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**BPEG**

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# 01 Introduction

Beijing Power Equipment Group Co., Ltd. (BPEG) was founded in 1952, and was formerly the largest repairing and manufacturing company in the electric power system. It is now subsidiary to China Energy Engineering Group Equipment Co., Ltd. The headquarter of BPEG is located in Liangxiang, Fangshan District, Beijing, and its subsidiaries are located in Beijing, Hebei and Xinjiang.

BPEG focuses on large-scale power station auxiliary equipment, extra-high voltage grid equipment, turnkey services, spare parts and maintenance services. It has formed a product pattern of "power generation, power grid, metallurgy, building materials and chemical industry" and a number of major technical equipment products with independent intellectual property rights. BPEG has the ability to develop, manufacture and maintain auxiliary equipment for large-scale nuclear power, thermal power, hydropower, wind power and other power stations, equipment for extra-high-voltage power grids and conventional power grids, grinding and pulverizing equipment for metallurgy, building materials, coal and chemical industries, and pulverized coal drying equipment and electronic control equipment. The product sales and service spread all over the domestic provinces, municipalities, autonomous regions and administrative special zones, and more than 90 countries and regions in the world.



## Company History



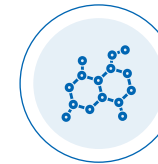
1952, established to prepare for the construction of an electric power base in Liangxiang, Beijing.

January 1952, named Liangxiang Repair and Manufacture Factory of North China Electricity Administration.

September 1984, officially renamed Beijing Power Equipment Group, under the Beijing Electric Power Industry Bureau.

September 2011, transferred to CEEC (China Energy Engineering Corporation Limited).

December 2014, changed name to Beijing Power Equipment Group Co., Ltd. , under China Energy Engineering Group Equipment Co., Ltd.



### [ Strategy ]

To build an international power equipment company integrating R&D, design, manufacturing and services.



### [ Goal ]

Fist-class in China Famous in the World.



### [ Image ]

We have friends all over the world.



### [ Prospect ]

Civilized home, charming garden, happy paradise.



### [ Business ]

Market is the cardinal principle.



# 02 Qualification

BPEG has provincial and municipal technology centers, is a world-class coal mill development base, and is one of the backbone enterprises for the localization and development of extra-high-voltage grid equipment and one-million-grade nuclear power busbar. It is an award-winning enterprise of the State Council's Special Prize for Scientific and Technological Progress, a national high-tech enterprise, one of the top 100 enterprises in China's machinery industry, a leading enterprise in China's industry, and a nominee of China's Industry Award.



BPEG has the qualification of general contracting for electric power engineering, elector-mechanical engineering and petro-chemical engineering and the qualification of specialized contracting for building elector-mechanical installation, and has established the integrated management system of four standards: quality, environment, occupational health and safety, and measurement.

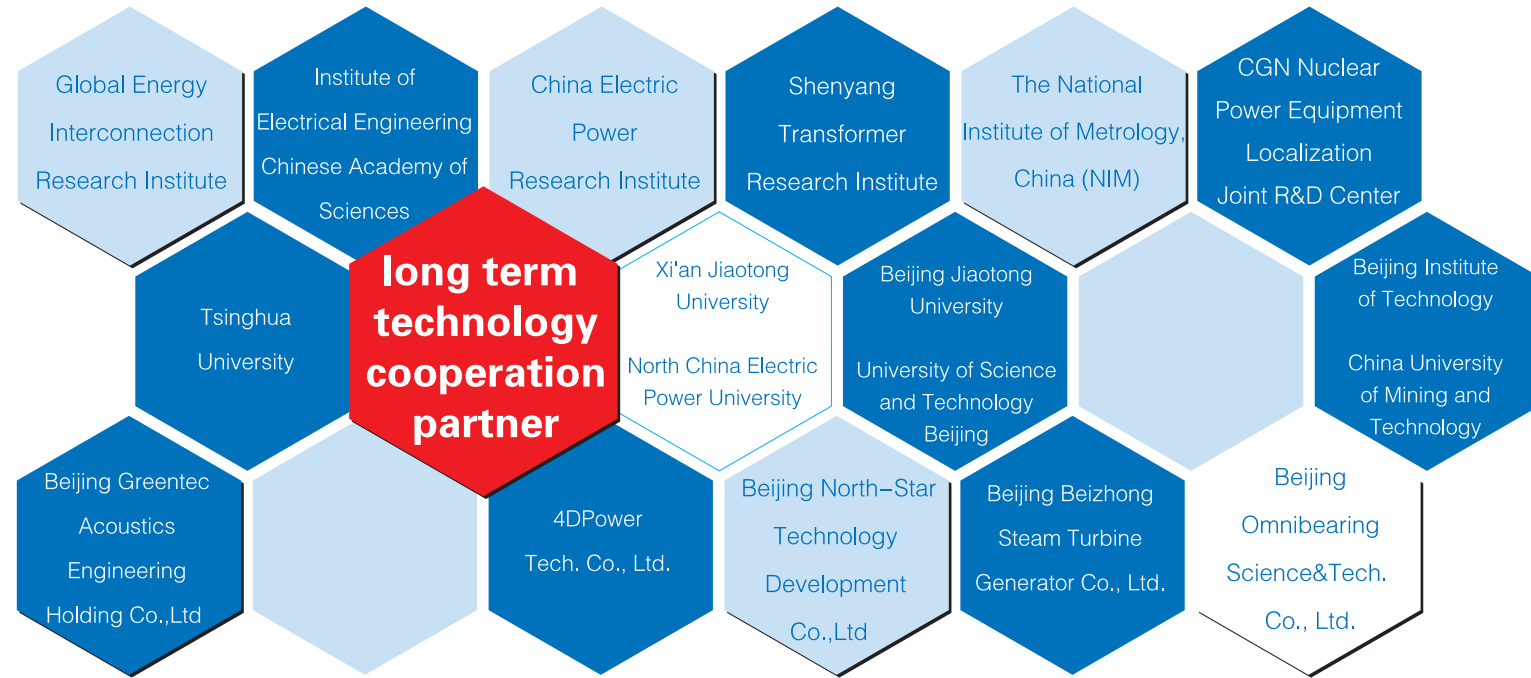




# 03 R&D

BPEG has formed a strong R&D capability in the fields of power station auxiliary machinery and grid equipment, participated in drafting and formulating many national standards, undertaken many scientific research projects of the Ministry of Science and Technology of China, provincial and municipal governments, and CEEC. It has established long-term cooperative relationships with many scientific research institutes, renowned colleges and universities, industry associations, etc.

With the core advantages in product research and development, technological innovation and professional services, more than 10 products with independent intellectual property rights, mature technology and reliable quality have been awarded the Beijing New Technology and New Product (Service) Certificate.



**BPEG highlights independent innovation and leads enterprise development with high and new technology.**



### R&D Ability

- Senior technical title personnel 100+
- Intermediate technical title personnel 200+
- Junior technical title personnel 200+

### Patents

- Invention patent 30+
- Utility model patent 160+
- Design patent 10+



# 04 Production



BPEG's production plant covers an area of 530,000 m<sup>2</sup>, with 339 specialized manufacturing plants and more than 2,000 sets of main production equipments. It has more than 2,000 sets of production equipments, of which more than 10% are high-end fine and large rare equipments. It has advanced quality assurance capabilities such as physical and chemical, metallographic, precision measurement, non-destructive testing, electrical testing, drying testing, etc. It has built an international standard electrical test room, electrical test hall, outdoor lightning impact test site, drying and grinding test station, and nearly 400 sets of various testing and experimental equipments.



# 05 Business

BPEG adheres to innovation to lead the development of enterprises, actively promotes the diversification of products and business layout, and is committed to providing customers with a full range of high-quality services.

## [Northeast China]

CGN Liaoning Hongyanhe 2 × 1150MW Nuclear Power Project(IPB)

Beilin District Agriculture and Forestry Biomass CHP Project(Biomass complete equipment)

## [North China]

Zhangbei Renewable Energy Flexible DC Grid ± 500kV Test Demonstration Project(DC circuit breaker)

10kV Multi-energy Complementary Smart Grid Comprehensive Demonstration Project in Chongli District, Zhangjiakou(Power Electronic Transformers)

## [Central China]

Shenhua Guohua Yongzhou 2 × 1050MW Power Generation Project ( coal mill )

Chongqing-Hubei South channel Back-to-Back Project ( smoothing reactor )

## [South China]

Guangdong Huarun Xijiang 2 × 660MW Power Generation Project ( coal mill )

CNNC Guangdong Taishan 2 × 1750MW Nuclear Power Project(IPB)

## [East China]

Jiangsu Sheyang Port 2 × 1000MW Power Generation Project ( coal mill )

Baihetan-Jiangsu ± 800 kV UHV DC Transmission Project (smoothing reactor)

## [Northwest China]

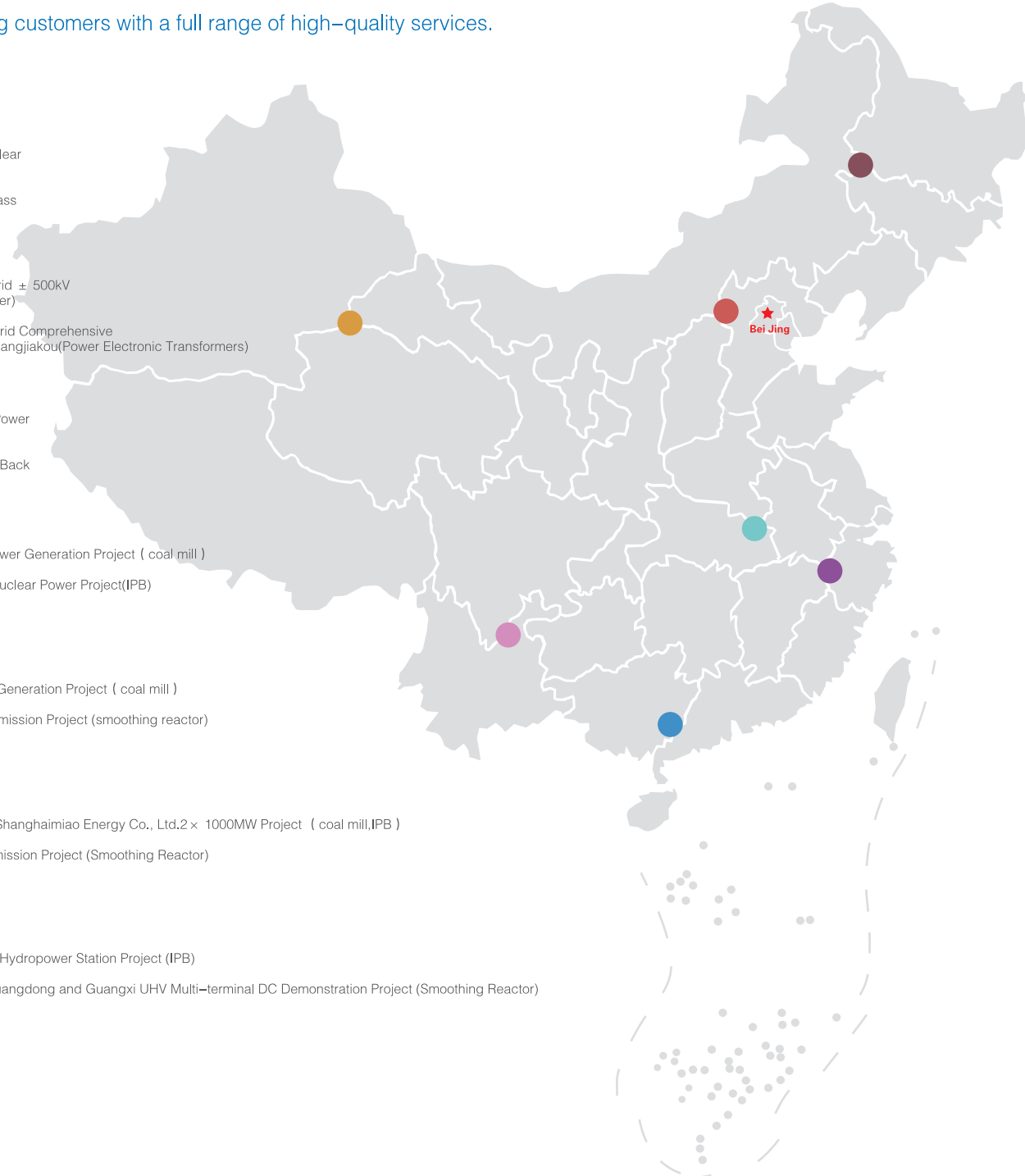
Guodian Power Shuangwei Inner Mongolia Shanghai Energy Co., Ltd.2 × 1000MW Project ( coal mill,IPB )

Changji-Guquan ± 1100kV UHV DC Transmission Project (Smoothing Reactor)

## [Southwest China]

Sichuan Baihetan Phase One 16 × 1000MW Hydropower Station Project (IPB)

Wudongde Hydropower Station to Power Guangdong and Guangxi UHV Multi-terminal DC Demonstration Project (Smoothing Reactor)



## ASIA

Indonesia Java 2 × 1050MW Thermal Power Plant (coal mill, IPB)

Pakistan Morashi 660kV DC Transmission Project (smoothing reactor)

Vietnam Hai Duong 2 × 600MW Thermal Power Plant (steam turbine)

## Africa

Kenya NCCL Clinker Production Line Project (coal mill)

Ethiopia Medium and Low Voltage Distribution Network Upgrade Project (transformer)

Egypt Hawamdiya Project(wave trap)

## North America

U.S. PG&E Project ( Current limiting reactor )

Mexico Doubletree Project ( iron core reactor)

Canada MICA Hydropower Project (IPB)

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## Europe

Turkey Zetas Phase III Coal-Fired Project (Coal Mill)

France ITER Nuclear Power Project (reactor)

Russia Teninskaya Gas Project (IPB)

## Oceania

Australia PCP Project (Series Reactor)

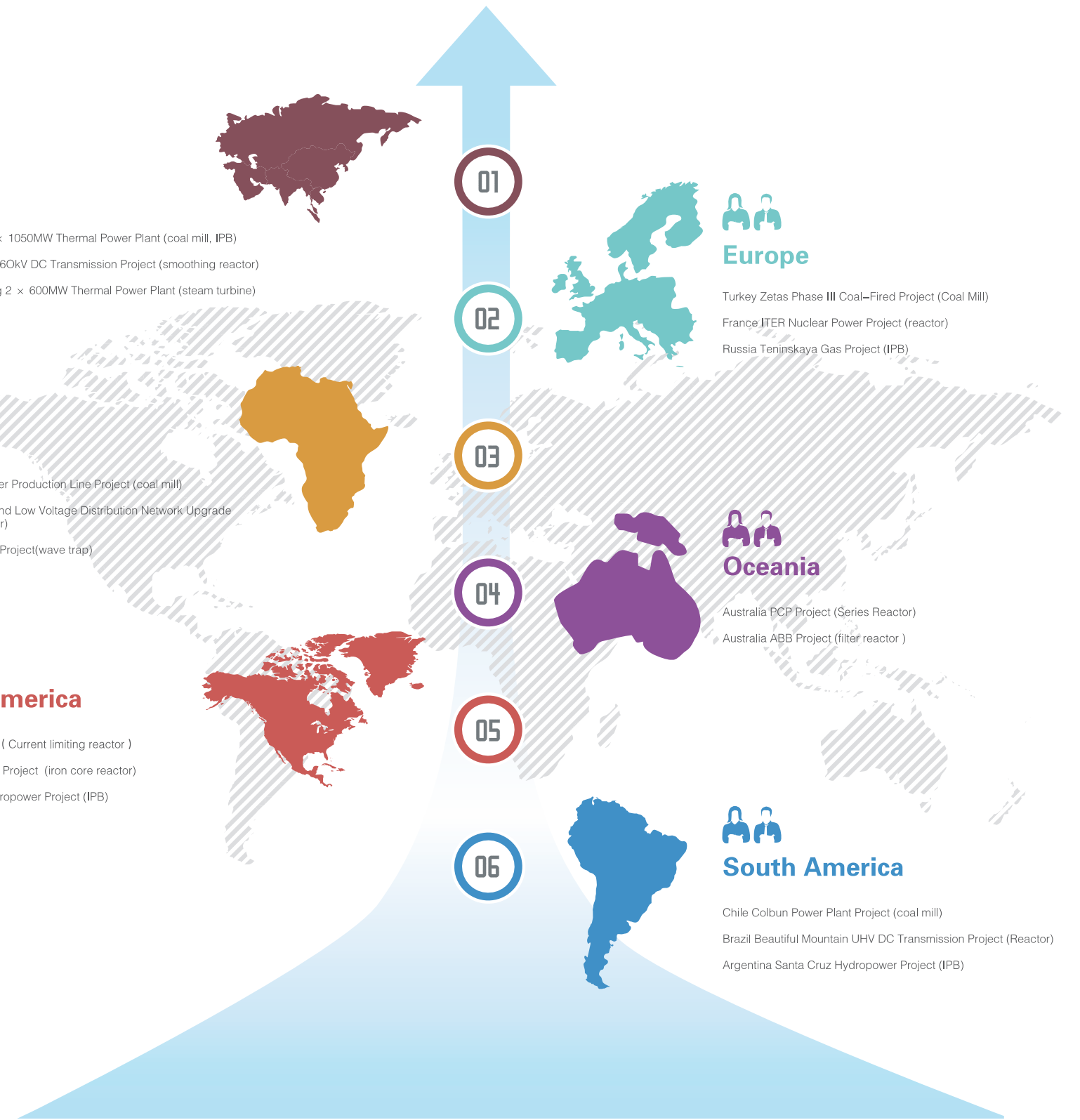
Australia ABB Project (filter reactor )

## South America

Chile Colbun Power Plant Project (coal mill)

Brazil Beautiful Mountain UHV DC Transmission Project (Reactor)

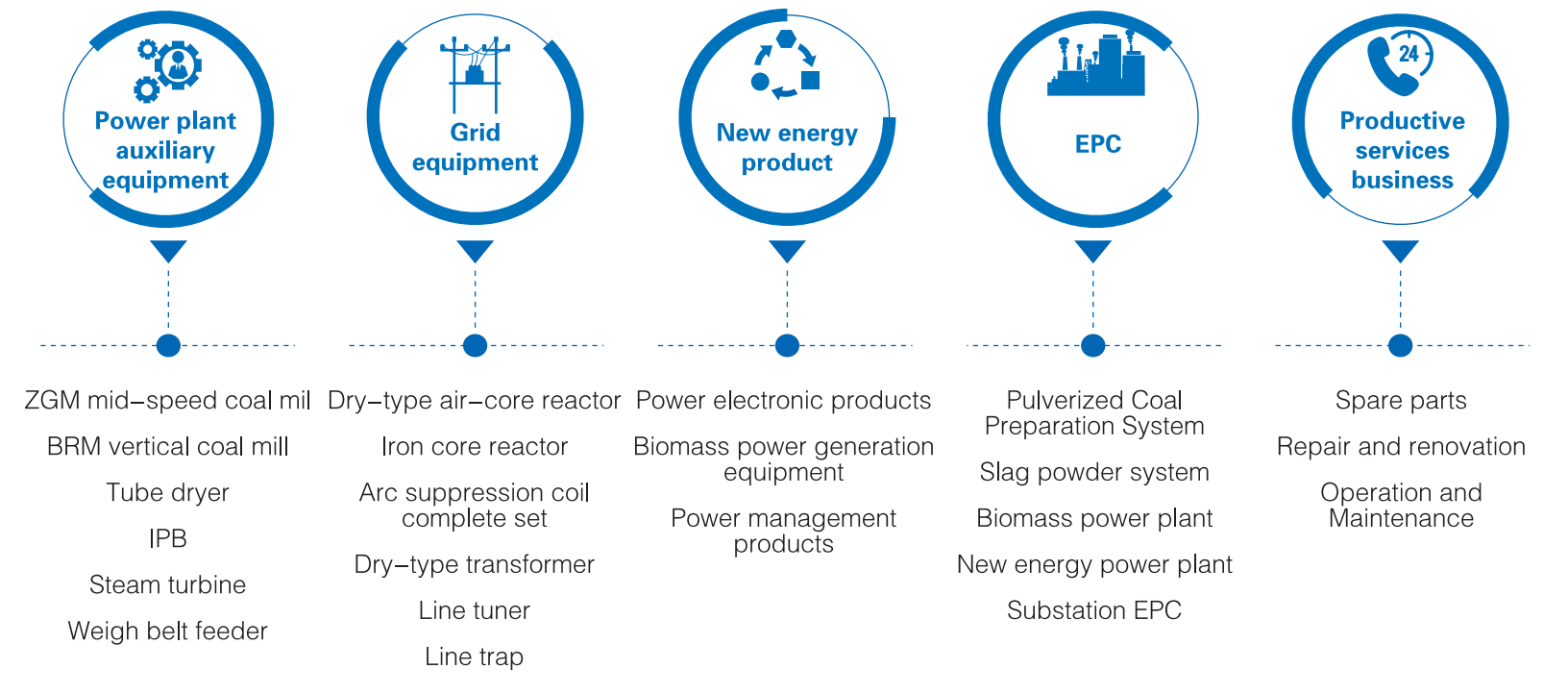
Argentina Santa Cruz Hydropower Project (IPB)



# 06 Products & Services



Based on the "clean energy, smart grid, energy saving and environmental protection", BPEG cultivates new industries and upgrades the existing traditional industries as a carrier, adheres to the key cultivation of high-tech industries and the traditional advantages of the industry as a whole to promote the combination of R & D, design, manufacturing, service integration of the international energy equipment company. It has an open mind to look around the world, and is committed to providing customers with high-quality products and services.





## ZGM Mid-speed Coal Mill

BPEG has developed into a well-known professional manufacturer of mid-speed roller coal mills at home and abroad, and its coal mill design and manufacturing technology has been perfected day by day. Since the manufacture of the first 151-bowl mid-speed coal mill in China in 1958, the independently-developed ZGM coal mill has completed the design and manufacture of 8 models and 73 specifications in series, which has the advantages of wide adaptability of coal types (can grind bituminous coal, anthracite, lignite, poor and lean coal), high grinding efficiency, low power consumption, long service life, safe and reliable, and easy to operate and maintain, etc., and it is widely used in the coal powder preparation system of electric power, metallurgy, building materials, chemical industry, and other industries.



## BRM Vertical Mill

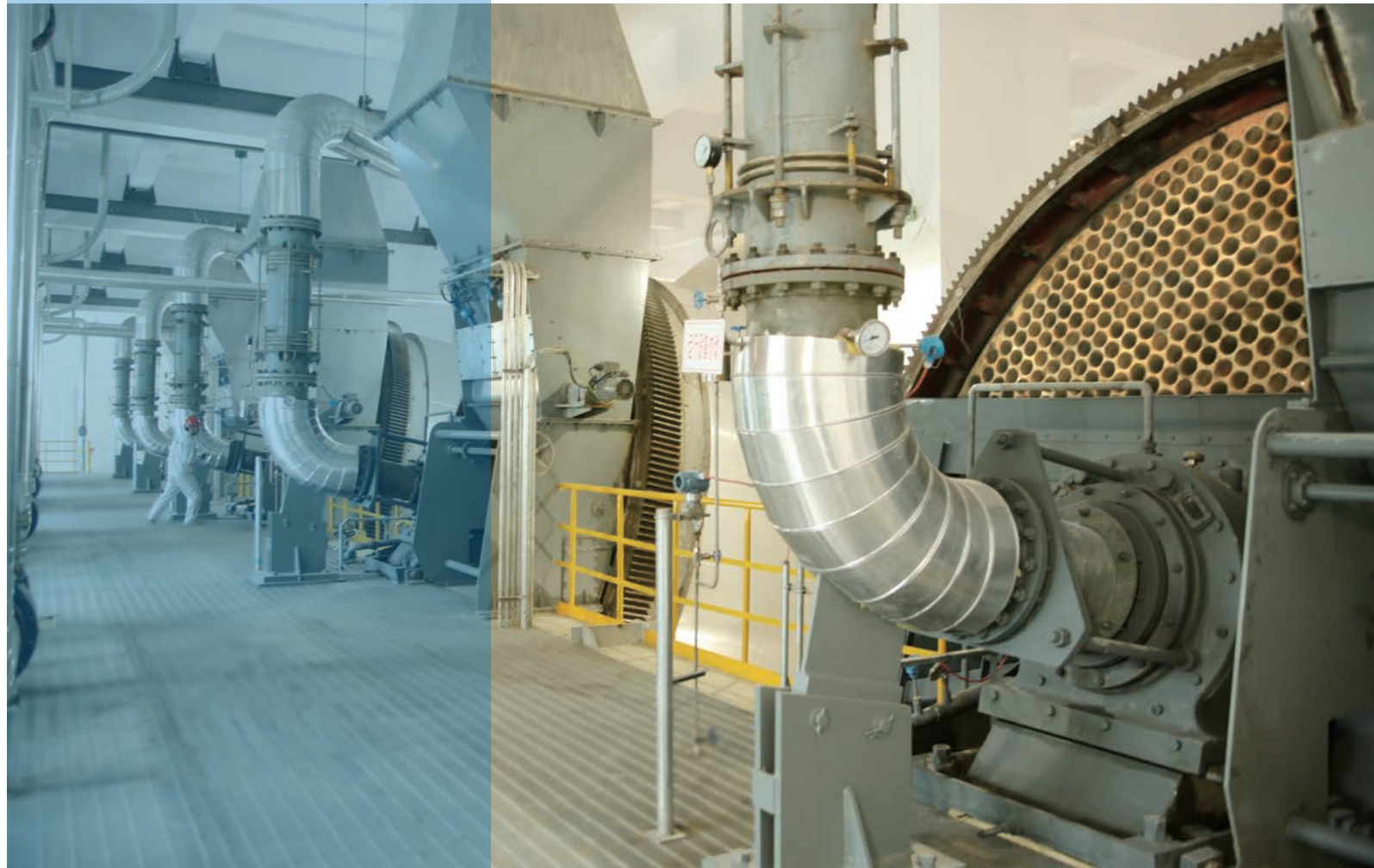


BPEG's self-developed BRM raw mill and slag mill two series of more than ten models, is based on the outstanding technical advantages of ZMG coal mill and advanced and stable production line. It provides energy-saving, high-quality, stable and reliable high-tech products for users in cement, metallurgy and other industries, which can adapt to hard-to-grind materials such as anthracite, petroleum coke, slag and so on, and has the characteristics of large output and so on.



## Steam Tube Dryer

BPEG's self-developed and patented Model ZGG Steam Tube Dryer is a closed, indirect heat exchanger. The first batch of ZGG5 × 8 steam tube dryer was developed according to the needs of the development of domestic coal chemical industry, and was successfully put into operation in October 2008 in Datang International Duolun Coal Liquefaction Project. The dryer adopts indirect drying form, which can dry lignite, coal and other materials, with high heat exchange efficiency and low energy consumption, and has a broad application prospect.



## Enclosed Bus



BPEG is the earliest company engaged in the R&D and manufacturing of enclosed bus in China, and participated in the drafting of the national standard GB/8349 "Metal Enclosed Bus". The self-developed series of 100MW–1750MW products, with mature technology, safe and reliable operation, can meet the requirements of different grades of hydropower, thermal power and nuclear power plants. BPEG has applied for more than 20 patents, with an annual production capacity of more than 100 sets and a market share of more than 40% in high-end closed bus.

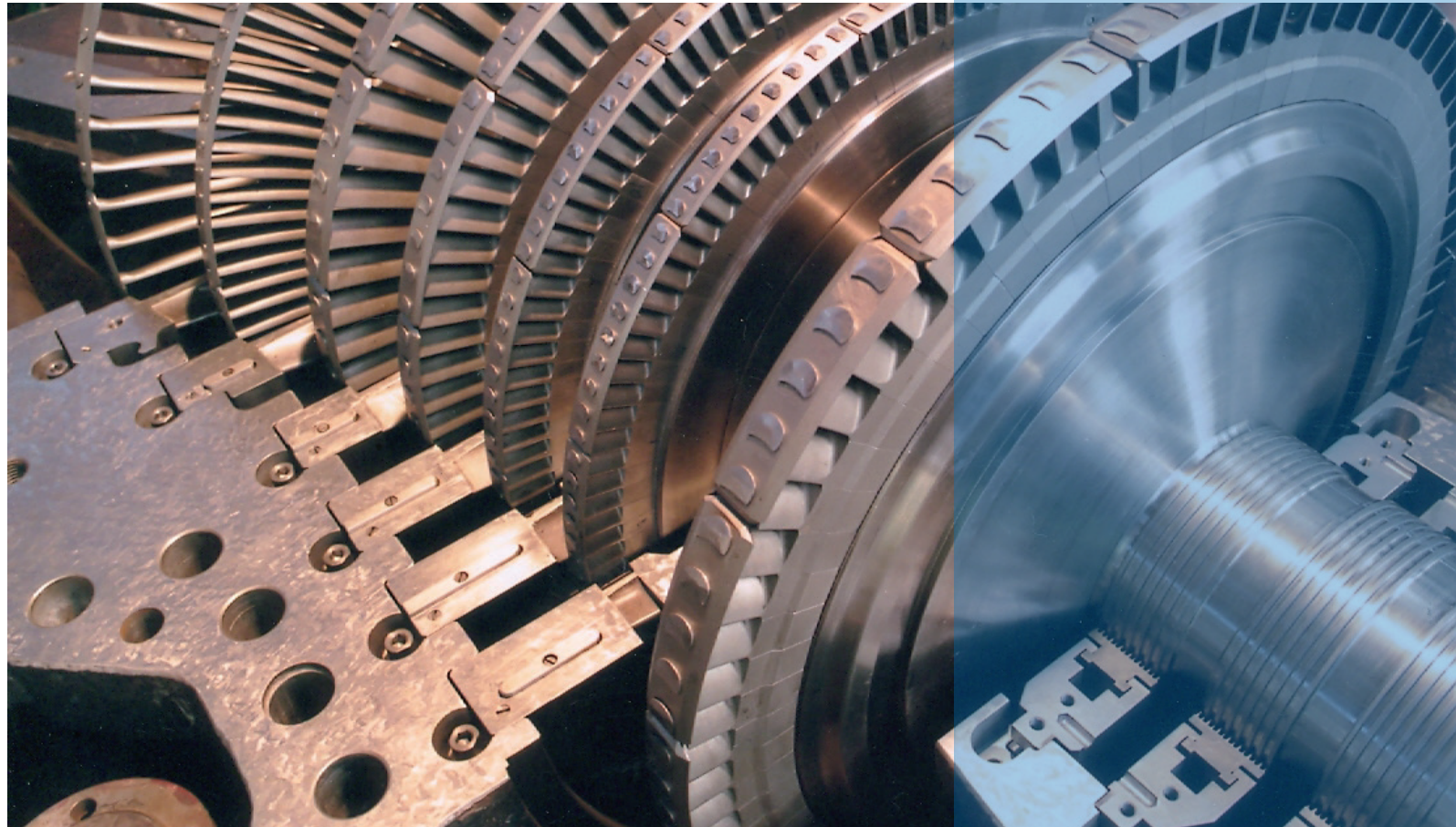
BPEG's self-developed fully insulated cast resin bus (CRB) and rigid gas-insulated transmission line (GIL) have successfully passed the product appraisal, with advanced technology and reliable quality, which not only have a wide range of application in hydropower, nuclear power, and urban transmission and distribution networks, but also have more applications in industrial and mining sites with higher operating environments, and chemically corrosive sites.





## Industrial Turbine

BPEG started to develop and design feedwater pump turbines in 1983, and the first feedwater pump turbine was put into operation in Shanghai Shidongkou Power Plant in 1987. Since then, BPEG has accumulated rich experience in the research and development, design, manufacture, maintenance and repair of steam turbines, and has formed a series of products of various specifications and types, such as the TGQ type of 1–100MW and the supporting units of 200–1000MW. It has also extended to the development of new energy power generation turbine. The product has won the first prize of Energy China Construction Scientific and Technological Progress, applied for more than 10 patents, and had a market share of more than 30%.



## Belt Coal Feeder



BPEG has been manufacturing the first DPG50 electronic weighing belt coal feeder since 1994, and has now formed a series of products with mature technology, reliable operation and stable performance. As the main coal feeding equipment used in conjunction with coal mill, this product has the advantages of pressure resistance, energy saving, environmental protection, etc. It is mainly used in powder preparation system of thermal power plant or circulating fluidized bed boiler feeding system to meet the needs of electric power, metallurgy, building materials, chemical industry and other industries.



## Dry-type Air-core Reactor

BPEG has independently developed and completed the development of 12 different types of dry type reactors of different voltage levels, such as smoothing, current limiting, bridge arm, parallel, series, filtering, test and damping reactors. All of the above products have passed the product certification of the Quality Inspection and Testing Center for Electric Power Equipment and Instrumentation of the Power Industry (China Electric Power Research Institute) and are widely used in electric power, wind power, photovoltaic, iron and steel, metallurgy, chemical industry, electrified railroads, paper making and other industries. The products in operation have proved to be stable, and all indicators are better than the relevant national standards. BPEG has applied for more than 50 patents related to dry-type air-core reactor, with an annual production capacity of 44 million kva. The market share of extra-high voltage dry-type air-core reactors is more than 50%, and the extra-high voltage 800kv DC transmission project in which BPEG is involved has won the Special Prize of the National Science and Technology Progress Award.



## Iron Core Reactor

BPEG is one of the earliest manufacturers of iron core reactors in China, and has completed the research and development of a series of 34 specifications of resin-cast dry-type iron core reactors and oil-immersed iron core shunt reactors. Oil-immersed reactors are up to 110kv, and resin cast dry-type reactors are up to 35kv. The product design method, manufacturing level, test capability and other aspects are in the domestic industry leading level. It has independently developed the first domestic 35kv maximum capacity-15000kvar dry core shunt reactor, successfully passed the product certification of China Electric Power Research Institute. The product is put into operation with stable performance, low noise, temperature rise better than the national standard.





## Extinction Coil Set

BPEG is one of the earliest manufacturers of extinction coil in China, with rich experience in manufacturing and technology research and development, and developed the first on-load tuning extinction coil product in 1993, and the first set of extinction coil grounding automatic compensation device in 1996. The product is suitable for capacitive current compensation of 6 ~ 66kV voltage level distribution network, which is increasingly widely used in various industries such as electric power system, metallurgy, petrochemical, coal, etc., and effectively improves the safety and reliability of the power supply system.

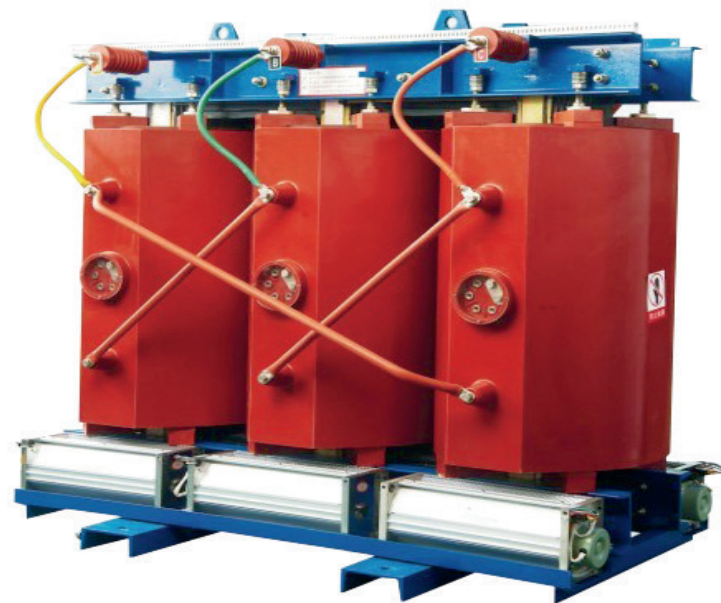


## Combined Filter

BPEG is the drafting unit of the Chinese national standard for combined filters, and the independently developed combined filters can effectively overcome the influence of coupling capacitors and capacitive voltage transformers' low-voltage terminal stray parameters on the transmission of power carriers. The combined filter can be used in phase-ground coupling and phase-phase coupling mode, applicable to various voltage levels, different specifications of the coupling capacitor and a variety of different line impedance continuous change.



## Dry-type Transformer



The dry-type transformers independently produced by BPEG are at an advanced level among similar products in China. They're widely used in power transmission and transformation systems, hotels and restaurants, high-rise buildings, commercial centers, stadiums, petrochemical plants, underground railways, stations and airports, offshore drilling platforms, etc., especially places with limited installation space and need to be close to the center of the load and have special fire prevention requirements of the place. It can give full play to the superiority of the product's small size and flame retardant.

## Line Trap



BPEG is the drafting unit of China's national standard for line trap, and the first 750kV line trap developed by BPEG was awarded the Third Prize of China Electric Power Science and Technology in 2007. It was applied in China's first 750kV transmission project (Guanting and Lanzhou East Demonstration Project), filling the gaps of this product in China. At present, it has formed a series of 28 specifications of two types of products, which are at the leading level of the international industry, and have been widely praised by users.

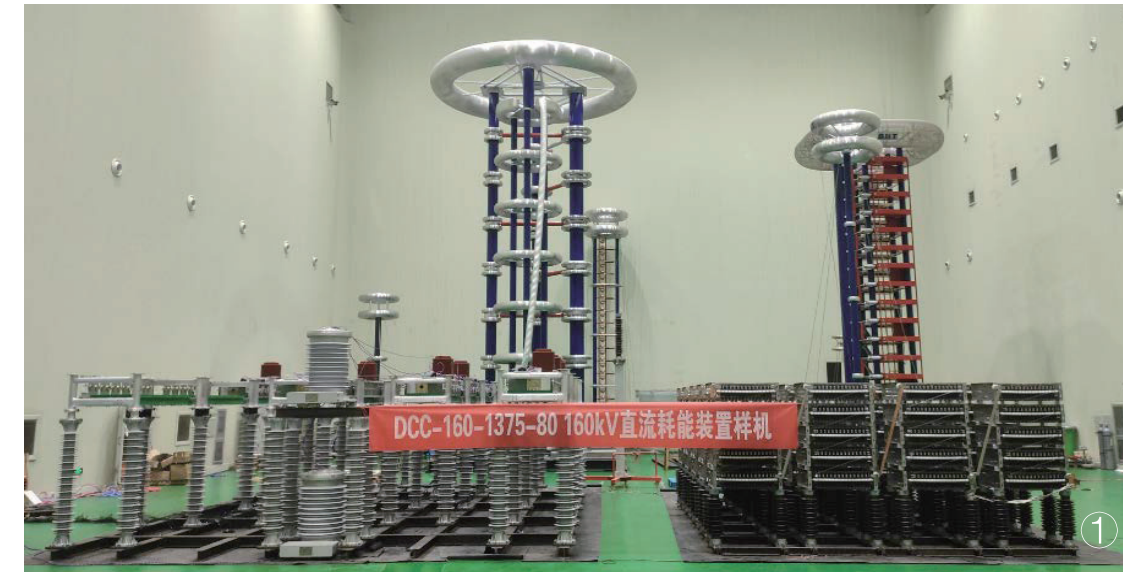


## Power Electronical Products

BPEG cooperated with Tsinghua University to successfully develop the world's first 535kV coupled–negative–voltage DC circuit breaker based on coupled–negative–voltage circuit topology, which successfully passed the product appraisal, realizing a major technological breakthrough in the equipment of ultra–high–voltage DC power grid. The technical performance of the product is at the international leading level, and it has been formally put into operation in the Zhangbei Flexible DC Grid Test and Demonstration Project. BPEG has a specialized power electronical test hall and power semiconductor device press fitting workshop, with 10kV~535KV hybrid DC circuit breaker R&D, production and manufacturing capabilities and a full set of test capabilities, and can undertake various external test business.



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▲ ①DC Energy Consumption Devices: BPEG successfully developed a 160kV DC energy consumption device prototype and obtained a third–party test report from Shenyang Transformer.

Research Institute third–party test report. The product adopts no water–cooling design and localized, high–performance, large–capacity power electronic devices that have been applied in engineering, and is characterized by small footprint, good technical economy and high reliability.

▶ ②DC Load switch: BPEG has successfully developed a 10kV DC load switch, which adopts LC series oscillation design. It is characterized by low loss, high reliability, fast recovery and good buffer effect.

▶ ③10 kV Three–Port DC Transformer: BPEG has developed a 10kV three–port DC transformer, the core equipment of the project, for the 10kV multi–energy complementary smart grid integrated demonstration project in Chongli District, Zhangjiakou. It has been put into use and is running well.





## Biomass Power Plant

BPEG has carried out independent research and development and optimized the design of CX90 straw molding machine for biomass, and has the ability to develop power generation turbines within 100MW to meet various working conditions. Relying on the Heilongjiang Suihua biomass project, Zhaodong biomass project, and the 1 × 40MW agriculture and forestry biomass project in Beilin District have been successfully landed, BPEG is making great strides in the biomass energy industry and gradually building up its competitive advantages.



A turbine for generating electricity



Straw molding machine

## Power Management Products

PEG adheres to the independent innovation of technology, and has independently developed a number of power management products such as APF, SUC, SVG, charging pile, shore power supply, etc., which have good market prospects. We can provide power quality optimization overall solutions for the power industry and power consumption enterprises.



- Power management products including APF, SUC, SVG, charging pile, and shore power supply.



## EPC

BPEG has the qualification of general contracting for electric power engineering, electro-mechanical engineering, petrochemical engineering and specialized contracting for building electro-mechanical installation, and it can undertake general contracting for various kinds of projects, such as pulverized coal preparation system, slag micropowder system, biomass power station, new energy power station, substation and etc.

In recent years, by virtue of the first choice of equipment manufacturing and technical advantages, engineering design as a leader, combined with the advantages of experimental research, project implementation and professional installation and commissioning team, BPEG has provided users with integration of high-quality services including design, manufacturing, installation, commissioning, training, spare parts, etc. We have undertaken and implemented a number of EPC projects, accumulated rich experience, and continued to expand the scale of EPC and focus on high-end projects.



Lingyuan pulverizing coal EPC project



State Grid Zhangjiakou Chongli 10kV multi-energy complementarity demonstration project

## Services

BPEG builds a regional marketing organization and customer service system based on customer service. It makes full use of the advantages of product technology "differentiation, large-scale, high-end", and extend the development of overhaul and maintenance and spare parts services. Shaft straightening technology for small industrial steam turbine has become a major player in its own right, and a number of integrated technical solutions for the production service market have been recognized by the market. To better meet customers' individualized service needs and we aim to realize the company's transformation from product manufacturing to a combination of manufacturing and service.



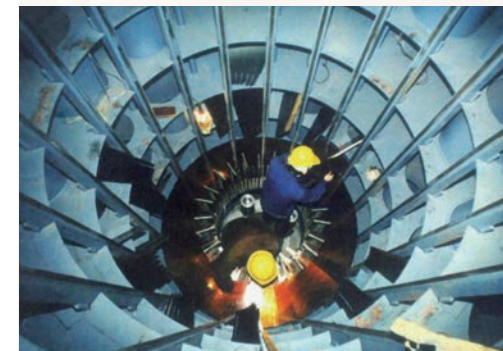
grinding roller



grinding track segments



steam turbine bulkhead



urgent repair of generator stator



urgent repair of large motor



urgent repair of 320MW turbine rotor



## Alkline Water Electrolysis Hydrogen Production Equipment

BPEG's self-developed alkline water electrolysis hydrogen production equipment is characterized by high power, low power consumption, high dynamic response and wide load operating range, and the hydrogen production capacity of a single electrolyzer can reach 1,500 Nm<sup>3</sup>/h. At present, we have a large-scale production and processing center, with an annual capacity of 500 MW alkline electrolyzers, can provide customers with alkline water electrolysis hydrogen production equipment system design, thermal control, rectifier power supply, electrolyzer manufacturing and assembly of "one-stop" service.



## Smart Park



The Low Carbon Smart Park system has the following three main layers by function: The physical layer is a hybrid AC/DC microgrid and an immersed electro-chemical energy storage system. The information layer mainly builds intelligent sensor networks based on IoT systems. The application layer focuses on building low-carbon energy management systems. Through the construction of the three-layer architecture, it realizes the overall intelligent operation and intelligent optimization control strategy of the company's low-carbon smart park, in order to achieve the company's goal of the lowest power consumption, the best cost and the lowest energy consumption.

BPEEG