

**Alliance for Batteries Technology, Training and Skills
2019-2023**

„Education Development in the European Battery Sector“

Lukas Folbrecht, ALBATTTS Work Package Leader



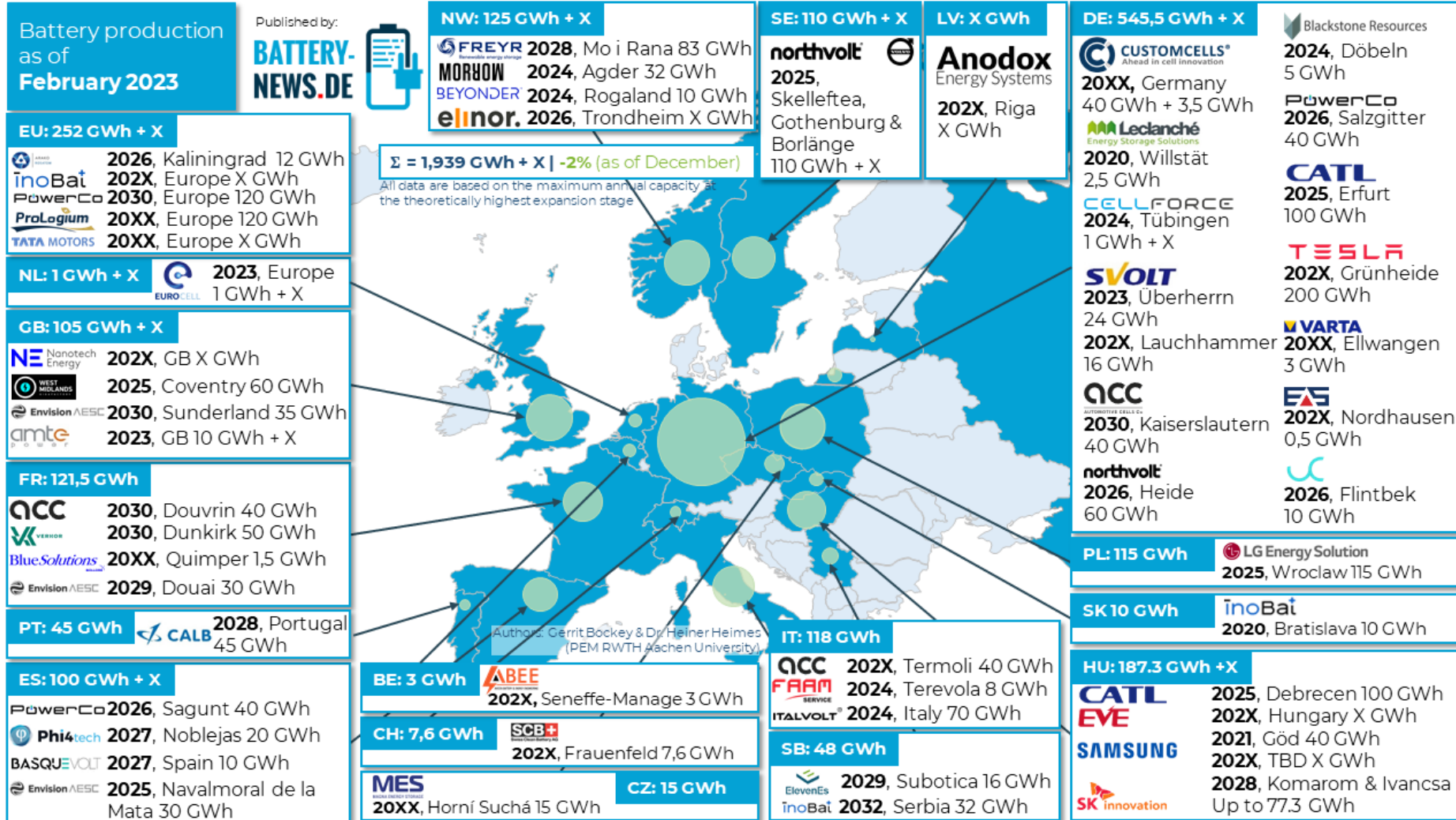
The Challenge



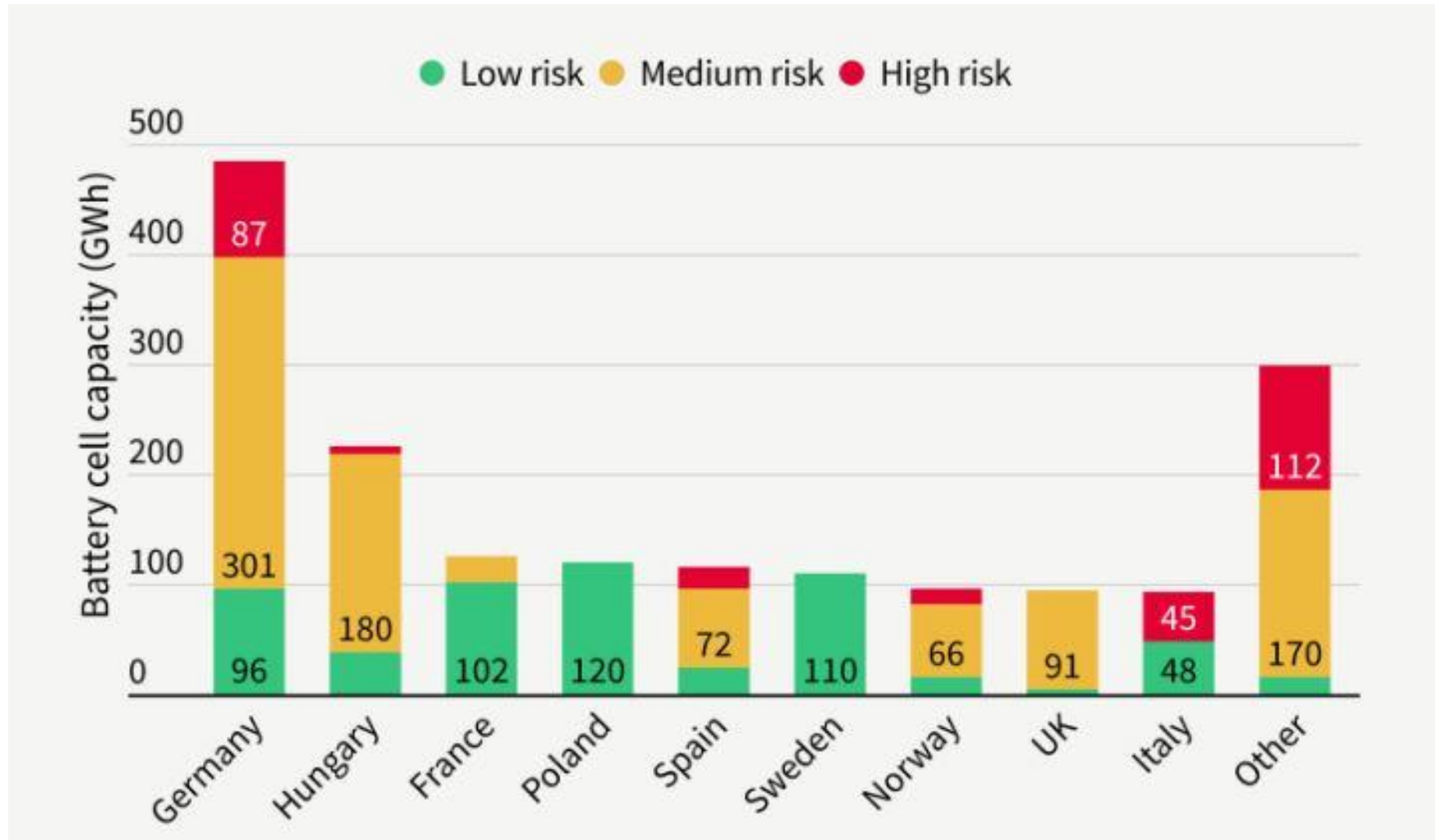
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Battery Production in Europe

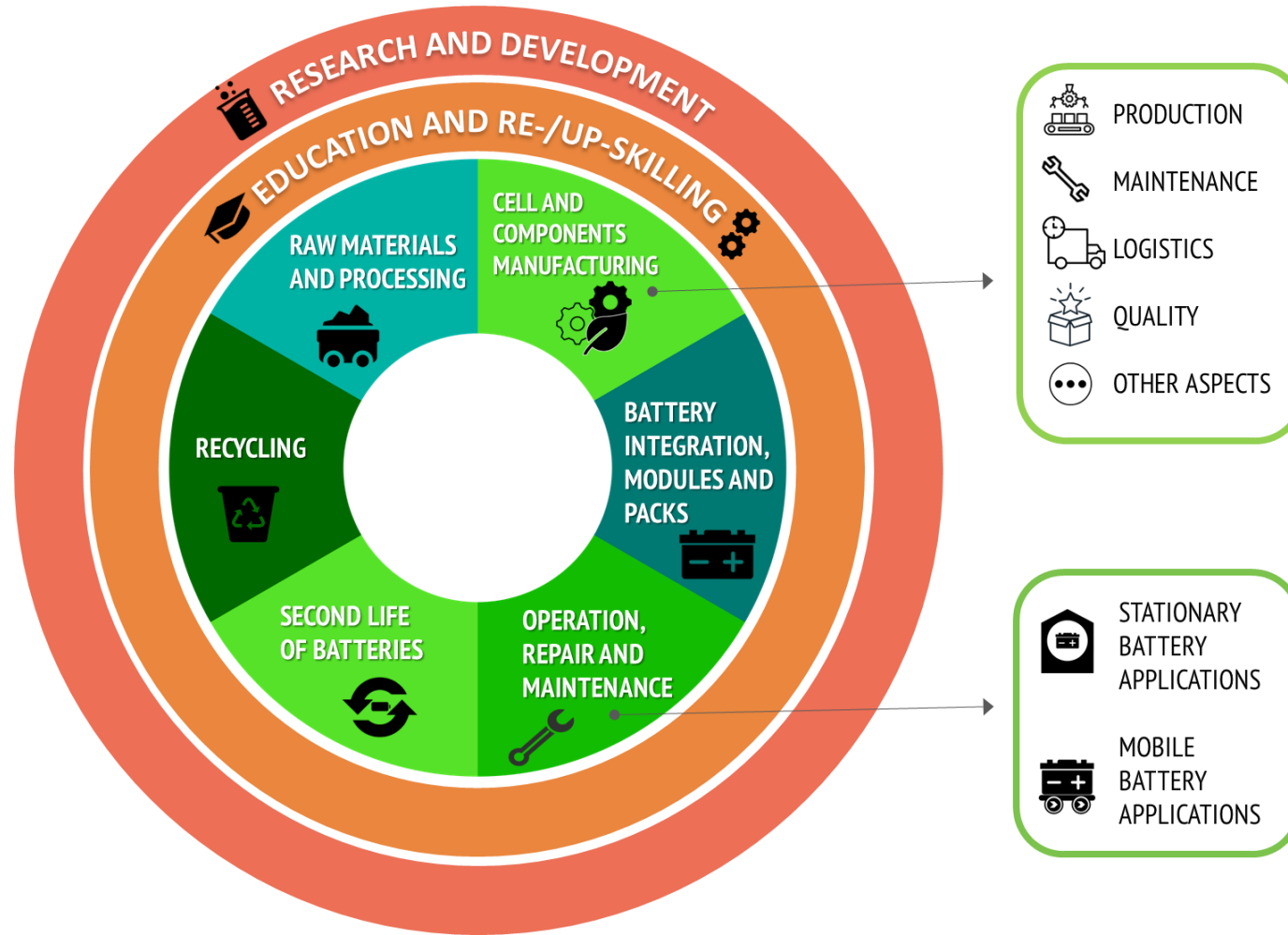


Planned EU production capacities at risk

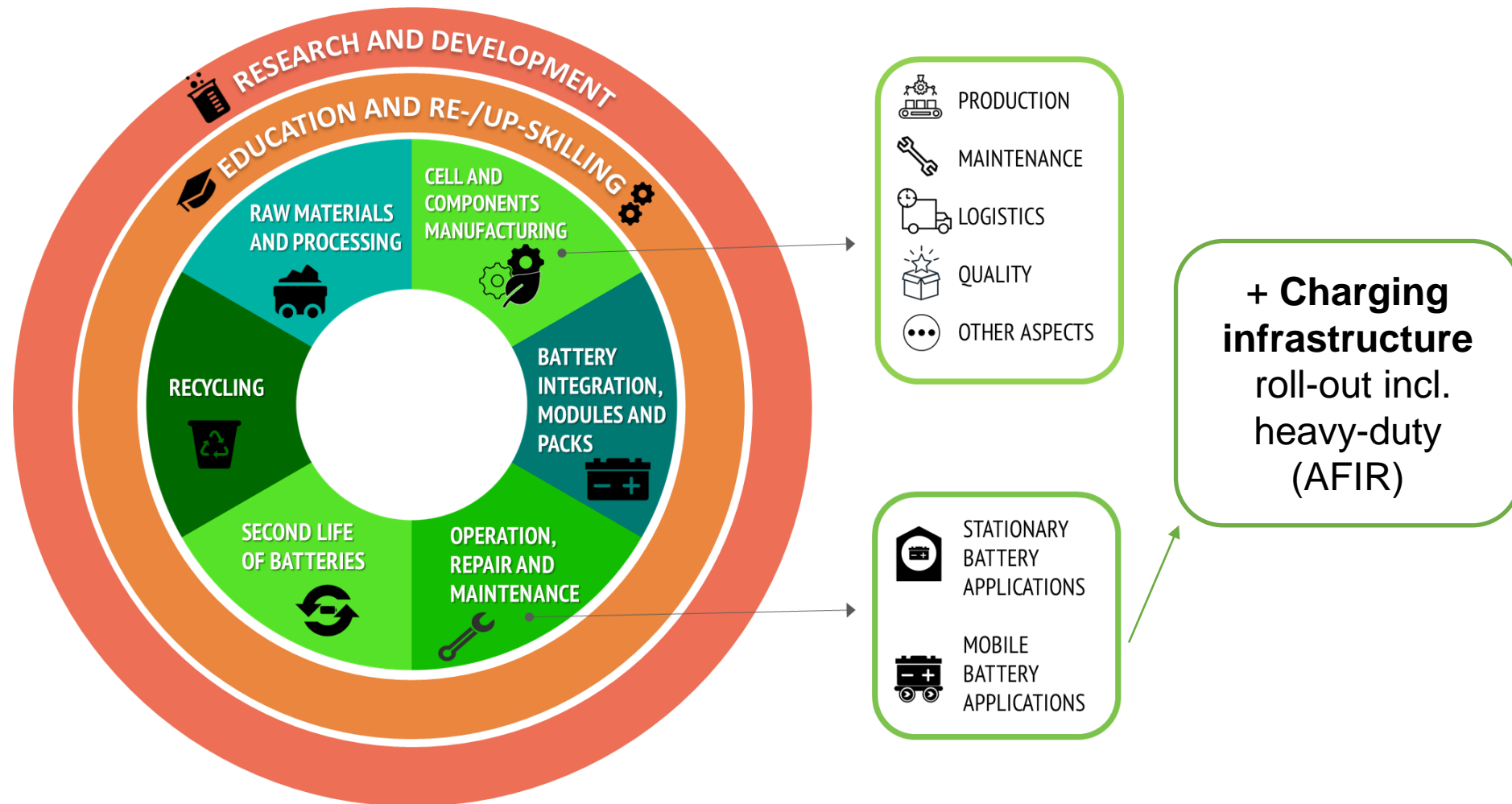


Source: Transport & Environment

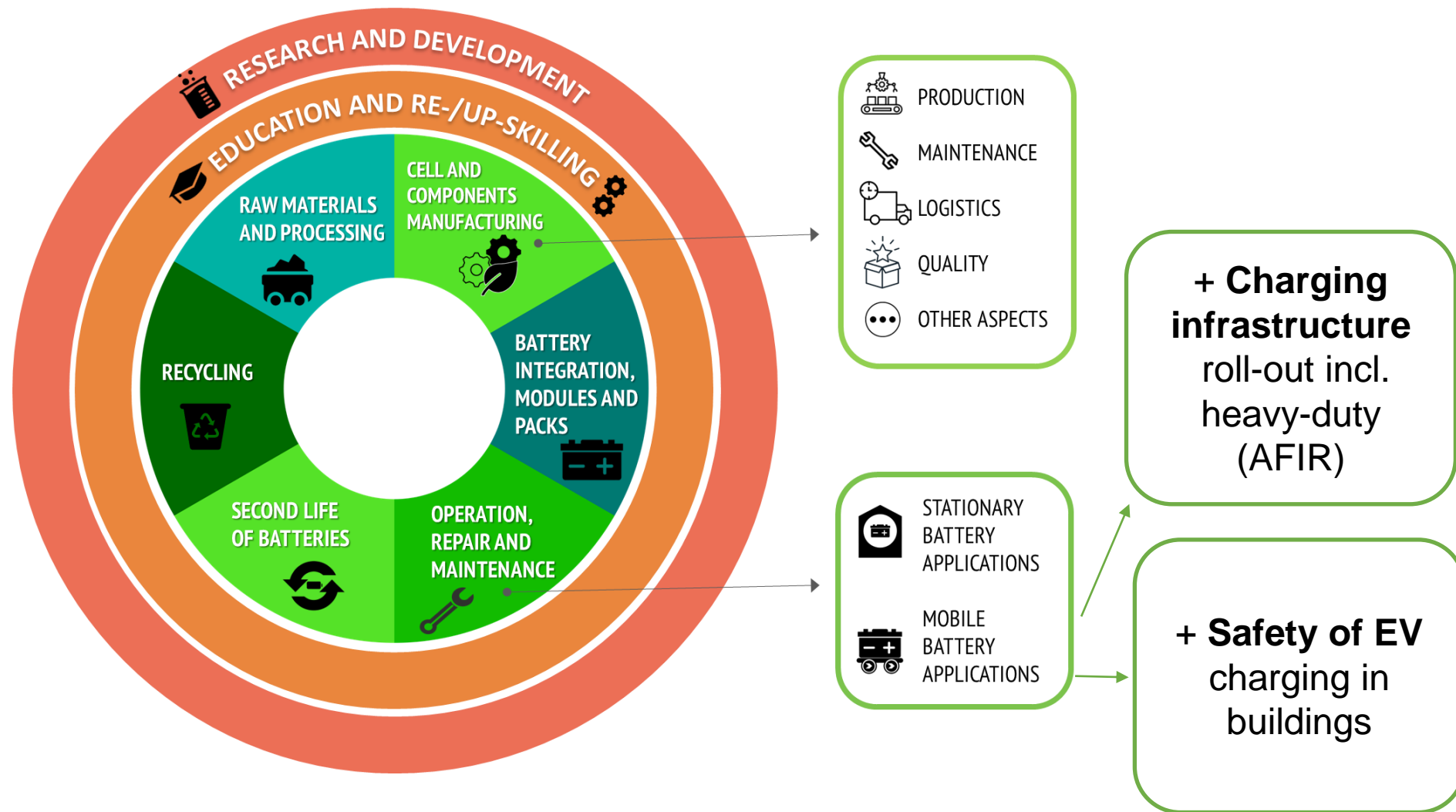
Battery Value-Chain



Battery Value-Chain



Battery Value-Chain





Project ALBATTIS

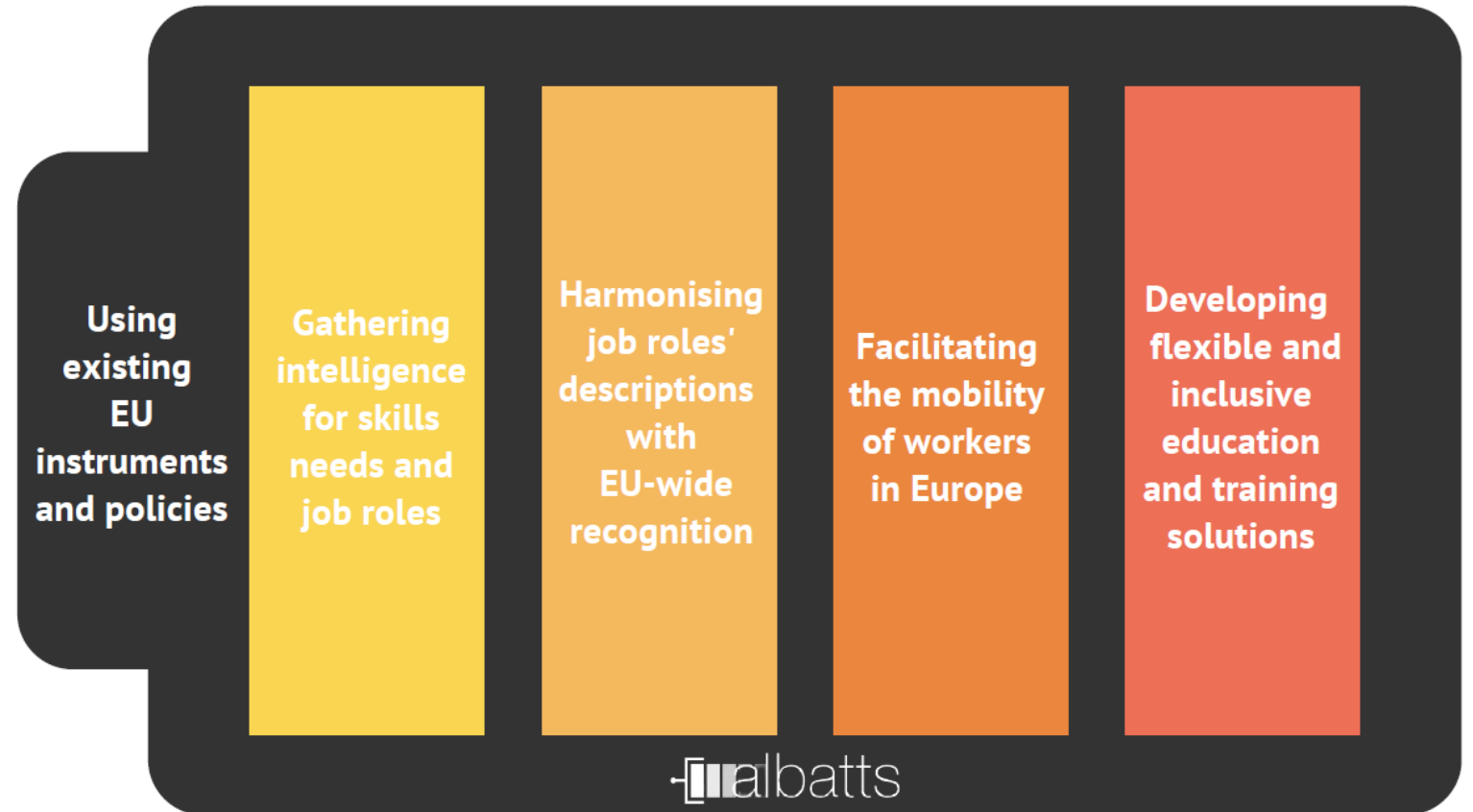
ALBATTTS in a nutshell



MISSION:

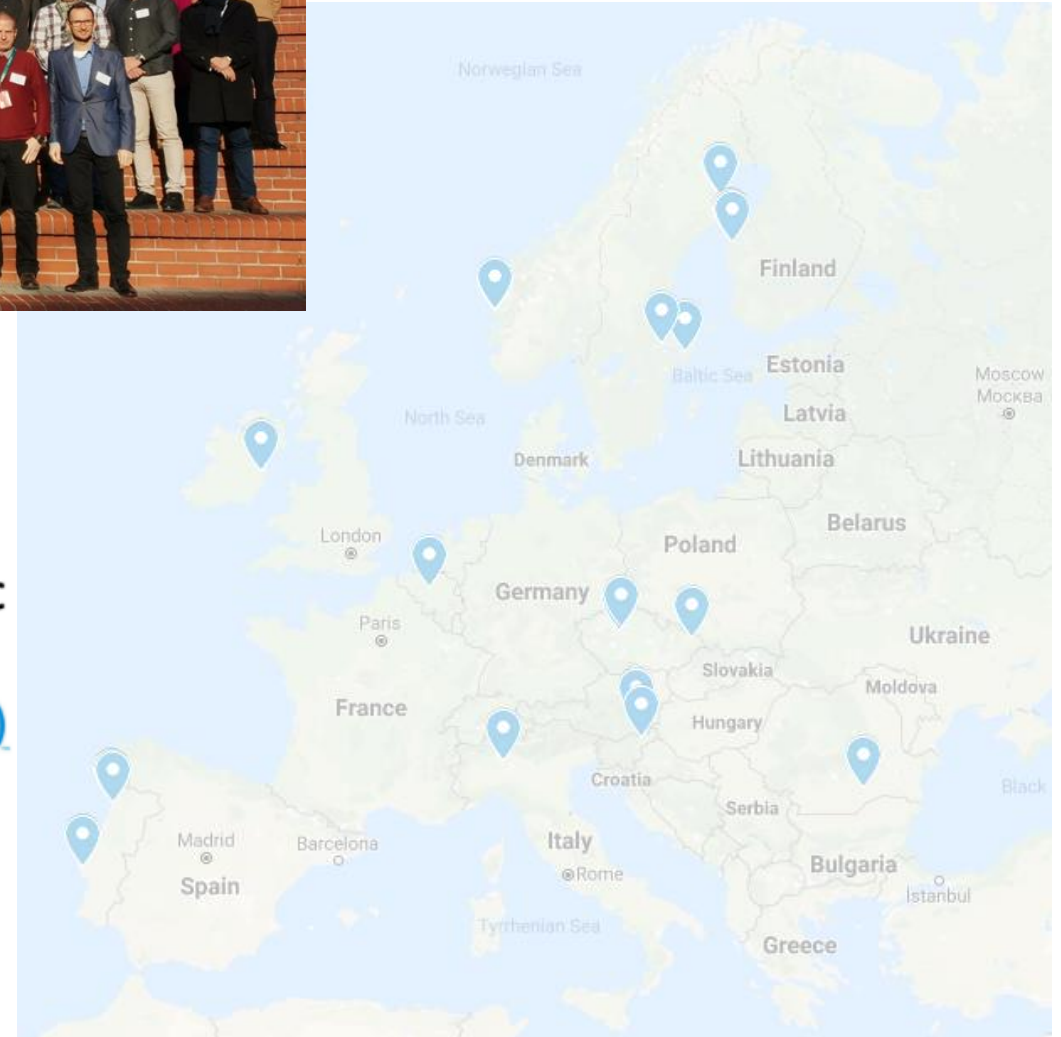
TO ENSURE THE FUTURE
COMPETITIVENESS OF THE
EUROPEAN BATTERY SECTOR
THROUGH THE AVAILABILITY OF A
HIGHLY SKILLED AND
COMPETENT WORKFORCE

ALBATTTS is a project funded by
the Erasmus+ Sector Skills
Alliances Programme



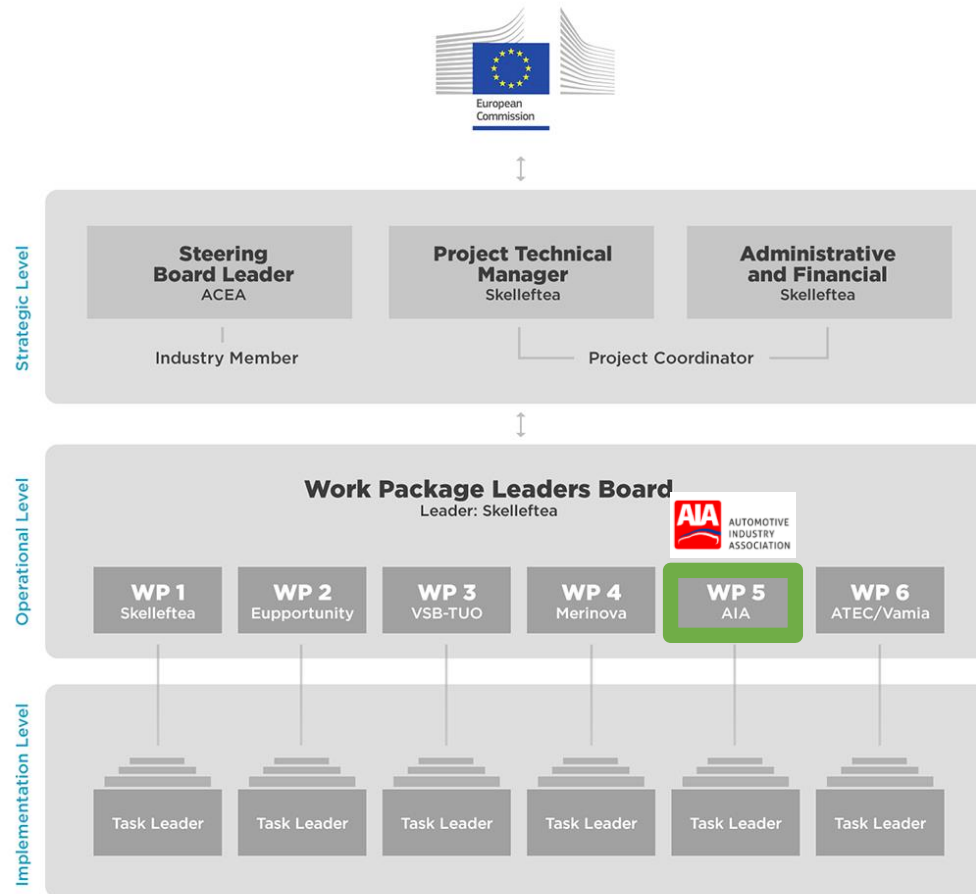
**COVERING THE WHOLE BATTERY VALUE CHAIN
INCLUDING MOBILE AND STATIONARY APPLICATIONS**

Partners





Project structure





Work process

SECTORAL INTELLIGENCE



WP3, WP4 (STATIONARY), WP5 (MOBILE)

ONGOING & INTERACTIVE QUALITATIVE AND QUANTITATIVE KNOWLEDGE PROCESS

Stakeholders database

Technologies
Stakeholders
Drivers of change

Desk research 1

Survey & Workshops 1

Emerging technologies
Global context

Desk research 2

Survey & Workshops 2

Job roles & skills

Desk research 3

Survey & Workshops 3

New skills needs
Emerging job roles
Education & training needs
Gaps in education offerings

EDUCATION & TRAINING



WP6

DEVELOPMENT AND IMPLEMENTATION PROCESS

Train-the-trainer guidelines

Piloting innovative course designs
Adaptive learning

Writing VET learning objectives
Producing OER

Analysis and definition of new job roles?
Analysis of best practices
Analysis of new skills

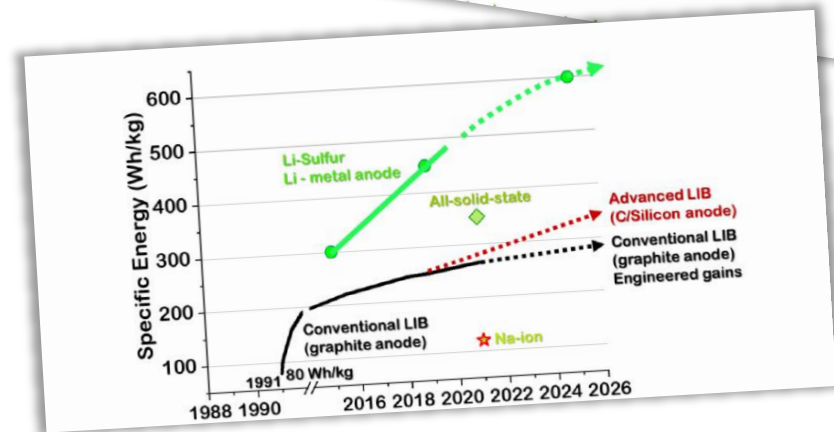
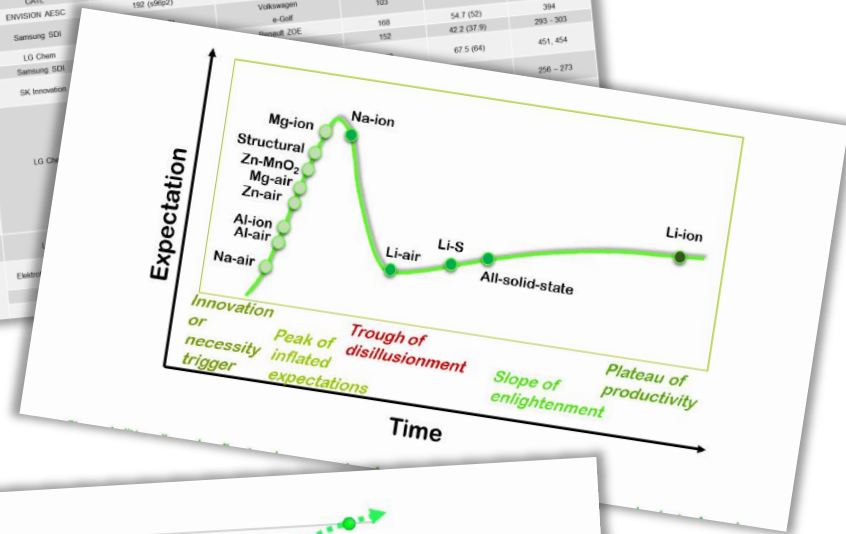
Implementation of results at EU level and in national education systems



Reports



Cathode type	Ratio (R) or Cell designation (S)	Manufacturer	No. of cells (series, parallel)	EV Model	Specific Energy (Wh/kg)	Energy (usable) (kWh)	Range, combined (WLTP, relevant) (km)
Lithium Nickel Cobalt Aluminium oxide (NCA)	18000 (S)	Panasonic	8256 (x10y8)	Tesla Model S	162	102.4 (98.4)	503, 487
	2170 (S)	Panasonic	4416 (x10y4)	Tesla Model X	168	80.5 (78)	530
Lithium Manganese Oxide (LMO)		Yusaka	80	Citroen Zero (LEV50 battery)	107	14.5	150
	532 (R)	ENVISSION AESIC	298	Nissan Leaf e+	140	56 (46)	385
Lithium Nickel-Manganese Cobalt oxide (NMC)	333 (R)	Samsung SDI	216 (x10y2)	Peugeot e-208 Opel Corsa-e	130	39.5 (36)	349, 336
	721 (R)	SK Innovation	192 (x6y2)	Nissan Leaf	103	35.8 (32)	270
Lithium Cobalt Oxide (LCO)		LG Chem		Volkswagen e-Golf	168	54.7 (52)	394
	622 (R)	LG Chem		Volkswagen e-Golf	152	42.2 (37.9)	293, 303
Lithium Iron Phosphate (LFP)		SK Innovation		Volkswagen e-Golf	152	67.5 (64)	451, 454
		EMVI					258 - 273

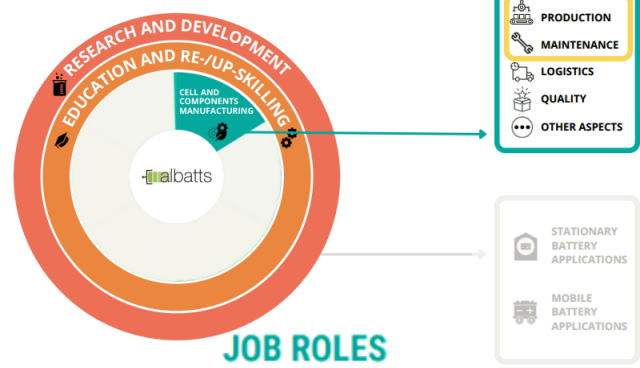


Webinars + Survey





Findings



Cell and Components Manufacturing – Production and Maintenance

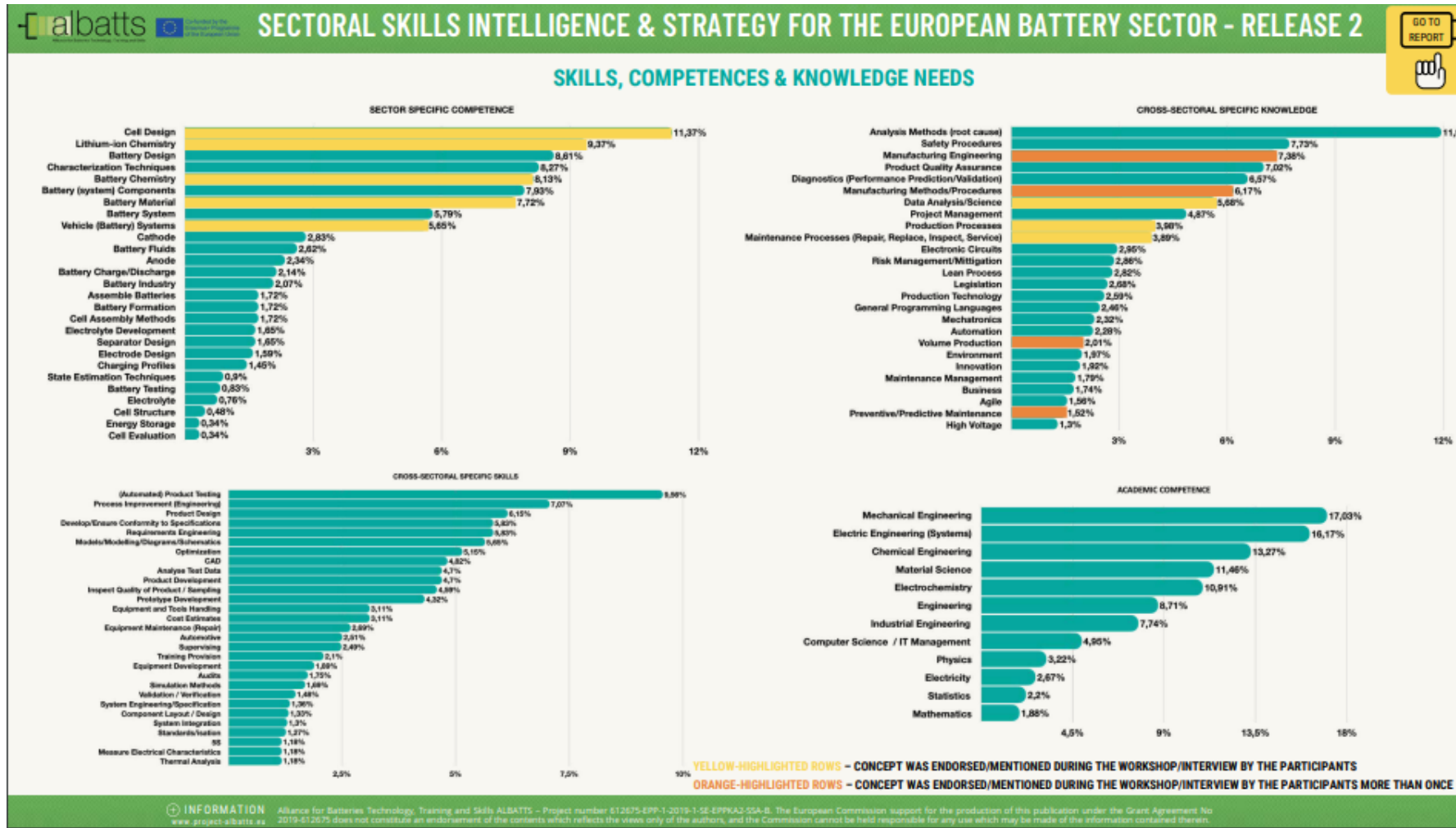
BLUE-COLLAR

TECHNICAL ASSEMBLY WORKER
 ELECTROMECHANICAL EQUIPMENT ASSEMBLER CMM LAB TECHNICIAN
 BATTERY TECHNICIAN OPERATOR
 MAINTENANCE TECHNICIAN SHIFT LEAD
 LITHIUM MAINTENANCE TECHNICIAN
 CALIBRATION TECHNICIAN
 CELL ASSEMBLY TECHNICIAN
 ELECTRICAL TECHNICIAN MECHANICAL DRAFTER MACHINE OPERATOR
 AUTOMATION/PROCESS OPERATOR
 TEAM ASSEMBLER INSTRUMENT TECHNICIAN
 PRODUCTION ASSEMBLY OPERATOR BATTERY PRODUCTION TECHNICIAN
 COMPUTER-CONTROLLED MACHINE TOOL OPERATOR MATERIAL PLANNER
 GENERAL-MACHINIST

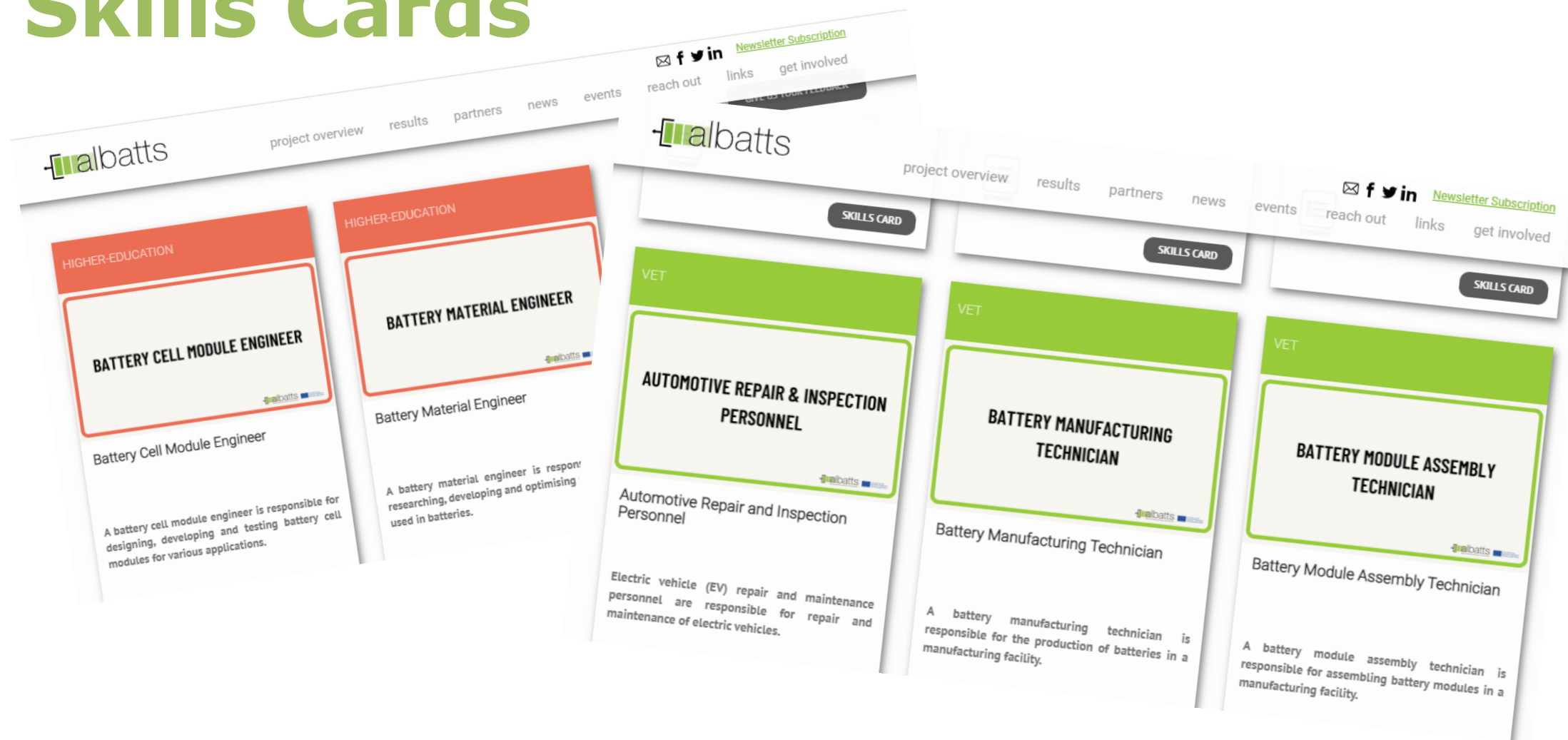
WHITE-COLLAR

BATTERY CELL SIMULATION ENGINEER
 DEVELOPMENT ENGINEER HIGH-VOLTAGE STORAGE COMPONENTS BATTERY MATERIALS ENGINEER HIGH-DENSITY ANODES
 CELL SIMULATION ENGINEER SR. BATTERY CELL ENGINEER MAINTENANCE ENGINEER
 ELECTROCHEMISTRY LEAD-BATTERY MATERIALS SR. ELECTRONICS ENGINEER TECHNICIAN
 FORMATION MAINTENANCE MANAGER CONTROLS ENGINEER CELL TEST ENGINEER
 MECHANICAL CELL DESIGN ENGINEER ELECTRICAL ENGINEER
 BATTERY MECHANICAL ENGINEER SENIOR CELL DESIGN ENGINEER
 LITHIUM ION CELL BATTERY SYSTEM ENGINEER
 CELL ASSEMBLY PROCESS ENGINEER MANUFACTURING ENGINEER
 EQUIPMENT ENGINEER
 MECHANICAL ENGINEER PRODUCTION ENGINEER
 MECHANICAL BATTERY DESIGN ENGINEER
 SENIOR/STAFF BATTERY ENGINEER ELECTRO-MECHANICAL ENGINEER
 PRINCIPAL MECHANICAL DESIGNER TOP CAP ENGINEER CELL DESIGN ENGINEER
 CELL MECHANICAL ENGINEER DESIGN ENGINEER-BATTERY TECHNOLOGY
 MECHANICAL DESIGN ENGINEER MANUFACTURING ENGINEER, LI-ION ENGINEER
 PRODUCT MANAGER CELL ASSEMBLY ENERGY STORAGE PRINCIPAL ENGINEER
 PRODUCTION MANAGER DOWNSTREAM PRODUCTION MANAGER CELL ASSEMBLY
 AUTOMATION ENGINEER SENIOR ENGINEER-BATTERY MODELLING & ANALYSIS
 ELECTRICAL DESIGN ENGINEER SENIOR BATTERY MECHANICAL ENGINEER

Cells & Components Manufacturing



Skills Cards



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Skills cards - Example



Cross-sectoral Specific Competence

Name	Type (S/K)	Description/Context	Level	ESCO
Inspect Quality of Product / Sampling	S	<ul style="list-style-type: none"> - Work towards optimizing product quality and resolving quality issues - Select, characterize, and validate materials and components - Create and update technical documentation, test plans, and test results 	Expert	inspect quality of product
Process Improvement	S	<ul style="list-style-type: none"> - Good understanding of production processes - Support root cause investigations and failure mode analysis - Drive design and process changes to improve cell technology - Find ways to improve the process and safety 	Expert	identify process improvement
Develop/Ensure Conformity to Specifications	S	<ul style="list-style-type: none"> - Select, characterize, and validate materials and components - Interface with RnD to evaluate new materials, modelling to define requirements, and validation to test new designs - Conduct feasibility studies for requested features before 	Expert	ensure conformity to specifications





Education & Training

(Work in progress...)

SECTORAL INTELLIGENCE



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Analysis of new skills

New skills needs
Emerging job roles
Education & training needs
Gaps in education offerings

Sectoral Intelligence

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Survey & Workshops 1

Desk research 2

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Survey & Workshops 2

Desk research 3

Job roles & skills

Survey & Workshops 3



STRATEGY FOR EDUCATION & TRAINING



STRATEGY FOR EDUCATION AND TRAINING IN THE BATTERIES SECTOR

TARGET GROUPS TO BE CONSIDERED:



MACRO



MICRO



EUROPEAN COMMISSION



NATIONAL AUTHORITIES

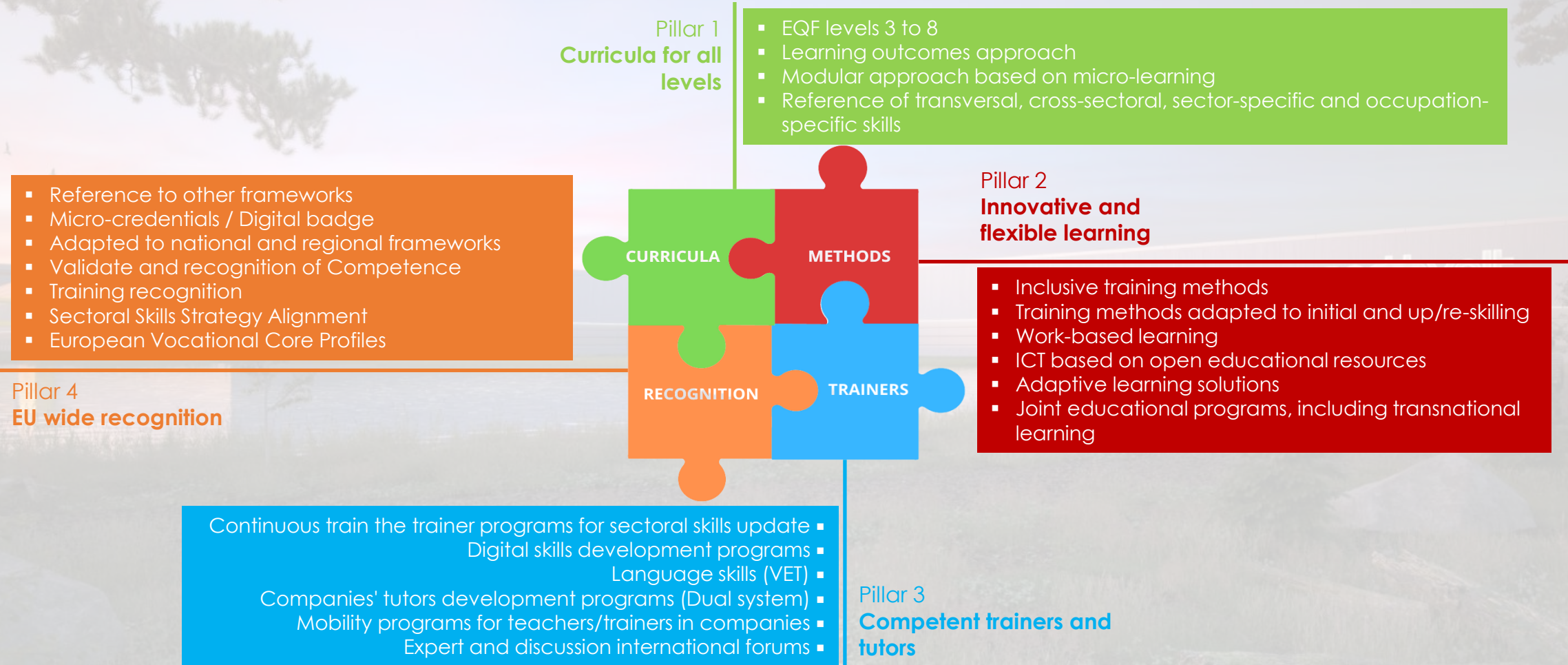


SCHOOLS (VET & HE)

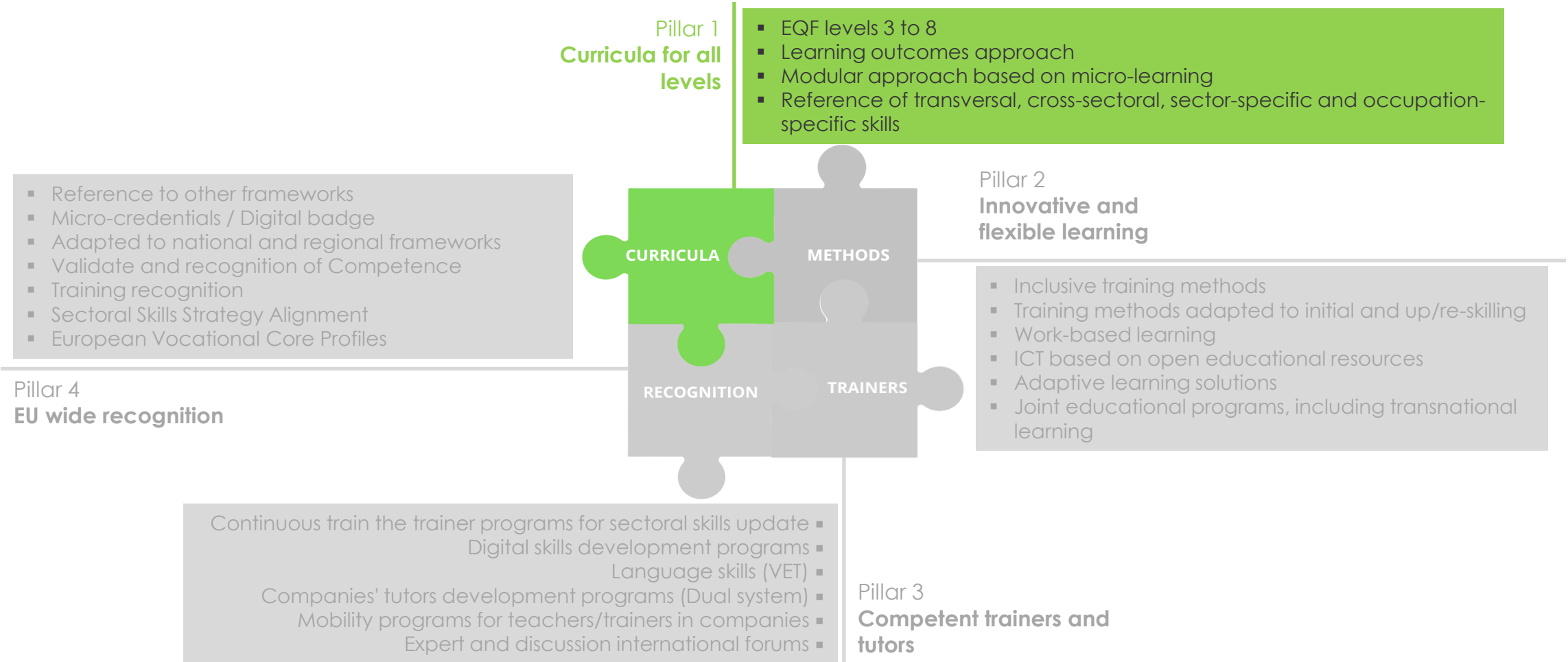


INDUSTRY/COMPANIES

Education & Training Framework



Education & Training Framework

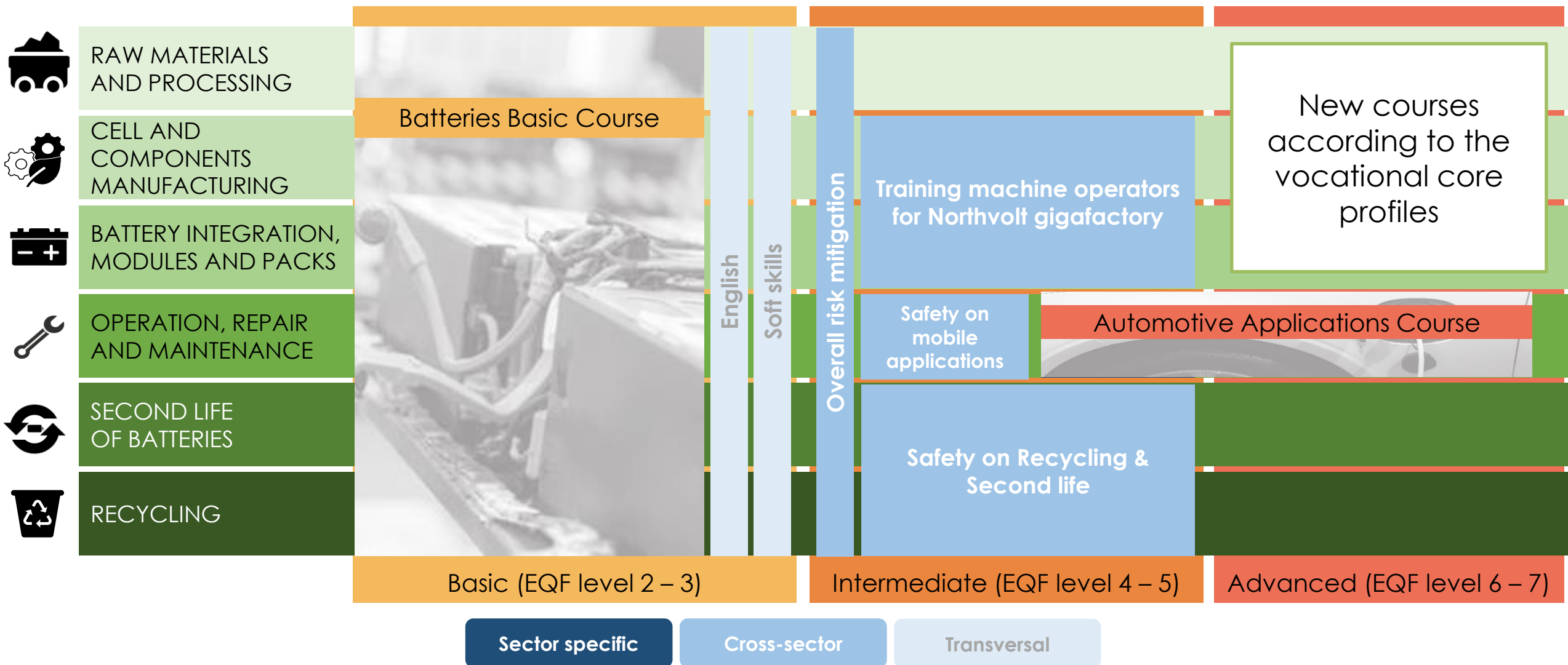




What are the most important topics to be addressed in a course for the battery sector?

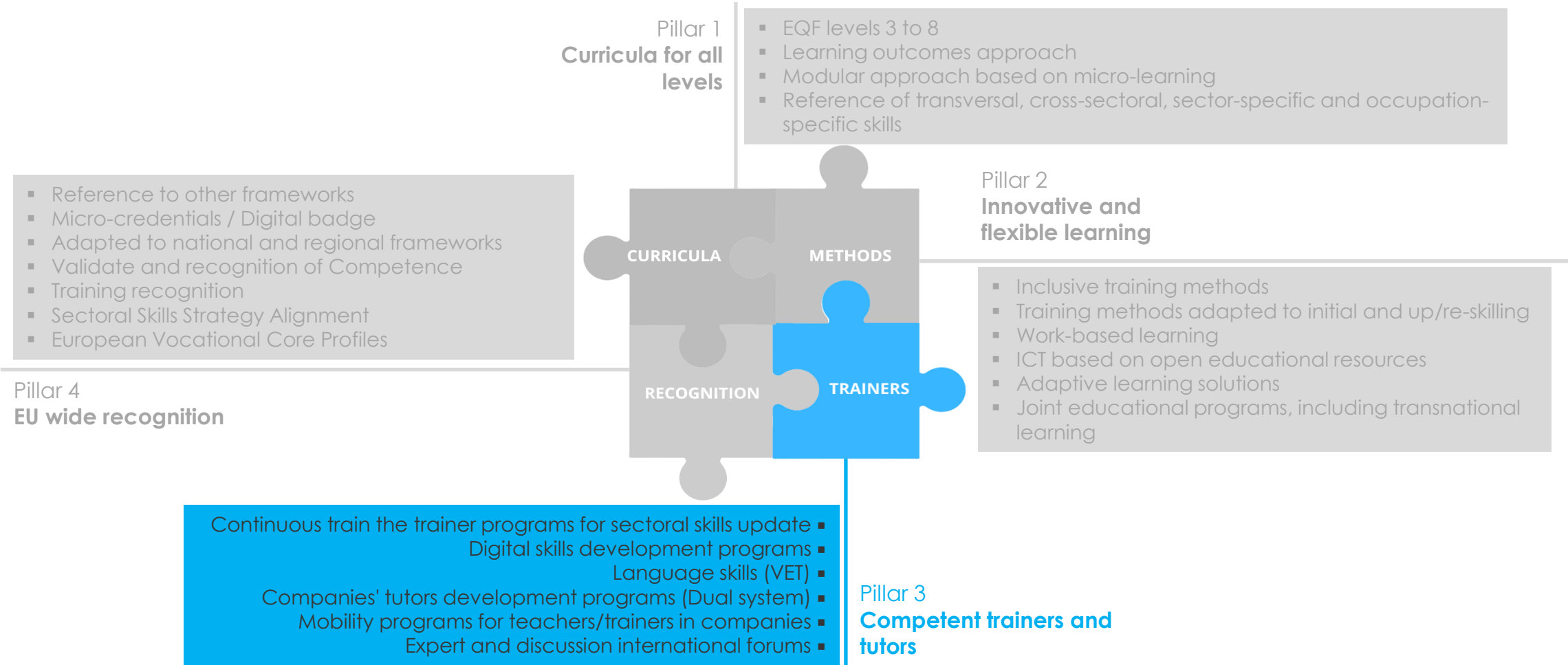


ALBATTTS Training Offer



New courses according to the vocational core profiles

ALBATTS Education & Training Framework



Building a Batteries Teachers & Trainers Forum



Teachers meeting 1-2 times a year in different locations in Europe

Mainly aimed at teachers in Vocational Education and Training



BATTERIES TEACHERS & TRAINERS FORUM

CONCEPT

Each meeting is thematic (eg. Battery industry in general, Giga factories, Electromobility, Automotive)

Building an international online teachers forum where they can meet and exchange ideas

Do you want to get involved?



Request to join!



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Battery Training Courses (selection)





Thank you!



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info@project-albatts.eu



<https://www.project-albatts.eu>



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@Project ALBATTs

JOIN OUR STAKEHOLDERS' DATABASE THROUGH OUR WEBSITE AND GET FIRST-HAND INFORMATION ABOUT OUR WORK!



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