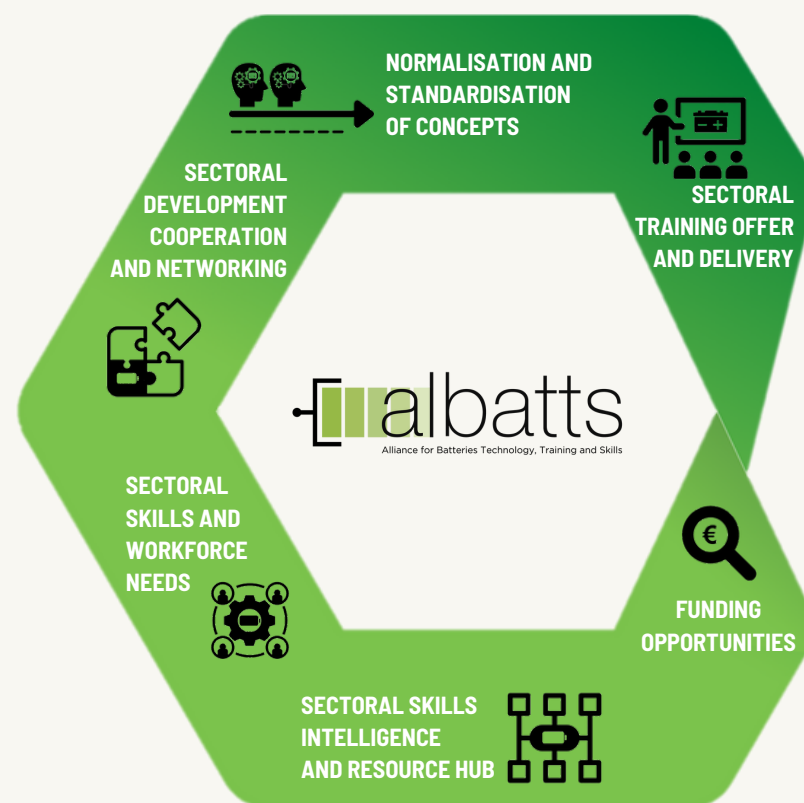


SECTORAL SKILLS INTELLIGENCE & STRATEGY FOR THE EUROPEAN BATTERY SECTOR

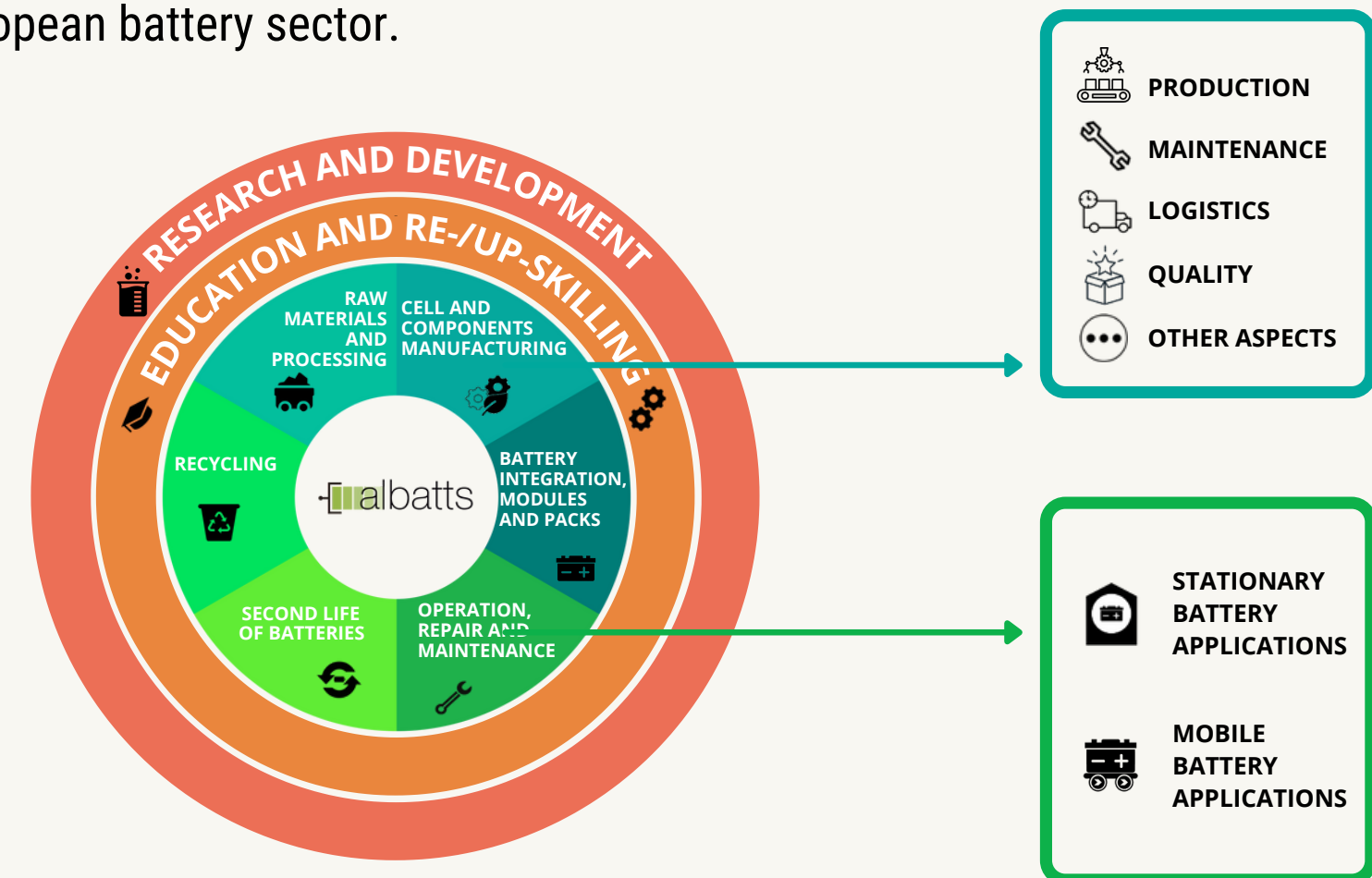
D3.10 – Sectoral Skills Intelligence and Strategy – Release 2

This is the **second** release of the sectoral skills intelligence and strategy covering the whole European battery value chain from raw materials to recycling of batteries in terms of skills needs, job roles needs and recommendations.



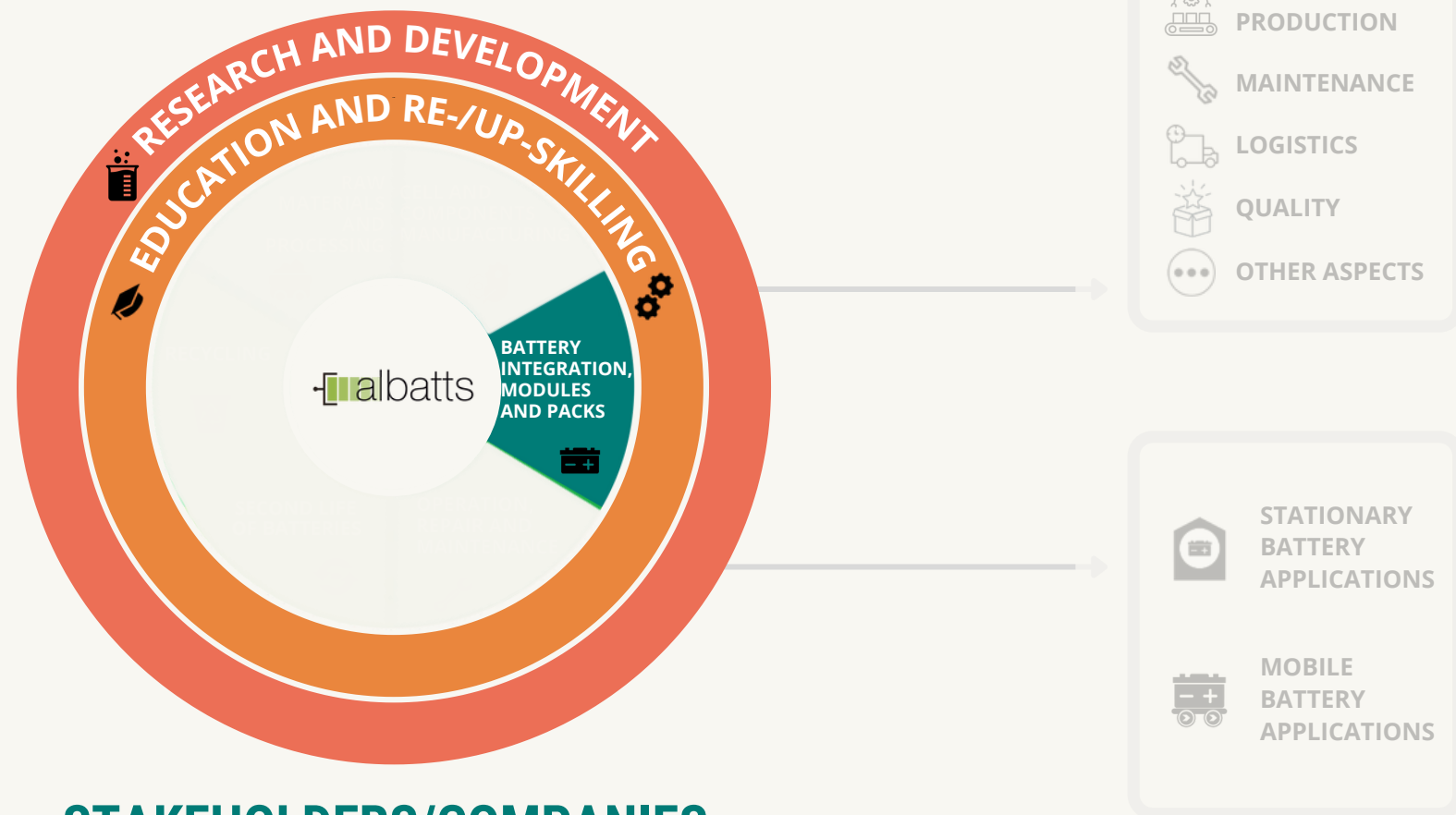
Readers will find designated actions needed in the sector to boost the overall re-/up-skilling activities as well as cooperation, information sharing and provision and many more.

The report also provides quantitative and qualitative overviews of the skills and the job roles needs per identified areas of interest consisting of the battery value chain steps, as well as specific aspects of production, quality or safety tailored to the battery production or other processes that are happening within the European battery sector.



This factsheet provides a summary of the report in what regards **battery integration modules and packs**.

BATTERY INTEGRATION MODULES AND PACKS

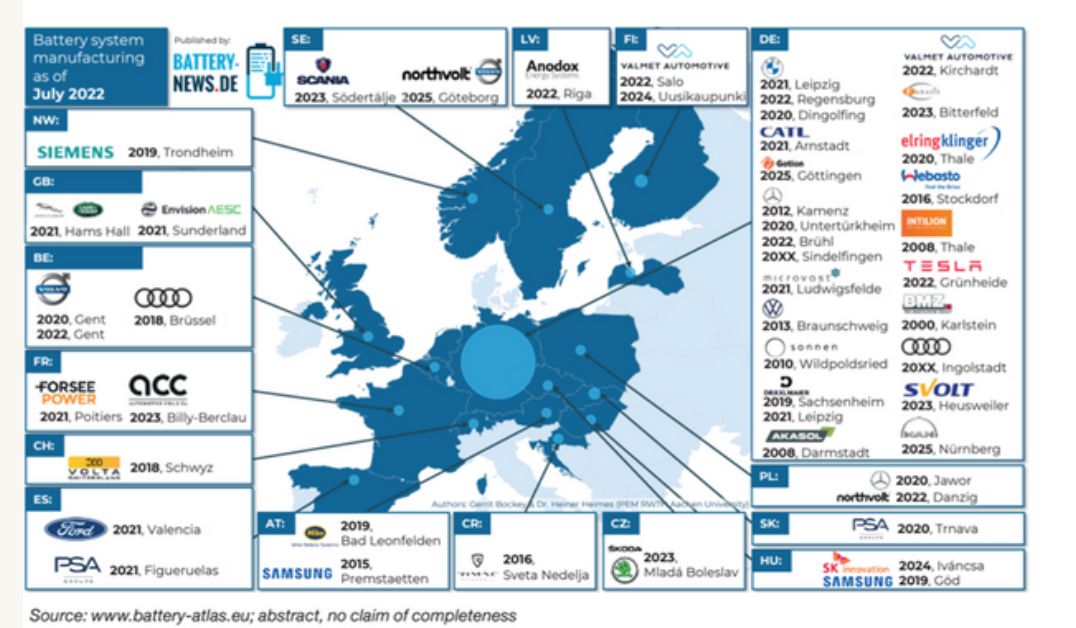


BATTERY INTEGRATION covers the process of pack compilation, where the pack usually consists of several blocks of battery modules, battery management systems, and other systems, for example, thermal regulation systems.

This part of the value chain concerns different aspects such as: **(1)** testing and validation (end of line testing and other related tests – functional testing, performance testing, connection scanning, electrical testing, calibration, part checks); **(2)** electronics packaging (electrical insulation, mechanical links, and other, optimization in terms of heat transfer); or **(3)** safety aspects and risk mitigation (related mainly to the thermal runaway and explosion), which is being assured by BMS, where different topologies may be implemented to keep the battery within the safety operation region in terms of voltage, current, and temperature during the charge, discharge, and some instances at open circuit.

STAKEHOLDERS/COMPANIES

MODULE AND PACK MANUFACTURERS



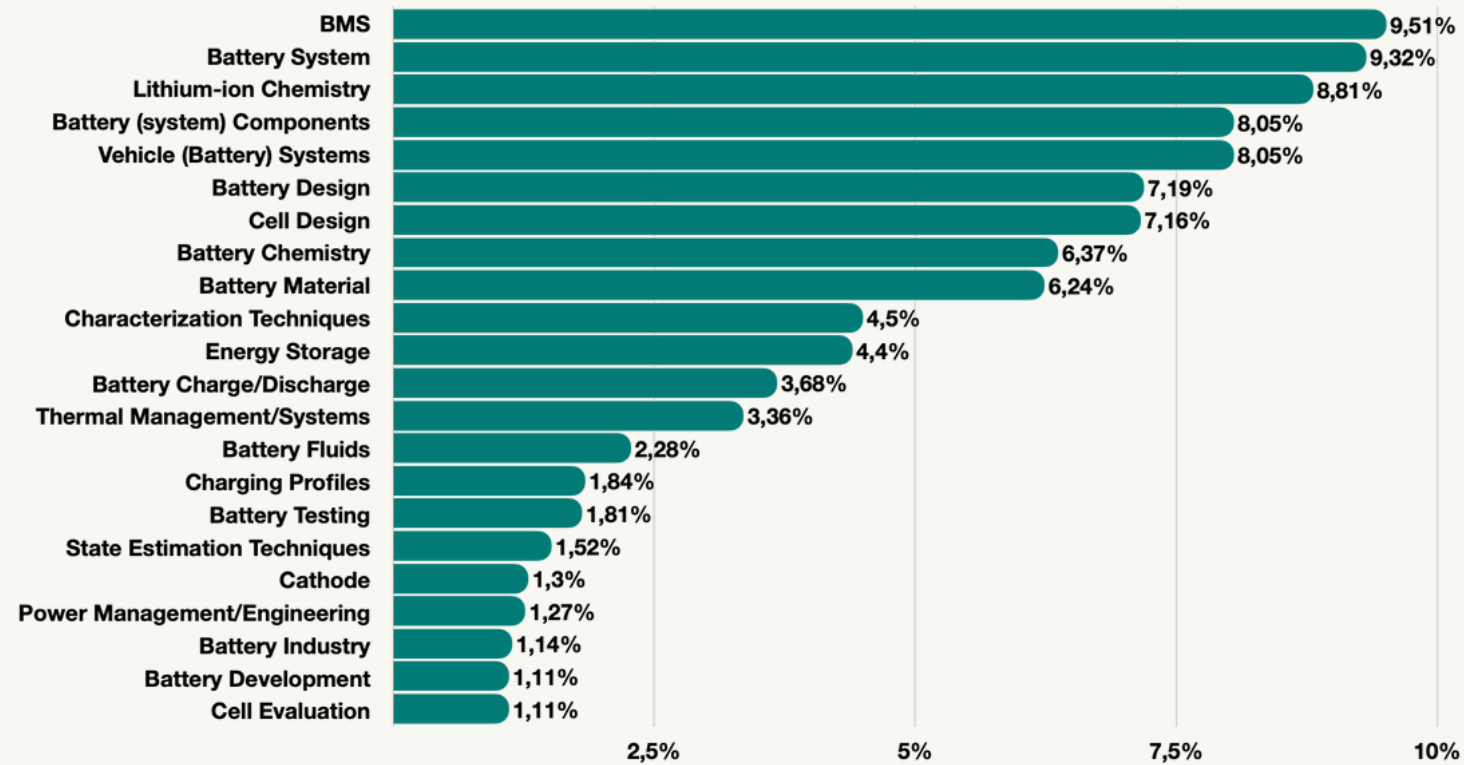
Furthermore, regarding the BMS, other features and functions are observed and implemented: **(1)** monitoring of voltage; **(2)** contactor control; **(3)** isolation monitoring; **(4)** temperature measurement and control; **(5)** state of charge, health, and other metrics' measurements.

TARGET GROUPS: battery integrators; BMS manufacturers; modules and packs manufacturers and integrators; and other system manufacturers.



SKILLS, COMPETENCES & KNOWLEDGE NEEDS

SECTOR SPECIFIC COMPETENCE



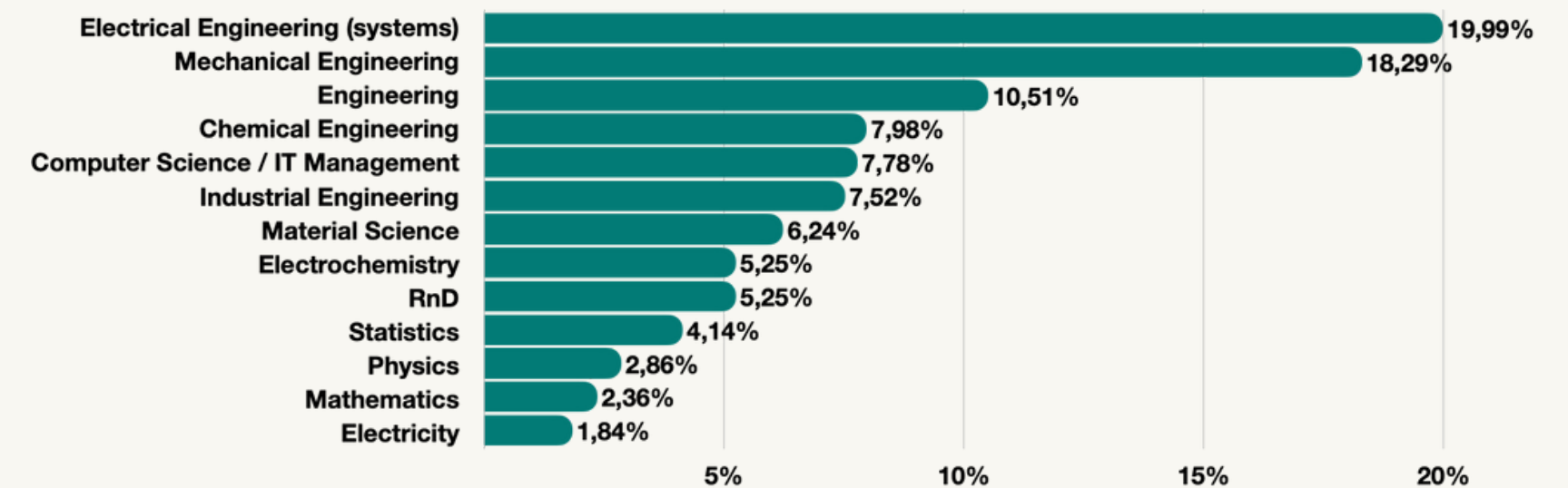
CROSS-SECTORAL SPECIFIC KNOWLEDGE



CROSS-SECTORAL SPECIFIC SKILLS



ACADEMIC COMPETENCE



JOB ROLES

BLUE-COLLAR

FACILITY TECHNICIAN SERVICE TECHNICIAN
 CLEANING TECHNICIAN PLANNER
 MAINTENANCE TECHNICIAN
 MACHINE OPERATOR **BESS TECHNICIAN**
 OPERATOR SR. QUALITY TECHNICIAN
 SHIFT LEAD **CELL ASSEMBLY TECHNICIAN**
 ELECTRONIC MOTOR BENCH TEST TECHNICIAN
 BATTERY TEST TECHNICIAN
 CELL INSPECTION TECHNICIAN RELIABILITY TECHNICIAN

WHITE-COLLAR

ELECTRO-MECHANICAL ENGINEER EV PROJECT MANAGER
 MECHANICAL CELL DESIGN ENGINEER BATTERY SYSTEM & TECHNOLOGY ENGINEER
 MECHANICAL SUPERVISOR PROJECT ENGINEER-CONTROLS ELECTRONICS FOR MOBILITY
 HIGH-VOLTAGE BATTERY DRE SENIOR INTEGRATION ENGINEER SYSTEM ENGINEER
 LITHIUM ION CELL BATTERY SYSTEM ENGINEER MECHANICAL BATTERY DESIGN ENGINEER
 MECHANICAL ENGINEER PRODUCTION BLOCK MANAGER PRODUCTION ENGINEER
 SENIOR ENGINEER-BATTERY MODELLING & ANALYSIS APPLICATION ENGINEER
 CELL TEST ENGINEER ELECTRIC ENGINEER-FIRMWARE MANAGER
 PRODUCTION MANAGER CELL ASSEMBLY **BATTERY SYSTEM ENGINEER**
MOBILE HYDRAULICS-APPLICATION ENGINEER
 ELECTRICAL VEHICLE ENGINEER-CHARGING **BATTERY SYSTEMS MANAGER**
 BATTERY TECHNICAL LEAD DESIGN ENGINEER-BATTERY TECHNOLOGY
 MAINTENANCE ENGINEER **PRODUCTION MANAGER DOWNSTREAM**
 SENIOR SYSTEM DESIGN ENGINEER SOFTWARE/MODELLING ENGINEER LEAD
 PRODUCTION ENGINEER MANUFACTURING ENGINEER FORMATION MAINTENANCE MANAGER
 CONTROLS ENGINEER ELECTROMOBILITY PROJECT LEADER POWER DISTRIBUTION ENGINEER
 ELECTRICAL SYSTEM ENGINEER SR. ELECTRONICS ENGINEERING TECHNICIAN

CONSIDERATIONS / RECOMMENDATIONS

Strengthening competence in BMS development to achieve development in efficiency, predictable behaviour, and risk mitigation – concern is a battery system safety

Development of competence within the standardization and frameworks for integration process and procedures of battery modules and whole systems

Understanding the battery systems topologies and components

Development and improvement of a framework for quality assessment and assurance

Research and development within the BMS – concern is a battery system safety; efficiency and more advanced features of the system

Battery integration & control - testing of integrated battery system within the application

Development of more efficient SoC & SoH algorithms

Strengthening of cooperation between integrators, manufacturers, and BMS suppliers

Overall digital skills

Development and research on BTMS - thermal management issues and other aspects – (1) safety; (2) physical or mechanical performance; (3) durability; (4) ripple current; (5) accuracy of measuring instruments; (6) materials for fire resistance and electronics packaging;

LINKS & RESOURCES

- [Sectoral Skills Intelligence and Strategy - Battery Integration, Modules, and Packs](#)
- See the [list of the ALBATTs SKILLS CARDS](#)



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