

CROSTORION ESS 5015

Liquid-Cooled Lithium Battery Energy Storage System
Standard Production Specification



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Product Features of the Storion ESS 5015

The **Storion ESS 5015** is a high-performance **liquid-cooled battery energy storage system**, engineered for demanding applications across **generation-side, grid-side, and user-side** scenarios.

The system integrates advanced **battery, thermal, fire protection, and control technologies** into a compact, modular, and scalable solution optimized for **renewable energy integration, peak shaving, frequency regulation, and grid support**.

System Composition

Each **Storion ESS 5015 container** consists of:

- **314Ah LFP battery cells**, configured into **liquid-cooled battery packs** and **battery racks**:
 - ❖ **1P52S pack topology**
 - ❖ **8 packs per rack, 12 racks per system**
 - ❖ Total nominal energy capacity: **5015.96 kWh**
- **Sub-control cabinets** and **main control cabinet**, providing centralized and string-level monitoring and protection.
- **Independent liquid cooling system**, including **liquid cooling units, multi-stage piping, and precision-cooled battery cold plates**.
- **Advanced Battery Management System (BMS)** with **three-layer architecture** (BMU, BCMU, BAMU), delivering real-time monitoring, intelligent charge/discharge control, and comprehensive protection.
- **Fire protection system**:
 - ❖ Combustible gas detection
 - ❖ Linked explosion-proof ventilation
 - ❖ Total flooding gas suppression
 - ❖ Water-based fire suppression
 - ❖ Integrated interlock with system controls
- **Non-walk-in container design**, fully pre-assembled at factory, with all maintenance performed externally.

Applications Scenarios

- **Renewable energy integration** (solar + storage, wind + storage)
- **Grid peak shaving and valley filling**
- **Frequency regulation / ancillary services**
- **Microgrids / islanded operation**
- **Backup power and reliability enhancement**
- **Industrial and commercial load management**

Product Features of the Storion ESS 5015

High energy density and efficiency:

- Utilizes large-format **314Ah LFP cells** with high cycle life and intrinsic safety.
- Supports both **string-level architecture** (*one rack – one PCS*) and **centralized DC bus architecture**, allowing flexible system designs optimized for project needs.

Flexible system topology:

- String topology enables **independent rack-level management**, improving charge/discharge efficiency and system availability.
- Centralized topology enables simplified system control and optimized component utilization.

Optimized space utilization:

- System housed in **standard 20-foot container**, compliant with **land and sea transport standards**.
- System footprint **< 15 m²**; supports **cabinet expansion**, reducing land use by up to **35%**.

Advanced liquid cooling:

- High-efficiency **frequency-conversion liquid cooling units** with **rack-level flow control**.
- Internal temperature delta within packs **< 2.5°C**, ensuring uniform cell temperature and extending battery life.

Comprehensive safety architecture:

- **Six-layer safety design**: 1) Pre-warning, 2) Detection, 3) Prevention, 4) Isolation, 5) Ventilation, 6) Extinguishing
- Fire protection fully integrated with BMS safety logic and early warning protocols.
- Continuous monitoring of **combustible gas, temperature, smoke**, and system electrical parameters.

Robust environmental adaptability:

- Protection rating: **IP55** & Corrosion protection: **C4**
- Wide operating temperature range: **-35°C to +60°C** (with derating >45°C)
- Supports installation in challenging outdoor environments.

Factory-integrated, pre-tested system:

- Delivered as a fully prefabricated solution, reducing on-site integration effort by **>50%**.
- Accelerated commissioning and lower project risk.

Humidity and condensation control:

- Equipped with independent dehumidification air conditioning, ensuring optimal container humidity and preventing condensation.

Serviceability and future-proofing:

- Designed for rapid upgrades and easy maintenance.
- Modular architecture allows for future system expansion and technology updates.

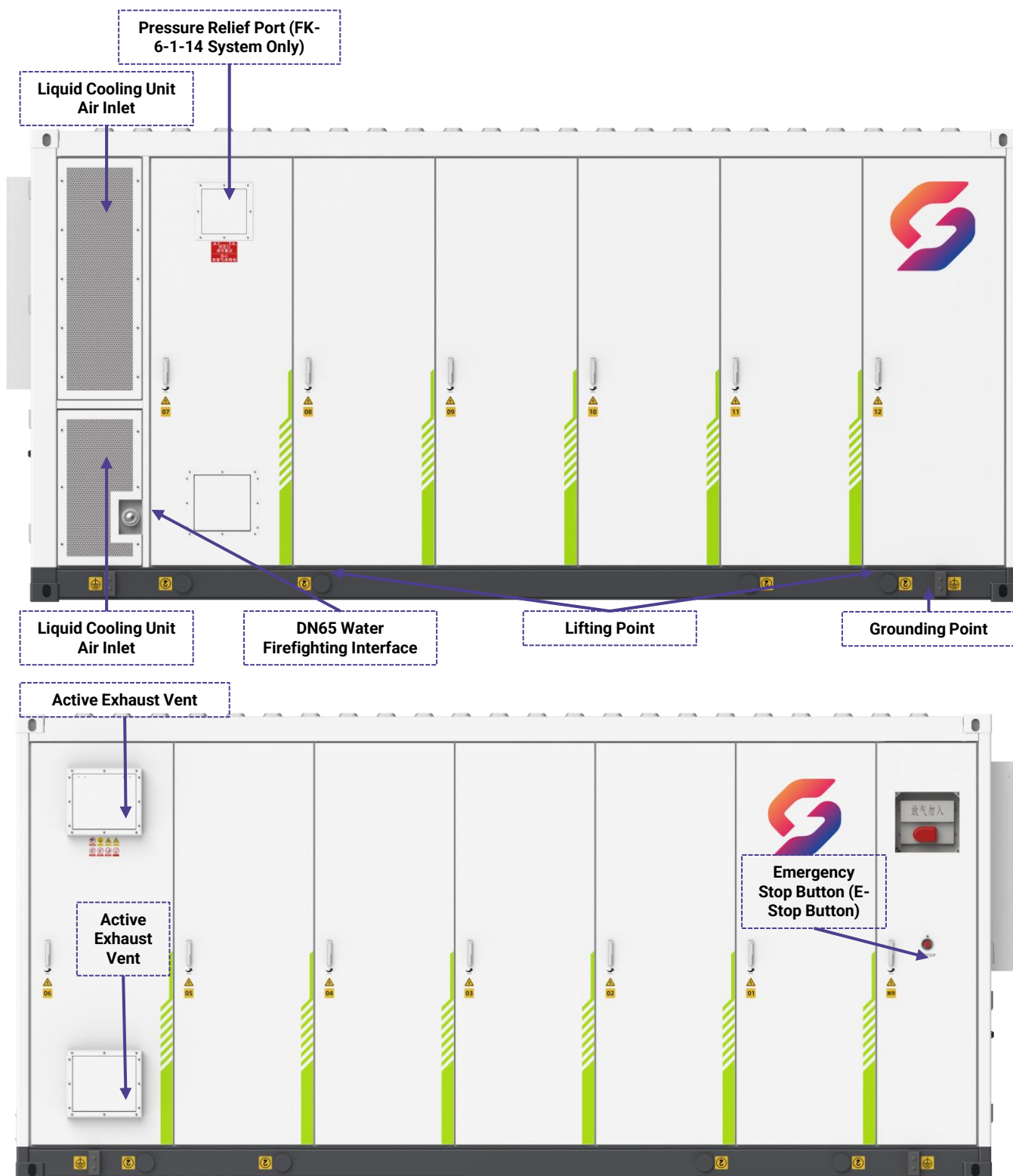
Product Specification of the Storion ESS 5015

Category	Name	Parameters	Remarks
Battery Parameters	Cell Type	LFP-3.2V-314Ah	
	Capacity [kWh]	5015.96	@25°C±3°C
	Nominal Voltage [Vdc]	1331.2	
	Voltage Range [Vdc]	1164.8~1497.6	
	Charge Rate	≤0.5CP	
	Discharge Rate	≤0.5CP	
	Maximum Charge/Discharge Power [kW]	2500	String or centralized PCS
	Operating Temperature	Charging [°C]	0~50
		Discharging [°C]	-20~55
	Recommended Ambient Temperature [°C]	25±10	
System Parameters	Cooling Method	Liquid cooled	Liquid cooling medium: water + ethylene glycol
	Fire Protection System	Aerosol+water fire protection	
	Corrosion Resistance Level	C4	
	Lightning Protection Level	Class II	
	Protection Level	IP55	
	Operating Temperature Range [°C]	-20 ~ +55	45°C derating
	Storage Temperature [°C]	0 ~ +45	<6 months
	Operating Humidity Range	0~95%RH	No condensation
	Installation Method	Outdoor installation	
	Work Condition	2 charges and 2 discharges	
	System Communication Interface	Ethernet/RS485/CAN	
	External System Communication Protocol	Modbus	
		TCP/IEC104/Modbus RTU/CAN2.0B	
	Altitude [m]	≤3000	
Conformity	Design Compliance Standards	6058×2438×2896	
		Weight [T]	
		Approximately 42	
Conformity	Design Compliance Standards	UL1973、UL9540A、	
		NFPA855、UN38.3、UN3536	

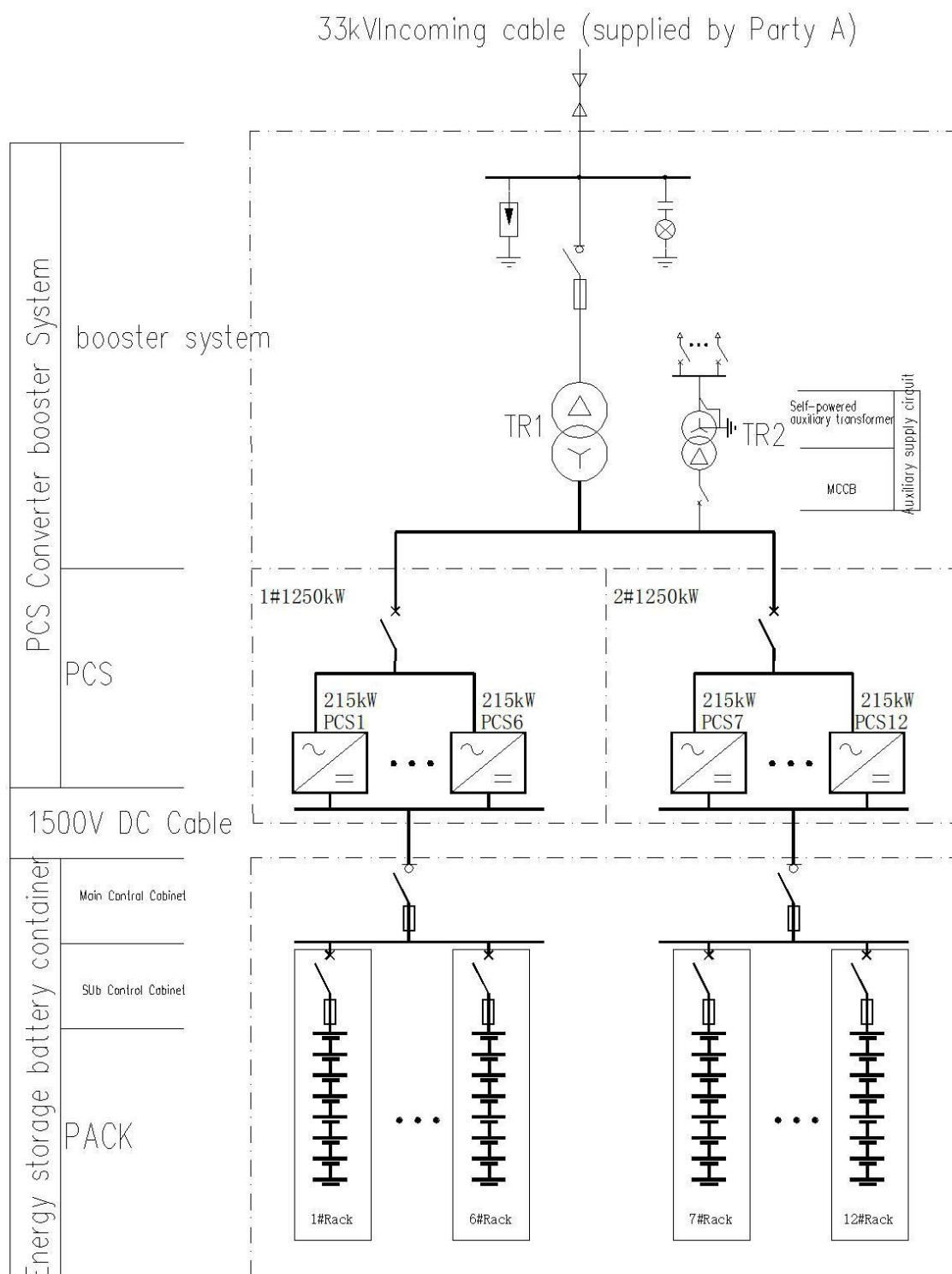
Layout Diagram of the Storion ESS 5015



Layout Diagram of the Storion ESS 5015



Electrical Single-line diagram of the Storion ESS 5015



Note: PCS converter and transformer, 1500V DC cable, are not included in the supply range of the energy storage product.

Configuration List of the Storion ESS 5015

No.	Item	Quantity	Remarks
1	Battery Container	1 set	5.015MWh, 20-feet container, 6058*2438*2896mm
1.1	Battery Rack	12 racks	417.996kWh
1.1.1	Liquid cooled Pack	8 sets	52.496kWh
1.1.2	Sub Control Cabinet	1 set	-
1.2	Central Control Cabinet	1 set	Convergence + power distribution + communication unit
1.3	Fire Protection System	1 set	Aerosol + water fire protection + flammable gas detection + fire explosion-proof ventilation exhaust, etc.
1.4	Temperature Control System	1 set	Liquid cooling unit + 3-level pipeline, etc.
1.5	BMS System	1 set	3-level structure
1.6	Other Auxiliary Systems	1 set	Such as temperature and humidity monitoring, lighting, etc.



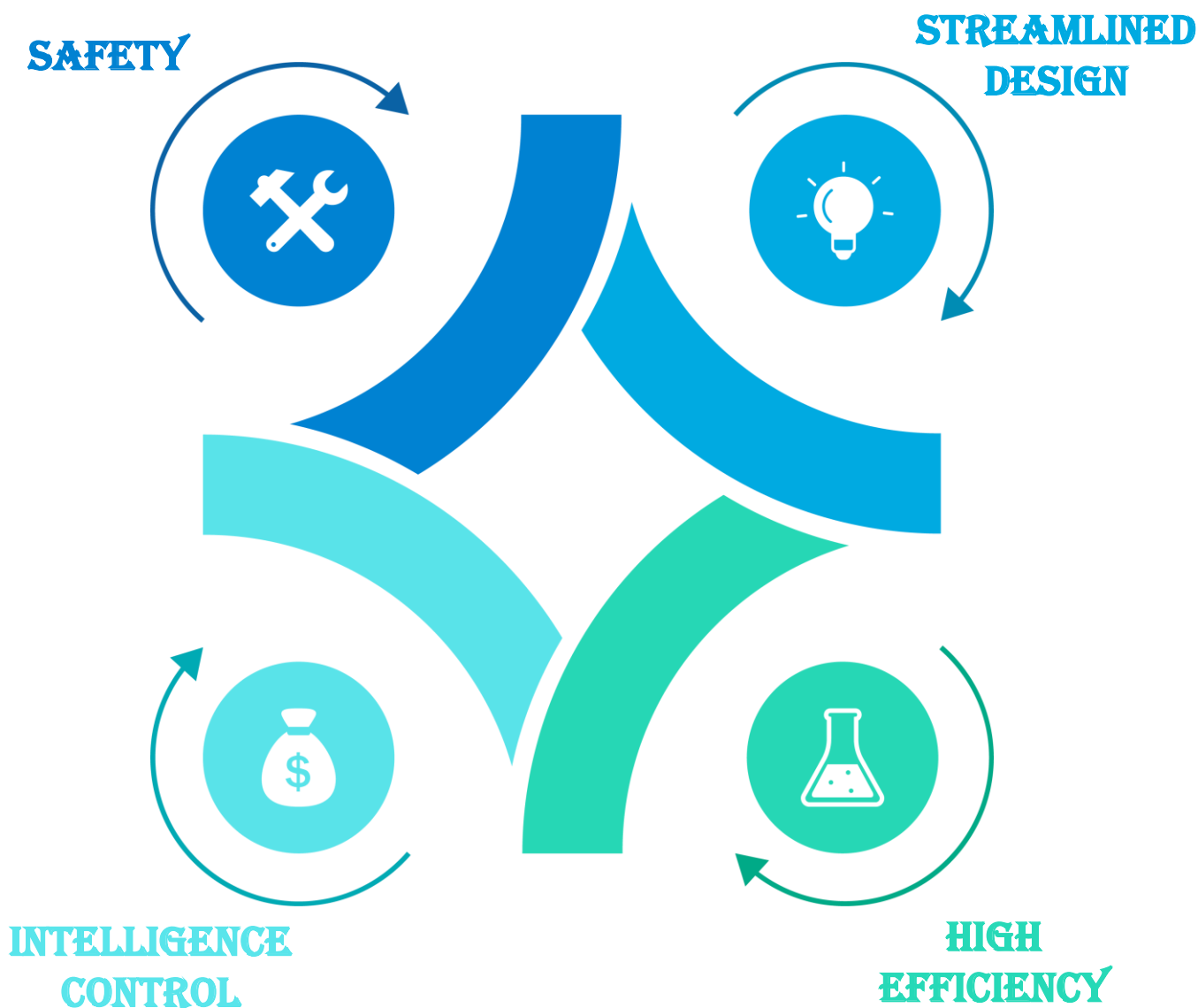
The Storion EMS ensures secure and intelligent energy management with real-time monitoring, scheduling, and remote control capabilities.

All operational data is securely stored on dedicated servers located in Zagreb, ensuring full data sovereignty and compliance with EU data protection regulations.

Our EMS is designed with cybersecurity in mind, providing reliable and encrypted data communication between all system components.

Product Features

The Storion Smart Energy Storage System is designed with a focus on **safety**, **streamlined design**, **intelligent control**, and **high efficiency**, tailored to meet the demanding requirements of industrial and commercial energy applications.



1. Safety

Advanced Intelligent Liquid Cooling

Equipped with a precision liquid cooling system that maintains cell-to-cell temperature variance within $\pm 2.5^{\circ}\text{C}$, effectively extending battery lifespan by up to 15%.

Verified System Safety

Tested and validated against industry safety standards, including protections against short-circuiting, overcharging, and thermal stress.

Multi-dimensional Electrical Protection

Integrated fault detection and protection leveraging comprehensive electrical fusion sensing, ensuring system-wide safety in real time.

Proactive Thermal Runaway Mitigation

A layered safety design including:

- Early-stage thermal runaway detection
- Targeted PACK-level fire suppression
- Combustible gas sensing
- Smoke containment
- Pressure relief mechanisms

All coordinated via real-time BMS/EMS linkage for rapid, intelligent response.

Sealed & Flush-Mounted Design

Fully enclosed with no exposed critical components, minimizing damage risk and improving system robustness.

High Protection Ratings

- Battery PACK: IP67
- Container system: IP55

Resistant to dust, water, and harsh environmental conditions.

Optional AI-driven Diagnostics

Optional AI modules offer predictive fault analytics, leveraging cell-level models to support preventive maintenance and early alerts.

2. Streamlined design

Integrated Modular Architecture

Compact layout with an all-in-one design; each system preassembled within a single 20-ft container occupying minimal ground space.

High Compatibility & Flexibility

Seamlessly integrates into various commercial setups with grid-friendly operations and scalable capacity.

Fail-Safe Installation

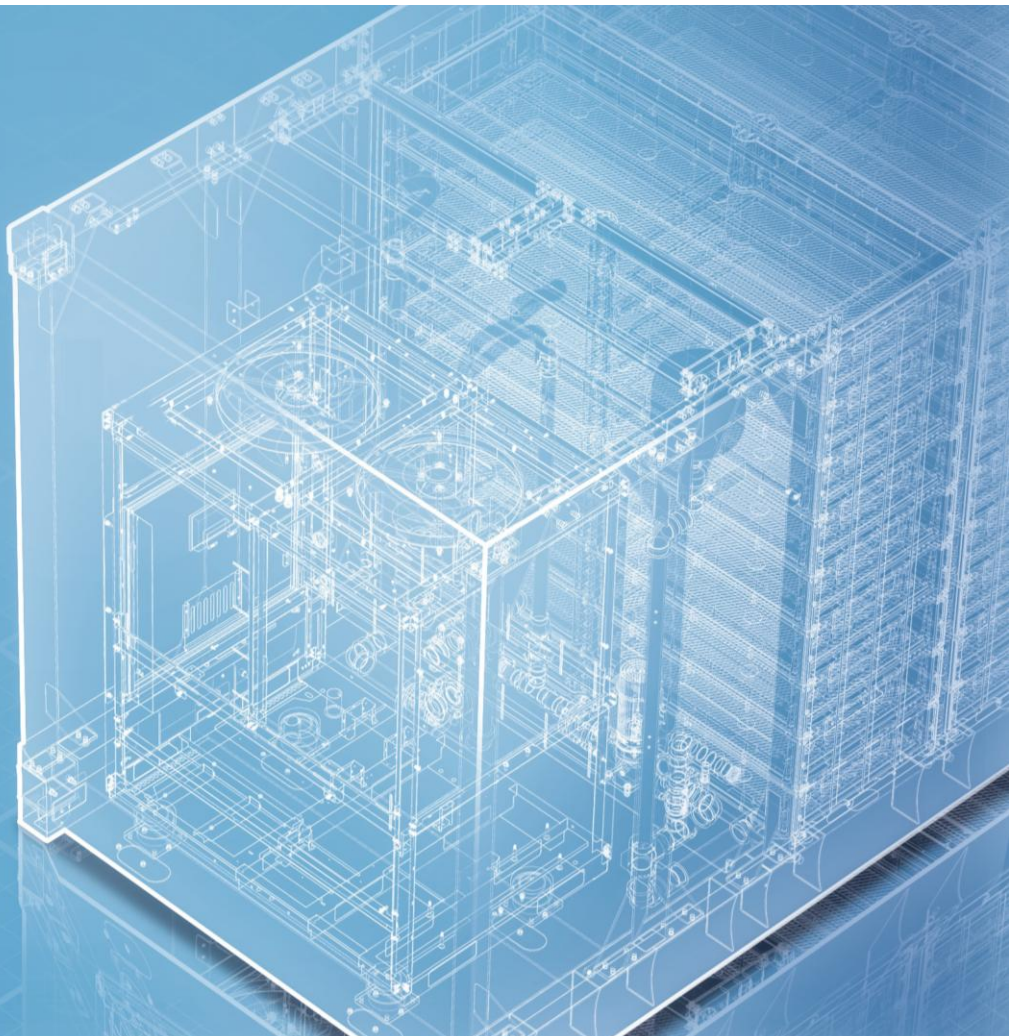
Built-in anti-reversal and short-circuit protection enhances safety and simplifies field operations.

Plug-and-Play Expandability

Aviation-grade connectors support parallel expansion with minimal onsite engineering.

Rapid Deployment

Factory-prefabricated and fully tested before delivery, reducing on-site deployment time and costs by up to 15%.



3. Intelligence

Smart Liquid Management

Real-time liquid leakage monitoring and auto-refill reduce maintenance needs and enhance system uptime.

Cloud-based O&M Platform

Supports local and remote monitoring, powered by AI-driven diagnostics and centralized fleet management—no on-site technician required.

AI-enhanced Lifecycle Optimization

Adaptive balancing strategies and predictive alerts preserve battery consistency throughout its full lifecycle.

Black Start Support

Enables autonomous restart in off-grid or microgrid scenarios, ensuring continuity during power outages.

Flexible Operating Modes

Supports:

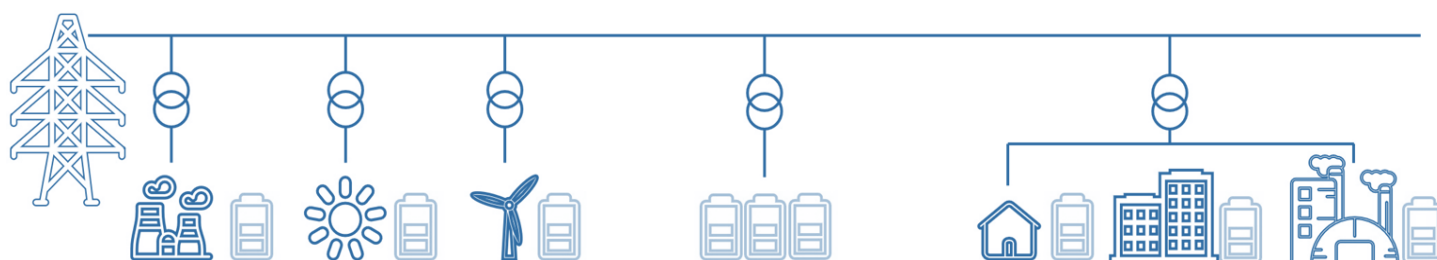
- Virtual Power Plant (VPP) aggregation
- Grid-connected operation
- Off-grid/islanded modes

Maximizing both flexibility and revenue generation potential.

4. High Efficiency

Next-generation Power Conversion System (PCS)

Built on third-generation semiconductor technology using silicon carbide (SiC) devices, achieving conversion efficiency of up to **99%**, ensuring minimal energy loss and superior system performance.





Born in
European Union



R&D center
in Croatia



Focus on
Eastern Europe

Storion Energy is a pioneer of new energy innovative technologies, committed to providing premier solutions and services for new energy applications in eastern Europe.



Quality
Policy

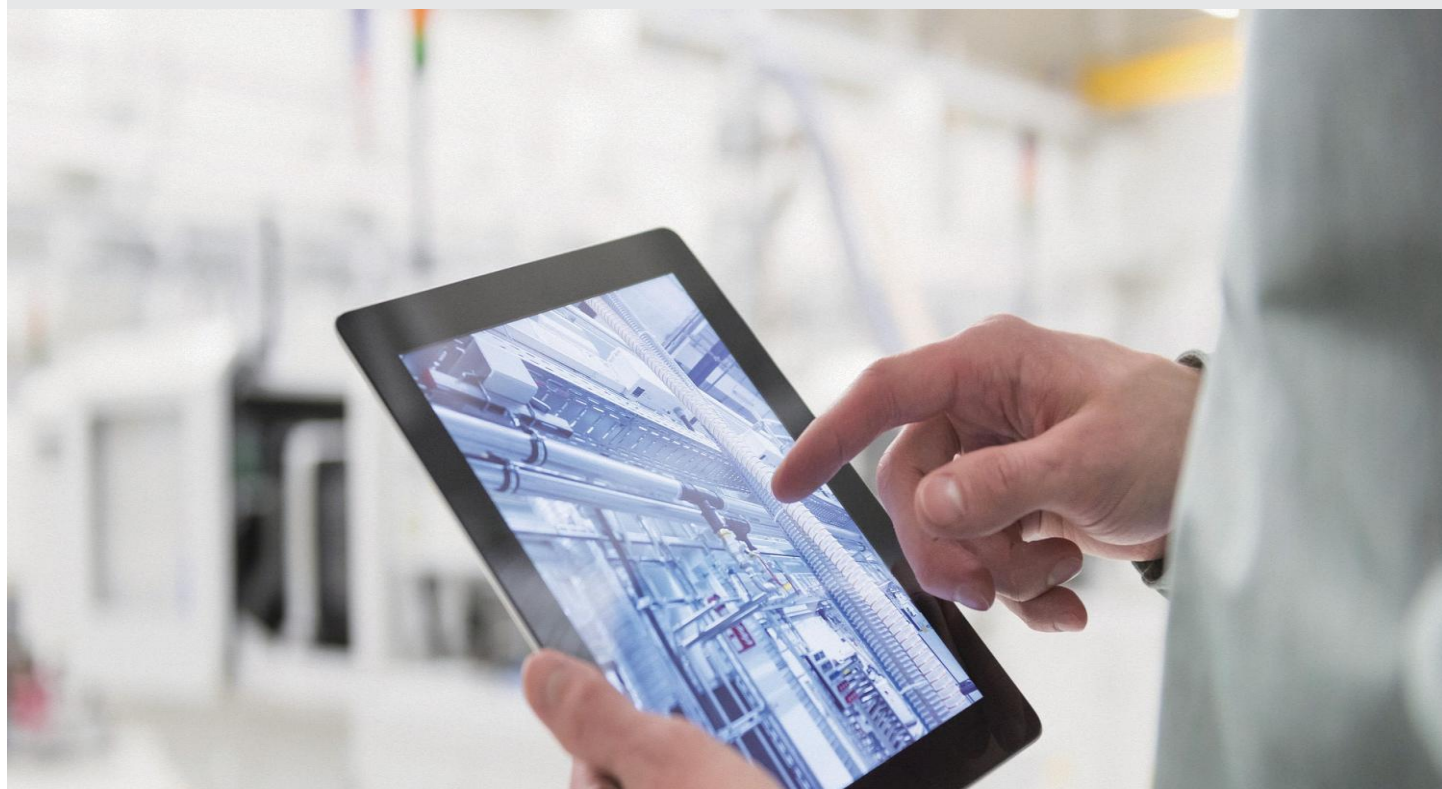
Providing clients with the perfect quality beyond expectations is our unremitting pursuit.

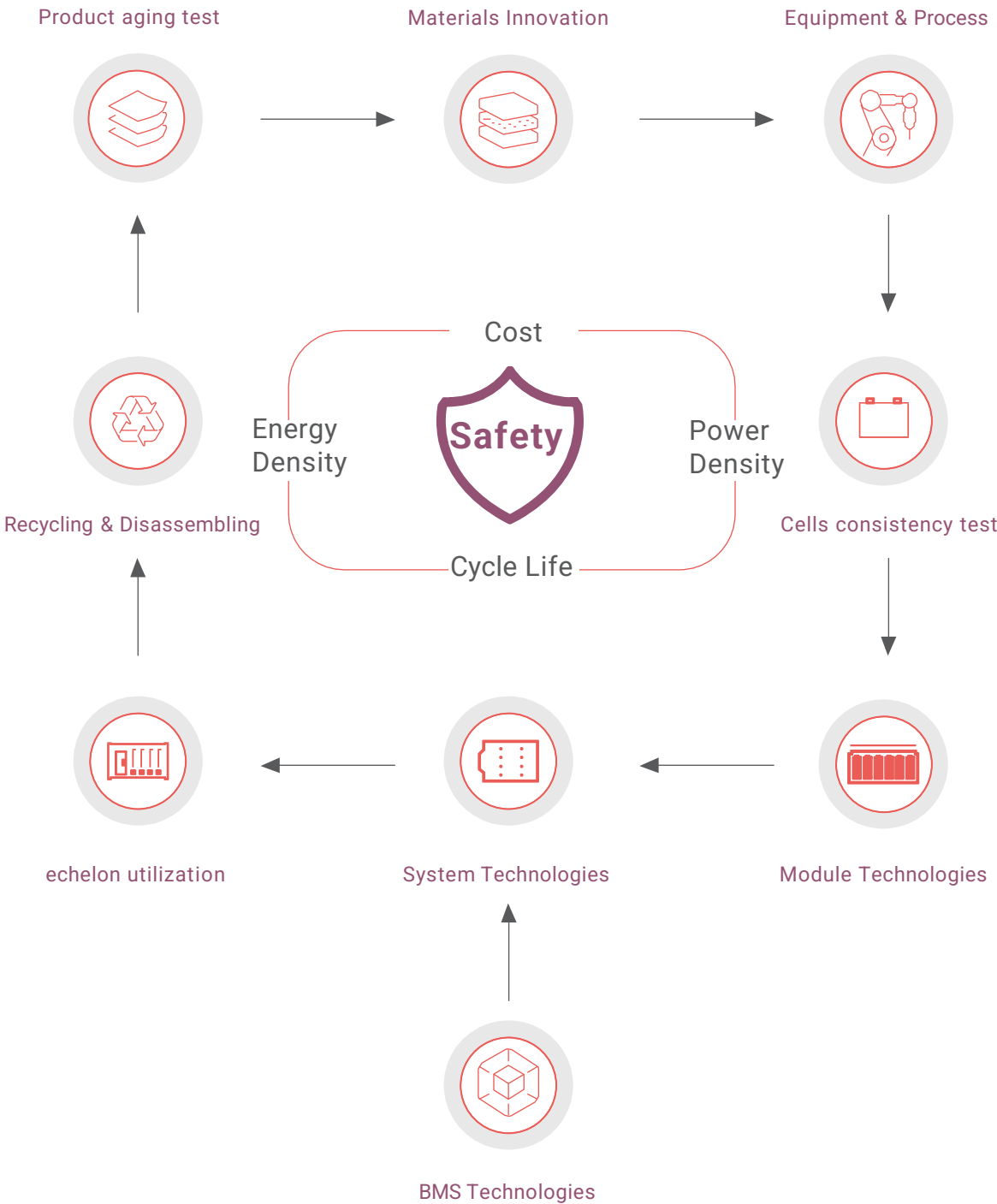


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Technology Highlights



Substantial Safety

Aircraft-grade safety and reliability

Storion Energy ensures safety and reliability in real scenarios with well selected and designed raw materials, multi-level protective structures, automated manufacturing processes, comprehensive testing and verification, 24-h monitoring, and big data-based early warning.



Long Service Life

Life up to 12,000 cycles

Storion Energy has upgraded key components such as the cathodes, anodes, electrolytes, and pole pieces of the battery to slow down the battery capacity loss, extend the battery life, and reduce LCOS throughout the battery life cycle.



Smarter Decisions

Based on AI and quantitative trading technology

Storion Energy has developed an Energy Management System that analyzes weather patterns, social events, and power generation data to predict hourly energy prices. This allows their energy storage solutions to deliver up to 30% higher returns compared to industry peers by optimizing energy cost savings.



Intelligent Temperature Control

Automatic temperature adjustment to cope with cold and heat

The intelligent thermal management system effectively avoids the bucket effect caused by the series connection of cells, guarantees the attenuation of life consistent of each cell to the greatest extent, ensures a temperature difference of cells in the container within 5°C, and improves the discharge capacity of the battery system. The integrated liquid-cooled units selected are featured in adaptive adjustment of the operating state, reducing the auxiliary loss by 30%.



Intelligent Management

24/7 protection

The BMS monitors the battery health status and identifies unhealthy batteries in advance. Intelligent internal short-circuit detection with early warning of battery fire hazards can reduce the probability of relevant fires by more than 90%. The online early warning system ensures the safe operation of battery throughout the life cycle.