



**LEADING DIGITAL ENERGY TECHNOLOGY
& INTEGRATED ENERGY SERVICES PROVIDER**

Part 1 Company Profile

1.1 Company Profile

 Founded on April 9, 1999

 Headquartered in Huangpu District, Guangzhou

 September 19, 2007, listed in Shenzhen Stock Exchange (Stock Code: 002169)



Business philosophy

Adhering to the business philosophy of "helping our customers use energy safely, economically and comfortably", Zhiguang Electric has focused on energy technology for more than 20 years.



Core business

- Power electronic technology researches and product applications;
- Comprehensive solutions to integrated energy services; and
- Investments in energy technologies and services.



14th Five-year development strategy

Focusing on the scale development of energy storage and taking the advanced integrated energy technology as the core, with the strategy and investment as the driving forces, Zhiguang Electric is committed to building a sustainable development model of "product+services+investment" and striving to grow itself into a leading digital energy technology and integrated energy service provider.

1.2 Development History

Establishment of Zhiguang Electric

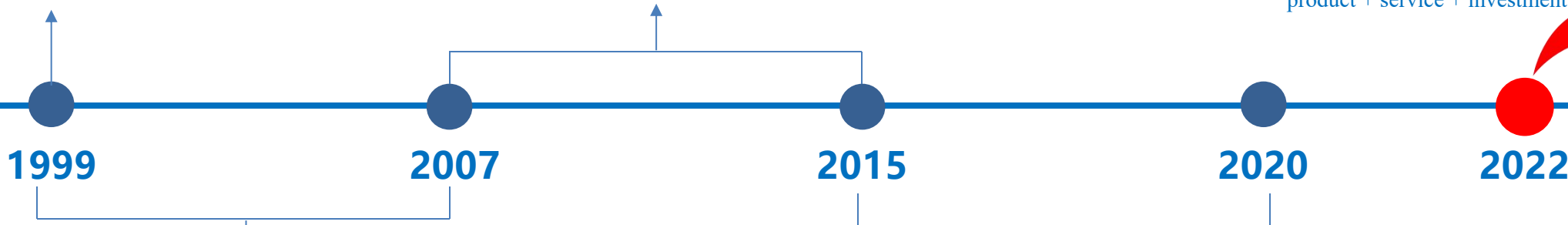
- With the main business in digital power system, Zhiguang Electric took its first step towards "a pursuer and advocator of smart energy".

Layout of integrated energy services

- Business upgraded , extending from product technology to energy services;
- Established Zhiguang Energy Saving Company and Zhiguang Electricity Investment Company and acquired Lingnan Cable; and
- Postdoctoral research workstation was approved.

New journey of “double carbon”

- Adjusts and focuses its business, establishing Digital Energy Technology Division and Integrated Energy Services Division;
- Focuses on storage capacity development; and
- Consolidates the sustainable development model of "product + service + investment".



Listed on the Shenzhen Stock Exchange

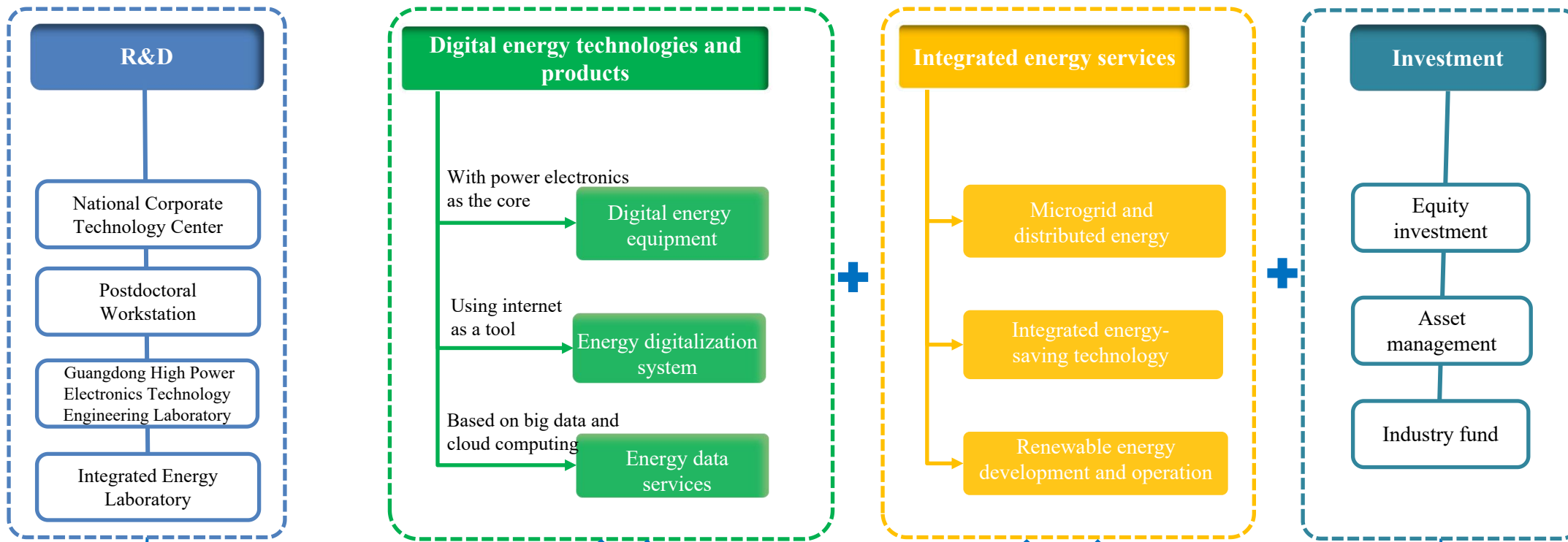
- Successfully listed on the SME Board of Shenzhen Stock Exchange, with the stock code 002169; and
- The business scope covered smart grid, energy-saving technology, renewable energy access and control technology.

Great leap forward

- Established Zhiguang Energy Storage Company, starting the business expansion scheme of the energy storage;
- Established Zhiguang Equity Investment Company as an industrial and strategic investment platform;
- Authorized to establish the National Corporate Technology Center and Guangdong High Power Electronics Engineering Laboratory;
- Rated as the internet benchmarking enterprise by MIIT;
- Ranked as one of the first batch of scientific and technological innovation (energy storage) pilot units by the National Energy Administration;
- Strategically invested in Guangzhou CanSemi Technology Inc.;
- Strategically invested in China Southern Power Grid Energy Efficiency & Clean Energy Co., Ltd. (Stock Code:003035) ; and
- Launched the integrated energy services industrial internet platform .

1.3 Industrial Layout

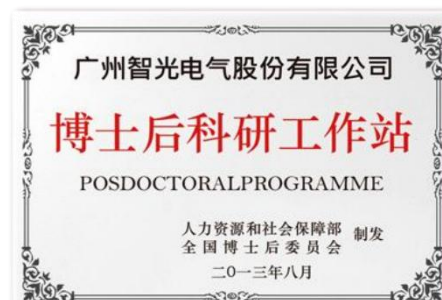
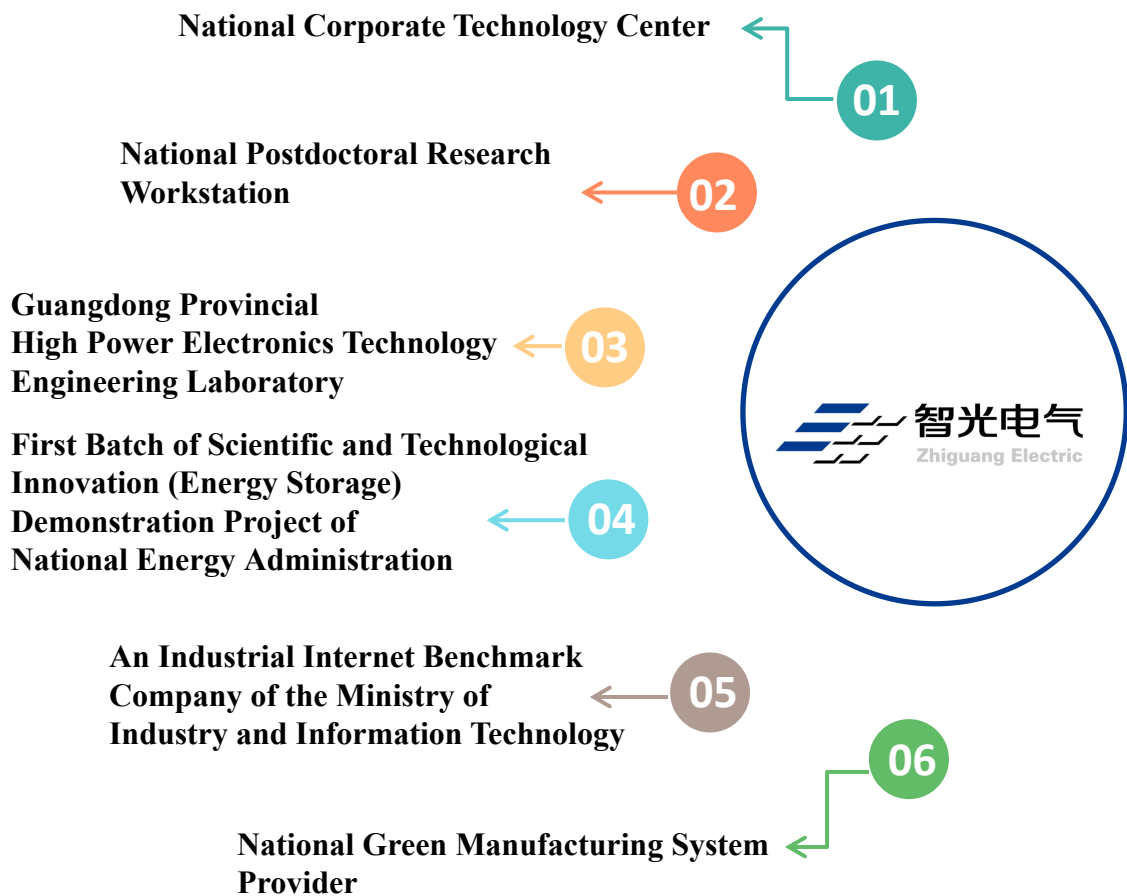
Digital energy technology and integrated energy services



Energy interconnection|Energy control and optimization Industrial internet platform of integrated energy services Cloud platform|Cloud computing



1.4 Professional Qualifications



1.5 Industrial Bases

Huangpu Science City
Zhiguang Electric headquarters
Zhiguang Integrated Energy Industrial Park

Yunpu Park
Power electronic
products R&D and
manufacturing base

Yonghe Park
Energy storage technology
research and manufacturing
base (under construction)

Nansha Park
Power transmission
products R&D and
manufacturing base



1.6 Production and Quality Assurance

Environmental Management System Certification

Occupational Health and Safety Management System Certification

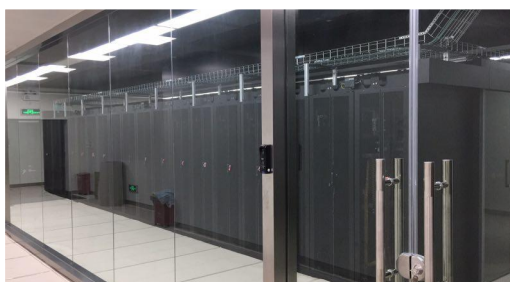
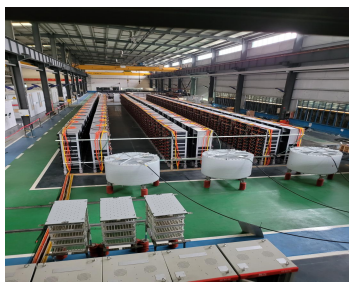
Quality Management System Certification



1.7 R&D Strengths



Integrated energy technology laboratory



Power electronics simulation laboratory	Experimental platform for 5MW energy storage	35kV Renewable energy grid-connected mobile test device	Power electronics control technology research laboratory
35kV Cascaded high voltage energy storage system	Zhiguang proprietary cloud data center	High voltage high power electronics test room	Ultra-large capacity high voltage frequency conversion technology laboratory
		Special electric reactor laboratory	Cable high voltage partial discharge test laboratory



1.8 Innovation Achievements

400+

Patents

300+

Computer software copyrights

60+

Key player or team member in drafting national (industrial) standards



Specification of Arc Suppression Coil Apparatus with Automatic Tracking and Compensation	DL/T1057-2007
The Guide of Design Optimization for Motor Systems (Fans, Pumps, Air Compressors)	GB/T 26921-2011
Power Transformers - Part 6: Reactors	GB/T 1094.6-2011
The Methods of Electric Power Balance Test and Calculation in Fan System	GB/T 13467-2013
Dry-type Converter Transformers for High Voltage Frequency Control	NB/T 42021-2013
Adjustable Speed Electrical Power Drive Systems - Part 5	GB 12668.501-2013
Power Cables with Cross-linked Polyethylene Insulation and Accessories for Rated Voltage of 110 kV(U _m =126 kV) - Part 1: Test Methods and Requirements	GB/T11017.1-2014
Long AC Submarine Cables with Cross-linked Polyethylene Insulation and Their Accessories for Rated Voltage of 220kV (U _m =252kV)	GB/T32346.1-2015
Electrochemical Energy Storage System Evaluation Specification	T/CNESA 1000-2019
Resistors for Earthed Neutral	JB/T 10777-2018

1.9 Main Clients

4000 +

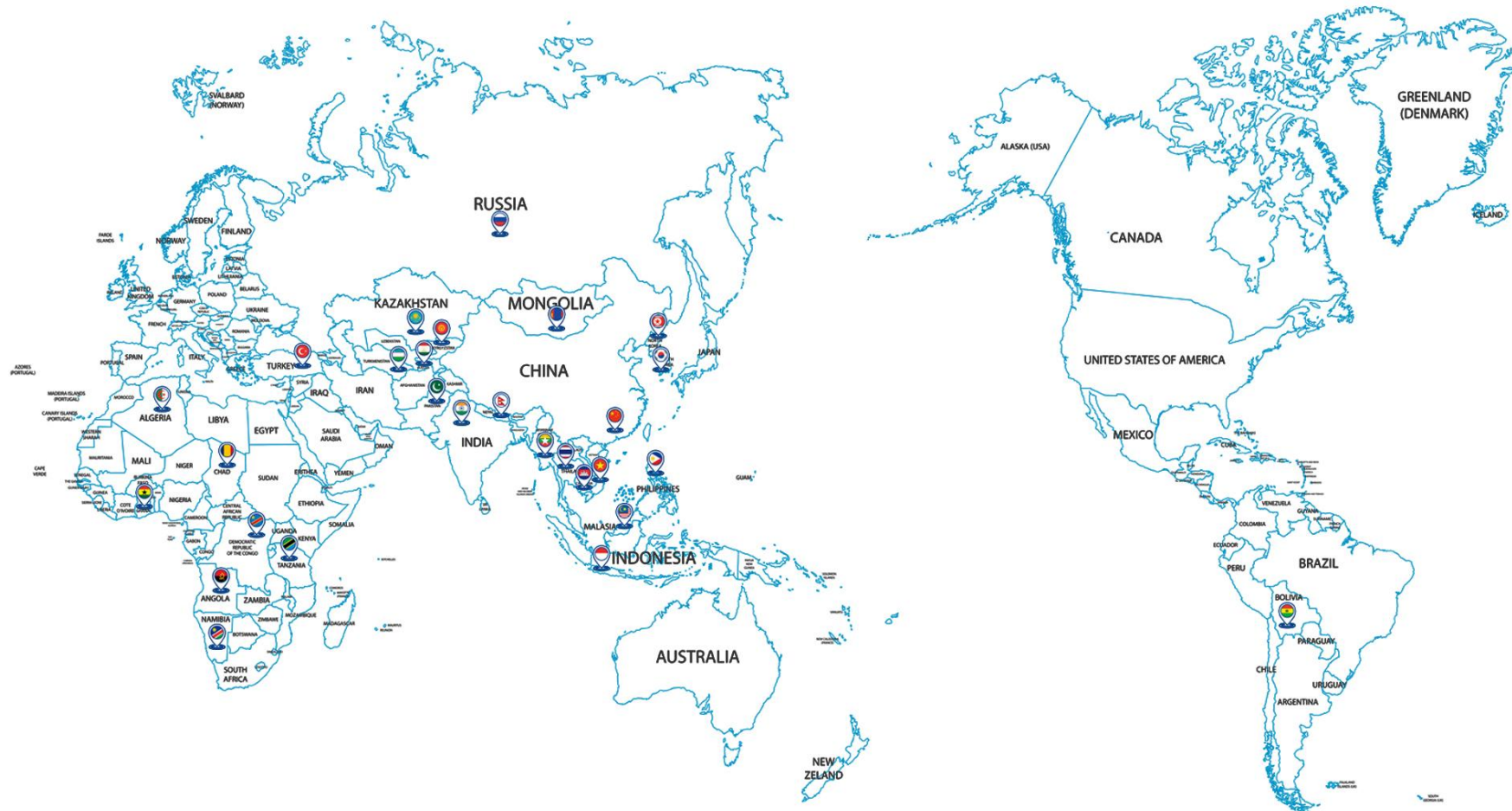
↳ Large and medium-sized corporate groups



1.10 Overseas Market

40 +

↘ Overseas countries and regions with Zhiguang Electric products' presence



Part 2 Business Introduction

2.1 Products and Services

Energy control and optimization



Energy interconnection



Integrated energy services



Energy data services



Big data | Cloud computing | Zhiguang private cloud platform



Integrated energy services

1. Microgrids and distributed energy
2. Integrated energy saving services
3. Renewable energy development and investments
4. Energy storage power station development and investments

Digital energy technologies and products

1. Energy storage and power station system
2. High / low voltage frequency control system
3. High voltage static var generator
4. Distribution network neutral grounding device
5. Power quality control (APF, SVG, etc.)
6. UPS uninterruptible power supply
7. Electric power informatization system
8. High and low voltage power cable, intelligent cable



01

Power supply+power grid (new-type power system business)

6~35kV Cascaded high voltage energy storage system



- ✎ The only global electrochemical energy storage system provider of over 90% RTE efficiency for large (shared) energy storage power stations;
- ✎ Unit-capacity can reach 25MW and be directly connected to 35kV, greatly simplifying the control of large-scale energy storage power stations;
- ✎ Battery cluster's high-power active balancing control, achieving power balancing among different clusters; and
- ✎ The investment of the whole station calculated by POI will be saved by over 10%.

✎ Examples of typical customers: China Southern Power Grid, State Grid, Huaneng, Huadian, China Energy, China Three Gorges, etc.

High voltage static var generator (SVG)



- ✎ Reactive and voltage stabilization control system for large renewable energy stations, power grids;
- ✎ Unit-capacity can reach 80MVar/35kV, with types of air-cooled and water-cooled; and
- ✎ Supports multiple units connection in parallel.

✎ Over 2000 practical applications of major power grid, renewable energy groups and industrial clients.

Distribution network neutral grounding system



- ✎ Provides various types of neutral grounding control systems for substation distribution network and ensures the safety of power grid operations;
- ✎ Types of grounding line selection system, such as high short-circuit impedance, multi-tap, small resistance and multimode; and
- ✎ Supports multiple units connection in parallel.

✎ Over 13000 practical applications of major power grid, renewable energy groups and industrial clients.

01

Power supply+power grid (new-type power system business)

Renewable energy grid connection test equipment and services



- ✎ The mobile renewable energy grid connection test platform developed by Zhiguang Electric can simulate various of working conditions of 6~35kV power supply based on the grid connection test requirements of renewable energy power station, energy storage power station, etc.;
- ✎ The test capacity is 6~35kV/5~20MVA;
- ✎ The test platform is designed for fast and convenient applications; and
- ✎ Can be specifically customized.

✎ Field tests have been successfully conducted in dozens of renewable energy stations and energy storage power stations of Guangdong Electric Power Research Institute, China Electric Power Research Institute, Datang Group, XJ Group, Yunnan Electric Power Research Institute, etc.

Light DC transmission and energy routing



- ✎ Provides customized research and development of light DC transmission equipments for distribution networks with voltage up to 35kV; and
- ✎ Able to provide energy routing equipments and related systems research and development for microgrid systems.

✎ It can be widely used in energy bridging of multi bus and hybrid bus in fields of urban distribution network capacity expansions, renewable energy and charging pile stations, etc.

Digital power grid and informatization



- ✎ Over 10 years of experience in data acquisition, storage and display with a stable integrated data platform based on SCADA;
- ✎ With the ability and experience in the design, development and deployment of communication terminals with multiple interfaces and protocols;
- ✎ With years of development experience in the design and development of edge computing and integrated energy IOT platform;
- ✎ With energy storage EMS system research & development capability; and
- ✎ Provides industrial internet IOT platform services.

✎ Zhiguang Electric provides power grid informatization services for power grid companies in Shanghai, Zhejiang, Hubei, Hunan, Jiangxi, etc.

01

Power supply+power grid (new power system business)

Condition-based maintenance system of high voltage power equipment



- ✎ On-line monitoring and diagnosis of capacitive equipment, circuit breaker, partial discharge;
- ✎ On-line monitoring and analysis of transformer oil chromatogram; and
- ✎ Condition-based maintenance management system of substation high voltage equipment.

- ✎ Over tens of thousands of monitoring points in 110~500KV substations of State Grid and China Southern Power Grid companies in more than 10 provinces;
- ✎ Led the implementation of Kunming National UHV base of China Southern Power Grid;
- ✎ Led the first provincial state monitoring project of Guizhou Power Grid Corporation; and
- ✎ Led the first online monitoring demonstration project of State Grid East China Power Grid.

High voltage and smart cable



- ✎ Internationally advanced Finland Maillefer 500kV Vertical Production Line and Switzerland Haefely Test Facilities;
- ✎ Able to provide 6~500kV high voltage cross-linking cables; and
- ✎ Provides smart cable with fiber temperature detecting.

- ✎ Key supplier of China Southern Power Grid;
- ✎ Provider of medium and high voltage cables for hundreds of key projects in China like Guangzhou Metro, Baiyun International Airport etc.; and
- ✎ The smart cable successfully developed and applied to China Southern Power Grid.

Renewable energy development and services



- ✎ Investment, development, construction and operations of renewable energy projects;
- ✎ Investment, construction and operations and maintenance of large energy storage infrastructure; and
- ✎ Renewable energy operation and maintenance services based on industrial internet platform.

- ✎ Renewable energy development cooperations with Huadian, SPIC, China Energy, Huaneng, Guangzhou Development Group, Guangdong Hydropower Group, etc.

02

Key industrial and commercial clients

High/low voltage frequency control and soft-start



- Has Provided over 15000 sets of high voltage frequency control system with single machine power up to 25MW for clients over 40 countries and regions around the world, covering asynchronous, synchronous and soft-start applications, which can support multiple coordinations, helping clients improve motor energy efficiency by 20-30%; and
- Has participated in the preparations of a number of industry standards.

- Cooperations with large enterprises (e.g. the five major power generation groups, China Resources, Baowu Steel Group, Conch Group and Huaxin Group, etc.) and local state-owned enterprises for many years; and
- Playing a key role in localization substitution for major domestic projects with comparable quality to that of international brands.

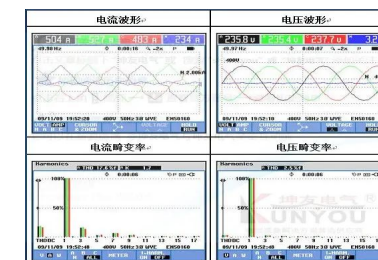
Industrial energy storage, UPS system



- Modular and standardized energy storage;
- Alleviating power shortage, participating in demand response and saving energy costs;
- Emergency power supply for important clients and loads; and
- Supports multiple connection in parallel

- Hundreds of thousands of devices used in many fields, such as Inspur Group, Beijing Metro, Chengdu Metro, MTR, public security, etc.; and
- Wider customer base extended to industrial clients of Pearl River Delta and power grid companies.

Integrated management of power quality



- Provides customized power quality management solutions for clients; and
- Crafted integrated electric energy solutions based on UPS, APF, SVG and support voltage sag, harmonic suppression, etc.

- Suitable for harmonic suppression in mining, metallurgy and other industries;
- Power maintenance of important loads, voltage sag treatment, etc.; and
- Emergency power supply, security power supply, etc.

02

Key industrial and commercial clients

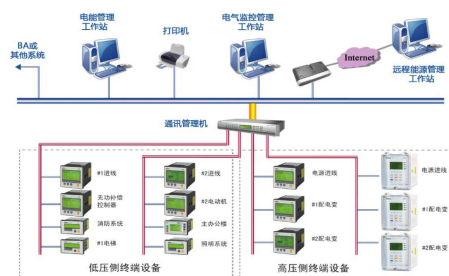
Substation neutral grounding line selection system



- Provides various types of neutral grounding control system for substation distribution network to guarantee the safety of power grid operations;
- Types of grounding line selection system, such as high short-circuit impedance, multi-tap, small resistance and multimode are covered; and
- Supports multiple units connection in parallel.

There're more than 13000 practical application cases, including major power grid, renewable energy groups and industrial clients.

Energy digitalization and energy management

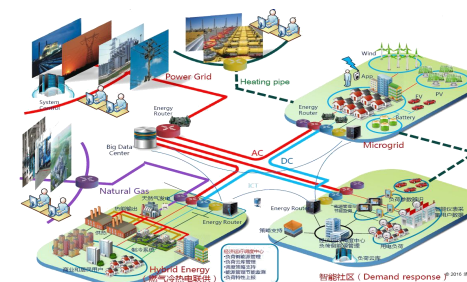


- Provides 0.4~35kv power automation instruments, integrated monitoring and protection for various industrial and commercial clients; and
- Provides digital energy management platform and digital transformation based on cloud data and cloud computing, offering suggestions and decision support for intelligent operation of energy.

Applications of hundreds of thousands of instruments and protections in over 200 power plants of the five major power generating groups, China Resources, etc.; and

With the experience of connecting provincial energy management centers and national energy platforms.

Integrated energy services



- Provides investment and services of energy saving, microgrid and distributed energy for large industrial and commercial entities;
- Provides services of energy trusteeship and regional energy optimization;
- Distributed energy storage business to alleviate power shortage and reduce energy costs; and
- Involved in spot market, demand side response, virtual power plant business.

Provider of integrated energy services for major commercial complex in Guangzhou Knowledge City and Nansha District.

03

Others

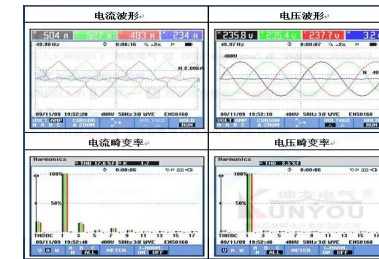
Large container terminals



- Provides 20MVA shore power system for green transformation of ports;
- Provides energy storage and energy saving of port machinery, refrigerated container facilities and systems for improved energy efficiency and energy cost reductions; and
- Provides energy digitalization and integrated energy business for ports.

- Provider of shore power equipments for large and important ports in Tianjin, Qingdao, Ningbo, Shamen, Shenzhen, Guangzhou , etc., with a market share of 35%; and
- Provider of energy digitalization business and integrated energy storage business for Qingdao Port and other important ports.

Electrified rail transit, hospitals, data centers, etc



- Modular and standardized energy storage;
- Alleviating power shortage, participating in demand response and saving energy costs;
- Emergency power supply for important clients and loads;
- Provides integrated power quality management, high / low voltage harmonic quality suppression, voltage sag, etc.; and
- Supports multiple units connection in parallel.

- Hundreds of thousands of devices are used in many fields, such as Inspur Group, Beijing Metro, Chengdu Metro, MTR, public security, traffic police, telecommunication, Expo venues, etc.; and
- Provider of distributed energy storage deployment business for industrial clients, power grid companies and energy companies in the Pearl River Delta.

2.2 Industrial Investment Fields

Hunt for seasoned, promising enterprises for investments, mergers and acquisitions in light of Zhiguang Electric's industrial chain and development strategy.

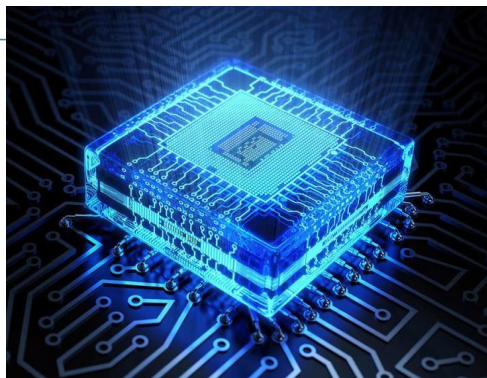
<p>Power and electronics technology (inverter, rectifier, etc)</p>		<p>Energy storage technology</p> <p>Power battery cascaded utilization</p>		<p>Energy saving and environmental protection technology</p> <p>Sludge solid waste disposal</p>
	<p>Energy digital technology</p> <p>Energy safety control</p>		<p>Investments and operations of renewable energy asset projects</p>	

2.3 Strategic Investment Fields



IGBT industry chain project

- Take “the foundation of the company's applications in power electronic products” and “Guangzhou CanSemi Technology Inc., the only mass production platform for 12-inch chip in the Guangdong-Hong Kong-Macao Greater Bay Area” as two fulcrums, looking for proper investment projects along the IGBT industry chain, with enterprises in medium voltage chip, module design and packaging as key focuses.



Design service for analog chip

- Zhiguang Electric will appeal to the pre-production verification and industrialization ability of Guangzhou CanSemi Technology Inc., a joint-stock enterprise whose main investments are in analog chip design service projects.



Third generation semiconductor

- Energy conversion revolution is the core driving force for the development of power semiconductor industry;
- The third generation semiconductors of SiC and GaN will play a crucial role in recyclable, efficient and reliable energy systems; and
- Zhiguang Electric will follow closely with SiC and GaN technology projects.

2.4 Projects Invested

↳ **China Southern Power Grid Energy Efficiency & Clean Energy Co., Ltd. (Stock Code: 003035)** is a "Double Hundred Enterprise" by the State-owned Assets Supervision and Administration Commission of the State Council, one of the fourth batch of national pilot enterprises of mixed reform and the business carrier of the integrated energy business of China Southern Power Grid, and a leading enterprise in the field of integrated energy services in China. **Zhiguang Electric is both a founding shareholder and strategic investor of the company.**



↳ **Semitronix Corporation (Stock Code: 301095)** is an industry-leading provider of integrated circuit EDA software and wafer level electrical testing equipment as well as an important partner of a group of large-scale integrated circuit manufacturing and design enterprises at home and abroad.

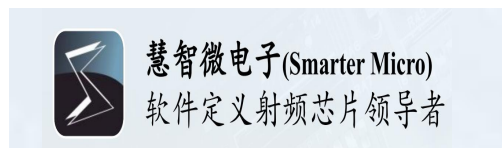


↳ **Zhiguang Electric has launched and invested in the Guangzhou CanSemi Technology Inc.,** the only 12-inch chip mass production company in the Guangdong-Hong Kong-Macao Greater Bay Area.

↳ **OnMicro is a leading provider of RF front-end chips and RF SOC chips in China.** The company majors in the development of RF / analog integrated circuits and SoC system integrated circuits, with annual chip shipments of 700 million.



↳ **Smarter Micro is a leading provider of high-performance microwave RF front-end chips.** The company has developed the basic patent -- RF front-end reconfigurable technology, which takes the lead in achieving technological breakthrough and large-scale commercial applications in the world.



Dedication to Smart Energy



Address: No.89, Ruihe Road, Huangpu District, Guangzhou

Tel: 020-83909333

Fax: 020-83909222

Website: www.gzzg.com.cn

