40ft

CONTAINER ENERGY STORAGE SYSTEM

500KW/2150KWH

Hovedkontor

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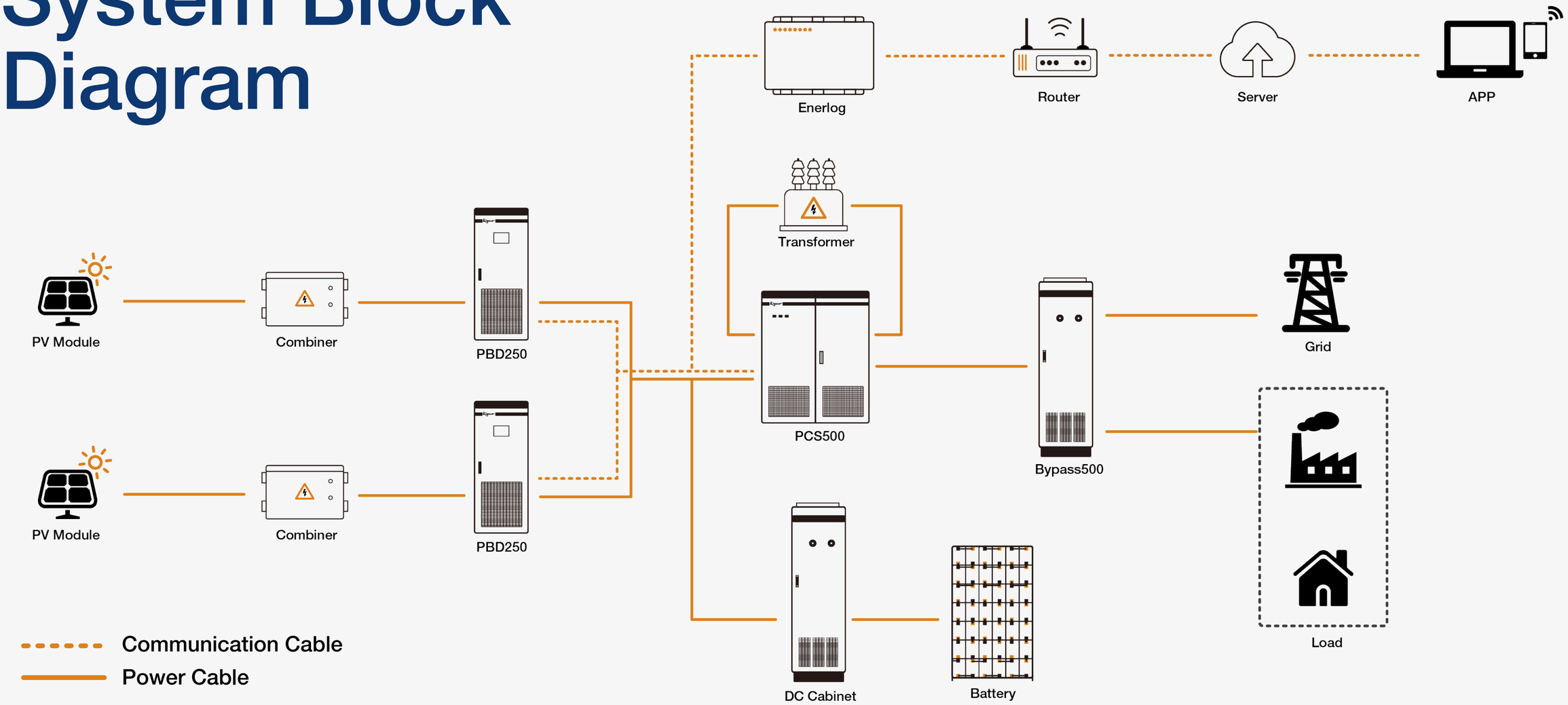
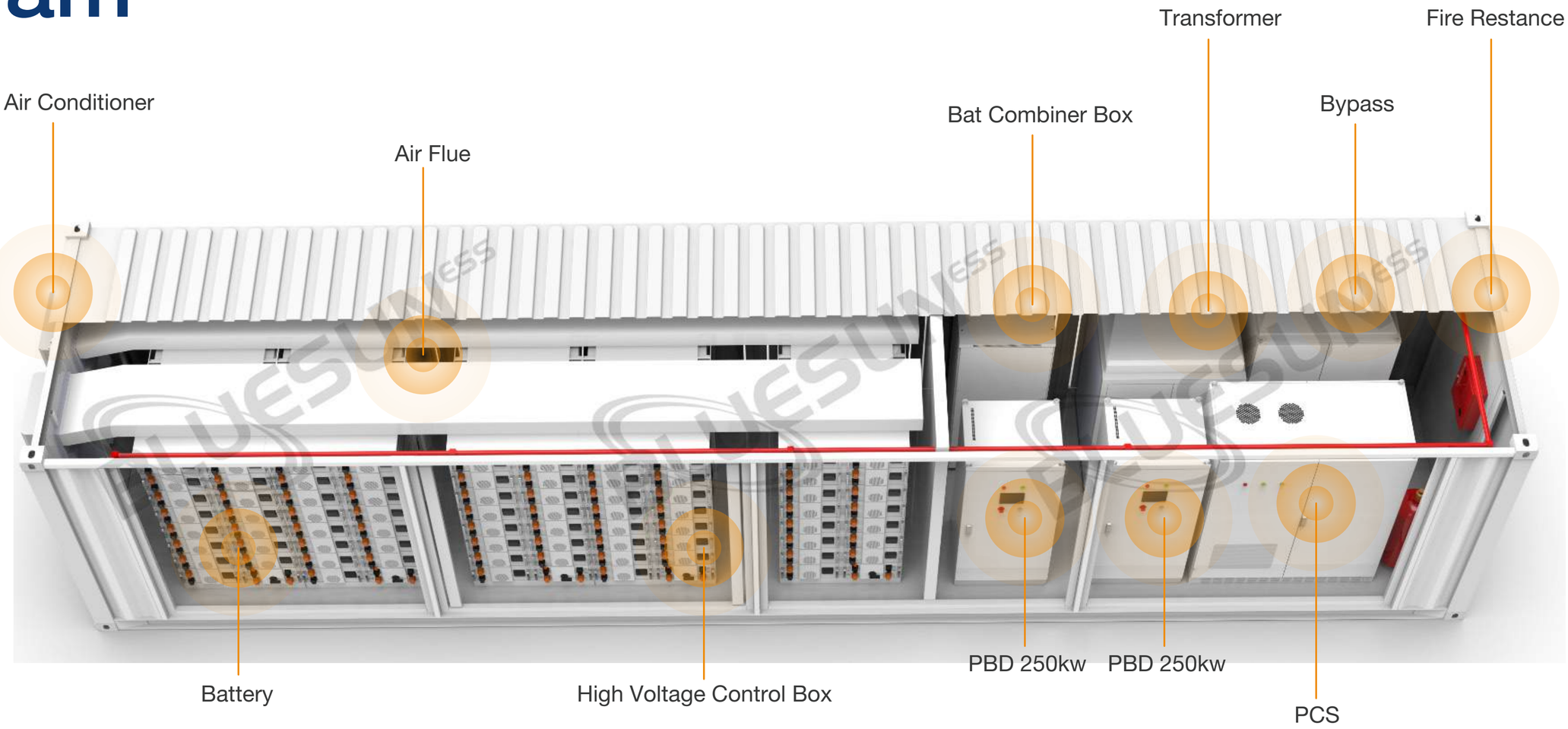
SYSTEM CONFIGURATION

1

System Block Diagram



System Block Diagram



System Configuration

Item	Quantity		Description	Comments
PV	BSM565M10-72HPH	960	12 pieces/string; A total of 80 strings; A total of 537.6kWp	
Battery 2150.4KWH (1720.32KWH available at 80% DOD) Backup	BAT-Conbiner box 1000V-1500A	1	For combination of multiple battery racks	
	BLUESUN-51.2V 280AH moudle	150	Battery With BMU module 51.2V 280AH Capacity 14.3kWh	
	BlUESUN-HV-Controller1000V 300A	10	High Voltage Controller Box	
PV-Combiner Box	8 Inputs 1 Output	10	For combination of multiple PV module strings	
PBD250		2	250kW solar charge controller	
PCS500		1	250kW battery inverter	
Isolation Transformer 500		1	500KVA Isolation Transformer	
Bypass 500		1	Switch between on-grid and off-grid	
EnerLog		1	Monitoring datalogger	
40FT Container		1	For outdoor installation, IP54,including lighting, fire-resitance system, battery rack,air conditioner	

Working Mode

On-grid mode

I. Zero export

1.When zero export,the redundant PV power cannot flow to the grid.

2.When no zero export,the redundant PV power can flow to the grid.

II. Load first
(Zero export function is optional)

1.When PV power is greater than load consumption, PV power will be first used to supply load, the excess part will be charged to battery.

2.When PV power is lower than load consumption, battery will discharge to offset the shortage part. If battery voltage approaches the under voltage value, battery will stop discharging, the load will be supplied by PV and grid. In the mean time, the grid will charge battery in triple current to protect battery.

III. Battery first
(zero-export is optional)

1.When PV power is greater than max battery charging power, PV is used to charge battery ,the excess PV power will be used to supply load.

2.When PV power is smaller than charging power, the battery will be charged simultaneously by PV and grid at maximum charging power. The load will be supplied by grid.

3.If HPS doesn’t discharge after 1 week of battery-first mode, it will discharge battery at a rate of 20% of rated power to maintain the chemical activity of battery.

IV. Economy mode (zero-export is optional)

1.During off-peak period, the working mode is same as battery-first mode.

2.During shoulder period:

a). Battery doesn't discharge, grid won't charge battery.
b). If PV power is greater than load consumption, PV is first used to supply load, the excess PV power will charge battery.
c). If PV power is lower than load demand, load will be supplied by both PV and grid. PV won't charge battery.

3.During peak duration:

a). Grid won't charge battery.
b). When PV power is greater than load consumption, PV is first used to supply load, the excess part will be used to charge battery.
c). When PV power is lower than load consumption.

1). PV and battery will supply load at the same time.
2). If battery voltage approaches the under voltage limit, It will stop discharging. Load will be supplied by grid and PV. Grid doesn't charge battery in this period.

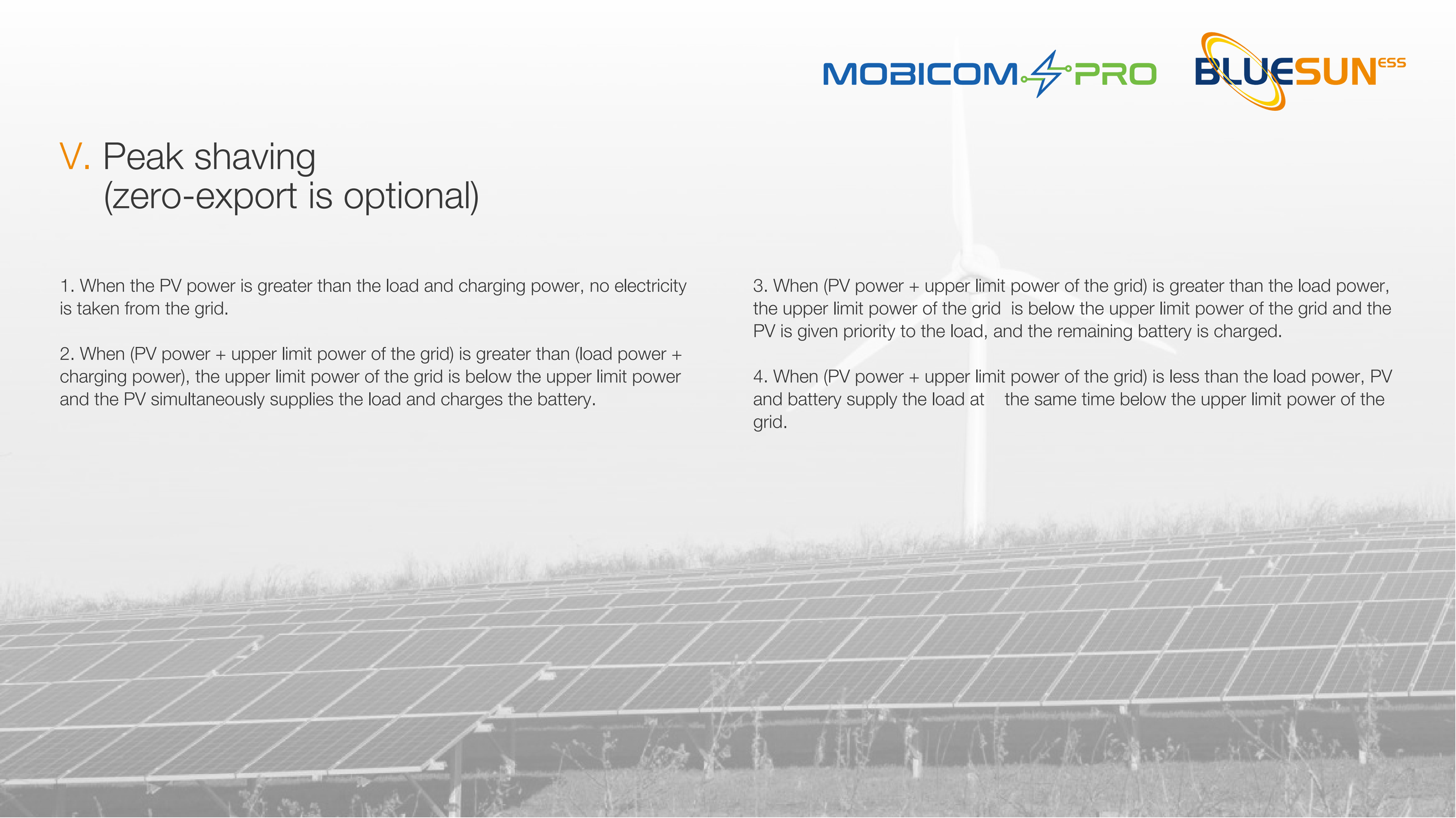
V. Peak shaving (zero-export is optional)

1. When the PV power is greater than the load and charging power, no electricity is taken from the grid.

2. When (PV power + upper limit power of the grid) is greater than (load power + charging power), the upper limit power of the grid is below the upper limit power and the PV simultaneously supplies the load and charges the battery.

3. When (PV power + upper limit power of the grid) is greater than the load power, the upper limit power of the grid is below the upper limit power of the grid and the PV is given priority to the load, and the remaining battery is charged.

4. When (PV power + upper limit power of the grid) is less than the load power, PV and battery supply the load at the same time below the upper limit power of the grid.



Off-grid mode

1.When PV power is greater than load consumption, PV is used to supply load and charge battery.

2.When PV power is less than load consumption, battery will discharge until reaching the under voltage threshold, then

a). In default setting the inverting part(bidirectional DCAC) will stop working, all the PV power will be used to charge battery.

b). If generator is connected, HPS will start generator using its relay output, generator will supply load and charge battery.

Optional function

I. Generator connection (dry contact control)

In off grid mode: When battery voltage is approaching under voltage threshold, HPS will start generator to supply load and charging battery. HPS will stop supplying power, only using generator power to charge battery.If generator is started

1.When PV power is greater than charging power, PV power will be limited to max battery charging power.

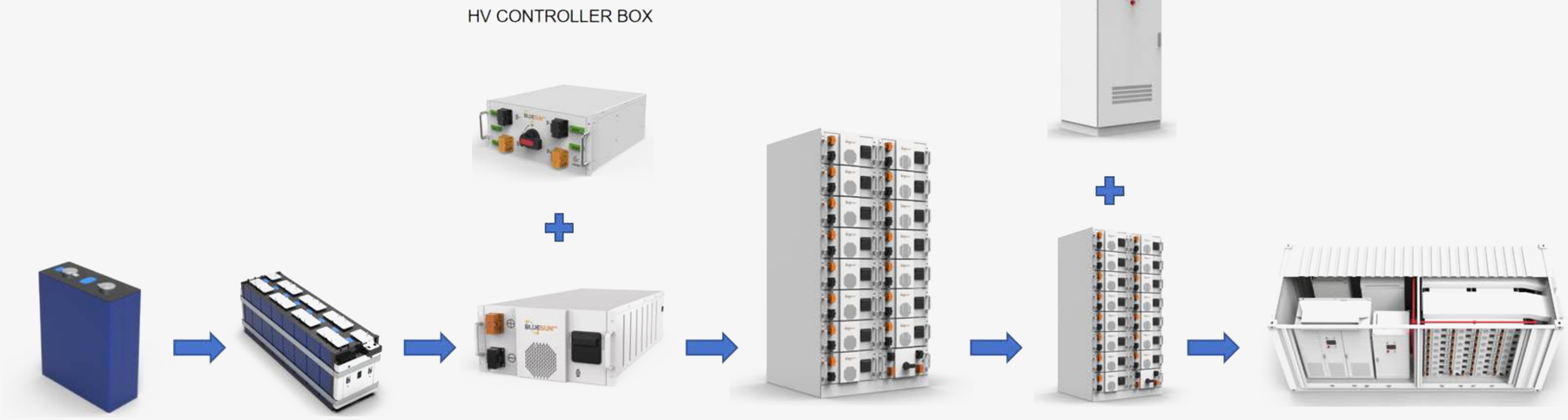
2.When PV power is less than max charging power, generator can be used to charge battery according to customer's requirement.

3.When battery is full, HPS will stop the generator and go back to off-grid mode.

4.When there is no grid, generator can connect to HPS's grid terminal. If grid and generator need to connect to HPS simultaneously, an ATS will be needed for the connection.

SYSTEM PART INTRODUCTION 2

LIFEPO4 Battery



Basic Parameters	BSMH-768-280AH
Nominal Voltage (V)	768
Nominal Capacity (KWH)	215
Usable Capacity (KWH)	215*90%
Battery Controller Name	BSMC-1500-300
Battery Module Name	BSM48280H
Battery Module Capacity (KWH)	14.336
Battery Module Voltage (Vdc)	51.2
Battery Module Capacity (Ah)	280

Basic Parameters	BSMH-768-280AH
Battery System Charge Voltage (Vdc)	840
Battery System Charge Current (Normal)	280
Battery System Charge Current (Max)	340
Battery System Discharge lower-Voltage (Vdc)	672
Battery System Discharge Current (Standard)	280
Battery System Discharge Current (Normal)	340
Design Life	10 years+
Cycle Life	>6000

PBD 250KW

Basic Parameters	PBD 250KW
INPUT (PV)	
Recommended photovoltaic power	250kw
MPPT voltage range	350V-850V
Full load MPPT voltage range	480V-850V
Maximum input current	575A(115A*5)
PPT quantity	5
OUTPUT (BATTERY AND PCS)	
Output voltage	600V-900V
Battery type	Lead-acid or Lithium battery
Maximum charging power	250kW
Maximum charging current	416A
Maximum charging efficiency	99%
BASIC INFORMATION	

Basic Parameters	PBD 250KW
Class of protection	IP20
Noise	<65dB(A)@1m
Environment temperature	-25°C...+55°C
Cooling model	Forced air cooling
Humidness	0%-95% no condensation
Highest altitude	6000m(Derating over 3000m)
Dimensions (width/height/thickness)	850/1900/700mm
Weight	600kg
Topological structure	No transformer
Standby power consumption	<100W
COMMUNICATION	
Reveal	Touch screen
Communication interface	RS485/CAN

PCS 500KW

Specification parameter	PCS 500KW
Ac (on-grid)	
Apparent power	550KVA
Rated power	500KW
Rated voltage	400V
Rated current	722A
Voltage range	310V-450V
Rated frequency	Rated frequency
Frequency range	45-55/55-65Hz
THDI	<3%
Power factor	0.8 precocious-0.8hysteretic
Ac system	3/PE
Ac (off-grid)	
Apparent power	550KVA
Rated power	500KW
Rated voltage	400V
Rated current	722A
THDU	≤2%linearity
Rated frequency	50/60Hz
Overload capacity	110%-10min 120%-1min
Dc (battery)	
Rated power	500KW
Current accuracy	±1%

Specification parameter	PCS 500KW
Voltage accuracy	±1%
Voltage ripple	<3%
Current ripple	<2%
Rated voltage	700VDC
Voltage range	600V-900V
Rated current	714A
Basic information	
Maximum efficiency	98.5%
Class of protection	IP20
Noise	<65dB(A)@1m
Environment temperature	-25° C...+55°C
Cooling model	Forced air cooling
Humidness	0%-95% no condensation
Highest altitude	6000m(Derating over 3000m)
Dimensions (width/height/thickness)	1200/1900/800mm
Weight	900kg
Built-in transformer	none
Switch time between on-grid and off-grid	Manual (default) Automatic (optional)≤10ms
Size	1600/2080/850mm
Reveal	Touch screen
Communication interface	RS485/CAN

Bluesun 40ft Container

1.Features of BMS

Battery status monitoring
- Events record and storage function
- Operation control
- Insulation detection
- Dynamic balancing management
- Protection alarms
- Communication

BMU:
Battery Management Unit
BECU:
Battery Electric Controller Unit
BSMU:
Batter System Management Unit

2.Features of PCS

- Wide-range of DC input voltage
- 10%additional power for continuous operation at ambient temperature up to 40℃
- Short conversion time offull power from charge to discharge
- Indoor or outdoor installation
- Low voltage ride through
- Reactive power adjustable,max.reactive power up to 500kVar
- Active power derating
- Film capacitor design

3.Fire Protection system

- Automatic fire detecting
- Manual/automaticfire alarming
- Control room and local fire alarm device
- Fault alarm for fire detecting and alarming system
- The accumulator is placed in fire alarming controller.When the main power is off, the accumulator will supply the power to the automatic fire alarming system
- The monitoring function for the open circuit and short circuit in detecting circuit
- The monitoring function for the open circuit and short circuit in alarming circuit

4.Air Condition System

- Power-off memory And Reboot
- Remote fault identification and alarm, and report the fault through RS485
- Use the fuzzy intelligence control for remote communication
- Have the cooling,heating,constant temperature and dehumidifying mode
- Heating control
- Temperature control
- Operation without failure continuous more than 2500 hours,Long life,good working performance in harsh environment

System Monitoring Unit

- Local webserver for easy configuration
- Supports export control with meters
- Up to 32 inverters connection
- Multi-function and high performance

- Data logger for overall system monitoring, collect operation data from different units via ModbusRS485 and communicate with Bluesun server via internet.

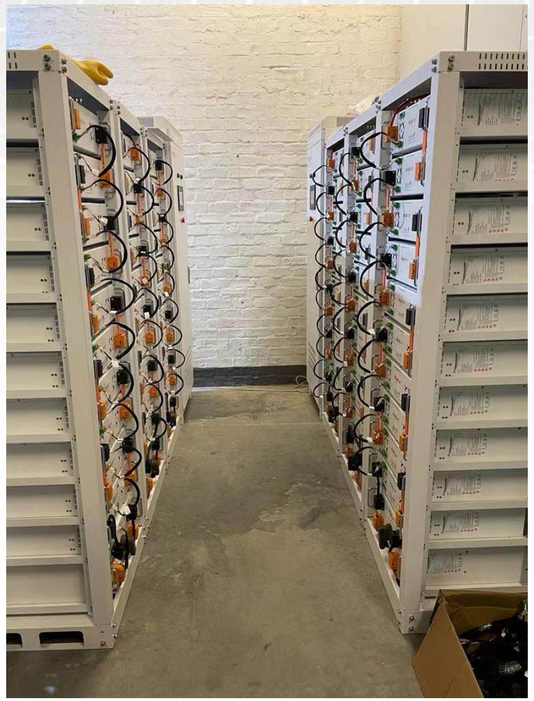
CASE 3

1MW+1.7MWH Thailand

1piece 40ft container of 1MWPC
1piece 20ft container of 1.7MWH lithium battery

150KW+600KWH South Africa

300KW+300KWH
South Africa



150KW+350KWH
Myanmar

Project Show

CONTAINER ENERGY STORAGE SYSTEM

*Release Container Energy Storage System-2024-01-Rev_01-EN

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