MAGIC POWER

GAIA

CONTAINERIZED ENERGY STORAGE SYSTEM

www.magicpower.co

KEEP YOUR LIGHTS ON.

What is Gaia?

The MagicPower Gaia energy storage system solution features a multi-modular system configuration, providing flexible matching for various commercial and industrial scenarios.

GAIA

Gaia supports multi-mode operation, enhancing investment returns by enabling peak-valley time shift, peak shaving, and alleviating grid pressure. Suitable for applications with high requirements for grid continuity, it can be used for peak shaving and as a backup power source. Additionally, it is suitable for applications in microgrid scenarios.

Gaia utilizes battery clusters, PCS, EMS, BMS, fire protection systems, and HVAC (Heating, Ventilation, and Air Conditioning) systems that are all certified to the IEC 62619 standard, ensuring continuous power supply and synergistic operation with photovoltaic systems.

- Rapid deployment
- Off-grid and on-grid
- Access to real-time electricity prices and smart strategy creation

Advantages

Certification: Batteries certified to IEC 62619, EN: 61000
PCS: IEC 62477; EN: 61000; EN 50549;
Transportation: UN3536

Cloud-Edge Collaboration: Supports automatic retrieval of electricity pricing data to generate charging and discharging strategies

Open System Protocol to VPP, participating in the optimization of grid operations

System Parameters

Model	MQK-500kW-1000kWh / MQK-500kW-1000kWh-TS
Specification	500KW/1MWh
Battery Side	
Cell Type	LFP
Cell Capacity	280Ah
Module Capacity	215kWh
Battery Cluster String	1P240S*5
PCS Parameter(On-Grid)	
Nominal Power	500kW
Nominal Voltage	AC400V
Nominal Frequency	50Hz / 60Hz
System Parameter	
Cooling Mode	Air conditioning
Noise	<68dB (1m)
IP	IP54
Altitude	3000m (>2000m Derating)
Temperature Range	-30°C to 50°C
Humidity Range	0~95%RH
Output overload capacity	110% load@ 10min; 120% load@1min
Communication Protocol	Modbus RTU / Modbus TCP
Certification	EN61000, IEC62619; EN50549; UN3536
Dimension(W*D*H)(approx.)	6058*2438*2896mm
Total Weight (approx.)	about 20t

Introduction to PCS

The Gaia containerized energy storage system integrates energy storage battery, modular PCS, energy management monitoring system, and distribution system. With modularPCS, it is easy to maintain and expand. The outdoor cabinet adopts front maintenance, which can reduce the area and maintenance channel. It has the characteristics of safe, reliable, fast deployment, low cost, high energy efficiency and intelligent management.

Common application scenarios and operation strategies are as follows:

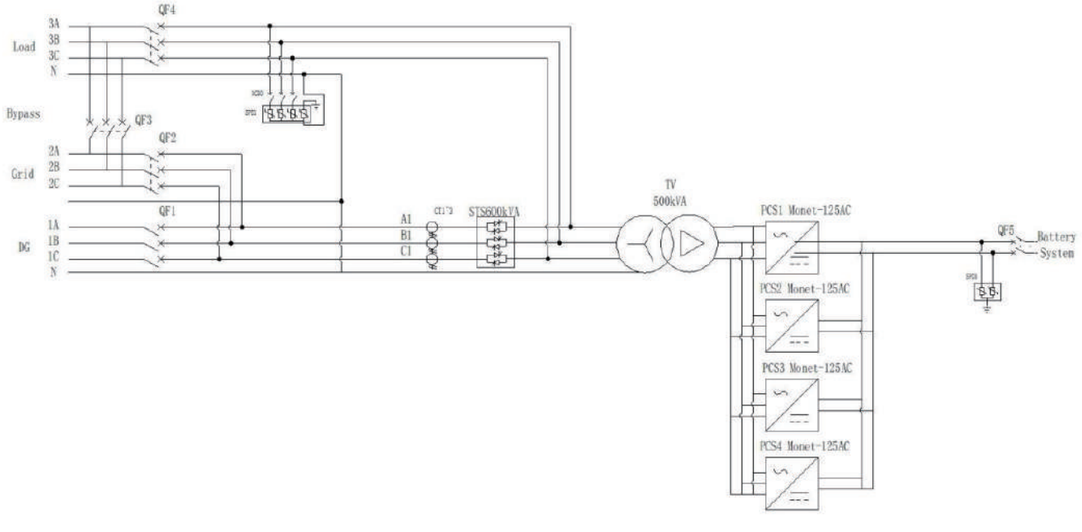
Grid-connected mode:

The energy storage converter is connected to battery, photovoltaic or other DC sources, and is converted into AC power through AC/DC power module to merge into the power grid.

It can achieve the following:

Energy storage battery access realizes peak shaving and valley filling, and arbitrage of electricity price difference. Photovoltaic power generation realizes profit from selling electricity.

PCS Electrical Schematic



Data Sheet

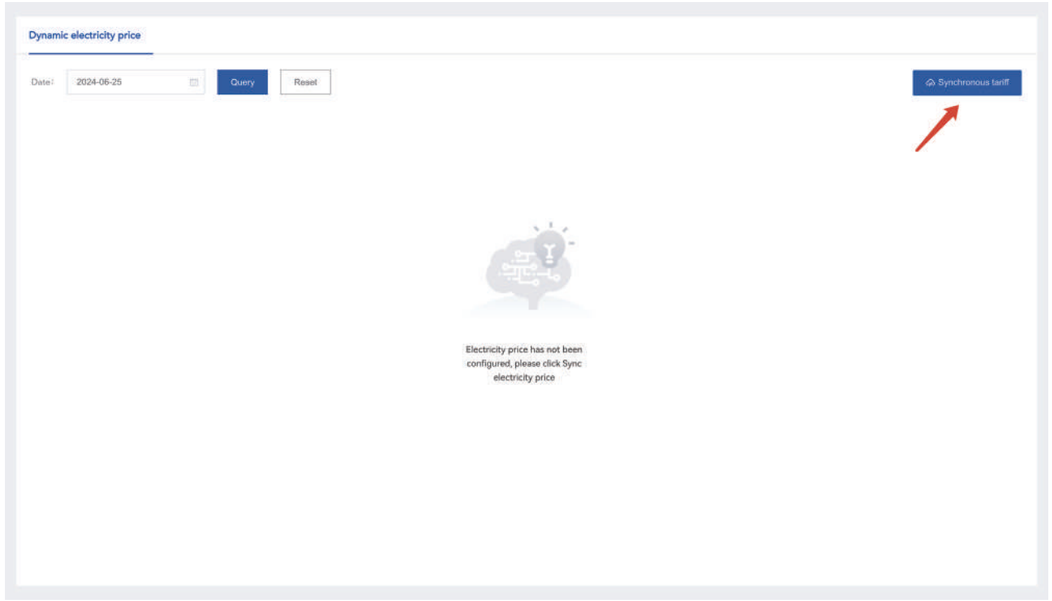
Model	MQK-500kW-1000kWh / MQK-500kW-1000kWh-TS
DC-side parameters	
Operate voltage range	600~1000V
Maximum DC current	200A*4
Adaptive battery	Lithium / lead-acid / Solar panel (MPPT)
Charging mode	According to BMS instructions / three-stage / MPPT
Operating mode	Constant current, constant power, MPPT, AC voltage source, DC voltage source
AC-side parameters (on-grid)	
Rated Max.AC power	500 / 550kW
Rated AC current	760A
Rated AC voltage	380V, 3W+N+PE / 3W+PE
Rated AC frequency	50/60Hz±5Hz
THDI	<3% (Rated power)
Power Factor	-1 leading to +1 lagging
AC-side parameters (off-grid)	
Rated AC voltage	380V
Rated AC frequency	50 / 60Hz
THDU	<3% (LinearLoad)
Overload capacity	110%, normal operation; 120%, 1 minute
General parameters	
Degree of protection	IP54(Outdoor)
Protective Class	I
Shutdown self-discharge	<100W (Without transformer)
Display	LCD
Relative humidity	0~95% (no condensation)
Noise	<78dB
Ambient temperature	-25°C to +60°C (derating above 45°C)
Cooling mode	Inteligent air-cooled
Altitude	3000m (>3000mreduction)
Communication interface	RS485 / CAN / Ethernet
Dimensions (W*D*H)	1200*1000*2300mm (Indoor)
Weight(approx.)	2050kg (Indoor)

Battery Cluster 215kwh

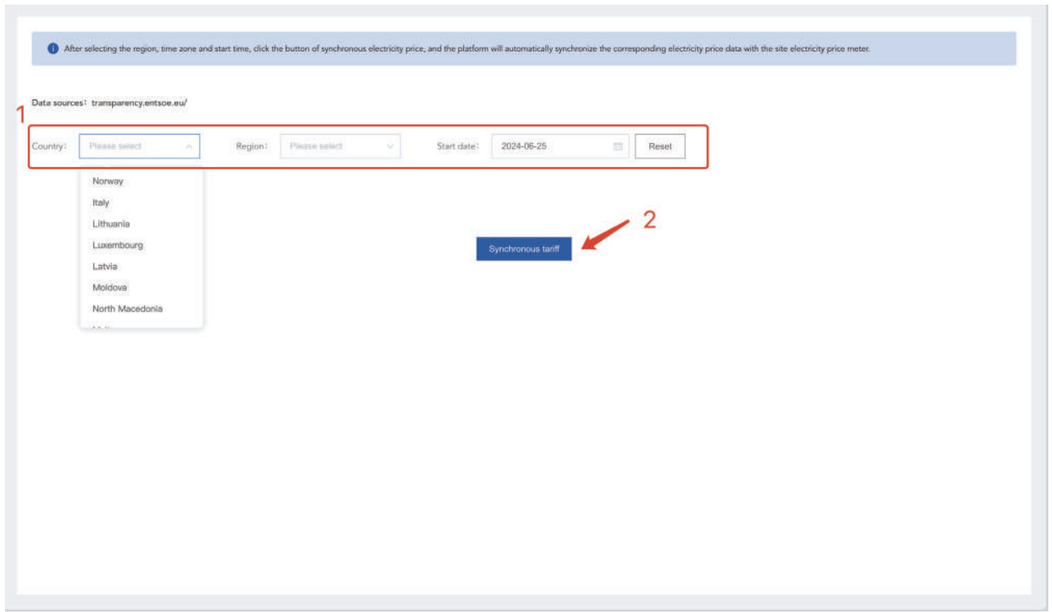
Model	MQK-500kW-1000kWh / MQK-500kW-1000kWh-TS
Cell Type	LFP
Nominal Energy	215.04kWh
Configuration	240S1P
Weight	1650kg
Nominal Capacity	280Ah
Nominal Voltage	768V
Voltage Range	672Vdc~816Vdc
Max.Charge Current	200A
Max.Discharge Current	200A
Certifications	UN38.3 / UL1642 (Cell)
Operating Temperature	0°C~55°C
Recommended Temperature	25°C
Communication	RS485 / CAN
IP	IP20
Cycle Life	≥6000, 80%DOD@25°C
Discharge Depth	90%

Introduction to EMS Dynamic Electricity Pricing Strategy

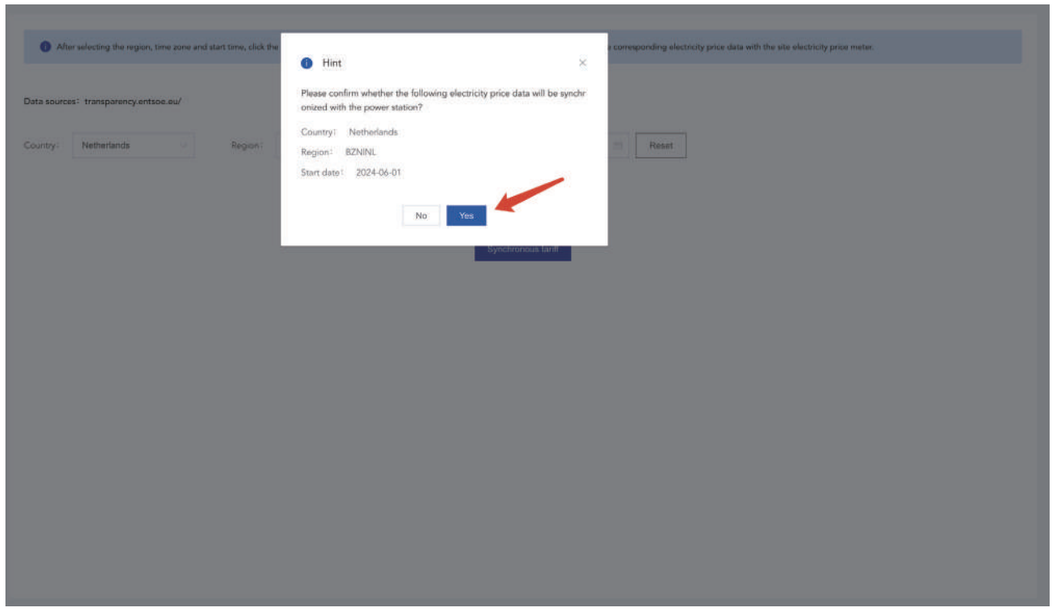
❶ **Initial page**: There is no electricity price information, and users need to perform the “Sync Electricity Price” operation. (Click the button on the picture)



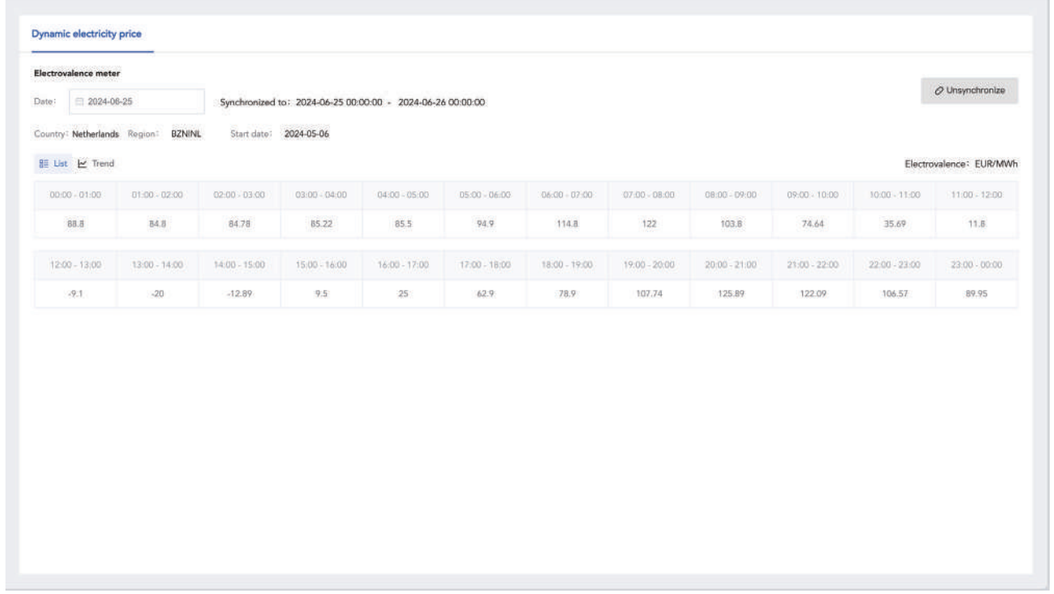
❷ **Synchronized electricity price configuration page**: After the user selects the region and start time, click the “Synchronized electricity price” button.



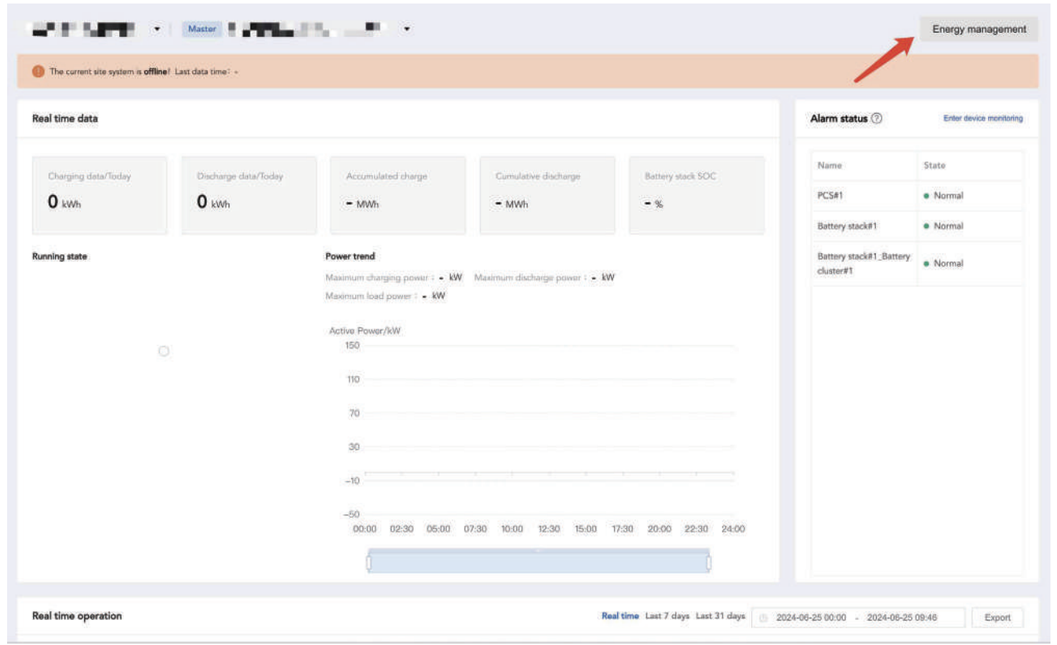
❸ Second confirmation: After confirming that the information is correct, click “Yes”.



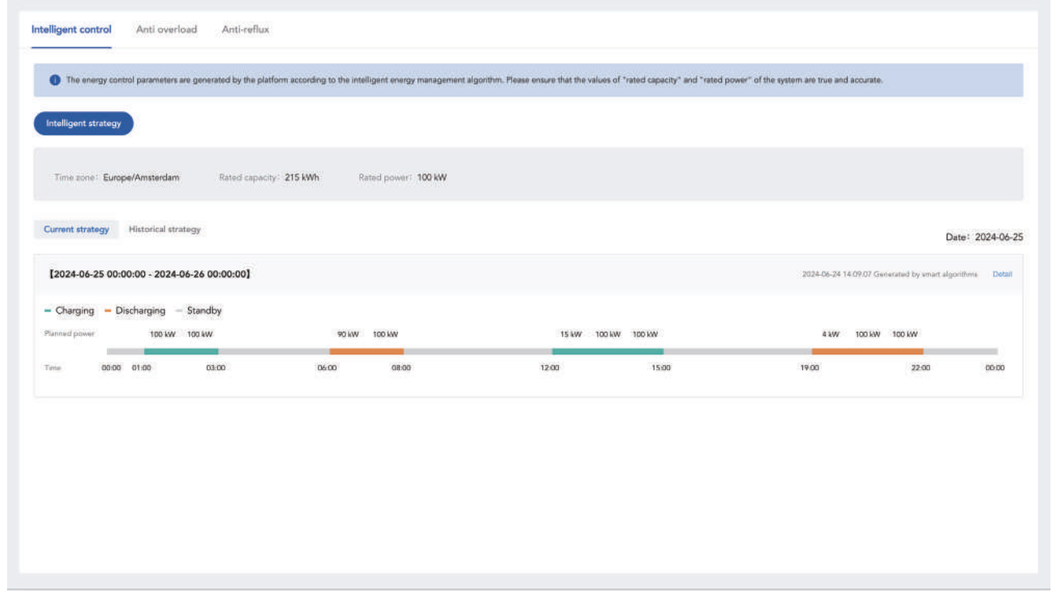
❹ **Electricity price page**: After the operation is completed, you can see the corresponding electricity price information on the electricity price page.



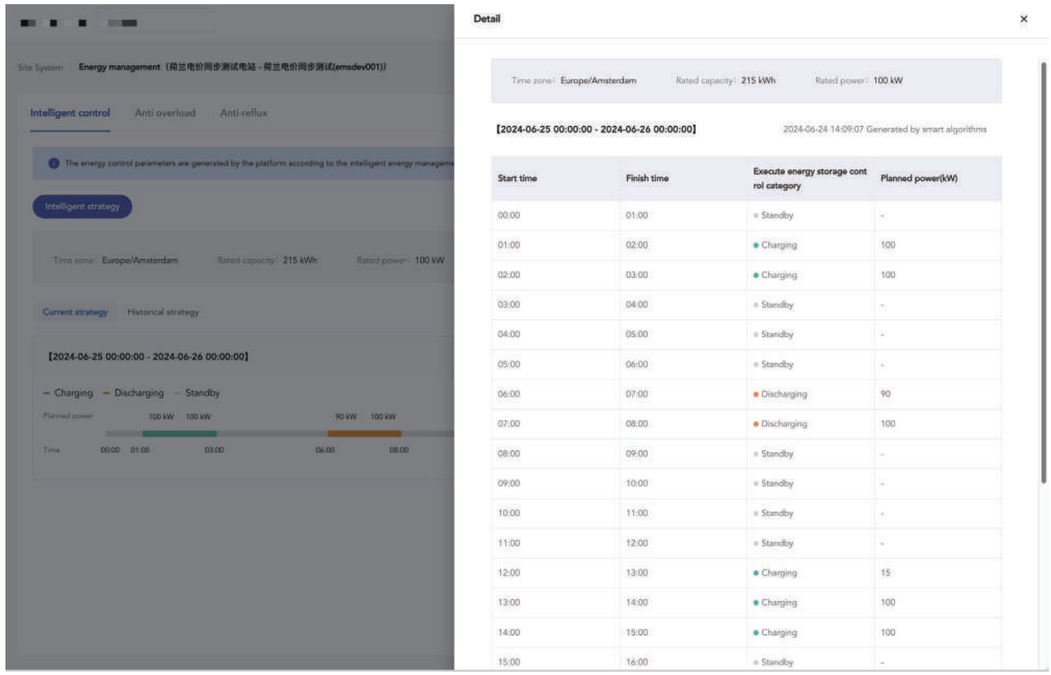
◆ **Function entrance:** After the platform side opens the function, click the “Energy Management” button.



◆ **Control page:** Display the policies generated and issued by the algorithm every day.

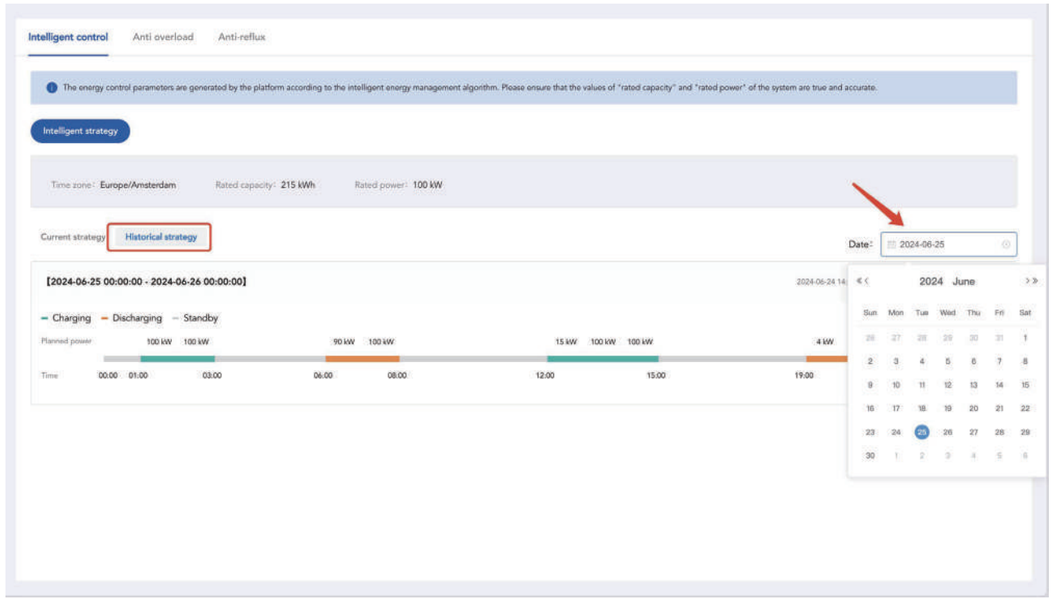


◆ **Policy details**: Support to view the details of the policy every day.



Start time	Finish time	Execute energy storage control category	Planned power(kW)
00:00	01:00	Standby	-
01:00	02:00	Charging	100
02:00	03:00	Charging	100
03:00	04:00	Standby	-
04:00	05:00	Standby	-
05:00	06:00	Standby	-
06:00	07:00	Discharging	90
07:00	08:00	Discharging	100
08:00	09:00	Standby	-
09:00	10:00	Standby	-
10:00	11:00	Standby	-
11:00	12:00	Standby	-
12:00	13:00	Charging	15
13:00	14:00	Charging	100
14:00	15:00	Charging	100
15:00	16:00	Standby	-

◆ **Historical policies:** View historical policy content is available.



CASE STUDY

Integrated Energy Storage Solution

Off-Grid EV Charging Stations

South Africa

Our collaboration with local and international partners in South Africa showcases our capability to provide localized and customized energy solutions tailored to specific regional needs and conditions.

Customer Requirements

558 kWh Liquid Cooling Energy Storage System

0.5C Discharge Rate

250kW PCS

300 kWp PV input MPPT

480kW Charging Module; Limited Capacity

22kW charger 2pcs

3 x Charging Stations, each Station with a 500A Liquid Cooling Gun and a 200A Air Cooling Gun and 2 x 22 kW AC chargers

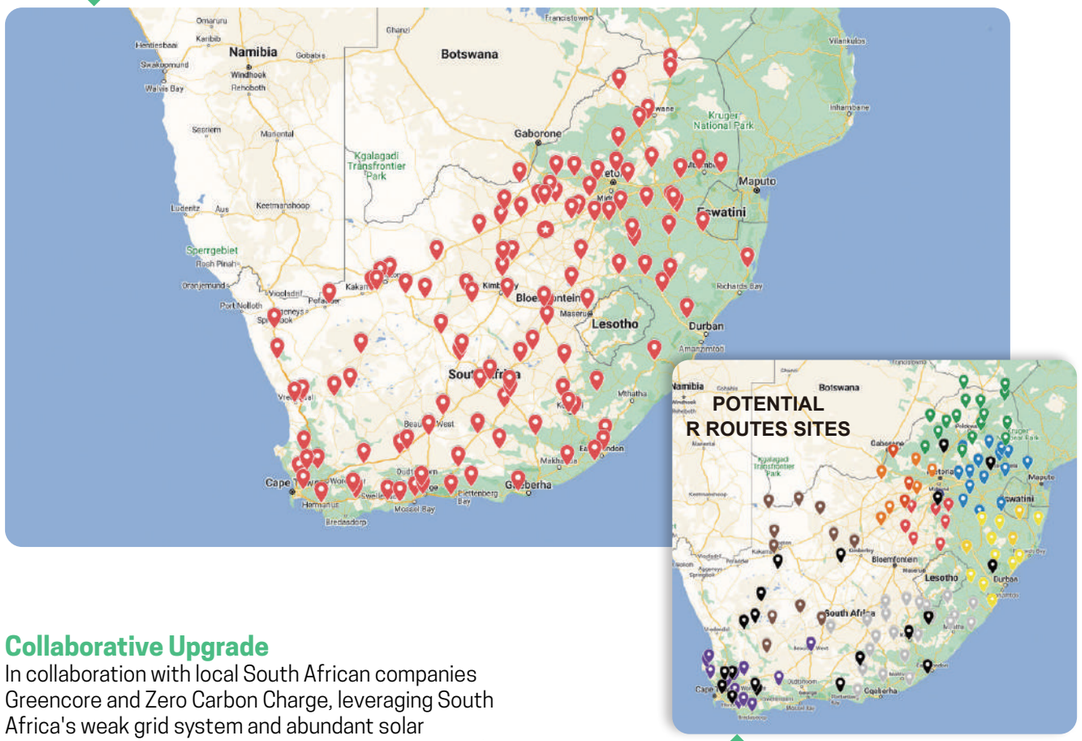
Isolation transformer 250kW

Expansion in the future with 250 kW PCS and 558 kWh batteries

The system operates off-grid

Background

Map: 120+ sites in development
Off-grid charging stations for passenger & commercial vehicles up to 8 tonnes



Phase 2:
Site expansion according to power demand & targeting more regional and urban routes.

Collaborative Upgrade

In collaboration with local South African companies Greencore and Zero Carbon Charge, leveraging South Africa's weak grid system and abundant solar resources, the commonly seen domestic integrated photovoltaic energy storage and charging stations have been upgraded to a pure off-grid system reliant on photovoltaic power.

Overcoming Challenges

This upgrade has addressed issues such as unstable busbars, system instability, and slow diesel generator start-up speeds. The first two pilot sites have already broken ground, and over the next five years, this model will be progressively implemented at 120 charging stations across South Africa, primarily around urban areas and along highways.

Research and Global Application

The research achievements have enabled the international application of pure off-grid photovoltaic storage and charging systems, providing a template for promoting new energy systems and electric vehicles in regions with weak grid infrastructure.

System Solution

Solar PV Energy Generation

Biofuel Backup Generator

Fuelled with hydrotreated vegetable oil

Containerised Battery Energy Storage System

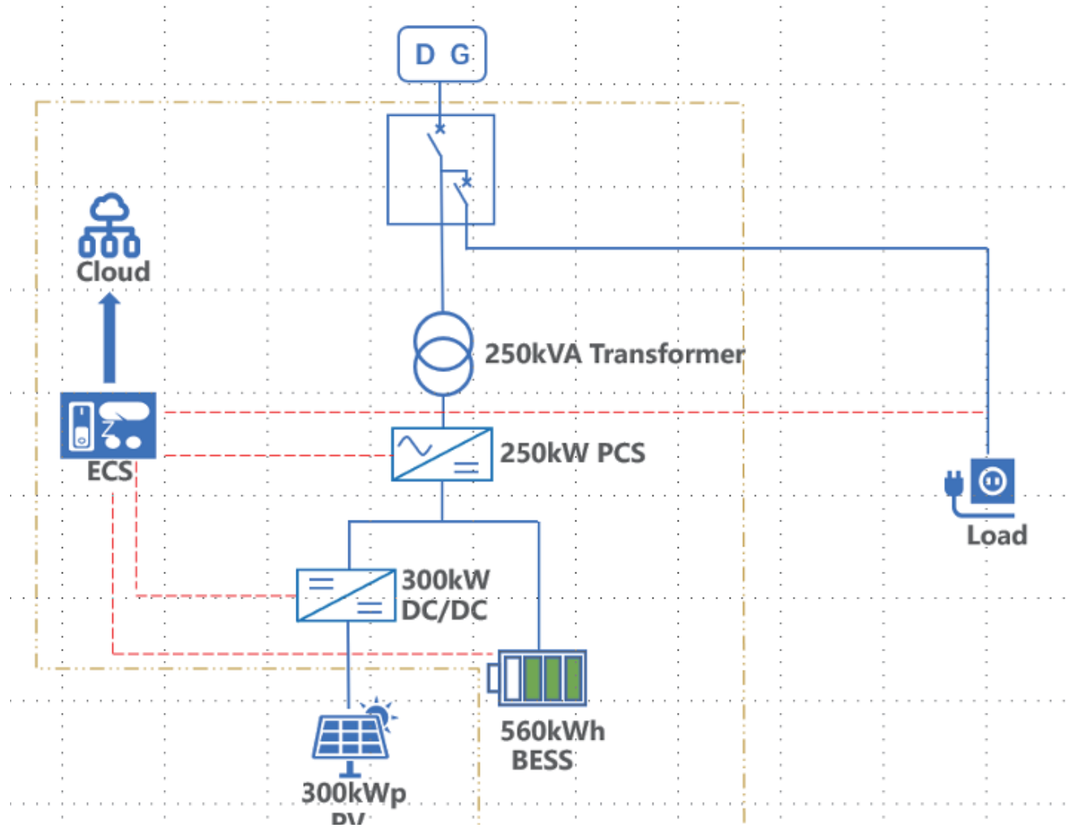
- Lithium Batteries
- Power Conversion System
- Energy Management System

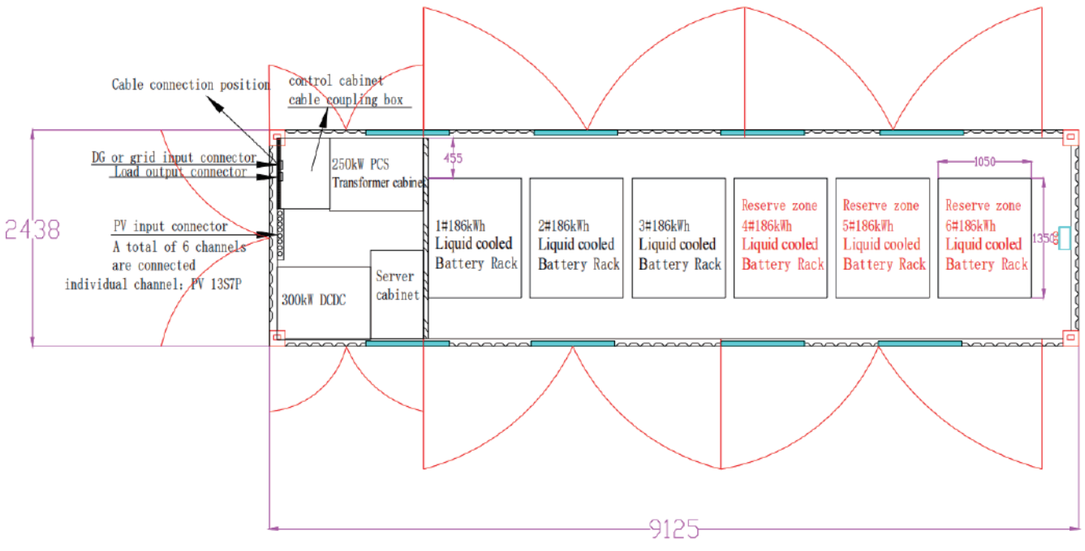
EV Charger

Power output up to 480 kW

EV Charger Dispensers

- 3 dispensers with 2 connectors each
- Each dispenser has one liquid-cooled cable and one air-cooled cable
- Up to 500 A output per liquid-cooled connector
- Cable management system



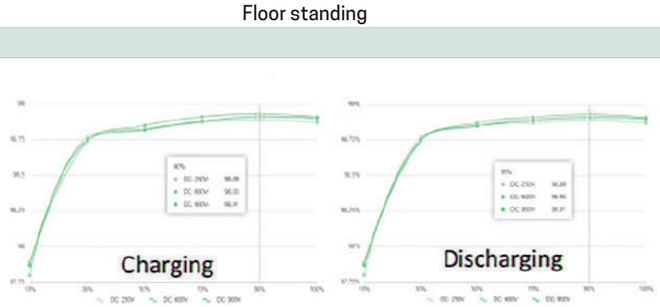


Rated Power	250kVA
PV Capacity	300kWp
Battery Capacity	558kWh
Cooling Methed	Liquid Cooling
Discharge Rate	0.5C
Charging System	480kW DC Charger+500A liquid-cooling Dispenser*3
Charging Protocal	OCPP 1.6J
Communication	Wifi/LAN/LTE
Container	30-Foot Container
Isolation Transformer	250kVA
Operation Methed	Off-Grid

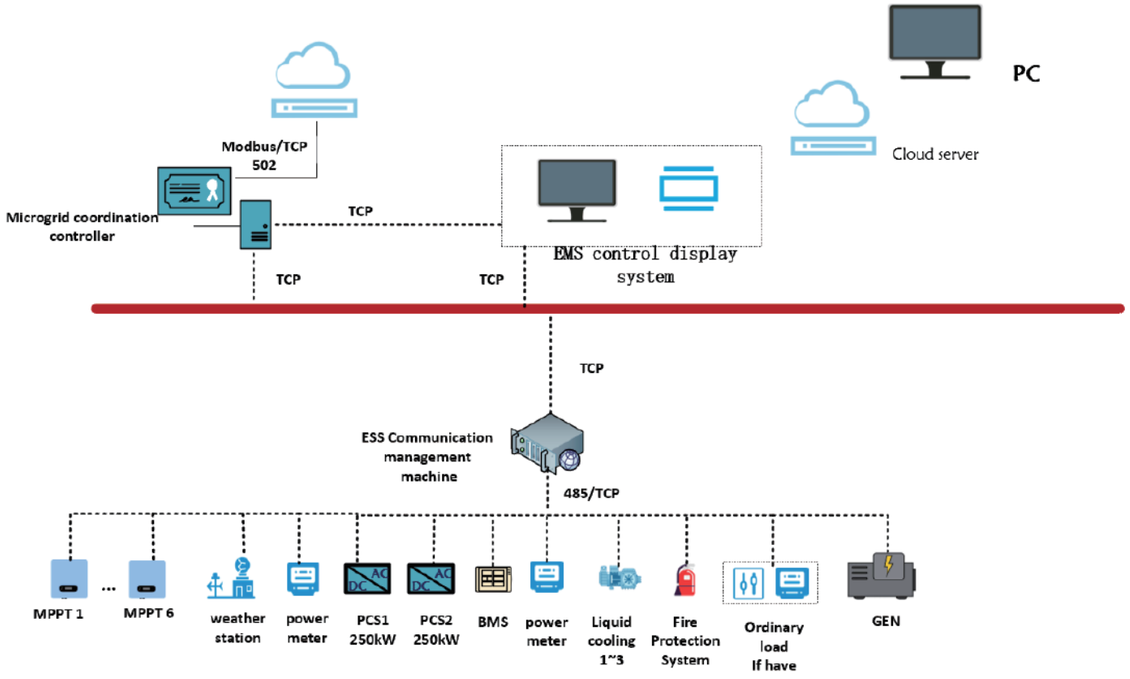
PCS Specifications

AC Parameters	
Rated AC Power	250 kVA
Connection Method	Three-phase Four-wire
AC Overload Capacity	275 KVA
Grid-Connected Operation Mode	
Allowed Grid Voltage	380/400 (-15%~15%) Vac
Allowed Grid Frequency	50/60 (-2.5~2.5) Hz
Total Current Harmonic Distortion Rate	<3%
Voltage Ripple Coefficient	<1%
Power Factor	0.99/-1~1
Islanded Operation Mode	
Rated Output Voltage	380/400 (-10%~10% adjustable) Vac
Output Voltage Distortion	<1% (Linear Load)
Rated Output Frequency	50/60 (-2.5~2.5 Adjustable) Hz
DC Parameters	
Maximum DC Power	275 kW
DC Voltage Range	600~900 Vdc
Maximum DC Current	625 A
Voltage Regulation Accuracy	1%
Current Regulation Accuracy	<+1%
System Parameters	
Maximum Conversion Efficiency	97.3%
Dimensions (Width * Height * Depth)	1100*2160*800mm
Weight	2600 kg
Noise	<75 dB
Protection Level	IP20
Allowed Ambient Temperature	-20~60°C (Derating above 50°C)
Cooling Method	Air-cooled
Allowable Relative Humidity	0~95% (No condensation)
Allowable Altitude	3000m (De-rating above 3000m)
Display and Communication	
Display	Touch Screen
Communication Interface	RS 485, Ethernet,CAN
Communication Protocol	Modbus TCP/RTU.IEC104
BMS Access	Support

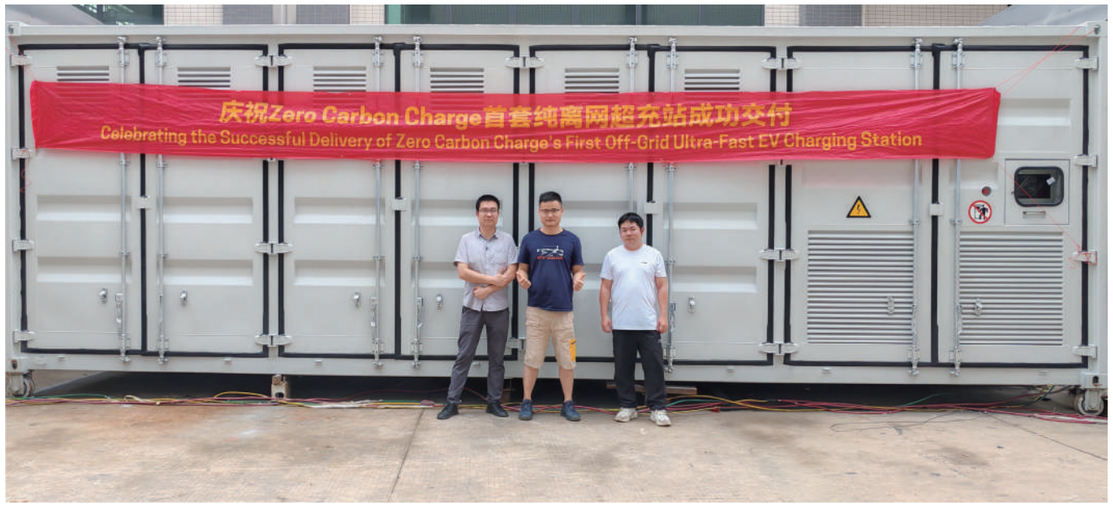
DCDC Specifications

LV PV input mode	
HV DC bus voltage	LV voltage+40V~850V
HV DC bus current	0~130Ax6
LV PV input voltage	250~800V
LV PV input current	0~130Ax6
Power rating	50kWx6
LV battery dis-/charge mode	
HV DC bus voltage	LV voltage+40V~850V
HV DC bus current	0~130Ax6
LV battery voltage	250~800V
LV battery current	0~130Ax6
Power rating	50kWx6
Physical	
Cooling	Forced air cooling
Noise	< 75dB
Enclosure	IP20/NEMA1
Max elevation	3000m/10000feet (> 3000m/10000feet derating)
Operating ambient temperature	-20°C to 50°C (De-rating over 45°C)
Humidity	0~95% (No condensing)
Size (WxHxD)	1100x2160x800mm
Weight	Cabinet 280kg + Module 40kg*n (n=1,2,...,8)
Installation	Floor standing
Other	
Efficiency curve	
Peak efficiency	98.60%
Protection	OTP OVP/UVP, EPO, Fan / Relay Failure, OLP
Configurable protection limits	Upper/Lower Voltage, Battery EOD voltage
Display	Touch Screen
Communication	RS485, CAN, Ethernet
Isolation	Non-isolation
Module Certification	CE LVD IEC 62109 / 62477, CE EMC IEC 61000, UL1741

Communication Diagram



Delivery Ceremony



Project Opening

About MagicPower

MagicPower specializes in the research, integration, sales, and service of new energy systems centered around energy storage devices. Our expert team spans fields such as power equipment, power grids, and artificial intelligence, covering the entire ecosystem of the energy storage industry. We are committed to delivering world-leading, one-stop clean energy solutions. Currently, our services extend across Europe, South Africa, Southeast Asia, and other countries and regions.

Our new energy solutions rely on self-developed energy storage equipment and control systems to coordinate wind, solar, and diesel power sources. These solutions cater to various user-side and renewable energy generation scenarios, with capacities ranging from 1 kWh to 2000 kWh. Currently, our clients include overseas solar power plants, photovoltaic installers, small and medium-sized commercial and industrial enterprises, new energy vehicle solar charging stations, residential projects, and individual users.

MagicPower's Main Business

Residential Energy Storage Systems

We provide comprehensive whole-house energy management solutions, featuring products like hybrid inverters, stackable battery packs, and all-in-one energy solar energy storage. With energy storage as the core, our solutions adapt to the critical electricity demands of entire households.

C&I Energy Storage Integration and Services

We specializes in integrating energy storage on both the power supply and grid sides, widely applied in scenarios such as new energy grid integration, frequency regulation, and demand-side response.

We offer C&I energy storage solutions, including container energy storage systems and outdoor energy storage systems. Simultaneously integrating solar and storage charging as a unified solution, constructing a reliable energy infrastructure.

MAGIC POWER

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