

**Empower Smart  
Electrical Development  
Lead Green  
Energy Innovation**



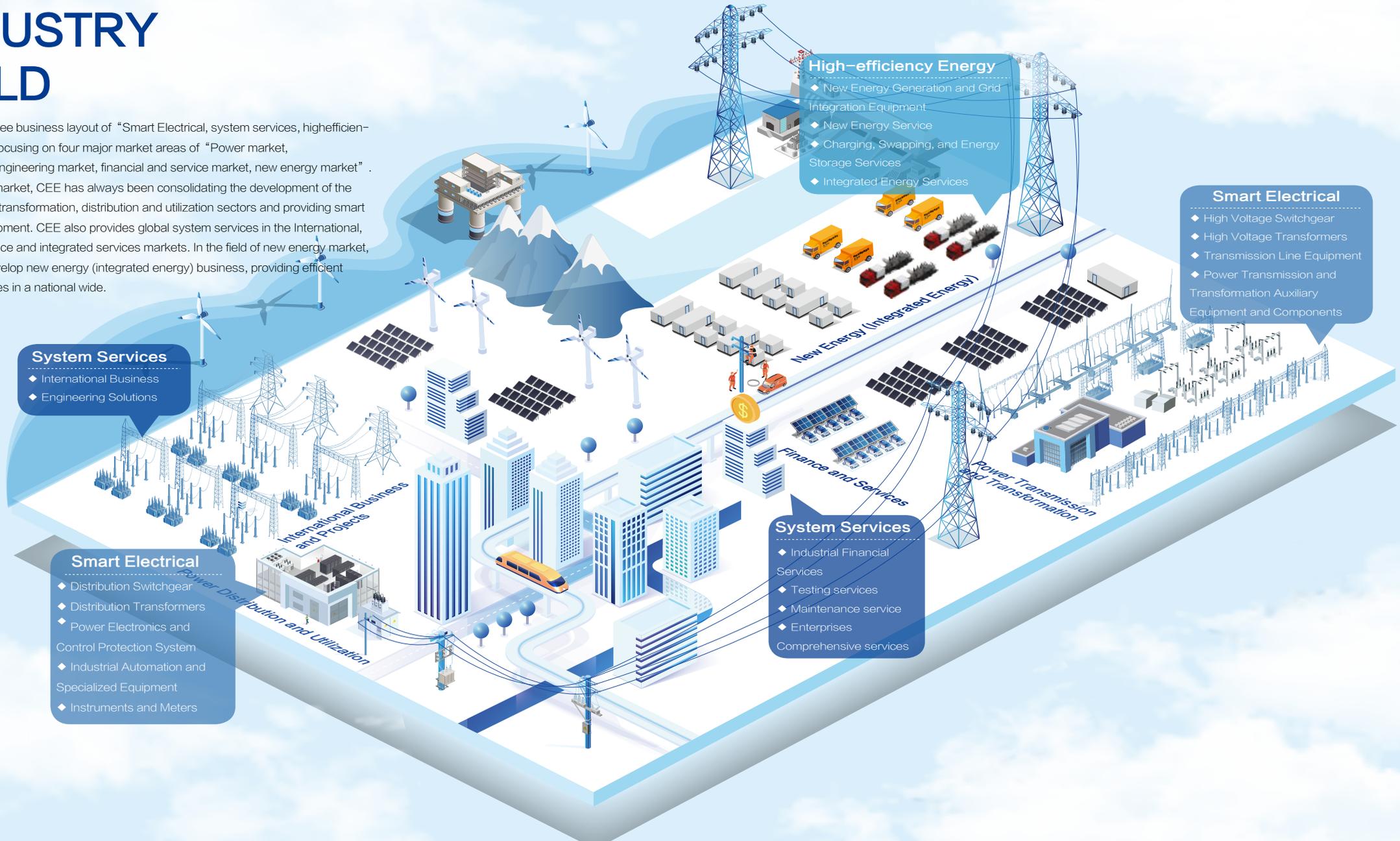


# OVERALL INTRODUCTION

China Electrical Equipment Group Co., Ltd. (abbreviated to “CEE” ) was reorganized by China XD Group, XJ Group, PG Group, and SDEE Group. Based on traditional advantageous industries of Power transmission & transformation and power distribution & utilization, CEE has actively participated in overseas investment, mergers and acquisitions, and asset operation, focused on overseas new energy investment, construction, operation, and construction of major projects, to promote the export of Chinese equipment, technology, services and capital.

# INDUSTRY FIELD

Around the three business layout of "Smart Electrical, system services, high-efficiency energy", focusing on four major market areas of "Power market, international engineering market, financial and service market, new energy market". In the power market, CEE has always been consolidating the development of the transmission, transformation, distribution and utilization sectors and providing smart electrical equipment. CEE also provides global system services in the International, industrial finance and integrated services markets. In the field of new energy market, vigorously develop new energy (integrated energy) business, providing efficient energy services in a national wide.



**System Services**

- ◆ International Business
- ◆ Engineering Solutions

**Smart Electrical**

- ◆ Distribution Switchgear
- ◆ Distribution Transformers
- ◆ Power Electronics and Control Protection System
- ◆ Industrial Automation and Specialized Equipment
- ◆ Instruments and Meters

**High-efficiency Energy**

- ◆ New Energy Generation and Grid Integration Equipment
- ◆ New Energy Service
- ◆ Charging, Swapping, and Energy Storage Services
- ◆ Integrated Energy Services

**Smart Electrical**

- ◆ High Voltage Switchgear
- ◆ High Voltage Transformers
- ◆ Transmission Line Equipment
- ◆ Power Transmission and Transformation Auxiliary Equipment and Components

**System Services**

- ◆ Industrial Financial Services
- ◆ Testing services
- ◆ Maintenance service
- ◆ Enterprises Comprehensive services

# R & D CAPABILITIES

CEE has built 16 national innovation platforms such as National Key Laboratories, 8 national quality testing centers, 3 academician workstations and 4 postdoctoral research workstations. Undertaken the centralized management of the power transmission and distribution industry standards in China, and the centralized work of Multiple technical committees (sub-technical committees), such as the IEC International Electro technical Commission.

## World-leading Testing Capability

- ◎ Xi'an High Voltage Apparatus Research Institute Co., Ltd.
- ◎ Xi'an High Voltage Apparatus Research Institute Changzhou Co., Ltd.
- ◎ Shenyang Transformer Research Institute Co., Ltd.
- ◎ Qingdao Marine Electrical Equipment Testing Co., Ltd.
- ◎ Henan Province High Voltage Electrical Research Institute Co., Ltd.



## ▶ CNAS Accredited Laboratories

- China Electrical Instruments and Meters Quality Supervision, Inspection, and Testing Center
- Henan Xuji Instrument Co., Ltd. Central Laboratory
- Xuji Electric Co., Ltd. High Voltage Testing Technology Center
- Xuji Group Co., Ltd. Metrology Calibration Laboratory
- Xuji Power Supply Co., Ltd. Electric Vehicle Charging and Swapping Technology Laboratory
- Shandong Power Transmission and Transformation Company Testing Center
- Xi'an XD Transformer Co., Ltd. Testing Center
- Changzhou XD Transformer Co., Ltd. Testing Center
- Xi'an XD High Voltage Bushing Co., Ltd. Testing Center
- Xi'an Xibian Component Co., Ltd. Testing Station
- Liaoning Xingqi Electric Materials Co., Ltd. Testing Center
- Xi'an XD Switchgear Co., Ltd. Physical and Chemical Laboratory
- Xi'an High Voltage Electrical Research Institute Co., Ltd.
- Shenyang Transformer Research Institute Co., Ltd. Transformer Laboratory
- Xi'an XD Electric Power Systems Co., Ltd. Experimental Testing Center



Electromagnetic compatibility laboratory



Synthetic test circuit hall



± 1100kV UHV Insulation Test Hall

# INTERNATIONAL LAYOUT



**ics+** countries and regions

CEE actively develops overseas market, expanding its business areas from developing countries in South Asia, West Africa, Southeast Asia, South and Central Asia to developed countries and emerging economies in Europe, North America, North Africa and Australia, covering over 100 countries and regions, having established a good image and won wide recognition and praise with high-quality products and perfect technical services for “Made in China” in the international market.



# DIGITAL TWIN SUBSTATION

## Project Name

30MW Photovoltaic Project in Stefan  
Dagong Village, Romania

## Source of funds

Owner's own funds

## Project location

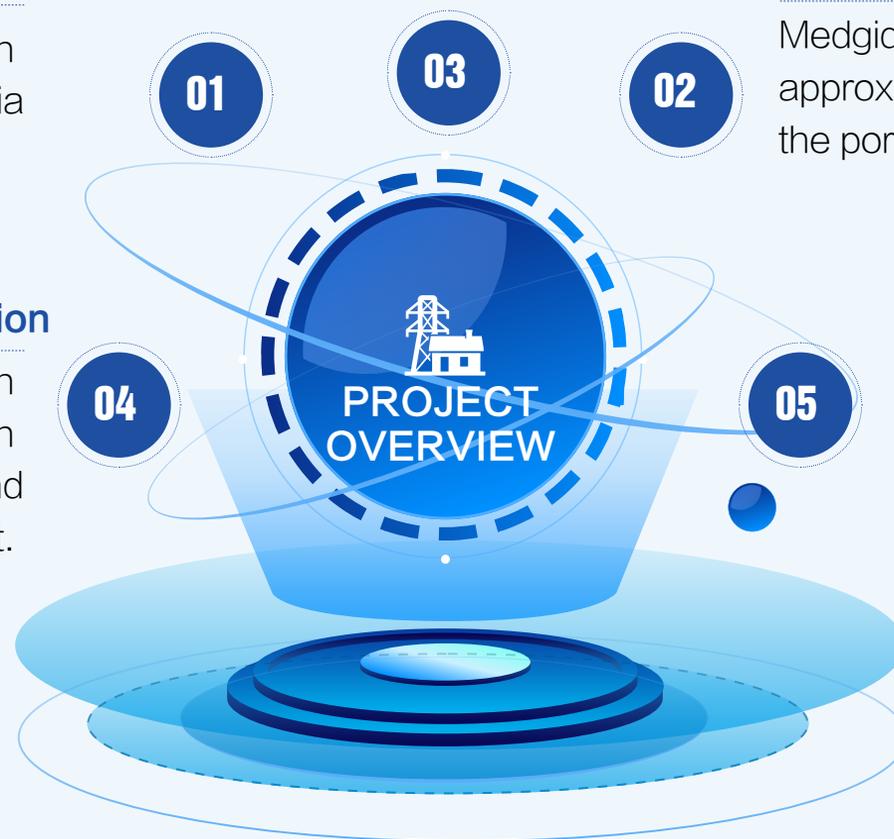
Medgidia, Crelachi City, Romania,  
approximately 50 kilometers from  
the port of Constanta;

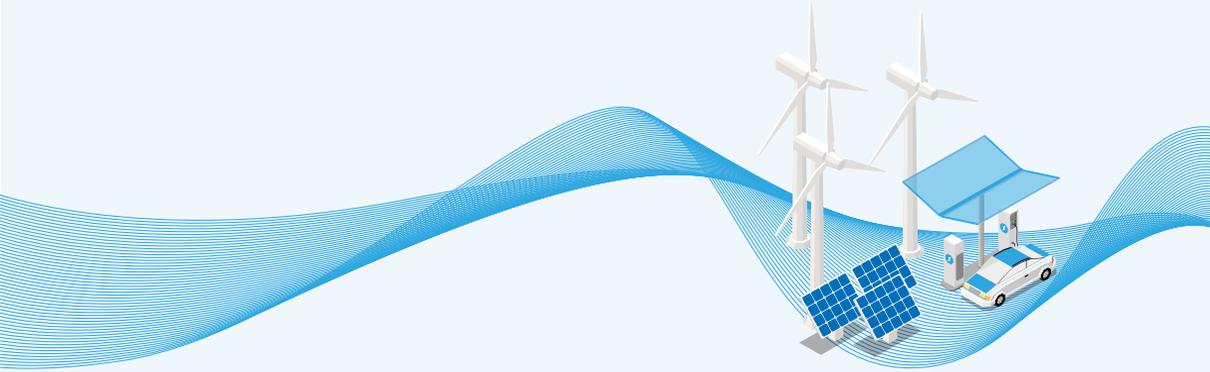
## Project duration

The EPC contract will be signed in  
September 2023 and will take effect upon  
receipt of the Sinasure guarantee policy and  
advance payment.  
The project duration is one year.

## Project content

Procurement, construction,  
commissioning, acceptance,  
and handover of equipment for the  
photovoltaic plant area of a new 30MW  
photovoltaic power generation  
project (excluding grid connection).





## PROJECT MODE



EPC+F. The Romanian project SPV company provides 15% of its own funds, while the parent company, the Italian power developer, provides guarantees. China Export Credit Insurance Corporation evaluates that its net assets meet 2-3 times the EPC contract amount of the project and issues a special insurance policy. Pinggao advanced 85% of the funds to fulfill the project, with a two-year deferred payment. After the customer's COD, Pinggao will be refinanced and repaid upon maturity.

## SIMILAR PROJECT DOCUMENT LIST

- Project land area, red line map, Google map coordinates (including nearby road transportation capabilities), and preliminary land layout design (if available)
- Three-year financial report of the project owner and accumulated net assets of the guarantee company;
- Preliminary Feasibility Design Report of the project, including details on related agreements, e.g., Land Lease Agreement, Grid Access Approval, Grid Connection Approval, Environmental Assessment Approval, Terrain Geological Survey, and Building Permits
- Details of nearby substations, including substation single line diagram, layout diagram, and remaining accessible capacity;
- Project life cycle income estimation calculations and their basis.



# FINANCING PROPOSAL FOR

## 100MW/200MWh BESS Project, Satu Mare, Romania

### © FINANCING PROPOSAL

As discussed by the video conference between CEEI and CRE on May 27th, 2024., and pursuant to consulting with China Export & Credit Insurance Corporation and Standard Chartered Bank, the following financing proposals as below is suggested:

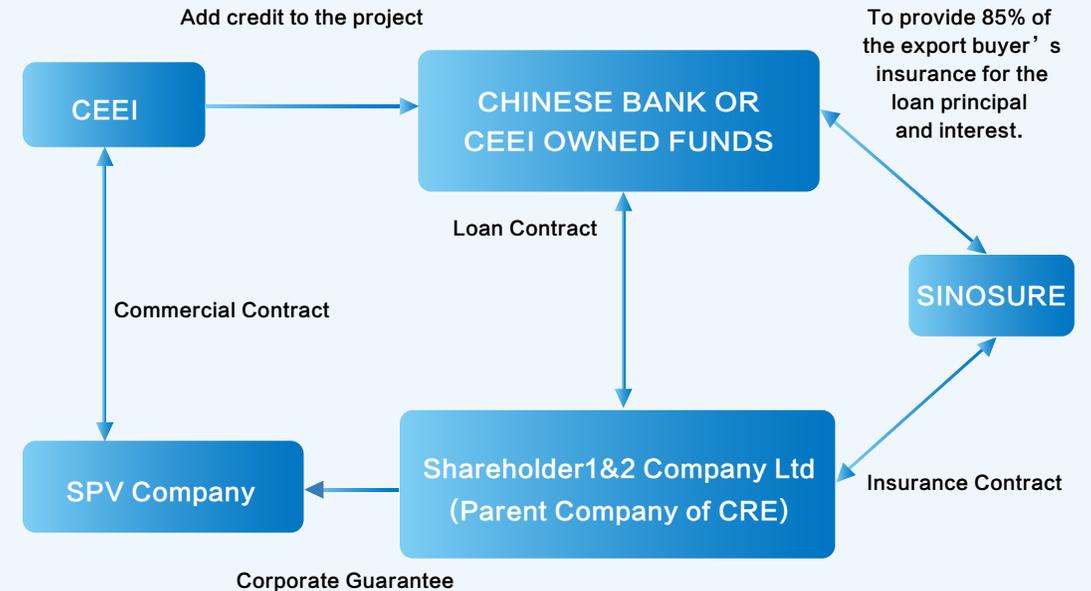
## Medium and long term commercial loan based on the export buyer's credit of SINOSURE.

### KEY INFORMATION UNDER THE PROPOSAL

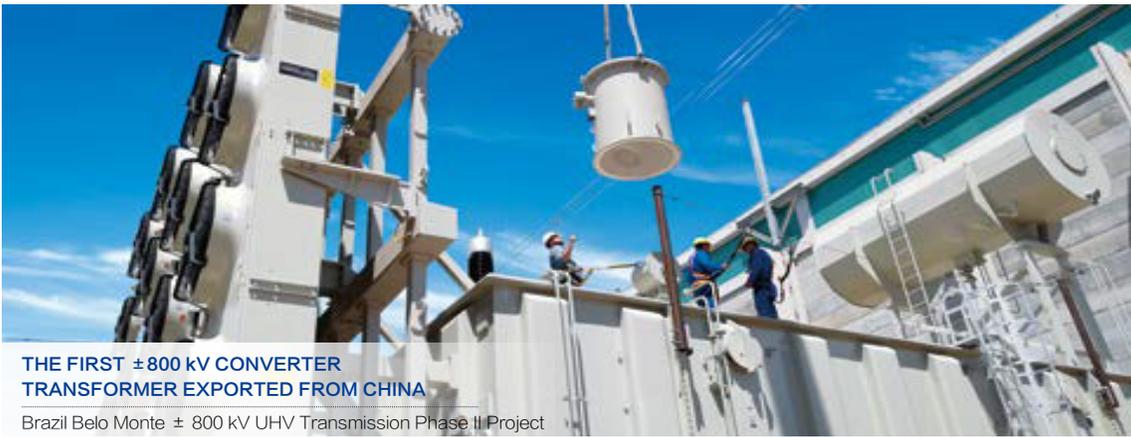
- ◆ The borrower: Center Renewable Energy S.R.L. ("CRE")
- ◆ Currency: RMB
- ◆ Loan period: Two years (Grace period: one year, and within the grace period only interest is required other than the principal.)
- ◆ The loan interest rate: annual interest rate about 6%, will negotiate with the bank.
- ◆ The initial bank cost: to be determined by consultation
- ◆ The credit structure: corporate guarantee from CRE is required, and must be accepted by China Export & Credit Insurance Corporation (Sinosure).
- ◆ Insurance rate: approximately the contract amount (contract amount minus advance payment) \* 0.603%.
- ◆ Loan amount: no exceeding of 85% of the commercial contract amount between CEEI and the Project Owner.

Note: CRE shall capitalize at least 15% of the project amount, and the financing bank arrange the remaining 85% of the capital. While for this project, CEEI will assist to find the off-taker in china after COD.

- ◆ Three-year financial statements, net assets and other guarantees should be provided, and 2 to 3 times of the project (EPC contract amount) total investment should be met for credit increase measures.



For some projects with low financing requirements, CEEI can directly use its own funds to help the project complete financing



**THE FIRST ± 800 kV CONVERTER TRANSFORMER EXPORTED FROM CHINA**

Brazil Belo Monte ± 800 kV UHV Transmission Phase II Project



**CHINA'S FIRST COMPLETED EU POWER TRANSMISSION AND TRANSFORMATION EPC PROJECT**

EPC Project of Kojenice Substation Reconstruction in Poland



**PAKISTAN'S FIRST HVDC POWER TRANSMISSION LINE**

Murtiari-Lahore DC Transmission Project  
Provide core equipment such as AC/DC control and protection systems and DC transmission converter valves



**THE WORLD'S LARGEST OPERATIONAL SCALE ETHIOPIA GDHA500 KV SUBSTATION**

Provided 500 kV transformer for the largest power grid EPC project undertaken overseas in my country during the same period



Ecuador 500 kV transformer project



Pakistan ± 660kV DC transmission project



Vietnam Nam Na II 3 x 22 MW Hydropower Station



Amazon power transmission tower in Brazil



GIS for Hong KongCLP Power Yau Ma Tei Project.



HONGSA 500kV line turnkey project in Laos



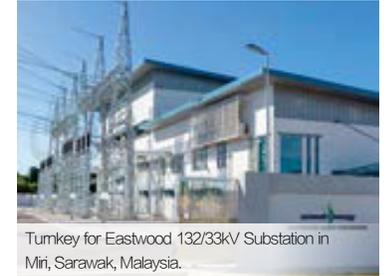
Van City Converter Station Project, Turkey.



Xiong'an New Area Rongxi No.2 110kV Construction Power Supply (Phase II) Project.



China Resources Henan Anyang Fengqiu Huangchi 50MW Wind Farm 110kV Booster Station PC Project.



Turnkey for Eastwood 132/33kV Substation in Miri, Sarawak, Malaysia.



Eastern Sudan Fund Line and Power Station Project Engineering.



Philippine converter station



Greece 280MVA-400kV autotransformer supply project



Philippines 230kV substation EPC project



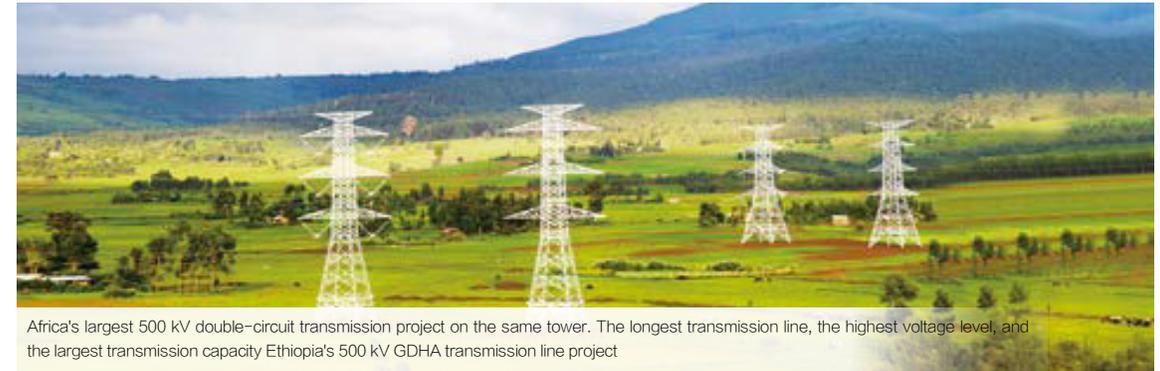
Malaysia 500kV substation project



GIS for Hong Kong CLP Power Yau Ma Tei Project.



Singapore ZF7A-72.5 gas insulated metal enclosed switchgear at Regon station



Africa's largest 500 kV double-circuit transmission project on the same tower. The longest transmission line, the highest voltage level, and the largest transmission capacity Ethiopia's 500 kV GDHA transmission line project



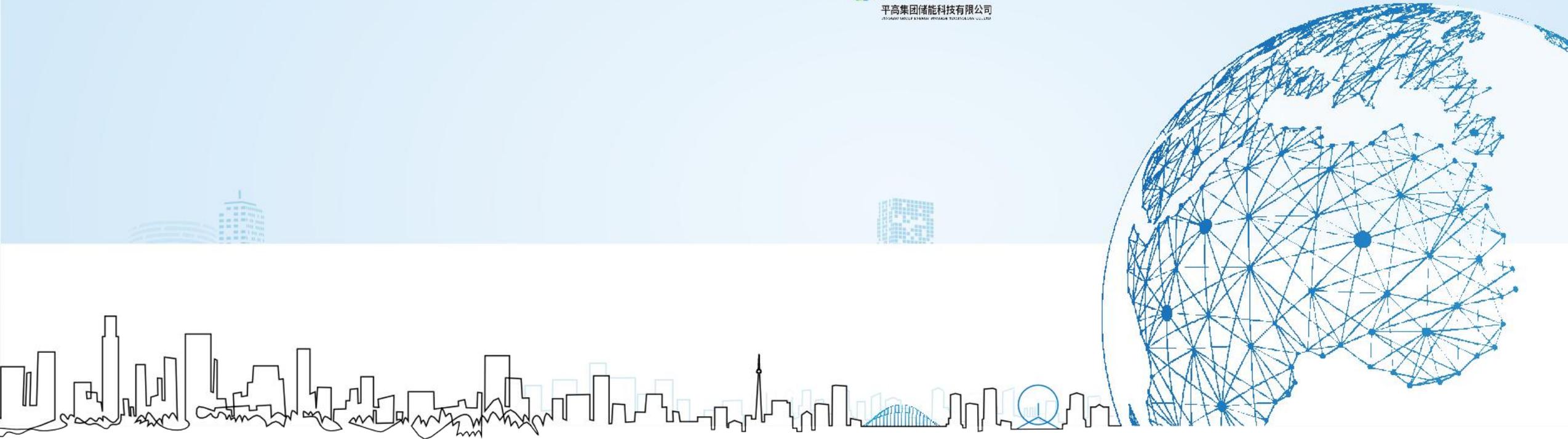
Mai Po 132kV GIS Substation, Hong Kong



Singapore Paya Lebar 420 kV GIS Substation



Ethiopian Power Company Fuxing Dam 500 kV Power Transmission and Transformation Project



平高集团储能科技有限公司  
PINGGAO GROUP ENERGY STORAGE TECHNOLOGY CO.,LTD.

Add: No.12 Hongtai Road, Dongli District, Tianjin

Tel: 022-59981083

<http://www.pinggaogroup.com>

# Modular BESS Proposal

The pioneer of large-scale & modular BESS technology

# About Us

**1970**

Founded in

**100**

Top 100 of Chinese machinery industry

**6.49GWh**

Total Capacity Delivered

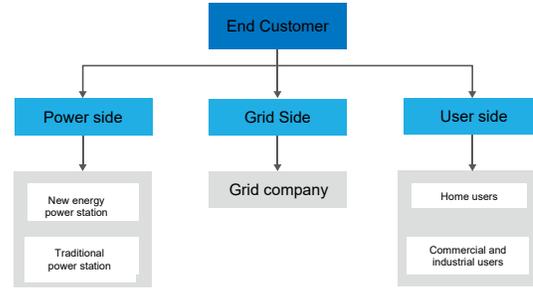
- /// Pinggao Group Co., Ltd., founded in 1970, is the R&D and manufacturing base of medium and low voltage, high voltage, ultra-high voltage and extra-high voltage switchgear in China, and is one of the top 100 enterprises of China machinery industry.
- /// Pinggao Group Energy Storage Technology Co., Ltd., awarded as "National Innovative Enterprises", is the core platform of energy storage sector built by Pinggao Group in response to the national energy structure adjustment strategy, as well as one of the first companies in China to enter the field of energy storage.
- /// The company is committed to the development and design of battery management systems, energy storage converters, energy management systems and other products, focusing on battery energy storage systems, mobile energy storage shelter, industrial and commercial energy storage and other key products manufacturing and operation and maintenance services.
- /// It can provide customers with quality services such as energy storage equipment, power station integration, project contracting, and overall solutions. It has built and operated energy storage projects of more than 6.49GWh in many provinces and cities across the country.



# APPLICATION SCENARIO

Electrochemical energy storage system has been widely used in all aspects of the power system, and has become a new focus of the development of the power industry.

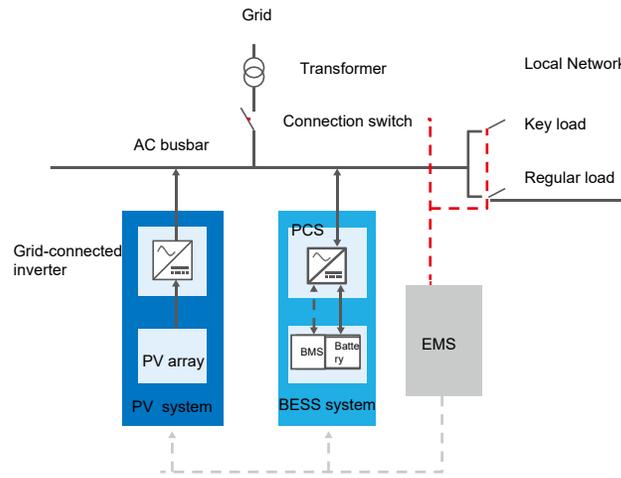
Energy storage industry mainly for power supply side, the grid side and user side three kinds of terminal customers.



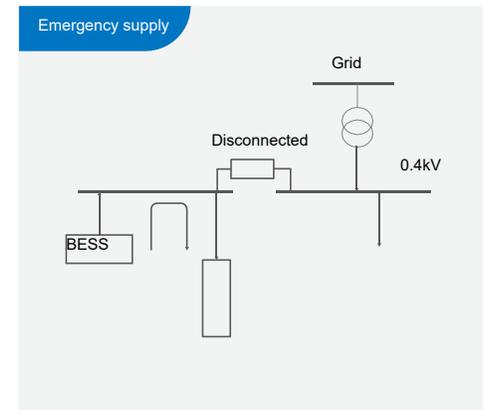
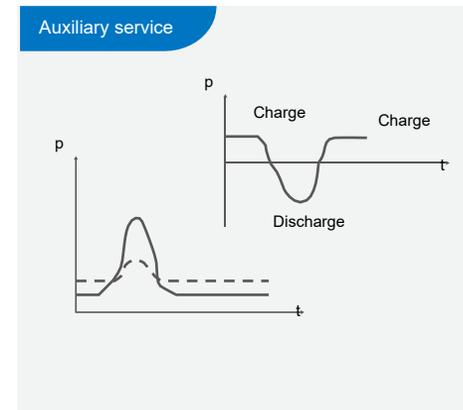
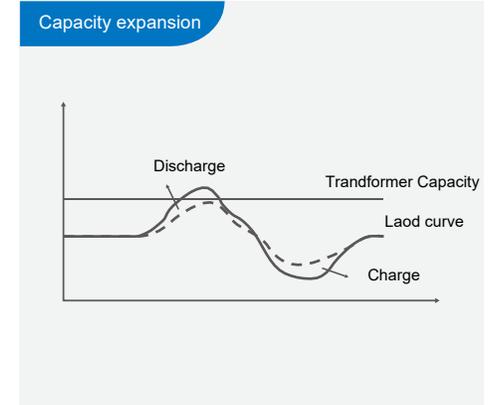
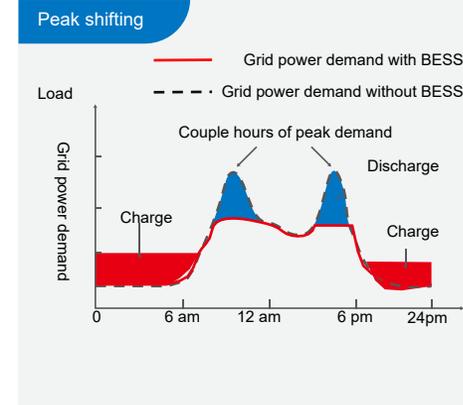
Industrial and commercial energy storage applications are mainly based on the current peak-valley price difference under the "valley charge & peak discharge" model, in order to improve the electricity structure of power users, and reduce electricity cost.

Business users configured with energy storage, can not only meet their demand of electricity load, but also use grid peak valley price difference to realize a return on investment.

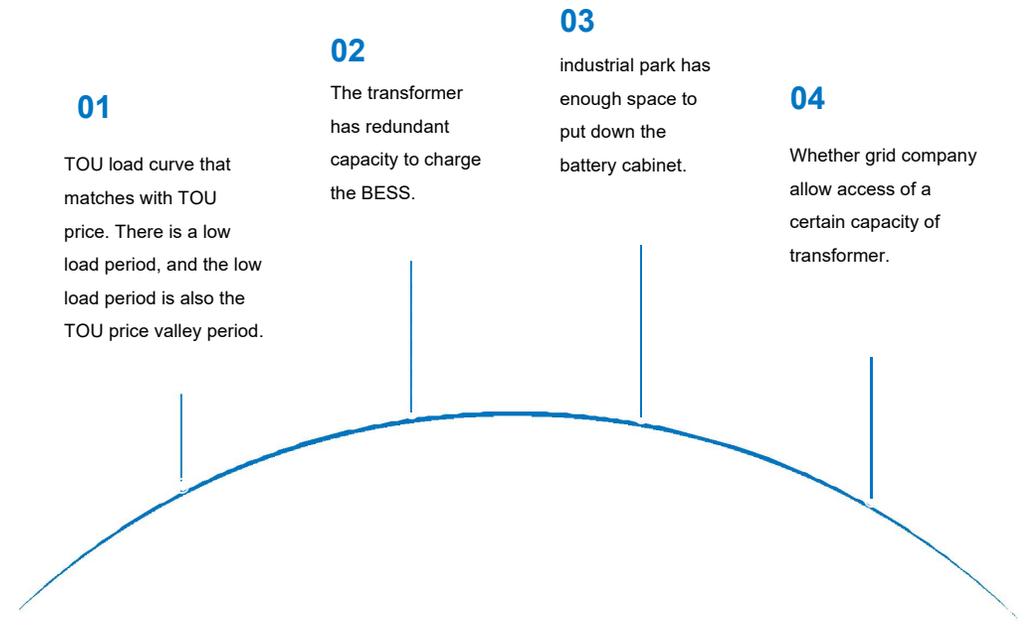
As the standby power supply in response to sudden blackouts, if combined with photovoltaic (pv), it can maximize photovoltaic spontaneous for private use, and promote clean energy given rate effectively.



# SYSTEM FUNCTION

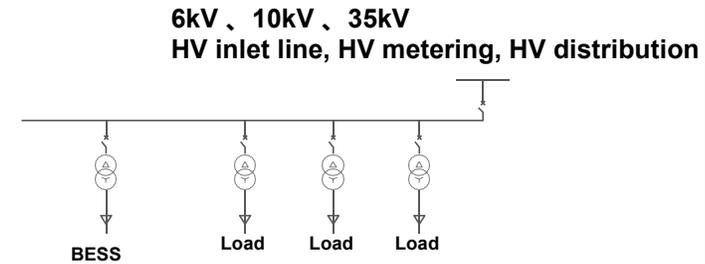


# APPLICATION SCENARIO

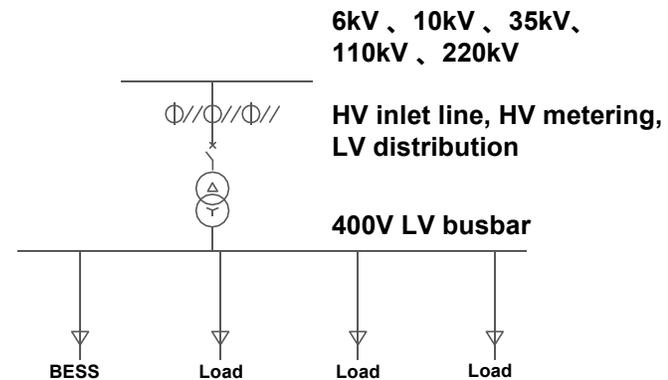


# ACCESS TOPOLOGY

## HV Access



## LV Access



The battery energy storage system includes the battery DC system, the converter AC system and the energy management system, and the converter charges and discharges the battery to achieve the storage of electric energy.

According to the access mode of the energy storage system, it can be divided into two modes: user high voltage access and user low voltage access.

# PRODUCT MODEL

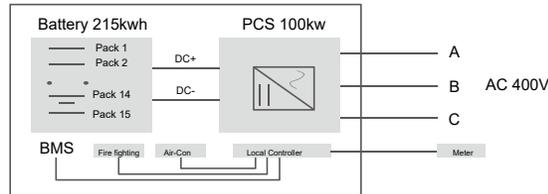
## PGESS6-100/215



### Product features:

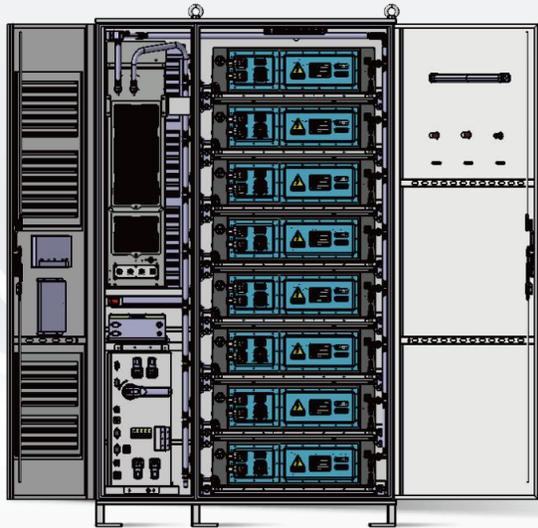
- Flexible layout, free installation.
- Air-cooled design, intelligent control.
- Short delivery cycle, low cost of operations

### Product schematic diagram



S.N.	Model	PGESS6-100/215	PGESS6-100/215
<b>DC side</b>			
1	Cell type	280Ah	280Ah
2	Battery type	1P16S	1P24S
3	Battery cluster configuration	1P240S	1P240S
4	System configuration	1×1P240S	1×1P240S
5	Battery capacity	215kWh	215kWh
6	Rated voltage	768V	768V
7	Voltage range	672-864V	672-864V
8	Power rate	100kW	100kW
9	Ratio	≤0.5 C	≤0.5 C
10	Maximum Capacity	215.04kWh	215.04kWh
<b>General</b>			
11	Dimension (L×W×H) mm	1550*1320*2400	1450*1400*2400
12	Weight	3000kg	3500kg
13	IP rating	IP54	IP54
14	Operating temperature range	-30~55°C	-30~55°C
15	Relative humidity	5%~95%RH	5%~95%RH
16	Maximum operation altitude	<3000m	<3000m
17	Cooling system	Air cooling	Air cooling
18	Fire fighting system	Perfluorohexanone / Heptafluoropropane / Aerosol	Perfluorohexanone / Heptafluoropropane / Aerosol
19	Standards	GB/T36276,GB/T34131,UN38.3	GB/T36276,GB/T34131,UN38.3
20	O&M	External maintenance	External maintenance
<b>Auxiliary Interface</b>			
21	Auxiliary power interface	AC220V/50Hz	AC380V/50Hz
22	Auxiliary power rate	3kW	3kW
23	Communication interface	RS485、RJ45	RS485、RJ45
24	Communication protocol	CAN/Modbus,104,IEC61850	CAN/Modbus,104,IEC61850
25	Fire water connection	Water immersion/water spray	Water immersion
<b>PCS</b>			
26	Rated power	100kW	100kW
27	DC side voltage	600-900V	672~864V
28	AC side voltage	400V	400V
29	Design model	Modular design	Modular design

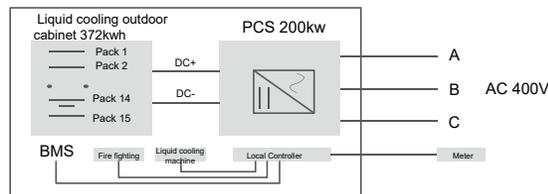
# PGESS6-200/372



## Product features:

- Flexible access to various voltage level network through isolation transformer.
- Integrated variable frequency liquid cooling system, small temperature difference, longer life.
- Support multi-unit parallel built-up.

## Product schematic diagram



S.N.	Model	PGESS6-100/215	PGESS6-200/372
<b>DC side</b>			
1	Cell type	280Ah	280Ah
2	Battery type	1P48S	1P52S
3	Battery cluster configuration	1P240S	1P416S
4	System configuration	1×1P240S	1×1P416S
5	Battery capacity	215kWh	372kWh
6	Rated voltage	768V	1331.2V
7	Voltage range	672-864V	1164.8~1497.6V
8	Power rate	100kW	200kW
9	Ratio	≤0.5 C	≤0.6 C
10	Maximum Capacity	215.04kWh	372.736kWh
<b>General</b>			
11	Dimension (L×W×H) mm	920*1300*2280	1350*1300*2311
12	Weight	3200kg	3500kg
13	IP rating	IP54	IP54
14	Operating temperature range	-30~55°C	-30~55°C
15	Relative humidity	5%~95%RH	5%~95%RH
16	Maximum operation altitude	<3000m	<3000m
17	Cooling system	Liquid cooling	Liquid cooling
18	Fire fighting system	Perfluorohexanone / Heptafluoropropane / Aerosol	Perfluorohexanone / Heptafluoropropane / Aerosol
19	Standards	GB/T36276,GB/T34131,UN38.3	GB/T36276,GB/T34131,UN38.3
20	O&M	External maintenance	External maintenance
<b>Auxiliary Interface</b>			
21	Auxiliary power interface	AC220V/50Hz	AC220V/50Hz
22	Auxiliary power rate	3kW	7kW
23	Communication interface	RS485、RJ45	RS485、RJ45
24	Communication protocol	CAN/Modbus,104,IEC61850	CAN/Modbus,104,IEC61850
25	Fire water connection	Water immersion/water spray	Water immersion/water spray
<b>PCS</b>			
26	Rated power	100kW	100kW
27	DC side voltage	600-900V	600-900V
28	AC side voltage	690V	690V
29	Design model	Modular design	Modular design

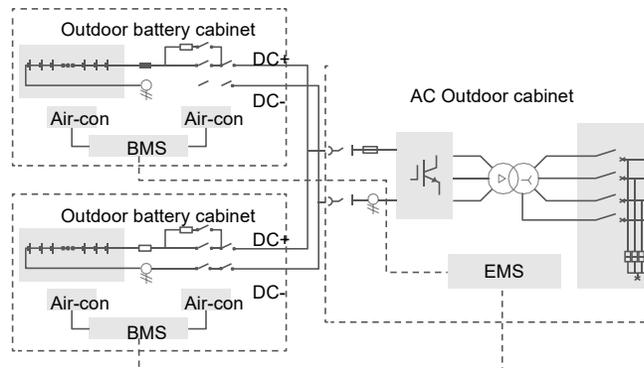
# PGESS10-200/215-1075



## Product features:

- Support multi-unit parallel built-up, easy for capacity expansion.
- Serial type PCS, easy installation and maintenance.
- Small footprint, flexible configuration.
- 100kWh-1000kWh battery capacity, applicable to various scenarios.

## Product schematic diagram



S.N.	Model	PGESS10-200/215-1075
<b>DC side</b>		
1	Cell type	280Ah
2	Battery type	1P16S
3	Battery cluster configuration	1P240S
4	System configuration	n×1P240S (distributed units, capacity expansion as per specific demand)
5	Battery capacity	n×215kWh
6	Rated voltage	768V
7	Voltage range	672-864V
8	Power rate	100kW, 200kW, 300kW, 400kW, 500kW
9	Ratio	≤0.5 C
10	Maximum Capacity	430.08kWh, 645.12kWh, 860.16kWh, 1075.2kWh
<b>General</b>		
11	Dimension (L×W×H) mm	(1200+1400*n)×1200×2896
12	Weight	500+1600*n kg
13	IP rating	IP54
14	Operating temperature range	-30~55°C
15	Relative humidity	5%~95%RH
16	Maximum operation altitude	<3000m
17	Cooling system	Air cooling
18	Fire fighting system	Perfluorohexanone / Heptafluoropropane / Aerosol
19	Standards	GB/T36276, GB/T34131, UN38.3
20	O&M	External maintenance
<b>Auxiliary Interface</b>		
21	Auxiliary power interface	AC220V/50Hz
22	Auxiliary power rate	5kW+2*n
23	Communication interface	RS485, RJ45
24	Communication protocol	CAN/Modbus, 104, IEC61850
25	Fire water connection	Water immersion/water spray
<b>PCS</b>		
26	Rated power	200kW
27	DC side voltage	600-900V
28	AC side voltage	400V
29	Design model	Modular design

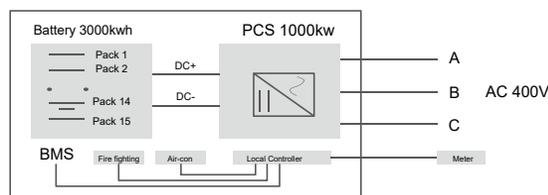
## PGESS45-1000/3000



### Product features:

- Modular built-up, simple installation, easy O&M.
- Support remote upgrade, no-manpower operation.
- Straight grid connection.
- Highly integrated system.
- Maxium access voltage of 10kV.

### Product schematic diagram



S.N.	Model	PGESS20-500/1200	PGESS45-1000/3000
<b>DC side</b>			
1	Cell type	280Ah	280Ah
2	Battery type	1P16S	1P16S
3	Battery cluster configuration	1P240S	1P240S
4	System configuration	1 × 1P240S	14 × 1P240S
5	Battery capacity	1290kWh	3010kWh
6	Rated voltage	768V	768V
7	Voltage range	672-864V	672-864V
8	Power rate	500kW	1000kW
9	Ratio	≤0.5 C	≤0.25C
10	Maximum Capacity	1290kWh	3010kWh
<b>General</b>			
11	Dimension (L×W×H) mm	6058*2438*2896	12192*2438*2896
12	Weight	20000kg	35000kg
13	IP rating	IP54	IP54
14	Operating temperature range	-30~55°C	-30~55°C
15	Relative humidity	5%~95%RH	5%~95%RH
16	Maximum operation altitude	<3000m	<3000m
17	Cooling system	Air cooling	Air cooling
18	Fire fighting system	Perfluorohexanone / Heptafluoropropane	Perfluorohexanone / Heptafluoropropane
19	Standards	GB/T36276,GB/T34131,UN38.3	GB/T36276,GB/T34131,UN38.3
20	O&M	External maintenance	External maintenance
<b>Auxiliary Interface</b>			
21	Auxiliary power interface	AC380V/50Hz,three-phase four-wire system	AC380V/50Hz,three-phase four-wire system
22	Auxiliary power rate	0	15kW
23	Communication interface	RS485、RJ45	RS485、RJ45
24	Communication protocol	CAN/Modbus,104,IEC61850	CAN/Modbus,104,IEC61850
25	Fire water connection	Water immersion/water spray	Water immersion/water spray
<b>PCS</b>			
26	Rated power	500kW	1000kW
27	DC side voltage	600-900V	600-900V
28	AC side voltage	400V	customized, up to10kV
29	Design model	Centralized design	Centralized design

