

# STERCOM

*Feel the Power!*



**Company Presentation 2024**

[www.stercom.de](http://www.stercom.de)



## About us

*"We founded Stercom with the vision of making our contribution to a livable future through new ideas and innovations."*

- Founded in 2014 by a group of experts in power electronics and energy storage to set new standards in sustainability, efficiency and safety
- Currently 58 employees with a focus on research and development and systems engineering
- Internal production and external production partners nearby
- Innovation partner network for holistic and interdisciplinary solutions in the fields of mechatronics, software and security
- We find the optimal solution in a challenging and fast-moving market environment





## Key Competences and Services

- High Power Energy Storage Systems
- Innovative Battery- and Cell-Management Technologies
- Power Electronics
- High Performance Controller Electronics
- Low- and High Level Software Engineering
- Functional Safety Engineering
- Mechatronic Integration
- Quality Management and ISO 9001 Certification



- HV system engineering
- Simulation and modelling
  - +electrical
  - +mechanical
  - +magnetic
  - +thermal
- Mechatronic Integrated Design
- Life Cycle Simulation
- EMI/EMC Laboratory
- Grid Simulation Laboratory
- Climatic chamber
- Functional Safety Design
- Qualification to various Standards: CE, ECE, ICE, UL, Mil, Transportation

# Stercom's Success Story

2014

## Stercom's Start

- Founded in 2014

2015

## Ultra Cap Power Storage

- Power Storage Buffer for roller coasters
- UltraCap High Power Module
- Patents for BMS and hybrid storage systems
- Start of the partnership with Tesvolt

2016

## Innovation in BMS

- Martin Kutschker joins the team
- New focus on power electronics
- Test Systems for Inductive Charging (ICI)
- Series production of the "Active Battery Management System (aBMS)" with Tesvolt

2018

## E-mobility

- E-mobility becomes a strategic priority
- Start of development of the Mobile BMS and Onboard Chargers product line

2021

## Innovation in BMS und E-Mobility

- Start of serial production OBC, significant market shares, strong growth
- Innovation leader for battery management and cell monitoring
- Tesvolt AG becomes Stercom shareholder
- Functional safety as a key innovation criterion

2022

## Investitionen in Effizienz

- Strong growth phase in all areas
- Significant investment in innovation and efficiency
- Stercom Academy to support young professionals

2023

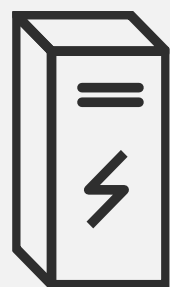
## Serial Production and Next Generation

- Further expansion of the market position
- Split into three independent business units
- Start engineering of the "next generation" for our main products
- Significant further investments in innovation and efficiency
- 55 employees at the end of the year

# Three Business Units



## Energy Storage Systems



- Battery- or supercap-based high-performance storage for niche applications
- Charging technologies
- Customized systems



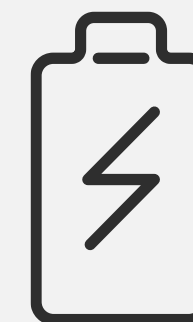
## E-Mobility



- AC/DC On-Board Chargers
- OnBoard Charging Management
- Inductive charging
- BMS for Mobile Applications
- Maritime special products



## Battery Management

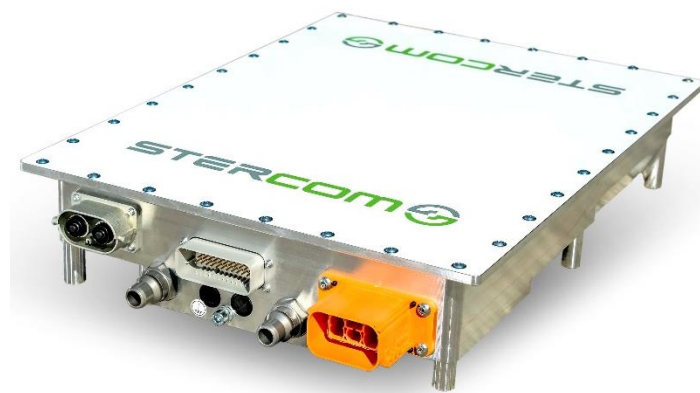


- Cell & Battery Management
- Energy Management
- Industrial & Commercial Energy Storage Systems



## Examples of our products

OBC\_22kW 450V/850V



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Ultra compact 22 kW OnBoard  
Charger for 450V bis 850V  
HV BEVs

SPB 30kW



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Bidirectional DC/DC converter for  
active connection of storage  
components to the DC bus

PowerSlide Racks



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PowerSlide UltraCap Rack  
Variable storage system for very  
high power boosting

Battery Management



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Cell and string management for  
mobile and stationary LiION  
batteries



# The Stercom Team

CREATIVITY, MOTIVATION AND COMPETENCE

## 01. Expertise

Focus on outstanding technical expertise



## 02. Growth

Continuous but "organic" growth of the Stercom team



## 03. Focus

Focus on experts in engineering, sales, customer support and marketing



## 04. Production

Production mainly with external dedicated production partners. Make or Buy decision would have a significant impact on the team

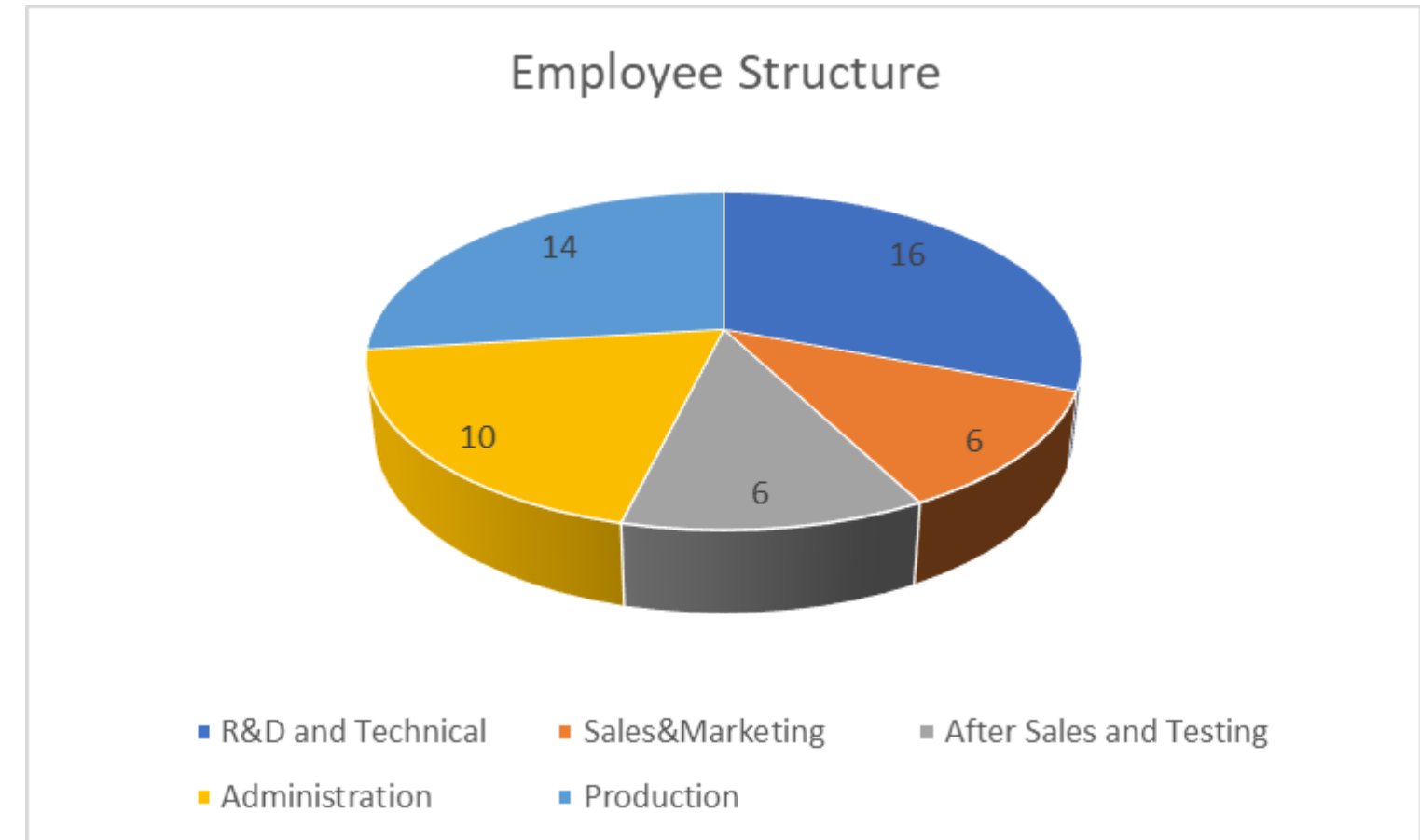
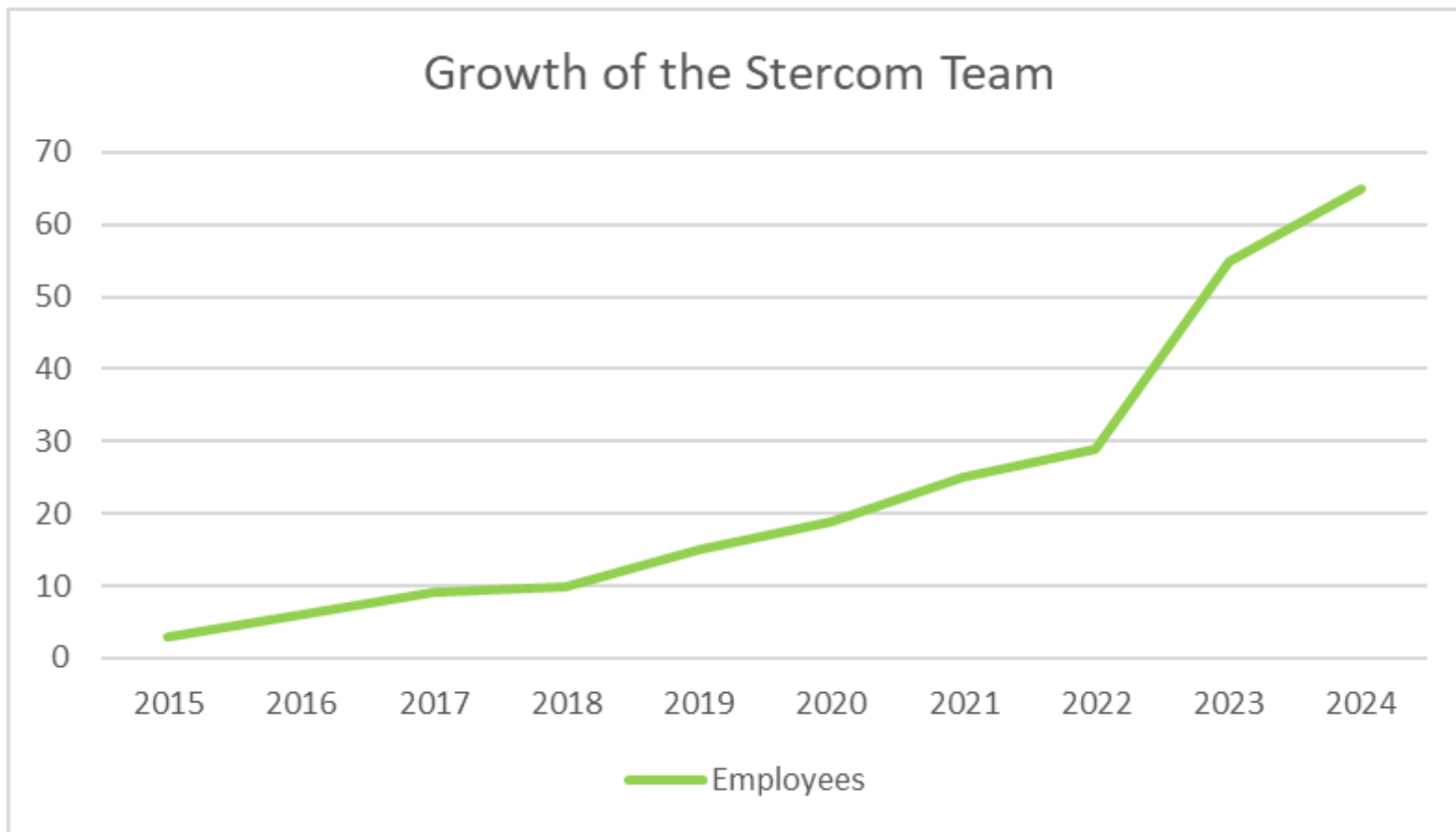
## 05. Innovation

Innovative software and outstanding power electronics secure the future of Stercom

**06. Safety** Functional safety requires additional human resources



# Growth of the engineering and sales area



Growth forecast assumes continuation with external production partners  
Growth would be significantly higher if the focus was on in-house production of electrical appliances

In the medium term, stronger separation and assignment of employees to the three business units





## Business Unit **E-Mobility**



Stercom supplies high-performance on-vehicle chargers (OBCs) as well as charging infrastructure components for commercial vehicles and off-highway vehicles. We set standards in terms of technology and efficiency. We understand batteries and e-mobility.



**Market growth CAGR > 50%**



## OnBoard Charger 22kW

- Ultra-compact 22 kW on-board charger
  - 450V/70A
  - 800V/40A
- Compatible with all types of standard AC wallboxes
- Optimized charging process for all types of battery technologies
- Very high efficiency (>98%)
- Liquid cooling with wide water ingress temperature range
- Remote maintenance via Stercom Diagnostic Studio



### Optional:

- PowerLine communication for DC charging mode
- Integrated Stercom battery and cell management
- External energy and grid management





# OnBoard Charger V2X

Onboard Charger for bidirectional charging

## THE ALL-IN-ONE SOLUTION

*"The OBC V2X offers a complete solution that integrates seamlessly with global charging standards and various network topologies. The use of state-of-the-art technology and exceptional efficiency makes it an ideal solution for a wide range of applications."*



## HIGHLIGHTS

### HV battery charger in two voltage ranges:

OBC\_V2X\_500 (200-500V / 80A)

OBC\_V2X\_1000 (500-1000V / 40A)

### Support for all network topologies

Supports almost all network topologies worldwide, also powered by generators or range extenders

### Scaleable

Power expansion through parallel connection up to 88kW in most operating modes (V2G, V1G)

### Adaptive Charging

Adaptive charging for all types of HV batteries, wired vehicle operation (optional without battery)

### Efficiency

Outstanding efficiency up to 96%

### Functional Safety

Certified functional safety according to ISO-26262 and DIN 61508

### EVCC

Integrated CCS charging control via EPLC (Embedded Power Line Communication). Compatibility with DIN SPEC 70121, ISO15118-20, OCCP, EN61851

### V2X Charging

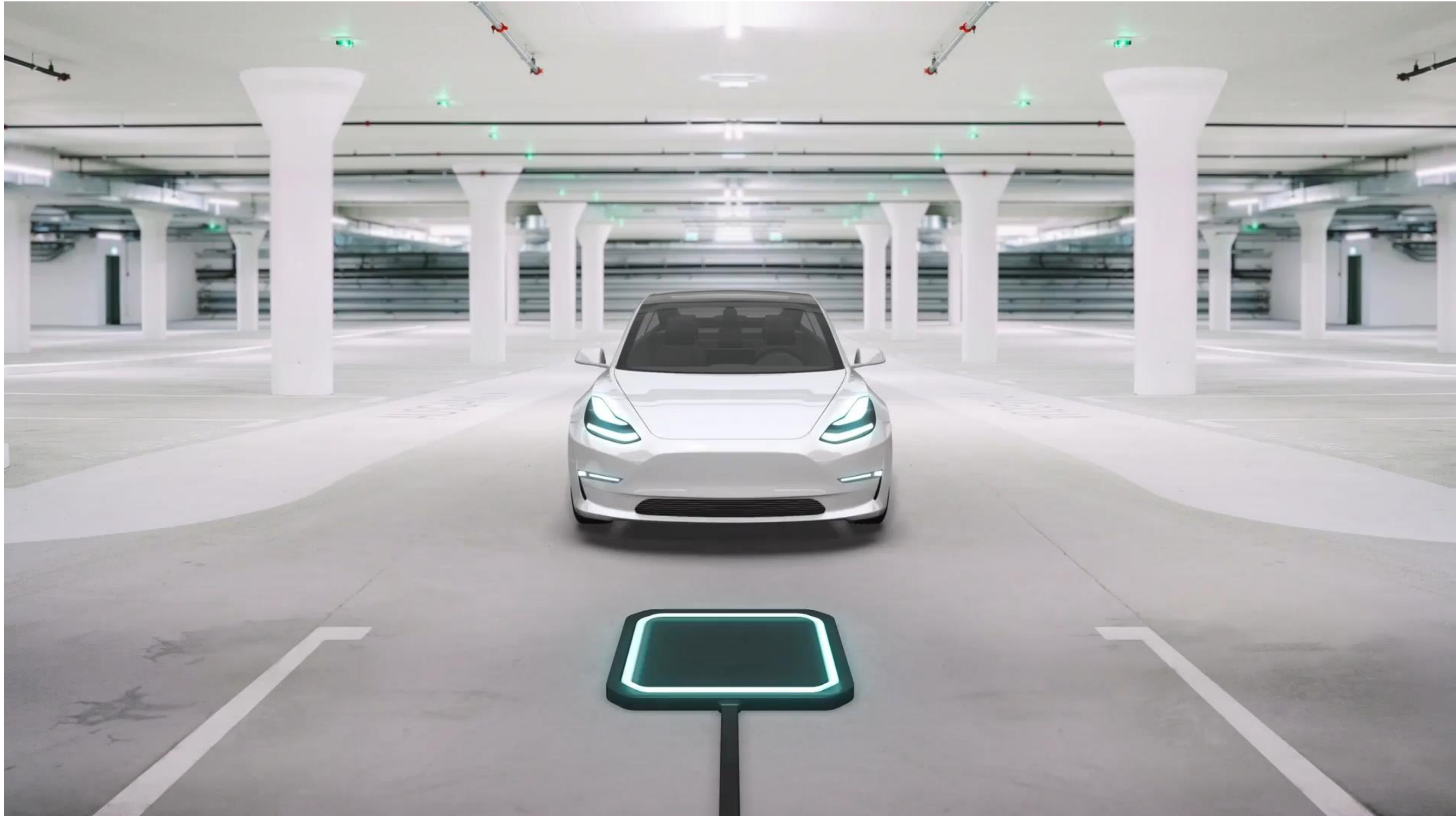
V2X-Charging Forward-Charge-Mode (V1G) for charging the vehicle battery from any network topology.

Reverse Charge Mode (V2X) for feeding the vehicle battery energy back into various AC load cases (V2L, V2B, V2G, V2V)





# ICI Wireless Power Transfer



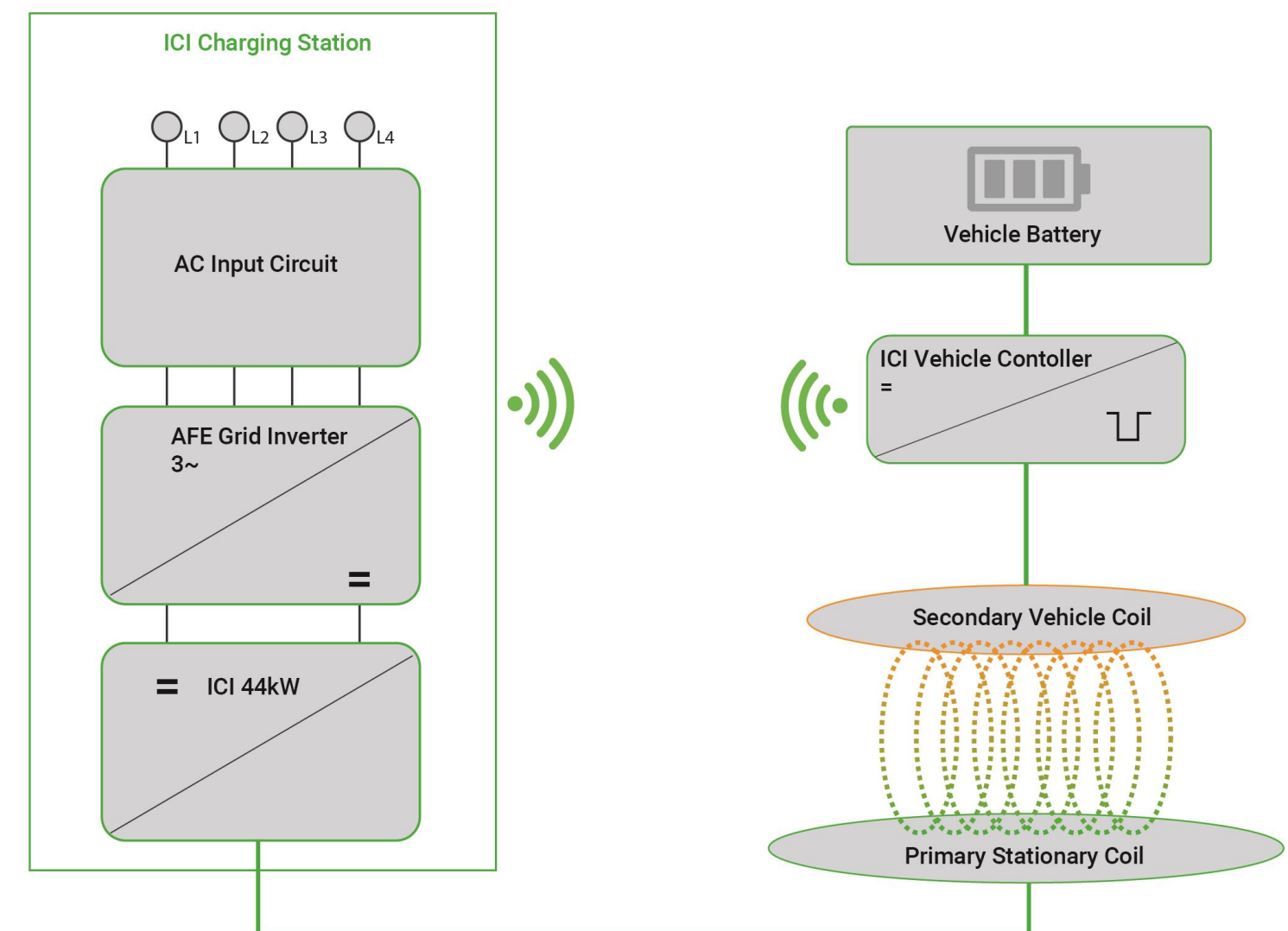
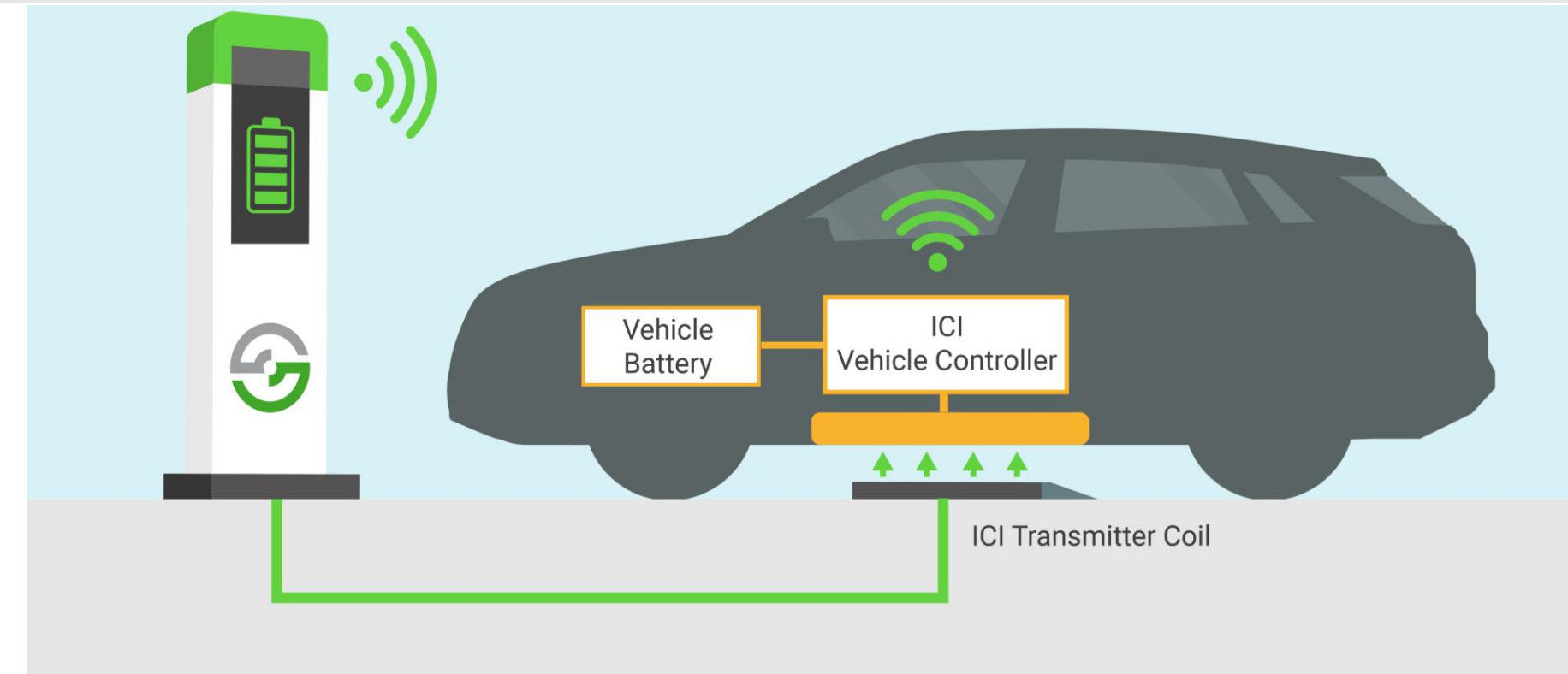
## ICI Wireless Power Transfer

### TV 19“Wireless Power Transfer

- Inductive Charge Inverter ICI with AC or DC Input and high frequency output to the primary coil
- Air gap (distance) between primary and secondary coil and proper positioning determines efficiency of the Wireless Power transfer. 200mm air gap tested.
- Vehicle side secondary (receiver-)coil and Vehicle-ICI Box for rectification and battery charging with (cccv charging mode)

### Safety and Control

- Fast and safe communication between ICI Charging Station and vehicle
- Foreign Object Detection
- Positioning Monitoring and Control
- Fast Communication between ICI Charging Station and Energy Supplier





## Business Unit **Battery Management**



- Focus on Innovative Cell-and Battery Management
- Two Unique Selling Points:
  - “Any serial connection of Battery or UltraCap cells is only as good as its weakest cell.  
Stercom actively supports this “bottle neck”
- Safety and Efficiency are the keys for our success  
future key for reliability and safety

**Compound Annual Market Growth (CAGR) > 35% p.a.**





# Lilon Battery Storage Systems



## TV 19“ Battery Slide-in System

- Battery stacks in 19“ slide-in-system, up to 13 modules per string
- Battery clusters by parallel connection of many strings
- AutoConfig for automatic configuration of low volt or high volt systems
- Passive connection to charger via String Management Unit

## String-, Battery- and Cell-Management

- Qualified according to EN/IEC 61508 Sil 1
- Precise cell voltage and temperature monitoring
- Precise monitoring of state of charge (SoC) and state of health (SoH)
- Grouping of several strings for huge battery clusters
- Configuration of Battery Modules /system via „Stercom Diagnostic Studio“



# Mobile BMS

- Precise cell monitoring and management
- AutoConfig features to automatically detect number of modules/number of strings
- Integrated pre-charge function
- Independent max. balancing to protect the cell from over-charging
- Isolated temperature measurements on the board
- CANopen 2.0B /SAE J 1939 or ModBus TCP/ IP System Interface
- Remote Monitoring
- Very Low Self Consumption in Sleep Mode
- CCS DC Charging Capability via EPLC
- Prepared for DIN ISO 26262 Functional Safety Level ASiL B and DIN 61508 SIL2
- Next Generation Platform starting 2023



Technical Data	
Cells per board/module	5-12
Max. voltage (board)	55 V
Min. voltage (board)	5 V
Balancing Current	0,45 A
Isolation test voltage	4000 VAC
Max. QTY (boards) per string	32
Temperature Sensors	4 outboard NTC + 1 onboard NTC
Cell voltage	0 bis 5 V
Resolution of the cell voltage	0,1 mV
standby consumption	< 35 µA





## Business Unit **Energy Storage Systems**



*With our extensive modular system of UltraCap modules, cell management and charging technology, we can develop the right storage system for you in a short time!*

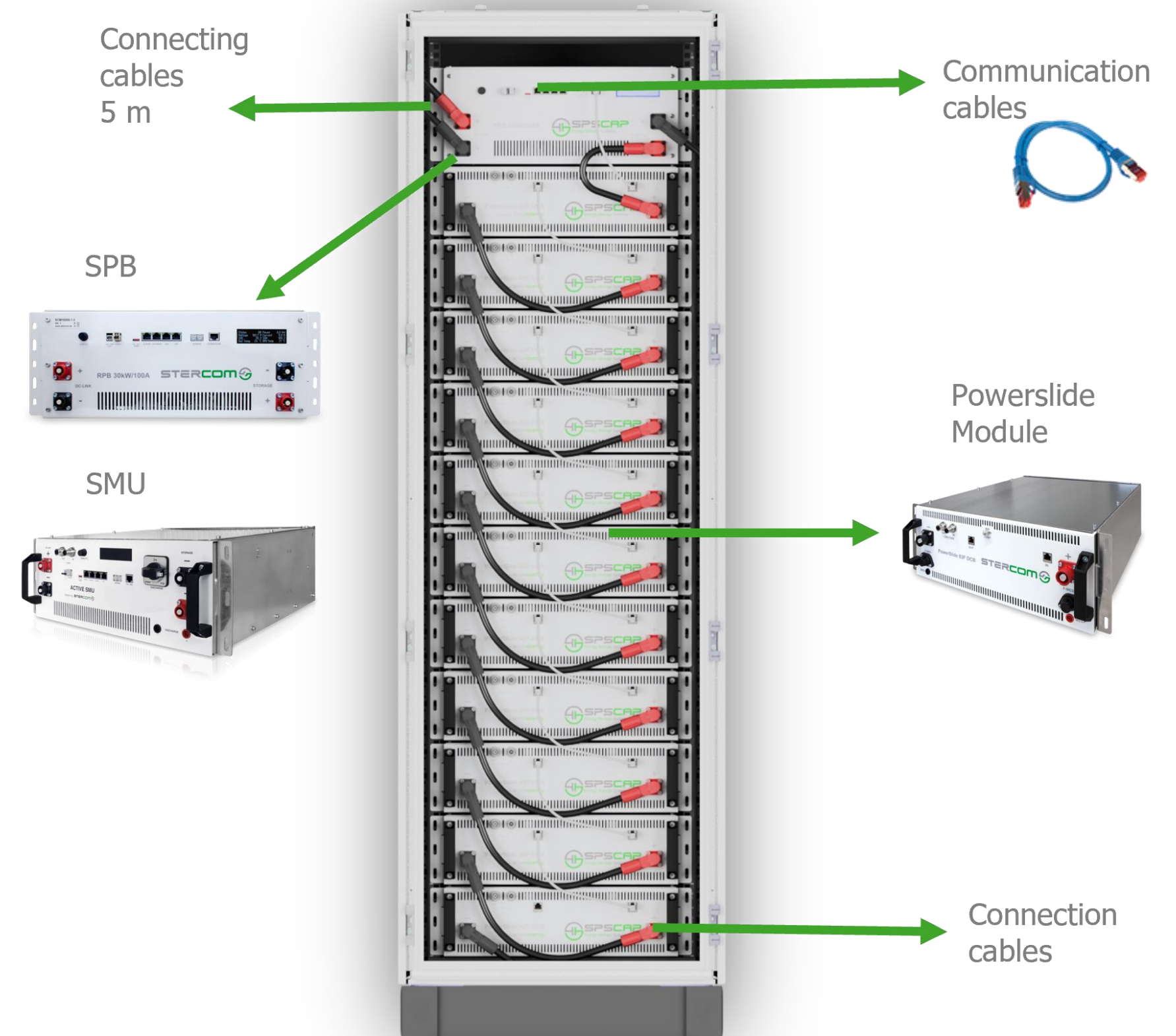




# UltraCap Power Booster:

## PowerSlide UltraCap System

- Variable configurable storage system for energy efficiency and safety
- Configurable stack voltages and power, AutoConfig Mode
- Active connection to a DC-link with the “String Power Booster” (SPB)
- Passive connection to a charger with the “String Management Unit” (SMU)
- Dynamic cell balancing and cell monitoring with DCB18
- Up to 13 modules per string, up to 1.500V stack voltage





# Hochleistungs-Batteriemodule

LTO High Power Module



**Scalable. Validable. Durable** High energy and power density

Optimized liquid cooling for uniform temperature distribution

Compact and lightweight solution, significant volume reduction due to liquid cooling

Long service life due to active and thermal management

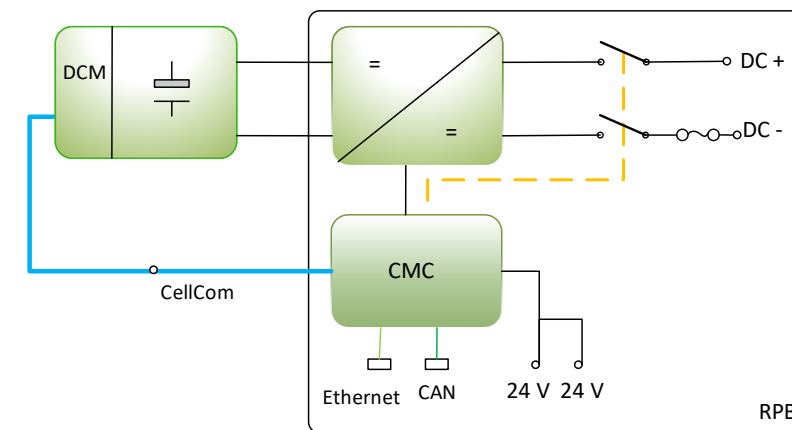
Active Cell Balancing

## Optimization for mobile and maritime applications

- Suitable for multi-string systems with single-string and full-string level monitoring
- Development conformity ISO 6469-1, ISO 6469-3, ISO 26262
- Safety conformity IEC 62619, UN ECE R100
- Transport UN 38.3
- IP67 protection
- SOC/SOH Analysis
- Single-cell voltage monitoring and balancing

# DC/DC converters for active DC systems

With String Power Booster (SPB)



- 30 kW DC/DC Converter and String Management Controller
- Bidirectional operation (no galvanic isolation)
- Charging and discharging control via operating modes
- Plus-minus separation by two shooters
- Voltage Range - UltraCap 0... 800 V (max. 900 V), max. 100 A
- Voltage range - DC-Link 0... 800 V (max. 900 V), max. 50 A
- Interfaces to external ECUs (CAN, ModBus TCP/IP, Ethernet)
- Forced cooling by temperature-dependent control
- Residual current monitoring
- DC link pre-charging function
- Voltage UltraCap < DC link

## Optionen:

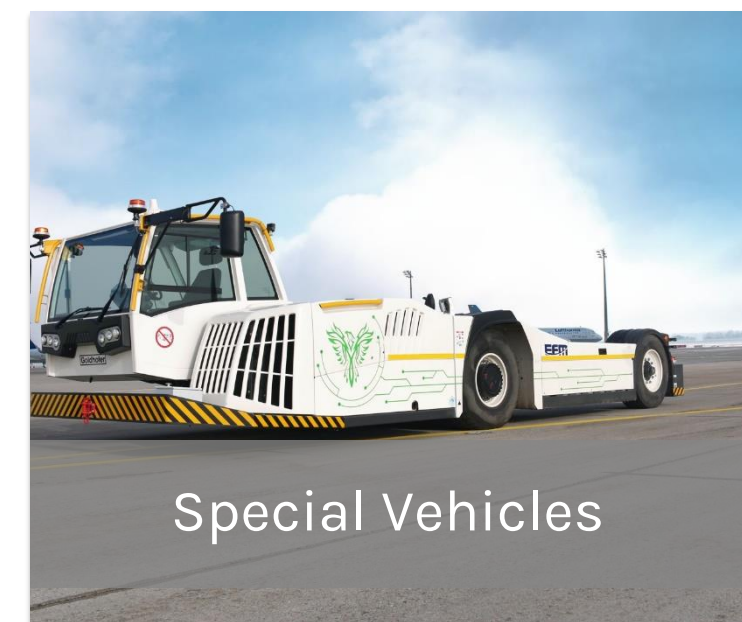
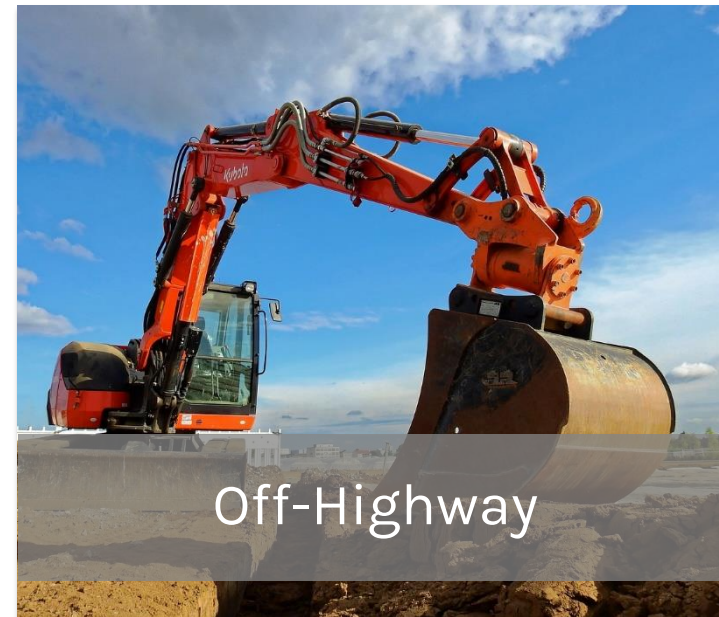
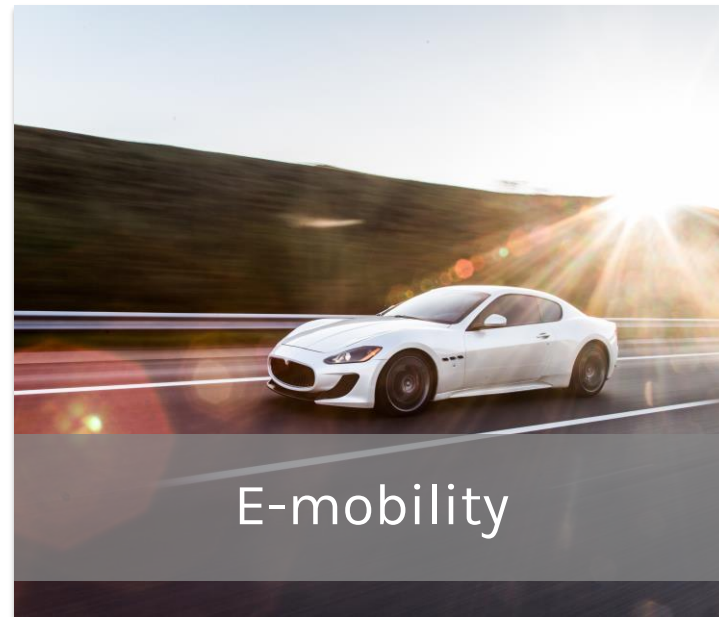
- Energy management for different energy profiles (loadshaving, peak shaving, UPS)
- Internal power supply (via DC-Link or UltraCap)
- SPB without integrated SMC
- Overlapping Voltage Ranges (Full Range Buck – Boost)



# **Projects and Applications**

# Applications

Stercom's products offer flexible solutions in a wide range of applications



# Our Clients

Some of our satisfied customers



Goldhofer



## Off- Highway Vehicles

Onboard charger for off-highway and special vehicles

*Specifically designed for outstanding performance in niche applications such as off-highway vehicles.*



Goldhofer, Flugzeugschlepper



Liebherr, Baufahrzeug



DDP Innovation-PEAK Evolution, Spezialfahrzeug für Bergbauanwendungen



Schmitz Cargobull  
Kühl-Trailer mit eigenem Batterie ESS  
Ladung mit OBC 22KW-800V  
Serienlieferung seit 2022



Bauer AG, Schrobenhausen



# Stationary Storage Systems (ESS) for roller coasters

Stercom provides the necessary power with SuperCap storage.



Silver Dollar City



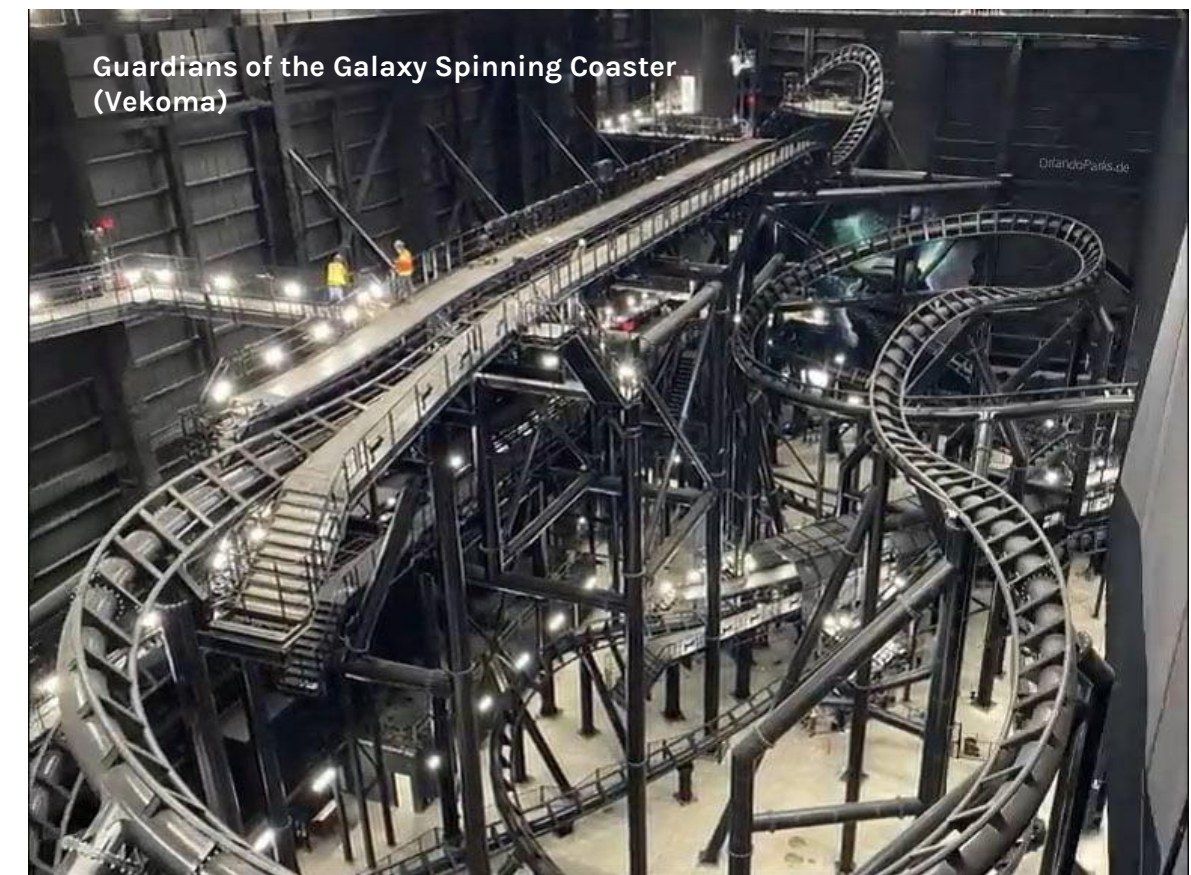
Pulsar Powersplash , Walibi Belgium



Big Bear Mountain, Dollywood Park



Chessington, WoA

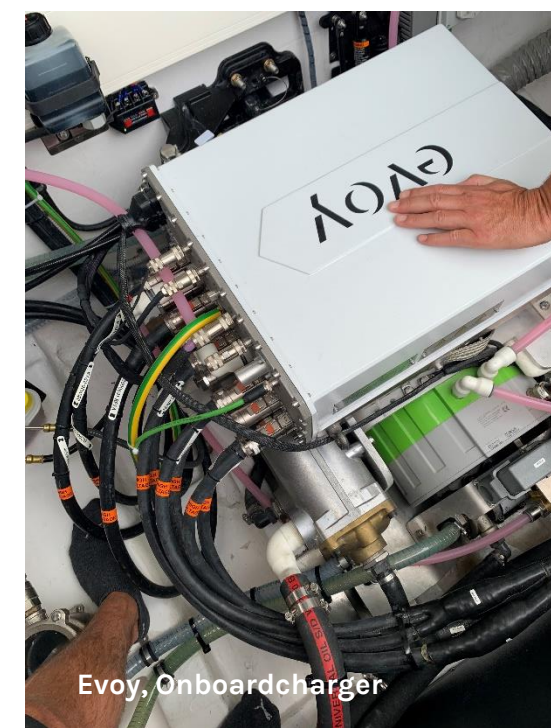
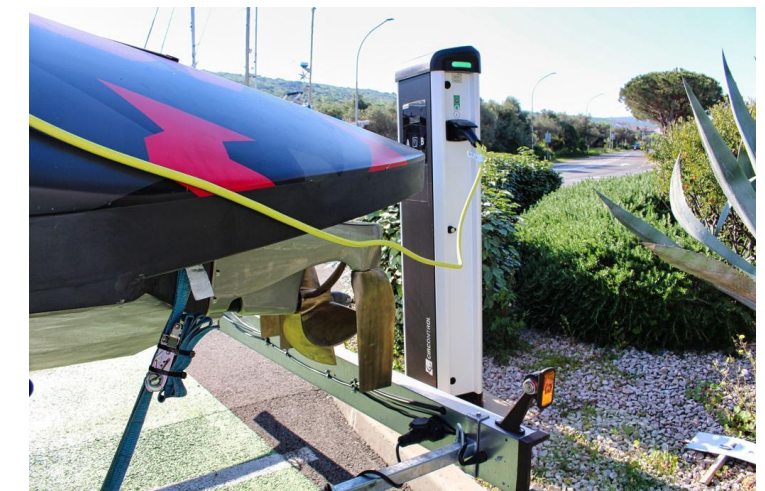


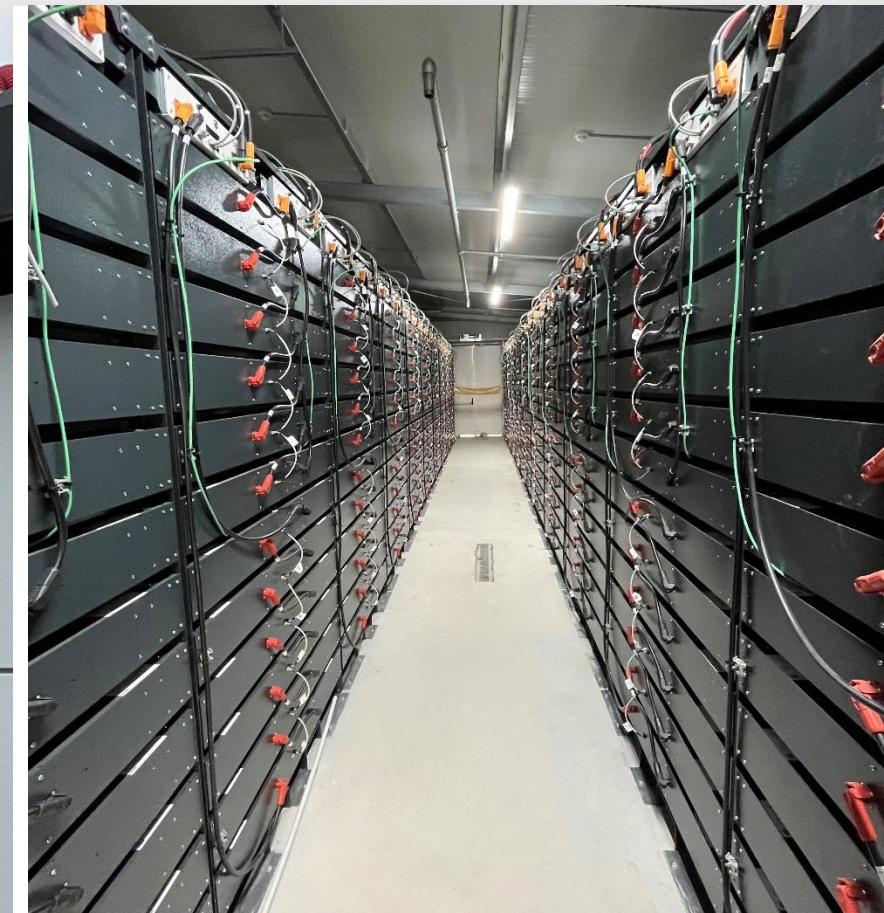
Guardians of the Galaxy Spinning Coaster (Vekoma)

# E-Nautics

Onboard Charger for Maritime Applications

- 1) ED-Tec
- 2) Evoy Performance





## Prime Monsson

Utility storage for buffering wind energy  
98 MWh LiION storage system

# Einstein Elevator

## Parabolic Flight System



- Large-scale research facility of the Hanover Institute of Technology (HITec)
- Objective: Investigation of various types of Substances under microgravity or defined low gravity
- Parabolic flight of an experimental capsule enables 4 seconds of almost complete weightlessness
- Up to 100 flights per day
- Technology: linear drive technology, vacuum-sealed capsule, fast-charging high-performance memory (Stercom)



# Contact

Stercom Power Solutions GmbH  
Ziegelstraße 1  
D-83629 Weyarn

Tel.: +49 (0) 8020 33996 0

Email: [info@stercom.de](mailto:info@stercom.de)  
[www.stercom.de](http://www.stercom.de)

Dipl.Ing. (univ) Robert Sterff

Rudolf Pauls

Dip.Ing. (univ) Martin Kutschker

