# Japan's First Solid-State Lithium-Ion Battery

. . A Holdings, Inc. gf.Z Co., Ltd. Yoshiki Nagaoka, President & CEO

Company name:	A Holdings, Inc.					
Established:	January 11, 2022					
Capital:	50,000,000 yen					
Location:	[Headquarters] 13F, Pacific Century Place Marunouchi, 1-11-1, Marunouchi, Chiyoda-ku, Tokyo					
	[Solid-state battery div.] 2F, 3-12-8, Takanawa, Minato-ku, Tokyo					
Leadership:	President & CEO Yoshiki Nagaoka					
	Director & COO Akira Takahashi					
Number of employees:	20 (Including outsourced employees)					
Businesses:	Planning, development, manufacturing and sales of solid-state lithium-ion battery systems					
	Planning, development, manufacturing and sales of EVs					
Consulting lawyer:	Meilin International Law Firm					
Affiliated company:	gf.Z Co., Ltd. (GF Holdings Co., Ltd. 51%、 A Holdings, Inc. 49%)					







# The Solid-State Battery Revolution





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# **Examples of Storage Battery Accidents in Japan**

- In March 2024, white smoke was generated from the building where storage batteries and solar inverter were installed at the Hayashi Solar System Takayanagi Power Plant (Isa, Kagoshima Prefecture). Four firefighters were injured.
- In March 2023, a storage battery installed at an elementary school (Yokohama, Kanagawa Prefecture) ignited.

#### <Takayanagi Power Plant>

- Installed by: Hayashi Solar System
- Operation start date: February, 2017
- Power Plant Output: 1,000 kW
- Storage battery capacity: equivalent to 7,000 kWh

#### <Damage>

- The building in which the storage batteries and solar inverter were installed and the power receiving and transforming facilities outside the building burned down.
- Part of the building was scattered by the explosion, damaging solar panels and scattering them outside the power plant premises (no human or property damage was confirmed).
- \* After the accident, a water quality and soil survey was conducted around the power plant and no abnormalities were found.

#### <Cause>

• The explosion and fire extensively damaged the storage batteries in the building, and the fourth rack in compartment three, which was the most heavily damaged of all, may have been the origin of the fire. White smoke was generated, indicating that the fire may have started in the storage battery. (Reported by the installer)

#### <The most intensely burned rack>





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#### <Fire accident at elementary school>

- An accident occurred in which a storage battery installed at an elementary school (Yokohama, Kanagawa Prefecture) ignited.
- Details of the accident are under investigation by Yokohama City.



Source: Document 3 and published information by the Working Group on Natural Disaster Countermeasures for Electric Facilities, Subcommittee on Electric Power Safety, Subcommittee on Safety and Consumer Product Safety, 21st Industrial Structure Council

## **Examples of Storage Battery Accidents Overseas**

- In recent years, lithium-ion battery fires have occurred in many parts of the world.
- Liquid lithium-ion batteries carry a risk of ignition, and once ignited, are difficult to extinguish. Therefore, ensuring safety is an important issue.



Source: Document 4-3 of the 2nd Study Group on Expanding the Use of Energy Storage Systems for Stationary Use



# Accelerate the deployment of sustainable energy through the explosion of the safest solid-state lithium-ion batteries on the planet

# The transition from liquid lithium-ion batteries to solid-state lithium-ion batteries



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#### **Three Advantages of Solid-state Battery**













Liquid lithium battery

Solid-state lithium battery





Liquid lithium battery

Solid-state lithium battery

# Performance Comparison with Liquid Lithium Batteries

	Conventional lithium-ion battery	Solid-state lithium-ion battery
Electrolyte	Liquid	Solid-state
Safety	Danger of liquid leakage, heat generation, and ignition	No liquid leakage, no heat generation, no ignition
Capacity per cell	<b>30 Ah</b>	280 Ah
Energy density	180 Wh/kg	368 Wh/kg
Self discharge rate	4% per month	0.1% per month
Operating temperature	<b>0</b> °C ~ <b>50</b> °C	<b>-30°C ~ 60°C</b>
Fast charge/discharge	5 C	10 C
Charge/discharge cycles	<b>4,000</b> * Depends on operating environment and conditions	<b>16,000</b> * Depends on operating environment and conditions
Life span	10 years	40 years



Liquid lithium battery

Solid-state lithium battery

#### **Business Scheme**

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We have partnered with a global leader in solid-state lithium-ion battery industrialization. We provide solid-state battery solutions tailored to our customer's applications and challenges.

# **Global Leader of Solid-State Lithium Battery (1)**

# 

#### Beijing WELION New Energy Technology Co., Ltd.

In 2016, WELION was established in Fangshan District, Beijing as the solid-state battery production and incubation center of Institute of Physics, Chinese Academy of Sciences. The company specializes in the field of solid-state lithium batteries, and is a high-tech enterprise integrating R&D, production, marketing, and sales.



#### 中国、次世代電池支援に1300億円 EV競争力強化狙う

2024年5月31日 2:00 [会員限定記事]

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【北京=多部田俊輔】中国政府は電気自動車(EV)に搭載する次世代電池「全固体電池」などの開発に約60億元(約1300億円)を投じる。中国政府系の英字紙チャイナ・デーリーが29日に報じた。車載電池やEV大手を支援し、世界で先行している中国のEV産業の競争力の強化をめざす。

全固体電池などの先端技術の研究開発のプロジェクトに資金を投じる。車載電池最大 手、寧徳時代新能源科技(CATL)、車載電池やEVの大手、比亜迪(BYD)、国有の中 国第一汽車集団、上海汽車集団、北京衛藍新能源科技、浙江吉利控股集団がプロジェ クトに参加して支援対象となる見通し。



NIO conducted a range test with a 150 kWh battery using WeLion's 360 Wh/kg solid-liquid mixed cell (SHE360S). The ET7 can travel 1,044 km on a single battery, bringing the range of intelligent pure EVs into the 1,000 km range era.

# Global Leader of Solid-State Lithium Battery (2)

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**Qingtao (Kunshan) Energy Development Group** 

- Established in 2016 in Kunshan
- Innovative company dedicated to solid-state lithium-ion batteries
- Complete industrial chain including batteries, materials, equipment, and recycling

1,500+ employees

500+ R&D personnel

Average age: 30.08 years old

More than 68% earned a master's degree More than 10 international cooperation teams

**400+** patents

419 patents, including 234 invention patents, have been filed and 266 patents, including 111 invention patents, have been granted (as of June 30)



Started pre-listing tutoring in November 2021



BEVs powered by solid-state lithium-ion batteries achieved a range of over 1,000 km for the first time in the world. Shanghai Automotive Industry Corporation (SAIC) has agreed to invest 2.7 RMB (approx. 54 JPY) to jointly develop next-generation solid-state batteries with Qingtao to accelerate industrial application of solid-state lithium batteries in automobiles.



# **Global Leader of Solid-State Lithium Battery (3)**



# **AMPOWER**

#### DEVELOPMENT HISTORY

Our branded products have over 70 granted patents for various products and many certifications such as CE certification, TUV certification, UL certification, CEPRI certification, and SGS certification. Our manufacturing facilities are ISO9000 and TS16949 certified.

#### 2016 •

Began mass production of single large-capacity all-solidstate polymer lithium batteries and systems Successful development of 1,000 Ah single large-capacity all

solid-state lithium battery cell

2015

All-solid-state storage battery development started

#### **Highly safe**

The internal resistance of the battery cell is less than 0.2 µΩ, and the cell structure is solid, so there is no risk of leakage or explosion and almost no heat is generated. In addition, since the system consists only of series connections, no cooling system is required, and individual cells can be monitored Japan's first all-solidmass-produced

#### 2018 Obtained CE certification and

2017 •

battery cell

Started production of MWh size

large-capacity all-solid-state

Started mass production of 1,500

all-solid-state polymer lithium

energy storage system

Ah single large-capacity

other international certifications for several models of single large-capacity all-solid-state polymer lithium battery cells and storage battery systems

#### 2019 • Successful driving test of a

long-distance EV bus that runs 1,000 km on a single Started applying to special products such as AI products

#### Single large-capacity all-solid-state cell

We have already succeeded in commercializing and mass-producing cells with a large capacity of 3,000 Ah. Cells with various features can be developed and mass-produced according to the application.

#### High charge/discharge efficiency

Charge/discharge efficiency is 99% or more for 150 kWh, and 96% or more for 250 kWh and 500 kWh

#### state storage battery to be in 2023

#### •2020

2021 •

Began production of improved MWh-size all-solid-state battery systems Started mass production of 3,000 Ah single large-capacity all solid-state battery cell 2022 •

Began sales in the US, Europe, and Southeast Asian markets

Large-scale all-solid-state battery system with MWh size received certification from the Chinese Academy of Electric Power Science in China

Can be used at low to

expands the possibilities of its application.

The performance of this product, which can operate normally in environments ranging from -70 °C to 85 °C,

\* Rapid charging and discharging at 8 C to 10 C under -40 \*C

is possible, and the charge/discharge efficiency is 98% or

\* Can be used normally even when left in a high temperature

\* Maintains at least 80% of normal performance at 70 °C and

high temperatures

environment of 85 °C for 7 days.

reduction of various products.

use over a long period of time.

Long operating life

more than 300 charge/discharge cycles

High energy density

It has an energy density of up to 400 Wh/kg,

contributing to the miniaturization and weight

The number of possible charge/discharge cycles can

be set to 11,000 or more according to the application

of the energy storage system. It allows for repeated

higher.

#### 2023

Business alliance with GF Group Sales to be launched for the Japanese market Assembly plant to start operation in Japan (planned for 2024) Cell mass production plant to be built in Japan (planned for 2025)

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Low natural discharge rate

The annual natural discharge rate is 4% or less

#### Low degradation rate

Retains more than 80% charge/discharge performance over 20 years.

#### High depth of discharge

The depth of discharge is 100%. Even if completely discharged, it can be charged and discharged again, making it a reliable power source for disaster reserves.

#### Rapid charge/ discharge

Products with C-rates up to 180 C are mass-produced. Charging and discharging at ultra-rapid rates is possible.

\* When a large-capacity EV charger is used to charge an electric vehicle, it can travel 500 km on a 5-minute charge.



TECHNOLOGY FEATURES

and controlled after the system is formed.

# Products

# [Stationary Products] SHS165-280 Energy Storage Solid-State Battery Cell



#### **High capacity**

• World's first 280 Ah solid-liquid mixed battery cell

#### Long lasting

- New nano solid electrolyte technology introduced
- Significantly suppresses side reactions and reduces loss of active lithium
- At room temperature: ≥ 8000 cycles, ≥70% SOH (@0.5P/0.5P-100%DOD)

#### High Safety

- 1P52S Module: No smoke, fire, or explosion when overcharged at 1C
- Cell surface temperature during thermal runaway in China's new national standard: > 120° C



# [Stationary Products] SHS165-280 Energy Storage Solid-State Battery Cell



		Items	Data		Remarks			
Items	SHS165-280			<ol> <li>Calibration: The test system is</li> <li>Test Battery Preparation: Two t</li> <li>between polyimide heaters and pa</li> </ol>	first calibrated with a reference material. est batteries (empty batteries) are sandwiched ackaged as a "battery pack" with heat-conductive			
Rated Capacity	280Ah(0.5P)			aluminum foil tape.	are placed in the center of the APC chember to public			
Rated Energy	896Wh (0.5P)	Specific heat capacity	990.479J/kg/K	contact with internal walls or other	contact with internal walls or other objects.			
Rated Power	448W	-		4. Temperature stabilization: Main battery pack temperature stabilize	itain the chamber temperature at 25°C until the s at 25°C. The heater is then used to heat the battery			
Rated Voltage	3.2V	-		5. Temperature rise and completic	tic mode. on of measurement: When the temperature of the test is completed			
Operating Voltage	2.5 ~ 3.65V (>0°C)	X surface thermal conductivity (thick pess)	2.9155w/m/k					
opolating voltage	2.0 ~ 3.65V (≦0°C)	Y surface thermal conductivity	21 1617w/m/k	Single-sided anisotropic, 5599 pr	obe, 40 sec, power 2.5W, point selection range 90-200			
Energy Density	≥165Wh/kg	(length) Z surface thermal conductivity	21.1617w/m/k	(n	ew version test method)			
Energy Density	≥340Wh/L	(height) X surface thermal conductivity	21:1017 W/III/K					
Energy Efficiency	>01%	(thickness)	7.3871W/M/K		Single-sided anisotropic, 4922 probe, 20 sec, power 1.5W (old version test method)			
Energy Enclency		(length)	16.9304w/m/k	Single-sided anisotropic, 4922				
Internal resistance (AC)	$0.17\pm0.05m\Omega$	Z surface thermal conductivity (height)	16.9304w/m/k					
		Max. explosion pressure	0.6±0.2MPa	Explosi	on-proof valve relief pressure			
Internal resistance (DC)	$0.40\pm0.05m\Omega$	Aluminum rod weiding specifications	Welding power: 3600 Welding speed: 120mn	n/s	Only for reference			
	207.1mm	battery assembly	300±10kg					
Size	71 7mm	Battery expansion force	BOL ≦3000N EOL(70%) ≤27000N		BOL FOI			
(300 kgf)	474.0			BOL	≤3000N			
	174.2mm	force of evenesia		EOL (SOH80%)	≤20000N			
Weight	5.5±0.1kg			EOL (SOH70%)	≤27000N			
Quales	At room temperature: ≧8000 @0.5P/0.5P-			Cell usage range	3000014			
Cycles	100%DOD, 70%SOH	Cell usage range	Rated capaci	ity within the range of cell use (Ah)	Remarks			
(300kgf)	45°C ≥3000 @0.5P/0.5P-100%DOD70%SOH	2.5V~3.65V		280				
		2.75V~3.60V		/	<u> </u>			
		2.5V~3.57 V		275				
		3.0V~3.6V		/				
		2.75\/~3.57\/		/				



# [Stationary Products] SHS165-280 Energy Storage Solid-State Battery Module

#### 280Ah standard module



#### \* Semi-solid-state batteries safer and more reliable than liquid batteries

- \* High capacity and high grouping efficiency
- \* Standardized modular structure reduces costs

#### 280Ah standard box



No	Specifications				
items	1P12S module	1P13S module			
Cell (Ah)	280/	/314			
Number of cells	12	13			
Nominal Voltage (V)	38.4	41.6			
Nominal Capacity (Ah)	280/314				
Rated Energy (kWh)	10.75/12.05	11.6/13.06			
Size (mm)	910*175*215	982*175*215			
Energy Density (Wh/kg)	153.2/163.2	153.6/164.4			
Generation Efficiency	94.1%	94.5%			
Charging/Discharging Power	0.5P/0.5P				
Operating Temperature	-30°C <	~ 60°C			
Module Weight (kg)	70.2/73.7	75.7/79.4			

	Specifications			
Items	1P48S	1P52S		
Cell Type	LFP Squ	are case		
Nominal Capacity (Ah)	280/	/314		
Nominal Voltage (V)	153.6	166.4		
Series-parallel connection method	1P48S	1P52S		
Operating Voltage Range (V)	120 ~ 175.2	130 ~ 189.8		
Rated Energy (kWh)	43/48.2	46.59/52.2		
Storage Temperature	$-10^{\circ}\mathrm{C} \sim 35^{\circ}\mathrm{C}$			
Charging/Discharging Operating Temperature	Charging: 0°C~60°C, Discharging: -30°C~60°C			
Charging/Discharging Power	0.5P/0.5P			
Energy Density (Wh/kg)	140.5/149.2	141.3/151.5		
Size (mm)	1069*787*235	1164*800*235		
Cooling System	Liquid coolir	ng (internal)		
Estimated weight (kg)	309/323	329.5/344.5		



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# [Stationary Products] Energy Storage Solid-State Battery System

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#### Cabinet



- \* Semi-solid-state batteries safer and more reliable than liquid batteries
- \* Intelligent, easy to use, investment cost saving, efficient and flexible
- \* Capacity can be increased by increasing the number of cabinets

Items	Specifications				
Cells	280A	\h/3.2V			
Rated Energy	215kWh	232.9kWh			
Package Configuration	1P48S	1P52S			
System Configuration	1P240S	1P260S			
Voltage Range (AC)	4	00V			
Rated Power	0.5P				
Size (W*D*H)	1300*1200*2300mm 1300*1300*2300				
Weight	2.35t 2.6t				
IP Rating	IF	P55			
Operating Temperature	-30 -	~ 55°C			
Operating Humidity	0∼95%(No	condensation)			
Cooling System	Liquid cooling				
Fire Extinguishing System	Perfluorohexane + Aerogel + Water				
Communication Interface	Ethernet				
Communication Protocol	Modbu	is TCP			



- \* Semi-solid-state batteries safer and more reliable than liquid batteries
- \* Convenient operation and maintenance functions, intelligent and efficient

Items	Specifications
Cells	280Ah/3.2V
Rated Energy	3.44MWh
Package Configuration	1P48S
System Configuration	10*1P384S
Rated Power	1228.8V
Voltage Range	1036.8 ~ 1382.4V
Rated Power	0.5P
IP Rating	IP54
Operating Temperature	-30 ~ 55°C
Size (W*D*H)	6058*2438*2896mm
Operating Humidity	$0 \sim 95\%$ (No condensation)
Cooling System	Liquid cooling
Communication Interface	Ethemet
Communication Protocol	Modbus TCP



# SHS165 Energy Storage Solid-State Battery Cell Safety Comparison

		Items	SHS165-280	Liquid 280Ah
Short Circuit	Cell	Short circuit after high temperature storage at 150°C	No smoke, fire, or explosion	Smoke generated, no ignition and explosion
Thermal Runaway	Cell	Thermal runaway due to overcharging and simultaneous heating	Trigger temperature: 123°C	Trigger temperature: 97°C
Overchar	1P13S module	Overcharge - 280A current	No thermal runaway	Thermal runaway/thermal diffusion occurrence
ging	1P52S module	Overcharge - 280A current	No thermal runaway	Thermal runaway/thermal diffusion occurrence

- When external short-circuit tests were performed with the cells stored at 150° C for 1 hour and the separator thermally contracted, the SHS165-280 cells were more stable than the liquid cells and did not cause thermal runaway.
- The trigger temperature of the SHS165-280 cell was more than 20° C higher than that of the liquid cell when the cell was tested for thermal runaway by heating at 0.5C and 1000W simultaneously according to the method of GBT36276-2023.
- When overcharge tests were conducted on 1P13S and 1P52S modules at a current of 280A, none of them experienced thermal runaway, nor did they smoke, ignite, or explode. Their safety was confirmed to be much higher than that of liquid 280Ah cells.



# Safety of SHS165 Solid-State Battery Cell

(High-Temperature External Short Circuit)



The curve shows that the SHS165-280 cell has a low rate of temperature rise, with a maximum temperature of 44.6° C, which does not cause thermal runaway.

This indicates better performance than the liquid 280 cell.







# Safety of SHS165 Solid-State Battery Cell

#### (Thermal Runaway)



ltem	Testing Methods	Cell	OverchargingS OC (%)	Trigger Time (min)	Trigger temperature (°C)
Thermal runaway	Heating plate of 1000W in direct contact with the battery while overcharging at 0.5C and heating at maximum output	SHS165-280	14.47	16.93	123.40
		Liquid 280Ah	10.89	12.85	92.70



#### Safety of SHS165 Solid-State Battery Cell (Overcharging)

# Max. temperature 110° C, no thermal runaway $\int \frac{1}{\sqrt{2}} \int \frac{1}{\sqrt{2}$





#### Safety of SHS165 Solid-State Battery Cell (Gas Generation)



	10000	20000	30000	40000
uid 280/	Ah batterv c	ell: 372Kpa		

> #1 of liquid 280Ah battery cell : 372Kpa

#2 of liquid 280Ah battery cell : 396Kpa

> SHS165-280 battery cell: 355Kpa

Data	SF	SHS165-280 #1 Liquid 280Ah #2 Liquid 2		#1 Liquid 280Ah		quid 28	0Ah		
Sampling time	Start	20 min.	60 min.	Start	20 min.	60 min.	Start	20 min.	60 min
CO2(V,%)		17.33	18.32		20.33	20.76		16.38	19.05
C2H4(V,%)		4.6	4.85		2.28	2.3		4.64	5.37
C2H6(V,%)		0.85	0.9		0.44	0.46		0.74	0.88
H2(V,%)		25.78	27.45		31.56	30.89		28.81	33.48
O2(V,%)	1.19	1.99	0.75	2.45	1.1	0.82	2.05	3.81	0.83
N2(V,%)	98.81	41.3	38.93	97.55	32.9	33.11	97.95	37.54	31.04
CH4(V,%)		3.17	3.41		3.11	3.23		2.60	3.02
CO(V,%)		3.99	4.27		7.58	7.74		4.35	5.06
Unknown gas(V,%)		0.48	0.51		0.12	0.12		0.46	0.54
C3H6(V,%)		0.39	0.46		0.48	0.45		0.54	0.59
C3H8(V,%)		0.12	0.14		0.09	0.1		0.12	0.14
Percentage of combustible gas (V,%)		41.37	42.74		46.76	46.11		46.07	49.91



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## SHS165 Solid-State Battery Cell Certification

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No.	Certifications	Certification Body	Remarks
1	GB/T36276-2018	中国電力科学研究院有限公司 (China Electric Power Research Institute)	Certification report obtained
2	GB/T36276-2018	中国北方車両研究所 (China North Vehicle Research Institute)	Certification report obtained
3	UL1642	TUV	Certification report obtained
4	UL9540A (Cell)	TUV	Certification report obtained
5	IEC62619	TUV	Certification report obtained
6	UN38.3	Kaiwei	Certification report obtained
7	ROHS	TUV	Certification report obtained
8	UL1973	TUV	Certification report obtained
9	2006/66/EC	TUV	Certification report obtained
10	GB/T36276-2023	東莞市巴能試験技術有限公司 (Dongguan BALUN Testing Technology Co., Ltd.)	Interim certification report obtained
11	GD22-2019 "Inspection Guidelines for Pure Battery Powered Ships" (Cell) Classification Society Certification		In progress Certification report expected in December 2024



# SHE360C High Energy Density Solid-State Battery Cell





# SHP770L Solid-State Battery Cell for Automotives

Specifications							
Type of cell	4695Cylindrical type, SHP770L-34						
Nominal Capacity 0.33C(Ah)	34						
Nominal Voltage 0.33C(V)	3.60±0.02						
Internal Resistance (AC) (50%SOC, 1kHz, mΩ)	1.5						
Internal Resistance (DC) (50%SOC, 2C, 10s, mΩ)	2.7±0.3						
Mass Energy Density 0.33C(Wh/kg)	≥285						
Volumetric Energy Density 0.33C(Wh/L)	≥770						
Charging Stop Voltage (V)	4.25						
Discharging Stop Voltage (V)	2.5(>0°C)、 2.0(≦0°C)						
Charging Temperature Range	-20°C ~ 55°C						
Discharging Temperature Range	-30°C ~ 55°C						
Rapid Charging Time (10%~80%SOC)	≤20 min. (Target 17 min.)						
Cycles	1200, ≥80% @25°C						
Safety Features	GB38031-2020, NTP						

	Items	Size
А	Diameter (mm)	$46\pm0.2$
В	Height (mm)	95.0±0.3
С	Overall Height (mm)	96.6±0.3
D	Terminal Diameter (mm)	16.0±0.1





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If the probability of an anomaly occurring inside a cell is the same, a small-capacity cylindrical battery is safer





## SHP800L Solid-State Battery Cell for Automotives

Specifications									
Type of cell	4695Cylindrical type、SHP800L-35								
Nominal Capacity 0.33C(Ah)	≥35								
Nominal Voltage 0.33C(V)	3.58±0.03								
Internal Resistance (AC) (50%SOC, 1kHz, mΩ)	1.2								
Internal Resistance (DC) (50%SOC, 2C, 10s, mΩ)	3.5								
Mass Energy density 0.33C(Wh/kg)	≥290								
Volumetric Energy density 0.33C(Wh/L)	800								
Charging stop voltage (V)	4.25								
Discharging stop voltage (V)	2.5(>0°C)、2.0(≦0°C)								
Charging Temperature Range	-20°C ~ 55°C								
Discharging Temperature Range	-30°C ~ 55°C								
Rapid Charging Time (10%~80%SOC)	≤25 min.								
Cycles	1200, ≥80% @25°C								
Safety Features	GB38031-2020, NTP								

	Items	Size
А	Diameter (mm)	$46 \pm 0.2$
В	Height (mm)	95.0±0.3
С	Overall Height (mm)	96.6±0.3
D	Terminal Diameter (mm)	16.0±0.1





# High power (1st generation) – SHP270

#### A HOLDINGS



#### High Rate

Max. continuous discharging rate: 3-5C

#### High Energy Density

 World's first 270 Wh/kg (3-5C) solid-liquid mixed battery product for drones

Model No.	SHP270-16 SHP270-17		SHP270-22	SHP270-27	SHP270-30			
Energy (Wh)	59.2	62.9	81.4	99.9	111.0			
Voltage Range	4.2 ~ 2.75	4.2 ~ 2.75	4.2 ~ 2.75	4.2 ~ 2.75	4.2 ~ 2.75			
Nominal Capacity (Ah、0.5C)	16	17	22	27	30			
Nominal Voltage (V)	3.7	3.7	3.7	3.7	3.7			
Mass Energy density (Wh/kg)		≥270 (0.5C/0.5C)						
Volumetric Energy density (Wh/L)		>560 (0.5C/0.5C)						
Charging Rate		Max. cont	tinuous chargin	g rate: <mark>2C</mark>				
Discharging Rate		<mark>3~5C</mark> 7~1	continuous disc 0C short discha	charge arge				
Cycles		≥1200 (0.	5 <mark>C/3C</mark> , 25°C, 10	00%DOD)				
Weight (g)	226±4	250.7±4g	297±5	363±5	404±5			
Size (mm, H*W*L)	7.7*74*172	8.6*74*172	10.3*74*172	9.7*87*187	10.8*87*187			
Certifications	UN38.3	/	UN38.3	UN38.3	UN38.3			

Note: Mass production started in 2020, 16Ah is product >260Wh/kg



# High power (2nd generation) – SHP320

### A HOLDINGS



#### High Rate

Max. continuous discharging rate: 3C

#### High Energy Density

Mass energy density: ~310Wh/kg

Volumetric energy density: ~700Wh/L

Model No.	SHP320-20	SHP320-25	SHP320-32	SHP320-35	SHP320-89				
Energy (Wh)	73.00	91.25	116.8	127.75	324.85				
Voltage Range	4.2 ~ 2.75	4.2 ~ 2.75	4.2 ~ 2.75	4.2 ~ 2.75	4.2 ~ 2.75				
Nominal Capacity (Ah、 0.5C)	minal ity (Ah、 20 25 32 .5C)		35	89					
Nominal Voltage (V)		3.65							
Mass Energy density (Wh/kg)		~310 (0.33C/0.33C)							
Volumetric Energy density (Wh/L)		~700 (0.33C/0.33C)							
Charging Rate		Max. cor	ntinuous charging	rate: 1C					
Discharging Rate		Max. continuous	discharging rate:	3C(5C, 60 sec.)					
Cycles		800 (0.5	℃/3C、25°C、97	%DOD)					
Weight (g)	243±10.0	243±10.0 299±10.0 382±12.0 410±15 105							
Size (mm, H*W*L)	8.5*74*172	10.4*74*172	10.3*87*187	11*87*187	11*187*359				
Certifications	UN38.3	UN38.3	UN38.3	UN38.3	/				

Note: Mass production started in 2024



# High Safety – SHE270

# A HOLDINGS



#### **High Safety**

 Nail penetration, 5mm copper needle, 25mm/s, penetration

#### High Energy Density

➤ ~270Wh/kg

Model No.	SHE270-22	SHE270-31	SHE270-78	
Energy (Wh)	79.2	111.6	280.8	
Voltage Range	4.2 ~ 2.5	4.2 ~ 2.5	4.2 ~ 2.5	
Nominal Capacity (Ah, 0.3C)	22	22 31		
Nominal Voltage (V)	3.6	3.6	3.6	
Mass Energy density (Wh/kg)		~270 (0.3C/0.3C)		
Volumetric Energy density (Wh/L)		~600 (0.3C/0.3C)		
Charging Rate	Max.	continuous charging rate	e: 1C	
Discharging Rate	Max. co	ontinuous discharging ra	te: 1C	
Cycles	1000,	(1C/1C、25°C、3.0~4.2	2V)	
Weight (g)	305±10	418±15	1052±20	
Size (mm, H*W*L)	10.5*74*172	10.8*87*187	11*118*359	
Certifications	/	IEC62619-2022 GB31241-2022 UN38.3	/	

Note: Mass production started in 2022



# High Voltage – SHP265

## A HOLDINGS



#### □ High Voltage

Upper voltage: 4.35V, Rated voltage: 3.72V

#### **High Rate**

- Max. continuous discharging rate: 5C
- ➢ Pulse: 10C, discharge time: ≤10S

Model No.	SHP265-29
Energy (Wh)	107.88
Voltage Range	4.35 ~ 2.75
Nominal Capacity (Ah、0.5C)	29
Nominal Voltage (V)	3.72
Mass Energy density (Wh/kg)	~266 (0.5C/0.5C)
Volumetric Energy density (Wh/L)	≥544 (0.5C/0.5C)
Charging Rate	Max. continuous charging rate: 2C
Discharging Rate	Max. continuous discharging rate: <mark>5C</mark> Pulse: 10C, discharge time: ≤10S
Cycles	≧500 (1C/5C, 25°C, 100%DOD)
Weight (g)	406±15
Operating Temperature	Charging: 0 ~ 45°C, Discharging: -20 ~ 55°C
Size (mm, H*W*L)	11*87*187

Note: Currently in beta prototype stage, mass production scheduled to start in 2025



## **High Power – SHP190**

# A HOLDINGS



#### **High Rate**

Max. continuous discharging rate: 10C

#### Long Lasting

- ➢ 1200 cycles (5C/10C、45°C、100%DOD)
- ➢ 900 cycles (5C/10C、 60°C、 95%DOD)

#### **Wide Temperature Range**

> 0 ~ 80 °C

Model No.	SHP190-20	SHP190-30			
Energy (Wh)	75	112.5			
Voltage Range	4.25 ~ 3.0	4.25 ~ 3.0			
Nominal Capacity (Ah、 0.5C)	20	30			
Nominal Voltage (V)	3.75	3.75			
Mass Energy density (Wh/kg)	≥190 (0.5C/0.5C)				
Volumetric Energy density (Wh/L)	≥400 (0.5	C/0.5C)			
Charging Rate	Max. continuous	charging rate: 5C			
Discharging Rate	Max. continuous dis	scharging rate: 10C			
Cycles	1200(5C/10C, 4 900 (5C/10C, 6	5°C, 100%DOD) 60°C, 95%DOD)			
Weight (g)	380±10g	550±10g			
Size (mm, H*W*L)	10.6*87*187	10.3*105*228			

Note: Currently in alpha prototype stage, mass production scheduled to start in 2025



### **Standard Modules**

Items	SHP270 module									SH	P320 mod	lule	LIBISS	Par Barne See				
		6	S			12S 14S			6S	12S	14S	No dada harafa da 2010. Martina da 2010.	22.2V 10C 599Wh 27000 #Ah					
Specifications	6S*16Ah	6S*22Ah	6S*27Ah	6S*30Ah	12S*16Ah	12S*22Ah	12S*27Ah	12S*30Ah	14S*27Ah	14S*30Ah	6S*35Ah	12S*35Ah	14S*35Ah	LIBISS	11 Ha State See Burnan San Karay			
Nominal Voltage (V)		22.2				44	1.4		51	.8	21.9	43.8	51.1	Salad antic Athan an articleran	82.2V 10C 666WM			
Operating Voltage (V)	25.2 ~ 16.8					50.4 -	~ 33.6		58.8 ~	- 39.2	25.2 ~ 16.8	50.4 ~ 33.6	58.8 ~ 39.2					
Capacity (mAh)	16000	22000	27000	30000	16000	22000	27000	30000	27000	30000		35000		79408-V134 1011:85-100-10 1011:85-100-10 1008-1 1008-1	-Terrsent - Terrsent - Terrsen			
Size (mm、L*W*H)	195*78*52	195*78*69	206*91*65	206*91*70	195*78*100	195*78*133	206*91*127	206*91*140	206*91*150	206*91*160	206*91*73	206*91*142.5	206*91*163	SE1/301/**	章 <sup>臣服1160</sup> 30000 <sup>m</sup>			
Weight (g)	1570	1980	2380	2650	2980	3950	4700	5200	5480	6100	2800	5500	6300					
Energy Density (Wh/kg)	226	247	252	251	238	247	255	256	255	254	273	278	283		State and Characteristic Characteristics			
Max. Continuous Discharging Rate	3C 5C (80A, ≤3min)	3C 5C (110A, ≤2.5min)	3C 5C(135A, ≤1.5min)	3C 5C(150A, ≤1min)	3C 5C(80A, ≤3min)	3C 5C(110A, ≤2.5min)	3C 5C (135A, ≤1.5min)	3C 5C (150A, ≤1min)	3C 5C (135A, ≤1.5min)	3C 5C (150A, ≤1min)	3C 5C(175A, 60s)			3C 5C(175A, 60s)			vvv/10C/152	第日期 第日期 第日 第日 第日 第日 第日 第日 第日 第日 第日 第日
Max. Continuous Charging Rate					2	С					1C 20	: (0 ~ 100%SOC C (0 ~ 60%SOC	C) ;)	LIBOISS Marchart Province and References Marchart	22.2V 100 489Wh 2000 Bah			
Charging operating temperature (°C)	0 ~ 45									0 ~ 45		LIBISS	TELSTER ME Bastes Also Every					
Disharging operating temperature (°C)	-10 ~ 55										-20 ~ 55		Tana eta de de dename sur Batterien	25.5V 10C 370Wh 2000 23A				
Cycles					7( (25°C, 0.5C/30	00 C, 100%DOD)					(25°C	500 , 0.5C /3C, 97%	DOD)		22.21/ 100 2551m 6000 ====			



## **Solid-State Battery Cell**

#### A HOLDINGS

The cells below are mainly applied in energy storage products. Appropriate cell model numbers are selected based on the product specifications and application details. They can be used singly or in modules of batteries connected in series or parallel.

Model Number	QT-114103310-37-ES	QT-108125352-50-ES	QT-37205175LFP150	QT-71173204-280/314-ES
Dimensions (mm)	11.4(T)*102(W)*310(H)	10.8(T)*124(W)*352(H)	37(T)*204(W)*174.5(H)	71.5(T)*174.4(W)*207.2(H)
Capacity (Ah)	37	50	150	280/314
Weight (g)	690	905	2830	5400/5500
Rated Voltage (V)	3.2	3.2	3.2	3.2
Voltage Range (V)	2.5 ~ 3.65	2.5 ~ 3.65	2.5 ~ 3.65	2.5 ~ 3.65
Package	Soft Package	Soft Package	Aluminum Case	Aluminum Case
Max. Continuous Charge/Discharge Rate (C)	1C/1C	1C/1C	1.2C/1.5C	0.5C/0.5C
Discharge Cutoff Voltage at Low Temperature (V)	2.0V @T<0°C	2.0V @T<0°C	2.0V @T<0°C	2.0V @T<0°C
Cycles (80% SOH)	4000	5000	4000	12000
Appearance	日本族新能感 JBAA 1.27	口·市均Fi能源 SoAh Sash		



### **Solid-State Battery Module (for Home Use)**

A HOLDINGS

The following modules consist of series and parallel cells and are mainly applied to household energy storage products. They can be used in conjunction with BMS and other components to make them standard modules.

Category	/		Appearance				
Cell Model							
Module Type		2P 16S	1P 32S	4P 8S	2P 8S	1P 16S	
Dimensions (mm)		372(W)*412(L) *129.5(H)	372(W)*412(L) *129.5(H)	372(W)*412(L) *129.5(H)	372(W)*229.6(L)*12 9.5(H)	237(W)*390(L) *129.5(H)	
Rated Voltage	(V)	51.2	102.4	25.6	25.6	51.2	
Voltage Range (V)		40 ~ 58.4	80 ~ 116.8	20 ~ 29.2	20 ~ 29.2	40 ~ 58.4	
Rated Capacity (Ah)		100	50	200	100	50	
Rated Energy (kWh)		5.12	5.12	5.12	2.56	2.56	
Charge Current (A) (Standard Current)		100	50	200	100	50	i and
Discharge Current (A) (Standard Current)		100	50	200	100	50	
Operating	Charge	0 ~ 55	0 ~ 55	0 ~ 55	0 ~ 55	0 ~ 55	
Temperature (°C)	Dis- charge	-30 ~ 60	-30 ~ 60	-30 ~ 60	-30 ~ 60	-30 ~ 60	
Weight (kg)	)	34 ± 0.5	34 ± 0.5	34 ± 0.5	18.9 ± 0.5	18.9 ± 0.5	

## **Solid-State Battery Unit (for Home Use)**

Category	Items	Specifications		Category	Items	Specifi	cations	Appearance
Model No.		QT-HoESS-5L	QT-HoESS-10L	Model No.		QT-HoESS-5L	QT-HoESS-10L	
	Max. Input Power (W)	10	000		Max. Apparent Power (W)	50	000	
Photovoltaic	Max. Input Voltage (V)	600		AC Output	Rated Output Voltage/Frequency /Current	230V/50(6	60)Hz/21.7A	
System input	Mppt Operating Votage Range/Rated Votage (V)	100~5	560/370	(Off-grid)	THDV (%)	<	<3	
	Mppt Quantity		2		Switching Time (ms)	≦15		
	Rated Input/Output Power (W)	50	000	Efficiency	Max. Efficiency (%)	97.50		
AC	Rated Voltage/Frequency Range	230V(1) AC)/50(45~55Hz	80~260V z)/60Hz(55~65Hz)	2) Protection Function	DC/AC Side Lightning Protection	Type II	/Type III	
Input/Output (Grid	Rated Input/Output Current (A)	21.7	7/21.7		Dimensions (W*L*H) (mm)	465*186*960	465*186*1440	
Connection)	Power Factor	0.9			Weight (kg)	75	117	
	THDI (%)	<	<3	3		-20	)~55	
	Grid Connection Type	Single	e-Phase	General	Cooling Mode	Natur	al Cool	
	Voltage Range (V DC)	40~	-58.4	Parameters	Protection Level	IF	266	
Battery	Rated Charge/Discharge Current (A)	100	)/100		Altitude (m)	30	000	
Parameters	Rated Energy (kWh)	5	10		Humidity (%)	0~	100	
	Battery Type	Solid-state LFP			Communication	RS 485/USC/0	CAN/Wi-fi/GPRS	



# Solid-State Battery Unit (for Home/Industrial Use)

A HOLDINGS

Several types of standard modules are available depending on the usage conditions in homes and industry.

Category	Home Energy Storage System Standard Module	Industrial Energy Storage System Standard Module (Air Cooling)		Industrial Energy Stor Module(Liqu	rage System Standard uid Cooling)
Appearance					
Rated Capacity (Ah)	100	280/314	300	280/314	280/314
Standard Current (V)	51.2	51.2	51.2	153.6	166.4
Weight(kg)	≤50	≈130/135	≈ 110	≤320	≤350
Max. Charge/Discharge Rate (C)	1C/1C	0.5C/0.5C	1.2C/1.5C	0.5C/0.5C	0.5C/0.5C
Module Type	2P 16S	1P 16S	2P 16S	1P 48S	1P 52S
Storage Temperature (°C)	-40 ~ 60	-40 ~ 60	-40 ~ 60	-40 ~ 60	-40 ~ 60
Dimensions (mm)	446(W)*135(H)*700(L)	486(W)*228(H)*770(L)	546(W)*200(H)*770(L)	790(W)*243(H)*1100(L)	790(W)*243(H)*1183(L)
Operating (°C)	Charge: 0 ~ 55, Discharge: -30 ~ 60				



## **Solid-State Battery Module (UPS)**

Standard modules can be arranged according to the UPS specification requirements.

Category	Specifications				
Model Number	QTM03B373P16S25	QTM03B372P24S25	QTM03B363P16S25		
Rated voltage (V)	51.2	76.8	51.2		
Voltage Range (V)	40 ~ 58.4	60 ~ 87.6	40 ~ 58.4		
Rated Capacity (Ah)	111	74	108		
Energy (kWh)	5.68	5.68	5.52		
Module Type	3P 16S	2P 24S	3P 16S		
Charge/Discharge Rate (C)	0.5C/0.5C	0.5C/0.5C	1C/4C		
Dimensions (mm)	482(W)*130(H)*766(L)	482(W)*130(H)*766(L)	482(W)*130(H)*766(L)		
Weight (kg)	≈49	≈49	≈49		



A HOLDINGS

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## **Industrial Energy Storage System**

#### A HOLDINGS

	6 +c
Air Cooling	

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Category		Specifications			
		50kW/100kWh	100kW/200kWh	100kW/215kWh	
	Power(kW)	50	100	100	
lass so set o s	Output Voltage(V AC)	AC380 ±10%	AC380 ±10%	AC380 ±10%	
Inverter	Output Frequency(Hz)	50/60	50/60	50/60	
	Output Wiring Method	Three-phase Five-wire	Three-phase Five-wire	Three-phase Five-wire	
	Adopted Module	51.2V/100Ah	51.2V/280Ah	153.6V/280Ah	
	Rated Charge/Discharge Power(kW)	50	100	100	
Battery	Nominal Voltage(V DC)	512	716.8	716.8	
	Voltage Range(V DC)	400~584	560~806.4	600~864	
	System Energy(kWh)	100	200	215	
	System Efficiency(%)	88	88	87	
	Operating Temprature(°C)	-30~60	-30 ~ 60	-30 ~ 60	
	Cooling System	A/C wind cooling	A/C wind cooling	Liquid cooling	
System	Fire Extinguishing System	Aerosol & FK-5-1-12	Aerosol & FK-5-1-12	Aerosol & FK-5-1-12	
	Dimensions(mm)	1000(L)*1000(W)*2200(H)	1600(L)*1100(W)*2350(H)	1000(L)*1300(W)*2450(H)	
	External Communication Port	Ethernet	Ethernet	Ethernet	
	System Life Span	10	10	10	



## **Industrial Energy Storage System**

- Solar and diesel power generation compatible

QT-100kW215kWh



QT-50kW100kWh



	-				
Category		Specifications			
		QT-50kW100kWh	QT-100kW215kWh		
	Rated Power (kW)	50	100		
	Input/Output voltage (V)	400	400		
	Frequency (Hz)	50/60	50/60		
Inverter	Grid Connection Type	3W+N+PE/3W+PE	3W+N+PE/3W+PE		
	Peak Efficiency (%)	97.3	97.3		
	Max. Capacity when overloaded (%)	110 (consecutive),120 (1 minute)	110 (consecutive),120 (1 minute)		
	Input Power (kW)	50	100		
Solar Power	MPPT Voltage Range (V)	300~750	200~650		
	Max. Input Current (A)	160	320		
Pottony	Rated Energy (kWh)	100	215		
Dallery	Cooling System	Air cooling	Air Cooling		
	Noise (dB)	<70	<70		
	IP Rating	IP55	IP55		
	Operating Temperature (°C)	-30 ~ 60			
	Operating Humidity	No condensati	on (0°C ~ 95°C)		
System	Weight (kg)	≈1500	≈3000		
	Dimensions (mm)	1000(L)*1000(W)*2200(H) (with A/C and handle)	1500(L)*1541(W)*2321.5(H) (with A/C and handle)		
	Grid On/Off Switch Function	Available	Available		
	Communication Port	RS485/CAN/Lan/Dry contact	RS485/CAN/Lan/Dry contact		



## **Energy Storage System for Grid Stabilization**





C	ategory	Specifications		
Module		12*(1P52S*8)		
Rated	Energy (MWh)	5.015		
Rated	Voltage (V DC)	1331.2		
Voltage	e Range (V DC)	1164.8 ~ 1497.6		
Rated Cha	arge Power (MW)	2.5		
Rated Discharge Power (MW)		2.5		
Auxiliary Po	wer (Voltage Range)	400V AC±5% 50Hz		
	Storage Temperature (°C)	-40 ~ 60		
Environmental Conditions	Operating Temperature (°C)	-30 ~ 60		
	Operating Elevation(m)	≤4000		
	Dimensions (mm)	6250(L)*2550(W)*3100(H)		
Basic Specifications	Color	RAL 7035		
	Weight (t)	≈38		
	Cooling System	Liquid Cooling		



# Examples

## A HOLDINGS





Model Number	DZ48N-25ET	DZ48N-30ET	DZ48N-35ES	
Rated Voltage	48V	48V	48V	
Rated Energy	1.2kWh	1.44kWh	1.69kWh	
Module Type	1P 15S	1P 15S	1P 13S	
Cell	Solid LFP	Solid LFP	Solid LFP	
Cell Model No.	QT83131204LFP-25	QT101310204LFP-30	QT96131204NCM-35	
Dimensions (L*W*H)	185*156*265mm			
Weight	< 8.2 kg	< 9.5 kg	< 8 kg	
IP rating	IP67	IP67	IP67	
Applications		Electric bike		



Model Number	DM60N-40ET	DM60N-45ES	DM72N-50ES	
Rated Voltage	60V	60V	72V	
Rated Energy	2.304kWh	2.678kWh	3.72kWh	
Module Type	1P 18S	1P 16S	1P 20S	
Cell	Solid LFP	Solid NMC	Solid NMC	
Cell Model No.	QT95161232LFP-40	QT86161232NCM-45	QT96161232NCM-50	
Dimensions (L*W*H)	205*175*285 mm	156*175* 285 mm	225*175* 285 mm	
Weight	<15 kg	< 12.5 kg	< 17.5 kg	
IP rating	IP67	IP67	IP67	
Applications	Electric motorized bike			

S <sup>3</sup> (Semi-Solid-State) Pouch Cell Battery *			
	30% Higher Energy Density	30% Smaller Battery Size	
	40% Wider Temperature Tolerance	5U-15U % Higher Discharge Performance	
	1500+ Higher Cycle Life		
General Specifications			
General Specifications			
General Specifications			

Items	Specifications
Capacity	105Ah
Nominal Voltage	73V
Voltage Range	60-84V
Standard Charging Current	25A
Max. Charging Current	50A
Standard Discharging Current	50A
Max. Disharging Current	140A
Charging Operating Temperature	0 ~ 55°C
Disharging Operating Temperature	-20 ~ 60°C
Weight	~34.9kg
Initial Internal Resistance	≤11mΩ(1kHz3.6V)
SOC as Shipped From Factory	60%~70%SOC

#### A HOLDINGS



Despite its small size, it features high degree of safety, long life, rapid charging, and high capacity discharging

## Case: Large-Scale Emergency Power Supply System



Kunshan Eastern Medical Center (operating room, hemodialysis room)

Kunshan Asian Cup Football Stadium

## Case: Large-Scale Emergency Power Supply System



Science and Technology Museum, Pidu District, Chengdu City (Energy storage /DC microgrid system)



Energy storage projects using solid-state batteries in Pidu District, Chengdu City (Photovoltaics/Energy storage/Charging)

#### **Case: Large-Scale Energy Storage Systems**



Energy storage and charging integration project in Taizhou city

#### **Case: Large-Scale Energy Storage Systems**

#### A HOLDINGS





16MW/28MWh microgrid energy storage project





9MW/4.5MWh thermal power plant energy storage project

#### **Case: Large-Scale Energy Storage Systems**

#### A HOLDINGS





Shared power plant energy storage project in Ouhai district, Wenzhou city Energy storage project for charging stations in Huangyan district, Taizhou city

# Case: World's First Large-Scale Solid-State Battery Energy Storage Plant for the Grid

World's first large-scale LFP energy storage plant for the grid using solid-state batteries,

200MW/400MWh demonstration project in Longquan, Zhejiang Province







- Longquan's demonstration plant has passed multiple unannounced inspections, all of which were passed in a single pass. Zhejiang Province has particularly strict inspection standards, and it is rare for a manufacturer to pass all of them at once.
- Large-scale energy storage plants typically have an efficiency of about 85%, but the efficiency of this demonstration plant reaches 86%.

the me	2 浙江 8 新 要闻	<b>#598</b> .2006 0.642	0571-85310479 M
		德国副总理来》 共话气候变化与	新江大学 同可持续
	該 <b>首</b> 签须惯用防御第2号指挥代令	▲田田、江田、市中村・5月21日、 マホースの開始がポールにおかり 市が、東京の開始がポールにおかり 市がしたり、日本、安全のしていたないたいで、 イボー、国本が生きたことであった。 日本、日本、日本、日本、日本、日本、日本、日本、日本、日本、日本、日本、日本、日	部に大学校当 中期期、形に入学し 同時に支援目的に、 時代点、統領地面容 協会に対応ない たか、今日の一部の にから、大学の に たか、今日の一部の ため、今日の一部の ため、今日の一部の ため、今日の一部の ため、今日の一部の に 人どしたで う読み、うべか に たか、「かられない に たか、「かられない に たか、「かられない に たか、「かられない に たか、「かられない に たか、「かられない に たか、「かられない に たか、「かられない に たか、「かられない に たか、 たか、 たか、 たか、 たか、 たか、 たか、 たか、 たか、 たか、
The state of the s		《福安地上记录如路面的小和书理》 动行民间。《书图书》如何记书一一号 通知。但是一一节度可打成。且书写 和问题的,但是一个节度可打成。且书写 作。通过自己注意的加速就是不可。 说了是大的书稿。也能行了人们的题情 不可能能起来了。本则你们也是的现分 书记他的知识人们来。	務總, 增加時日 這個華寶總統, 得到 即日大学和文部日 表等會加多次的大 全方位副時代作業 開始, 考久自己時代 能位則 對片 活音 和55。
y e	本服我 记录 主义者 用者 ALL 在 影响较大,为面对行动等地,则则 中上的水位上面,完让动水田可能到 脚上安心觉"。在对在,方种就100000 本者 意义说 考考人 新气影的门道 有关的门边子为日中中的常常不动的 影力为江、五河道、代望和高级中国人, 经公司规定部次通常发动物用,并在	"中国创翼"创业创新大制	奥温州市选拔
the state of the s	程,6月24日至34日,前北京市中国部 和陸林市委員会第二人。17日前提生作品 有時他性大用編件,5日前於広告計畫 均常常以出現金業業430人。17日前提生作品 加速率時期により、11日前次に計畫書 均常常以出現金業業430人。17日前提生作品 加速率時期により、11日前次に計畫書 加速率時期により、11日前次に計畫書 加速率時期により、11日前次に計畫書 加速率時期により、11日前次に計畫書 加速率時期により、11日前次に計畫書 加速率時期により、11日前次に計畫書 加速率時期により、11日前次に計畫書 加速率時期により、11日前次に計畫書 加速率時期により、11日前次に計畫書 11日前前次に計畫書 11日前 11日前次に計畫書 11日前	以同灰里创业	「山同贝
and the second s	12年間時期、通信人が市地市の人間、資産が利用した「市地市人を除ませた」、 時期の時期のは、日本の日本の人間、資産が利用した「市地市人の日本であた」、 時期の時期のは、日本の日本の人間、本を解除水面は、10時になられたの にの日本の日本の日本の人間、本を解除水面は、10時になられたの にの日本の日本の人間、本を解除水面は、10時になられたの にの日本の日本の日本の人間、本を解除水面は、10時になられたの にの日本の日本の人間、本を解除水面は、10時になられたの にの日本の日本の人間、10時になられたの にの日本の人間、10時には、10時になられたの にの日本の人間、10時には、10時になられたの にの日本の人間、10時には、10時には、10時になられたの 10時には、10時には	● (株式) (1)(1)(1)(1)(1)(1)(1)(1)(1)(1)(1)(1)(1)(	新台湾市内市市 新台湾市内市市
2ª and	为治一参加分配安定水用效用。系作属 除了新安定水用。在东方面的属用品,用 加入化合为常数1.面目,相称 用用 点声,在这些用在安定的生产物 用物用量点化和效用工作,从 日,我者 由水带子从目的和常常的用学说力用	※単か、大算由人を加上力、戦力手数 振行の考知(1)の第一口其他量化(1)年の	作用前面構成は7月 対応対導ら个項目目
and the second s	電发電相防機電子可提供信令。總導換 按下一時的水面的防衛。機能从至2011 余利,料減、業に发生点的共常可能性 果,常依没在村门等动生活指指使空厚 出品的效型電力令,紧定紧缩的所各項 21时30分起并机的物。份的地量100位 能大「营作好電」),然此,增点,增	高质量就设。 本次大概以"防电影时代 共振中	图6月2月中国18月28 周史会秋林、人8238
R. M.	通知,保助了2000只大规矩记在保认、为米杉、在东道和政治学派,几本地想用 鲜、安治、村外、团型、地区、二联、北部、 集团水、印度会说主要订用水位米 G采,通用的市口用的比如作与4600.此 但以可能发生出的大学(我也当知)。 新生生生产 这些现在,我的关系出的承承,我与	间梦"为主用。设置先迟转动、现代服务 2个主体群、多时联升、纵发热济和研	本次大勝副標 「2010日原来原何日
	新上维,不少水利工程的建度工作正常 官校出等工程工计学大量工行公力来。 我好"集中傳唱,般現得用,造建得 丙酮将水道验,我好会生生产安全的 他开展中,44日,新会江水电局的影響 特别的你工"面目得希望公式公式力来。 但,他就是有"否要从能量加加产能的 和,目前,各级是务队出进人的失数灭	他起拼3个专项赛。大赛其收到116 个型在项目段和参赛、最终50个项目	各案例的综合评计 社會[711年人民權]
and the second se	建206、当天15时20分,水库增至5 影频步,截至24日17时,支金大中 初导势,各加运进及人间的用势至小 一级指导改造生产,截至24日16时,支 孔坦振闻世科,22时,增加到7月、课 标水库超纳提水位有半角、其中机用1 中、首组安区和11课,展村干部全天候 省已重计出出最多组织4个2017人	老人专用,最高人工新聞。新聞新,生物	学、以开始者、集团
	增生水和局征工程的外方金统,从当天 唐,要有1度;主要公司运有14个运点 经空用地;并入通输运用;发展灾害;自 次,实施指导推断传受主体401年次, 依约者,人用地量约大于当用地量。提 超量或水位,算不可测用极少站,机算 水能增导及能量是又结人处没行转移 相形地改立产品口口间,希望出现大	(CAL 18 AL	2.00.427
坦国决议	计水库水位将使用每小时1至2至米道 器区10间,要水文管部中心提出。由 金属,目前已要让导导200人,在当然 都等你应该是有437万余,就是将国本的 皮肤能上做,下原水也也会将你快速上 来三次,那安仁水位钟做上都。钱第匹 14个提大安置等中,确保"吃上可口饭。"21米,圈及现象200号。	出口新加坡手续	を更简便
	急流冲垮坝脚——	AND IN PAR BUT	RAA JOS PRO
	危急时刻,他们套上麻绳往下跳	8.44年)6月21日,秋戸和美方原仁 大学校木泉台有限公司の用了一枚回 日至前回来的高額社木曽知道关于 株、泉井町(19)(19)(19)(19)(19)(19)(19)(19)(19)(19)	*投資進行年 認知時、注意当地 日本等年に重知時 日本等年に重加時 日本等年に重加時
	本期於州6月24日間、1日市 A市共享取用通用1余1-9月82	業人、同步中位"項目発物」与古療液項 目在市区成出機地。今日、市区企业产	加坡的语天故事 升。"大华物典自言
	来和东北方的北京桥桥,	品企口能加速的建义于维特更加限使。 在传畅的造成模式下,会会需要在	第山和站地关有关 能隔与会议生产制
	另一一批批計劃,將將和学事成自發進 下了下導進地的任果。	情報法CROBCIAFIL(HELBERGHELE) 服果人用中枢。新聞式目前目:会注目	權,已定期从会设施 产品会口的全醫集
•	这一样,股生在建築生活建築業業等的 村、股市和学校会社会社会社会社会社会社会社会社会社会社会社会社会社会社会社会社会社会社会社	業通信"中国"活行20時時期第一個口" 平台這人一次數則,相关数据不仅可用	*
	T相关和特别。估计的结形则据,总结 需要形式系统研究和组。	于海中湖和艾吉行出口中和。经过半台 把自动增输和特化的,还可以用于辅助	最格实行的成为合 论、今年4月16日
	####.###2.40############################	生成和生物是口利的投入现代。在第一	星北京 北方(古州)
na	第52里亚马加斯莱尔加兰和2米之高。 高速也比平时的2十八级。如果之外。	(山間は日十合	t⇔\左梁湖N
Πu	就是400余位良初。良阳之外,就在村 即用点为和学术成为学学者的理想的服务。 爱记者问题 后,如后"董道总找行自己的乐,我又 去。"一旦我和他当我见全开城,水果当	明美法词计游	F:ta
	成外。結果不能能量。53%起始的防防地。然后因为用。此时的同期,只有一同 过了加上的原则与用量上量,	成省はいうていた	3/40
	取草原皆石十八分钟,300年少 时存击星期前"信口"。北地泊在周 担乎一例的击器者带灯加机 二人數下 分词直接等用有用带的利润。村干部 袋,再和麻鸭,十八个句轻人,他过老潮 晚,"农水放开,我来!""我放下,两个人 了机用下将总定,肉提把被杀去的乱的 柏特拉氏在安置点,我菜,做饭,可安置	本版机州6月24日33(記者 中後度 遠辺県 新女子) 千百年泉,四	根因于資有之、批 作为辛収、通ば不
	MENARGRANG.LINERTR. PROF. STREE.REATING (REPAIR STREET, ST	線時117天衛文人勝善在此理智。但41 创作的1998就与自然英誉相喻。其因	新的約線,重空況 "基础到到自然電
	开化:山乡里,绝不落下一人	*RANNELL*, 01-04, 07, 04114	+ 10.01 (C - , - 40.0 1538.
	AMARGAZADE (CE 14 AV DELAM, EEV164-01.ERMINER	而中国建义是在把义者是定共同行为 而在中国建筑大会——而属建会),在有	为了12世界/ 机、肥好和新用20
r to nace	从用于把自己的 # # # # # # # # # # # # # # # # # # #	语节目为《中国》和大会刊于主编	B48*.9507*#
i io pass	19月1日の18月1日の中心の中で、中国大阪の中心の 東大学校会会教育化動物理 11日本村村代報約「万日単数的法会法」	在户外亲领、节目遭遭文化沿岸重算	<b>股标识""打打象</b> 算
	MTRARTINGSO. # / 2 - WHIRE R. MISSING R. MIS		ADDITO ADTS
	араниясяная, наражна, сланае, с	浙江龙泉磷酸铁锂储能	示范项目并网
	AVELLE, SOLUTION STRATEGY R. PRODUCTS STRATEGY S	山区建起大型"	充电宝"
	全方形的支援部位之利型自主任何的用。在 但人会回答的。时令法正的关键型的时候,然后 6月24日,而产品的证据和时代其中的证据和时,将生成的法律 的原则上面和时代的一般时间的资源一起。 如果如果是在 的关键的 2010年,后期 的复数学校学校。 的是 的复数 医乙基基 医子宫炎 化合金化合金化合金化合金化合金化合金化合金化合金化合金化合金化合金化合金化合金化		
	総方総付小式地上市大事業の対応 立た村 水市等設行24く45回営業県市市協会、80%の 株式店市時代、営業総合、単分業が目的立たも 単分素型活動人名、単位不知一件に務一人。	中華美 中央美 中县) 近日,田水市 新大的化学建築中站。一部に自己開	·····································
officionov		MANNER-SCILLSPH, *#49503320-004970360	70. *##II&d
еппсіенсу	吊山,风闲甲,收到发心外买	研究計算化会会——卫浪影響影響产 例200Ab年期希望醫療期、期料、単	用。可能把建度用 解决了新用型用用
	本規算位6月24日电(记者 电电音 老人亦因素积积成者如果、企老人行动事用天 日期政治·电山 电影》相下这么大,不能去来 "你见山不会心理地女儿的中效果。最爱日期,	目前用了中国工程的职士,中国科学院 物型研究所研究员体立员之际和中国	新闻任,安全公司 新闻集团新,送台。
	植食素,中型把成件服用,在时有你们,就在太 常山田说面和(2008)7.20 余碗洗餐车,在店 配合了,"24 日中午12日,完心田金田根园板 20余户利,为20余余户单人板纸式餐店具,	展出的"游台巡台化"技术。"项目投资 长出数增加将机会的全部增加和10分	山の制機制が設備 地分の相応の増入
n plant	東京村町夕村田市会商品村市民用文高学作 市田市町市会会、高市市会、市市市会会、日本市市市会会、日本市市市市市市市市市市市市市市市市市市市市	指公司负责人养兴有介绍。通过"游位 国农化"技术的创新,希望信号和小面	记得从见泉市 第时在的东京, 去5

#### **Case: Large-Scale Energy Storage Systems**



Ulan Chab City Project (July 2022) 2MWh



Jining Shared Energy Storage Plant (September 2022) 2MWh



UMVA Industrial Energy Storage (Dec 2023) 215 kWh (100 MWh cumulative)



Huaneng Power Plant Shared energy storage (June 2024) 27MWh



Shenzhen Qianwan Power Station (July 2024) 27.52MWh

# Thank you!