



Elecnova ESS Solution

Elecnova





Green Energy Powers the World

Elecnova

Energy for Earth, Power for People



www.elecnovaess.com

Elecnova Solutions

ABOUT US

Elecnova

“

Elecnova delivers smart and reliable energy storage solutions that empower businesses and communities to achieve energy independence and sustainability.

Leveraging advanced R&D and integrated manufacturing capabilities, Elecnova offers complete ESS solution packages — including PACK, PCS, BMS, and EMS — ensuring high performance, flexibility, and long-term reliability.



Tailored solutions built around real-world needs



Enabling clean, efficient, and low-carbon energy use



Contributing to a resilient and sustainable energy future

2
Factories

3
R&D Centers

28+
Years Established

700+
Employee

100,000+
Projects

Elecnova

Project Info



Request

- Location: Poland
- Requested capacity: 5MW/10MWh
- Application scenarios: PV-storage power station
- Voltage of Grid: 15kV
- Charging/Discharging hour per time: 2h

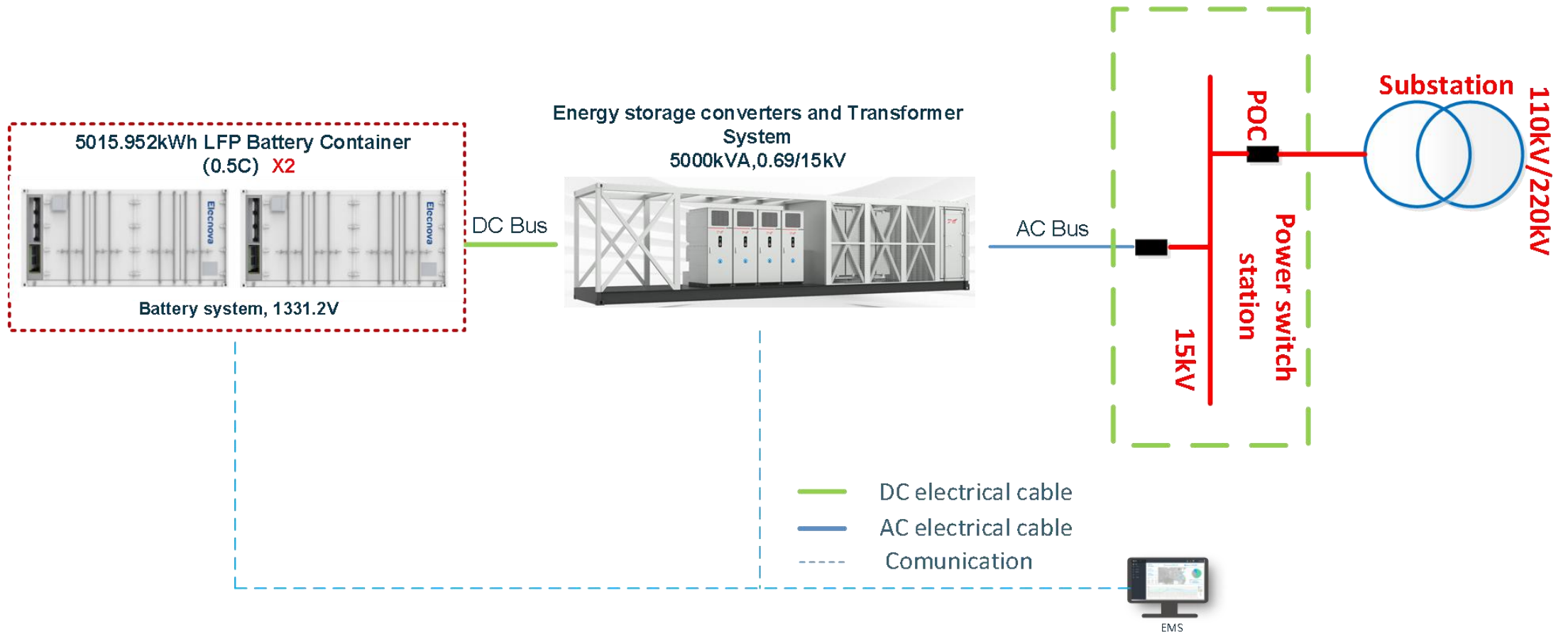
Primary Proposal

This technical proposal is a solution based on 5MWh(0.5C) liquid cooling energy storage container solution.

SLD and Layout drawings of the project can be provided upon request, as well as any technical support regarding the project.



Topology



Configuration

5MW/10MWh Battery Energy Storage System

Item	Description	Qty.	Brand	Unit
1	Battery Energy Storage System Model: ECO-B20FT5015LP	2	Elecnova	SET
2	Energy storage converters and Transformer System (MV System) 5000kVA,0.69/15kV	1	KEHUA /Other	SET
	2.1 PCS Specification: 1250kW <i>PCS is dependent on the actual project and can replace other.</i>	4	KEHUA /Other	
	2.2 Transformer Specification: 5MVA 0.69/15kV, Aluminum winding; <i>include 690V breaker, transformer (vegetable insulating oil), protect device, etc. Transformer is a customized product, specific requirements need to be provided by the customer. Please provide the specific transformer certification requirements, we will provide a revised quotation based on the particular requirements.</i>	1	Eaglerise /Other	
	2.3 RMU(DCV default, CCV...for option; <i>≤24kV SF6 free</i>)	1	Schneider/ Other	
3	EMS	1	EcoWatt /Other	SET
4	Project site service Installation guidance, debugging, training etc.	1	Elecnova	SET

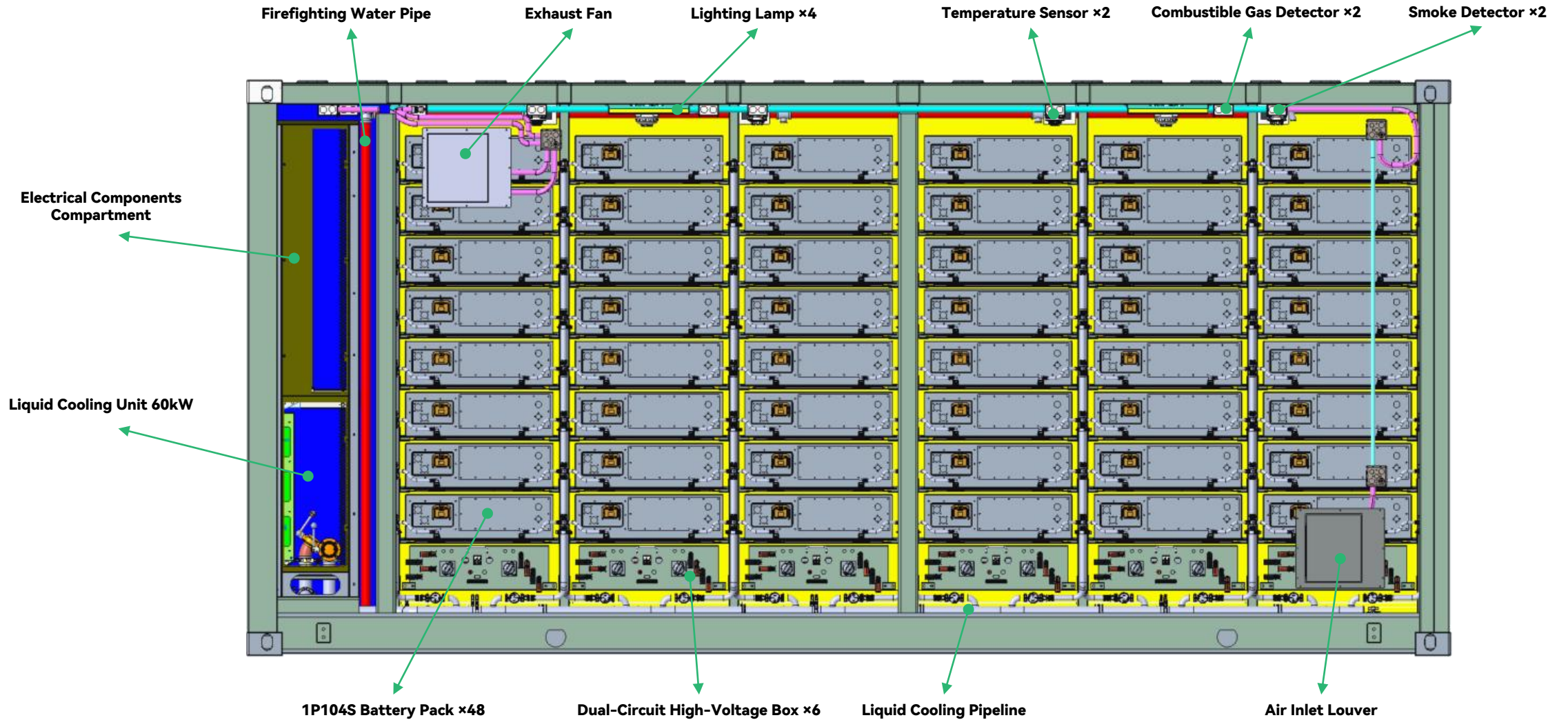


5MWh Product parameters



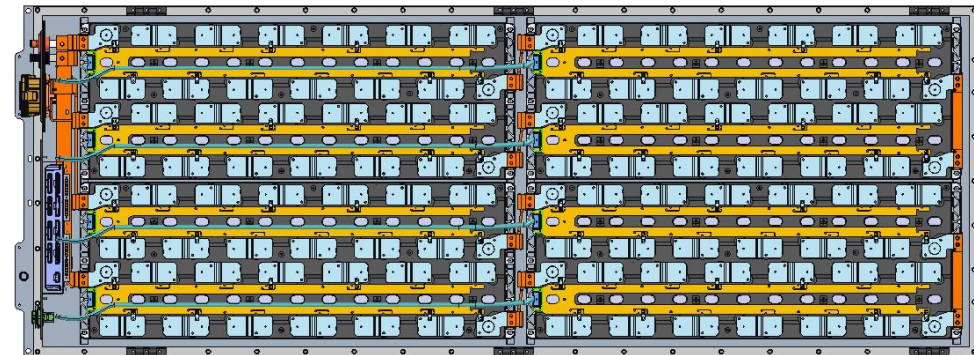
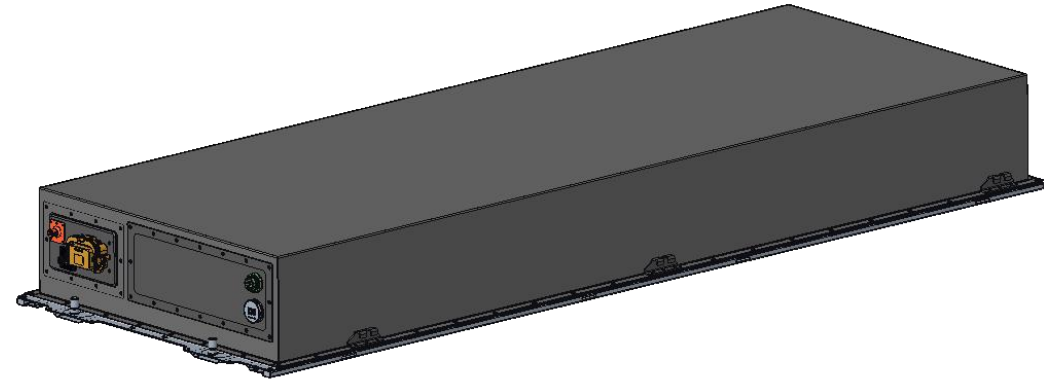
Item	Parameter
Cell Type	LFP314 Ah
Pack Configuration	104.5kWh / 1P104S
System Configuration	5.015MWh / 12P416S
Rated DC Voltage	1331.2 V
DC Voltage Range	1165 ~ 1498 V
Max. Charge/Discharge Rate	0.5 P
Max. Depth of Discharge	100% (25 ± 2 °C)
Cycle Life	≥ 8,000 cycles
Fire Suppression System	Aerosol system(pack level and container level), water spray system
Ingress Rating	IP55
Cooling	Liquid cooling+Forced air cooling
Operating Temperature	-25°C~55°C (Derating after 45°C)
Anticorrosion Rating	C4 (C5 optional)
Humidity	0~95% RH (non-condensing)
Altitude	3000m
Dimensions (W*D*H)	6,058*2,438*2,896 mm
Weight	45 t

5MWh Internal components



Pack Introduction

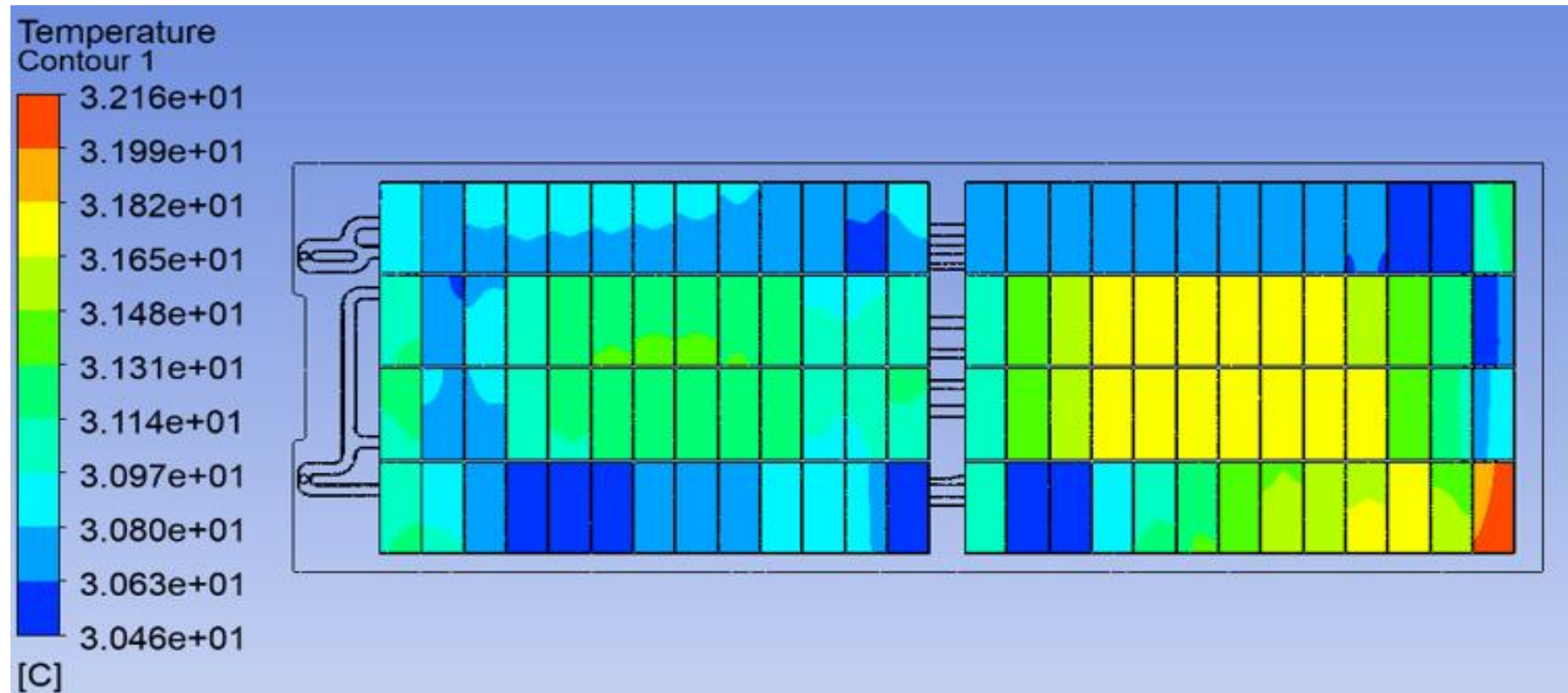
Item	Parameter
Model	ECO-P1P104LP-H-G
Cell Capacity	314Ah
Configuration	1P104S
Nominal Voltage	DC 332.8V
Rated Energy	104.499kWh
Dimensions (W × D × H)	790*2180*249mm
Weight	Approx. 690 kg
Rated Charge/Discharge Power	0.5P
Operating Temperature	-25°C ~ 55°C
Protection Rating	IP65
Fire Protection System	Aerosol Fire Extinguishing System
Cooling Medium	50% Ethylene Glycol Coolant
Temperature Uniformity	Cell Temperature Difference $\leq 3^\circ\text{C}$



1P104S Battery Pack



Thermal simulation



Thermal simulation results of liquid cooled pack:

The maximum temperature difference at the top section of PACK is **1.7 °C**.



Level Fire Suppression System

ECO-B20FT5015LP

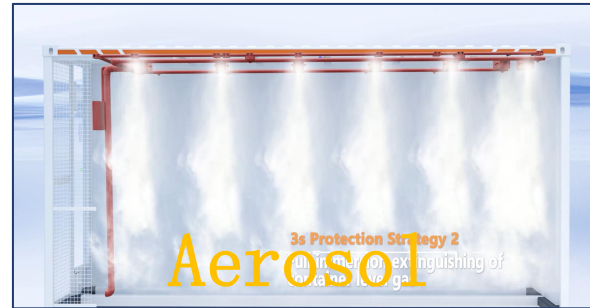
1st Layer Protection



Pack-level submerged protection system

- Real-time cell-level temperature monitoring
- Activate for the battery pack with abnormal temperature
- Aerosol injection
- Protection efficiency can reach 90%

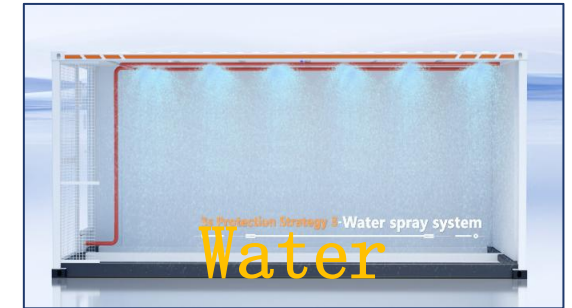
2nd Layer Protection



Submerged gas extinguishing

- Thermal runaway spread to the container
- Temperature sensor, smoke sensor and/or gas detector triggered (fire alarm activated)
- Aerosol released for gas extinguishing

3rd Layer Protection



Water sprinkler system

- External fire hydrant required
- If level 2 aerosol extinguishing cannot control the fire in the container, active water sprinkler system to ensure the thermal runaway in the container does not spread to adjacent containers
- Cooling the whole container to prevent reignition



1250kPCS (新款)

DC input

Max DC voltage 1500Vdc

DC voltage range 1060~1500V

Max. DC current 1403A

Grid-tied AC output

Rated AC output power 1250kW

Max. AC output power 1375kW

Rated grid-tied voltage 690Vac

Grid voltage range -15%~10%(settable)

Rated grid frequency 50Hz

Max. output current 1150.6A

Power factor $\geq 99\%$

Adjustable power factor 1 (leading)~1 (lagging)

THDi <3% (at rated power)

General data

IP grade IP65

Operation temperature -35°C~60°C (>50°C derating)

Relative humidity 0~100% (no condensation)

Cooling type Intelligent forced air cooling

Dimensions (W×H×D) 735×2135×1300mm

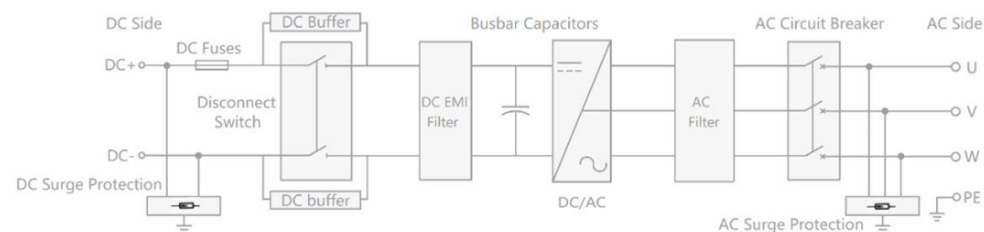
Weight About 950kg

Altitude 4000m (>2000m derating)

Display LED

Communication protocol Modbus-RTU/Modbus-TCP/IEC61850/IEC104

Standard EN/EC 62477-1, EN/IEC 61000-6-2, EN50549-2/10, IEC62116, IEC61727, IEC60068-2-1/2/14/30



5MW Converters and Transformer System



Safe

- On-line insulation detection
- Adapt to extreme environment, such as high temperature, salt, and extreme cold etc.
- Real-time transformer condition monitoring



Smart

- Grid forming technology, providing extra inertial support.
- Millisecond-level power response, stable power grid operation.
- Multiple functions, including Black-Start and VSG etc.



Simple

- Integrated design of converter and transformer system, integrated system, integrated data acquisition and optic fiber network.
- Wide DC voltage operation range, flexible configuration.
- Adapt to multiple scenarios, including power generation side, grid side and user side application, supporting multi-device parallel.

Technical Specification

Items	BCS4000K-C-HUD/T4	BCS5000K-C-HUD/T4
DC input		
Max. DC voltage	1500Vdc	
DC voltage range	1000-1500Vdc	
Max. DC current	1122A*4	1403A*4
Soft start	Yes	
AC output (On-grid)		
Rated AC output power	4000kW	5000kW
Max. AC output power	4400kVA	5500kVA
Rated grid-tied voltage	690Vac 3P3W+PE	
Grid voltage range	-15%~10% (settable)	
Grid frequency range	50/60Hz	
Max. output current	3682A	4602A
Power factor	>0.99 (at rated power)	
Adjustable power factor	1 (leading)~1 (lagging)	
THDi	<3% (at rated power)	
AC output (Off-grid)		
Rated AC output voltage	690Vac	
Output voltage accuracy	1%	
Max. output current	3682A	4602A
THDu	<3% (liner load)	
Rated output frequency	50/60Hz	
Overload capability	110% overload	
PCS efficiency		
Max. efficiency	99%*	
Transformer		
Rated power	4000kVA	5000kVA
Voltage transformation ratio	0.69/(6~33)kV (Can be customized)	
Isolation mode	oil-immersed transformer	
General data		
IP rating	IP65(PCS) IP54(Skid)	
Operation temperature	-35°C~60°C (>45°C derating)	
Relative humidity	0~100% (no-condensing)	
Cooling type	Intelligent air cooling	
Dimensions (W×H×D)	12192×2896×2438mm	
Weight	27000kg	28000kg
Altitude	2000m (>1000m derating)	
Display	LED	
Communication protocol	Modbus-RTU, Modbus-TCP, IEC61850, IEC104	
Communication interface	RS485, CAN, Ethernet	

• * This efficiency value was measured in a laboratory environment.

• * Specification indexes may be subject to changes without further notice

RMU

Ring Main Unit with multiple functional units with double extensibility

3 functions: Example of RM AirSeT DE-IIQ Active Plus: 2 switch-disconnectors + 1 switch-fuse combination including native integration of PowerLogic T300



Insulation level - voltage withstands					
Rated voltage	U_r	kV	12	24	
Rated frequency	f_r	Hz	50 / 60		
Rated short-duration power-frequency	U_d	Phase-to-Phase & Phase-to-Earth	kV (1 mn RMS)	28	50
		Across the Isolating Distance		32	60
Rated lightning impulse	U_p	Phase-to-Phase & Phase-to-Earth	kV (1.2 μ s)	75	125
		Across the Isolating Distance		85	145

Insulation and switching					
Insulation medium	Busbar, Disconnectors, Earthing switch...			Pure Air ⁽¹⁾	
Air relative filling pressure	At 20 °C	MPa	0.04	0.15	
Disconnecting principle	In pure air, compartment sealed from ambient conditions			Three position disconnecter	
Switching and Breaking Medium				Vacuum	
Mechanical Endurance	As per IEC			Endurance class "Extended"	

Current					
Rated current	I_r	Busbar		630 A	
Short time withstand current	I_k/I_{he}		kA	20 / 20	
Duration	t_k/t_{he}		s	1 s or 3 s / 1 s	
Rated peak withstand current	I_p		kA	52	

Service continuity class as defined in the IEC 62271-200					
Other high-voltage compartments or function may remain energized	LSC 2: access to cable compartment when busbar energized is possible			LSC 2	
Internal Partitions between compartment	PM: Metallic earthed			PM	

Degrees of protection provided by enclosure					
External Enclosure as per IEC 60529	Protection of active Medium voltage circuits (tank)			IP67	
	Protection of MV cable compartment			IP4X	
	Access to Mechanism			IP4X	
	Protection of LV auxiliary components			IP4X	
Internal as per IEC 60529	Index between compartments			IP2X	

Degree of protection against mechanical impacts					
IK code	Class as per IEC62262			IK07	

Internal Arc fault Withstand					
Basic	Sealed compartment is equipped with safety membrane			Not classified	
IAC	I_a	Class A FLR Front-Lateral & Rear access	kA	20 kA AFLR	
	t_a	Duration	s	1 s	
	Gas relief			Downwards in cable compartment	

Life Cycle characteristics					
Sealed pressure system: expected operating duration under IEC 62271-1 normal service conditions				40 years	
SF6-free Gas Insulated Switchgear: definition of enclosure as per IEC 62271-200				Sealed pressure system GIS	
High voltage mobile or fixed parts in the Gas Insulated compartment				No maintenance	
Specific procedure of recovery, transportation and recycling of gases				None: No fluorinated gas (air only)	
Contamination of sealed compartment by arc-quenching by-products				No by-products: switching in vacuum	
RM AirSeT 24 kV can be used on networks with U_r of 17.5 kV and / or U_d of 38 kV 1 mn and/or U_p BIL of 95 kV					

(1) Pure air is compliant with IEC 62271-4 (gas handling) and IEC 63360 (gas composition) for synthetic air. It comprises approx. 79% nitrogen (N2) and 21% oxygen (O2) with less than 30ppm of other gases. Refilling of air is not needed under normal service conditions defined by the IEC 62271-1.

EMS Control and Interaction Architecture

- Charge/Discharge Control
- PV-BESS-EVSE-DG Coordination
- Transformer Protection
- Cell-Level Protection
- ...

Open MQTT-API

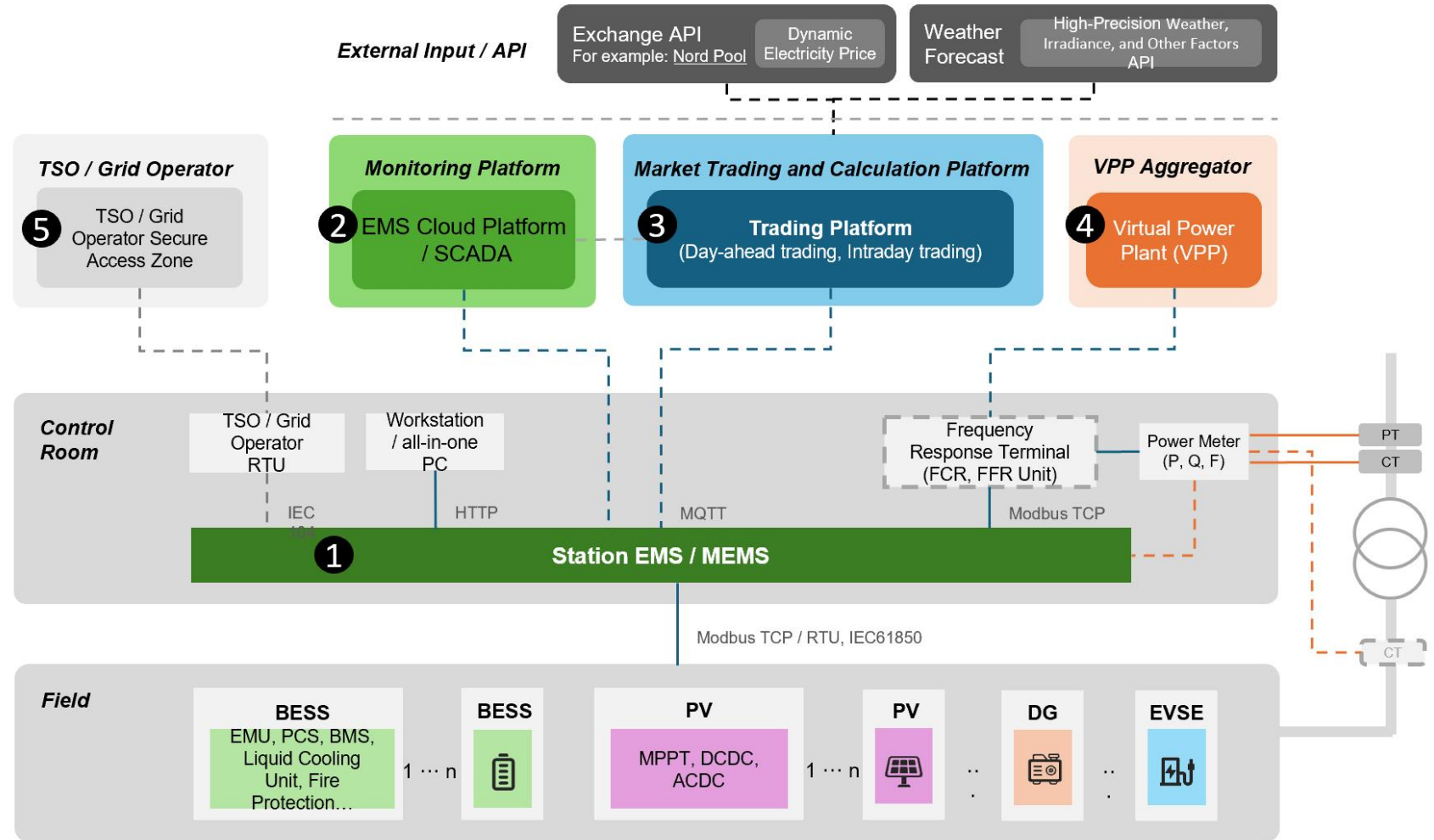
Supports integration with customer trading platforms for Day-Ahead / Intra-Day market participation.

Open Modbus API

Enables integration with Virtual Power Plants (VPPs) for providing frequency regulation services such as FCR/FFR.

Customized IEC104 Protocol

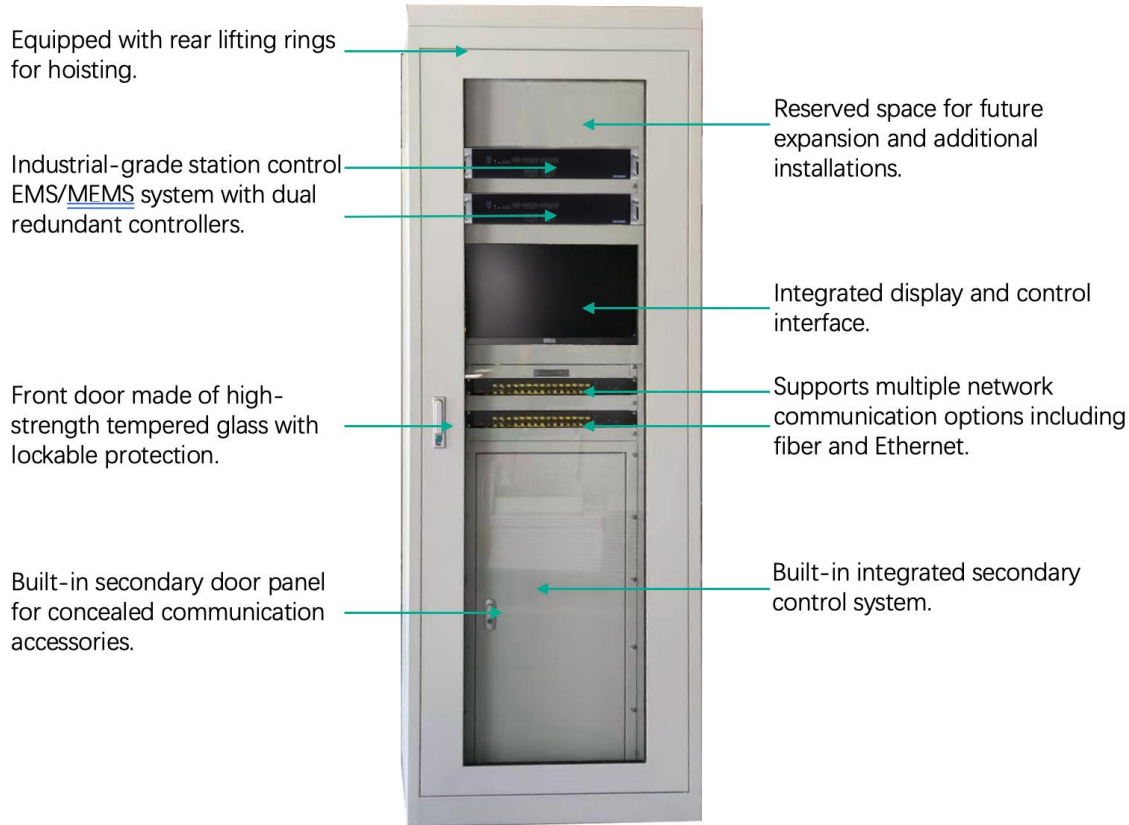
Supports connection with TSO/DSO to enable aFFR services.



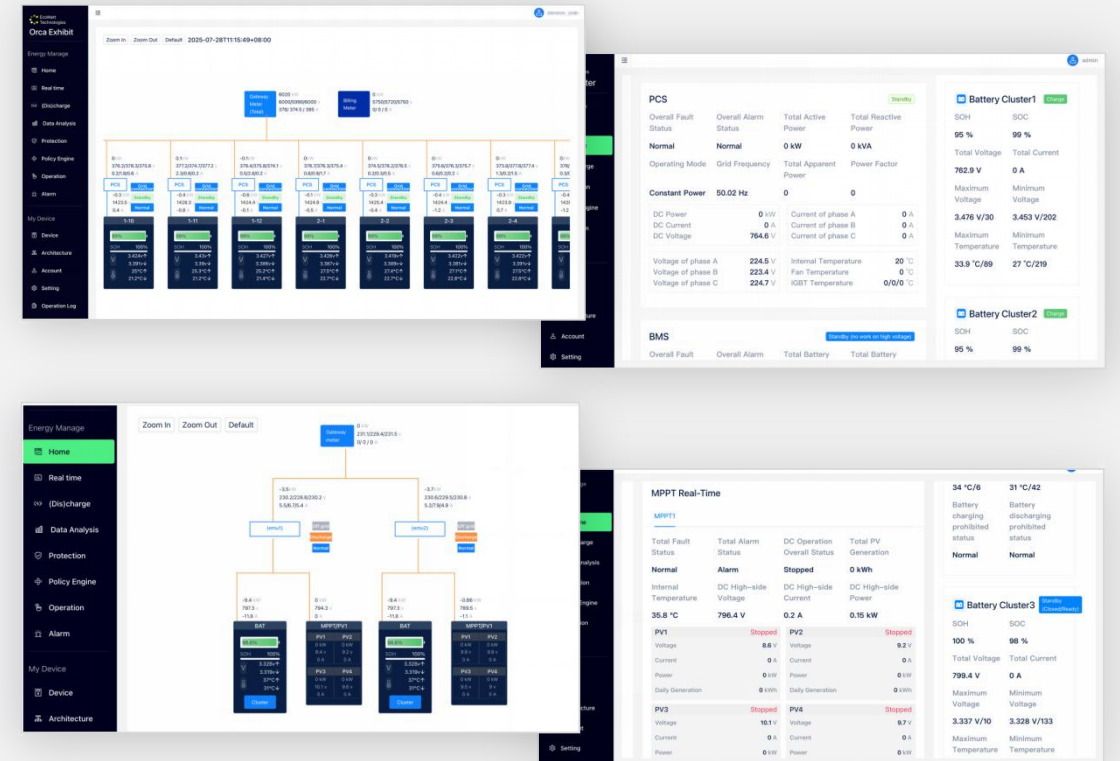
EMS Software and Hardware

Station Control EMS/MEMS Control System Cabinet

The cabinet system consists of the station-level EMS and related communication accessories. The control system supports a redundant architecture, while the network communication design is compatible with both star and ring topologies.



EMS Software Embedded in Hardware

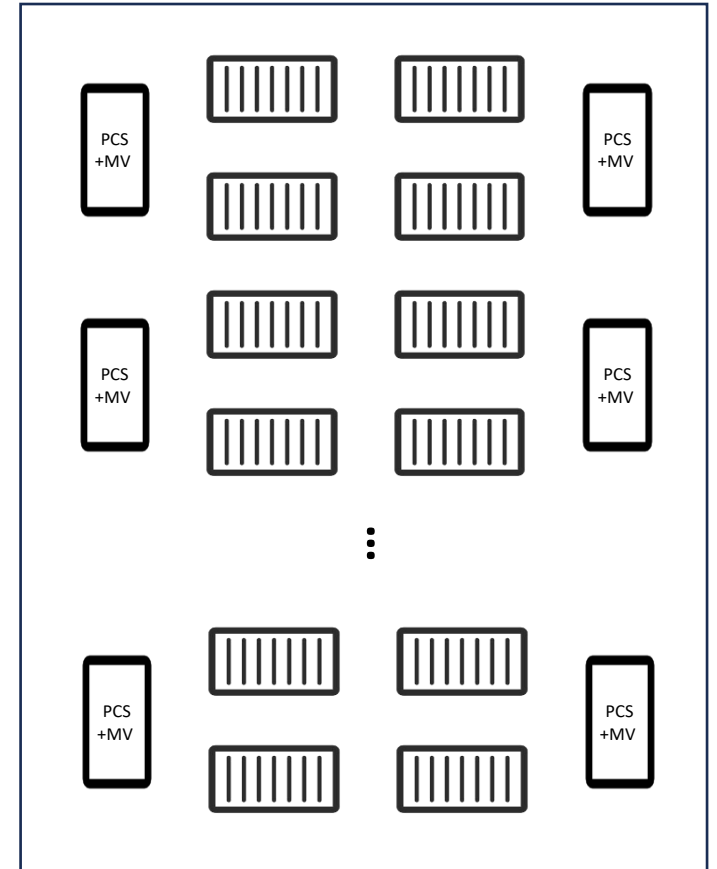
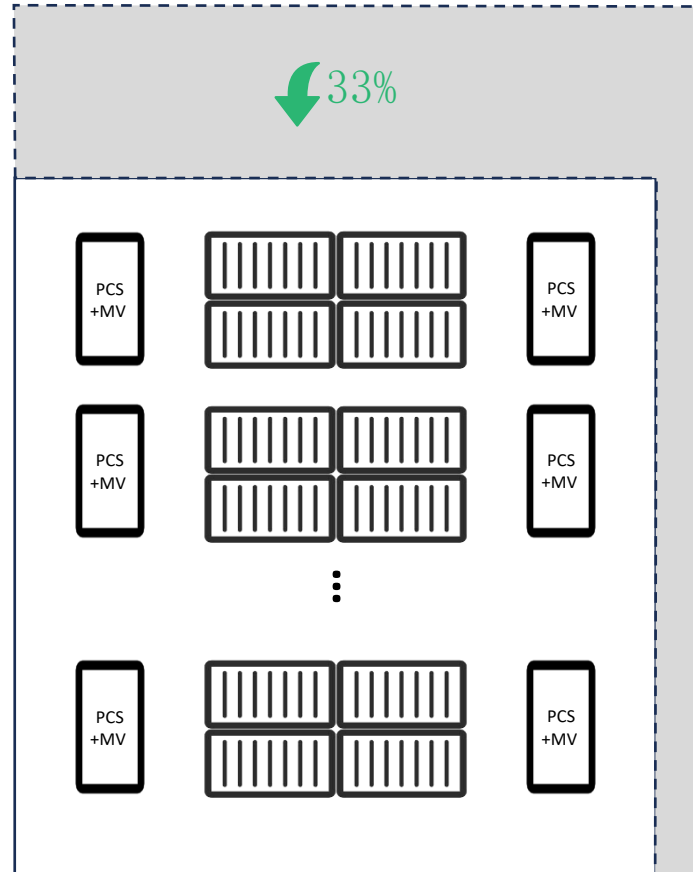
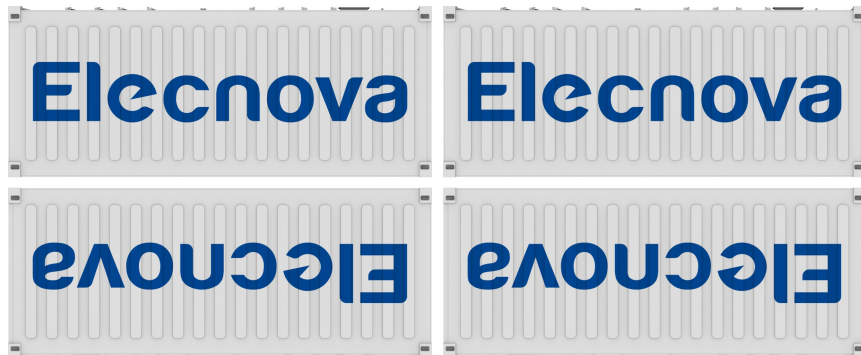


High Energy Density

ECO-B20FT5015LP

- High energy density cells
- Highly integrated system
- Back-to-back, side-to-side installation

Land using reduce 33%



Battery Container

ECO-B20FT5015LP



ECO-E20FT5015LP

Transport Standards

- UN38.3

Container

- EN/IEC 62477-1 LVD; EN/IEC 61000 EMC;
On Going: UL9540A; IEC 62933-5-2;

Battery Pack

- TUV MARK
(IEC 62619; IEC63056)

Cooperative Partner





Thanks for watching!

Elecnova

