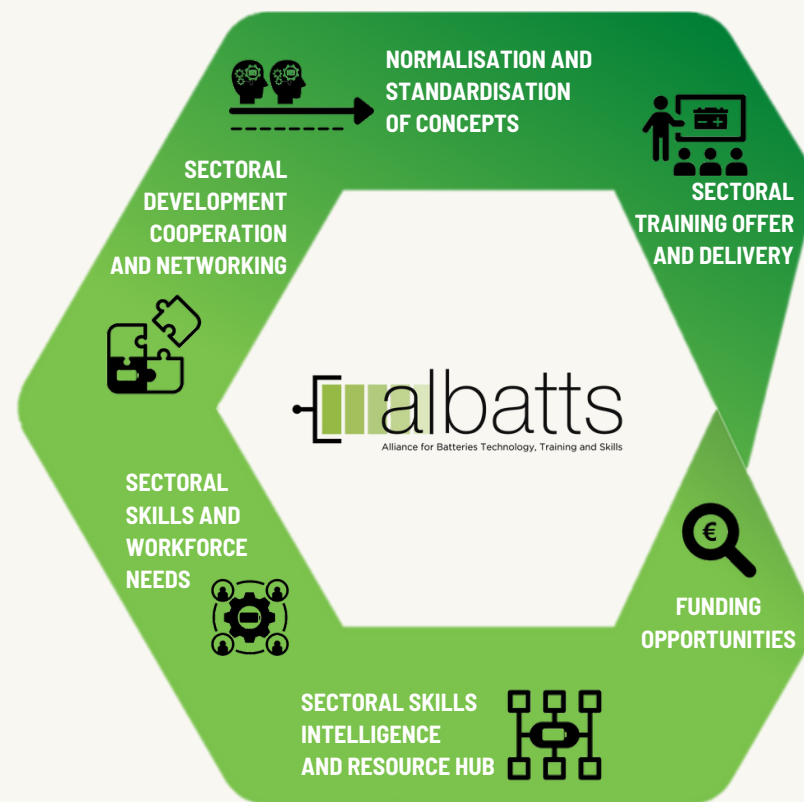


## SECTORAL SKILLS INTELLIGENCE & STRATEGY FOR THE EUROPEAN BATTERY SECTOR

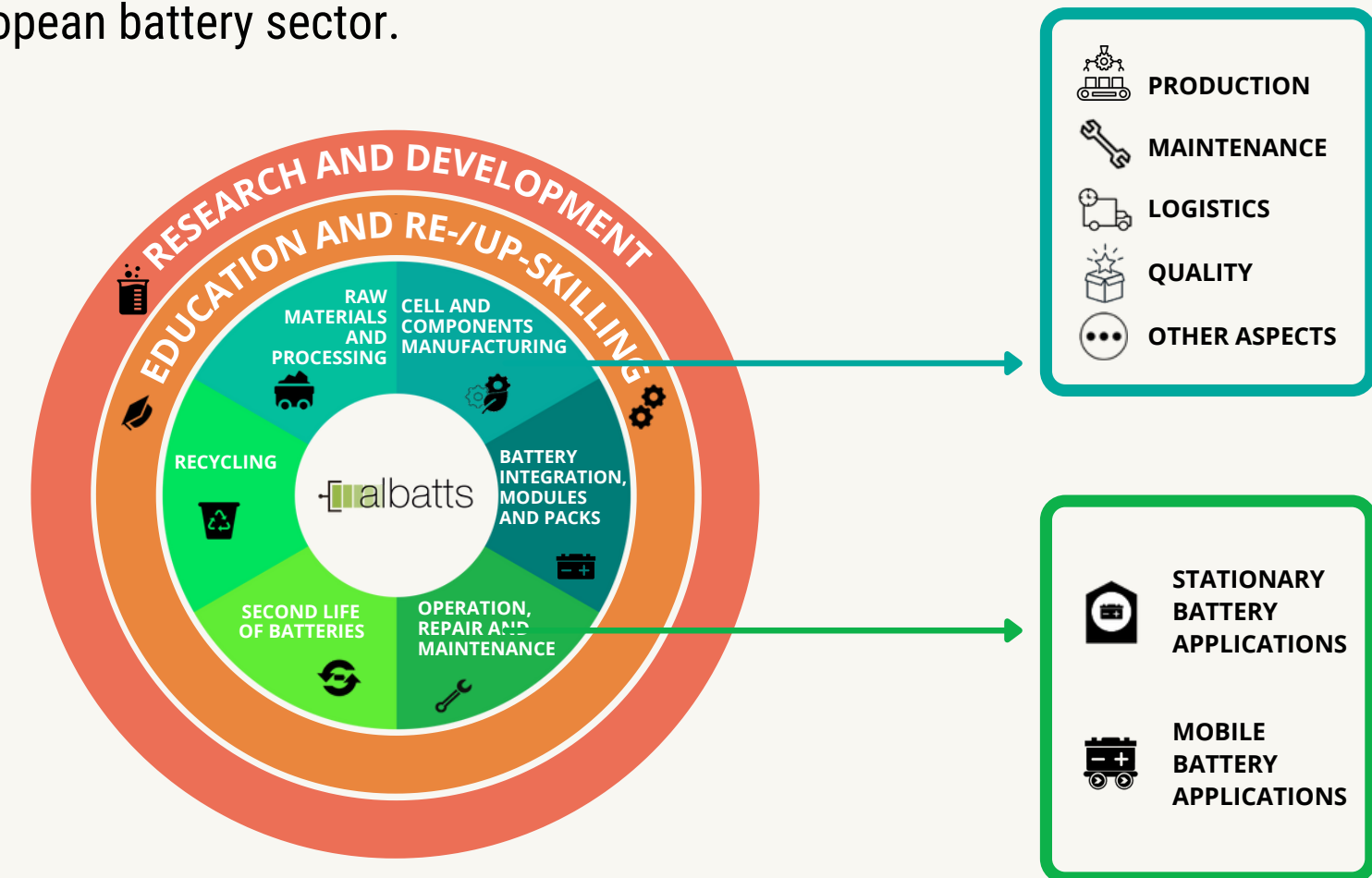
### D3.10 – Sectoral Skills Intelligence and Strategy – Release 2

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.



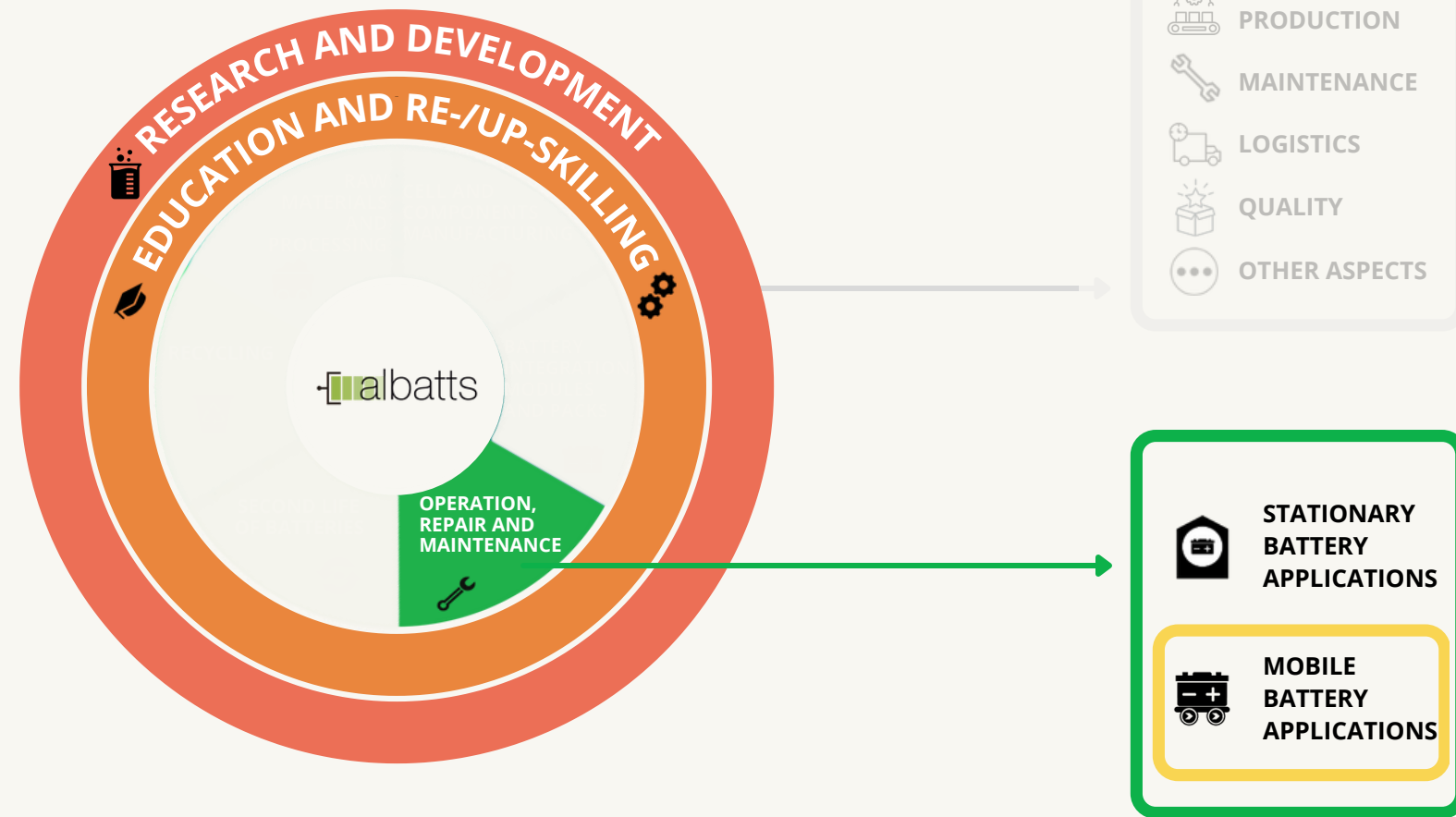
Readers will find designated actions needed in the sector to boost the overall re-/up-skilling activities as well as cooperation, information sharing and provision and many more.

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 **operation, repair and maintenance of mobile battery applications**.

## OPERATION, REPAIR AND MAINTENANCE



## MOBILE BATTERY APPLICATIONS

Main areas of interest and trends identified for mobile applications of batteries (passenger EVs and maritime vessels are being focused on in this report) with provided recommendations on how to further boost the development and availability of the skills and competences are the following:

- **EV Battery servicing, repair, and dismantling**
- **EV customer needs and related services**
- **Autonomous driving, vehicle to grid**
- **EV Testing, certification, type approval, roadworthiness tests**
- **Electrification of vessels**
- **Other Mobile Battery Applications**

## STAKEHOLDERS/COMPANIES



**TARGET GROUPS:** automotive OEMs, automotive suppliers, electric bike and suppliers, battery manufacturers and suppliers, system integrators and EPC contractors, monitoring and service providers.

## EV BATTERY SERVICING, REPAIR, AND DISMANTLING

Activities and trends related to servicing, maintenance, repair and dismantling of batteries installed in electric passenger vehicles. Skills and competence for EV batteries maintenance and repair that need to be strengthened include especially the following areas:

- EV and battery diagnostics and repair in general;
- troubleshooting;
- high voltage competence and qualification;
- battery charge and discharge;
- battery management systems;
- safety;
- relevant standards and regulations knowledge.

The lack of workers with high voltage qualifications seems to be rather urgent. Knowledge, and skills in second life, safe handling, refurbishment and recycling of batteries, digitalisation, and traceability of battery lifecycle are also needed when dismantling EV batteries.

Dealerships and vehicle repair shops need to be adjusted, especially in terms of safety. They often need to build and operate charging stations at their premises, sometimes complemented by storage systems and solar panels. VR/AR training environment may be efficient means of training delivery in this area.

## SUB-TRENDS:

**Servicing, repair, and maintenance of electric vehicles and EV batteries**



**End of life – dismantling of batteries**



**Adaptation of dealerships, service, and repair shops**





## EV CUSTOMER NEEDS AND RELATED SERVICES

Selection of customer services related to the operation of EVs and their batteries. The range and volume of information provided in dealerships can vary across the regions.

Methodological guidance, such as different manuals and training to the employees in dealerships, car rental, or shared mobility companies, could help in this regard. When it comes to smart charging and fleet management business, competencies in many areas need to be combined - battery and charging systems, business and software development, telematics, and grid functions.

Companies dealing with charging infrastructure design, installation, and maintenance also need various competencies – including engineering, mastering building permit processes, battery-relevant safety, or IT and payment solutions. First-responders, fire fighters, and rescue services need new methods, tactics, and specific training to deal with emergencies related to EV batteries.

Research and development of new extinguishers or procedures will need to react to current and future battery technologies. We can also expect higher demand for towing and mobile charging services in the future. Competence within the driving schools should be updated, together with teaching materials, and strengthened to facilitate the electrification of road transport and structural changes in the automotive sector.

## SUB-TRENDS:

**Advising customers in dealerships, car rentals, and secondary market**



**Smart charging, fleet management, data sharing services**



**Charging infrastructure design, installation, and maintenance**



**Rescue services, roadside assistance**



**Education in driving schools**



## AUTONOMOUS DRIVING, VEHICLE TO GRID

Relates to technical areas of autonomous driving and vehicle to grid (V2G) concepts and services. As EVs seem to be easier controlled by autonomous systems than ICE vehicles, they are an essential driver of autonomous mobility.

Cybersecurity skills/competence and knowledge related to the mobile applications of batteries in electric vehicles need to be prioritised when applying concepts of autonomous vehicles to ensure customer safety and privacy.

When it comes to the Vehicle to Grid concept, it can bring crucial opportunities not only for improving renewable energy sources integration into the energy grid. Battery and grid-relevant knowledge, together with IT skills, will be needed to be strengthened.

## SUB-TRENDS:

**Autonomous driving**



**Vehicle to grid (V2G) concept**



## EV TESTING, CERTIFICATION, TYPE APPROVAL, ROADWORTHINESS TESTS

Focuses on activities and trends related to technical aspects of electric vehicles and charging infrastructure before they can be placed on the market and put into operation and periodic roadworthiness tests of electric vehicles.

Relevant technical expertise is closely linked to legislation and standards knowledge. Given the systemic shift and increasing complexity of the process of testing and homologation brought by EVs, massive investments are needed in new technologies and systems for testing, certification companies and technical services. At the same time, employees of these companies will need to expand and improve their knowledge and skills, especially in electrical and high voltage fields and interoperability. In addition, these companies usually cover testing of charging infrastructure as well.

Among others, digital communication, grid connection guidelines, and different safety standards must be complied with. So far, specific processes for EVs during periodic roadworthiness tests do not exist. However, with the increased number of EVs in operation and development of the used cars market, attention to this area could be expected, as well as a need for upskilling existing employees or hiring new ones.

## SUB-TRENDS:

Testing of electric vehicles



Testing and certification of charging infrastructure



Type approval of electric vehicles



Periodic roadworthiness tests of electric vehicles



## ELECTRIFICATION OF VESSELS

Vessels travel across the oceans and can be more challenging to reach for service personnel than an electric road vehicle. For this reason, remote diagnostics and over-the-air updates are necessary. Apart from battery-related expertise (such as electrochemistry, high voltage qualification, or mechanical engineering), digital technology competence (remote diagnostics & fault finding, cybersecurity, data transfer, communication protocols, etc.) is crucial.

Like electric vehicles, electrified vessels are better suited for autonomous sailing. Therefore, strengthening the skills and training people in digital technology for autonomous systems - data scientists, test engineers, software developers, cloud solutions experts, and cybersecurity experts and engineers, is necessary. For product design and consulting, combining skills of internal combustion engines, batteries and programming are crucial.

In addition, knowledge of safety requirements for maritime should be strengthened (e.g., thermal management, off-gas handling, system-level safety, or risk evaluation).

## SUB-TRENDS:

**Servicing – remote diagnostics, repair, and maintenance of electric vehicles**



**Autonomous electrified vessels**



**Customer product design, consulting, fleet management**







## OTHER INDUSTRIAL AND STATIONARY BATTERY APPLICATION

**Heavy-Duty Vehicles:** Mobile applications of batteries in trucks, buses, and utility vehicles are discussed in the context of where they stand in electrification. Specific technologies and trends are discussed



**Vans:** Vans' electrification and specifics compared to the other commercial vehicles are drawn



**Motorbikes, Micro-mobility, e-bikes:** The electrification and connected trends of customer demand and new business models of shared mobility connected to motorbikes, micro-mobility, and e-bikes are discussed



**Aerospace:** The usage of batteries in space applications such as spaceships or satellites is being discussed. Other applications in drones or planes are outlined



**Inland Waterway Vessels:** Electrification of vessels in city centres and areas where clean air is desired



## JOB ROLES AND SKILLS NEEDS

Job roles and skills needs within this domain were analysed and categorised by the production lifecycle. The following categories were identified, and needed skills and job roles based on the job advertisements were outlined:

- Design and Development;
- Manufacturing;
- Maintenance;
- Sales, Services, and Support or Technical Project Management





## LINKS & RESOURCES

- [Sectoral Skills Intelligence and Strategy - Mobile Battery Applications](#)
- See the [list of the ALBATTs SKILLS CARDS](#)



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