

GANFENG ENERGY STORAGE SYSTEM INTEGRATION SOLUTION

Creating a new era of solid-state batteries

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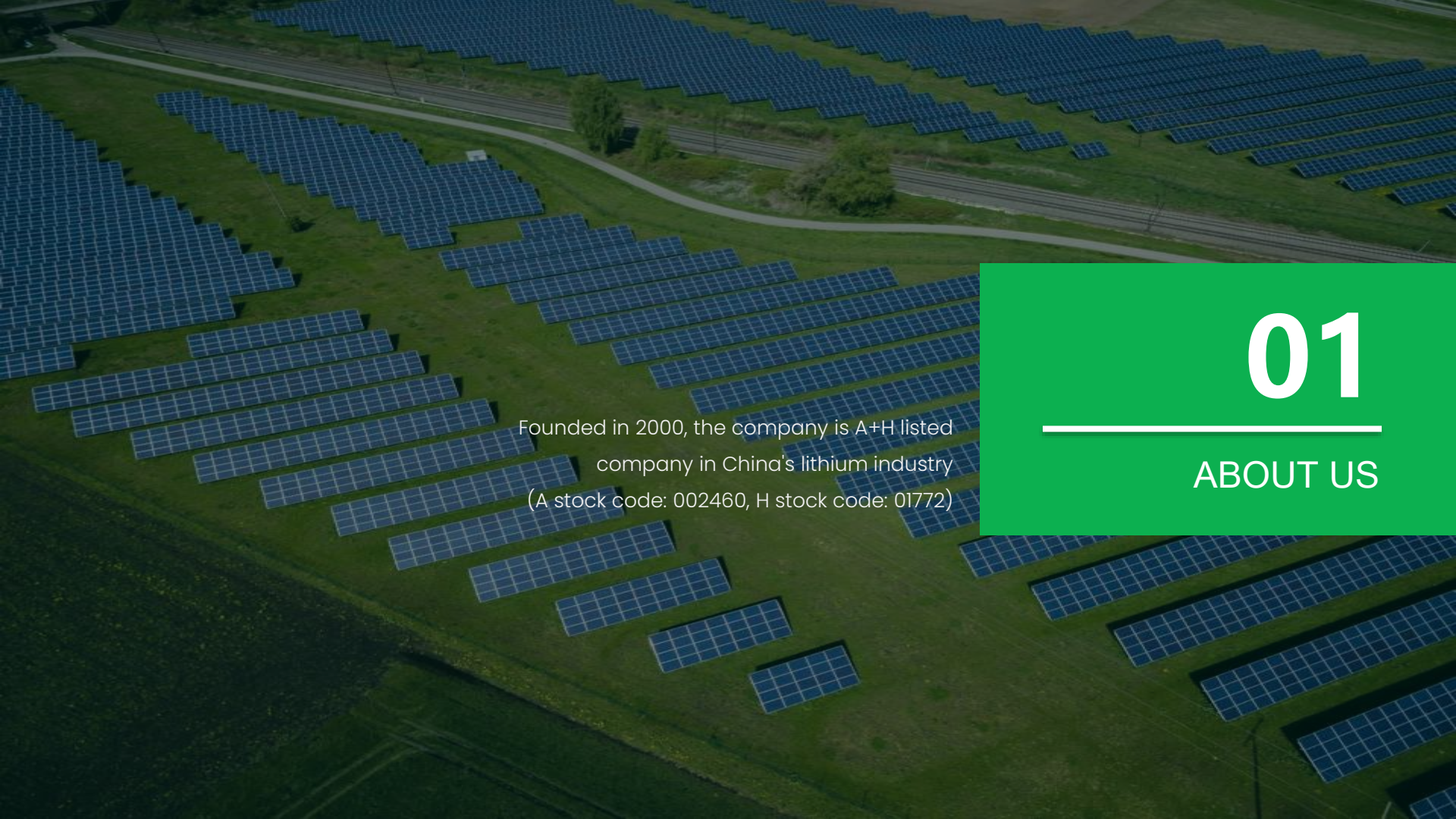
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CREATE A NEW ERA OF SOLID STATE BATTERIES

GanfengLiEnergy



01

ABOUT US

Founded in 2000, the company is A+H listed
company in China's lithium industry
(A stock code: 002460, H stock code: 01772)

Global Leader of Lithium Industry

Accompanying lithium, integrated development of upstream and downstream



- **World's No.1** supplier of Lithium metal
- **World's No.2/China's No.1** supplier of Lithium compounds



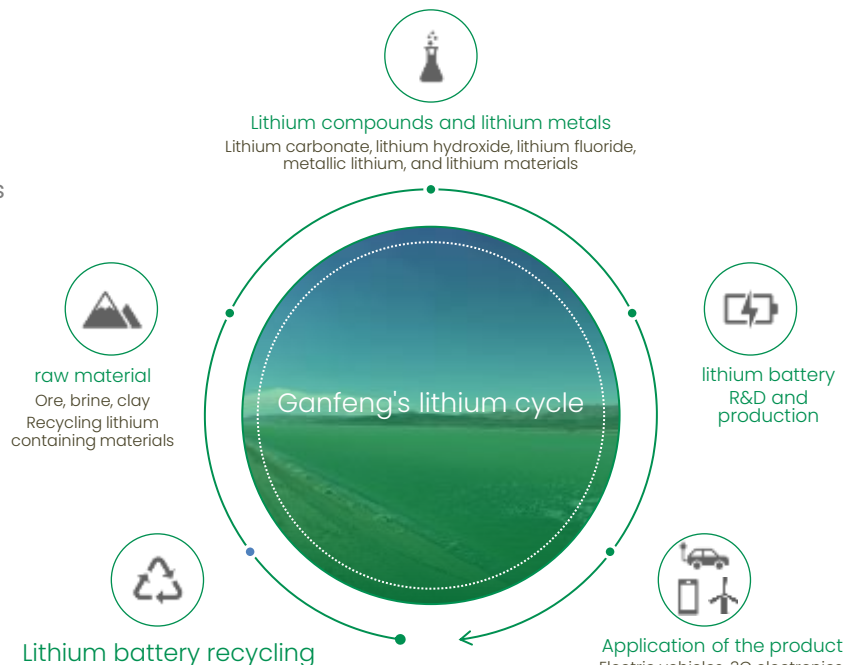
- Professional lithium products manufacturer with
- the world's most extensive product portfolio,
 - the longest product processing chain,
 - the most comprehensive process technology.



2010 Listed in A-shares | **2018 Listed in H-shares**
SZ Code: 002460 | HK Code: 01772
China's 1st lithium company listed in A+H stock market



- The only company in the world with industrialized technologies of extracting lithium from brine, ore and recycled batteries



Global Layout



Global Leading Lithium Product Manufacturer

Lithium series product planning capacity

● Lithium carbonate 91,000 T

● Lithium hydroxide 106,000 T

● Lithium metal 3,150 T

*Data source: Ganfeng Lithium's 2023 Annual Report

600000 tons
2025
300000 tons

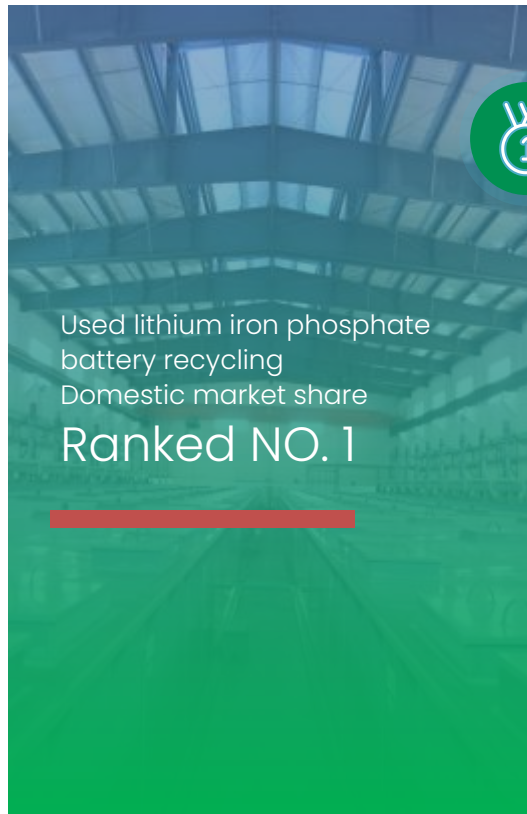


Lithium product
supply capacity

Lithium resource
project reserve

- Plan to establish a global lithium product supply capacity of no less than 600000 tons of LCE in the future, as well as more...

Lithium Battery Recycling and Sustainable Utilization



Used lithium iron phosphate
battery recycling
Domestic market share
Ranked NO.1



- ✓ **Largest recycling system** for used lithium batteries in China;
- ✓ Listed in the second batch **Whitelist** of battery recycling;
- ✓ Several domestic recycling locations;
- ✓ **No. 1 LPF battery** recycling in China;
- ✓ **No. 3 NMC battery** recycling in China;
- ✓ Project Leader of Key Research and Development Program by National Ministry of Science and Technology (2020): efficient and clean recycling technology of used lithium battery and demonstration projects;
- ✓ Cascade utilization of used batteries;
- ✓ **Automated dismantling technology** waste lithium batteries;
- ✓ Comprehensive recycling technology

Build an Ecological Leading Enterprise

Leading the new era of solid-state batteries and creating a green future together



The first spin-off of a listed subsidiary of Gangfeng Lithium

Be expected to be listed on the A-share market



Revenue in 2022

RMB 8.6 billion

Revenue in 2023

10 billion RMB

Rapid growth in EV & ESS markets



Advanced solid-state battery technology and industrialization scale

Proprietary solid-liquid hybrid battery technology capacity 4 GWh (2022 Q4) | 14 GWh (2024 Q4)



Products cover all levels from mAh to hundred-level Ah

CE, EV, ESS, etc more than 20 application areas

Top 4

Mobile phone battery
(2023, China)



Top 2

TWS battery
(2023, China)

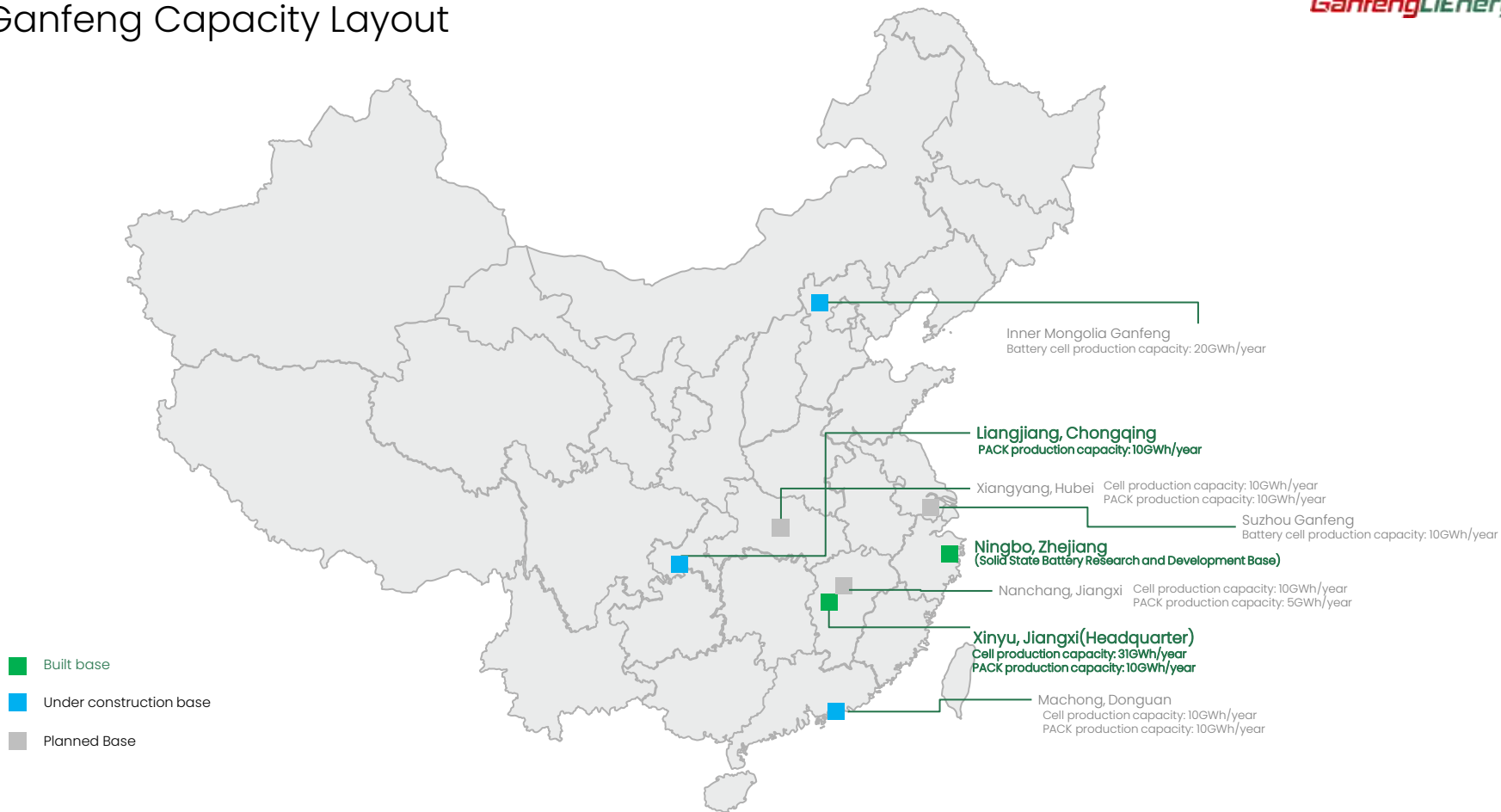


Top 5

Energy storage system
(2023, China)



Ganfeng Capacity Layout



Ganfeng Technology: Building an Innovation Highland



Applied for national patent

1563 items

Applied for invention patent

616 items

Applied for utility model patent

834 items



Authorized Patent

931 items

Obtained invention patent

213 items

Obtained utility model patent

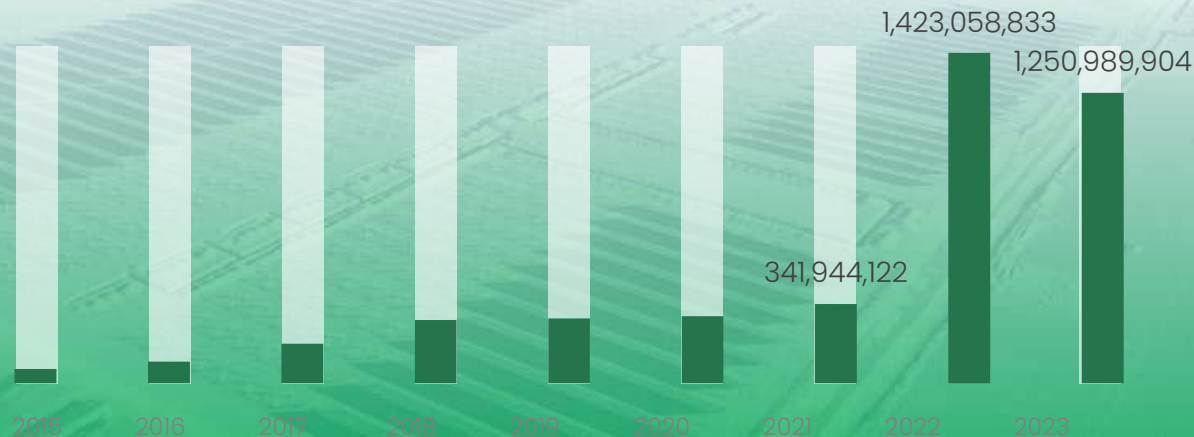
669 items



Ganfeng Lithium Industry in the past five years
Total R&D investment

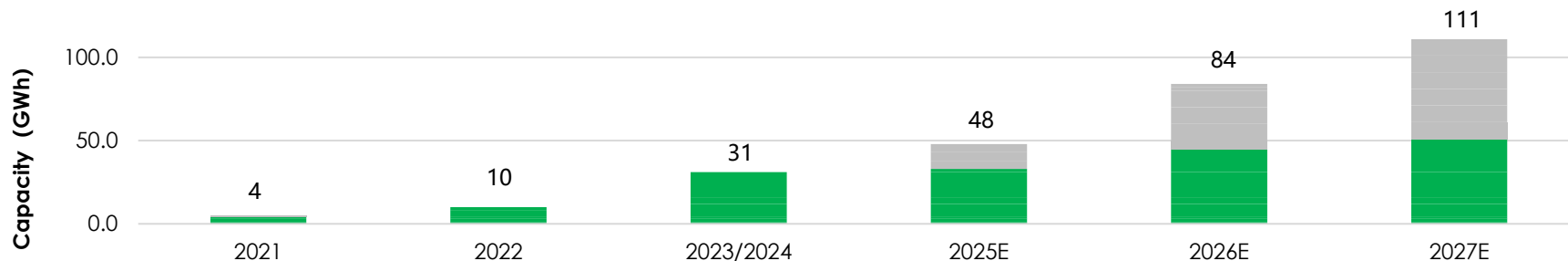
3.584 billion RMB

Ganfeng Lithium Industry's R&D investment amount from 2015 to 2023
(unit: billion RMB)



*Data as of March 2024

Capacity Plan for EV/ESS Battery



Xinyu Phase 1

3.3 GWh put into use in 2020

- SSB: 0.3GWh
- Regular: 3GWh



Xinyu Phase II/III

27 GWh put into operation in 2023

- SSB: 4GWh
- Conventional: 23GWh



Ganfeng, Inner Mongolia (Planned base)

- Cell production capacity: 20GWh



Dongguan Machong (Planned base)

- Cell production capacity: 10GWh
- Pack capacity: 10GWh

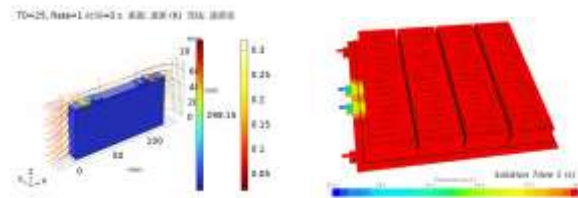
R&D Strength

R&D

- Focusing on R&D of battery cell and system
- Pay attention to safety, cost, and specific power, etc.
- Efficient integration with the industrial chain

Two Research Institutes

Advanced Technology Research Institute
Engineering Technology Research Institute



- Through the simulation capability of multi-scale and multi physical fields from battery cells to systems.
- Assist in the development process from conceptual design to product delivery

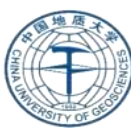
Co-Development



CSU



HUST



CUG



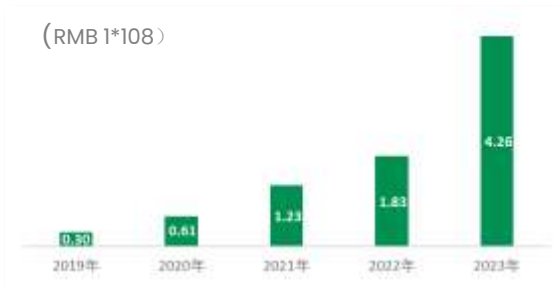
NUAA



NCU

R&D investment

(RMB 1*108)



688+

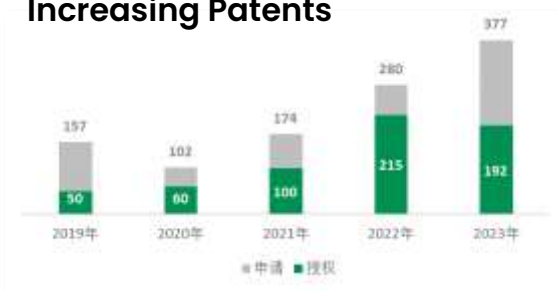
R&D Staff

180+

Postgraduates



Increasing Patents



120+

Invention

477+

Utility Model

Test Capability

Material and Cell

100+

Material and chemical instruments

100+

High and low environment box

60+

Safety test Equipment

12500+

CH/DCH channels

PACK

500+

More than 500 testing equipment, ranging from components to vehicle level inspection

90%+

Covering 90%+ test items

Capable of testing national and international standards such as GB, UL, and UN38.3.



Xinyu Phase I lab



Xinyu Phase II lab



Chongqing base lab

Quality Control

3596+

Quality control points



Overall goal: To build a first-class quality system in the industry, with a 100% completeness and compliance rate of system standards



IEC62619



IEC62477-1



UL1973



UL9540A



UN38.3



IATF16949



ISO9001



ISO3834-2



ISO14001



ISO45001



5MW System Solution
12000+cls, increased capacity density by 34%

02

Our solutions

Our Solutions – Battery Product Collection

PRISMATIC



Cell Status	MP	MP	MP	MP	MP	MP	MP	MP	MP	MP	MP
Cell Type	LFP	LFP	LFP	LFP	LFP	LFP	LFP	LFP	LFP	LFP	LFP
Typical Capacity (Ah)	50Ah	86Ah	100Ah	100Ah	100Ah(3U)	125Ah	150Ah	206Ah	228Ah	280Ah	314Ah
Cell Dimension (mm)	39.8*149.0*101.7	48*173.9*132.7	48*173.9*132.7	48*173.9*132.7	48*173.9*120.8	33.3*200.6*172	33.3*200.6*207.1	53.8*174.2*207.1	53.8*174.2*207.1	71.8*174.2*207.1	71.8*174.2*207.1
Voltage Platform (V)	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.22	3.2	3.2
Energy Density (Wh/kg)	139	131	149	149	149	162	152	160	171	163	175
Cycle life(25°C)	4000,1C,EOL 80%	5000,1C,EOL 80%	6000,0.5C,EOL 70%	3000,0.5C,EOL 80%	5000,0.5C,EOL 80%	3000,1C,EOL 80%	8000,1C EOL 70%	3000,0.5C,EOL 80%	4000,0.5C,EOL 80%	6000,0.5C,EOL 80%	8000,0.5C,EOL 70%
Terminal	Welding	welding/screw	welding/screw	welding/screw	welding/screw	welding	welding	welding	welding	welding	welding
Max. Charge C-rate (Continuous)	1C	1C	1C	1C	1C	1C	1C	1C	1C	1C	1C
Peak discharge C-rate	2C	2C	2C	2C	2C	3C	3C	2C	2C	2C	2C
Certificates	BIS, UL1973, UL1642, UL9540A, IEC62619 etc.	BIS, UL1973, UL1642, UL9540A, IEC62619 etc.	BIS, UL1973, UL1642, UL9540A, IEC62619 etc.	BIS, UL1973, UL1642, UL9540A, IEC62619 etc.	BIS, UL1973, UL1642, UL9540A, IEC62619 etc.	BIS, UL1973, UL1642, UL9540A, IEC62619 etc.	BIS, UL1973, UL1642, UL9540A, IEC62619 etc.	BIS, UL1973, UL1642, UL9540A, IEC62619 etc.	BIS, UL1973, UL1642, UL9540A, IEC62619 etc.	BIS, UL1973, UL1642, UL9540A, IEC62619 etc.	BIS, UL1973, UL1642, UL9540A, IEC62619 etc.

POUCH



Cell Status	MP	MP	MP	MP	MP	MP	MP	MP	MP
Cell Type	LFP	LFP	LFP	LFP	LFP	LFP	LFP	LFP	LFP
Typical Capacity (Ah)	16/20/25Ah	18/20/25Ah	20/30Ah	30Ah	50Ah	20/25Ah	20/25/28Ah	29Ah	50Ah
Cell Dimension (mm)	7.8/102/12.7*117*169	7.8/9.2/10.0*094*249	7.8/11*133*202	7.5*159*270	110*165*260	9.1/10.2*119*194	7.8/9.3/10*130*198	9.4*135*195	13*110*310
Voltage Platform (V)	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
Operating Voltage (V)	2.5~3.65	2.5~3.65	2.5~3.65	2.5~3.65	2.5~3.65	2.5~3.65	2.5~3.65	2.5~3.65	2.5~3.65
Cell Weight (kg)	0.31/0.39/0.48	0.35/0.39	0.39/0.55	0.62	0.95	0.46	0.41/0.47/0.51	0.49	0.9
Energy Density (Wh/kg)	165~172	165 ~ 172	170~175	170	175	190	175	175	180
Specific Energy (Wh/L)	330 ~ 345	350 ~ 360	325~335	325	350	360	350	350	360
Standard Charge C-rate	0.5C	0.5C	0.5C	0.5C	0.5C	0.5C	0.5C	0.5C	0.5C
Max. Charge C-rate (Continuous)	1.0C	1.0C	1.0C	1.0C	1.0C	1.0C	1.0C	1.0C	1.0C

Our Solutions – Cell Solution



↑ **12%**
Capacity
increased

8000
cycles

TECHNICAL PARAMETERS

• Capacity (Ah)	314
• Dimension (mm)	71.8*174.2*204.1
• Working Voltage (V)	>0°C 2.5~3.65 ≤0°C 2.0~3.65
• Max. Continuous Rating	1C
• Weight (kg)	5.69
• Working Temperature (°C)	-30~60
• Storage Temperature (°C)	-30~45 (1 month)
• Cycle Life	8000 cls @0.5C/0.5C, 25°C, 70%SOH
• Certificates	UN 38.3, UL9540A, UL1973, IEC62619

Our Solutions – Cell Solution



↑ **12%**
Capacity
increased

12000
cycles

2025 H2

TECHNICAL PARAMETERS

• Capacity (Ah)	314
• Dimension (mm)	71.8*174.2*204.1
• Working Voltage (V)	>0°C 2.5~3.65 ≤0°C 2.0~3.65
• Max. Continuous Rating	1C
• Weight (kg)	5.69
• Working Temperature (° C)	-30~60
• Storage Temperature (° C)	-30~45 (1 month)
• Cycle Life	12000 cls, @0.5C/0.5C, 25°C, 70%SOH, 1cl/day
• Certificates	UN 38.3, UL9540A, UL1973, IEC62619

Our Solutions – Pack Solution



33%
Energy density increased

TECHNICAL PARAMETERS

Capacity (Ah)	314
Nominal Voltage (V)	166.4
Configuration	1P52S
Voltage Range (V)	130~189.8
System Power (kWh)	52.25
Weight (kg)	≤338
Dimension (mm)	1155.5*768*245.5
Cooling Method	Liquid Cooled
Fire Protection Medium	Aerosol/Water/Perfluorohexane (optional)
Certificates	UN38.3、UL9540A、GB/T36276

Our Solutions – Container Solution



34%
Energy increased
Vs. 3.73MWh product

TECHNICAL PARAMETERS

• Model	E71SE_1.0
• Cell Capacity (Ah)	314
• Nominal Voltage (V)	1331.2
• Configuration	12*1P416S
• Voltage Range (V)	1164.8~1476.8
• System Power (MWh)	5.015
• Nominal Power (MW)	2.5
• Weight (T)	≤43
• Dimension (mm)	6058*2438*2896
• Cooling Method	Liquid Cooling
• Fire Protection Medium	Aerosol+Water

Our Solutions – AC Side Solution



99%
efficiency

Three level topology structure,
supporting bidirectional energy
flow, wide range battery voltage

TECHNICAL PARAMETERS

• Rated Power (MW)	2.5
• DC Voltage Range (V)	915~1500
• Maximum DC Current	1505*2
• AC Voltage Range	0.63/(6~37kV)
• Maximum AC Current	50.4A @ 35kV
• Communication Frequency (Hz)	45~55
• Output Format	Three-phase three-core
• Cooling Method	Air cooling
• Working Temperature range (° C)	-20 ~ 60
• Transformer Type and Power	2500 kVA, dry transformer
• Protection Level	IP54
• Overall size	6400*2600*2896



Higher Safety | Higher Reliability | Longer Life

03

Our advantages

Our Advantages – Three Major Advantages

3 Advantages



HIGHER SAFETY

- Intrinsic safety
- intelligent management
- Active defense
- Smart Firefighting



HIGHER RELIABILITY

- Intelligent Manufacturing
- Ultra standard, Suitable for all scenarios
- Comprehensive testing and validation



LONGER LIFE

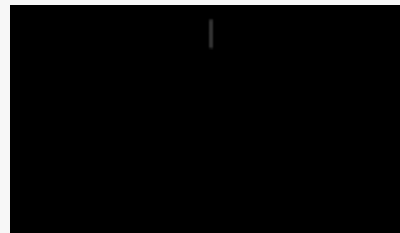
- Material selection, ultra-long cycle life
- C5M anti-corrosion, with a service life of 20 years+
- Full-time domain equalization technology
- Data driven

Our Advantages – Higher Safety

INTRINSIC SAFETY

Flexible solid electrolyte membrane, with better mechanical properties, thermal shrinkage performance, and interface stability

All vehicle grade safety tests have passed



Diaphragm Hot Puncture Test

Test method: 300 °C steel needle, diameter 2.5mm
Test result: Aperture<3.0mm (flexible solid electrolyte membrane)
Aperture>3.5mm (ceramic coating film)
Aperture>5.0mm (traditional diaphragm)

Diaphragm Heating Test

Test method: 180 °C hot box, 1h
Test result: Shrinkage rate<2% (flexible solid electrolyte membrane)
Melting (ceramic coating film)
Melting (traditional diaphragm)

Item	Test Method	Conventional Liquid Lithium Iron	Ganfeng Semi-solid Lithium Iron
Overcharging	At room temperature, charge to 1.5 times the cut-off voltage at 1.0C.	No smoke, no fire, no explosion~ 116% SOC reaches the cut-off voltage	No smoke, no fire, no explosion~ 108% SOC reaches the cut-off voltage
Acupuncture	5mm steel needle penetrates the battery cell	No fire or explosion; The maximum temperature of the battery cell is 213.8 °C	No fire or explosion; The maximum temperature of the battery cell is 60.9 °C
Hot box	Heat up to 180 °C at a rate of 5 °C/min and hold for 30 minutes	No smoke, no fire, no explosion; The maximum surface temperature of the battery cell is 178.2 °C	No smoke, no fire, no explosion; The maximum surface temperature of the battery cell is 146.6 °C

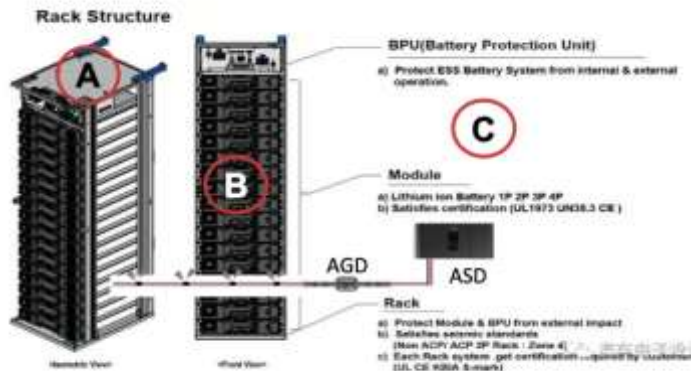
Our Advantages – Higher Safety

Big data intelligent management, fault warning, diagnosis, and etc.

- > Self developed fault prediction algorithm with a 0% missed detection rate
- > Pioneered full cycle monitoring model, providing full protection throughout the entire process
- > Data-based visualization, intelligent operation and maintenance, Multidimensional data collection, real-time monitoring
- > Optimal revenue collaborative management, minimum OPEX.



Our Advantages – Higher Safety



PACK

New fire protection plan

- A. Embedded Miniature Linear Temperature Detector
- B. Battery electrolyte leakage detection
- C. Inhalation type smoke and gas detector...

Proactive firefighting, intelligent firefighting

- Newly developed nano thermal insulation material with a thermal conductivity of $\leq 0.036\text{W}/(\text{m} \cdot \text{K})$ at 800°C
- Bidirectional heat insulation film, ultimate heat absorption, suppresses heat conduction
- Full coverage active detection, improved detection density

Inhalation detector+gas detection, actively detecting and...

Our Advantages – Higher Reliability

Intelligent, automated, and information-based production and manufacturing capabilities

- Highly intelligent, automated, and data-based production and manufacture

- GANFENG Cell manufacturing workshop: 100,000 level dust-free workshop, 10,000 level equipment small environment control vs. average manufacturers' 300,000 level

* The cleanliness is an important indicator for measuring the cleanliness of the air in the production workshop, and directly affects the quality, efficiency and production cost.

* 100,000 level: the number of fine dust particles with a diameter greater than or equal to 0.5 microns per cubic meter of air in the workshop shall not exceed 100000.

- The coating machine die head is industry-leading, and the COV of the coated electrode material is ≤ 0.20

- Extremely strict quality control

Traceability of the entire manufacturing process

Various tests before delivery

...



Our Advantages – Higher Reliability

Exceeds Standards Reliability is our top priority

With strict selected and designed raw materials, multi-level protective structures, and strict quality control, **GANFENG** ensures reliability in harsh environments:

- **5000 m** high altitudes
- **-40° C** Low temperature environment
- **+50° C** High temperature environment
- **95%RH** High humidity environment



Our Advantages – Higher Reliability



Laboratory testing capabilities

- 15000+ cell tests
- 108+ safety tests
- 200+ module tests
- 217+ reliability tests
- 100+ pack tests
- 100+ performance tests



Thermal runaway test



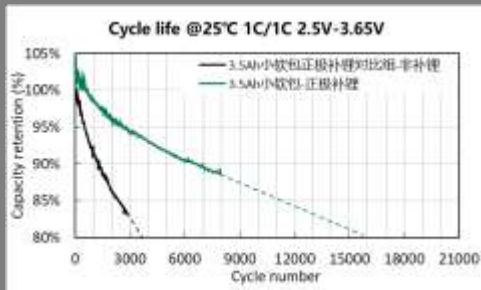
Vibration testing
Squeezing test
Submerged test



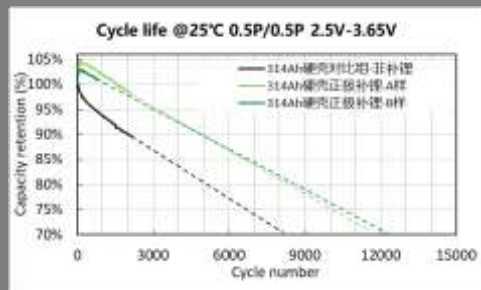
Our Advantages – Longer Life

12000 cls, 70% SOH, 95.5% high energy efficiency

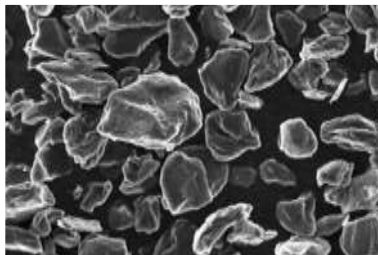
Cathode and Anode Pre-lithiation



Anode pre-lithiation pouch: 8308 times, maintaining a capacity of 88.3%

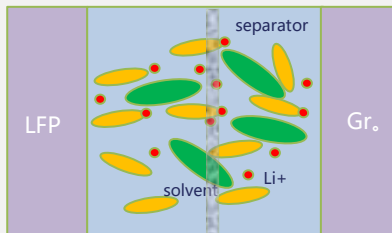


314Ah Anode pre-lithiation: sample B 0.5P 25 °C cycling trend >12000 times @ 70%



Cathode material

- Structural design: reduced defects by regulating the crystallinity and content of the carbon layer coating on the surface, reducing defects
- Raw material selection: low expansion, isotropic



High-entropy electrolyte

- Composite lithium salt: high conductivity
- Solvent: Low interfacial resistance for large cells
- Special additive: Highly resilient and stable SEI, lower lithium consumption

Our Advantages – Longer Life

C5M corrosion protection for container, ensure a 20+ years service life.

The external coating of the container meets the requirements of **ISO-12944-5 C5M** intermediate standard.

The durability of the coating meets the intermediate requirements of C5M, and it achieves a rating of **720 hours** in the ISO12944-6 neutral salt spray test



Our Advantages – Longer Life

Domain equalization technology can precisely allocate energy among individual battery cells, significantly extending the system's operating duration.

Reduce heat loss during energy conversion, lower cooling requirements, and enhance energy efficiency.

Full-time Domain Equalization

- Equilibrium duration: **5 times ↑**
- Available battery capacity: **7% ↑**
- System pressure difference: **26.7% ↓**



Efficient
Equalization

Shortening
Charging



Quickly balancing battery voltage differences and accelerating the overall charging of the battery pack to full charge.



Low Heat
Generation

Longer Life



Ensure that battery cells operate within the optimal voltage range, maintain battery health, and reduce the frequency of replacements.

Our Advantages – Longer Life

- ✓ Data driven, NDT
- ✓ Strategy – Lifespan – Strategy Closed Loop

- Data driven

Fast time: 10 times ↑ detection efficiency

High accuracy: Capacity estimation error <2%

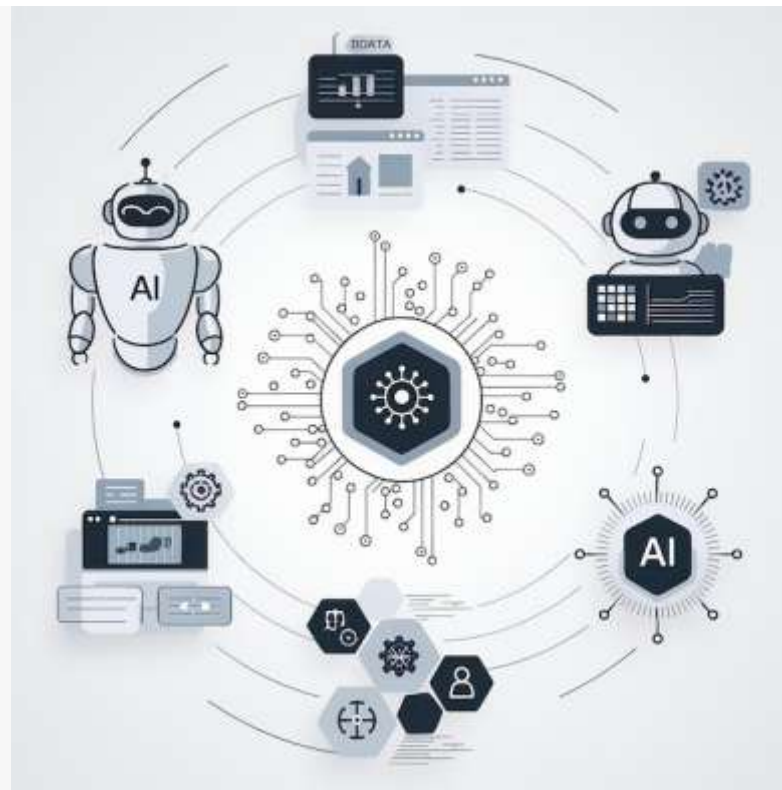
- Machine Learning

Establish a machine learning based prediction model to predict the performance of energy storage systems, use machine learning algorithms to diagnose and locate faults in energy storage systems, and improve maintenance efficiency and accuracy.

- Closed loop strategy

Real time monitoring and feedback: The status of the energy storage system is monitored in real-time through sensors and data acquisition systems, and the data is fed back to the machine learning model for analysis.

Optimization control strategy: Based on the prediction results of the machine learning model, optimize the control strategy of the energy storage system to improve its performance and safety.





11+GWh accumulated project experience

31+GWh annual production capacity

100+large-scale project applications

04

Our Projects

Our Projects

11+ GWh

Accumulated project experience

31+ GWh

production capacity,
ensuring fast delivery

100+

Large scale project applications



Our Projects



Taiwan, China

78MW/156MWh



Inner Mongolia, China

60MW/120MWh



Gansu, China

40MW/80MWh



Xinjiang, China.

125MW/500MWh



Guangdong, China.

35MW/70MWh



Xinjiang, China

70MW/140MWh

Our Projects



Hubei, China

50MW/100MWh



Hubei, China.

50MW/100MWh



Hubei, China.

50MW/100MWh



Xinjiang, China

37.5MW/75MWh



Inner Mongolia

30MW/60MWh



Jiangsu, China

150MW/300MWh

Our Projects



Xinjiang, China

15MW/30MWh



Jiangsu, China.

5MW/21MWh



Jiangsu, China

10MW/54MWh



Gansu, China

15MW/30MWh



Henan, China.

4.75MW/4.75MWh



Gansu, China.

10MW/42MWh

Thank you!



Utilize limited resources to create infinite value



GanfengLiEnergy

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