

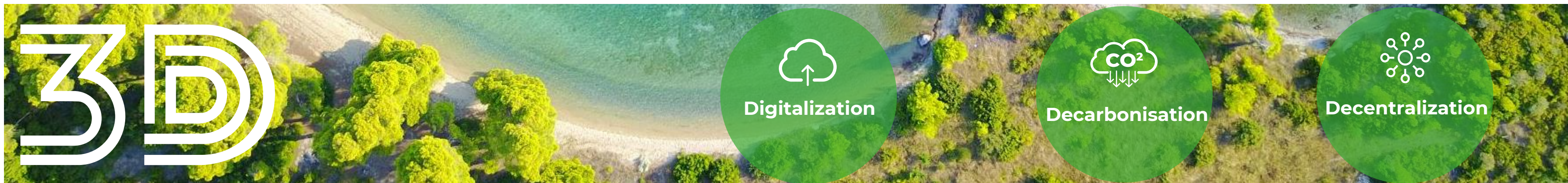


reap
battery





About Us



Founded in **early 2000s** **YEO** has become a **leading company** positioned along the electrification value chain—from power generation, transmission and distribution to the **smart & efficient application** of electrical energy.

The key and most active area of activities of YEO is the implementation of projects in the **renewable energy industry**. We successfully operate in this industry, providing a **full range of services** for the design, construction, and maintenance of solar power plants, floating solar power plants, wind power plants, biogas and biomass power plants with integration of **ESS (Energy Storage Systems)**, and **modern digital technologies**.

YEO Technology is a listed company in **Turkish Stock Exchange Market**.

19 Years Experience



3

Continents



30+

Countries



620+

Employees



150

Engineers



40

Women



400+

Completed Projects

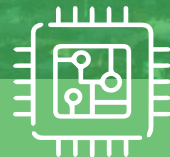
Business Segments

Renewable Energy



- Solar
- Wind
- Battery Energy Storage System

Technology – R&D



- Renewable Energy
- Energy Storage
- Green Hydrogen
- Digital Solutions

System Integration



- Energy
 - Power Generation
 - Power Grid
- Water & Wastewater
- Oil & Gas
- Cement & Mining

Investments and Project Development



- Bulgaria
- East Efrica
- Italy
- North Macedonia
- Romania
- Türkiye

Offices



At YEO, we operate as an **agile team** to serve our clients wherever they are. With offices across **10 countries**, we provide our clients with access to our **industry knowledge, experience,** and **international network.**

YEO TÜRKİYE (Head Office)		YEO POLAND	
YEO YEO TÜRKİYE (Ankara)		YEO AZERBAIJAN	
YEO NORTH MAKEDONIA		YEO UZBEKISTAN	
YEO GERMANY		YEO UNITED KINGDOM	
YEO ROMANIA		YEO UNITED ARAB EMIRATES	
YEO ETHIOPIA		YEO NETHERLANDS	

Investments & Joint Ventures & Strategic Partners

REAP Batarya Teknolojileri A.Ş.



% 100 of shares owned by YEO

Reap Battery is a full-system supplier for custom BESS manufacturer with full design and engineering capabilities.

ni-cat



% 10 of shares owned by YEO

Nicat develops new generation cathode materials by using AI technology.

BrandIT



% 51 of shares owned by YEO

BrandIT provides end-to-end connected and real time data-based solution from production machines to predictive maintenance applications, intelligent field equipment management and augmented reality.

Solitek



Strategic Partnership

Solitek as an EPC company experienced in international solar and battery energy storage projects will be responsible for integration of REAP's solutions to residential, commercial & industrial under 1 MWh BESS applications.

(Investment to the company are under negotiation.)

Ratio



Strategic Partnership

Ratio as a R&D company is developing Energy Management System for storage integrated energy generation power plants and simulation tools for preparing feasibility for BESS investments. According to partnership REAP develops Energy OS system for BESS with Ratio.

(Investment to the company are under negotiation.)

Ion Membrane



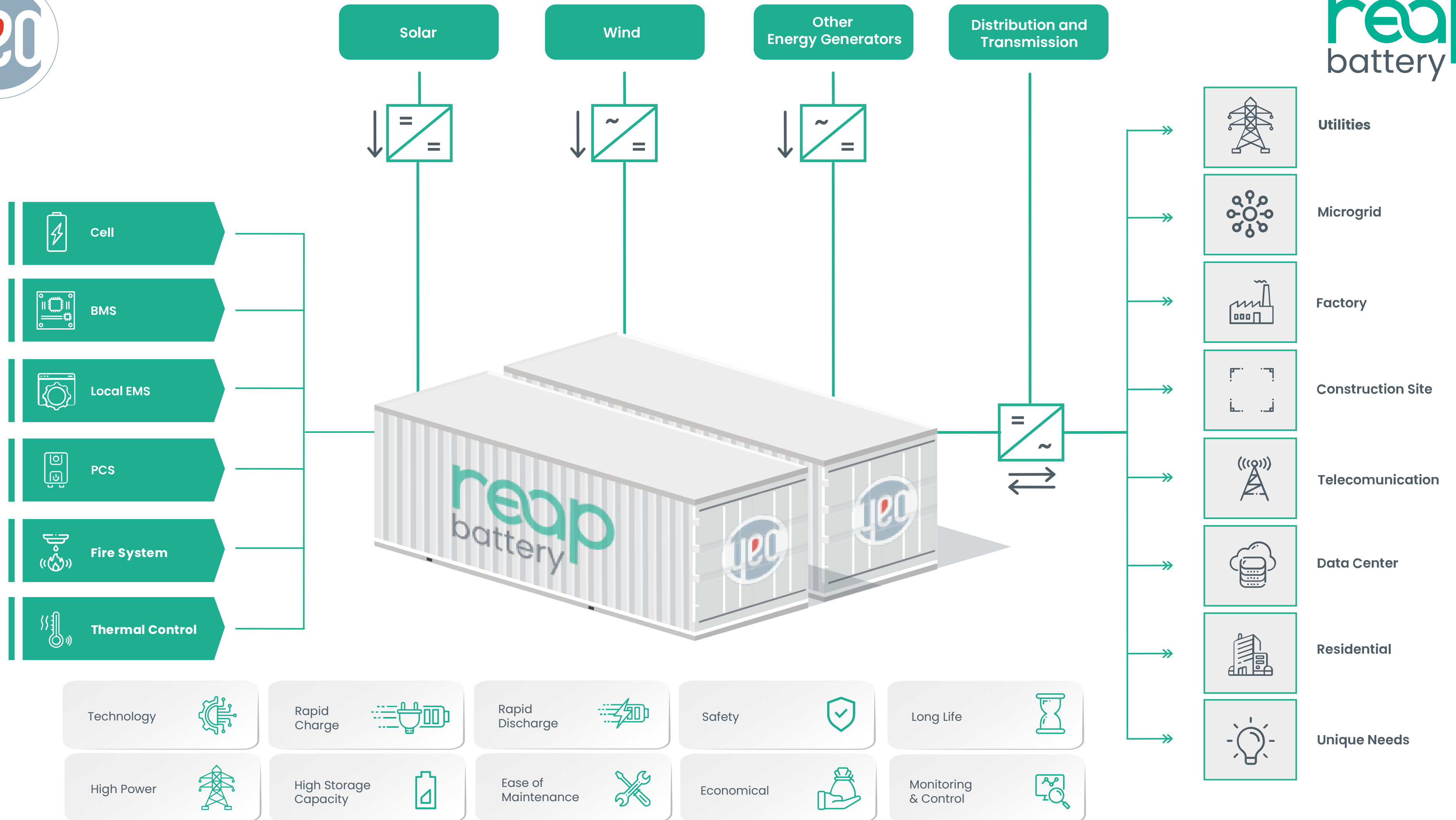
Strategic Partnership

Ion Membrane is developing membranes for fuel cell and separators for battery cells. According to the partnership YEO & ION is working on development of PEM Membrane for hydrogen electrolyser.

(Investment to the company are under negotiation.)



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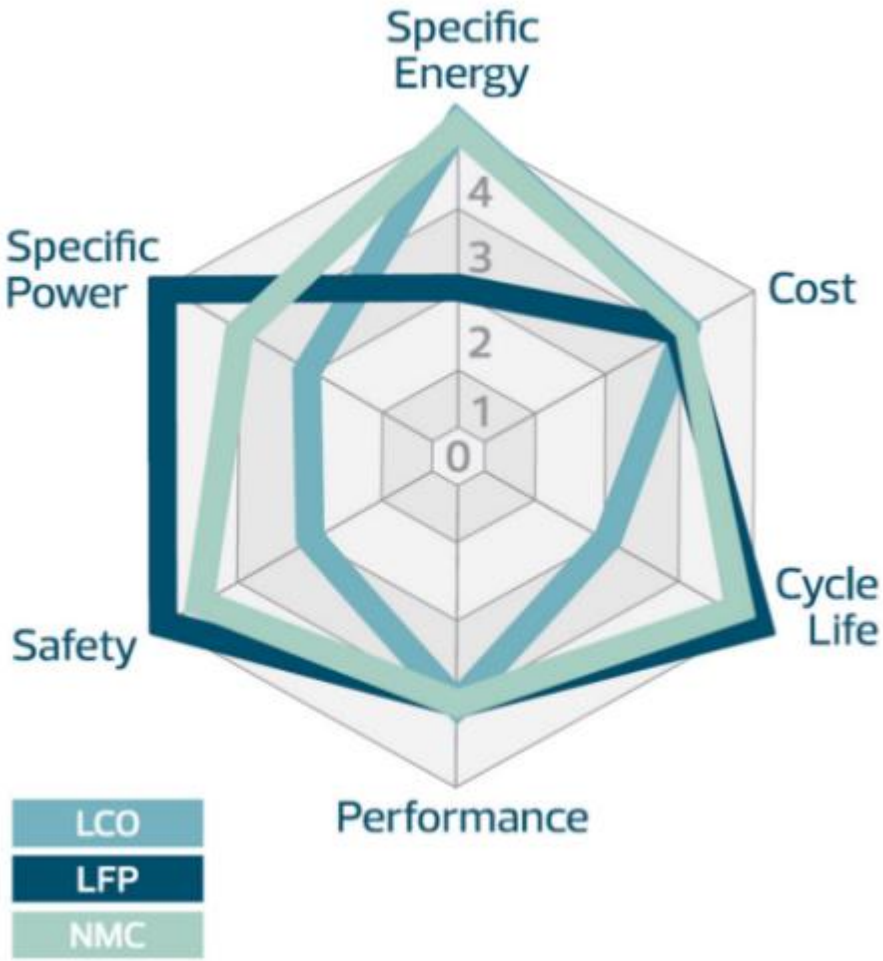







Technology

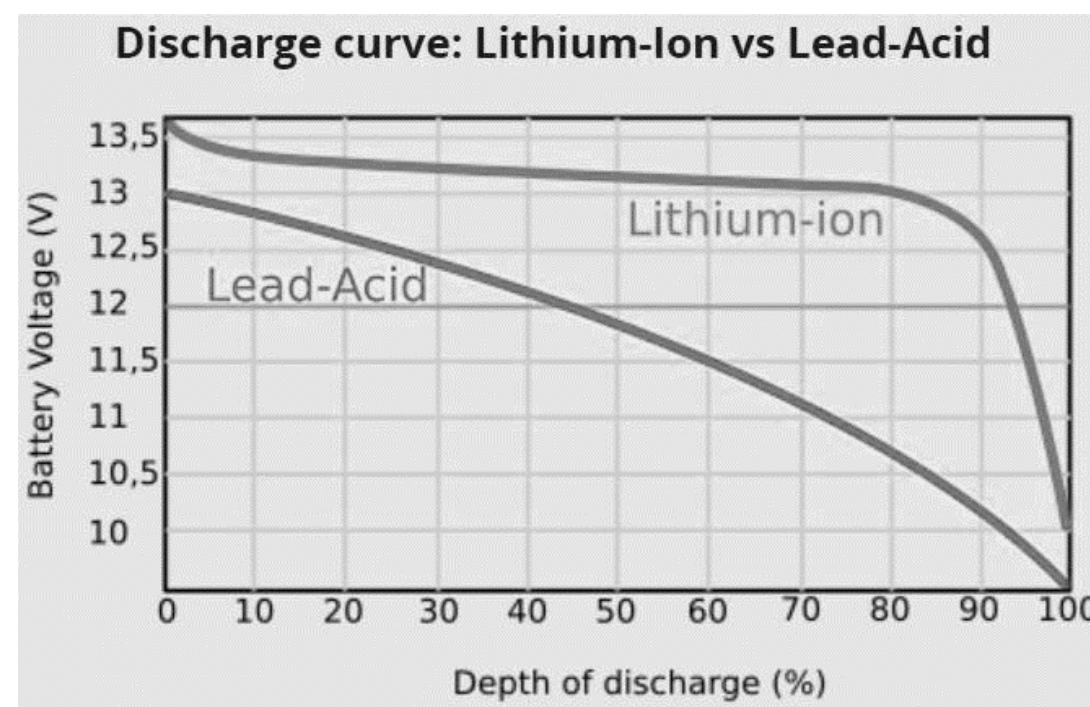
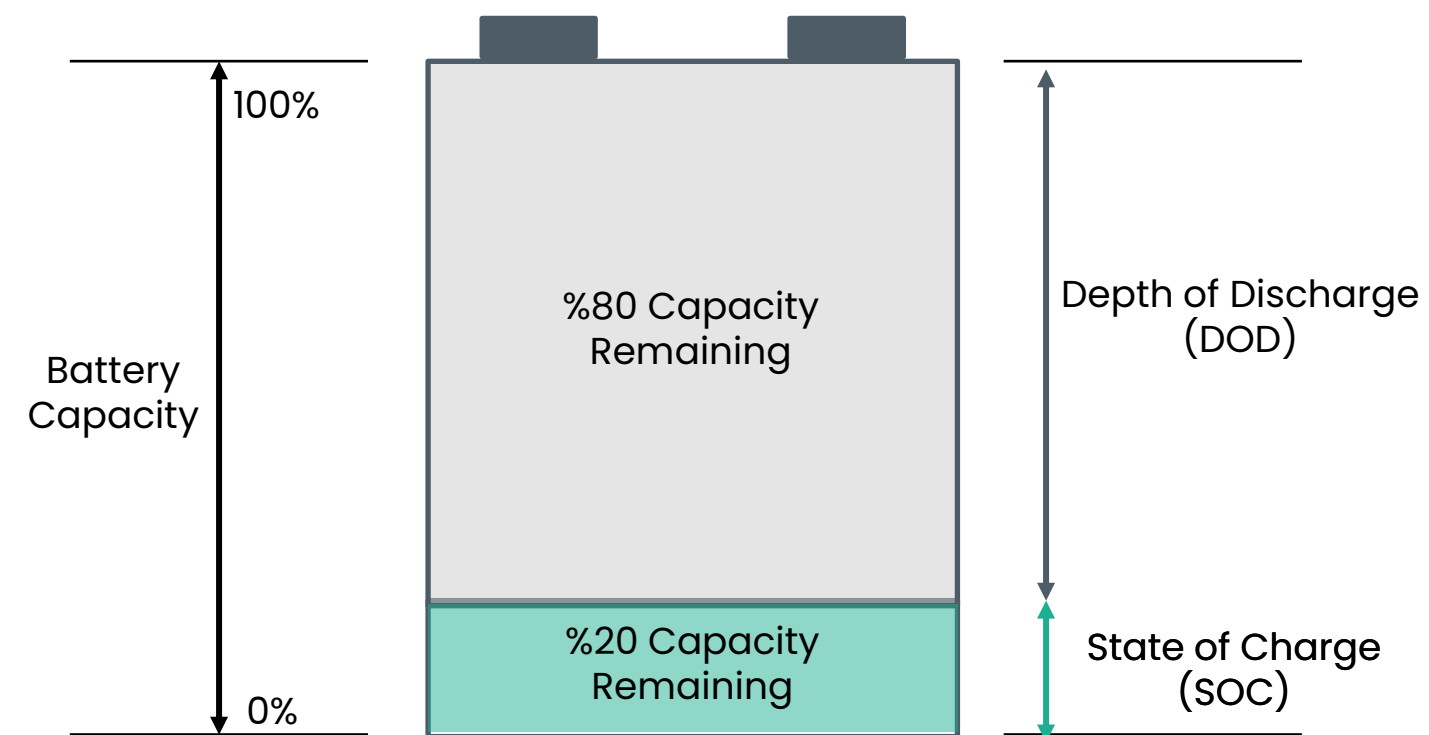
Lithium Batteries

LCO (Lithium Cobalt Oxide)	LFP (Lithium Iron Phosphate)	NMC (Lithium Nickel Manganese Cobalt)
Moderate Safety	✓ Excellent Safety	Moderate Safety
Moderate Cycle life	✓ Excellent Cycle life	Excellent Cycle life
Good Power	✓ Excellent Power	Good Power
Good Cost	✓ Good Cost	Good Cost
Excellent Energy	✓ Moderate Energy	Excellent Energy



Cylindrical cell	Prismatic cell	Pouch cell
		

Key Parameters of Battery



Parameters

1. **DOD:** Depth of Discharge (%80)
2. **SOC:** State of Charge (%15-%95)
3. **SOH:** State of Health (Coloumb Counting)
4. **Life Cycle:** Loss of %10 BoL Capacity
5. **C Rate:** Speed of Charge/Discharge

Project Requirements

1. Operating Temperature
2. Life Time
3. Charge/Discharge Cycle

REAP-BMS | In-house Developed Unique and Flexible BMS

Flexibility

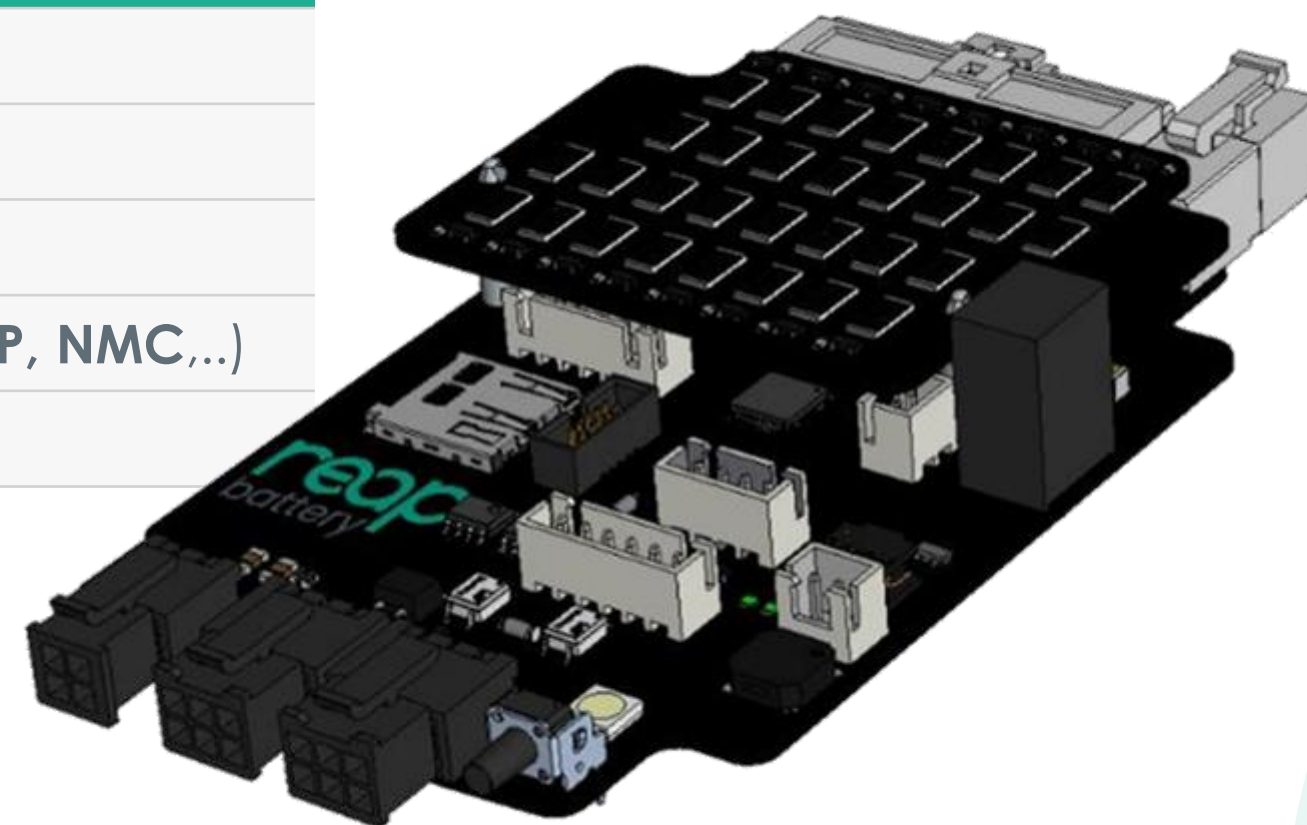
12 VDC to **1500 VDC**

16 cells control in series (Slave BMS)

512 cells in series (Master BMS)

All battery parameters easily configured (**LFP, NMC,..**)

Battery model for **intelligent rate control**



Safety

Detection of error modes and warning conditions

Noise and vibration robust

-40° to +85°C operational range

Functionality

Cell voltages 0-5V, **±1mV accuracy**

Highly **accurate SOC and SOH estimation (<1%)**

Isolation resistance calculation

Active balancing operation with a balancing current of **1000mA/cell**

Cell and pack resistance estimation

Thermal management

Advanced charger/discharger control

Data logging

CANbus, RS485 and Direct-WiFi(optional) communication interfaces.

3 contactor control outputs up-to 5A

REAP-EMS | Beyond the Limits of Energy Storage

Reap-BESS energy control system consists of an Energy Management System (**Reap-EMS**) software, Master Reap-BMS boards, and Slave Reap-BMS boards and an Isolation Detection Unit board (IDU). Reap-EMS manages up-to 32 Master Reap-BMS.

Reap-EMS is a **real-time energy intelligent platform** that provides performance monitoring and management solutions for renewables. Reap-EMS is **fully compatible with regulations in Türkiye**, communicates with power grid and renewable energy plants and with other Reap-ESSs, and reports the operation.

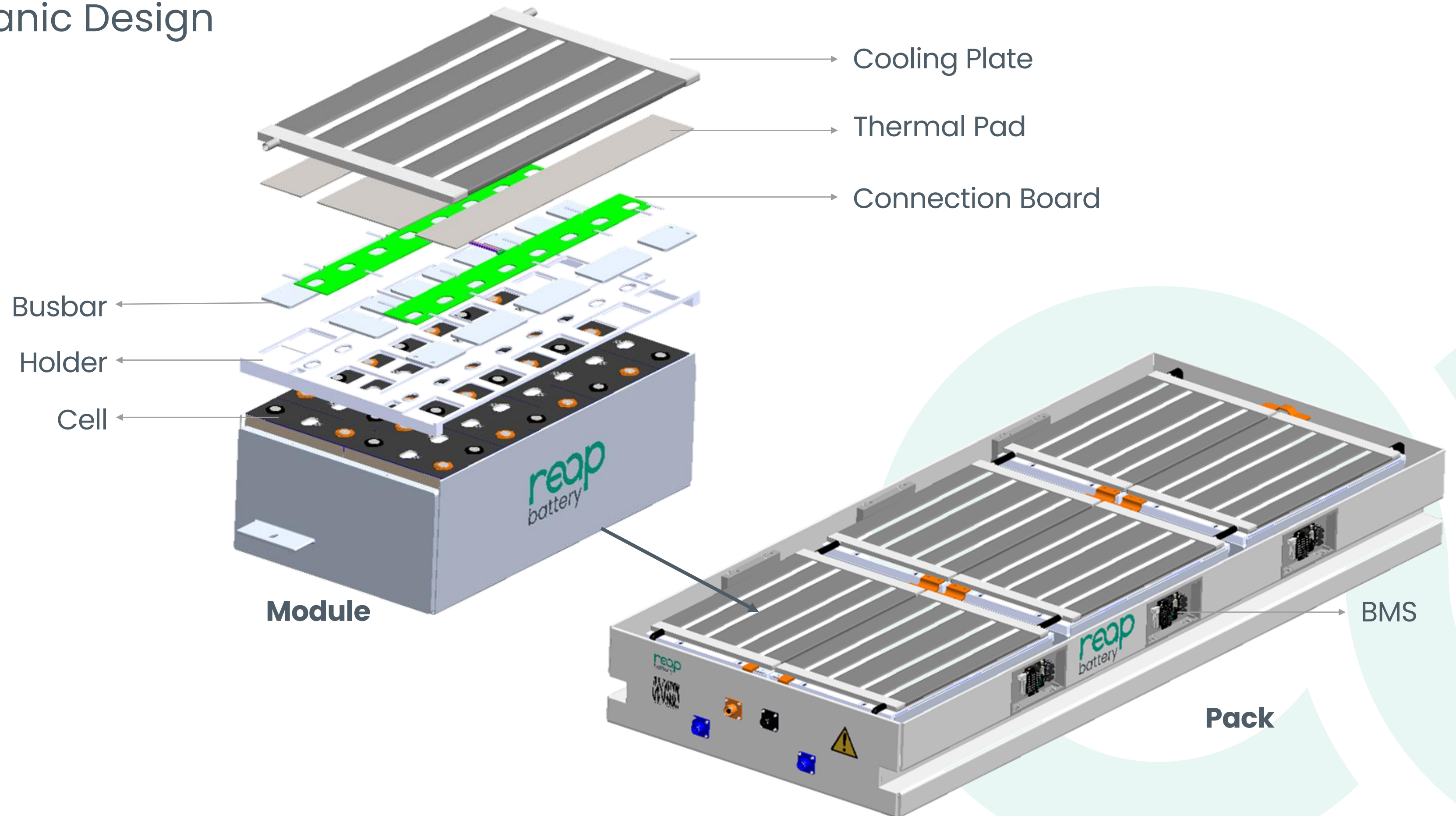
Reap-EMS monitors and controls all the **batteries, power control / thermal /cybersecurity /fire systems** in the Reap-BESS.

Reap-EMS software provides a suite of system configuration tools as well as displays for monitoring battery and BMS performance. It allows you to set battery parameters such as limit voltages and temperatures, allowable charge and discharge rates or improve SoC estimation with your own battery model.

IDU board **measures the isolation resistance and voltage at the pack level.**

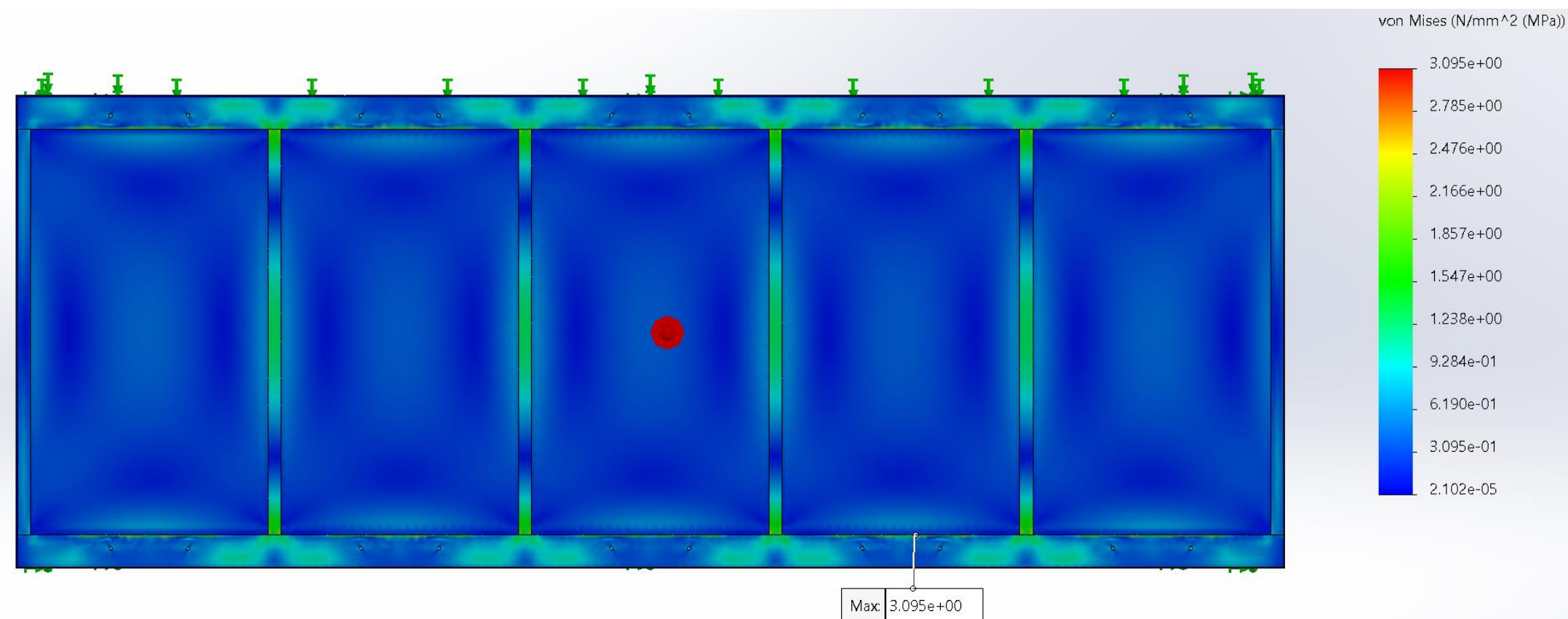
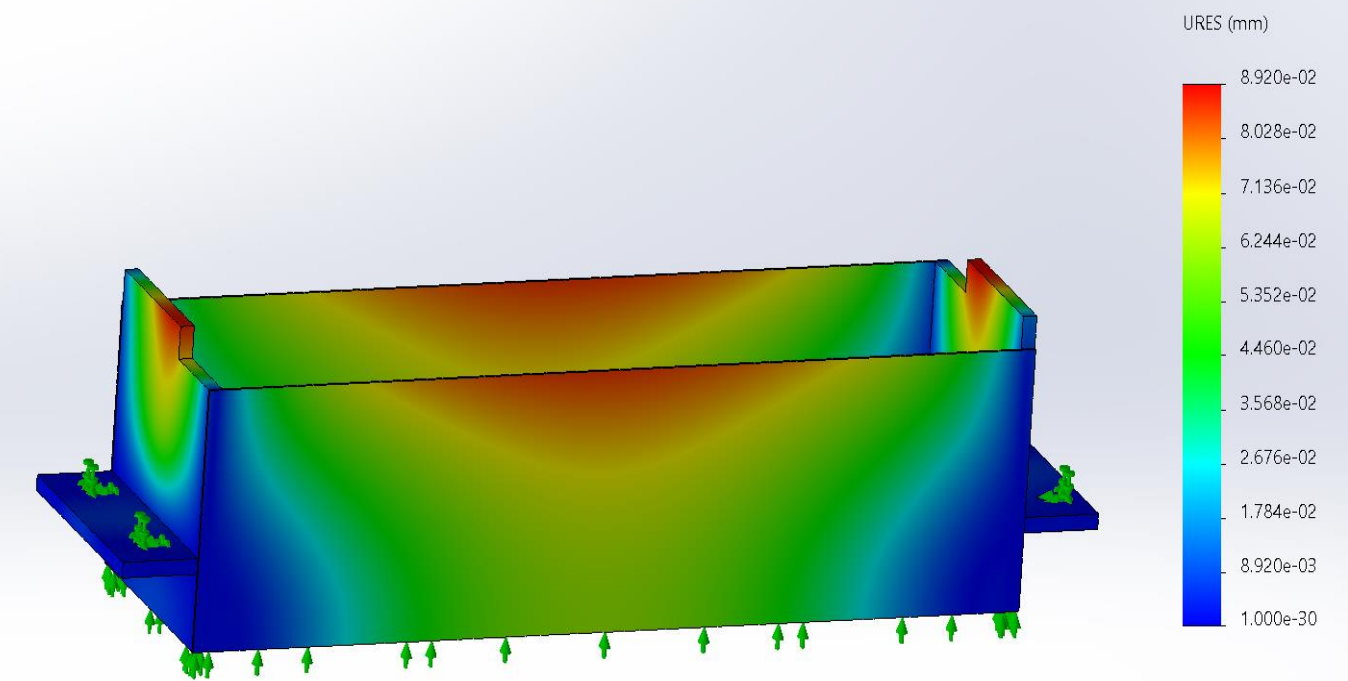
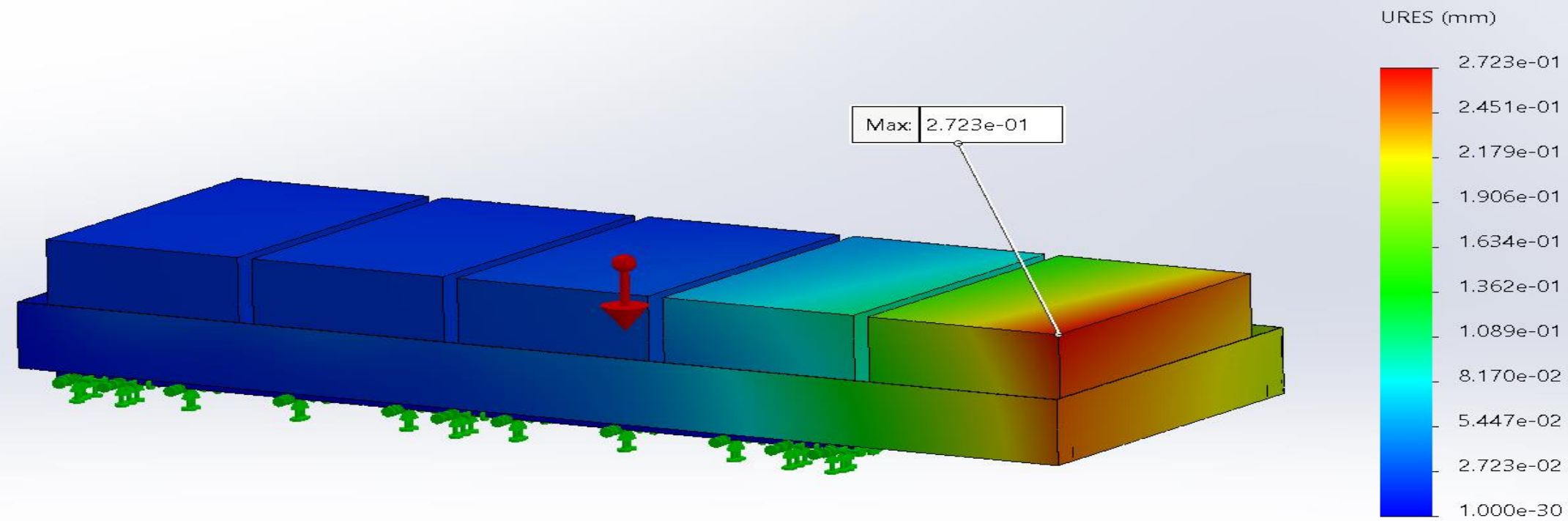
Technology

Mechanic Design



Technology

Structural Analysis

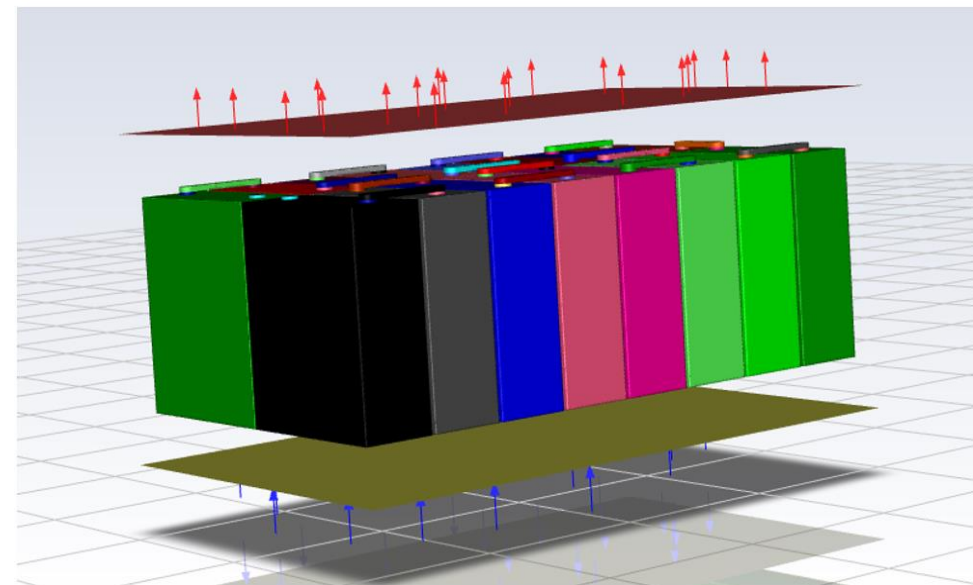
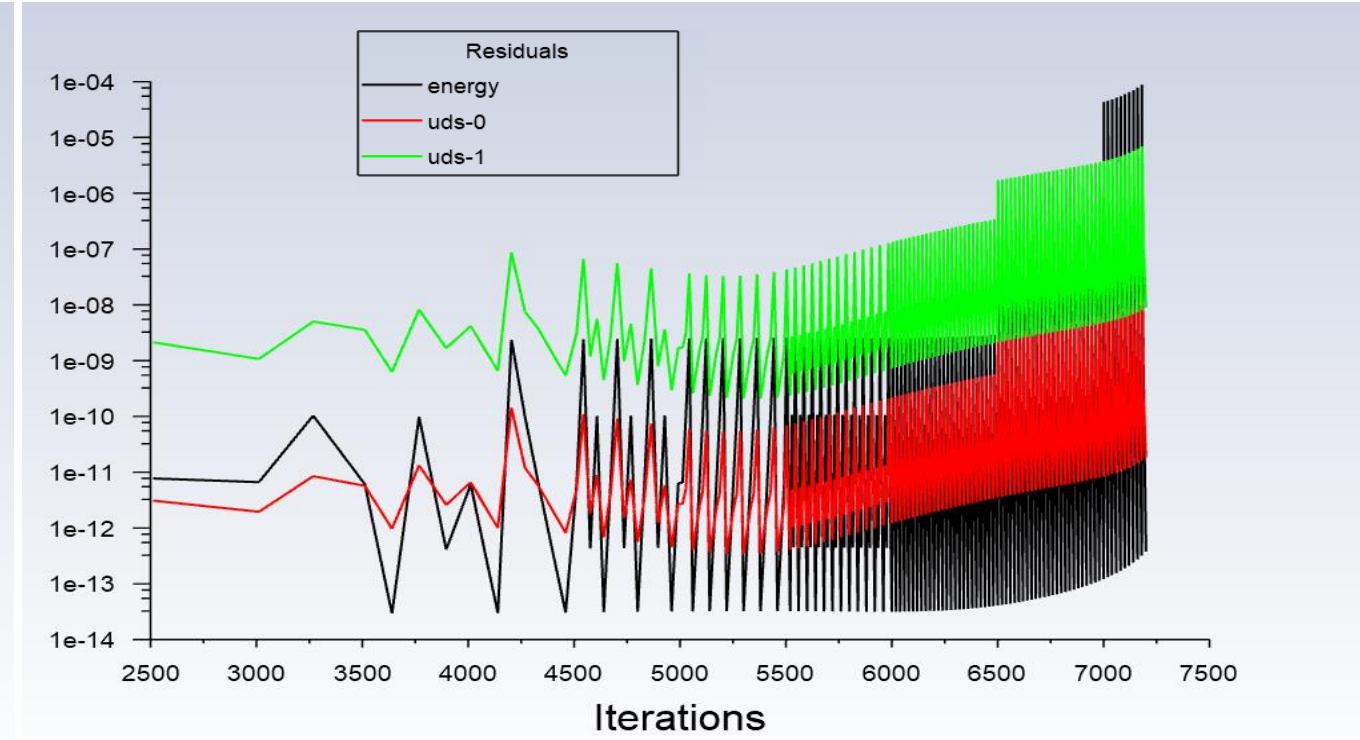
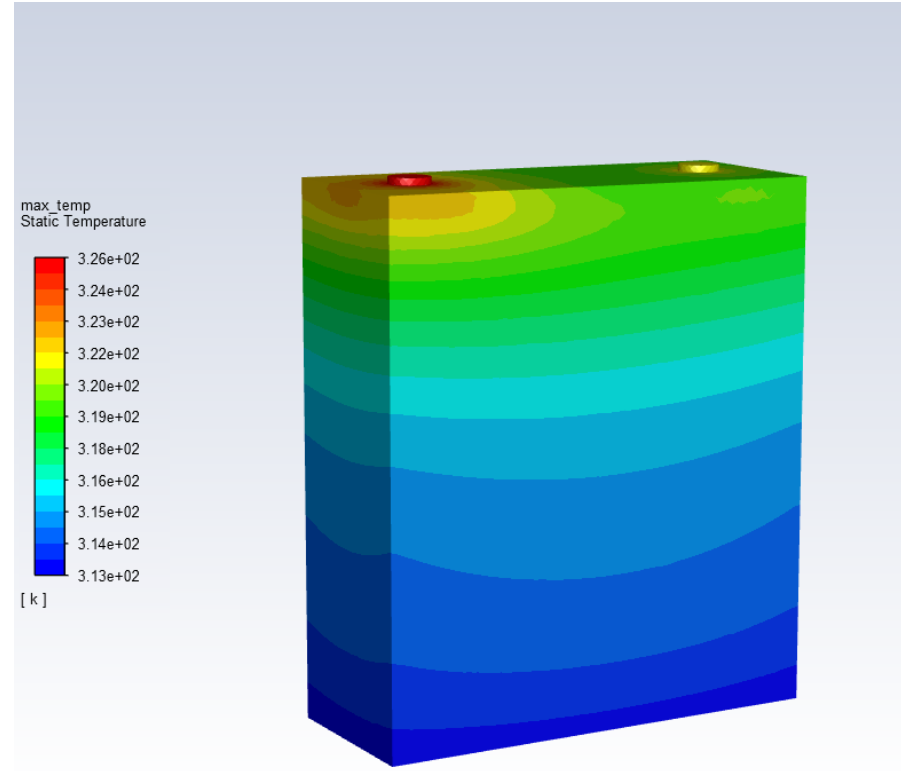


Computational Analysis

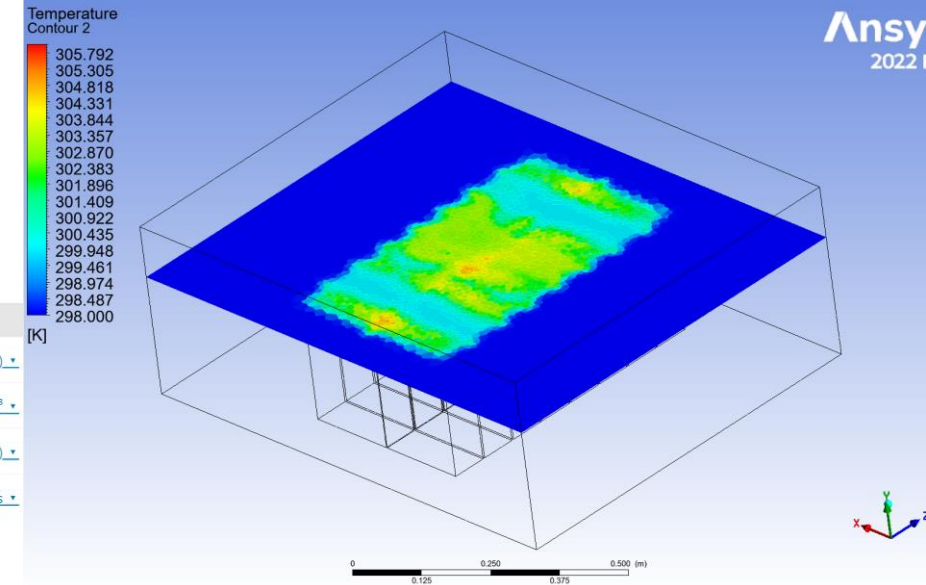
Long Term Durability

Enhanced Reliability

Lowest Costs



Hücreler arası mesafe	
mm	mm
4	75.65
busbar mesafeleri	
mm	mm
4	75.65
Hız (m/s)	0.5
Diameter (m)	0.48022
Intensity	0.047774032
Fluid parameters	
Substance	Air (25 °C)
Fluid density	1.184 kg/m³
Dynamic viscosity	0.0000186 kg/(m.s)
Kinematic viscosity	0.00001571 m²/s



Operating Temperature

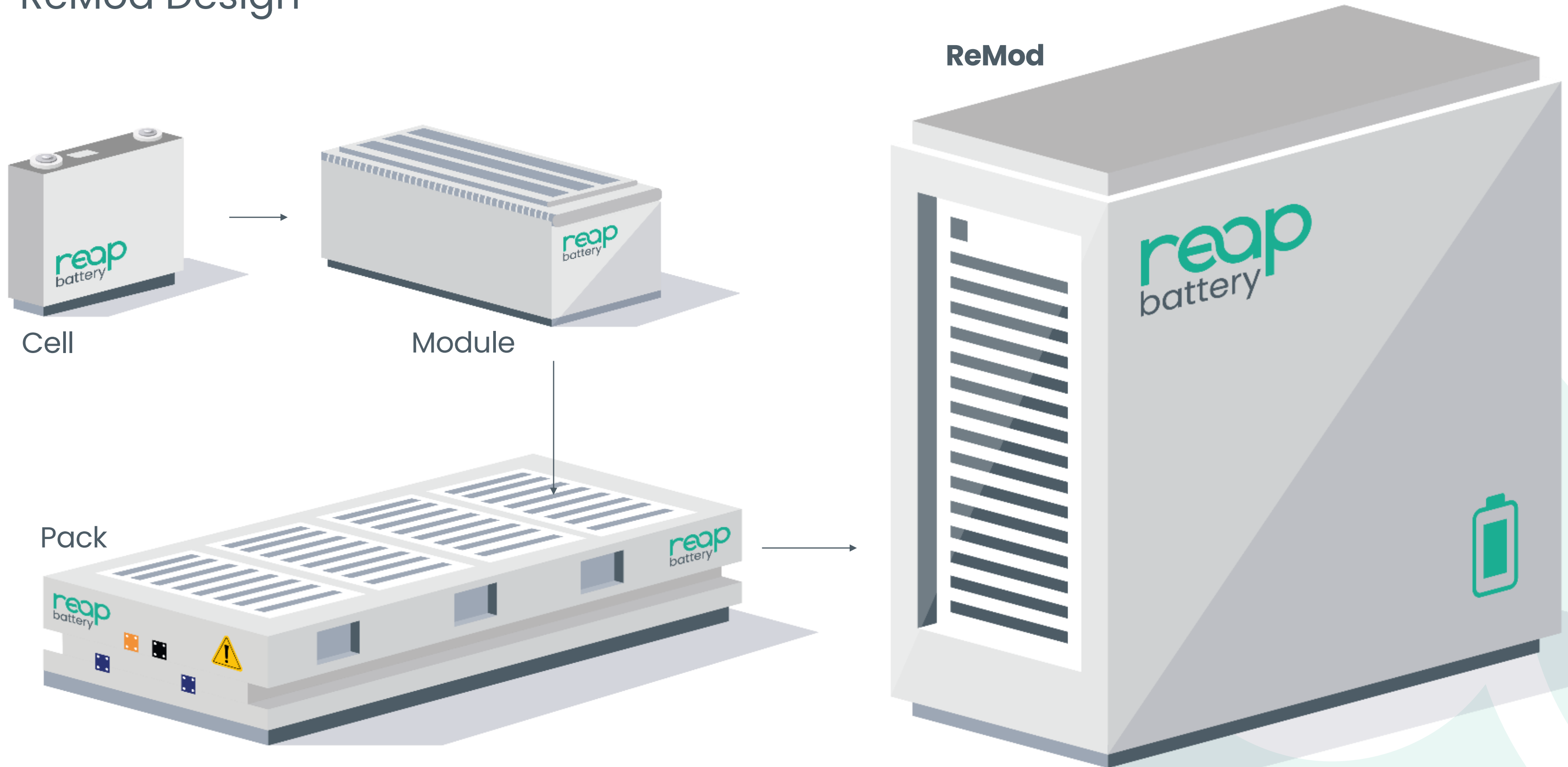
Specific design are made to guarantee ESS to work $-5^{\circ}\text{C} \sim +80^{\circ}\text{C}$ ambient temperature.

Cooling System

Liquid cooling or air cooling system options are available.

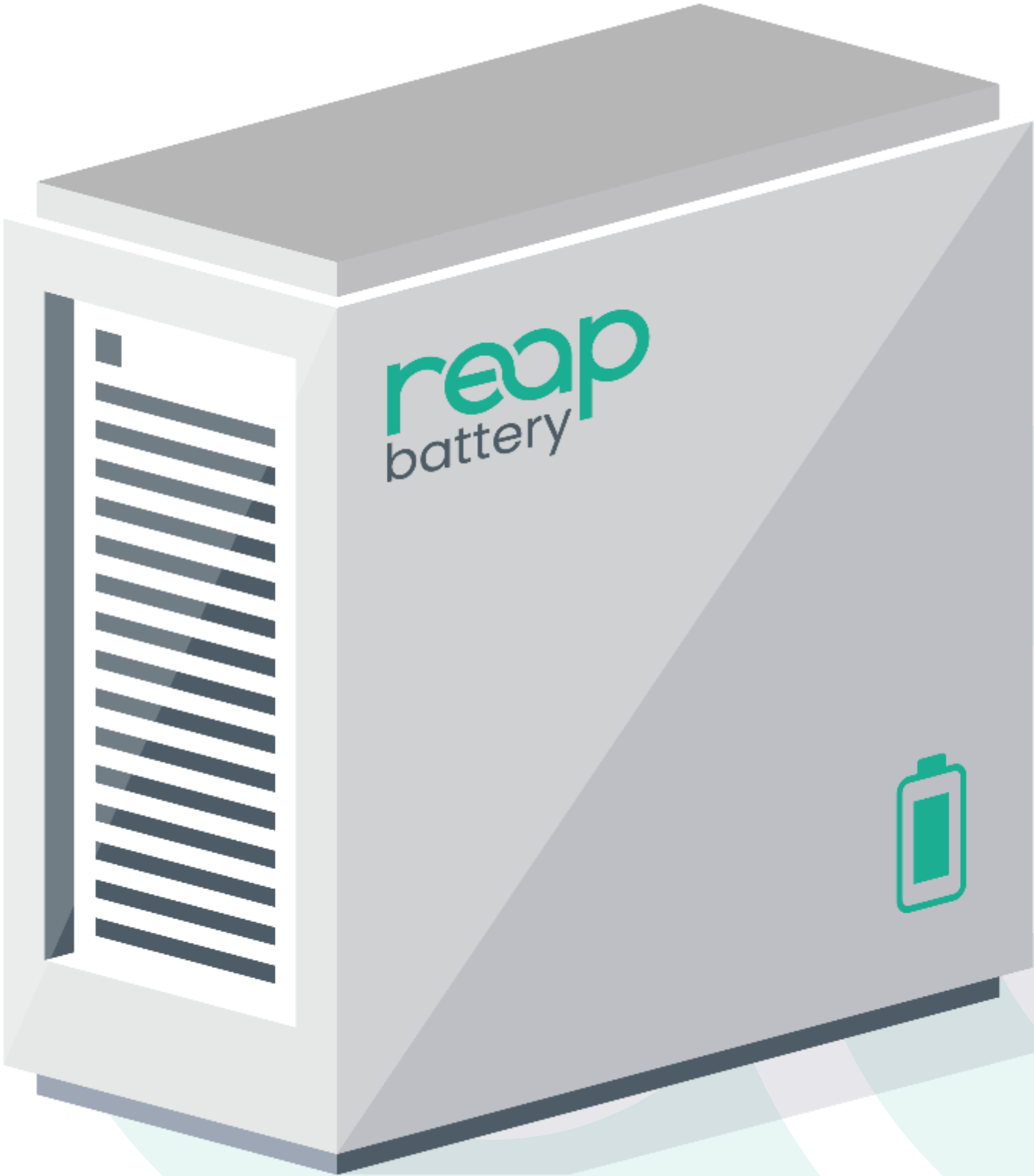
Max 3°C difference between cells.

ReMod Design

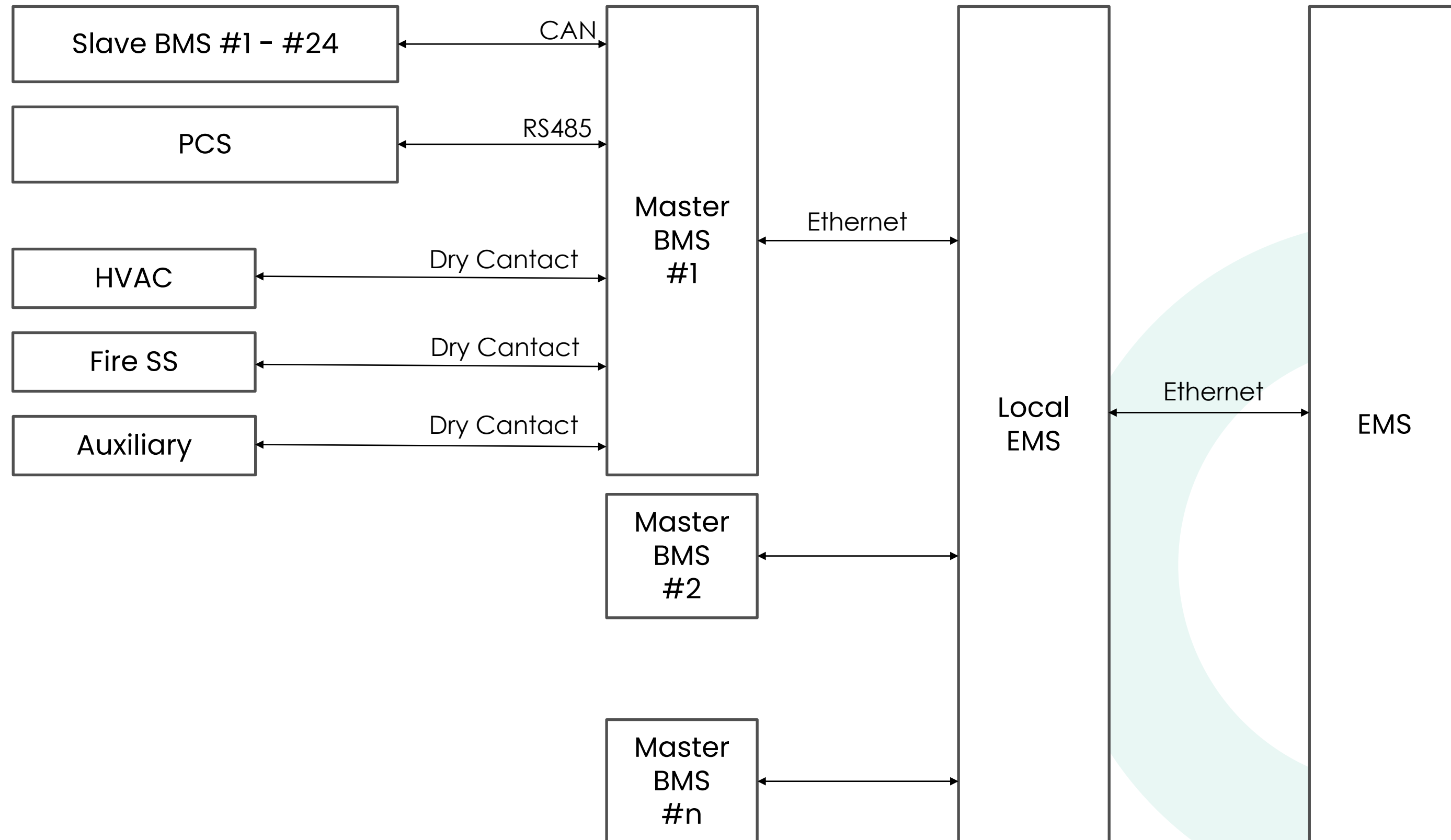


ReMod Specifications

ReMod	
Capacity	688 kWh
Nominal Voltage	1229 Vdc
Operating Voltage Range	1075-1400 Vdc
Max. Charge / Discharge Current	560 A
Nominal C Rate	0.5C / 0.5C (@25°C)
Max Continuous Rate	1C / 1C
Cell	LFP Prismatic
Cell Balancing	1000mA/cell active balance with REAP-BMS
Life (1.8cycle/day, @80% DOD, @25°C)	>80% BOL Capacity @ 10 th Years >70% BOL Capacity @ 15 th Years
Operating Ambient Temperature	-20..+55 °C
Cooling System	Liquid Cooling
Self Consumption (Standby/Operating)	1.5kW / 25kW (0.5C / 0.5C @25°C)
Communication	CAN, RS485
Dimension	W1500 x D2450 x H2590 mm
Weight	7.000 kg
Altitude	< 2000m
Certificates	CE, UN 38.3, IEC 62619, UL9540, UL 1973
Warranty	3 Years Product / 10 Years Performance Warranty
Recycling	Managing with REAP Battery Passport



Control & Communication System



Production and Quality Certificates



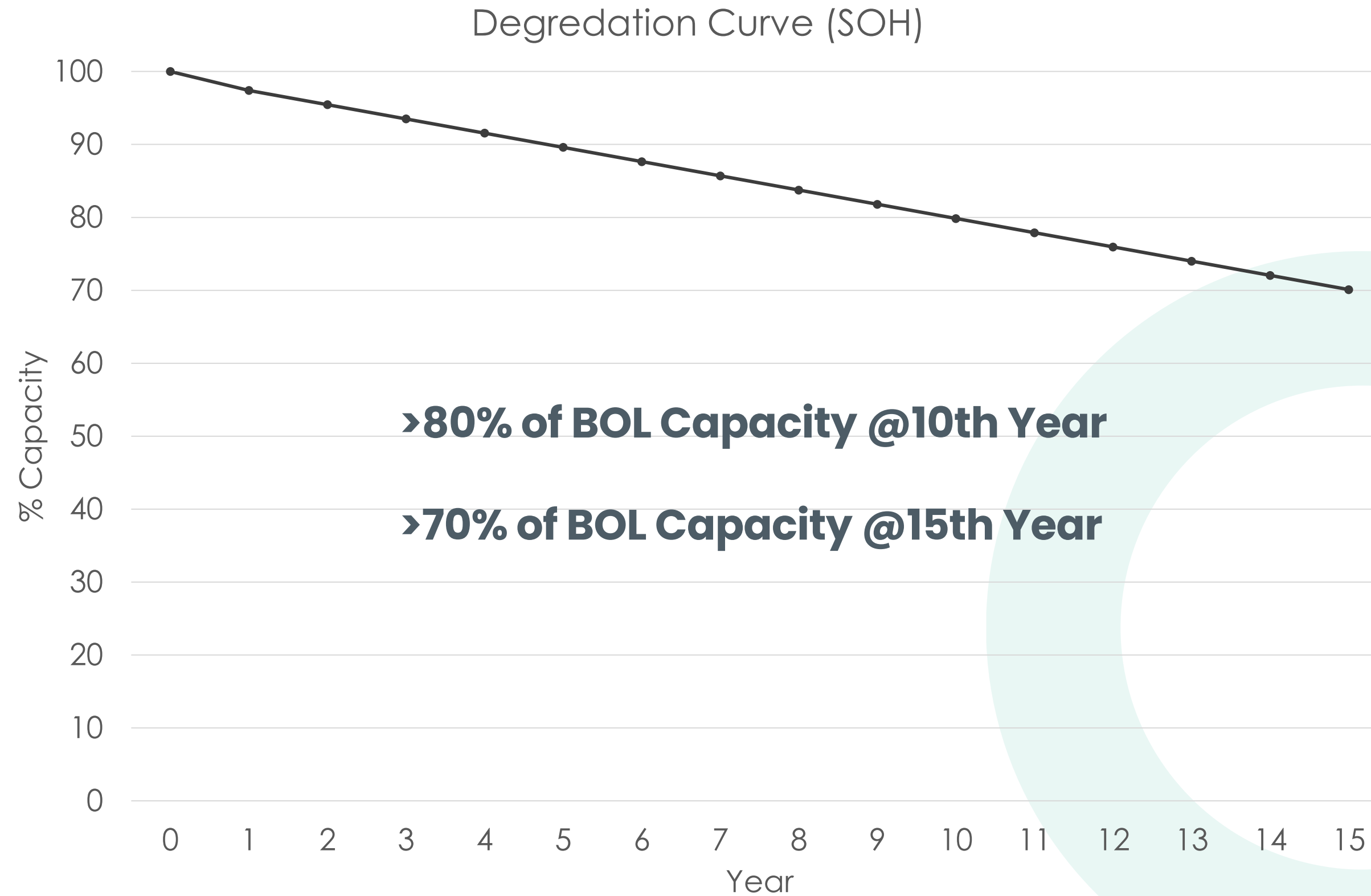
Standards	Description
UN 38.3	Transport- Req. for the safe transport of lithium bat.
IEC 62619	Safety Req. for secondary cells and bat., bat sys. test.
IEC 61326	Electrical equipment for measurement, control and laboratory use
UL 9540	Safety Standard: Thermal Runaway Fire Propagation within BESS
UL 1973	Safety: Stationary Batteries
UL 1741	Inverter – PCS Standarts-Dist.Energy Sys
CE, DIN EN ISO 9001 / 14001 / 45000 / 27001, DIN EN SA 8000 SO1	





Degradation Curve

Sample Curve for 1.8 cycle/day



Self Consumption

<5%

Periodic Control

- Fan
- Filters
- Monthly Reporting for Preventive Maintenance
- PCS
- Electrical Panel
- Visual Inspection

Warranty Term

Period 10 Years

Available Capacity: BOL(Beginning of Life) or EOL (End of Life)

Capacity Expansion

Arbitrage Day Ahead Market

- Electricity is being purchased low-price time of the day and sold at peak hours
- Buy on price of between 00:00–04:00 and sell on 05:00–08:00
- 22% gross profit margin (calculated average in last 3 years)

Arbitrage Intra-Day Market

- Storing the electricity of installed capacity over licence during day time and selling between 18:00–24:00
- Feed-in tarif price of stored electricity is 20% higher than solar production.

Auxiliary Grid Services

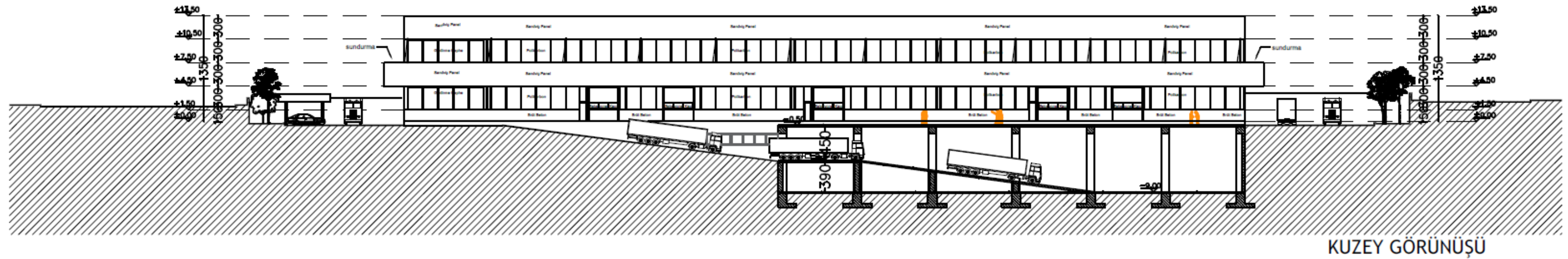
- Selling in balancing market
- 3, 4, 5-hour proposal may be given in Secondary Frequency Control market

Mechanical Power

- Unusable energy regarding the power difference between installed mechanical power and licence capacity could be stored and sell another time to grid.
- Expected revenue increase is 2,2% (calculated average in last 3 years)

Current Status

Team	REAP Battery team has extensive experience in the field of research and product development, commercialization, and production of energy storage systems, battery management systems, power drive system and battery packs for electric vehicles.
Technology	Reap-BMS is a flexible and highly accurate Battery Management System for automotive, industrial and stationary battery packs, ranging from 12VDC up to 1500VDC . It manages any rechargeable lithium batteries chemistry . This feature maximizes battery sourcing freedom.
Corporate	YEO Technology is a listed company in Turkish Stock Exchange Market. Market CAP \$ 1 Billion (Highest of 6 Months). All the historical data, financials, projections and strategy plans are publicly announced and accesible.
Network	YEO Technology is a trusted EPC company preferred by giant energy and industry companies and TSOs like Enerjisa, Tupras, Isken, Azerenergy and TEIAS.
Investment	YEO Technology has applied for electricity licence for investing solar&wind power plant including BESS totally 530MW . For validation and creating references in the field, YEO Technology would be one of the first customer of REAP Battery.
Grant	REAP Battery has already granted with investment incentives by Ministry of Industry and Technology for establishing BESS manufacturing including building facility, procurement of machinery, installation and commissioning.



Factory layout is planned in

4 Sections: A (2000m²), B (1000m²), C (2000m²), D (1000m²)

3 Floors: 20.000m² (8m Height with mezzanine)

Rooftop and Carport Solar PV, Energy Storage System(ESS), EV Charging Station

Electrical Panel Manufacturing and REAP Battery will be located in the plant.

"Confidential information. It cannot be shared without YEO's permission."



Phase 1

2022 – 2024

Modular ESS
Production Facility

Phase 2

2025 – 2027

Lithium Battery
Cell Production

Phase 3

2026 – 2028

Battery Cell Second Life
and Recycling Facility

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#ItsPossible