



COMPANY PRESENTATION

MARCH 2022

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The future of battery technology... starts here.



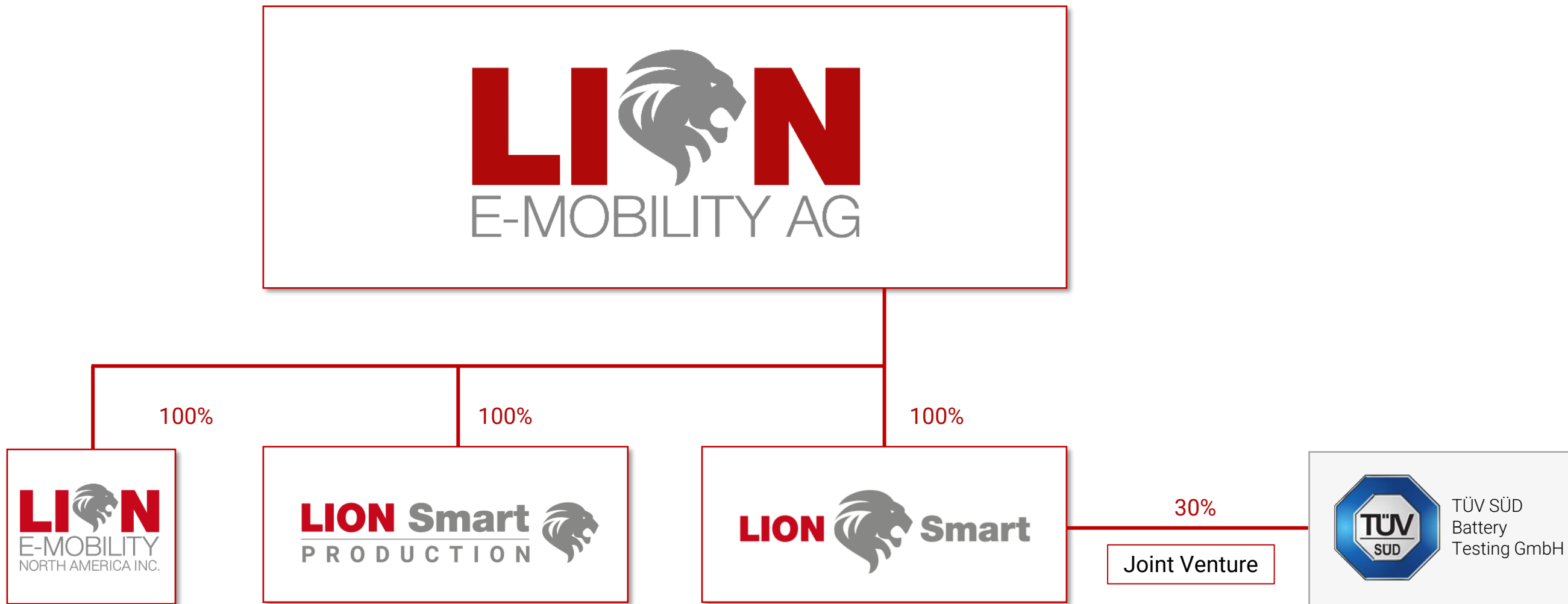
Our Mission

At LION Smart, we believe in a sustainable future. Through our commitment to battery development, we are helping to make our technologies smarter, more efficient and more powerful. We are convinced that progress and sustainability can only exist together and are committed to improving and shaping the world with our ideas.

Our Values

The driving force behind our corporate culture is sustainability. This applies not only to our research and development work, but also to the way we interact with each other. Here, the fundamental goal of all our activities is to create added value in a responsible manner. Sometimes it's a long road to get there, and it's difficult to live up to this commitment. But in the end, everyone involved benefits – our employees, customers, suppliers and the environment.

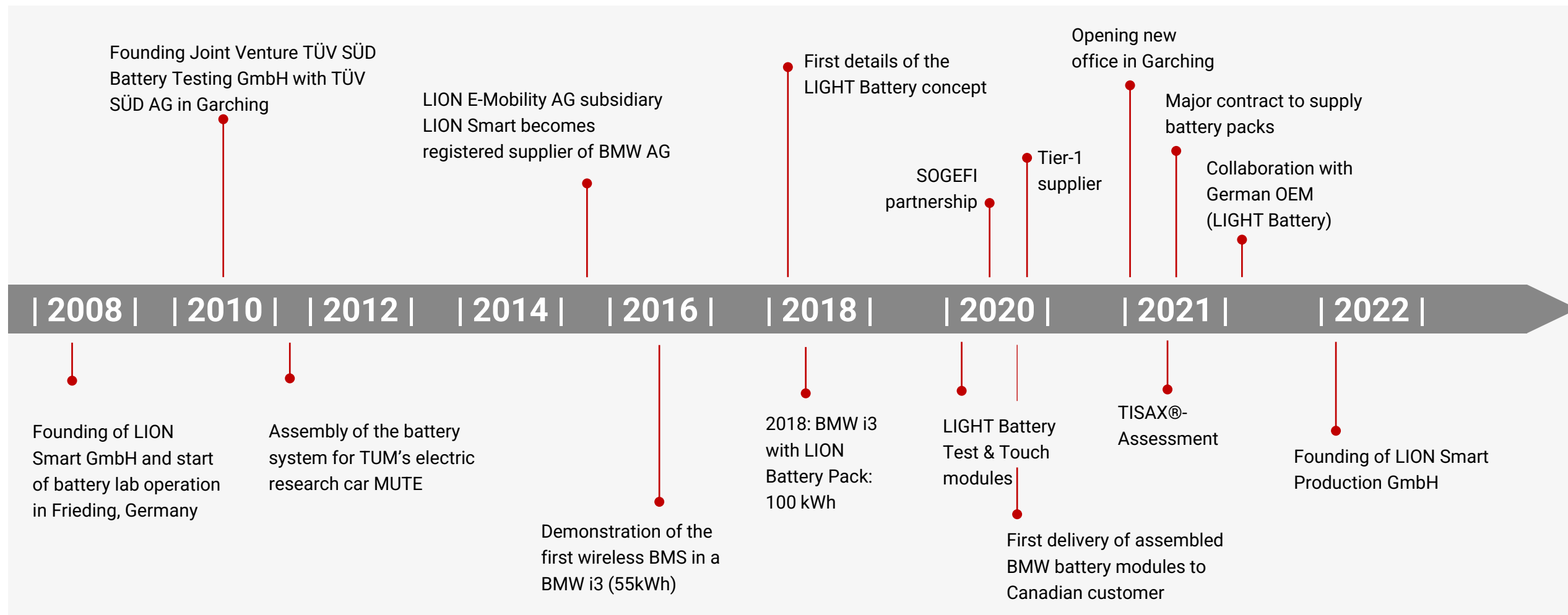
THE LION GROUP



COMPANY HISTORY



IMPORTANT MILESTONES



OUR PRODUCTS & SERVICES

LION SMART AT A GLANCE



LION
Smart

LIGHT BATTERY

Immersion cooled cylindrical modules and packs



SOLUTIONS FOR BATTERY PACK INTEGRATION

Integration and adaption services



BATTERY MANAGEMENT SYSTEMS & COMPONENTS

DNVGL certified and ISO 26262 ready



DEVELOPMENT AND PROTOTYPING

Technical expertise and strategic analysis



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LIGHT BATTERY



HIGH PERFORMANCE BATTERY

LIGHT BATTERY

A whole new battery concept that uses liquid immersion cooling for ultra-fast charging and high performance lithium-ion cell technology.



[LIGHT Battery Promo](#)








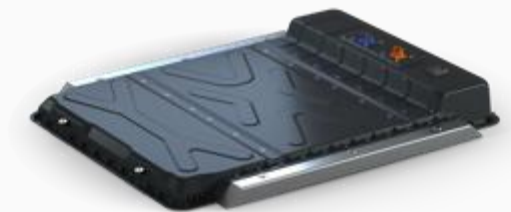
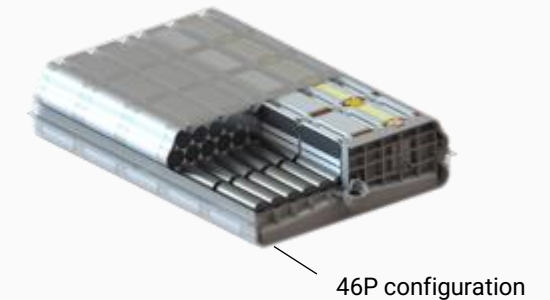
A NEW CONCEPT

The LIGHT Battery concept combines multiple innovative approaches to reduce cost, maximize energy density and guarantee product safety. "Wireless" construction and cells as well as electronics immersed in a dielectric liquid.

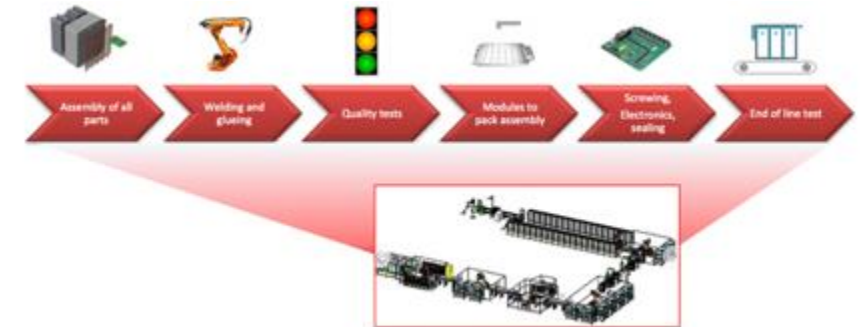
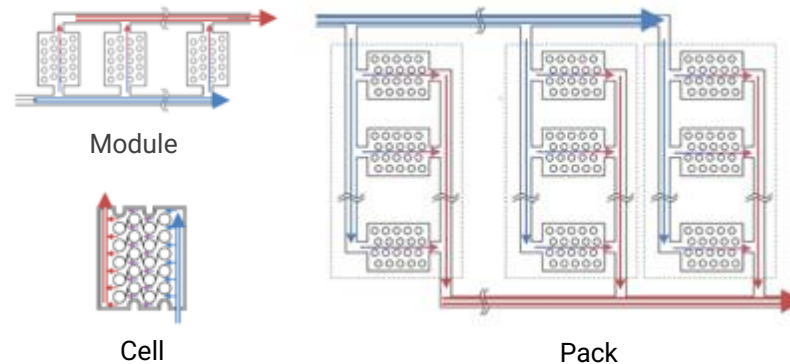
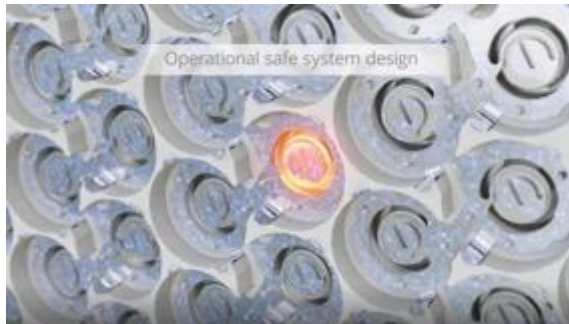
LIGHT BATTERY

OUR LIGHT BATTERY - YOUR BENEFITS

-  **HIGH PERFORMANCE BATTERY**
Ultra-fast charging | High continuous charge- and discharge rates
-  **INCREASED LIFETIME**
Significant reduction of temperature gradient and average cell temperature in the battery pack
-  **SUPERIOR SAFETY CHARACTERISTICS**
Single cell fuses and noncombustible cooling medium
-  **HIGH FLEXIBILITY AND MODULARITY**
Customizable number of supercells (based on 21700 cells) and flexible design for easy adaption
-  **PRODUCTION ORIENTED ENGINEERING**
Designed for automated high-volume production and reduction of assembly costs to a minimum



SAFETY & COOLING TECHNOLOGY - DETAILS



Superior Safety Characteristics

- Cells immersed in dielectric, non-flammable coolant
- “Single cell fuse” reduces propagation by internal short circuit
- Small cell releases much smaller thermal energy in case of failure
- Reduced propagation risk due to heat absorption by the coolant
- Immersion cooling reduces risk of fire and cools gases

Innovative Cooling Technology

- Modular design for absolute homogenous temperature distribution
- Minimal temperature gradient within cell
- Maximized active cooled contact surface - $\sim 38\text{cm}^2/\text{cell}$ in current design and setup
- Immersion cooling allows fast-charging

Production Oriented Engineering

- Designed for automated production
- Number of parts minimized to meet stringent cost targets
- Based on 21700 cell due to superior energy density and cost
- Module design enables minimum number of plugs and galvanic isolated elements
- No complex wiring harness for measurement electronics

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CUSTOM BATTERY PACK INTEGRATION

SEAMLESS FULL ELECTRIC CONVERSION

FULL-SERVICE INTEGRATION

Pack integration by LION Smart as highly experienced and well-trusted partner

WIDE RANGE OF USE-CASES

State of the art voltage levels of 400V and 800V and various configurations possible

EASY SCALABLE

From small to large volumes – suitable components ready for integration

PREMIUM CLASS

High-quality, road-proven and certified battery packs and modules of various suppliers with great warranty

Integrated BMW PREMIUM Battery Packs – 400V and 800V Solutions

Premium class, highest standards automotive solution
→ Safe, reliable, certified and very cost-competitive



Premium BMW Modules and Components for customized solutions



- ✓ INTEGRATION OF COMMUNICATION
- ✓ COOLING INTEGRATION
- ✓ SAFETY INTEGRATION
- ✓ ELECTRICAL INTEGRATION

CUSTOM BATTERY PACK INTEGRATION

MAIN APPLICATIONS

Commercial Vehicles



Stationary Storage Systems



Benefits

- ✓ Highest automotive standards (Premium OEM)
- ✓ Reduction of maintenance costs over lifetime
- ✓ Very robust and safe
- ✓ Validated and tested
- ✓ Optional cooling
- ✓ High torque

- ✓ No pollution on site
- ✓ Noise reduction
- ✓ Instant power availability
- ✓ Long lifetime
- ✓ Guarantee & warranty by BMW
- ✓ Additional components available

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INNOVATIVE & POWERFUL

The battery management system (BMS) is the central element for monitoring and controlling lithium-ion energy storage systems. The modular Li-BMS is very easy to apply in a variety of types and sizes of battery packs through its flexible hardware and software structure.

Concept

LION's BMS consists of a master control module (LCM) containing the processing unit and a variety of interfaces. It can be flexibly connected to up to 16 measurement modules (LMM) via an isolated bus system.

The LMM features fast and precise measurement of cell voltages and cell temperatures and provides balancing of cells. An independent, redundant measurement path adds safety.

Benefits

- Flexible and modular
- Ideal platform for industrial and development projects
- Safety loop in hardware
- Easy adaptation to various requirements and needs
- High-quality electronic components
- External communication interfaces for all standard applications
- Additional generic interfaces for customer-specific requirements



HV BMS Master (LCM)



HV BMS Slave (LMM)

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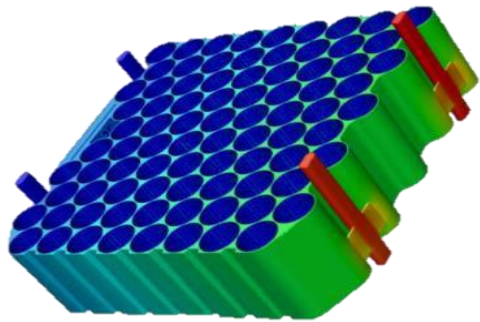
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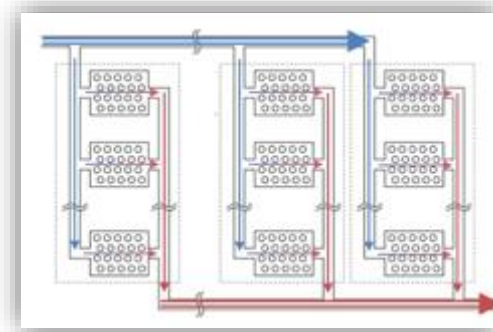
TECHNICAL EXPERTISE & STRATEGIC ANALYSIS

Simulation

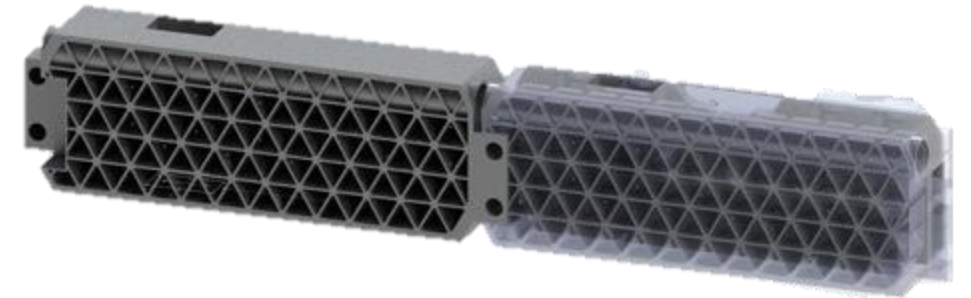
Thermal



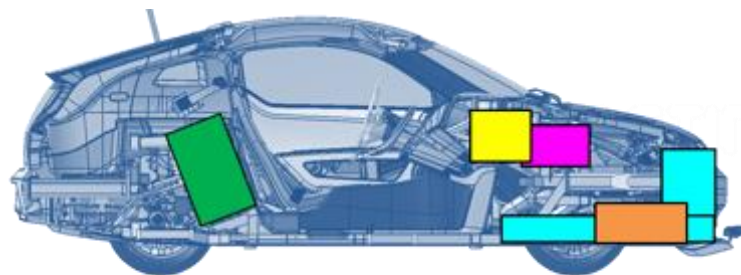
CFD



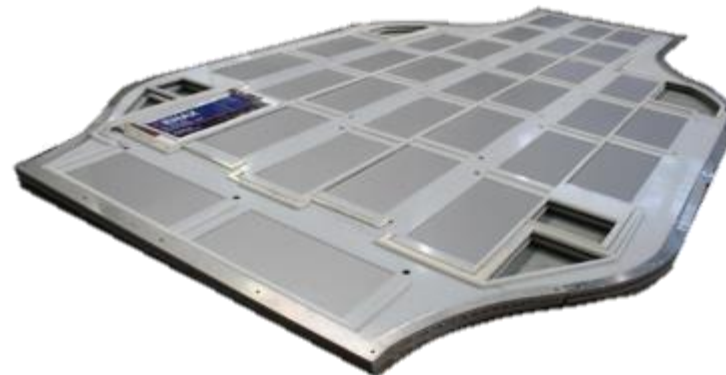
Mechanical



Development and Integration



- HES
- DCDC RE
- Sicherheit
- RE
- Pufferbatterie PB



MULTI-MATERIAL BATTERY ENCLOSURE

Together with consortium partners Vestaro, Evonik, Forward Engineering, Lorenz Kunststofftechnik and Minth, LION Smart developed a new composite battery housing that is 10 percent lighter compared to other common material combinations on the market.



[Battery Housing Project](#)



Have teamed up to demonstrate the benefits of a novel modular multi-material battery enclosure

This presentation contains forward-looking statements that involve a number of risks and uncertainties, including statements that relate to, among other things, the Company's objectives, goals, strategies, intentions, plans, beliefs, expectations and estimates, and can generally be identified by the use of words such as "may", "will", "could", "should", "would", "likely", "expect", "intend", "estimate", "anticipate", "believe", "plan", "objective" and "continue" (or the negative thereof) and words and expressions of similar import. Although the Company believes that the expectations reflected in such forward-looking statements are reasonable, such statements involve risks and uncertainties, and undue reliance should not be placed on such statements. Certain material factors or assumptions are applied in making forward-looking statements, and actual results may differ materially from those expressed or implied in such statements. Important factors that could cause actual results to differ materially from expectations include but are not limited to: general business and economic conditions (including but not limited to currency rates and creditworthiness of customers); Company liquidity and capital resources, including the availability of additional capital resources to fund its activities; level of competition; changes in laws and regulations; legal and regulatory proceedings; the ability to adapt products and services to the changing market; the ability to attract and retain key executives; and the ability to execute strategic plans. The Company does not undertake any obligation to update publicly or to revise any of the forward-looking statements contained in this presentation, whether as a result of new information, future events or otherwise, except as required by law.