ESS Smart Energy Storage and Management System

Innovative Energy Solutions · Enabling Flexible Energy Dispatch

- Grid-connected Energy Storage for Power Trading Platforms
- Distributed Energy Solutions Combining Photovoltaic and Energy Storage
- Obligatory and Behind-the-Meter Energy Storage for High Power Users
- EV Charging and Energy Storage Solutions

BILLION Watts

Containerized Energy Storage System Introduction

Why Billion Watts ?

- We are building Asia's premier one-stop Energy-as-a-Service (EaaS) company, offering fully integrated solutions for smart energy storage and energy management systems.
- We provide grid-connected storage systems for transmission and distribution-level needs, large power users, as well as commercial, industrial, and residential energy storage solutions.
- Our solar-plus-storage solutions maximize feeder utilization, enhancing power system resilience. We also offer expert bidding services on Taiwan Power's AFC energy trading platform, along with comprehensive site maintenance services.
- Our energy storage applications support corporate power transfer, peak shaving, load leveling, and smoothing output, helping companies address challenges such as renewable energy intermittency and nighttime demand increases.

Products and Services Scope

Energy Storage Batteries and BMS System

- Utilizes high-safety Lithium Iron Phosphate (LFP) battery cells
- Equipped with liquid cooling technology; the thermal management system ensures optimal operating temperatures
- Active fire detection and suppression system
- Dedicated battery cell monitoring and protection system

EPC

- Specialized project design for electromechanical engineering (high-voltage panels)
- Power interfacing (distribution panels, transformers)
- Civil engineering construction
- Integrated communication testing and operation & maintenance services

Power Conditioning System (PCS)

- Local Taiwanese supplier ensuring reliable maintenance services
- Compliant with IEC62477 and UL1741 standards
- Supports communication protocols such as ModBus TCP/RTU and IEC61850
- DC/AC conversion efficiency up to 98%

Aggregator Management Services

- Operated by certified and approved traders
- Utilizes data analysis from Taiwan Power Company and various power generation sources for precise decision-making
- Intuitive operation enables rapid order placement and bidding
- Ensures high execution efficiency and system dispatchability

Energy Management System (EMS)

- Real-time operational information and alarm event logging
- Remote parameter adjustments and settings available
- Remote emergency stop function, providing a basis for manual decision-making
- Customizable services based on client requirements

Energy Storage Insurance Services

- Lifting, Collision, and Dropping
- Fire / Explosion
- Third-Party Liability: Fire Spread and Pollution
- Loss of Business Income
- Battery Performance Degradation and Warranty Risks

Advantages

- Cutting-edge battery material design, high energy density, and lightweight load-bearing capacity
- 2.5MWh (20-foot container capacity), 5MWh (40-foot container capacity)
- Suitable for power-type frequency regulation and energy-type peak shaving and valley filling
- Communication equipment free from cybersecurity concerns related to mainland China manufacturing
- High-efficiency heat dissipation and enhanced safety features
- Strong local operational presence, offering battery warranty services

Engineering General Contracting and Construction Management

Accelerating Corporate Energy Transformation Goals Driven by Government Policies

As global trends toward net-zero carbon emissions intensify, carbon pricing has become a key method for countries to control carbon emissions and promote decarbonization. The official announcement of the carbon pricing era has arrived! A comprehensive plan for a net-zero emissions roadmap and carbon reduction is a key focus for businesses preparing for the future. According to the government's "2050 Net-Zero Emissions Pathway" and its 12 key strategic plans, the goal is to achieve over 60% of renewable energy generation by 2050. The Energy Bureau has released short-term plans for promoting solar power, and Taiwan Power Company (Taipower) has announced a 10-year investment of NT$564.5 billion in the "Grid Resilience Enhancement Project," with ten major areas of focus, including the "extensive increase of energy storage equipment" to complement green energy development and enhance grid stability.

Taiwan Energy Storage Market and Application Models

- Energy storage systems act as emergency power sources for Taiwan's power grid.
- Based on startup speed, there are three types：frequency regulation reserve, immediate reserve, and supplemental reserve, all of which support Taiwan Power Company's grid operations.
- Taiwan's substations are generally aging, and the replacement of old equipment cannot keep up with the rapid growth in industrial electricity demand, leading to the emergence of the energy storage market.
- With the future decommissioning of nuclear power plants and the inability to build new thermal power plants, the issue of electricity shortages cannot be ignored, highlighting the advantages of energy storage systems.

Energy Storage System Cooperation Model

1 Willingness Assessment
2 On-Site Survey
3 Content Description
4 Contract Signing
5 Design Review
6 Engineering Construction

Energy Storage Site Construction Process

1

Project Preparation

Site survey, land lease agreements, Taipower feed-in line application, system preparation, and application, etc.

2

Energy Storage System Design and Planning

Owner contract signing, electrical and civil engineering drawings, project manager assignment, procurement of panels and key equipment, etc.

3

Civil Engineering Construction

layout, weeding and land grading, site excavation, grounding system and piping works, RC foundation in equipment area, etc.

4

System Engineering and Testing

Low-voltage and high-voltage power system engineering, EMS network monitoring system engineering, equipment placement, pre-power delivery testing, etc.

5

Cooperate with Relevant Unit for The Final Acceptance

Acceptance of test items, system start-up test, acceptance of related data , Taipower transmission, education and training, etc.

6

Maintenance and Operation Team Takeover

After-sales service, project site follow-up maintenance services, spare parts procurement and replacement operations, etc.

Client-side Energy Storage Applications

Obligatory Energy Storage for Major Power Consumers

Power users with a contracted capacity of 5000 kW or more are subject to mandatory energy storage requirements, requiring at least 10% of their contracted capacity (approximately 500 kWp) in green energy installations. It is anticipated that this requirement may expand to power users with an 800 kW capacity in the future.
Users can choose one or multiple options from the following four solutions. Energy storage and renewable energy generation equipment must adhere to self-consumption principles and cannot be sold back to Taipower or leased for other sales. Additionally, energy storage systems are prohibited from participating in Taipower's ancillary services. Taipower has introduced a new policy, the "Renewable Energy Obligatory User Storage Adjustment Program," encouraging major power consumers to fulfill their obligations by installing energy storage systems to improve utilization rates. This program will be officially implemented in 2024.

Four Options	Calculation Formula
Install Renewable Energy Generation Equipment	Mandatory Equipment Capacity = Mandatory Contract Capacity x 10%
Purchase Renewable Energy Power and Certificates	Annual Purchase Quota = Mandatory Equipment Capacity x Annual Sales Power per kW of Selected Renewable Energy Category
Install Energy Storage Equipment	Installation Capacity = Mandatory Equipment Capacity x Minimum Power Supply for 2 Hours
Pay Compensation	Annual Payment Amount = Mandatory Equipment Capacity x 2,500 kWh/kW x 4 NTD/kWh (Compensation Rate)

Renewable Energy User Storage Adjustment Measures

The storage equipment set up by major electricity users can discharge for two hours from 6 pm to 8 pm on weekdays throughout the year (excluding off-peak days), limited to once per day. During discharge times, charging the storage is not permitted. Participation is voluntary, and users can choose one of the two currently planned options.

Obligatory hours type

Set up the system of obligatory hours (400 hours); beyond the obligatory hours, an electricity bill deduction of 10 NT dollars per kWh can be provided.

Progressive deduction type

No obligation hours are set, and different electricity bill deductions are given according to the progressive discharge hours：a deduction of 1 NT dollar per kWh within 150 hours, 2 NT dollars per kWh for 151 to 400 hours, and 5 NT dollars per kWh for more than 401 hours.

Four Key Application Types

Maximizing Self-Consumption

Uses batteries to store electricity generated by photovoltaics, enhancing the self-consumption ratio.

Peak Shaving and Valley Filling

Charges the battery during off-peak hours and discharges during peak hours to reduce electricity costs.

Off-Grid Operation

Provides a reliable and cost-effective standalone power supply for areas with limited or unstable grid access, enhancing energy autonomy and resilience.

Backup Power

Serves as a backup power source during grid outages.

Industrial & Commercial ESS

Billion Commercial & Industrial Energy Storage System

Active Safety

- System-level aerosol firefighting
- Pack IP67 protection, system IP54 protection
- The rapid aerosol fire suppression system is suitable for relatively enclosed spaces such as cabinets

Compact & Flexible

- Compact footprint enhances configuration flexibility
- All-in-one design, flexible transportation & fast installation
- Modular configuration, PCS+BMS+EMS integrated design

Smart & Efficient

- Real-time health & work status tracking
- Refined thermal management, ensures optimal battery operating temperature
- Supports parallel connection of multiple cabinets to enable system expansion

Fusio One 100kW/215kWh

DC Parameter

- System Capacity：215kWh
- Battery Type：LFP 3.2V / 280Ah
- Battery PACK Configuration：1P48S, 43kWh
- Battery PACK Protection Rank：IP67
- Battery System Configuration：1P240S
- Rated Capacity：215kWh
- Rated Voltage：768VDC
- Voltage Range：672 ~ 876VDC
- C-Rate：≦ 0.5C
- Depth of Discharge：0 ~ 95%
- Cooling Methods：Liquid Cooling

AC Parameter

- Rated Power：100kW
- Rated Grid Voltage ：400VAC
- Grid Voltage Allowance Range：320 ~ 460VAC
- Rated Grid Frequency：50 / 60Hz
- THDi：≦ 3%
- DC Component：≦ 0.5%
- Wiring Method ：3L+N+PE
- Cooling Method：Smart Air Cooling

General Specifications

- Dimensions (W*H*D)：1,000 x 2,280 x 1,350 mm
- Degree of Protection：IP54
- Max. Operating Altitude：4,000m (derating ＞ 2,000m)
- Operating Temperature Range：-20°C ~ 55°C (derating ＞ 45°C)
- Operating Humidity：0% ~ 95% (non-condensing
- Fire Protection System：Fire detection (temperature, pressure, smoke) + Aerosol fire extinguishing
- Communication Interface：Ethernet
- Wiring Method：Entering and exiting from below

Compliance Standards

- BAT：IEC62619、UN38.3、UL9540A
- PCS：IEC61000、IEC62477

Billion Commercial & Industrial Energy Storage Integrated System

Active Safety

- Module-level + system-level fire detection and suppression system to enhance product safety
- Pack IP67 protection, system IP54 protection

Compact & Flexible

- PCS+BMS+EMS integrated design
- Optional MPPT and STS modules to accommodate various applications
- Scalable and flexible multi-module design
- Supports 2-hour, 4-hour, and 8-hour charge/discharge solutions

Smart & Efficient

- Real-time health & work status tracking
- Refined thermal management to maintain the optimal operating temperature of battery

Fusio One II 125kW/261kWh

DC Parameter

- System Capacity：261kWh
- Battery Type：LFP 3.2V / 314Ah
- Battery PACK Configuration：1P52S, 52kWh
- Battery PACK Protection Rank：IP67
- Battery System Configuration：1P260S
- Rated Capacity：261 kWh
- Rated Voltage：832 VDC
- Voltage Range：728 ~ 936 VDC
- C-Rate：≦ 0.5C
- Depth of Discharge：95%
- Cooling Methods：Liquid Cooling

AC Parameter

- Rated Power：125kW
- Rated Grid Voltage ：400VAC
- Grid Voltage Allowance Range：340 ~ 460VAC
- Rated Grid Frequency：50 / 60Hz
- THDi：≦ 5%
- DC Component：≦ 0.5%
- Wiring Method：3L+N+PE
- Cooling Method：Smart Air Cooling

Solar Input

- Rated Power：125 kW
- MPPT：8
- Maximum Voltage：1100 V
- Operating Voltage Range：150 ~ 1000 V
- Minimum Voltage at Full Power：340 V
- Maximum Input Current per PV String：45A

General Specifications

- Degree of Protection：IP54
- Max. Operating Altitude：＜ 3,000m
- Operating Temperature Range：-20° C ~ 50° C
- Operating Humidity：0% ~ 95% (non-condensing)
- Fire Protection System：System-level smoke and temperature detection, Module-level pressure relief and explosion-proof, Module + System-level aerosol fire extinguishing
- Operating Mode：On-grid, Off-grid, Automatic on/off-grid switching
- Communication Interface：Ethernet
- Wiring Method：Entering and exiting from below

Compliance Standards

- BAT：IEC 62619、IEC 60730、UN38.3
- PCS：IEC 61000、IEC 62477

Billion Commercial & Industrial Energy Storage Cabinet

Active Safety

- System-level aerosol firefighting
- Pack IP67 protection, system IP55 protection
- Highly integrated: including thermal management system, fire protection system, BMS, etc.

Compact & Flexible

- Compact footprint and high power density, enabling configuration flexibility
- System integrated design, flexible transportation & fast installation
- Support parallel connection of multiple cabinets

Smart & Efficient

- Real-time health & work status tracking
- Refined thermal management, ensures optimal battery operating temperature
- System energy efficiency ≧94%

Fusio 215kWh-344kWh

Cell

- Cell Chemistry Type：LFP
- Nominal Capacity：280 Ah (0.5P、25°C)
- Nominal Energy：896 Wh (0.5P、25°C)
- Nominal Voltage：3.2V

Module

- Module Configuration：1P48S
- Nominal Capacity：280 Ah (0.5P、25°C)
- Nominal Energy：43 kWh (0.5P、25°C)
- Nominal Voltage：153.6V

Cabinet

- System Energy Efficiency：≧ 94%
- Nominal Charge/Discharge Rate：0.5P
- BMS Communication：CAN
- Noise Level：≦ 75dB
- Thermal Management：Liquid Cooling
- Coolant：50%Water & 50%Glycol
- Coolant Volume：~11L
- IP Level：IP55
- Operation Temperature：-30°C ~50°C
- Storage Temperature：-20°C ~ 35°C (suggested)
- Dimensions (L x W x H)：1,300 x 1,300 x 2,350 mm

Compliance Standards

- IEC62619、IEC60730-1、UL1973、UL9540A、UN38.3

Model Type	Fusio 215kWh	Fusio 258kWh	Fusio 344kWh
Cabinet Configuration	1P240S	1P288S	1P384S
Module Quantity	5	6	8
Nominal Energy	215 kWh	258 kWh	344 kWh
Nominal Voltage	768 VDC	921 VDC	1228 VDC
Operation Voltage	600 ~ 876 VDC	720 ~ 1051 VDC	960 ~ 1401 VDC
Total Weight	≦ 2.6 T	≦ 2.9 T	≦ 3.5 T

Photovoltaic + Energy Storage

Photovoltaic and Energy Storage Integrated Distributed Energy Systems

Taiwan's 2030 carbon reduction target has been raised to 24%, with the energy storage capacity target increasing from 1.5 GW in 2025 to 5.5 GW by 2030.
To encourage the integration of energy storage systems within solar power projects, electricity generated by solar energy during the day can be shifted for use at night. This effectively alleviates peak demand on the grid during nighttime hours and increases daytime grid integration, thereby maximizing feeder line utilization. These initiatives further expand the application of energy storage systems for energy transfer.

Bidding Principles

1. The calculation of the purchase rate for electricity released from the energy storage system includes the battery capacity rate, which serves as the basis for bidding.
2. Bids are ranked from lowest to highest rate, with selections made until the allocated capacity for the current period is fulfilled.

The application plan should comply with the following

1. For completed and grid-connected targets, the unsaved energy can be sold in bulk to Taiwan Power Company, supplied directly, or resupplied. However, all stored and subsequently released energy must be sold in bulk to Taiwan Power Company only.

Regulations for Adding Energy Storage Systems to Renewable Energy Power Purchase Agreements

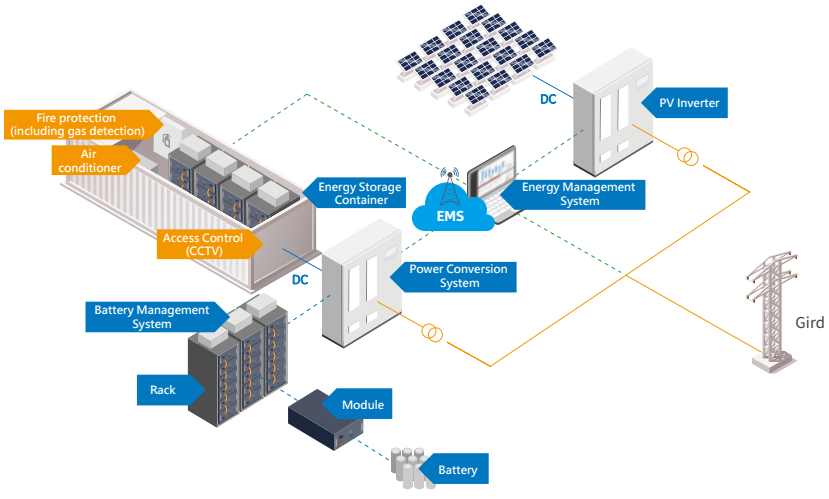
1. The electricity rate for stored energy released to the grid is set at 1.25% of the power purchase rate for unstored energy. If the stored energy includes multiple power purchase rates, the rate is determined based on the storage proportion of each rate.
2. The power purchase rate for unstored energy released to the grid will follow the applicable renewable energy power purchase rate and relevant calculation formulas as announced.
3. The charging and discharging of the energy storage system shall be executed by Taiwan Power Company (Taipower) according to dispatching principles. The daily guaranteed billable energy is calculated as 2.61 times the nominal effective power (MW) of the energy storage system, expressed in MWh. Unless otherwise specified by Taipower, the energy storage system should be charged between 9:00 AM and 2:30 PM daily.

New Solar + Storage Installation

- Provide services for photovoltaic (PV) equipment, monitoring, and operation & maintenance (O&M), while managing sales channels and customer base
- Be familiar with PV site design, planning, and installation, with experience in integrating energy storage systems

Existing Solar + Storage Upgrade

- Offer solutions to retrofit and enhance the power generation capacity of aging PV systems, adding energy storage systems to increase feed-in tariff (FiT) revenue
- Retrofit projects expand EPC (Engineering, Procurement, and Construction) revenue sources, with a 12-year warranty for PV systems and a 10-year warranty for energy storage system operations



Grid-Connected Energy Storage

Power Trading Platform Grid-Connected Energy Storage

Participates in Taipower's ancillary services market trading platform, using ancillary services and reserve capacity as mechanisms for power trading. As a qualified trader, it engages in bid transactions, providing rapid-response support every second to stabilize the regional grid frequency. Currently, high-value frequency regulation reserve products like dReg 0.25, dReg 0.5, sReg, and E-dReg are available. In the event of grid emergencies, the system proactively detects power system frequency to execute peak and off-peak energy transfer through charge and discharge cycles.

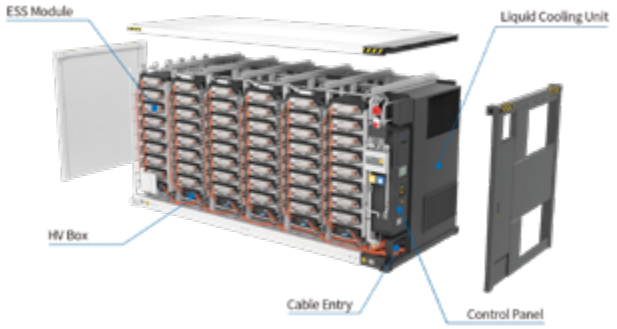
Billion Liquid-Cooling Battery Energy Storage System

Integration & Flexibility

- Pre-configured and tested to minimize on-site labor and shorten project duration
- Up to 4 containers connected in 1 PCS, support 2~8h application
- Flexible layout, support back to back and side by side
- Support bottom and string and centralization PCS

High Safety

- Liquid cooling for high thermal stability
- Multi-stage fire protection
- LFP cells with high cyclic lifetime
- Dedicated cell monitoring and protection system



Levelized Cost of Storage

- Excellent thermal management improves energy throughput by ensuring optimal operating temperature
- Highly integrated: including thermal management system, fire protection system, BMS, etc.
- Supports back to back and side by side installations

Fusio 5.015MWh

General Specifications

- Battery Type：LFP314-2P52S
- No. of Battery Modules：48 (6 x 8)
- Configuration：12P416S
- Cooling Method：Liquid Cooling
- BMS Communication：CAN、RS485、Ethernet
- Gravimetric：＞ 111 Wh/kg
- Volumetric：＞ 117 Wh/l
- Application Altitude：≦ 4,000 m

Electrical

- Nominal Voltage：1,331.2 V
- Operating Voltage：1,123.2 ~ 1,497.6 V
- Nominal Energy：5,015.96 kWh
- Nominal Charge/Discharge Rate：0.5 P / 0.5 P
- Round Trip Efficiency：＞ 94 %

Mechanical

- Dimensions (L x W x H)：6,058 x 2,438 x 2,896 mm
- Weight Container (20 ft.) ：＜ 45,000 kg
- Protection Level：IP55

Temperature Range

- Operating：-30°C ~ 55°C
- Storing (recommended)：-20°C ~ 35°C

Compliance Standards

- IEC 62619、IEC 62477、IEC 63056、IEC 61000、UL 1973、UL 9540A、UN 38.3

Residential Energy Storage

PS20 Residential / Commercial Energy Storage System

- 5-Year Warranty for Taiwan region only
- Sleek and Easy to Install：Modular design allows up to 8 storage systems in parallel for enhanced capacity
- High Power Output of 11.5kW：Ideal for both residential and commercial applications
- High Safety Standards：UL9540 certification for complete system
- Smart Management：User-friendly UI APP interface

Side View

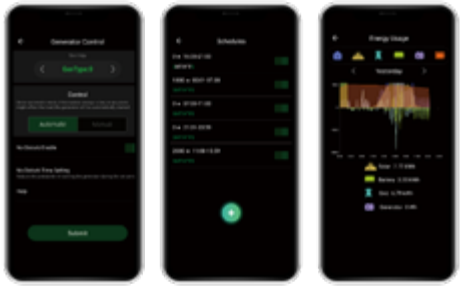
PS20 11.5kW/20kWh

- Solar Input：Maximum Power 2 x 8.5 kWp
- Grid Input：Rated Power @220V 11.5 kW
- Generator Input：Can be connected, works with solar and grid
- Rated Voltage：Single-phase Three-wire 110 / 220 V
- Maximum Current：52 A
- Expandable Units：8 units (160kWh)
- Protection：Entire Unit IP65
- Safety Features：Fast Shutdown, Surge Protection, Anti-Islanding, Over-temperature Protection, Overcurrent Protection, Ground Fault Isolation

Cloud Monitoring and Energy Management System

Cloud Monitoring System Platform

Online Support and Maintenance Platform



Cloud Energy Management APP

Real-time App Monitoring and Customized Energy Management

Electric Vehicle Charging Station

AC EV Charger

- Developed, produced, and manufactured locally in Taiwan
- 4.3-inch screen display, clear execution status
- RFID identity recognition, easy operation
- Flexible choice for "Instant Charging" during peak periods
  Patent Number：New Model No. M646619
- Wall-mounted or pedestal installation, widely applicable
- Compatible with EV-EMS EnergyManagement System

BH-2000

Power Output and Input

- Output Power：7kW
- Output Current：32A
- Input Rated Voltage：220Vac
- Input Rated Frequency：50 / 60Hz
- Output Rated Voltage：220Vac
- Charging Connector Type：Type1 (SAE J1772) / Type2 (IEC 62196-2)
- Charging Cable Length：16 ft. (standard) / 23 ft. (optional)
- Number of Connections：1

Protection Mechanisms

- Overvoltage Protection：Yes
- Undervoltage Protection：Yes
- Over Current Protection：Yes
- Short Circuit Protection：Yes
- Ground Fault Protection：Yes
- Over-Temperature Protection：Yes
- Leakage Protection：RCD TypeA
- Surge Protection：Yes

User Interface & Control

- Ethernet：LAN (standard) / Wi-Fi (optional)
- Backend Protocol：OCPP
- LCD Monitor：4.3 吋 LCD
- Operational Identification：RFID
- Status Indicators：Power, Network, Charging
- Emergency Button：On/Off
- Operation Modes ：Rapid Charging / Smart Charging, Load Balancing

Operating Environment

- IP/IK Rating：IP55 / IK08
- Operating Temperature：-4° F ~ 122° F (-20° C ~ 50° C)
- Humidity：5 ~ 95% non-condensing
- Altitude：＜ 2000m
- Cooling：Natural Cooling
- Standby Power：＜ 2W

Mechanical Design

- Dimensions：9.45” W x 13.78” H x 5.12” D
- Weight：5.5kg

Safety Certification

- Meets CNS15511-1 Standard

EV-EMS EV Charger Management System

1. Real-time charging pile information display
2. Charging history record query
3. Monthly charging cost statistics download
4. Optimized charging strategy
5. Charging distribution for charging piles

Industrial Computer
Processor：Intel Core i5 quad-core or above
Memory：32G-DDR4*2
Hard disk：SSD*1+HDD*1 (adjust based on charging pile quantity)
Operating system：Linux Ubuntu 18.04

Smart Charging Mode
Price concession charging in off-peak hours

Rapid Charging Mode
Ensure instant charging in peak hours

Smart DC EV Charger 120-240K

High-Efficiency Design

- 95% energy conversion efficiency, providing 240kW high-power output
- Can be equipped with both CCS 1 and CCS 2 dual-standard charging guns
- Supports dual-gun simultaneous output, eliminating range anxiety for electric vehicles

Safety Protection

- Compliant with IP55 rating, Air-Cooled system

Smart Charging

- 7-inch LCD screen display, clear charging status
- Supports OCPP communication protocol and various communication functions
- Integrated RFID card reader for identification, authentication, and payment functions

BEVC 120-240K

AC Input Parameter

- Input Voltage：3P+N+P 380Vac ± 15%
- Input Frequency：50Hz / 60Hz
- Power Factor：≧ 0.99
- Efficiency：≧ 95%

DC Output Parameter

- Output Voltage Range：DC 200Vdc ~ 1000Vdc
- Output Current Range ：0 ~ 250A
- Output Power：120KW /180KW / 240KW
- Output Voltage Tolerance：≦ ±0.5%

User Interface

- LED Light：Charging (A), Charging (B), Power, Error
- LCD Screen：7" LCD touchscreen
- Button：Emergency stop button
- Activation：Mobile APP、RFID card

Communication Interface

- Communication Protocol：OCPP 1.6J
- Network Interface：Ethernet (Standard) / 4G LTE & WIFI (Optional)

Appearance & Operation Condition

- Connector Type：Dual CCS1 connectors or Dual CCS2 connectors or Single CCS1 connnector + Single CCS2 connector (Adaptable)
- Cable Length：5M(Standard) / 7M(Optional)
- Cooling Method：Air cooling
- Operation Temperature：-30° C ~ +50° C
- Storage Temperature：-40° C ~ +60° C
- IP Rating：IP55

Safety Protection

- SPD Protection：Yes
- Protection：Output overvoltage, output overcurrent, input undervoltage, phase loss, overtemperature, AC surge, voltage limiting, current limiting, ground fault, insulation monitoring, emergency stop
- Emergency Button：Push button

Physical Specifications

- Dimensions(mm)：700(W) * 530(D) * 1700(H)
- Weight：＜ 300KG

Safety Certification

- VPC(CNS15511-1、CNS1511-23、CNS15511-24、CNS15511-21-2)

Smart DC EV Charger 480K

High-Efficiency Design

- Optimized for high-power fast-chargingstations, ensuring maximum performance
- Three-phase PFC circuit (Power Factor 0.99) minimizes energy loss
- Soft-switching high-frequency power modules enhance conversion efficiency
- Innovative module dormancy and rotation ensure efficiency under varying loads

Safety Protection

- Remote OTA fast and stable upgrades
- Intelligent monitoring and fault protection ensure safe charging
- IP54 for various outdoor environments

Smart Charging

- LCD screen displays real-time charging status, time, and cost
- Digital current-sharing enhances stability and interference resistance
- Supports multiple charging modes:time-based, quantity-based, and cost-based

BEVC-480K

AC Input Parameter

- Input Voltage：3P+N+G 380Vac ± 15%
- Input Frequency：50Hz / 60Hz
- Power Factor：≧ 0.99
- Efficiency：≧ 95%

DC Output Parameter

- Output Voltage Range：DC 200Vdc ~ 1000Vdc
- Output Current Range ：5 ~ 1600A
- Output Power：480KW
- Output Voltage Tolerance：≦ ±0.5%

User Interface

- LED Light：Power, Protection, Error
- LCD Screen：7" LCD touchscreen
- Activation：Mobile APP、RFID card

Communication Interface

- Communication Protocol：OCPP 1.6J
- Network Interface：Standard: Ethernet / Optional: 4G LTE

Appearance & Operation Condition

- Connector Type：Optional quantity of CCS1 and CCS2 (Up to 8 charging connectors)
- Cable Length：5M
- Cooling Method：Air cooling
- Operation Temperature ：-20°C ~ +50°C
- IP Rating：IP54

Safety Protection

- Protection：Charging Connector Temperature Detection, Overvoltage, Under Voltage, Overload, Short Circuit, Ground, Over Temperature, Low Temperature, Insulation Monitoring, Reverse Polarity, Surge, Emergency Stop, Leakage
- Emergency Button：Push button

Mechanical

- Power Cabinet Dimension (mm) ：1000(W)*800(D)*2000(H)
- Charging Dispenser Dimension (mm)：450(W)*300(D)*1800(H)
- Power Cabinet Weight：＜ 660KG
- Charging Dispenser Weight：＜ 125KG

Certification

- VPC(CNS15511-1、CNS1511-23、CNS15511-24、CNS15511-21-2) Expected by 2025Q4

Energy Storage Management and Monitoring System

Energy Management System

- Real-time display of statistical data and system execution status, enabling efficient analysis and allocation of resources for faster decision-making.
- Monitor various devices and operational modes, integrating PCS and BMS systems, and monitor power supply data. Provides battery and PCS data charts, device monitoring, and environmental data.
- Real-Time response to Taipower dispatch, allows flexible power adjustments and frequency anomaly monitoring to ensure stable operation.
- Integrated Solar and Storage Control System Integrates solar data, automatically dispatches battery usage to meet frequency, voltage, and power requirements.

Power Single-Line Diagram

The single-line diagram displays the energy storage charge and discharge status. A negative value indicates charging, while a positive value indicates discharging.

System Alerts

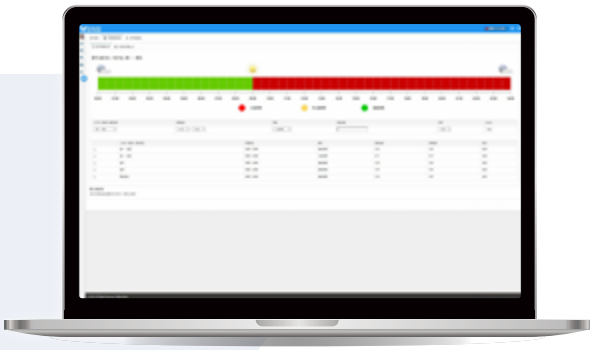
All real-time alerts are displayed using pop-up alert windows.

Scheduling Settings

The scheduling control panel is implemented in a calendar format, allowing "events" to be dragged and dropped onto the calendar to set relevant data.

Basic Parameters and Time-Based Pricing Management

Provides peak/off-peak pricing schedules and parameters required for generating electricity usage reports.

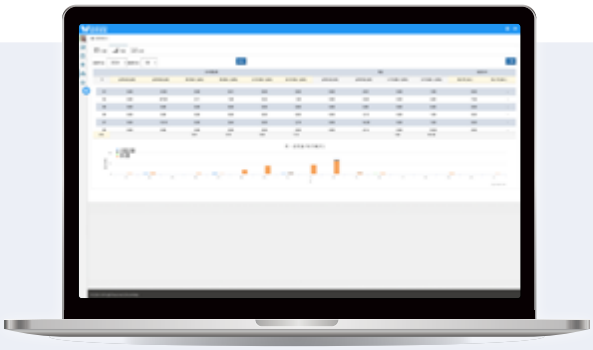


Device Monitoring

Real-time data updates every second. Users can click on relevant power parameters to display the curve chart of that parameter below.

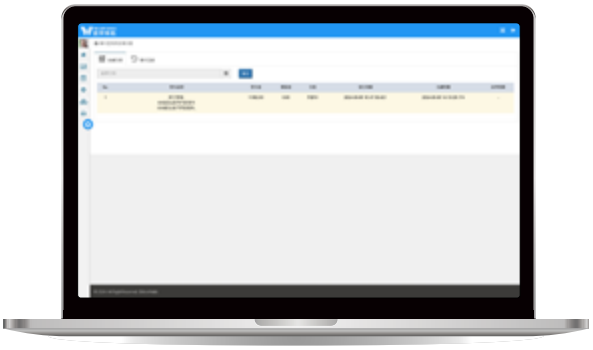
Power Consumption Statistics

Gathers data from the EMS energy management system, including PCS, BMS, and electric meters, to calculate kWh and store it in the database.



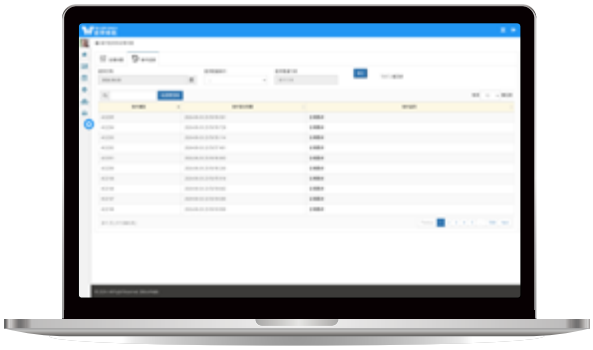
Device Alarms

Displays all real-time and historical alarm data within the equipment cabinets.



Event Query

Displays operational logs from the EMS system, including program and user activity records.



ESS Cloud Monitoring System

Web-Based Visual Cloud Service Platform

Utilizing Web Service technology, this platform allows project owners to access a single portal to monitor real-time operational statuses. Monitoring data includes remaining energy, active power (output/input), and execution rates, all presented in a visual data interface. This allows for a quick grasp of the latest operational conditions on-site, with data updates every second from Taiwan Power, stored directly on this cloud platform.

Real-Time, 24/7 Monitoring

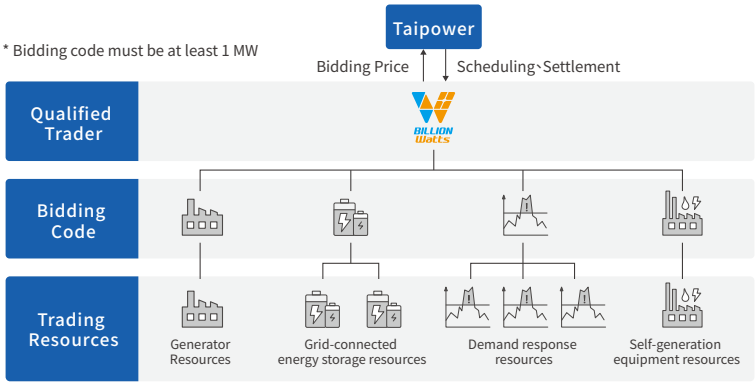
The system supports multi-screen switching and enables real-time monitoring through cloud-based AI information management technology. This ensures immediate alerts for any anomalies and allows for centralized oversight across multiple sites. Around-the-clock monitoring displays live statistics and execution status of the control system, facilitating resource analysis and allocation for maximum efficiency. This enables faster decision-making and enhances operational effectiveness on-site.

Energy Storage Value-added Services

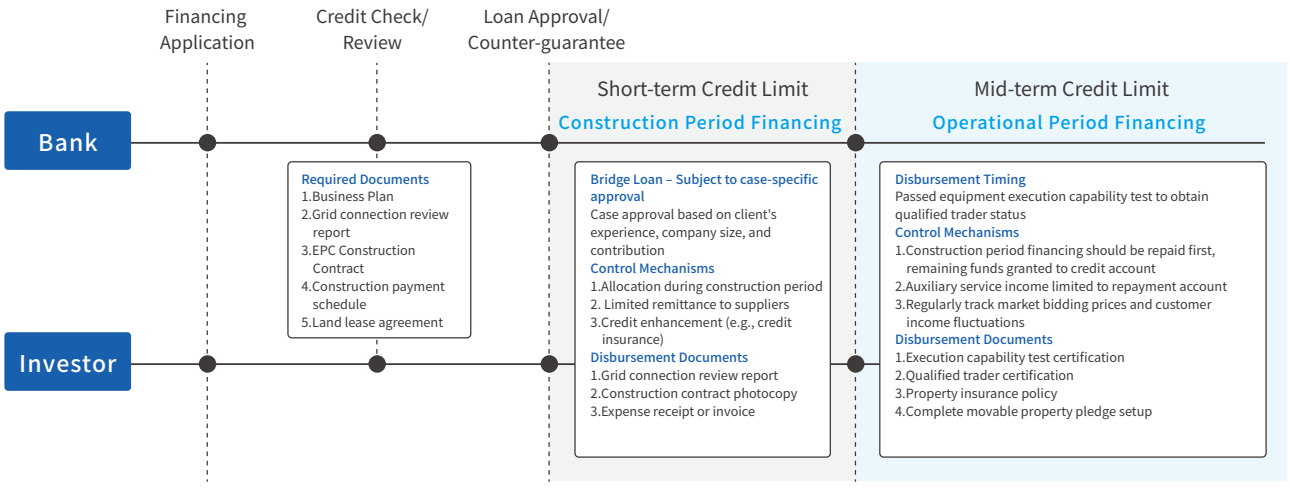
Power Trading Agent Resource Bidding

- Central monitoring center management, 24hr standby scheduling
- Analyze today's power supply trend, precise pricing strategy
- Consolidate resources to increase weight and grasp bidding opportunities

Billion Watts	Aggregator's resources joining the market
Aggregator	Guarantee execution efficiency SBSPM >=95% Guarantee energy storage system availability >=95% Guarantee minimum hours Must sign O&M contract
Customer	Monthly fixed management fee payment Profit sharing for hours beyond guaranteed hours



Investor Financing Process



Business Owners or Major Power Consumers

Leasing Items

- Tax Saving
- Maximizing Operations
- Cash flow streamlining
- Information Optimization

Example：

⇨Purchase 1 energy storage container, amount NT$25 million

⇨Leasing and repayment period: 5-7 years, 60-84 months

⇨Ownership reverts to the customer after lease period

Capital Leasing and Banks

- Capital Leasing Services
- Bridge and project financing services
- Accounts Receivable
- Insurance Services
- Credit Check Services
- OA Product Packaging

Example：

⇨ One-time payment to supplier

⇨Sign leasing contract

⇨Capital leasing：Monthly invoicing

⇨Bank project financing：Repayment via escrow account

Billion Watts Green Energy

- Product Shipment
- Maintenance Services
- Technical Support
- System Integration

Example：

⇨Product Shipment

⇨Maintenance Services

⇨Provide comprehensive after-sales technical service within the warranty period

Power Trading Platform Professional Qualification Certificate

Billion Group employees have passed the Taiwan Power Company's communication and capability tests and officially joined the Taiwan Power Trading Platform bidding process. They aggregate grid-connected energy storage resources and become domestic vendors for frequency regulation reserve power auxiliary services.

The energy storage site passed the IEC/CNS 62933-5-2 voluntary verification test

(after verification is completed, it can proceed to the Taiwan Power Company's capability testing stage).

The IEC/CNS 62933-5-2 on-site test is issued by Bureau Veritas, a global leading inspection organization. The test includes many safety and reliability tests, covering areas such as PCS, energy storage battery cabinets, related AC low-voltage electrical conditions, fire simulation, and communication anomaly status confirmation.

Energy Storage Operation and Maintenance Services

Preventive Maintenance

1.Extend Equipment Lifespan：Regular preventive maintenance helps detect potential issues early, preventing minor problems from escalating into major failures, thus extending the equipment's lifespan.
2.Reduce Unexpected Downtime：Regular inspections and maintenance effectively reduce the risk of unexpected downtime, improving the reliability and stability of the equipment, ensuring continuous system operation.
3.Save Maintenance Costs：Regular preventive maintenance can prevent costly repairs after major equipment failures, reducing long-term operational costs.
4.Improve Operational Efficiency：Preventive maintenance keeps the system running in optimal condition, improving overall operational efficiency and service quality.
5.Comply with Safety and Regulatory Requirements and Ensure Warranty Validity：Maintenance tasks and schedules follow the manufacturer's guidelines to ensure warranty validity and compliance with safety and regulatory requirements, avoiding potential legal liabilities and fines.

Corrective Maintenance

1.24 hours Engineer Monitoring：If abnormal conditions arise, engineers perform corrective maintenance within 1 hour. If unresolved, report to the manufacturer for online diagnosis within 24 hours, dispatch personnel for site inspection within 48 hours, and proceed with repairs within 72 hours after RMA confirmation.
2.Quickly Restore Equipment Operation：Restore normal operation of equipment promptly after a failure, minimizing downtime and ensuring operational continuity.
3.Targeted Problem Solving：Focus on known issues and address current failures or performance degradation, avoiding unnecessary maintenance tasks.
4.Ensure Equipment Reliability：After equipment issues occur, repair or replace faulty components to restore equipment to a reliable working condition, preventing ongoing performance issues.
5.Reduce Safety Risks：Immediate corrective maintenance effectively prevents safety risks caused by equipment failures, protecting personnel and other equipment on site.
6.Extend Equipment Lifespan：Promptly repairing equipment faults prevents further damage or chain reactions, helping to extend the overall lifespan of the equipment.

Professional Technical Team Locations

Taipei Location
7F, No.190, Sec. 2, Zhongxing Rd., Xindian Dist., New Taipei City 231,Taiwan

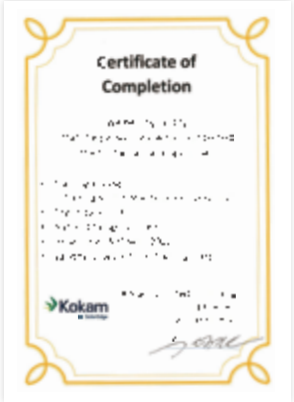
Yilan Location
No. 8, Dexing 1st Rd., Su' ao Township, Yilan County 270,Taiwan

Yunlin Location
No.15, Minle St., Douliu City, Yunlin County 640, Taiwan

Kaohsiung Location
No. 15, Ln. 51, Qingping St., Nanzi Dist, Kaohsiung City 811,Taiwan

SolarEdge and Saft Original Manufacturer Operation and Maintenance Technical Training Certification

Engineers have obtained authorized training certifications from international manufacturers SolarEdge and Saft, with regular education and exams.



Energy Storage Insurance Services

Energy Storage Insurance Services *Subject to insurance company terms and conditions

	During Installation and Construction of Energy Storage Equipment	After Completion of Energy Storage Equipment
Recommended Insurance Type	Installation (Engineering) All-Risk Insurance	Machinery Comprehensive Insurance
Coverage	1. Property Damage (Covered incidents: accidental incidents, excluding non-covered items) 2. Third-Party Liability Insurance	1. Property All-Risk Insurance
Common Additional Coverage	Employer's Liability Insurance Additional Clause	• Coverage for Strikes, Riots, and Civil Commotion • Automatic Increase of Coverage Amount (10% of the insured amount) • Additional Coverage for Professional Fees • Debris Removal Costs • Firefighting Costs • Overtime and Expediting Expenses • Advance Payments 1. Earthquake Coverage, applicable to Business Interruption Insurance 2. Distributor Clause, applicable to Business Interruption Insurance 3. Air Freight Replacement Costs 4. Claims Preparation Costs
Required Information for Insurance Quotation	1. Project Duration (Estimated Schedule) 2. Detailed List of Construction Items (including project, quantity, cost, etc.) 3. Location, Structural Plans, Elevation Views, and Related Design Diagrams 4. Structural Calculations 5. On-site Inspection if Necessary 6. Other Case-Specific Requirements	1. Required Documentation Similar to Electronic Equipment Insurance 2. Property All-Risk：Replacement Cost 3. Other Business Income Case-Specific Requirements

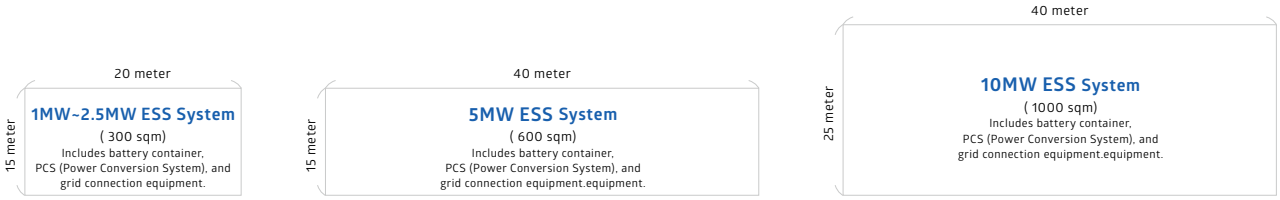
Electronic Equipment All-Risk Insurance - Coverage

Coverage of Financial Loss Insurance	Business Interruption Insurance Coverage
Insured items listed in this insurance contract, including temporary relocations, are covered during the policy period for unforeseen or force majeure incidents that cause sudden and substantial damage or loss, excluding agreed-upon non-covered items. The company is liable to compensate the insured for such losses.	During the policy period, if insured items are damaged by a covered financial loss incident, causing business interruption or disturbance resulting in loss of insured interests, the insurance company is liable to compensate the insured, unless otherwise agreed.
General Coverage： All incidents are covered except non-covered items, including natural disasters (typhoons, floods), theft, fire, and other accidents. Insured Items： Permanent and temporary machinery, electrical sub-equipment, and related installations owned, used, managed, or controlled by the insured.	Scope of Covered Losses： 1. Gross Profit：Loss of gross profit due to reduced business revenue during the compensation period. 2. Continuing Expenses：Fixed expenses the insured is required to pay during the compensation period. 3. Extra Expenses：Necessary and reasonable expenses incurred to avoid or reduce loss of insured interests.

Grid-connected Energy Storage Installation Guidelines

Energy Storage System Interconnection Review Requirements

- Land Use Planning Principles for Energy Storage: Safety distance of 1.5 meters between equipment and a 3-meter setback from the boundary.
- Current installations are primarily within industrial zones, with future compliance required to meet regulatory standards.



Grid-connected Energy Storage

- Grid-connected energy storage primarily provides auxiliary services：It is designated to serve the power grid as needed.
- Guidance for setting up grid-connected energy storage in industrial parks：Industrial zones have high power demand and ample grid connection points.
- Phase-by-phase opening in various industrial zones：Including designated industrial zones, urban planning industrial areas, and technology industrial parks.

Regional Planning for Grid-connected Energy Storage Installation

Installation within certified factory premises in industrial zones

At present, direct installation is allowed without additional applications：According to the letter from the Construction and Planning Agency (CPAMI) in August 2018, the "Building Act" specifies certain miscellaneous works, but energy storage systems are not included within the scope of the current regulations and therefore do not require a miscellaneous license. As a result, existing factories can install energy storage systems without needing to modify their usage permit or submit a separate application.

Application for Site Occupancy in Industrial Zones

Currently, energy storage systems are allowed in industrial zones, urban planning industrial zones (special, class A, and class B), and science parks.

- Designated industrial zones：Grid-connected energy storage is classified under the broader electricity and gas supply sector, allowing direct application for occupancy.
- Urban Planning Industrial Zones (special, class A, and class B)：Considering that energy storage systems can help adjust and stabilize electricity supply and demand in the power distribution sector, as well as improve self-sufficiency in power backup, they may be installed as "public service facilities" or "necessary auxiliary facilities for factories".
- Technology Industrial Parks：If requirements match those of urban industrial zones, application for occupancy is allowed, though space is currently fully occupied.

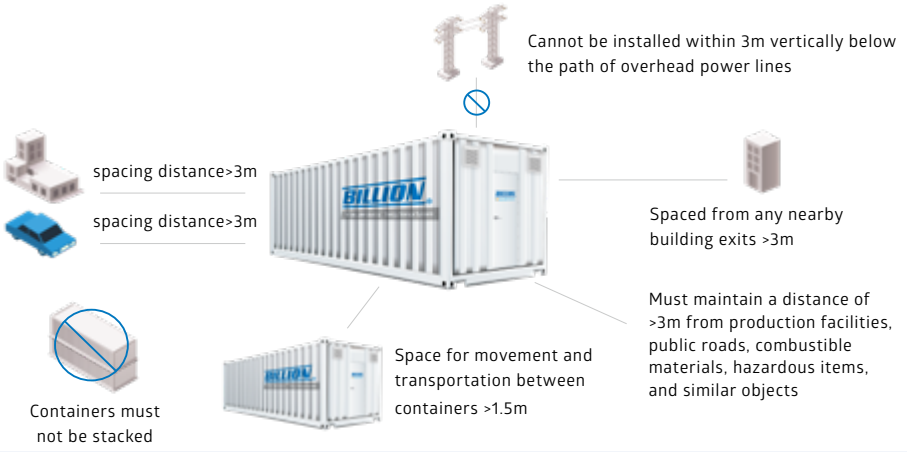
Installation within certified factory premises outside industrial zones (proposed addition)

- Existing factories are already under regulatory management：To improve factory management and guidance, the "Factory Guidance and Management Act" stipulates that factories are subject to management.
- Installation within existing factory premises：Energy storage systems can be installed within the premises of factories that have already obtained valid factory registration, as long as they are connected to the grid.

Grid-Connected Energy Storage Safety Standards

- For the energy storage subsystem, operators can choose to comply with U.S., European, or Taiwan standards by submitting qualified test reports or certification documents for review.
- Upon completion of the energy storage system installation, it must undergo on-site testing to obtain a qualified report from an impartial third-party organization (e.g., TAF, ILAC accredited laboratories) following IEC 62933-5-2 or UL 9540 standards.

Classification	Equipment items	US Standard	EU Standard	Taiwan Standard
Storage Subsystem	Cell/single battery	UL 1642 or UL 1973	IEC 62619	CNS 62619
	Battery pack/ cabinet	UL 1973	IEC 62619 IEC 63056	CNS 62619 CNS 63056
	Battery Management System(BMS)	UL 991 or UL 1998 or UL 60730-1	IEC 61508 or IEC 60730-1	CNS 60730-1
Energy storage system (on-site test pass report)		UL 9540 (6 Tests)	IEC 62933-5-2 (7 Tests)	CNS 62933-5-2

Regulations	Safety Distance	
Distance regulations outside the plant area Refer to the domestic 'Standards for the Installation and Safety Management of Public Hazardous Materials and Flammable High-Pressure Gas Manufacturing, Storage, and Processing Facilities'	30m Safety Distance	1.Public hazardous material manufacturing or storage sites. 2.Combustible high-pressure gas manufacturing or storage sites. 3.Site under Article 12, Item 6 of the installation standards. 4.Residential areas. 5.Buildings. 6.Parking lots. 7.Public roads.
Energy Storage Cabinet Distance Specification Refer to the National Fire Protection Association NFPA855 in the United States		

NOTE

- If the energy storage system meets one of the following conditions, the distance from locations specified in items 5 to 7 above may be set to 3 meters or more：
  1. A fire-resistant wall with a minimum two-hour fire rating or equivalent fire protection equipment is installed, along with automatic sprinkler or water mist fire extinguishing systems.
  2. Fire spread prevention meets the specifications in Item 8.
- The energy storage system should maintain a distance of over 3 meters from on-site buildings. However, with a fire-resistant wall or equivalent fire protection equipment rated for two hours or more, this distance may be reduced to 1.5 meters. The system should have a height of less than 4.5 meters to facilitate emergency response actions.

Equipment Safety

- Key Components (Battery, Module)：Follow international/domestic standards by first obtaining a test report or verification certificate, then completing standard certification before applying for parallel connection and power delivery procedures with Taipower.
- Energy Storage System：Choose one standard (CNS, IEC, UL) to follow. Obtain on-site test approval from a third-party certification body before applying to Taipower for parallel connection and power delivery procedures.

Fire Safety

- To align with the energy transition policy toward net-zero emissions, this guideline enhances fire safety management for energy storage systems, reducing disaster losses and ensuring public safety.
- This guideline applies to grid-connected lithium-based battery energy storage systems with an installed capacity of 20 kWh or more (hereafter referred to as energy storage systems).
  Terminology in this guideline follows the regulations for user electrical equipment installation, building technical codes, various fire safety equipment standards (hereafter referred to as setup standards), outdoor battery energy storage system site design, verification review requirements, and technical specifications for outdoor battery energy storage system site verification.
- The installation of energy storage systems should involve assessment and analysis of the following information to create a fire risk assessment report：
  (1) Energy storage system installation location, facility layout, and nearby buildings, parking lots, public roads, or sites for hazardous or flammable high-pressure gas manufacturing or storage.
  (2) Number, type, and verified safety standards of energy storage systems.
  (3) Fire resistance time of protective facilities such as dedicated containers or other structural forms for the energy storage system.
  (4) Operational procedures for managing and monitoring energy storage system-related equipment.
  (5) Operational space and water source capacity for firefighting personnel and vehicles. The previous fire risk assessment report should include：
    1. Hazard Identification：Evaluate potential ignition sources, construction materials, combustible substances, and usage. Specify fire load, ensuring that toxic gases released during normal charge, discharge, and operations do not exceed the flammability limit in the energy storage system space.
    2. Potential Fire Scenarios：Design for potential fire points, fire scale, and other relevant factors, including assumptions and limitations, such as thermal runaway conditions of a single module or battery cabinet.
    3. Fire Scenario Assessment：Analyze possible fire scenarios, specifying assumptions and limitations, such as failure conditions of automatic sprinklers or fire alarm systems.
    4. Fire Prevention Concept Design：Assess design concepts of fire safety equipment and other fire protection methods, establishing multi-layered fire prevention strategies.
- Energy storage systems should be equipped with one of the following fire suppression systems based on actual conditions: closed wet-type, pre-action, open-type automatic water sprinklers, or water mist fire suppression system.
  The installation guidelines for closed wet-type or pre-action automatic sprinkler systems are as follows:
  (1) Sprinkler density should be at least 12.2 liters per square meter per minute, and the sprinkler water discharge pressure should be at least 1 kg per square centimeter or 0.1 MPa.
  (2) Water supply capacity for closed wet systems should be sufficient to provide water for the most distant 24 sprinklers for a continuous 30 minutes. If the number of sprinklers is less than 24, the water supply capacity should be calculated based on the actual number of sprinklers.
  (3) When using a pre-action flow detection system, the number of sprinklers should be increased by 50%.
  (4) Sprinkler head spacing should be at least 1.8 meters horizontally.
  (5) Install a separate zone flow detection device or a control valve with equivalent performance.
  (6) Connect to an emergency power supply or use an engine-driven system with the same effect, with sufficient capacity to operate the automatic sprinkler system for at least 30 minutes.
  (7) Install a water supply outlet in an area easily accessible by fire trucks.
  (8) Install proper drainage facilities.

- The energy storage system should be equipped with an automatic fire alarm device, with the following setup guidelines：
  (1) Install smoke detection systems using confined-type smoke detectors (Type I or Type II) or other systems with equivalent performance.
  (2) In areas where external airflow prevents effective fire detection, relay the alarm signals from the Battery Management System (BMS) or Energy Storage Management System (ESMS) to the central fire alarm panel.
  (3) Emergency power should utilize battery equipment with enough capacity to enable the fire alarm system to function effectively for more than 30 minutes.
- Fire safety equipment installed for the energy storage system or its flame-retardant performance, upon completion of large-scale combustion testing according to CNS/IEC 62933-5-2 Appendix C or UL9540A, and after evaluation by fire safety equipment design personnel for gas composition, temperature, and heat flux during thermal runaway, shall not be subject to the restrictions in Points 4 and 5.
- Fire safety equipment design personnel should verify and complete the following design documents and files when designing fire safety equipment for energy storage systems：
  (1) Fire risk assessment report.
  (2) Fire safety equipment design drawings.
  (3) Original equipment manufacturer (OEM) catalog, performance specifications, detailed component list (detailed drawings), and design/installation manual for fire safety equipment, in English (and Chinese).
  (4) Fire safety equipment construction safety specifications and maintenance manual.
  (5) Domestic and international laws, standards, and regulatory documents referenced in the fire safety equipment design, with relevant drawings.
  (6) Testing standards and result analysis tables referenced in the fire safety equipment design, along with supporting documents and drawings.

Adjust the review process for participation in the platform in accordance with the regulations set by the competent authority

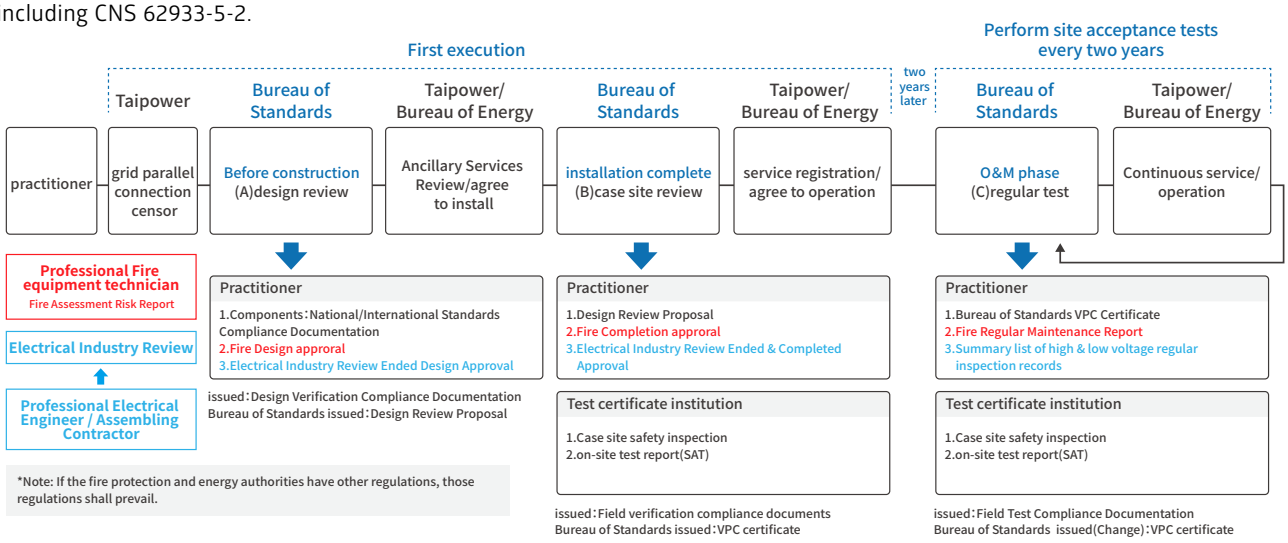
The Bureau of Standards, Metrology and Inspection (BSMI) under the Ministry of Economic Affairs promotes the Voluntary Product Certification (VPC) for outdoor battery energy storage systems to ensure safety through a three-stage certification process. In addition to meeting safety standards for energy storage equipment, the energy storage system must also secure endorsements from an electrical engineer and a fire protection engineer before passing the BSMI review.

Review Stages

A. Design Review：A design review application must be submitted for new project sites before construction begins. Once compliance is verified, construction may proceed.
B. Site Review：Upon completion of new project sites, a site review is conducted, including on-site acceptance testing. If the site meets the original design safety requirements, a VPC certificate will be issued.
C. Maintenance Review：After obtaining the VPC certificate, on-site acceptance testing is conducted every two years (periodic testing). Compliance with this testing is required to renew the certificate.

Review Standards

Technical specifications for site verification of outdoor battery energy storage systems and relevant national standards, including CNS 62933-5-2.



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