regions, and has offered system solutions that integrate survey, design, construction, installation, testing, training, operation and maintenance to our many partners. By combining world-class power grid business solutions with our advanced technologies, TBEA is able to unlock innovative business models and create enormous social and economic value for local communities.



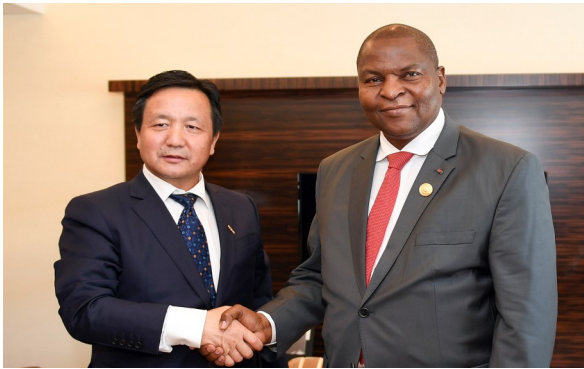
Guinean President Alpha Condé visits the TBEA Beijing Headquarters during his visit to China in September 2018, when he urges the company to speed up project construction to benefit both peoples.



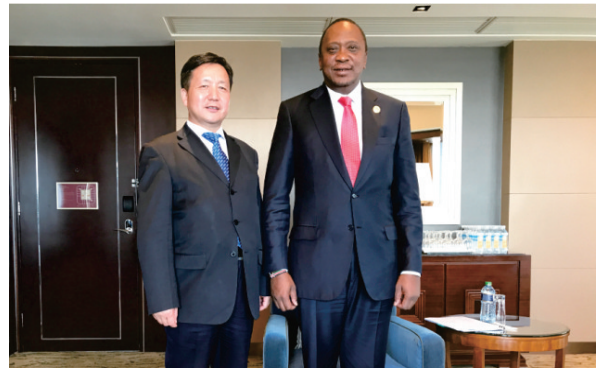
Togolese President attends the commencement ceremony of the Sokode Substation constructed by TBEA on August 30, 2013.



Tajikistan President Emomali Rahmon attends a ceremony to celebrate the second-phase completion of the Dushanbe Thermal Power Plant constructed by TBEA on December 8, 2016.



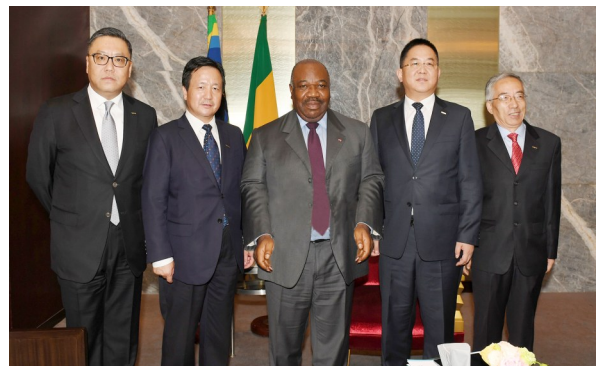
President of the Central African Republic Faustin Archange Touadéra meets with a TBEA delegation led by Chairman Zhang Xin in November 2018.



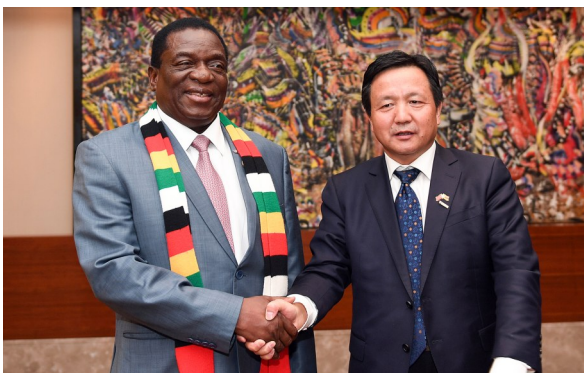
Kenyan President Uhuru Kenyatta meets with TBEA Chairman Zhang Xin on May 14, 2017, speaking highly of TBEA's contributions to the development of Kenya's power industry.



Sierra Leonean President Julius Maada Bio meets with a TBEA delegation led by Chairman Zhang Xin in Beijing.



Gabonese President Ali Bongo Ondimba meets with a TBEA delegation led by Chairman Zhang Xin in Beijing.



Emmerson Dambudzo Mnangagwa, President of the Republic of Zimbabwe, meets with a TBEA delegation led by Chairman Zhang Xin in September 2018.



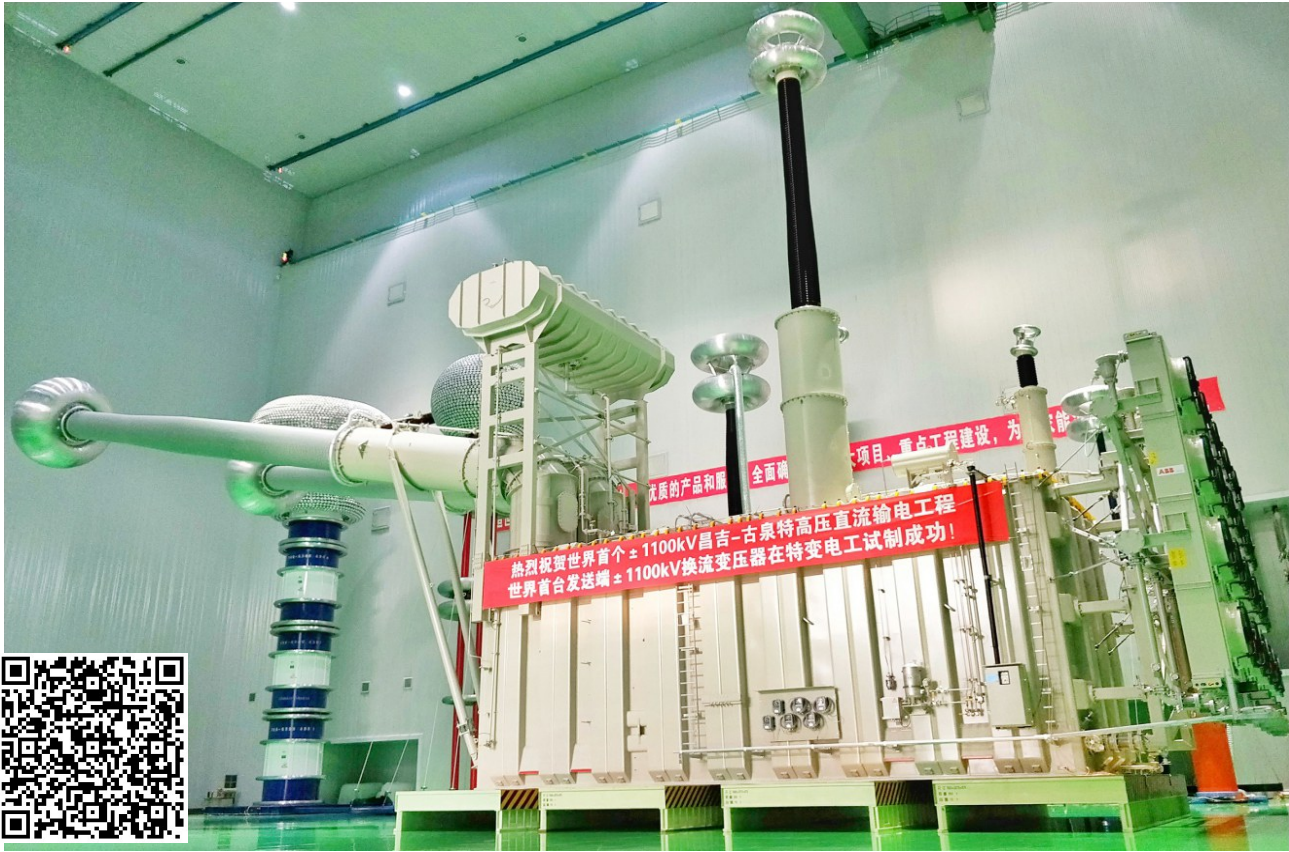
Somali President Mohamed Abdullahi Farmaajo meets with a TBEA delegation led by Chairman Zhang Xin in Beijing.

## A Leader in Energy Efficient Power Transmission and Distribution

TBEA is a high-innovation enterprise of transformers, wire and cable, high-voltage switchgears, components, electrical secondary equipment and electrical engineering construction. As the world's top transformer producer with an annual production capacity of 260 million kVA.







The world's first 607MVA/1100kV DC converter transformer, is used in the Changji-Guquan 1100kV UHV DC Power Transmission Project, which boasts the highest voltage level, the largest transmission capacity, the longest transmission distance and the most advanced technology among all UHV transmission projects in the world.

## Key Projects

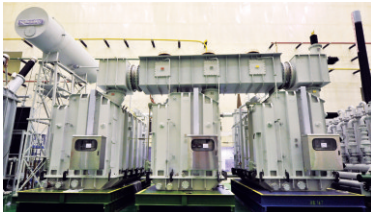
TBEA is a dedicated partner in the construction of China major strategic projects, including the world's first commercial 1000kV Southeast Shanxi-Nanyang-Jingmen UHV Alternative Current Test Demonstration Project, which is green, smart and energy efficient; the Changji-Guquan 1100kV UHV Direct Current Project, the embodiment of the world's finest UHV DC transmission technology; the Wudongde-Guangdong Guangxi UHV Multi Terminal Direct Current Demonstration Project, the world's highest voltage grade and the largest transmission capacity UHV DC project, which guarantees the commissioning of 14 1000kV UHV AC and 16 800kV UHV DC projects. TBEA's main transformers are used extensively in large-scale megawatt thermal power, hydropower, nuclear power and renewable energy plants.



TBEA's 1000MVA/1000kV UHV AC transformer is used in the world's first commercial 1000kV Southeast Shanxi-Nanyang-Jingmen UHV Alternative Current Test Demonstration Project.



The world's first DFP-410000/1000 generating transformer developed by TBEA is used in China Power International's Anhui Pingwei 2×1000MW supercritical generating unit.



China's first SSP-H-860000/500 EHV, ultra-large capacity combined transformer developed by TBEA is used in the Xiluodu Hydropower Station of China Three Gorges Group.



TBEA's DFP-700000/500 nuclear power transformer is used in the Taishan Nuclear Power Plant of CGN Power Co., Ltd., which boasts the world's largest unit capacity of its kind.



The world's first 1000kV power transformer and shunt reactor, independently developed by TBEA, is used in the world's first commercial 1000kV Southeast Shanxi-Nanyang-Jingmen UHV Alternative Current Test Demonstration Project. TBEA's UHV AC transmission critical technology, complete equipment and engineering application project won the National Science and Technology Progress Special Award.



The world's first 800kV UHV DC converter transformer, independently developed by TBEA, is used in the world's first commercial 800kV Yunnan-Guangdong UHV DC Transmission and Distribution Demonstration Project. The 800kV UHV DC transmission project won the National Science and Technology Progress Special Award.



The world's first  $\pm 800\text{kV}$  dry hollow bridge arm reactor, independently developed by TBEA, is used at the receiving end of the Longmen Station of the Wudongde-Guangdong Guangxi UHV Multi Terminal Direct Current Demonstration Project. It boasts the world's highest voltage level and the largest AC/DC mixed current dry hollow bridge arm reactor.



The first 800kV UHV dry-type DC bushing with independent intellectual property rights developed by TBEA is used in Qinghai-Henan 800kV UHV DC transmission project, the first UHV line designed for clean energy transmission.



TBEA's centralized supply of primary equipment for offshore booster station successfully passes user acceptance testing and becomes the first offshore wind power supplier in China.



TBEA completes China's first domestically-made 500kV cables+accessories+construction integration project - 500kV XLPE insulated power cable project of the Shandong Chiping Xinfu 700MW generator set.



A large cross-section expanded diameter thermal-resistant aluminum alloy busbar is successfully operated in China's first UHV AC Project - 1000kV Southeast Shanxi-Nanyang-Jingmen UHV Alternative Current Test Demonstration Project.



## Wire & Cable, High-Voltage Switchgears and Supporting Areas

TBEA is committed to building a smart, modular and energy-efficient power transmission industrial chain with strong research and development (R&D) capabilities in the fields of transformers, reactors, wires and cables, instrument transformers, high and low voltage switchgears, secondary integrated automation system protection, bushings and cable accessories. Its variety of products serve China's economic and social development as well as improve people's livelihood. They are applied in gas power generation, rail transportation, airport construction, industrial parks, big-data centers, urban and rural power grid reform, urbanization and other fields. TBEA has undertaken R&D for power transmission and distribution products related to a series of national landmark projects, such as the Zhengzhou-Xi'an Passenger Railway and Beijing Olympic stadiums.



High-voltage cable accessories up to 500kV developed by TBEA.





TBEA's prefabricated modular substation is used in the Weishan Xiaobuwan 50MW Photovoltaic Power Station constructed by Three Gorges Renewables. The substation is a fusion of primary and secondary smart equipment modules, which further enhances overall performance in terms of quality, efficiency, reliability, cost, productivity, environmental sustainability and customer satisfaction.



## Smart Power Distribution

As a significant part of smart energy systems, smart power distribution is contributing tremendously to China's transition to a low-carbon economy. TBEA's smart power distribution system integrates measurement, safety control, monitoring and transmission to ensure the safe, reliable and high-quality operation of the entire power system. Our cutting-edge products are used extensively in critical fields such as state grids, China Southern Power Grid, five power generation groups, Sinopec, rail transportation and data center.



TBEA's Mobile Substation 110kV Mounted on Vehicle is used in the Fujian Putian Substation. Vehicle-mounted mobile substations adopt highly integrated, easily transportable and fast deployable power equipment modules. They are widely used in live-line maintenance, reconstruction and expansion, electric load transfer, temporary power supply and fast power restoration after natural disasters.



- ①ZF53-550(L) / Y4000, 5000-63 enclosed gas insulated switch are used in engineering projects in Dharbhanga and Motihari in India.
- ②The AGU - 800 current transformer is used in India's PGCIL UNNO project.
- ③TBEA's 800kV SF6 tank-type circuit breaker successfully put into operation at the Zhudong Wucaiwan Beiyi Power Plant in western China.





Horizontal integrated pole transformer



A TPT-type photovoltaic inverter booster integrated machine



A ZBW-type landscape buried box-type transformer substation



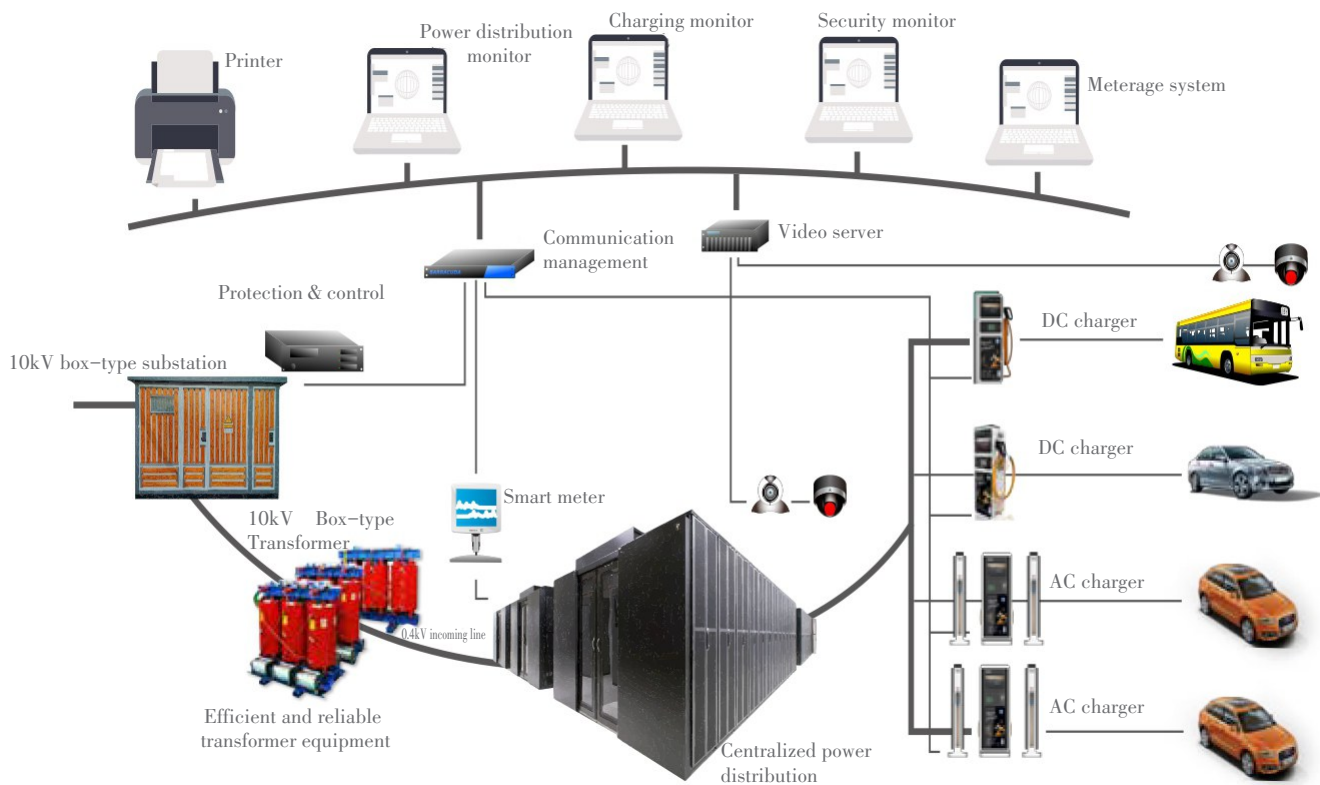
An MNS LV withdrawable switchgear cabinet



A KYN28A-24 armored removable alternative current metal enclosed gas-insulated switchgear



The MNS LV withdrawable switchgear cabinet used in the Changle Power Plant Project (First phase, 2×1000MW) constructed by Gansu Province Electric Power Investment Group Co., Ltd.



"Renewable Energy Charging Facilities (Stations) Overall Solutions"  
The Charging and Distribution System Industry Chain



## Smart Charging

TBEA is a trailblazer in providing smart, green charging solutions that integrate AC/DC charging systems, photovoltaic power generation systems, energy storage systems and smart cloud platform operation and maintenance systems. Our charging piles, which feature enhanced customer safety and satisfaction, are widely installed in many parts of China including Jiangsu, Hunan, Chongqing and Guangxi.





A TBEA charging station in Changji



A TBEA charging station in Fuyang



A TBEA charging station in Wuzhou



A single-phase alternative current charging pile



An integrated direct current charging device



The world's first 330kV AT power supply traction transformer is used in the Zhengzhou-Xi'an Passenger Railway.



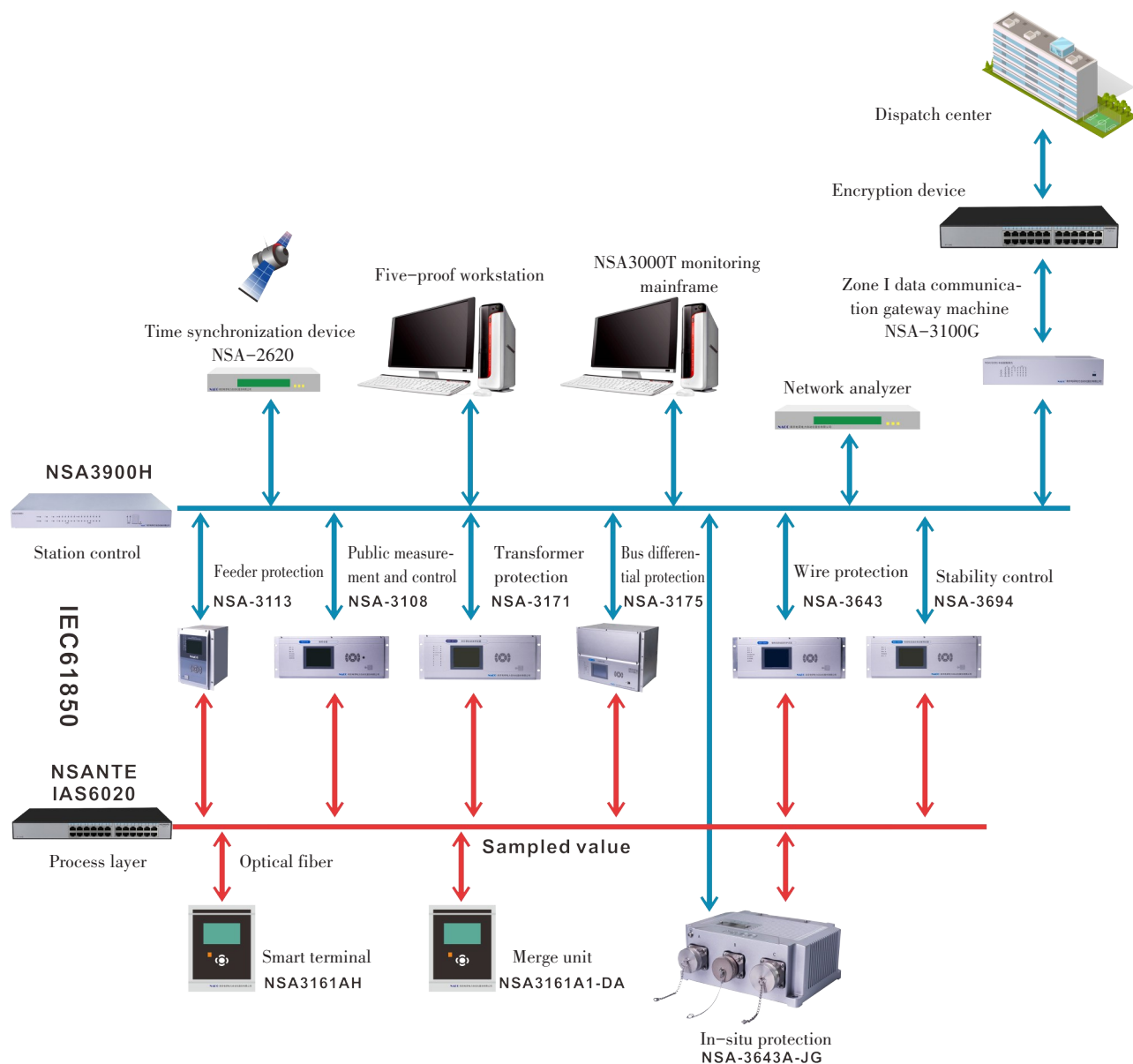
Various types of transformers, high and low voltage switchgears, pre-branch cables and other equipment are used in the Chengdu Tianfu International Airport.



The photoelectric composite cable, a "three-in-one" energy-saving product integrating cable, optical fiber and signal cable, is widely used in smart power grid construction and the building of automatic control equipment.

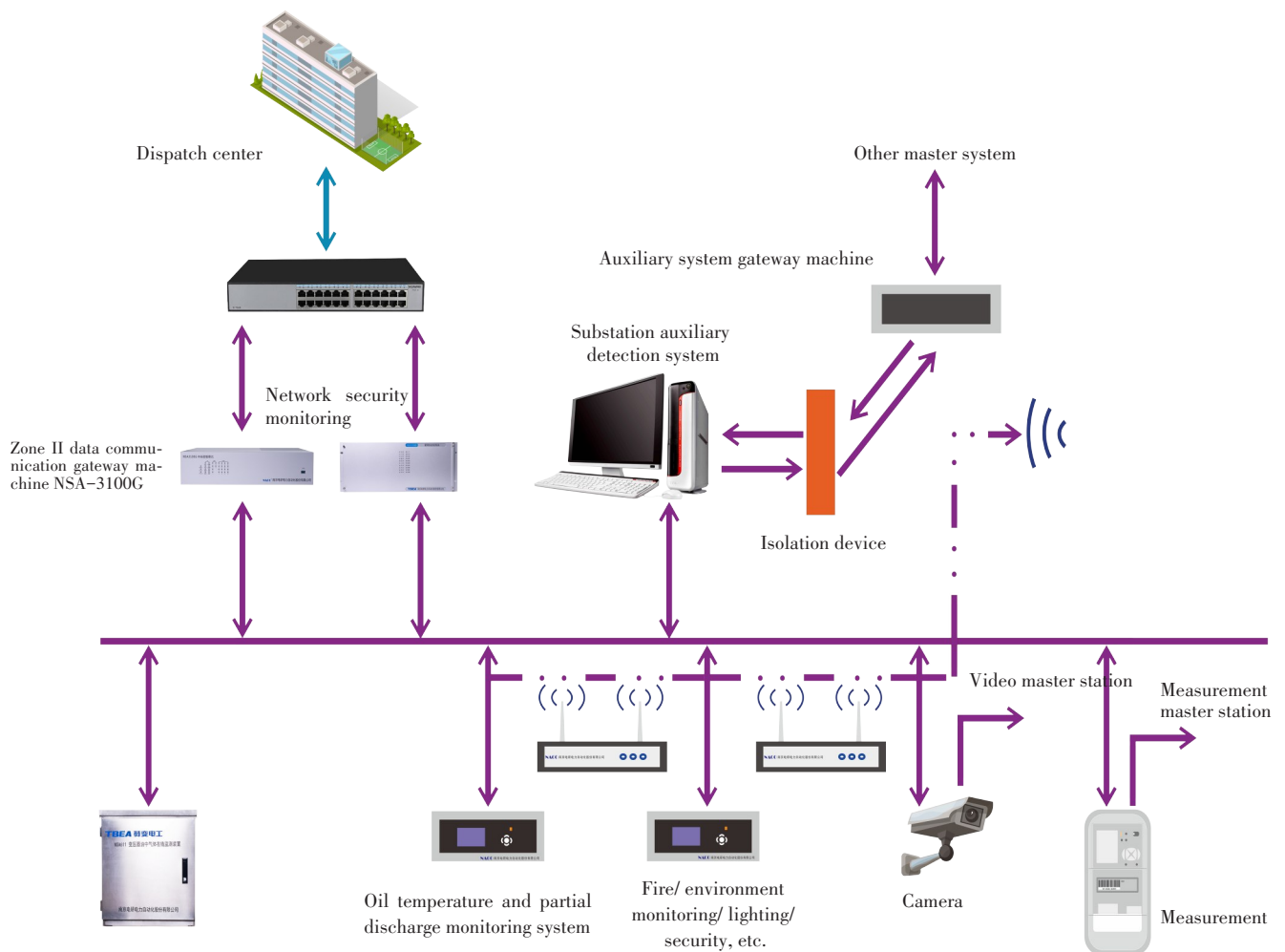


TBEA's rail transit cable is used in various projects where reliability is critical in Beijing, Tianjin, Shenzhen, Qingdao, Wuhan and Urumqi, etc.



## Smart Substation System Solutions

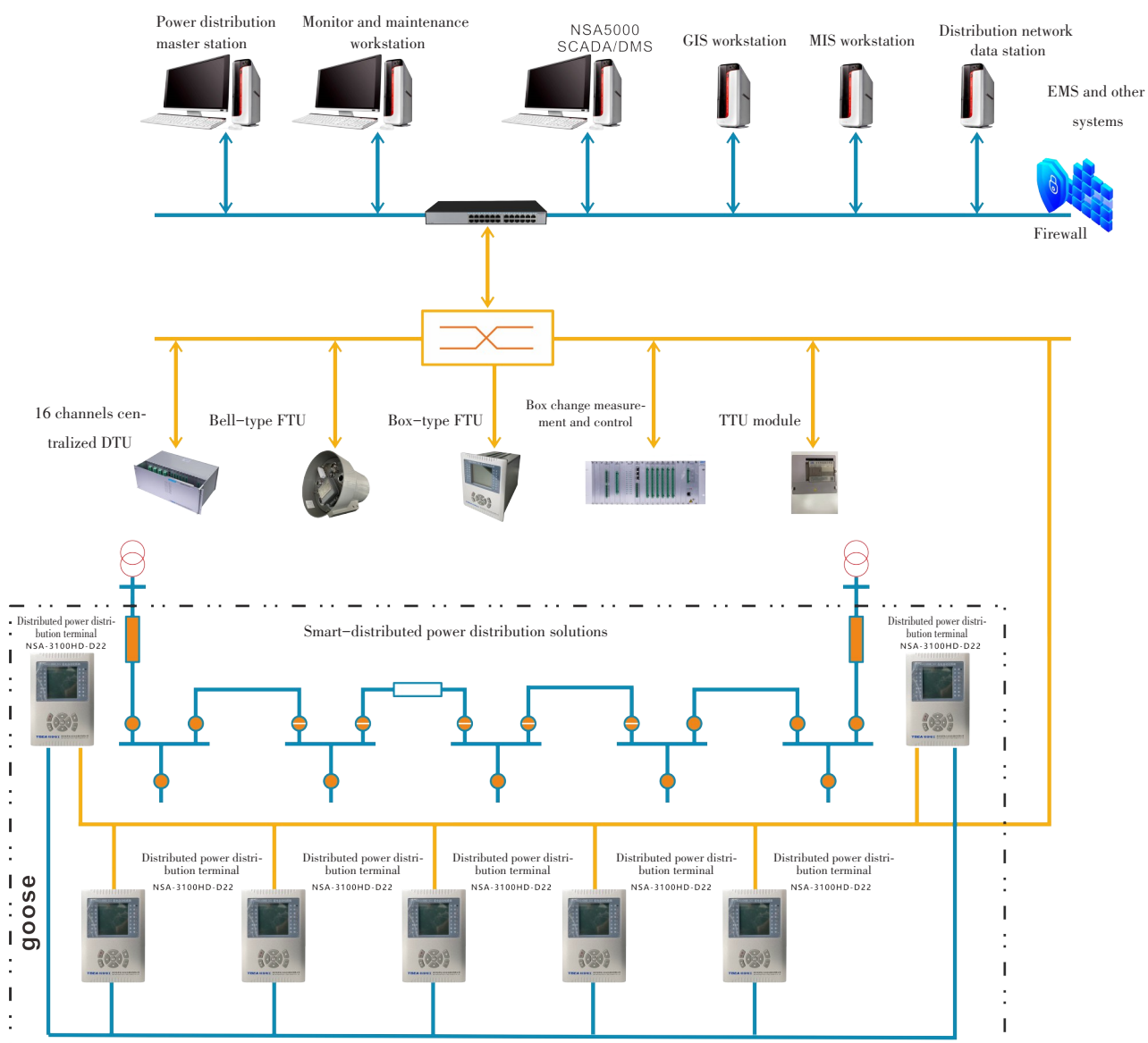
With a diverse range of standard and smart transformer substation solutions, TBEA flawlessly customizes to client specifications. Our products cover all voltage levels and main wiring methods, including merging units, smart terminals, relay protection and control devices. The secondary equipment of the substation adopts the IEC61850 standard and effectively connects the control room and the switchgear station through an optical fiber link, eliminating the need to load a secondary circuit and making the substation more intelligent and reliable.



## Smart Operation and Maintenance Services

TBEA's primary equipment monitoring system observes the status of high-voltage primary equipment, allowing users to detect and analyze potential instability before serious problems emerge. TBEA aptly keeps customers up-to-date on the condition of the equipment and time of possible repair or replacement. These convenient and practical features help enhance overall grid stability and reliability.



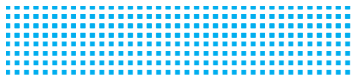


## Smart Power Distribution Solutions

TBEA aims to provide advanced and reliable integrated power distribution solutions that surpass customer expectations. With our integrated automatic power distribution terminals, primary and secondary fusion pole switchgears and ring network boxes, smart-distributed power distribution protection and self-healing systems, TBEA expertly guarantees power quality and greater service continuity. Our smart power distribution protection and self-healing systems, based on GOOSE information, enable swift fault location and isolation as well as service restoration.



CT intelligent assembly block



## Green Intelligent Manufacturing

TBEA fervently adheres to the “science and technology are primary productive forces” guidelines, investing heavily in R&D for cutting-edge technologies. As a result of our strong commitment to high-quality development through management informatization, production digitalization and product intellectualization, TBEA was one of the first companies to meet the requirements of China’s National Standard of “Assessment specification on integration of informatization and industrialization for industrial enterprises.” With a pioneering outlook, TBEA has become a national pilot demonstration for smart transformer manufacturing and a pilot demonstration for high-purity crystalline silicon smart factories. Eight of our plants have been awarded national level green factories and three autonomous-regional level green factories.



GIS integrated test system



A modern bending machine of sheet metal flexible processing line



To date, a total of 8 TBEA's holding subsidiaries have been recognized as National Green Plants by the Ministry of Industry and Information Technology of the People's Republic of China.



Automatic ultrasonic intelligent cleaning line



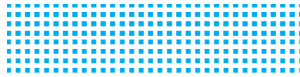
Automatic welding production line



3D imaging automatic detection line



The Angola Soyo-Kapary Substation, one of TBEA's major overseas projects, was awarded the China Construction Engineering Luban Prize (Overseas Project), China's top construction award.



## Integration Capability

As a committed participant in China's Belt and Road Initiative, TBEA is tapping into international markets by providing advanced, green, smart, reliable and highly efficient energy equipment and system solutions to more than 70 countries and regions including the United States, Russia and India. TBEA's transformation from a standard follower to an international standard setter is a telling sign of our ever-growing expertise in the industry. From Tajikistan and Kyrgyzstan to Sudan and Zambia to Pakistan and Togo, TBEA has adroitly helped plan and construct power grids for more than 30 countries, offering integrated solutions including financing, survey, design, construction, equipment, installation, commissioning, operation, maintenance, training and after-sales services. This innovative and convenient approach to international clients has won TBEA both appreciation and admiration worldwide.



TBEA's Special Grade for Power Engineering Construction General Contractor Certificate



TBEA's Grade A Qualification for Engineering Design in Power Industry Certificate



The Phase II Project of the Dushanbe No. 2 Thermal Power Plant in Tajikistan won the China Construction Engineering Luban Prize (Overseas Project), China's top construction award.



The Dushanbe 500kV Substation in Tajikistan won the China Construction Engineering Luban Prize (Overseas Project), China's top construction award.



The Ulan Bator-Manderlay 330kV Power Transmission and Distribution Project in Mongolia was given the Mongolia Energy Construction Quality Engineering Award.



The 2x150MW Renovation and Expansion Project of the Bishkek Thermal Power Station in Kyrgyzstan won the 2019 China Power Quality Project Award.



Phase I and II of the Nairobi 220kV and 66kV Power Grid Upgrading Project in Kenya



A photo of the Jatikalan Substation and the 765kV UHV Main Power Grid Transmission Project in India.



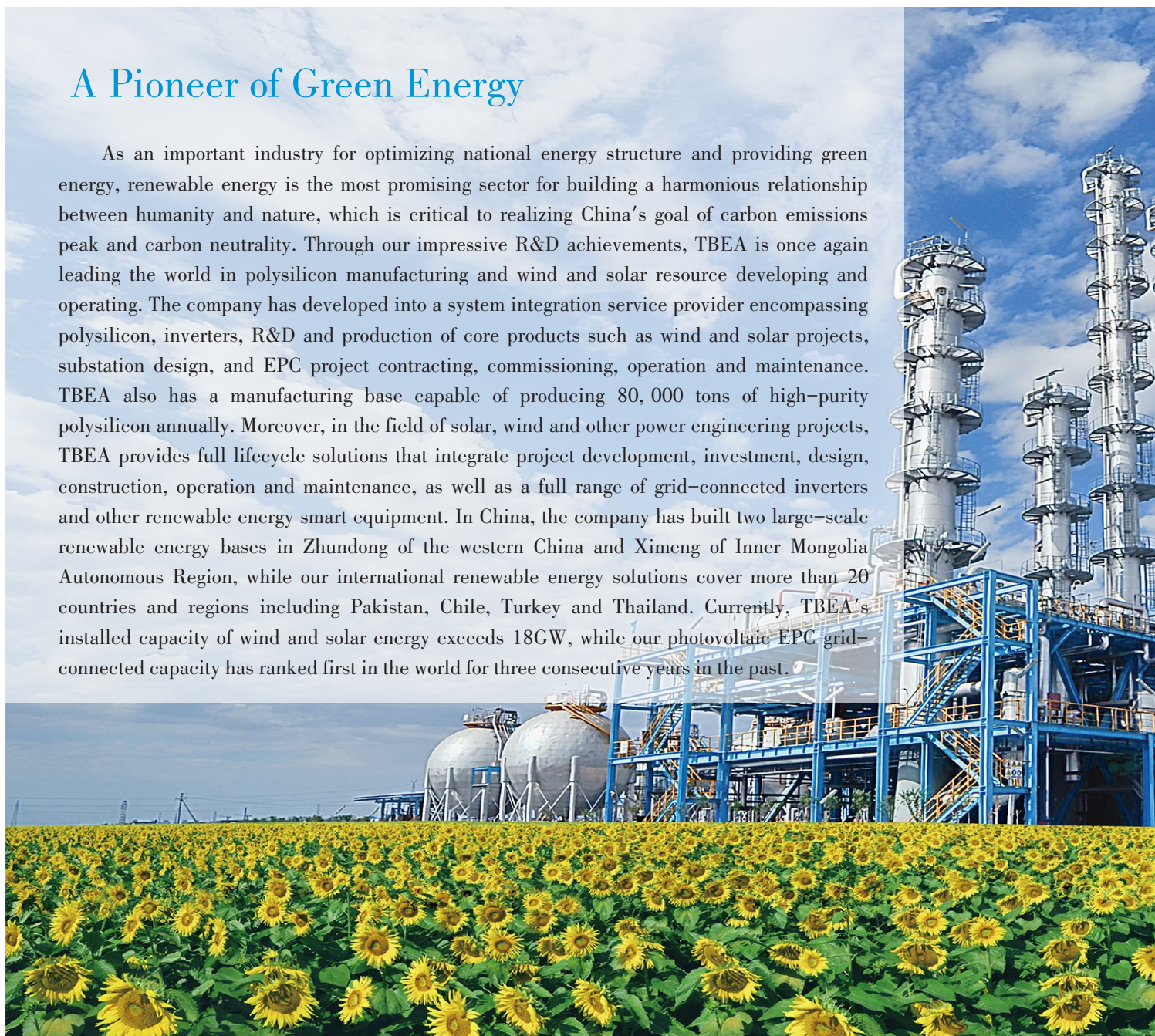
WOLAITA-AKAKI 400kV Transmission Project in Ethiopia.



The Togo Sokode 126kV Substation and Transmission Line Project.

## A Pioneer of Green Energy

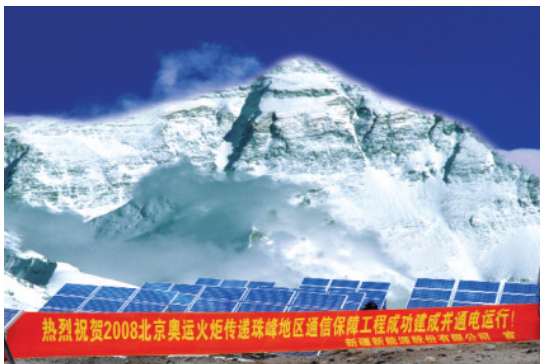
As an important industry for optimizing national energy structure and providing green energy, renewable energy is the most promising sector for building a harmonious relationship between humanity and nature, which is critical to realizing China's goal of carbon emissions peak and carbon neutrality. Through our impressive R&D achievements, TBEA is once again leading the world in polysilicon manufacturing and wind and solar resource developing and operating. The company has developed into a system integration service provider encompassing polysilicon, inverters, R&D and production of core products such as wind and solar projects, substation design, and EPC project contracting, commissioning, operation and maintenance. TBEA also has a manufacturing base capable of producing 80,000 tons of high-purity polysilicon annually. Moreover, in the field of solar, wind and other power engineering projects, TBEA provides full lifecycle solutions that integrate project development, investment, design, construction, operation and maintenance, as well as a full range of grid-connected inverters and other renewable energy smart equipment. In China, the company has built two large-scale renewable energy bases in Zhundong of the western China and Ximeng of Inner Mongolia Autonomous Region, while our international renewable energy solutions cover more than 20 countries and regions including Pakistan, Chile, Turkey and Thailand. Currently, TBEA's installed capacity of wind and solar energy exceeds 18GW, while our photovoltaic EPC grid-connected capacity has ranked first in the world for three consecutive years in the past.







## “Energy–Electricity–Polysilicon–Solar PV Power Plant System” PV Circular Economy Industrial Chain

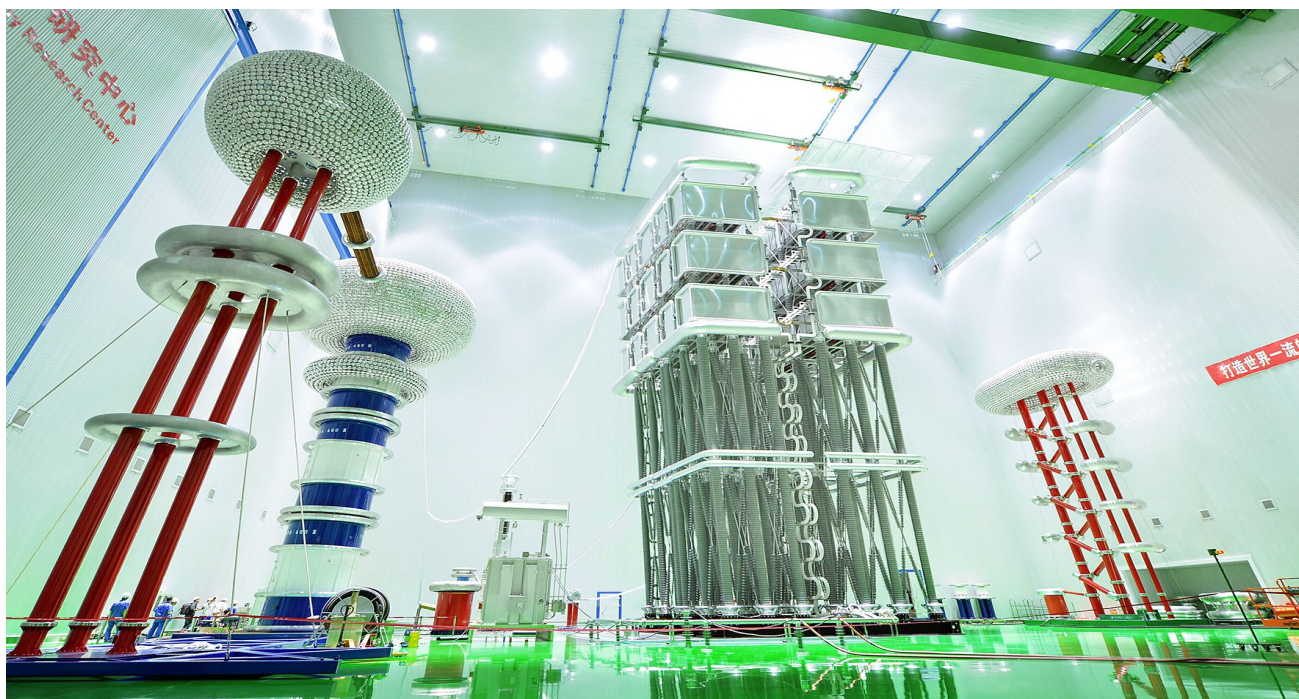


The world’s highest power station, the Mount Everest PV Power Station at 5,800 meters, supplied power for the Beijing 2008 Olympic Torch Communication Base Station.



The Shanghai Hongqiao High-speed Passenger Railway Station 6.6MW Project is Asia’s largest BIPV power station.





The world's first 800kV/5000MW UHV flexible DC converter valve, independently developed by TBEA, is used in the Wudongde-Guangdong Guangxi UHV Multi Terminal Direct Current Demonstration Project. The power plant will become the world's first UHV multi-terminal hybrid DC project, the first UHV flexible DC converter station and the world's largest UHV multi-terminal DC transmission project. It demonstrates China's capability in energy restructuring, energy conservation and power equipment upgrading, and will boost the coordinated economic development of the Guangdong-Hong Kong-Macao Greater Bay Area.



The photo shows the completion of the hoisting of the first wind turbine at the UHV outgoing wind farm project in Fengsheng Zhengxiangbaiqi.

The renewable energy base in Inner Mongolia, which attracted over 10 billion yuan in investment, integrates equipment manufacturing, renewable energy power generation, and operation and maintenance services. It is expected to generate annual revenue of 1.3 billion yuan, with 160 million yuan going to pay taxes.



The 150MW Desert Power Station in Hami.



The 100MW Fishing and PV Integration Project in Poyang Lake.



The 100MW PV Power Station in Punjab, Pakistan.

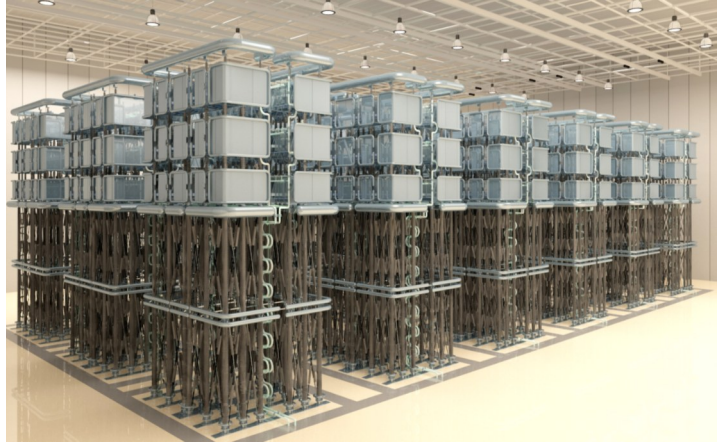


The 186MW PV Power Station in Benban, Egypt.



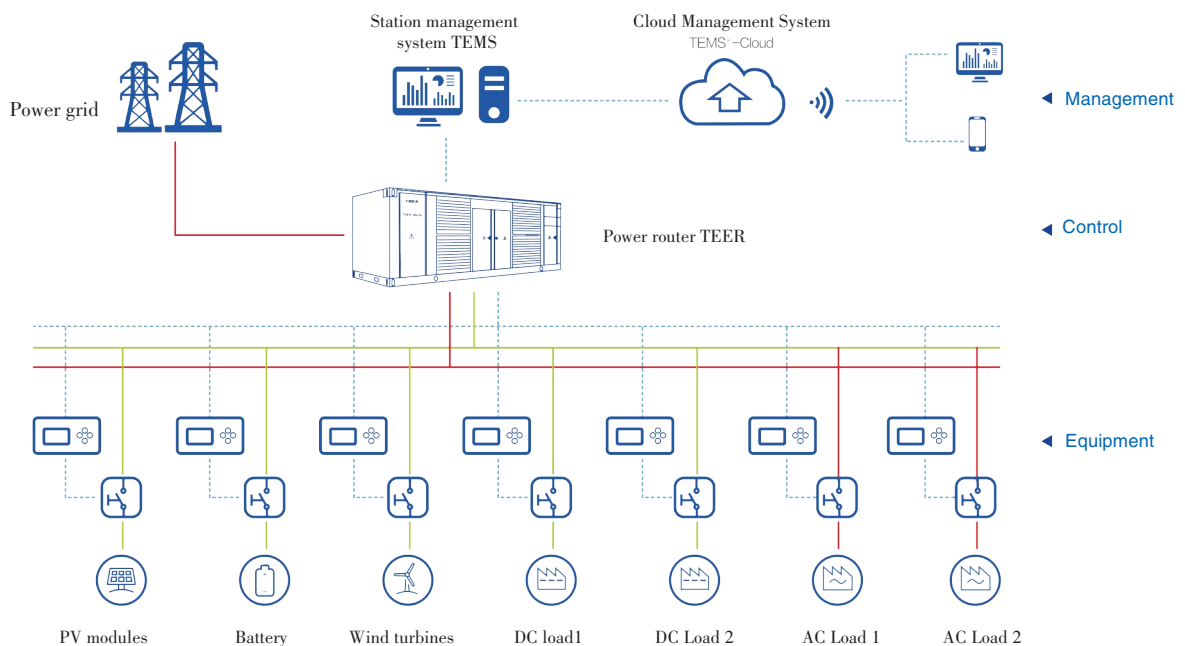
## Offshore Wind Power Solution

TBEA offers a variety of offshore wind power UHV flexible direct current converter valve and energy relief solutions. In order to build upon main grid 800kV UHV flexible DC transmission technology and adapt to offshore power generation demand, TBEA uses exceptionally mature IGBT devices, excellent explosion-proof systems, extremely reliable anti-tilt, anti-vibration, anti-interference and anti-corrosion solutions, which further improve power density while ensuring a compact and lightweight structure. By adopting the pioneering technology of offshore wind power modular distributed energy discharge devices, TBEA prevents the failure of the onshore AC system from affecting the offshore wind power system, guaranteeing the safe and reliable operation of the entire system.



## Smart Microgrids

Since smart microgrid is a crucial component of renewable energy, TBEA is dedicated to providing innovative and integrated microgrid services. With our independently developed hi-tech electric energy router, TBEA is able to coordinate the demands of power plants, grids and users, while building modular and integrated energy storage systems, and providing full lifecycle microgrid services including planning, design, product, construction, operation and maintenance. In addition, the router is reinforced with key parts such as an energy management system, a central controller and an energy storage system, and offers “dual-end, three-layer, multi-scenario” customized smart microgrid solutions for industrial and commercial parks, data centers, islands and areas without access to electricity. TBEA has one of the few Internet Plus smart energy demonstration projects recognized by the National Energy Administration; the world’s largest Multi-terminal AC and DC Hybrid Flexible Distribution Network Interconnection Project (Zhuhai), the AC and DC Hybrid Microgrid Renewable Energy Technology Research and Engineering Demonstration Project (Dongguan) – one of the national key R&D plans, and the National "863" Plan-2MW Source Network Load Storage Coordination Microgrid Demonstration Project (Xi'an Park).



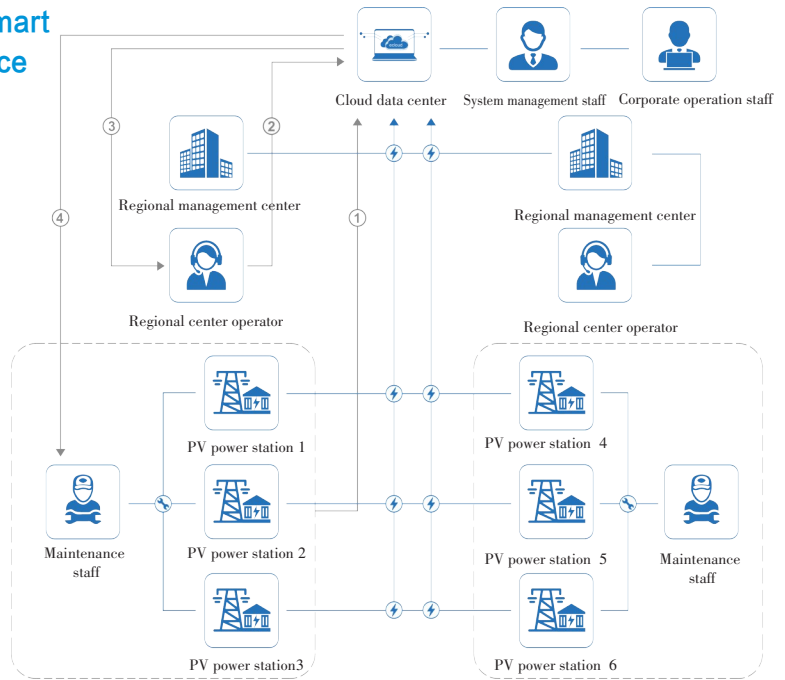
# TB-eCloud Smart Energy Management Platform

Renewable energy power stations smart monitoring, operation and maintenance

Powergeneration: Up **3%**

Revenue: Up **1%**

Smart energy management is an indispensable part of new innovative systems. That is why TBEA developed the TB-eCloud smart energy management platform, which provides user-friendly data enrichment solutions for global power plants. It seamlessly allows real time collection, efficient distribution, precision analysis, smart processing and a multi-dimensional display of data generated by the power plant.



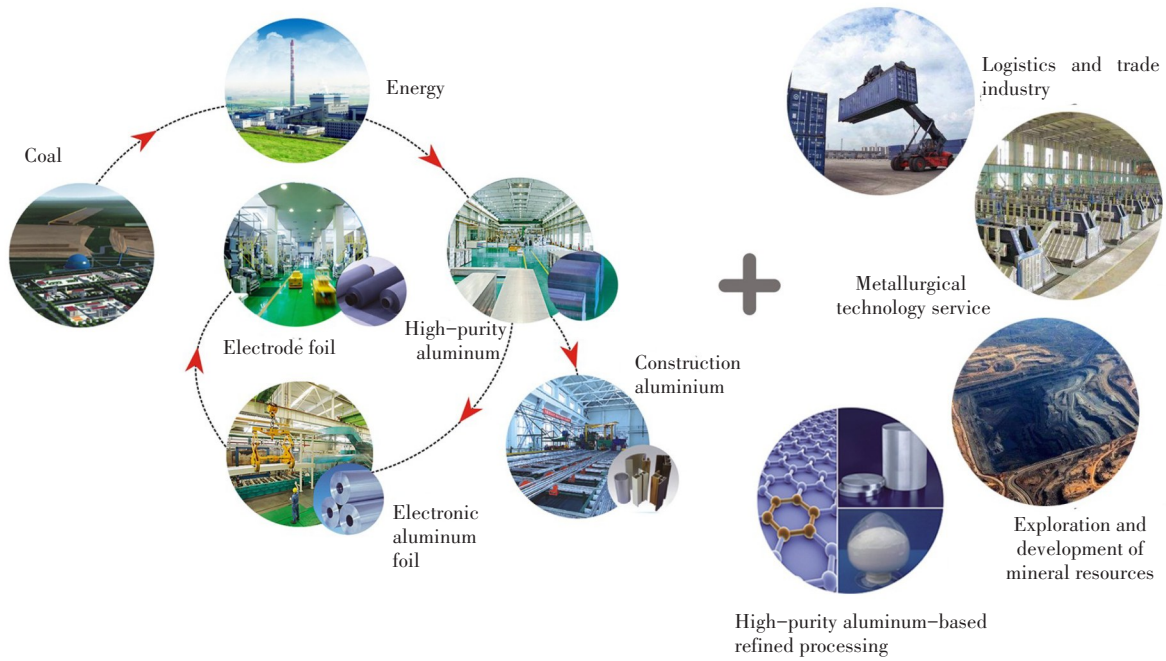
## A Supplier of Aluminum Electronic New Material

Sustainable innovation in new material empowers a nation to discover compelling industrial trends. TBEA's core technology in aluminum deep-processing has inspired a circular economy industrial chain that integrates energy, high-purity aluminum, electronic aluminum foil and electrode foil. TBEA's unique modernization has made it the only company in the world capable of producing a whole range of upstream products of aluminum electrolytic capacitor, which have been well received around the world including in Japan, the United States and Europe. TBEA is also a leading supplier of high-purity metal materials.





New Material Industrial Park



“Energy–High–purity Aluminum–Electronic Aluminum Foil–Electrode Foil”  
Circular Economy Industrial Chain



Aerospace



Automobile manufacturing



Industrial robots



Rail transit



Aircraft manufacturing



Urumqi High-tech Industrial Development Zone's North Park



Ganquanpu New Material Industrial Park



Shanshan County Dikaner Industrial Park



Shihezi New Material Industrial Park



An aluminum foil production line

Electronic aluminum foil

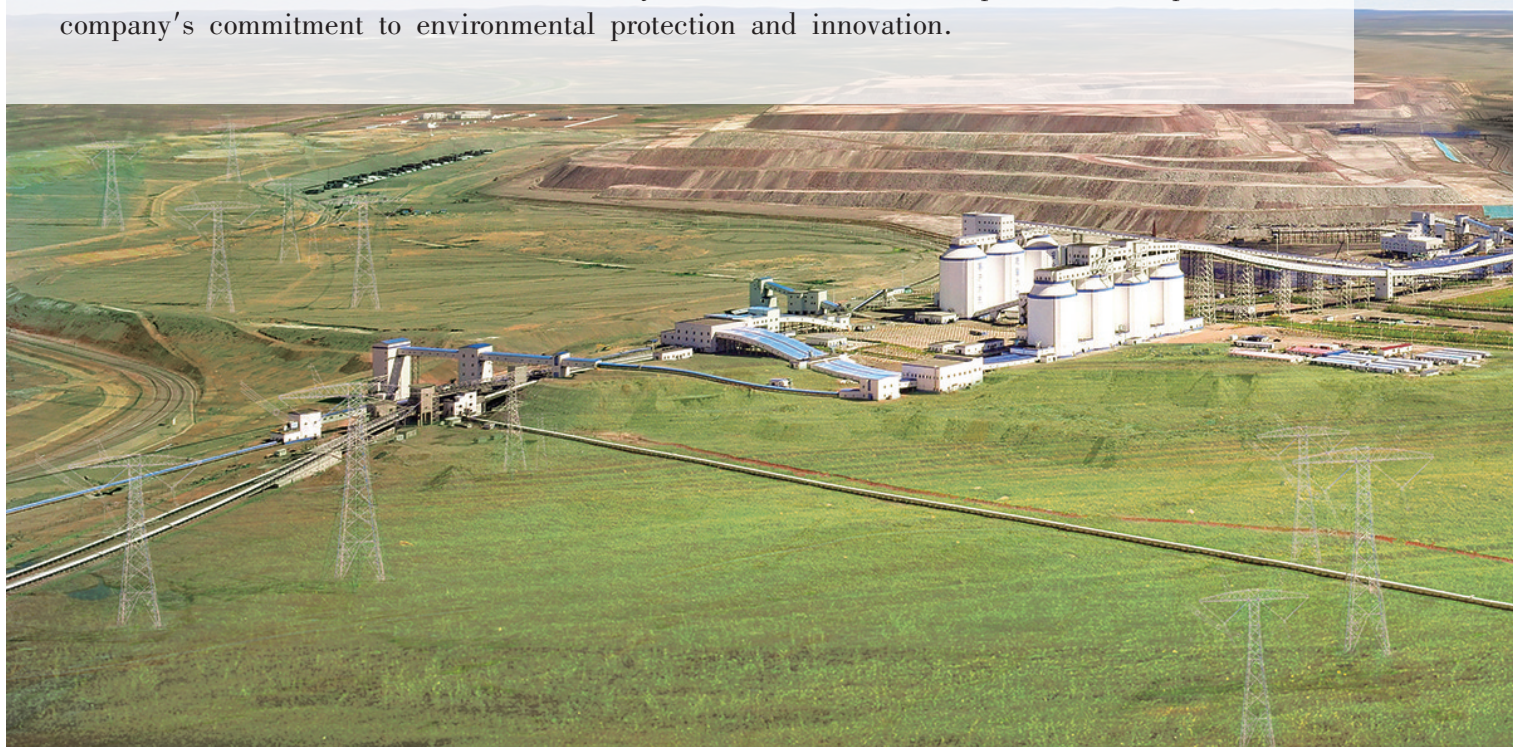


An electrode foil production line

Electrode foil

## A Promoter of Economic and Social Development

Based in western China, TBEA resolutely follows state and regional environmental protection requirements and adheres to the highest standards of carbon emissions. The company's design for pollution and emissions reduction has always been ahead of national requirements, including the recycling and reuse of wastewater. In addition, TBEA strives to create a circular economy industrial chain featuring renewable energy from coal electrochemical polysilicon and new material from coal electrochemical aluminum electrons. This industrial expertise has given TBEA a competitive edge in the global market. TBEA's achievements are showcased in two green, smart and modern ultra-large open-pit coal mines, each with a total production capacity of 50 million tons in Zhundong Wucaiwan and Jiangjun Gobi in Xinjiang. The former was listed as one of the "23 new key projects of China's great development of the western region" strategy. Moreover, TBEA owns two power plant projects, the TBEA Zhundong Wucaiwan 2×660MW Beiyi Power Plant and the Changji 2×350MW Combined Heat & Power Generation Project, which have developed in the spirit of the company's commitment to environmental protection and innovation.









The panorama of South Open-pit Mine



A railway automatic loading system



A 10,000-ton heavy haul train



A dust control dome for coal storage yards



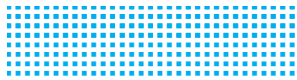
The Tianchi Energy Zhundong Wucaiwan 2x660MW Power Plant, serving China's first 1100kV UHV DC Power Transmission Project



The Changji 2x350MW Combined Heat & Power Generation Project



The TBEA Tianchi Energy South Open-pit Mine smart integrated dispatching command center

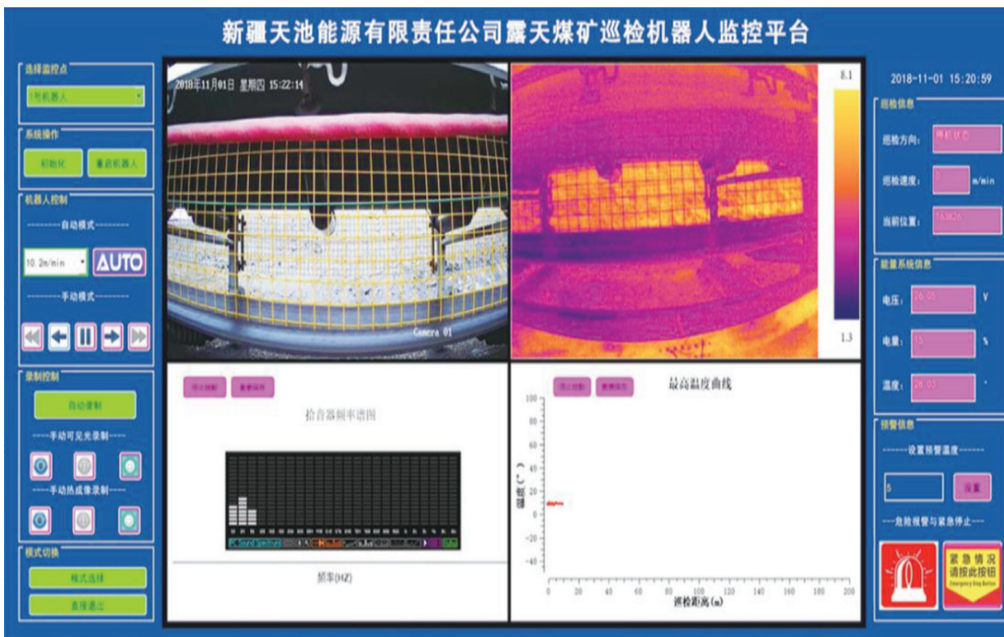


## Smart Mine Construction

In response to the nation's call for “new infrastructure construction”, TBEA launched smart “5G+industry Internet” industrial parks, which will further promote the integration of AI technology and the coal–electricity integrated industrial chain as well as the high–quality development of the energy industry. Moreover, TBEA's innovative products have been applied to over 30 scenarios such as “5G+robotic smart inspection”, “5G+driverless vehicle”, “5G+video AI risk sensor” and “5G+drone smart inspection” among others.



“5G+driverless” intelligent transportation



六大平台	序号	任务名称	执行情况
智能设计	1	三维激光扫描自动建模与分析系统	已完成
	2	地、测、采智能三维设计系统	已完成
智能生产	3	矿山重型卡车无人驾驶系统	准备测试
	4	基于人工智能技术的机器人自动巡检系统	已完成
智能运维	5	特种作业机器人智能巡检	已完成
	6	基于视频AI技术的节能调速优化	正在启动
	7	三维仿真智能设备诊断分析与预警系统	已完成
	8	基于视频AI技术的主运输智能化综合保护	正在启动
智能服务	9	煤炭交易电子商务平台	已完成
	10	基于主动安全机制的智能防撞预警系统	已完成
智能安全	11	露天矿边坡地质雷达监测预警平台	已完成
	12	漫游式智能视频监控系統	已完成
	13	基于虚拟现实的人员定位系统	正在启动
	14	三维仿真培训系统	正在启动
	15	露天矿能耗分析系统	正在启动
智能决策	16	电厂能效分析及节能系统	正在启动
	17	煤电一体化燃料源头管控系统	正在启动
	18	生产成本大数据分析系统	正在启动

An intelligent inspection robot monitoring platform



## Logistics Automation Solutions

TBEA closely observes economic globalization and information technology trends, delivering valuable products that cover the whole spectrum of the targeted industrial chain. Starting out as a local company in western China, TBEA has blossomed and expanded both domestically and internationally. As we endeavor to bring more convenience to customers and create higher value, TBEA remains committed to the development of high-end comprehensive logistics services and highly efficient innovative supply chain construction that integrates storage, transportation, delivery and bonded logistics centers. TBEA has established four logistics industrial bases in northwest China, northeast China, south China, north China, and is in the midst of setting up a Eurasian international logistics port.





A logistics industrial park



A special operation platform for Zhongjiang Logistics Co., Ltd.





The International Logistics Park



A logistics informatization management center



Zhongjiang Logistics Co.'s first cargo train

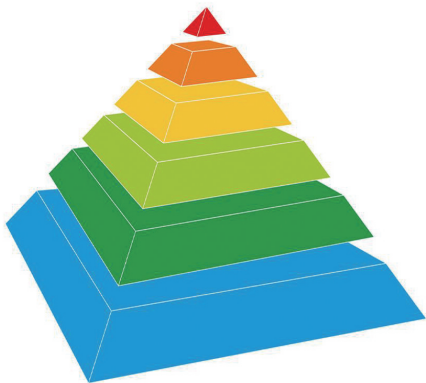


The world's first  $\pm 1100\text{kV}$  UHV transformer lab



## Technological Innovation and Talent Cultivation

In our quest for state-of-the-art development, TBEA invests 4 percent of its sales revenue in innovation and has made 117 major breakthroughs, created over 1,600 patents, trade secrets and software copyrights, and participated in 210 standard-setting cases both at home and abroad. TBEA owns China's only national-level UHV transformer engineering technology research center, four national-level engineering labs, five national-level corporate technological advancement centers, a postdoctoral research station and an academician work station. Among other prizes mentioned.



- 9 National High-tech R&D Program (863 Program)
- 11 National Science and Technology Research and Support Plans
- 63 firsts in the world
- 54 firsts in China
- 117 major technological breakthroughs
- 1600 core patented technologies and proprietary technologies
- 210 industry standards



TBEA has won eight special prizes for scientific and technological progress in China's machine industry.



The only national engineering laboratory in transformer industry



A national-level renewable energy lab



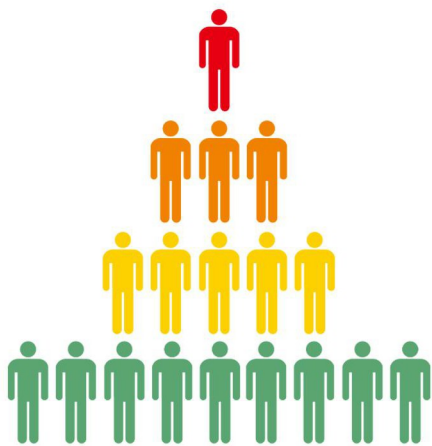
The only national engineering laboratory in new material industry



A first-rate coal quality lab



As a talent-led organization, TBEA puts people first. We aim to be the employer of choice for the world's most innovative talent. TBEA boasts more than 300 industry leaders and nationally recognized experts, over 1,700 employees with postgraduate degrees and more than 80 percent with college degrees and above.



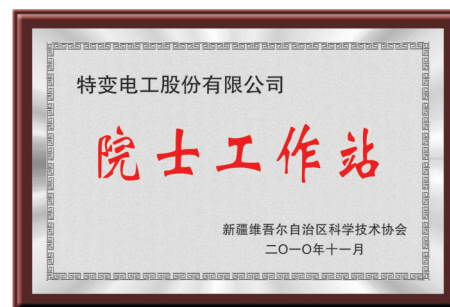
300 industry leaders and nationally recognized experts

1,100 returning students and foreign employees

1,700 employees with masters and doctor degrees

8,200 employees with various professional certifications

As part of our people-first philosophy, TBEA readily spends 100 million yuan in employee empowerment in order to attract and keep the world's best talent. TBEA has set up a China-Germany international talent training center to train professional and skilled workers, and established joint strategic production-education-research bases with top domestic and international universities including Tsinghua University, the Chinese Academy of Sciences and the German Teutloff Institute of Technology, where the company's management staff is trained and future leaders nurtured. TBEA has been awarded the titles of Outstanding Contribution Unit of National Skilled Talents Training and First Enterprise Practice Base of National Vocational Education Teachers. In 2019, the company was approved as an industry-education integrated enterprise in western China, which has been included in the key construction and cultivation scheme of the autonomous region.



TBEA and Germany's Teutloff Institute of Technology unveil the Sino-German Northwestern Polytechnical Talent Training Center in August 2017.



TBEA and Huazhong University of Science and Technology hold a donation ceremony of school-enterprise cooperation fund, in October 2017.



TBEA signs a Cooperation Agreement on Innovation Platform for Integration of Production and Education with China University of Mining and Technology on July 18, 2017.



TBEA and North China Electric Power University agree to jointly build an integrated strategic production-education base on July 27, 2018.











Green Innovative Smart Reliable Efficient





**TBEA 特变电工**

Address: No. 189 South Beijing Road, Changji City, Xinjiang, China

Post code: 831100

Telephone: +86-400-687-1000

Fax: +86-994-2723615

Website: [www.tbea.com](http://www.tbea.com)