

Shenhao energy storage homestorage & portable energy storage business introduction



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Business background



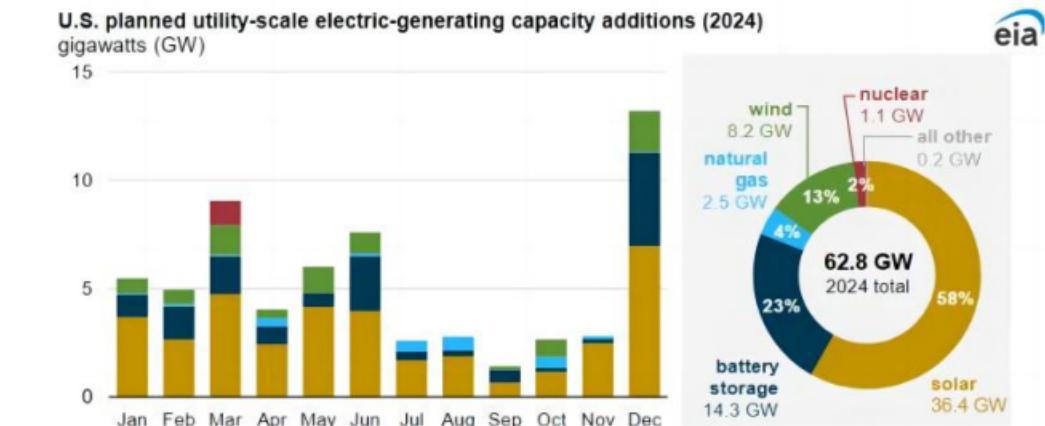
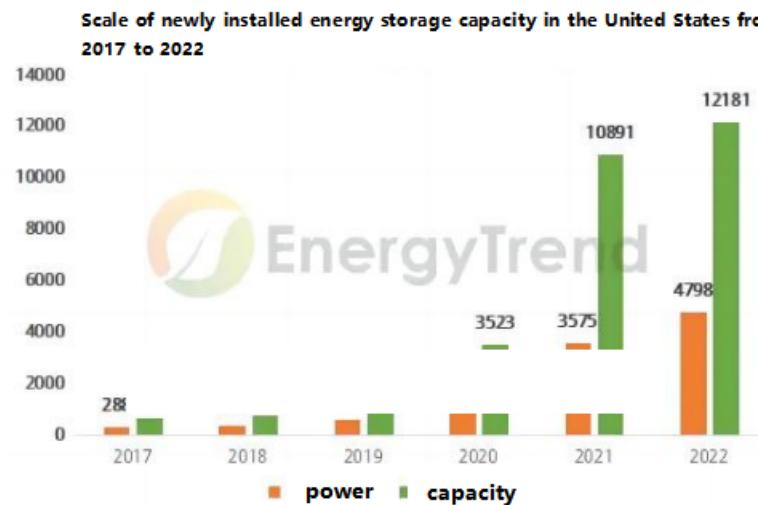
North America's energy storage Industry background

America——

Market size



In 2023, the scale of new energy storage installed capacity in the United States reached 8.7GW, an increase of more than 90%. It is expected that the new installed capacity is expected to reach 14.3GW in 2024, and the cumulative installed capacity of energy storage on the grid side will nearly double.



Policy support



The Inflation Reduction Act (IRA) and new FERC regulations streamline the process of subsidizing and connecting new energy projects.

State governments have also developed independent energy storage support policies, such as



Technology trend

Lithium iron phosphate batteries are the main market segment, accounting for about 87%.

Battery storage technology is moving towards higher energy density, longer cycle life and lower cost.

YEAR/STAGE	TOTAL INSTALLED CAPACITY (GW/GWh)	THE YEAR-ON YEAR FROWTH RATE(%)	PRE-SCALE ENERGY STORAGE (GW/GWh)	RESIDENTIAL ENERGY STORAGE (GW/GWh)
2022	4.78/13.83	35.79/25.54	4.01/12.03	0.62/1.60
2023 H1	2.46/7.74	8.91/32.06	2.06/6.66	0.29/0.77
2023 Q3	2.35/7.32	62.21/47.54	2.16/6.85	0.17/0.38

Overview of installed capacity of the US energy storage market

Residential energy storage



The U.S. rooftop solar installations have the technical potential to meet 45 percent of U.S. electricity demand, and rooftop solar installations have grown about 10-fold over the past decade.

The decline in supply-side costs, such as batteries, and the ITC credit for independent energy storage larger than 5KWh under the IRA Act have improved the economics of household storage.

TIME	2022	2023	2024-2032	2033	2034	2035	2036
BEFORE UPDATE	26%	22%	10%	10%	10%	10%	0%
AFTER UPDATE	30%	30%	30%	26%	22.5%	15%	15%

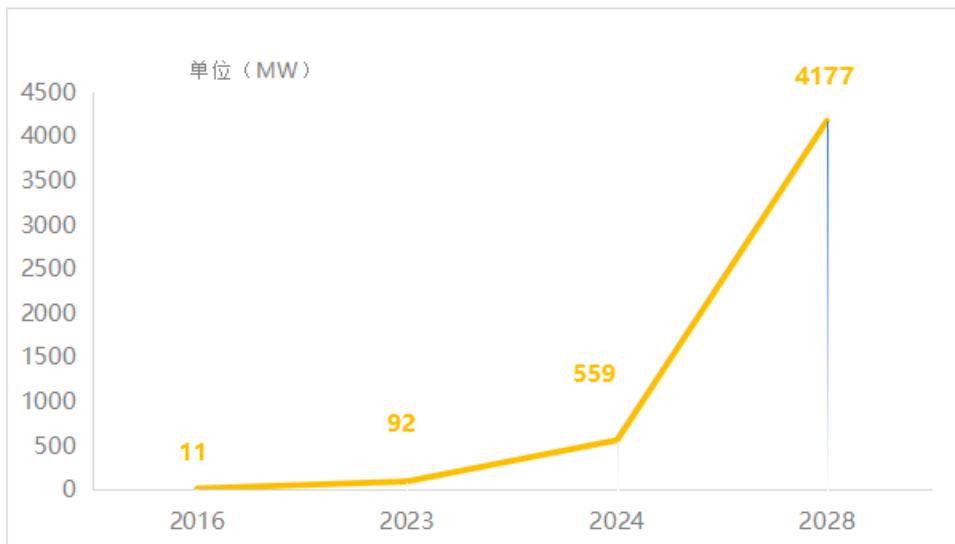
Changes in U.S. ITC subsidies before and after the Inflation Reduction Act of 2022 in residential

Canada

Market size



The PV energy storage market has grown from \$120 million in 2019 to an estimated \$390 million in 2024, representing a CAGR of 26.8%. Lithium-ion batteries are the main energy storage devices, accounting for the vast majority of the market share. The market size was \$90 million in 2019 and is expected to reach \$310 million in 2024, with a CAGR of 28.5%.



Changes in installed capacity in Canada 2016-2028

Policy support



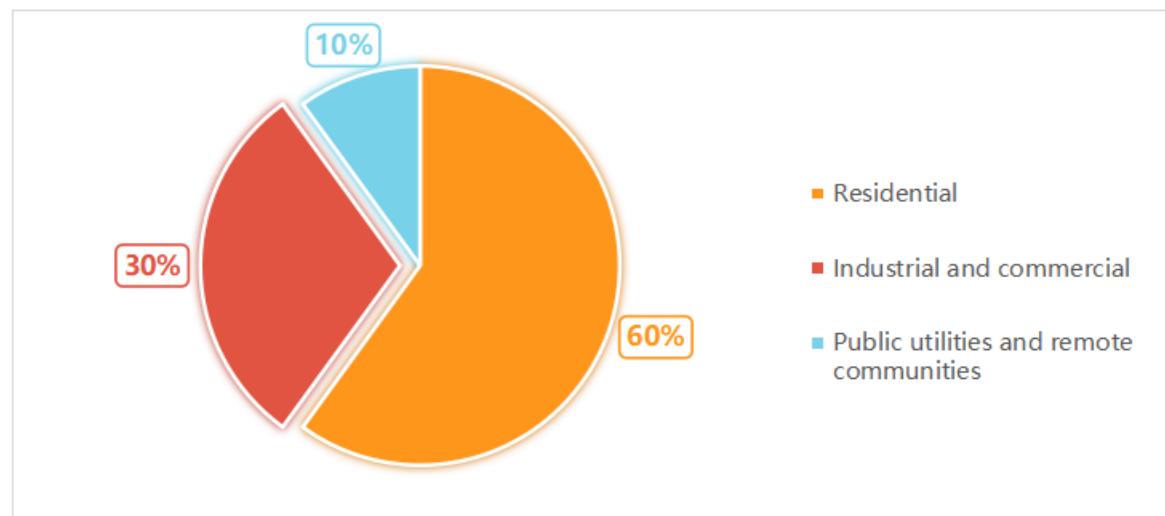
Specific measures: tax credits, subsidies, net metering, power purchase agreements and other incentives. Set up energy storage auction mechanisms (such as Italy's MACSE) to support large-scale energy storage projects.

The government report, Energy Storage: Canada's Critical Net-Zero Path, states that at least 8-12GW of storage needs to be installed to achieve the net-zero target by 2035.



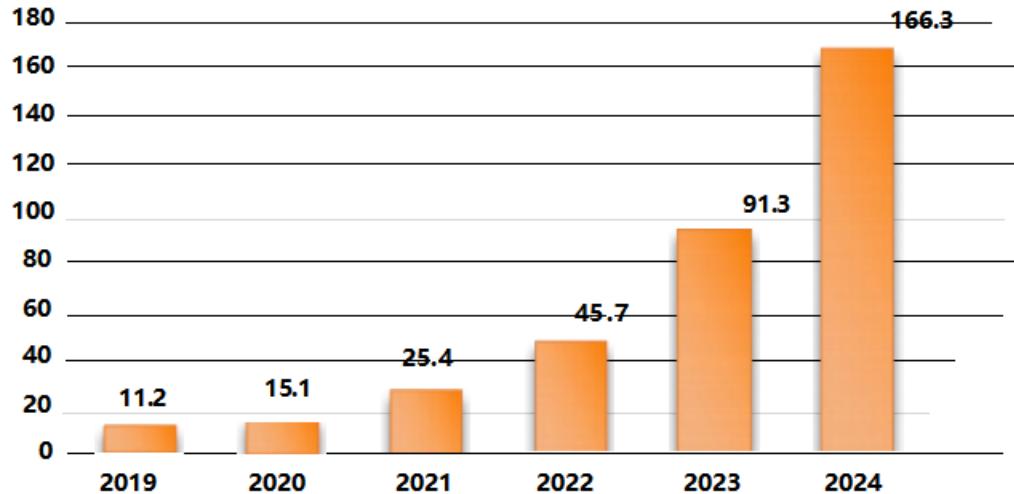
Specific performance of the energy storage market in residential

According to the latest forecast, affected by the decline in electricity prices and natural gas prices, the new installed capacity of Canadian residential storage is expected to reach 11GW/20.9GWh in 2024, an increase of 5%/11%.

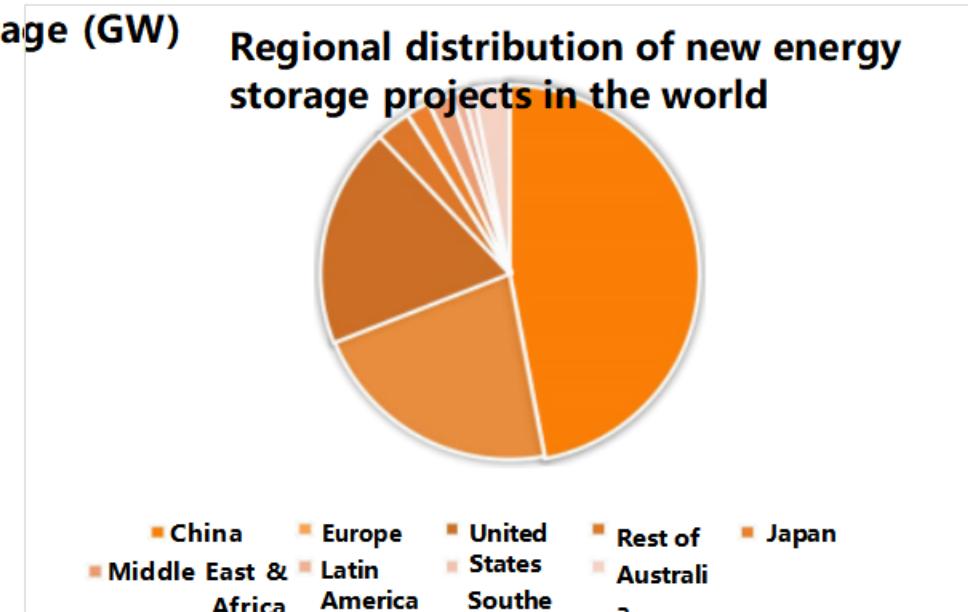


Global Energy Storage Industry Background

Global cumulative installed capacity of new energy storage (GW)



Regional distribution of new energy storage projects in the world



Scale of new energy storage installations worldwide:

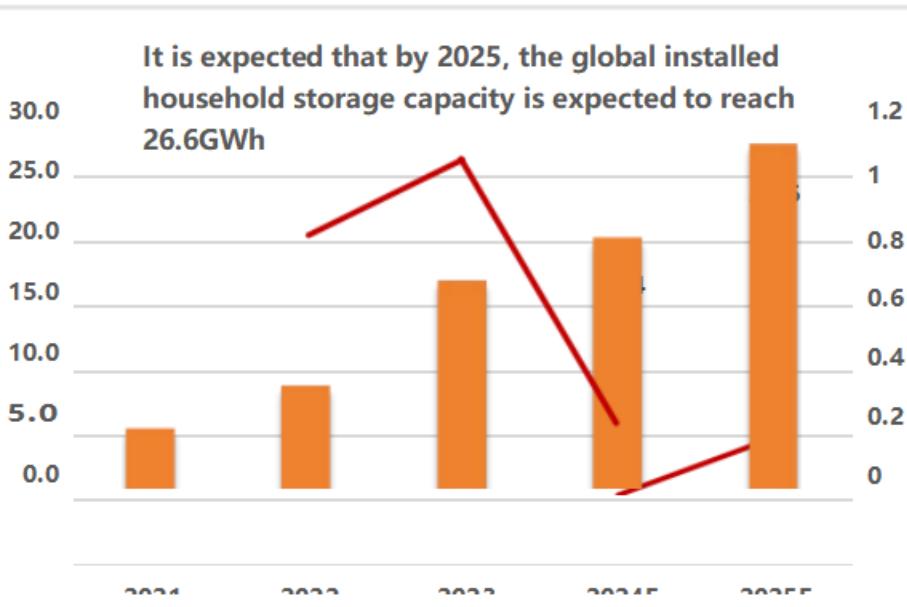
In recent years, the global new energy storage installed capacity is growing rapidly, and there is still a great potential for growth in the future. The "2024-2029 Global and China new energy storage industry market in-depth research and investment Prospects Report" released by the China Business Industry Research Institute shows that by the end of 2023, the global cumulative installed capacity of new energy storage reached 91.3GW, is

Nearly double that of the same period in 2022. China Business Industry Research Institute analysts forecast that the global cumulative installed capacity of new energy storage will increase to 166.3GW in 2024.

Global market share:

In terms of regional distribution, China, Europe and the United States continue to lead the development of the global new energy storage market. In 2023, the global new energy storage new operation scale of 45.6GW, of which, China, Europe and the United States accounted for 47%, 22% and 19%, respectively, the three accounted for 88%, other countries and regions of the new energy storage market accounted for relatively small.

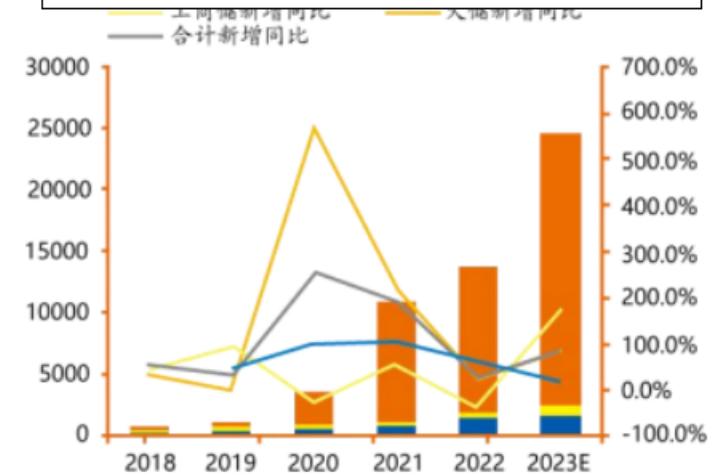
The demand of the international household storage market continued to improve, and the installed capacity remained at a high level



2019-2023 New installed capacity of major countries



New installed capacity of energy storage in the United States over the years and forecast (MWh)



Since the rapid rise of European household storage, household storage has become a high-quality track for the new energy sector.

Among them, due to high energy prices, policy support, rapid technological upgrading, and people generally pay more attention to the concept of health and environmental protection, the European and American markets have become hot areas for the development of household storage.

Affected by global high inflation and the energy crisis brought about by regional geopolitical conflicts in Europe, the global household storage capacity jumped from 4.7GWh to 16.1GWh in 2021-2023, with a compound annual growth rate of 85%.

electricity, high electricity prices, energy storage has become a demand in emerging markets such as Southeast Asia

In Southeast Asian countries such as the Philippines, Vietnam, Thailand, Indonesia, Malaysia and Singapore, as well as other emerging markets, energy storage has become a rigid demand due to the lack of power and high electricity prices.

According to the Paris Agreement target, Southeast Asian countries must deploy about 21GW of renewable energy per year by 2030, when their energy storage market is expected to add nearly 15GWh cumularly compared to 2020.

COUNTRY	Electricity market main issues	Renewable energy policy/document	Energy storage installations/market size
Thailand	The electricity gap is large, about 13% depends on imports, and the electricity price is about 0.12 US dollars /kWh, which is at a high level in Southeast Asian countries.	Power development Plan for 2022	2023H1, energy storage installed capacity of about 30MW.
Vietnam	In the north, demand for electricity exceeds supply and production is halted, while the remaining water in the south is only enough for 4 days of electricity consumption according to the high peak electricity standard, and the future energy storage demand will be put on the agenda.	The Eighth Power Development Plan (PDP8)	By 2030, photovoltaic power plants will increase to 12GW, and 2.7GW of energy storage.
Philippines	The country relies on fossil fuels for 70% of its electricity, which are mostly imported, leading to shortages Electricity is severe and the price of electricity is high. At the same time, typhoons and other natural disasters are frequent, and remote islands cannot be connected to the power grid.	Amendments to the Renewable Energy law	6GW of energy storage is expected to be configured.

Singapore	<p>More than 95% of its electricity comes from imported natural gas, and its power sector has high carbon emissions</p> <p>It accounts for 40% of total emissions. To enhance energy security and achieve carbon reduction, vigorously deploy solar power generation and storage facilities.</p>	Award of the power import project	Construction of Southeast Asia's largest energy storage project, with 200MW deployed.
Indonesia	<p>Large population with strong demand for electricity; Renewable energy is abundant and installations are rising fast. But grid coverage is low, grid infrastructure is backward and ununified,</p> <p>Power transmission and distribution is difficult, and the use of rooftop photovoltaic + household storage can better ensure living</p> <p>The stability of civil electricity.</p>	Presidential Regulation on Renewable energy	Plan to build 7 gigawatts of solar power and 12 thousand Megawatts of battery storage, expected to be the world's largest energy storage project.
Malaysia	<p>Currently, 55.5% of electricity supply comes from coal and 37.1% from natural gas, recoverable</p> <p>The proportion of electricity supply from raw energy is 6.48%. To achieve carbon neutrality by 2050, 31% of electricity generation in 2025 is expected to come from renewable sources.</p>	National Energy Transition Roadmap (NETR)	Plans to invest \$143 billion for energy storage system integration and other projects, is expected to install 4.5MW capacity of photovoltaic panels, will bring 2250KWh household storage capacity.

The portable energy storage market is growing rapidly, and the opportunities for new energy vehicles, two-wheelers and other To B scenarios are prominent

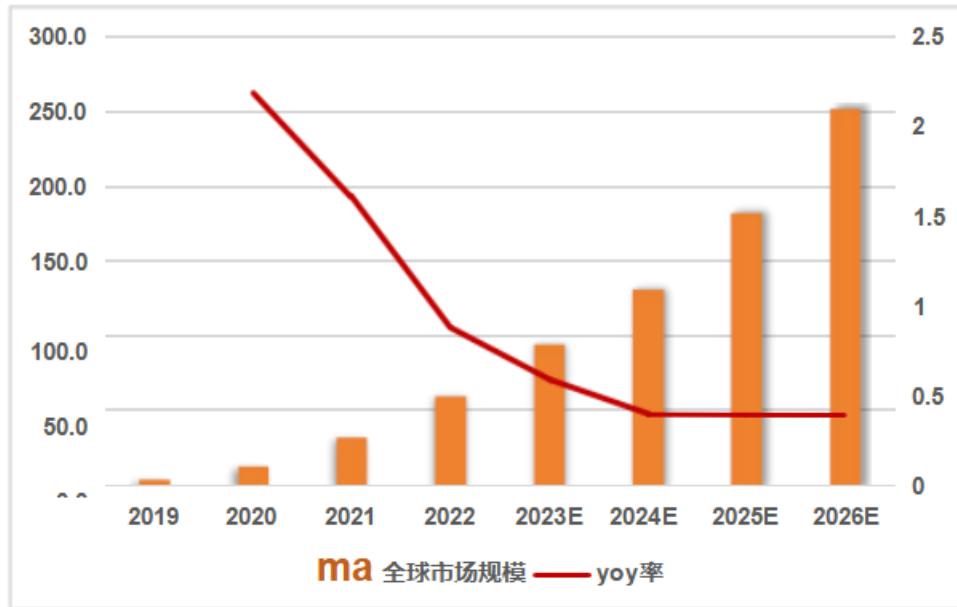


Figure 1: Global portable energy storage market size from 2019 to 2026

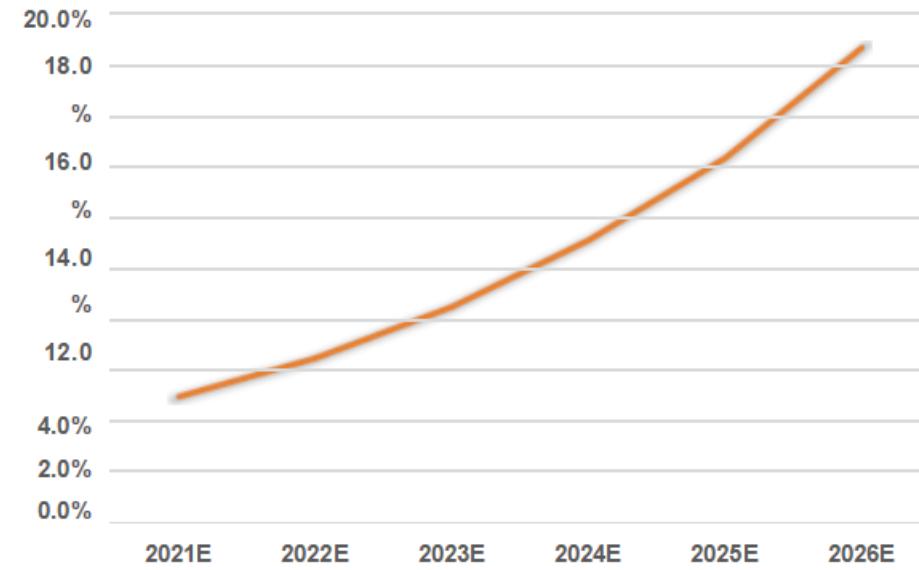


Figure 2: The proportion of portable energy storage replacing traditional diesel generators continues to rise

During the epidemic period from 2019 to 2022, the global portable energy storage power supply market grew rapidly, and the industry scale increased from 380 million US dollars to 5.9 billion US dollars. As the two major application scenarios of outdoor sports and emergency backup power continue to release demand, it is expected that by 2026, the global market will maintain a growth trend and the growth rate will stabilize, and the market size is expected to exceed 25 billion US dollars. Under the trend of low-carbon development, portable energy storage power is expected to quickly replace traditional diesel generators. According to the forecast of China Chemical and Physical Power Industry Association, the replacement ratio is expected to rise to 18.6% by 2026. Among them, opportunities are particularly prominent in to-B scenarios such as new energy vehicles, two-wheelers, construction, movies, events and emergency services.

Developing household and portable energy storage to promote energy transformation and change our lives

As the energy crisis stimulates high electricity prices, and people's awareness of low-carbon environmental protection continues to increase, the development of household and portable energy storage has become a general consensus of governments and industries around the world.

The industry expects that through the development of household and portable energy storage, the energy choice and autonomy of users will be increased, and the quality of life of people will be improved while promoting the development of energy transformation.

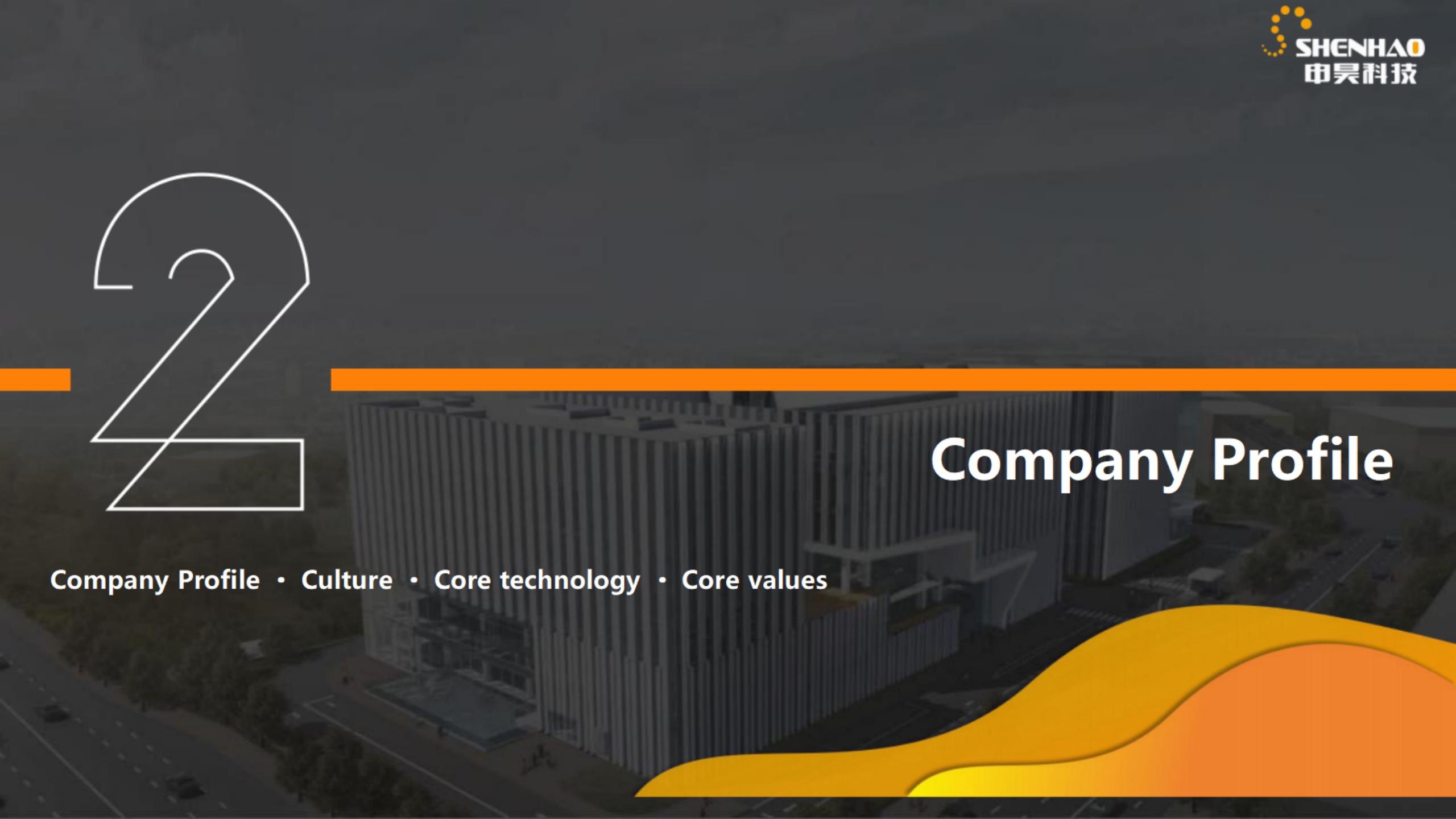
01

Household energy storage system is generally combined with photovoltaic power generation system to achieve photovoltaic power generation self-use and surplus power storage. Through the development of household energy storage, it can reduce the electricity bill of household users and improve the home.

02

With the rise of self-drive Tours, outdoor camping and other modes of travel, new energy vehicles, two wheels cars, motorhomes, and small appliances such as rice cookers, projectors, drones, and incubators gradually become the standard, bring portable energy storage products hot demand. Emergency lighting, mobile stalls, mountain and wild forest operations and other diversified scenes.

2



Company Profile

Company Profile · Culture · Core technology · Core values



Company Profile

Focus on prevention, real-time control, standardized testing, implementation of each step of the implementation of safety standards

Accidents

Company profile:

Shenhao Energy Storage is jointly established by Shenhao Technology (stock code: 300853) and Qida New Energy, which is a group company specializing in the research and development and production of energy storage cells and energy storage battery packs. Headquartered in Hangzhou, Zhejiang Province, the company has a soft-pack lithium battery cell factory with an annual capacity of 1.2Gwh covering an area of 50,000 square meters in Longyan, Fujian Province. The PACK factory covers an area of 112,000 square meters and has an annual capacity of 2Gwh of energy storage in Huinan City, Anhui Province.

Main products:

113161230-50Ah lithium iron phosphate soft PACK battery, industrial and commercial energy storage system, household/home energy storage system, high and low voltage energy storage lithium Pack, ESS lithium energy storage system, portable outdoor power supply, etc.

Core technologies

Long life cell

Integrated high-quality cycle
number LFP cel , cycle times > 8000

Efficient and balanced BMS
Single series design + efficient
balancing technology , the system
parallel loss tolerance is 0

High performance PCS
Integrated battery management and Intelligent
distribution system , multi-level topology ,
minimum switching vector control algorithm ,
maximum efficiency 99 . 3 %



Active safety system
Partition safety isolation ,
Pack-level active safety
warning unit+ submerged fire
control to ensure fire control

Thermal management system
Use air cooling liquid cooling to maintain
each cell of the battery PACK working at a
suitable temperature to ensure battery
performance and cycle life

Manufacturing



Shenhao Energy Storage -- creating a new era of household and portable energy storage

Extreme safety: The standardized cabinet realizes the safety isolation of the battery system. Based on the thermal management technology of a single cell, 9-level active safety monitoring, pack-level active safety warning and submerged fire protection technology, it ensures the safety and controllability of the energy storage system.

Economical and efficient: zero parallel loss tolerance of single series design, efficient multilevel topology and minimum loss frequency conversion control technology, optimal thermal management design and intelligent environment temperature control technology, PCS and battery voltage optimal fitting technology, so that the system conversion $\geq 290\%$.



Ultimate Safety

The standardized cabinet realizes the safety isolation of the battery system, based on the thermal management technology of a single cell, 9-level active safety monitoring,

Pack-level active safety warning and submersible fire technology, indeed the energy storage system is safe and controllable.



Economical and efficient

Zero parallel loss tolerance single series design, high efficiency multilevel topology and minimum loss frequency conversion modulation technology, optimal thermal management design and intelligent ambient temperature control technology, PCS and battery voltage optimal fitting technology.



Grid-friendly

Support primary and secondary frequency modulation, high and low voltage pass through, source network load, AGC/AVC,

Inertial control and other power grid stability control strategy, power grid dispatching power response time $<50\text{ms}$: embedded peak cutting valley filling,

Demand control and other user side control strategies, each device can operate independently.



Intelligent operation and maintenance

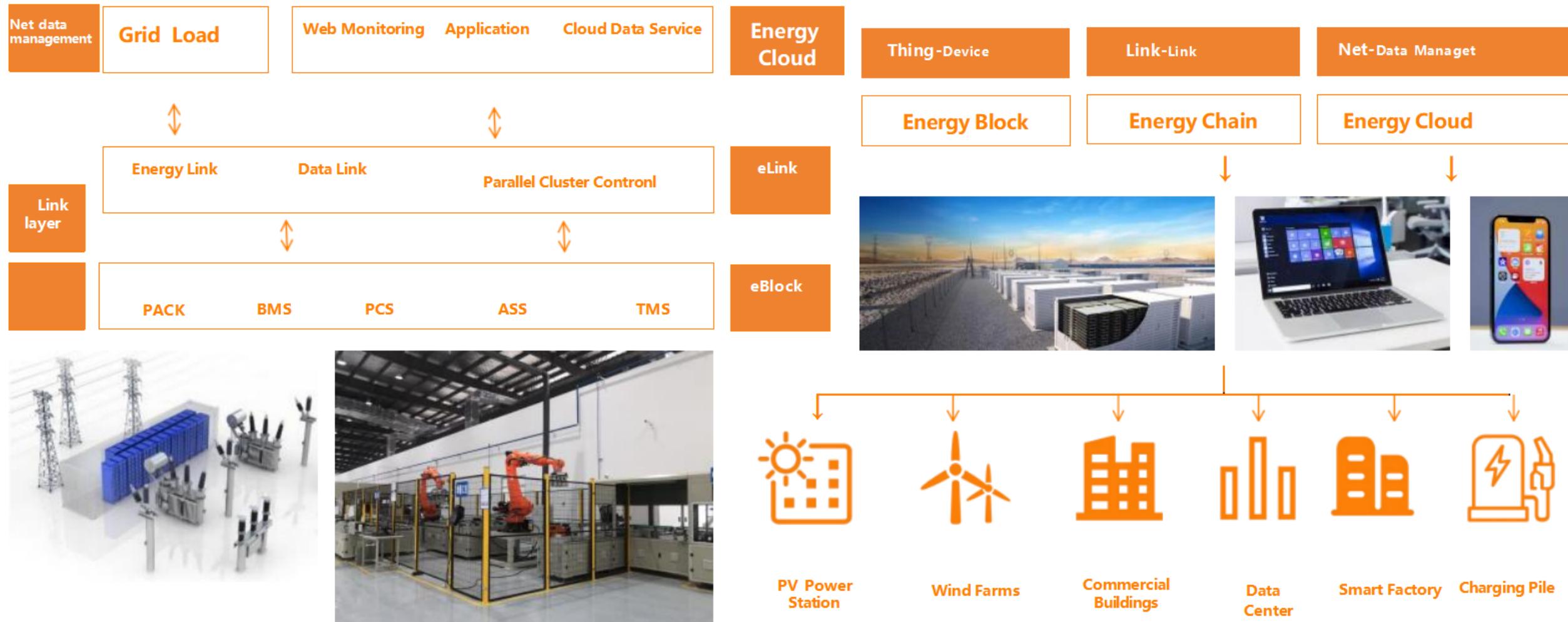
Infinite parallel to achieve the elastic expansion of the energy storage station and complete modular maintenance, the running data can be connected to the singularity energy cloud eMind through Wi-Fi, 5G, LAN, etc., to truly realize the unattended energy storage station.



Energy storage solutions

Light storage integration of comprehensive intelligence: let green electricity benefit thousands of industries and thousands of households

Based on energy block, it is designed according to the device layer, link layer and data management layer. The core products include energy block, energy chain and energy cloud. Through this scheme, efficient and safe building block design from 100kwh small energy storage unit to GWh large energy storage power station can be realized. It solves the common problems in the traditional centralized energy storage scheme, such as low system security, high parallel loss tolerance and short system life, and defines a new standard for energy storage system integration.



Household energy storage Optimizes electricity use, increases energy efficiency and lowers electricity bills with the help of renewable energy

Household energy storage has the characteristics of efficient energy storage, intelligent control system, multi-function inheritance, scalability, security design, etc., which is of great significance for improving energy utilization efficiency, reducing electricity expenditure, and enhancing energy autonomy.

At present, the mainstream application scenarios of household energy storage include solar self-use, power grid peak load balancing, backup power supply and smart home.

Solar self-use

In homes equipped with solar photovoltaic systems, household energy storage devices can store excess electricity generated on white days for use at night or on cloudy days. This not only improves the utilization rate of solar energy, but also reduces the dependence on the grid and reduces the cost of electricity.

Peaking of the Grid

During the peak load of the grid, Electricity prices are usually higher. Household energy storage devices can be charged during low hours, such as late at night, and Solve the power grid pressure. discharged during high hours to supply electricity to the home, thereby reducing the cost of electricity. In addition, it can also provide peak service for the power network and slow down

Backup power

The household energy storage device can be used as a backup power supply to provide emergency power protection for the family in the event of a power failure. Through the intelligent control system, the energy storage device can automatically switch to the standby power mode in the case of power failure, ensuring the normal operation of important equipment in the family.

Smart home

The combination of household energy storage devices and smart home systems enables more efficient energy management. For example, through the intelligent control system, the energy storage device can adjust the charging and discharging strategy according to the household power consumption habits and weather forecast, optimize the energy use and improve the comfort of the family.

With the help of renewable energy sources, portable energy storage can optimize power use, improve energy efficiency and reduce electricity bills

The portable energy storage market is developing rapidly, and various brands and models of products continue to emerge, and will show more functions and more efficient charging efficiency, more lightweight and easy to carry design, more intelligent and personalized operating experience, a wider range of applications and other trends.

At present, the application of portable energy storage equipment in camping and outdoor activities, RV electricity, emergency power, combined use of solar panels, electric vehicle charging and other scenarios has been very mature.



Camping and outdoor activities

In camping, outdoor activities, mountaineering expeditions, picnics, bonfire parties, high-altitude work, portable energy storage power can support mobile phone charging, cooking food, playing music and other activities, but also connected to electric oven, electric fan, mobile refrigerator, mobile air conditioning and other equipment, for outdoor life to provide more convenience.



Motorhome electricity

The use of portable energy storage power in the RV can support the use of a variety of household appliances, such as rice cookers, electric kettles, etc. By connecting to an outlet in the RV, electricity can also be stored for use outside the home for extended periods.



Emergency Power Supply

A portable energy storage power source stores electricity and can be used as an emergency power source in the event of a power outage. In the event of power failure, you can continue to use lighting, heating equipment, and even use a microwave oven to heat food, ensuring that life is not affected.



Solar panels are used in combination

The combination of portable energy storage power and solar panels can achieve a more environmentally friendly and energy-saving power supply. The electric energy generated by solar power generation is stored in the portable energy storage power supply by connecting to the outdoor power supply and the solar power panel, which provides power for various appliances and provides longer use.



Electric Vehicle Charging

Portable energy storage devices with larger power can replace charging stations and charge electric vehicles such as new energy vehicles and two-wheelers. It should be noted that new energy source vehicles have strict requirements for power supply specifications. Safety must be ensured when using portable energy storage power.

Stacked household energy storage



ZD64000V

DC Battery Parameters/DC Battery Parameters			
Cell Type Cell type	LFP 50Ah	Battery voltage range Battery Voltage Range	40~58V
Battery PACK configuration Battery PACK Configuration	2.56 kWh	Number of temperature detected Temperature Detection Number	10
Battery System Configuration Battery System Configuration	12.8kWh	Dc protection DCProtection	Fuse
System Parameter /System Parameter			
Maximum System efficiency MaxSystemEfficiency	85% or higher	Cooling method CoolingMode	Aircooling /AirCooled
Charge/discharge ratio ChargeandDischarge Ratio	0.5 C	Operating temperature OperatingTemperature	-10 to 55 °C
Discharge depth DischargeDepth	80%DOD	Relative humidity RelativeHumidity	0-95% RH, no condensation 0-95%RH,no condensation
System voltage system System Voltage Standard	220Vac/50Hz	Noise Noise	<40dB
Number of cycles CycleNumber	P 6000	Altitude Altitude	≤2000m
Charge and discharge switching time Chargeand Discharge SwitchingTime	<100ms	System Size System size	650*500*1700mm
Communication interface Communication Interface	RS485/RS232/C AN	Type of fire FireProtection Style	Aerosol
Protection Rating IP Rating	IP54	Weight Weight	105kg

Portable outdoor



ZDP-1200 portable mobile power supply is A mode of portable energy storage power supply that integrates various functions, with built-in high-performance lithium iron phosphate battery core, high-quality BMS management system, efficient inverter conversion circuit, which can be used for home, office, outdoor camping and emergency backup power supply. Optional mains or solar charging, can provide rated 220V/1200W AC output, 5V/12V DC output, USB output, Type-C, Wireless output.

ZDP-1200W (1120Wh)

Model number(Model)ZDP1200

Rated Capacity 1120WH

The Rated Power is 1200W

Charge And Discharge Parameter Charge and discharge parameter

Charge operating temperature

0°C to 40°C

ChargeTemp Charge type

Support AC direct charging,solar charging (Support AC direct charging,solar charging)

ChargingType

Mains input 100V/Solar input 26-40V(AC Input 100V/Solar Input 26-40V)

InputVoltage Range Maximum

Mains input 100V Solar input 26-40V(AC Input 100V/Solar Input 26-40V)

InputVoltage Max InputVoltage Charging
voltage InputVoltage

16.8V

AC Max Charging Current AC Max charging current

100V/10A

Max Charging Power MaxCharging power

550W

DischargeTemp

- 10 °C to 40 °C

OutputType OutputType

AC USB Type-C DC Wireless Charge (Wireless)

Rated OutputPower Rated output power

1200W QC3.0 18W 65W MAX 100W 15W

50Hz/60Hz±1HZ

Rated output frequency

110 to 230V/10A 5V/2.4A 5V/3A 5 to 20V/3.25A 12.5V 8A 12V/1.25A

RatedOutputFrequency Output voltage
/Current Output Voltage/Current

Product Feature ProductFeature

Heat Dissipation Mode Heat Dissipation mode

Two-way air cooling technology

RunningNoise Running Noise

≤5dB

Protection Level

IP53

Protection Grade

65 ±20%RH

Working Ambient Humidity Storage Humidity

370*245*275m 65±20%RH

Product Parameters ProductInformation

Product Size (Product Size)

370*245*275mm

Package size (Package Size)

455*325*368mm

GrossWeight (Net

15KG

Weight) Net weight

13KG

(Weight)

carton packing (carton packing)

Packing Method (Packing Method)



Application Cases

Shen Hao Energy storage x polar krypton

To the standard of car building

Create intelligent outdoor ecology

Let you call life anytime and anywhere



ENERGY STORAGE

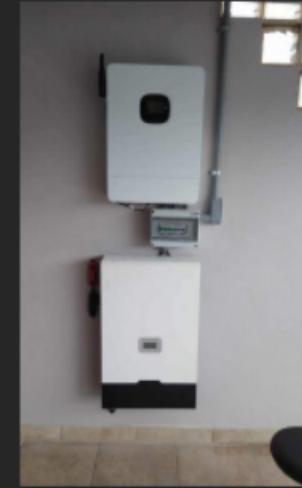
Application case 1: Portable mobile power supply allows people to enjoy the outdoor life



Tour in the mountains and rivers, breathe the fresh air freely, enjoy the sweet outdoor life.



Application Case 2: Household energy storage equipment settled in Southeast Asian households



Application Case 3: Household energy storage equipment to provide electricity security for Myanmar households



The company's household energy storage equipment has been put into use in Myanmar and other countries, providing convenient and guaranteed power security for Southeast Asian families with imperfect power facilities.



The industry is healthy and healthy,
and it is no longer difficult to remove the obstacles

THANK YOU