

Kstar BESS Overview

BluE Residential ESS Solution



01

About KSTAR & BESS Solution

Introduction | Main Product

02

BluE Residential ESS

Safety | Simple | Interconnection

03

Advantage of CATL Battery

Safety | Reliability | Long Life

About KSTAR

KSTAR R&D and Manufacturing Base



KSTAR Industrial Park at Guangming Hi-Tech Zone, Shenzhen

Company Full Name

**Shenzhen KSTAR
Science and Technology Co., Limited**

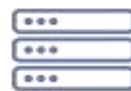
Establishment

1993

Headquarters

Shenzhen, China

Main Business



Data Center



PV inverter



EV charger



ESS

ESS Solution



BTM



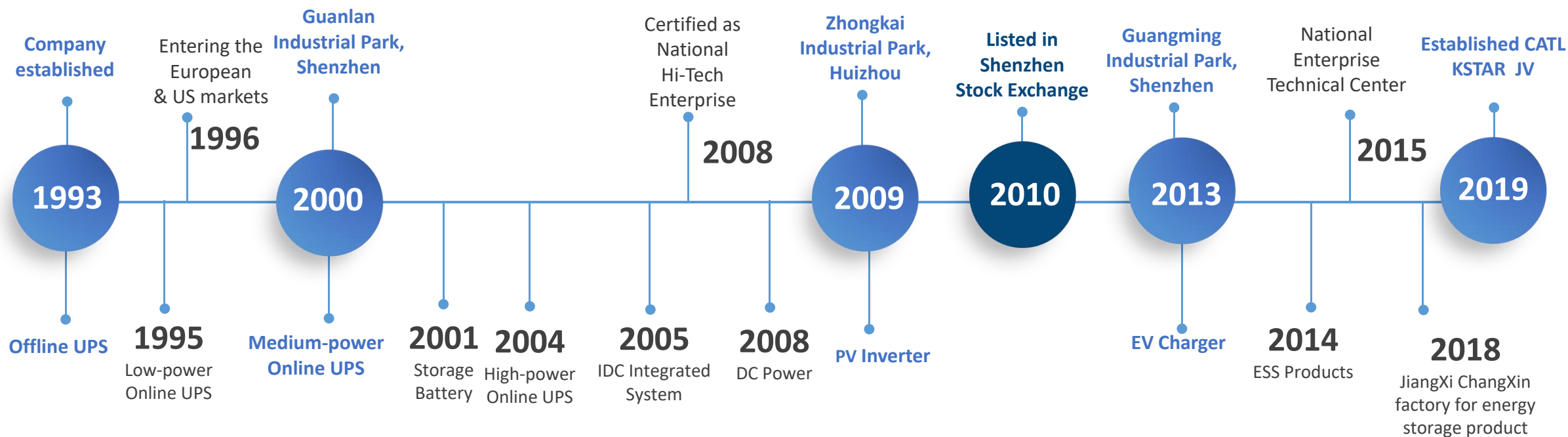
T&D



Generation

KSTAR

Development Schedule of KSTAR



Main Business

Data Center



PV Inverter



ESS



EV Charger



Manufacturing Ability

AI/SMT



UPS



CRAC



EV Charger



Inverter



Battery



Testing Center-CNAS



Testing Center



EMS



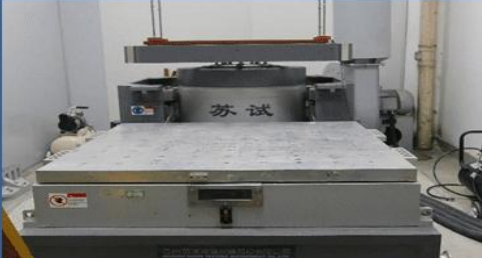
EMI



Enthalpy difference



Water Proof



Vibration



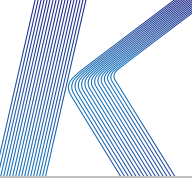
Salt-Fog



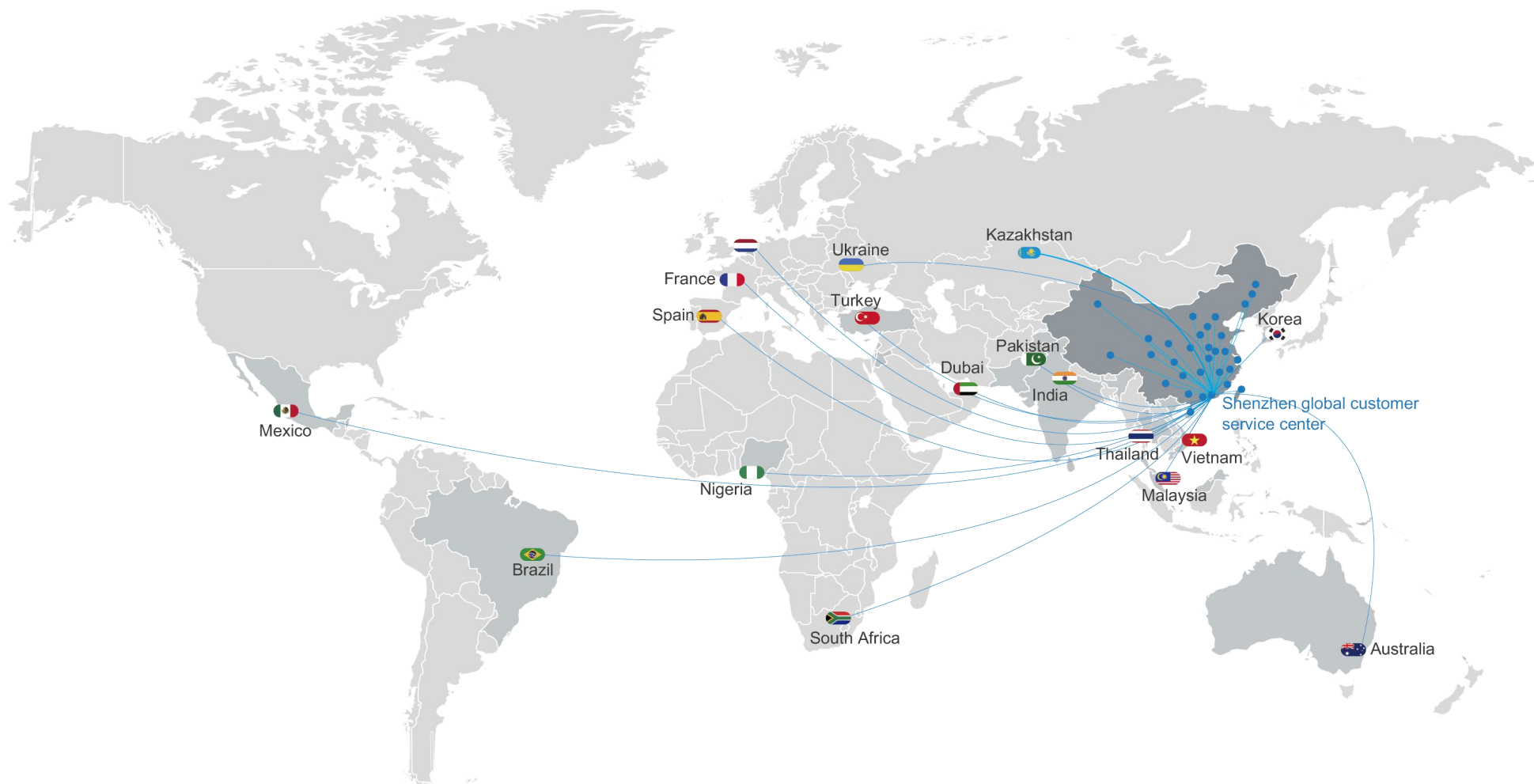
Sand & Dust



3M Anechoic Chamber



GLOBAL SERVICE



Worldwide
Service Network



24/7 Response
and Support



40 Overseas
Service Engineers



17 Overseas Branch

JV Company of CATL KSTAR



JV Company Full Name

CATL&KSTAR Science and Technology Co., LTD

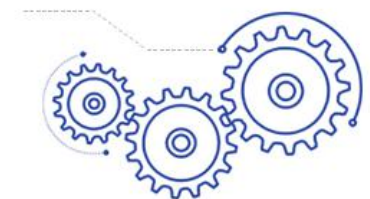
Establishment

2019



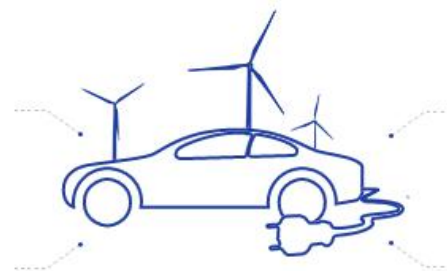
Headquarters

Fujian, China



Main Business

Focus on R&D, Production and sales of energy storage products such as power converter, battery PACK, container-type PCS, PV+ESS and charging equipment all in one system.



Main Product



PV inverter



EV charger



PCS

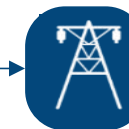
ESS Solution



BTM



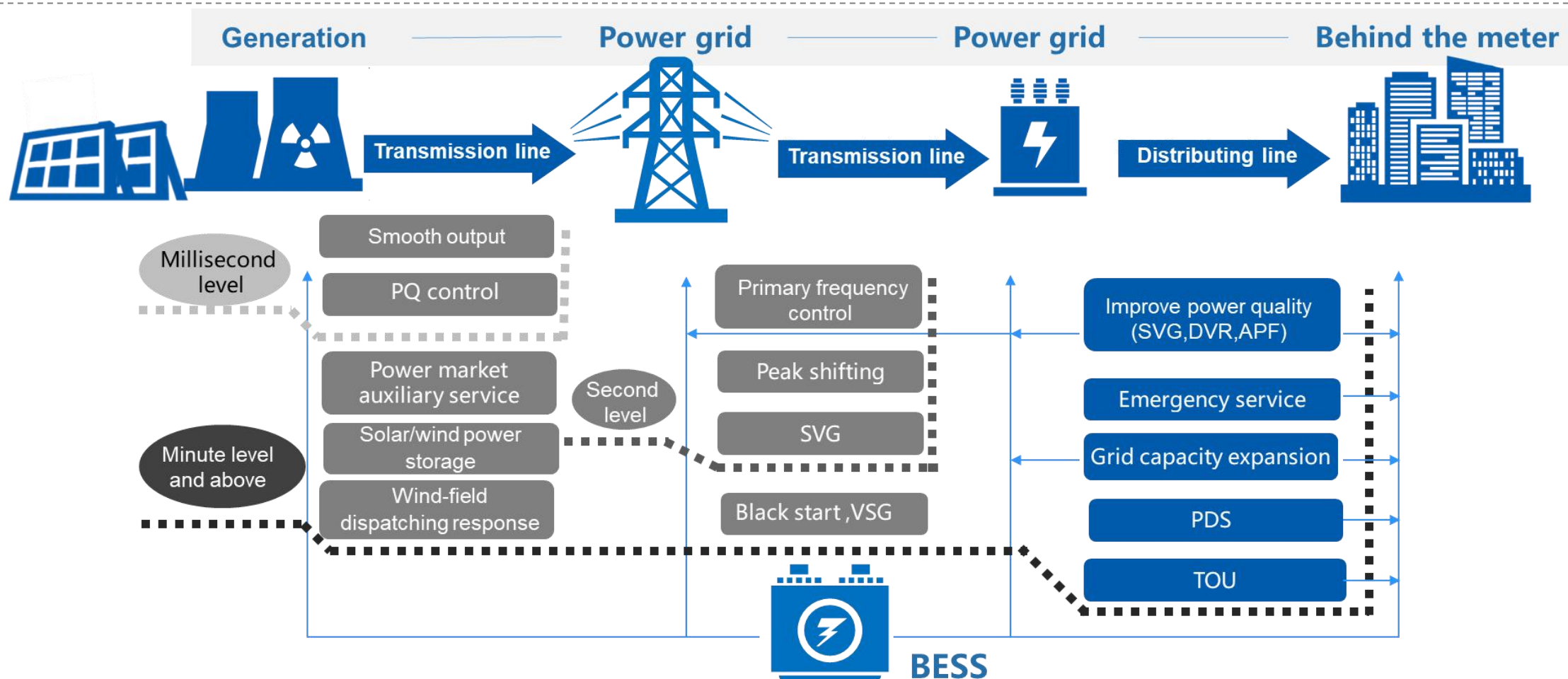
T&D



Generation

Energy Storage system application

The renewable energy that penetrates into the power system covers the whole process of power generation, transmission, distribution and consumption, so the battery energy storage system has typical application for the generation, the T&D and Behind the meter.

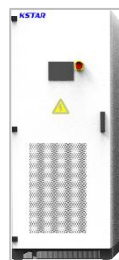


Energy Storage Product

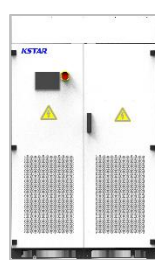
Power Converter



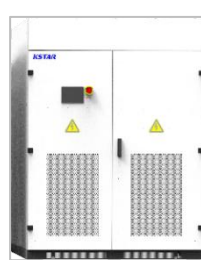
GSE0050T



GSE0100T



GSE0250T



GSE0500/0630T



GSE0500/0630



GSE1250



KAC0150 / 0300 / 0600



KDC0150 / 0300



Energy Management



Data Acquisition Controller



EMS Cabinet



EMS Cloud Platform

BESS



KESS (Battery System)



GSE-MV (PCS + MV Transformer+RMU)

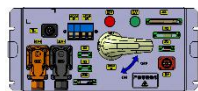


KESS (Battery System + PCS)



Resi-ESS

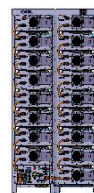
Battery



Control Box



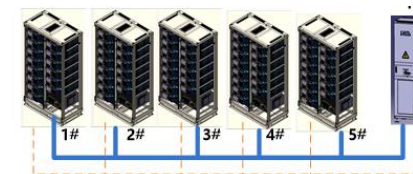
Control Panel



Battery Rack



BMS



Battery System

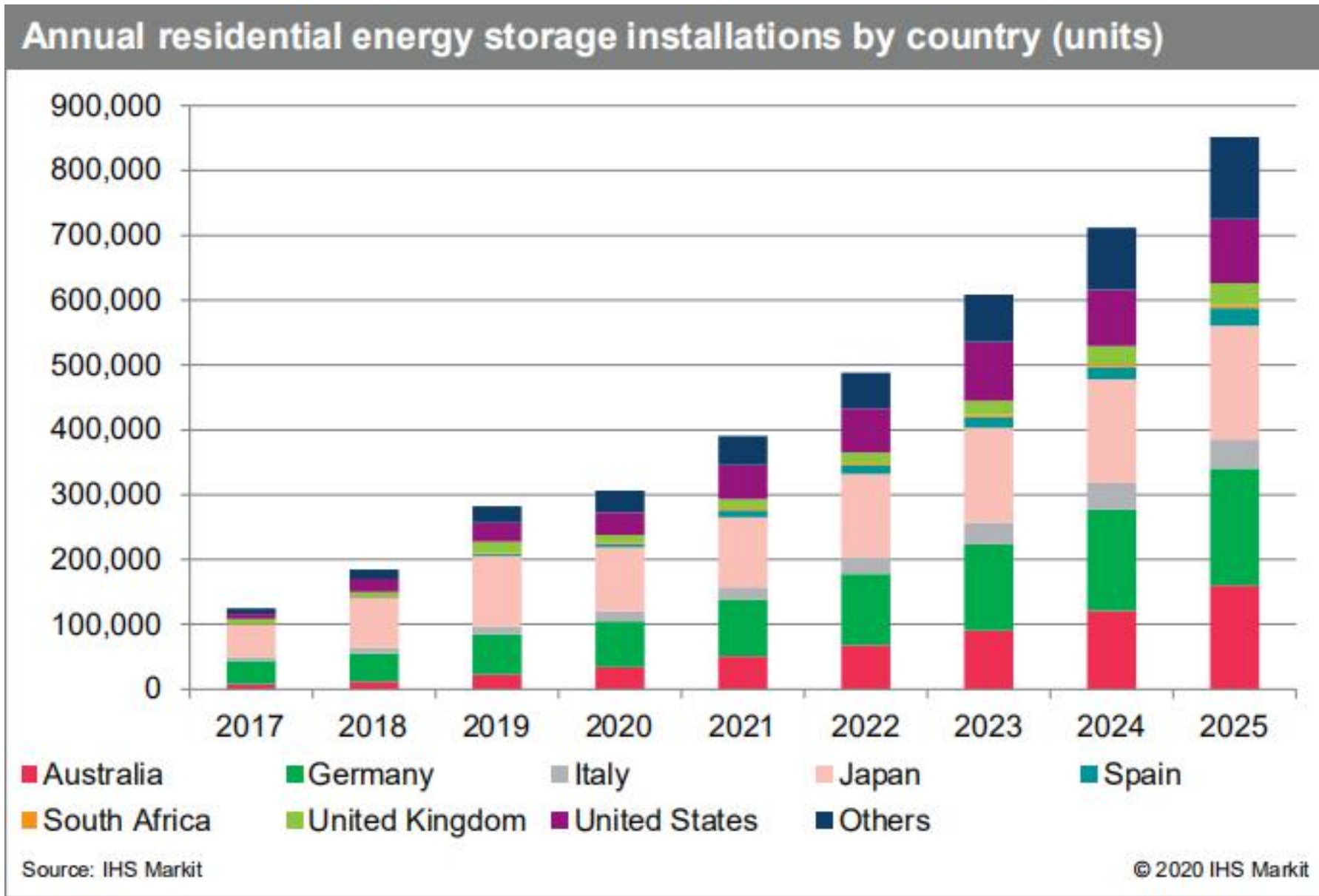


02

BluE Residential ESS

Safety | Simple | Interconnection

In 2020, 300,000 units of grid-connected energy storage has been installed,
The annual installations will grow to nearly 800,000 units by 2025.



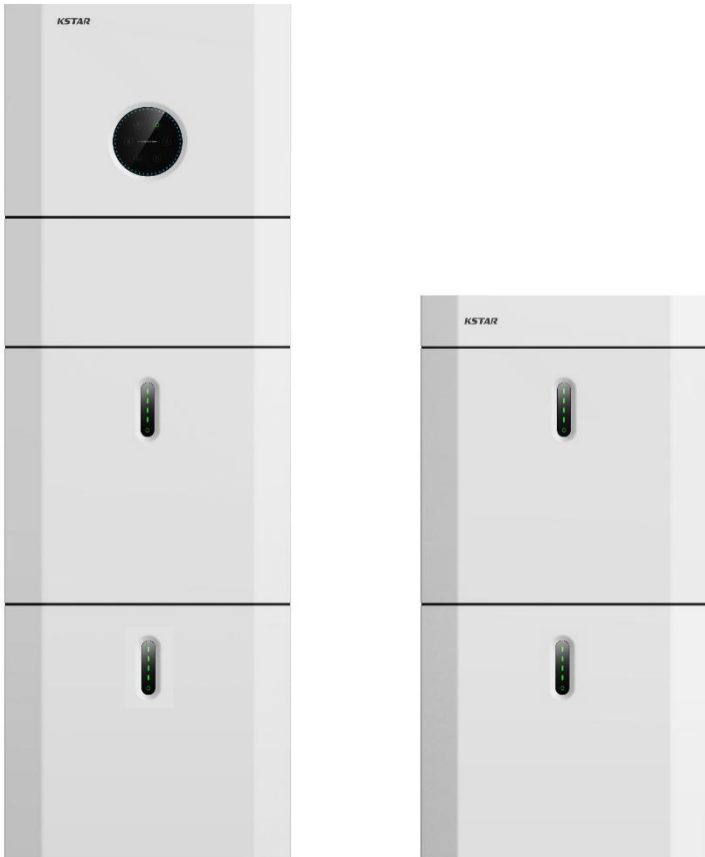
All-in-one Storage System

All-in-One BluE ESS

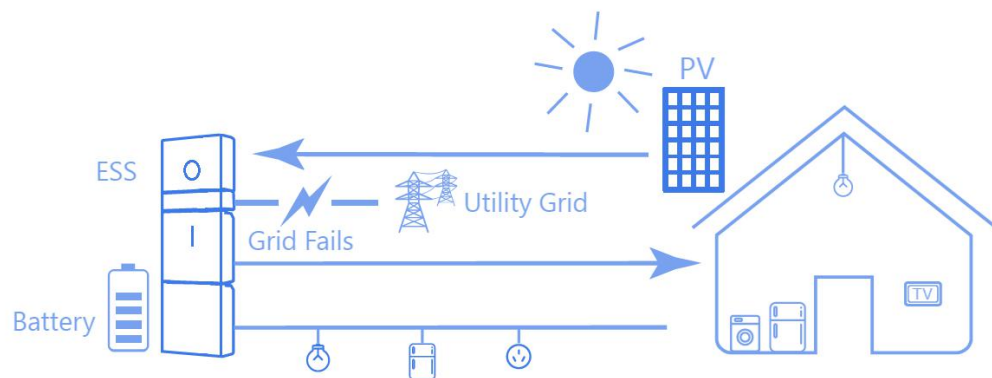
Hybrid Inverter: BluE-S 3680D/ BluE-S 5000D

Battery Pack: BluE-PACK5.1, expandable to 20.4KWH

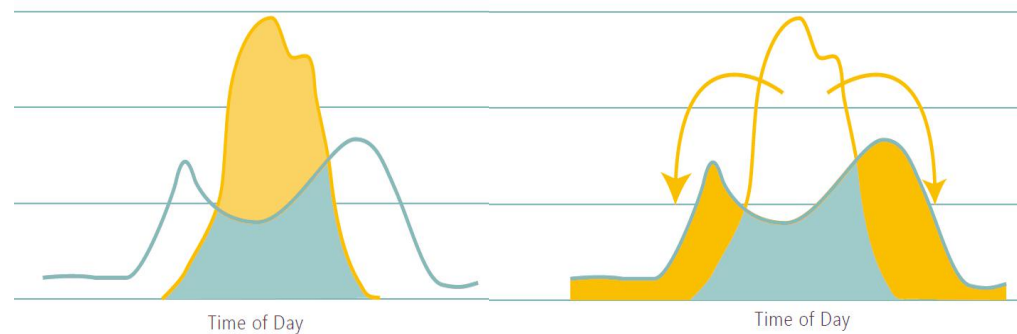
- All-in-One ESS IP65 Range
- Flexibility Configuration: 5.1kWh/10.2kWh/20.4kWh
- Long Duration- ≥ 10000 cycles (Lab environment)
- Battery/Grid conversion efficiency up to 94%
- CATL LiFePO4 Battery cell, Safety and 0 cobalt & nickel
- Easy installation



All-in-one Storage System



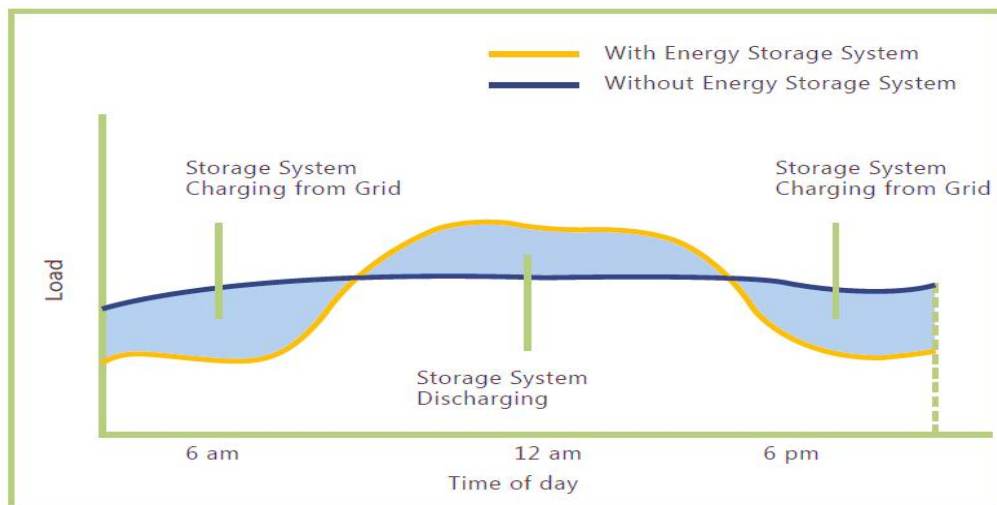
Backup-Uninterrupted Power Supply (UPS)



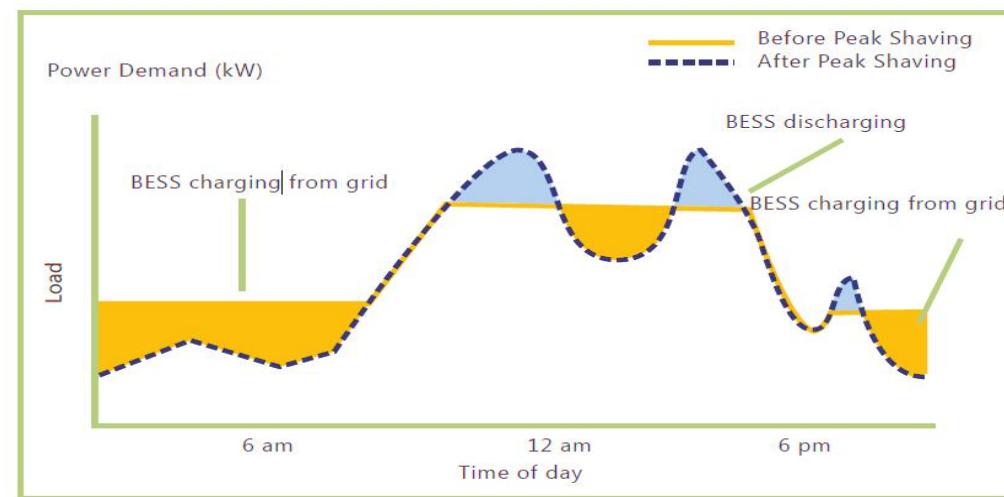
Grid-tie system without storage

Grid-tie system with storage

Self-Consumption Optimization

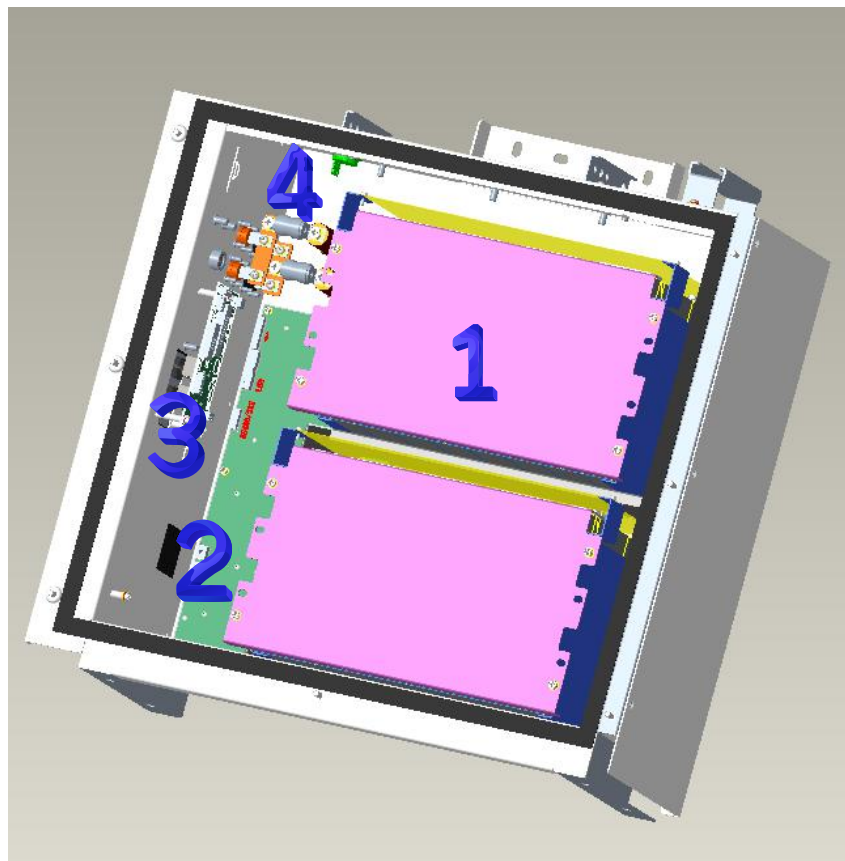


Load Shifting



Peak Shaving

Battery Pack



1. Battery module
 2. BMS
 3. Communication interface board
 4. Positive and Negative fuses
- *Heater can be optional which in the module



1. Battery Negative terminal
2. Battery Positive terminal
3. Earth terminal
4. Communication and DIP

ITEM	SPECIFICATION
Cell	LFP-100Ah
Nominal Energy	5.12kWh@25°C, 1P16S
Rated Voltage	51.2V
Voltage Range	Min:40V Max:58.4V
Weight	48kg
Dimension	490mm(H)*540mm(W)*240mm(D)
Operation Temperature	Min:0°C Max:50°C
Cooling Method	Air Cooling
Humidity	0%~95%, No condensing
Cetification	Cell:IEC 62619,UL1973,UL9540A,UN38.3 Pack:IEC 62619,UN38.3

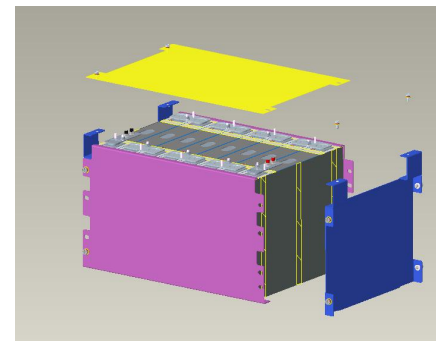
Battery Cell and Module

Battery Cell



ITEM	SPECIFICATION
Capacity	100Ah @ 25°C, 0.5C
Nominal voltage	3.2V
Dimension(W×H×D)	200.3×172.2×33.2mm
Weight	2.27±0.30Kg
Impedance(1kHz,BOL,40%SOC)	0.15±0.06mΩ
Reversible capacity loss (25°C,100%SOC/month)	≤ 3.5%
Operation temperature	-30° C ~ 60° C
Storage temperature	-30° C ~ 60° C
Certification	IEC 62619,UL1973, UL9540A,UN38.3

Battery Module



ITEM	SPECIFICATION
Cell	LFP-100Ah
Nominal Energy	2.56kWh@25°C, 1P8S
Rated Voltage	25.6V
Voltage Range	Min:20V Max:28.2V
Weight	21kg
Dimension	303*187.5*203mm
Operation Temperature	Min:0°C Max:50°C
Cooling Method	Air Cooling
Humidity	0%~95%, No condensing

Battery Management System

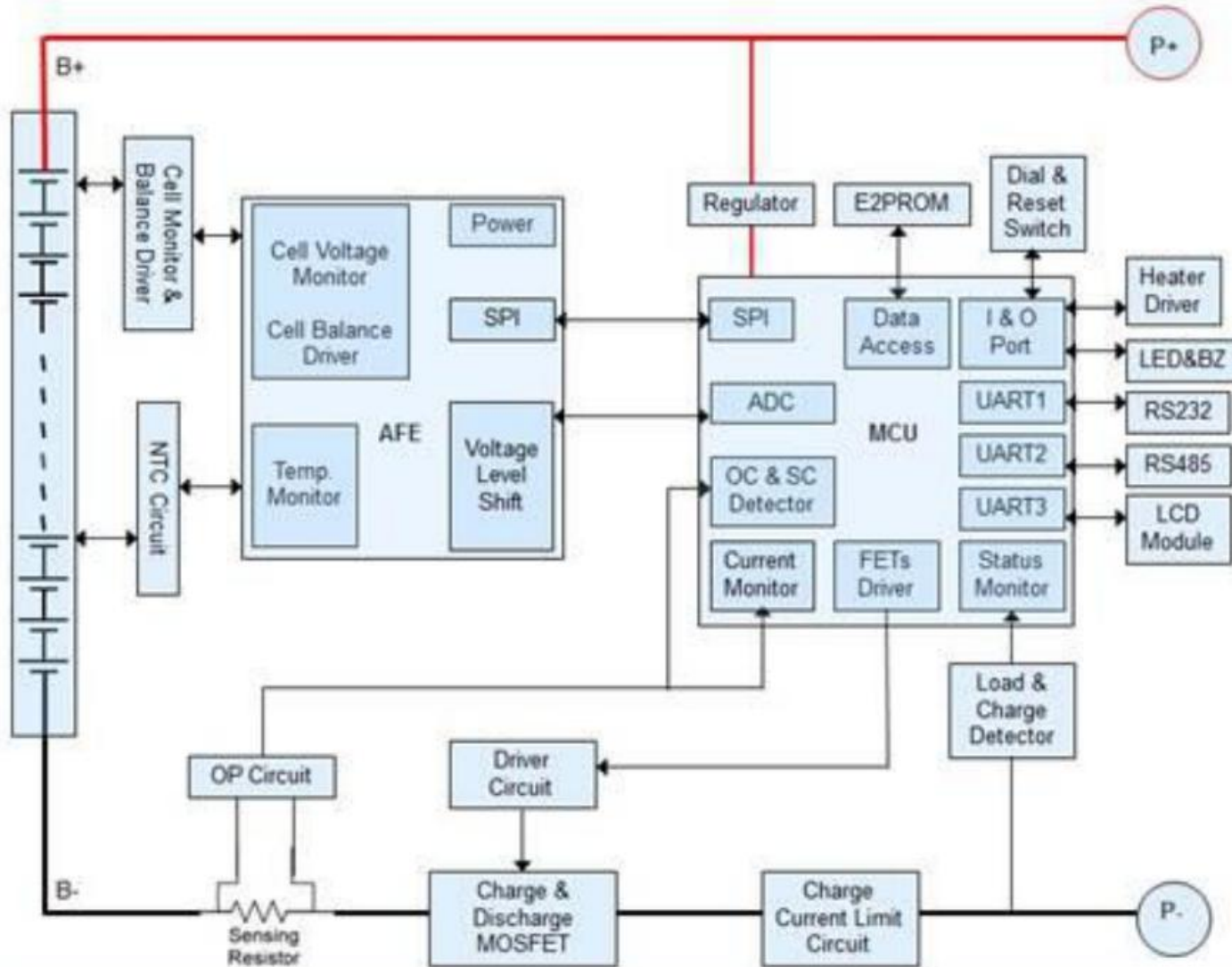
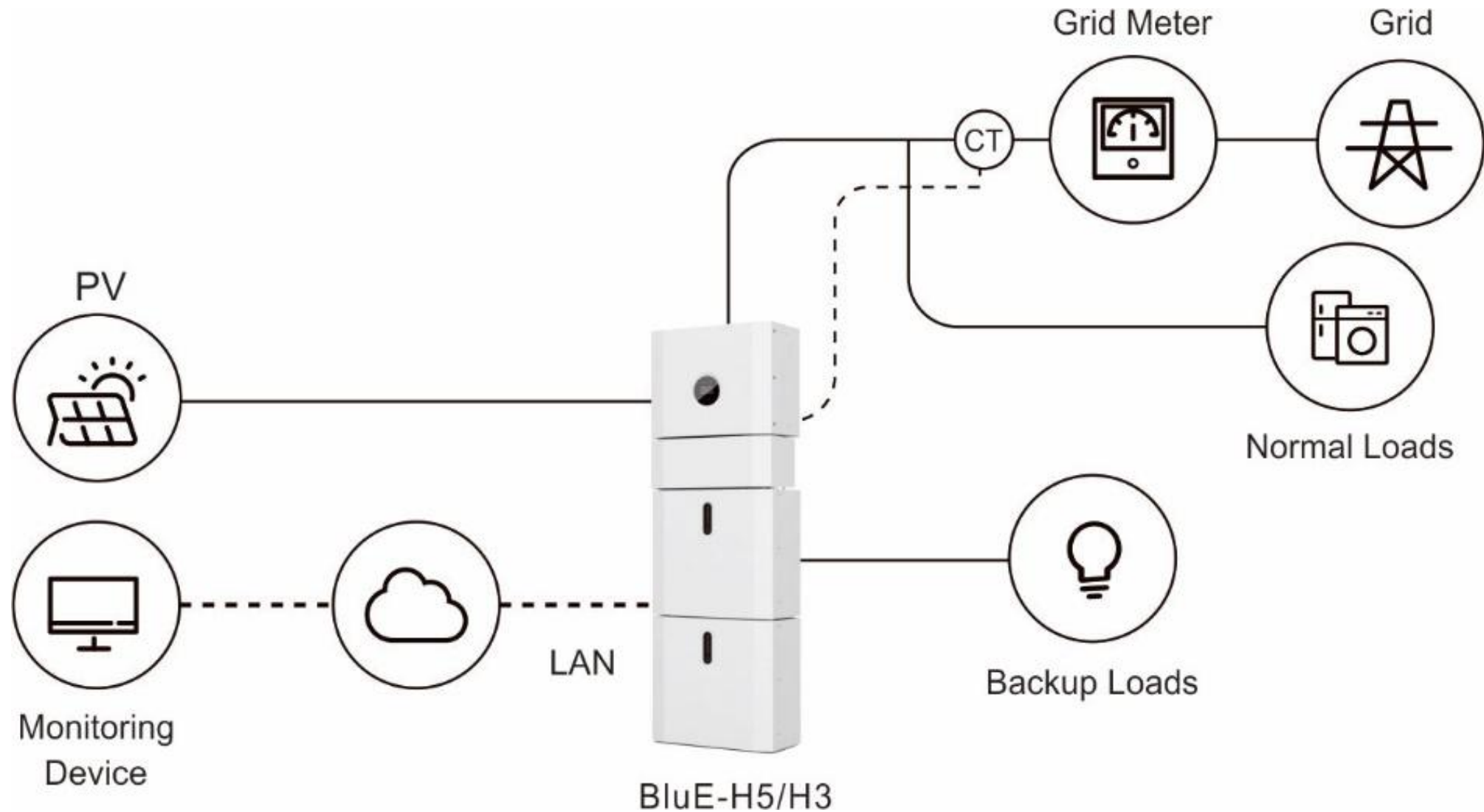


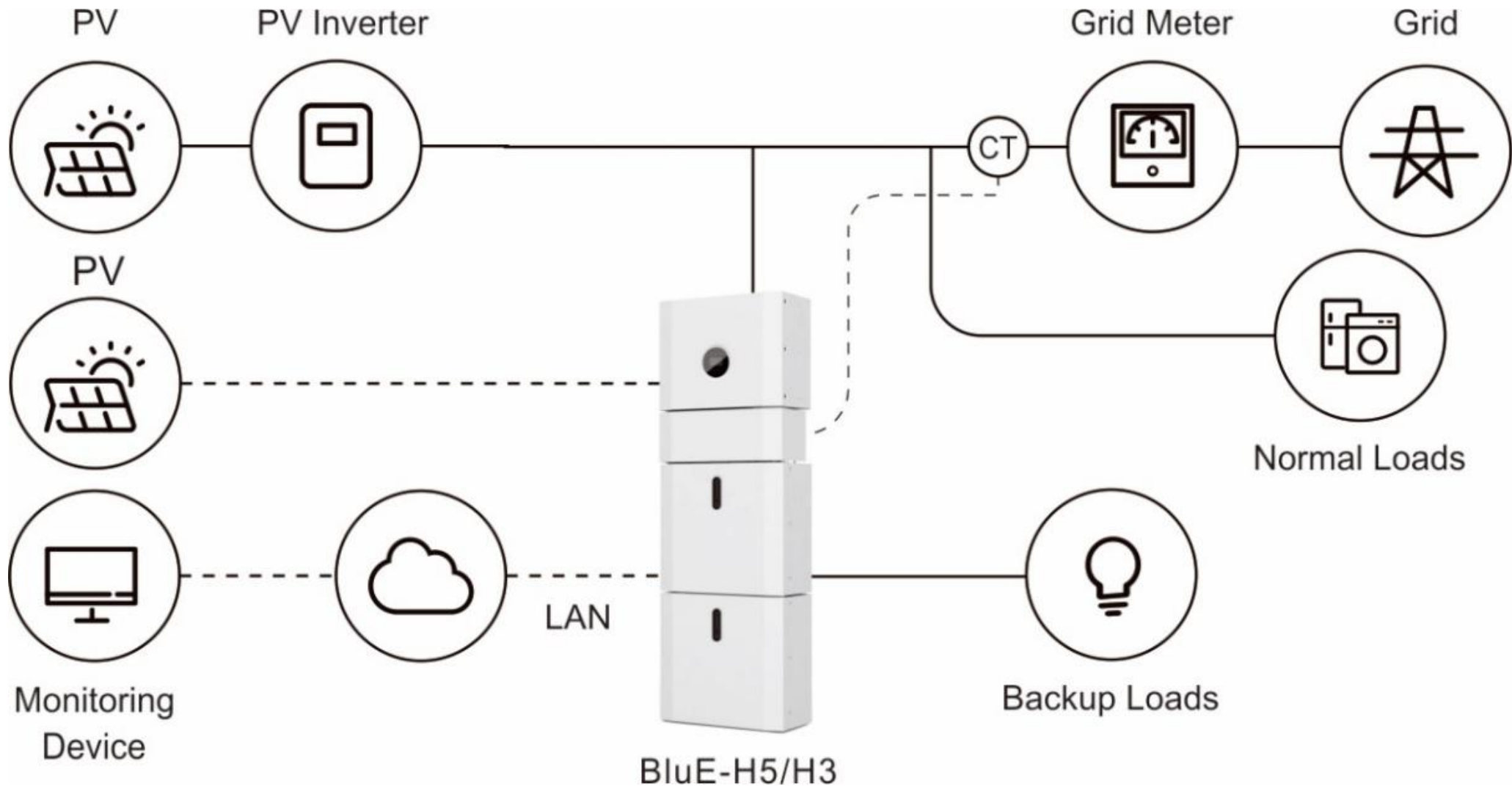
Table :BMS function lists

- High integrated analog front end
- Adjustable over current protection
- Isolated power circuit
- It has a variety of sleep and wake-up modes
- Integrated serial port IC
- low power consumption
- High voltage accuracy ($\leq 20\text{mV}$)
- Dual RS485 communication
- High current accuracy ($\leq 2\%@\text{FS}$)
- Parameter adjustable setting
- 4Circuit battery temperature detection ($\leq 2^\circ\text{C}$)
- Buzzer alarm function
- SOC estimation function
- LED status indication function
- SOH estimation function
- It has charge equalization function
- Short circuit protection function

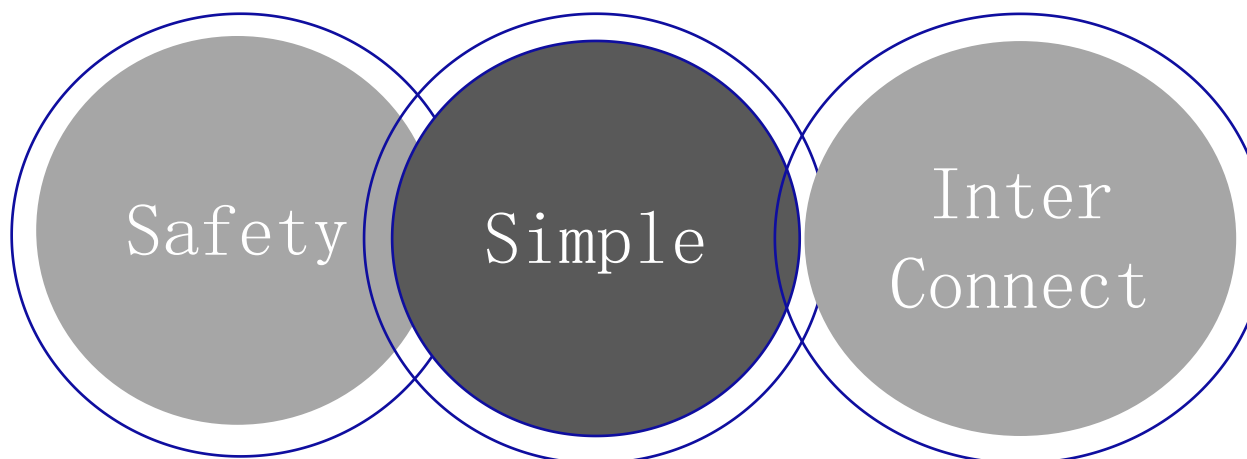
Typical Application - New Build



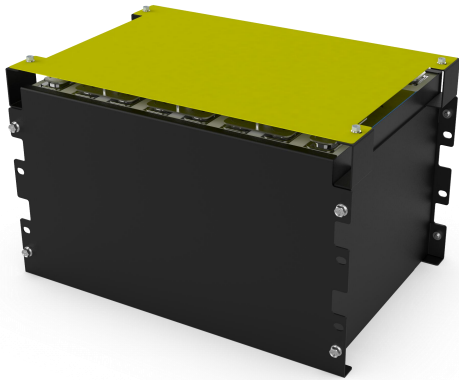
Typical Application - Existing / AC coupled



Highlights



All-in-One System Level Safety Design



01-Module



02-PACK



03-System

Triple Level Safety Design

Protection IP65 - Suitable for Outdoors, Away from living Zone



Battery Cell Safty

CATL

Capacity (Ah)	100
Chemistry	LFP
Dimension (W*D*H) (mm)	200.3*33.2*172.2
Operating Voltage (V)	>0°C 2.5~3.65
	≤0°C 2.0~3.65
Weight (kg)	2.27
Charge/Discharge Rate (C)	0.5
Operating Temperature (°C)	Charge 0~60
	Discharge -20~60
Storage Temperature (°C)	-40~60
Cycle Life @25°C, 0.5C/0.5C, 100%DOD, 70%Ret	10,000



100Ah Cell

Comprehensive Test & Validation of 100Ah



IEC 62619



JIS C 8715-2



THE STANDARDS INSTITUTION OF ISRAEL



UL 1973

UN38.3

UN 38.3

SII Cush & Nail
Standards Institution of Israel

Highlights



Simple

Ease of Worry – One-step Business

KSTAR All-in-One ESS Solution



Purchase



Distribution

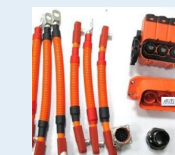


Installation



Aftersales

Other Suppliers



Labor Saving——Modular Design can be handled and installed by single person.



Saving 50% installation time :

Installation in half an hour, wiring in one hour.
Quick plug connection design ,free from on-site wiring.



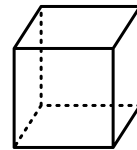
Handled by single person :

One module is less than 50kg, which can be handled by single person.



Installed by single person :

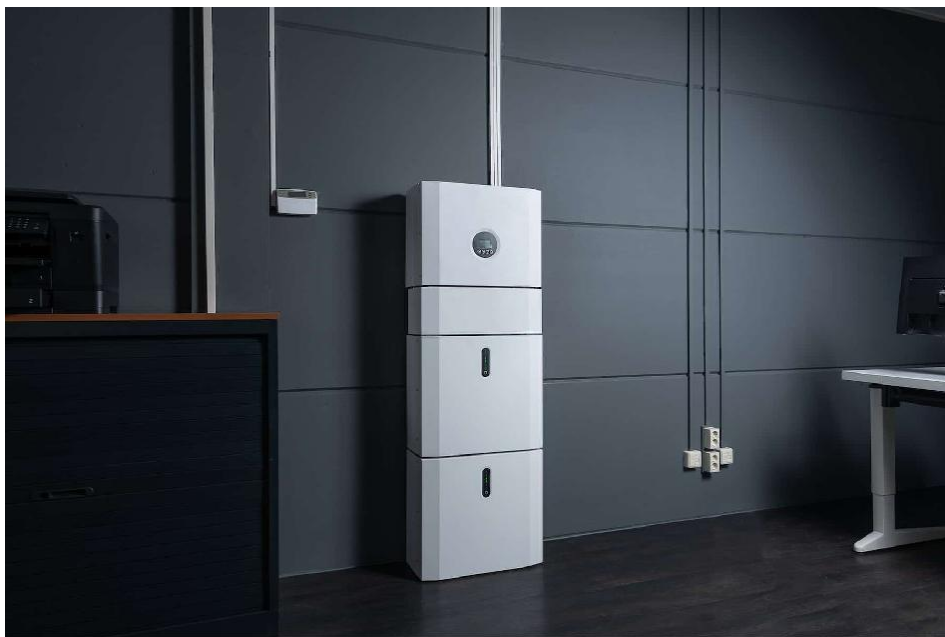
stacked and installed by single person



Minimum cover :

0.6M*0.25M (0.15 square meters)

Time Saving - Plug and Play. 0 Field Debugging.



KSTAR All-in-One ESS Solution

- 👤 Integrated distribution
- 👤 Integrated design and quick plug connection
- 👤 Plug and play , free of adjusting the inverter and battery together.



Other Field Integration Products

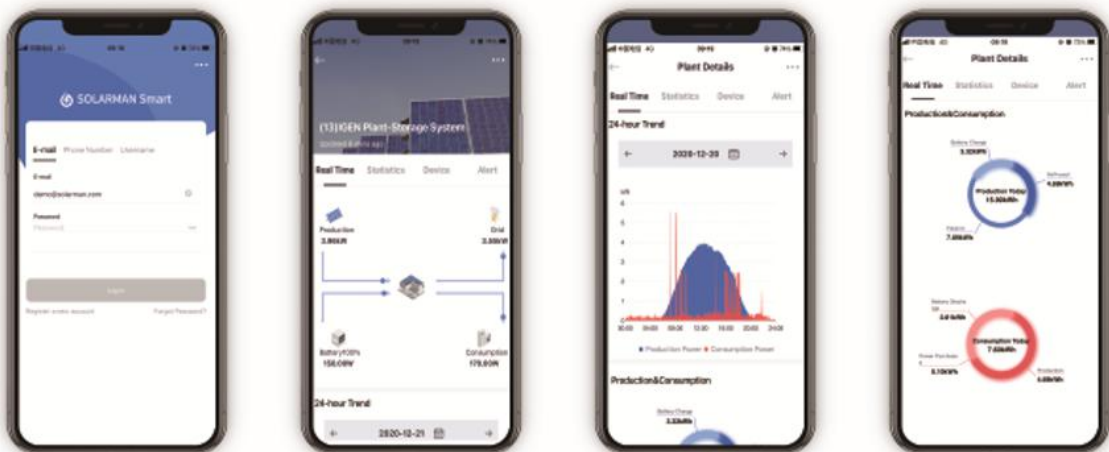
- 👤 Making unsightly cables on the spot
- 👤 Power distribution and installation
- 👤 Adjust the inverter and battery together

Highlights



Inter
Connect

Energy Management System



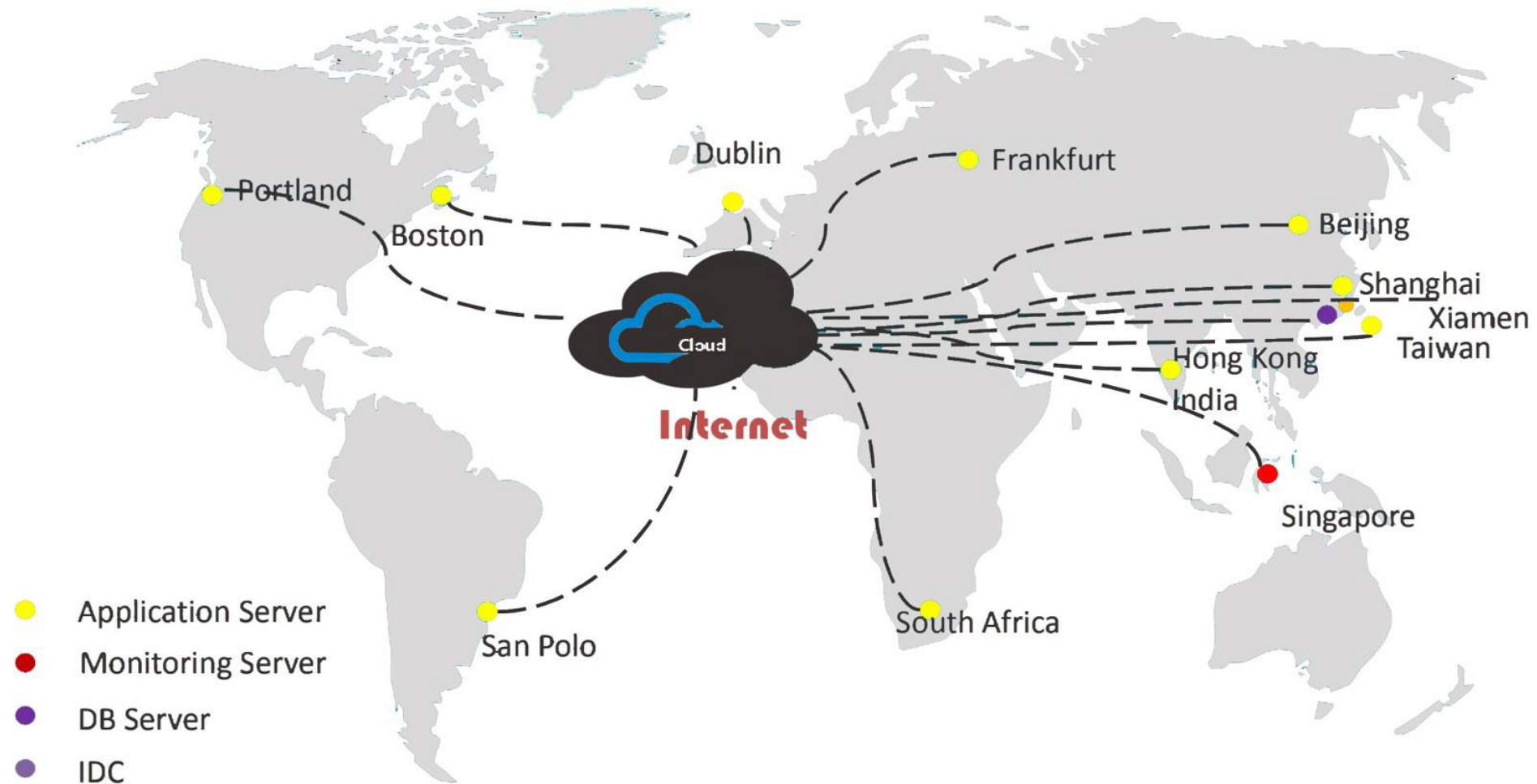
SOLARMAN Smart home system with APP Remote access to the system

With the app you can monitor production and energy consumption of your home in real time. Set your preferences to optimize your energy independence, the protection against blackouts or energy savings.

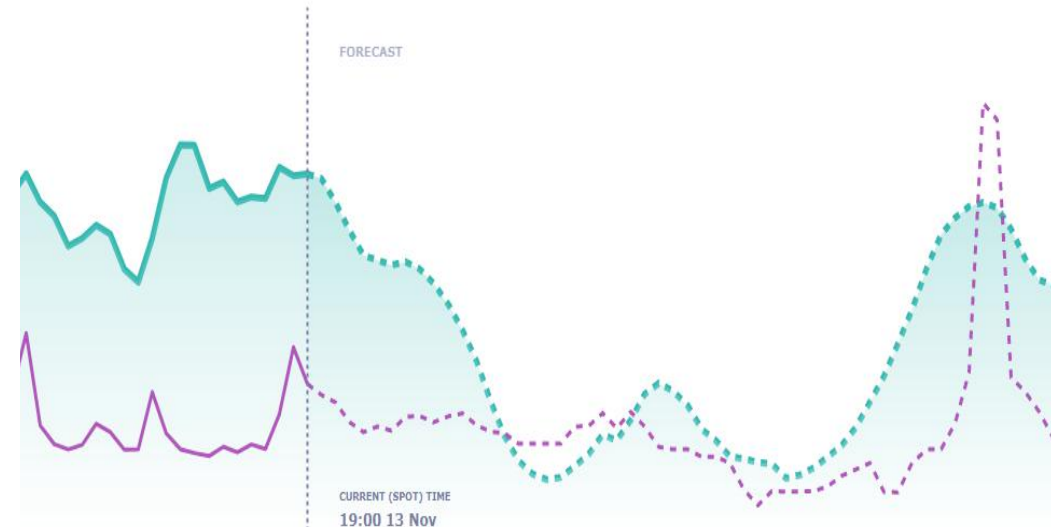
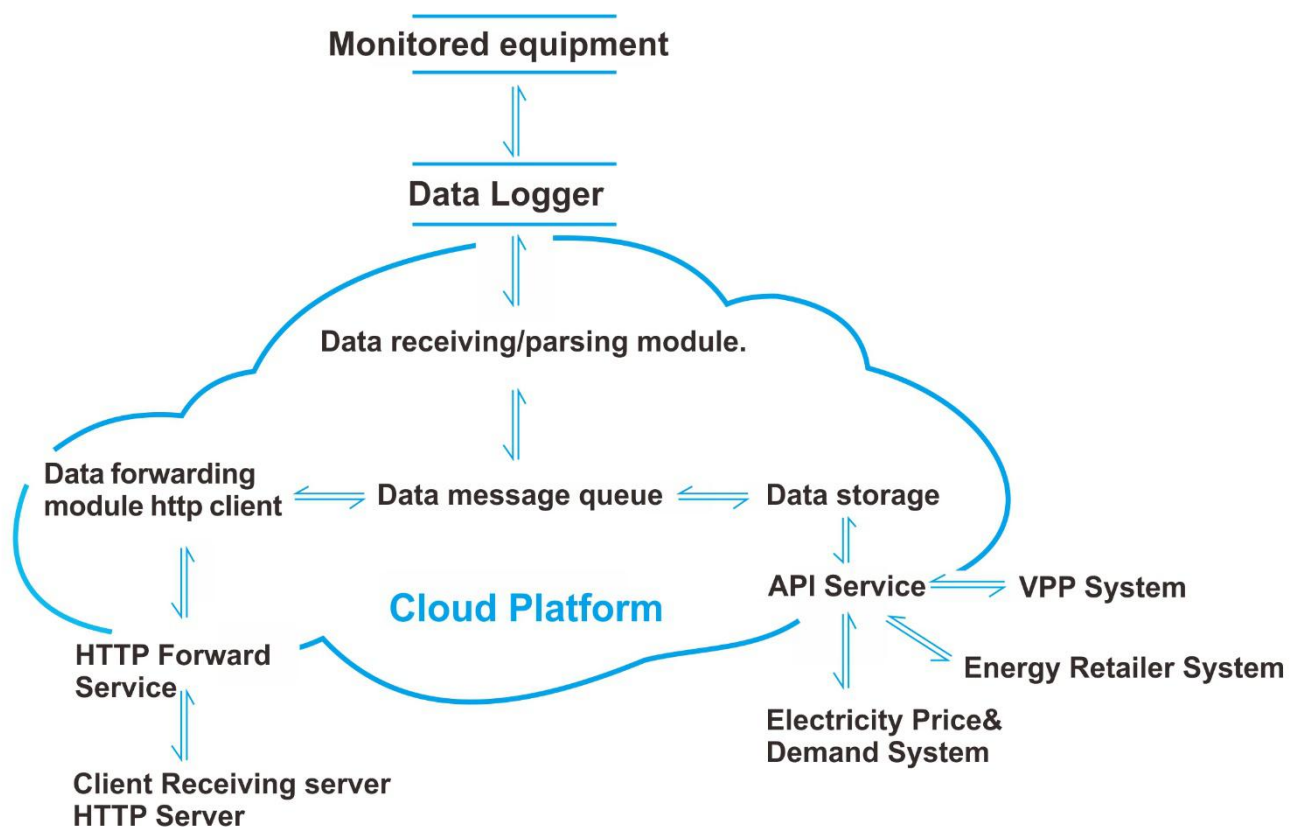
Thanks to instant alerts and access to distance, you can control your plant wherever you are.



Worldwide Footprints



Interconnection- API support to extend the network control function



Certificate



Certificate of Suitability

Addendum

Certificate No.: **SAA202450**
Date of Issue: **14 October 2020**
Regulatory Definition: **Non-Prescribed Hybrid Inverter**

Additional Models: **Blu-E-S 36800**
Trade Name: **KSTAR**
Rating/Marking: **PV input: Max 580Vdc; 13A/13A 4800W
MPPT voltage range: 120-550Vdc; 1sc: 16A/16A
Battery: Lithium or lead-acid 48Vdc, 40-450Vdc
Max charge current: 50A
Max charge power: 3680W
Max discharge current: 80A
Max discharge power: 4000W
Grid side: Input: 230V~ 50Hz Max 32A 7350VA
Output: 230V~ 50Hz Max 16A Max 3680W 3680VA
Back-up: 230V~ 50Hz Max 16A 3680W 4000VA
Class I, IP65, -25°C to +40°C**



Certificate of Suitability

Certificate No.: **SAA162304**

Certificate Holder: **Shenzhen Kstar New Energy Company Limited**
The 9th Floor, R&D Building, Kstar Industrial Park,
Guangming Hi-tech Industrial Zone, 518107 Shenzhen,
Guangdong Province,
P.R. China

Class Description: **Non-Declared**
Product Description: **PV Grid-Interactive Inverter**
Brand Name: **KSTAR**



CERTIFICATE

No. Z2 075386 0126 Rev. 00



Holder of Certificate: **Shenzhen Kstar New Energy Company Limited**
The 9th Floor, R&D Building
Kstar Industrial Park, Guangming Hi-tech Industrial Zone
518107 Shenzhen, Guangdong Province
PEOPLE'S REPUBLIC OF CHINA

Certification Mark:



Product: **Converter**
(Photovoltaic grid-connected inverter)

Certificate	BLuE ESS
UN38.3	√
IEC62619	√
IEC62109	√
CEI 0-21	√
IEC61000	√
AS4777	√
.....	Planning
.....	Planning

  中国认可 检验 INSPECTION CNAS IB0078 海运 By Sea

货物运输条件鉴别报告书

Identification and Classification Report for Transport of Goods

危险物品 (Dangerous Goods) 此报告本年度有效 有效期至2020年12月31日

报告编号: SEKSZ2020091477610370001
Issued No: _____
签发日期: 2020.09.15
Issued Date: _____
委托单位: 深圳科士达科技股份有限公司
Applicant: SHENZHEN KSTAR NEW ENERGY COMPANY LIMITED
物品名称: 锂电池组146-PACKS, 1 51.2V 100Ah 5.12kWh
Name of Goods: LITHIUM BATTERY PACK BluE-PACKS,1 51.2V 100Ah 5.12kWh

北京迪捷姆空运技术开发有限公司
Beijing DGM Air Transport Technology Development Co., Ltd.

CERTIFICADO ◆ CERTIFICATO ◆ CERTIFICATE ◆ СЕРТИФИКАТ

Case Study



ESS : BLuE-S 5000D + 10.2kWh

Solar System : 6.6kw - 330W Seraphim Half-Cell

Location : Ireland

➤ Self-consumption :

- In daytime, the solar system will support the load and charges the battery
- In nighttime, the battery will support the load via the hybrid inverter.

➤ Off-grid :

- The solar panel and battery will support the loads when the power is outage.

Case Study



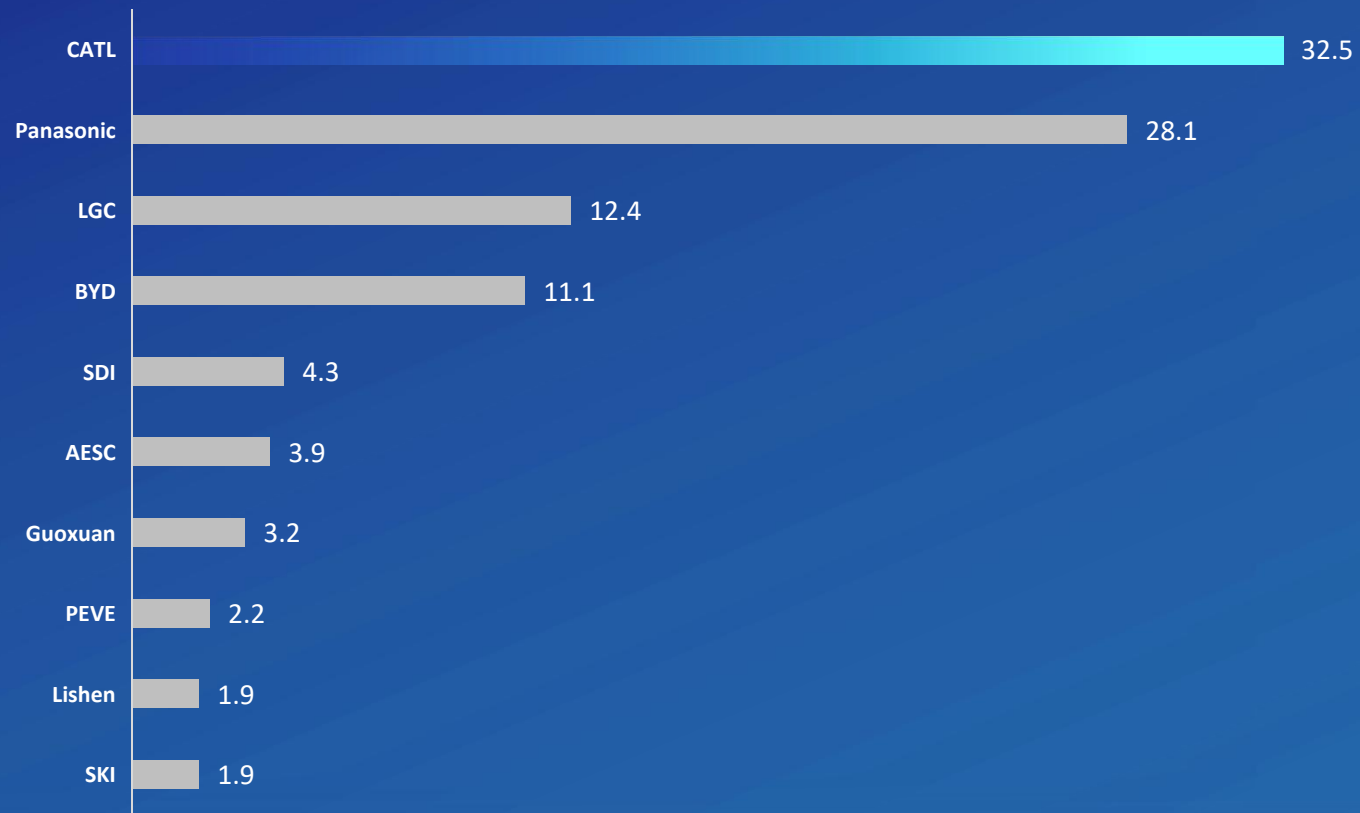


03

Advantage of CATL Battery

Safety | Reliability| Long Life

Global Top 10 Lithium-ion Battery Manufacturers in 2019 (Unit: GWh)



Date Sources: SNE Research



BESS Performance



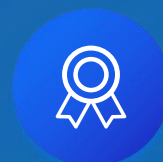
Aftersales Service System



Safety

35GWh

CATL's Total LFP Installation
as of 2019



Reliability













Low Failure Rate

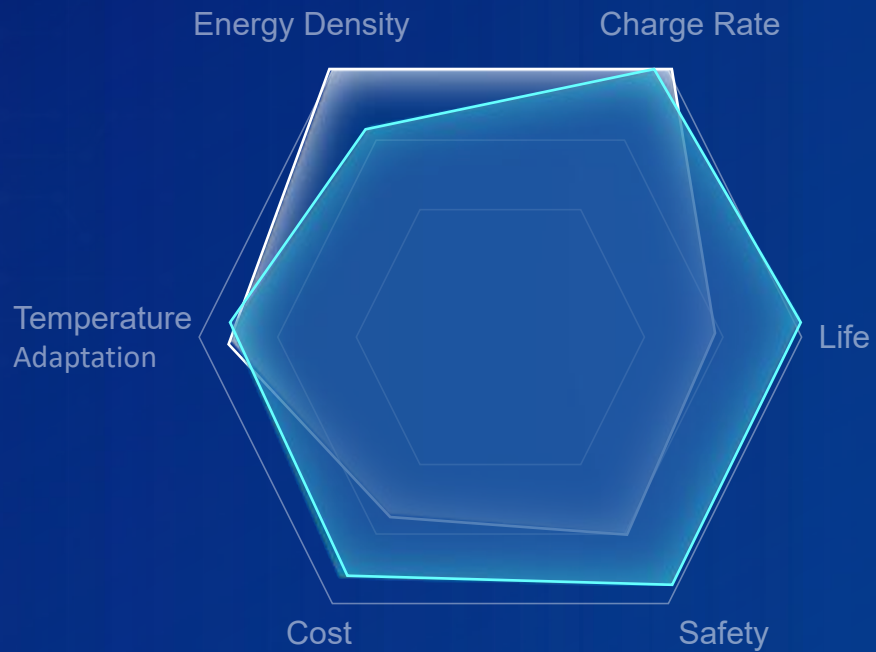


Long Life

>10,000 Cycles

CATL Recommend BESS to Use Safe & Long Life LFP Material

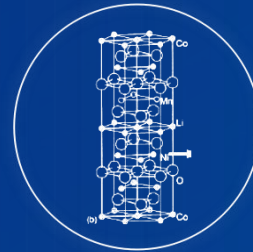
Cell Type	Voltage (V)	ED (Wh/kg)	Safety	Life Cycle	Material Price Fluctuation
LCO	3.7	230		800	
LFP	3.2	170		4,000-12,000	
NCM	3.7	200		1,000-6,000	
NCA	3.68	260		1,000-2,000	
LMO	3.9	130		1,500	
LTO	2.2	80		15,000	



NCM

Layered Crystal

structure

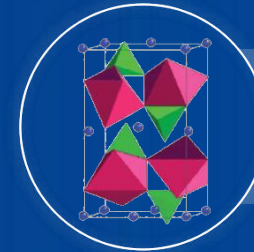


Higher Energy Density

LFP

Olivine

structure



Longer Cycle Life

Safer & More Reliable

Safety

Reliability

Long life

CATL

Intelligent Manufacturing System



Intelligence

Introduce & develop advanced production system to
optimize manufacturing
EPR+MES+Big Data+Automation



Automation

100% automated & flexible
production



Information

IoT & big data
20 years' traceability

Safety

Reliability

Long Life

CATL

Quality Management System

Never Compromise on Quality

Customer Quality Management



System Quality Assurance:

- External customer quality audits > 100 times per year
- First Time Pass Rate = 100%
- Certified by BMW, VW & PSA, etc.
- Certifications: ISO 45001, ISO 9001, ISO 14001, IATF 16949, ISO50001, etc.



IATF 16949



ISO 14001



OHSAS 18001



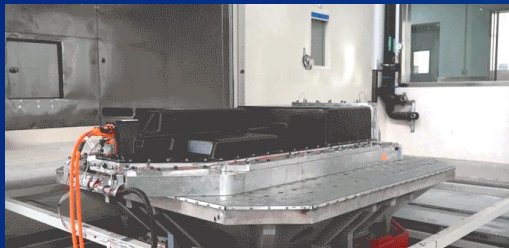
PSA QSB+ Certification

Comprehensive Test & Validation

273 Tests in Total

Safety  48Reliability  125Performance  100

Monthly Test Capability

  70,000  2,200  600

Vibration Test



External Fire Test



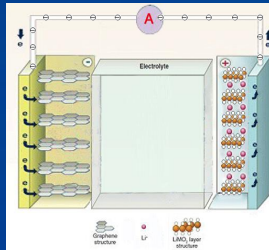
EMC Test



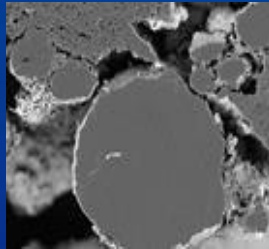
Mechanical Shock Test

Self-healing Technology

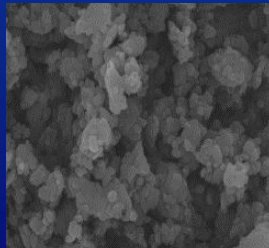
Optimize Anode/
Cathode/
Electrolyte



Graphite with
Self-healing
Structure
(Volume
ED \geq 350Wh/L)

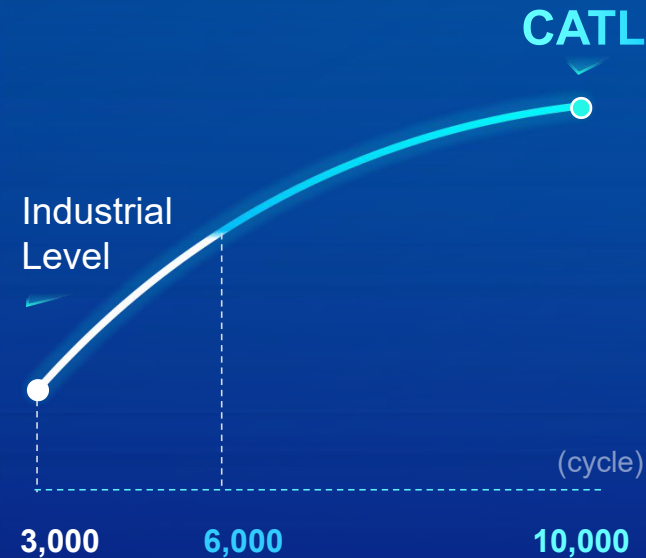


Martial Coating



CATL Long Life Product

Long Life



*@25°C, 0.5C/0.5C, 100%DOD, 80%Ret

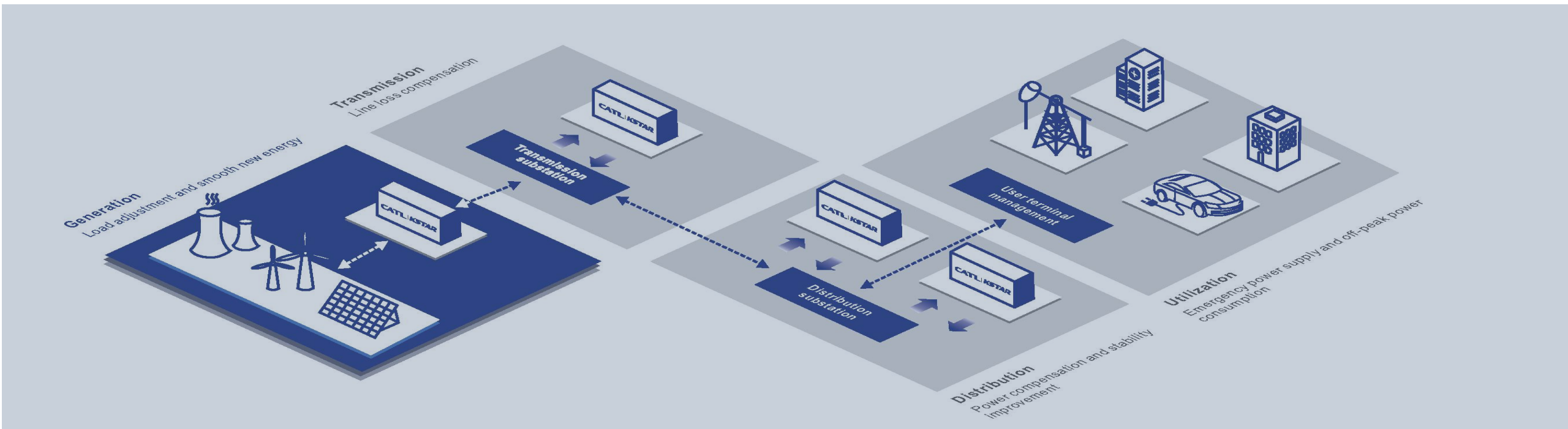
Case Study

Jinjiang Megawatt-scale BESS Station

30MW/108MWh



- Provide peak load shifting and frequency regulation services for substations.
- The first BESS project whose life is more than 12,000 cycles.



THANK YOU

P O W E R I N G G R E E N F U T U R E