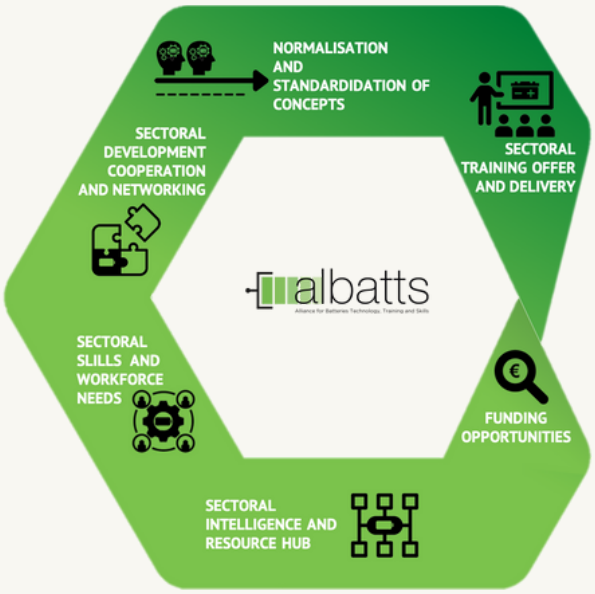
SECTORAL SKILLS INTELLIGENCE & STRATEGY FOR THE EUROPEAN BATTERY SECTOR

D3.6 – Sectoral Skills Intelligence and Strategy – Release 1

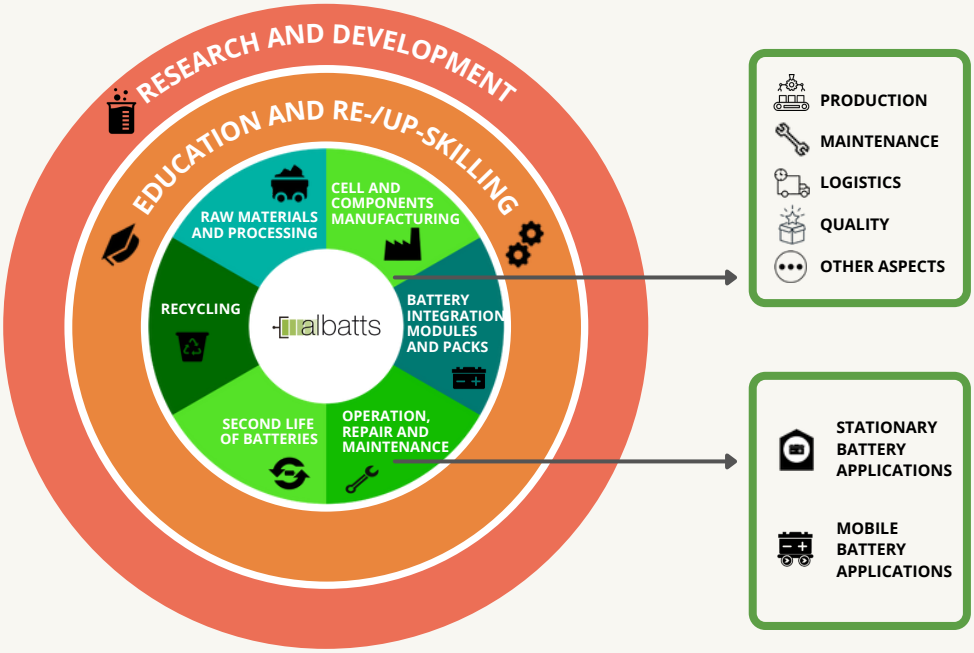
This is the first release of the sectoral skills intelligence and strategy **covering the whole European battery value chain from raw materials to recycling of batteries in terms of skills needs, job roles needs and recommendations**.

GO TO REPORT



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 overview of the skills and 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.



INFORMATION
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RECYCLING

OVERALL NEEDS

Overall focus on the skills/job roles needs for the whole value chain, example intelligence in **recycling**:

- Biggest **recruitment challenges**: engineers and researchers (first phase of the recycling facility set-up requires more white-collar workers, which levels more with the blue-collar as the plant is in the later stages of maturity)
- **Technology** and **processes**: chemical and physical recycling processes needs to be educated, this is joined with knowledge and skills of: (1) environmental management and circular economy; (2) battery design and design of components with the orientation on recycling at the end of the lifecycle; (3) battery materials, material science, chemistry and electrochemistry; (4) vehicle battery systems and systems overall; (5) material flow; (6) recycling processes, technologies, innovations and automation; and many more
- Strategies for **used battery collection**, methods and systems need to be developed

JOB ROLES NEEDED

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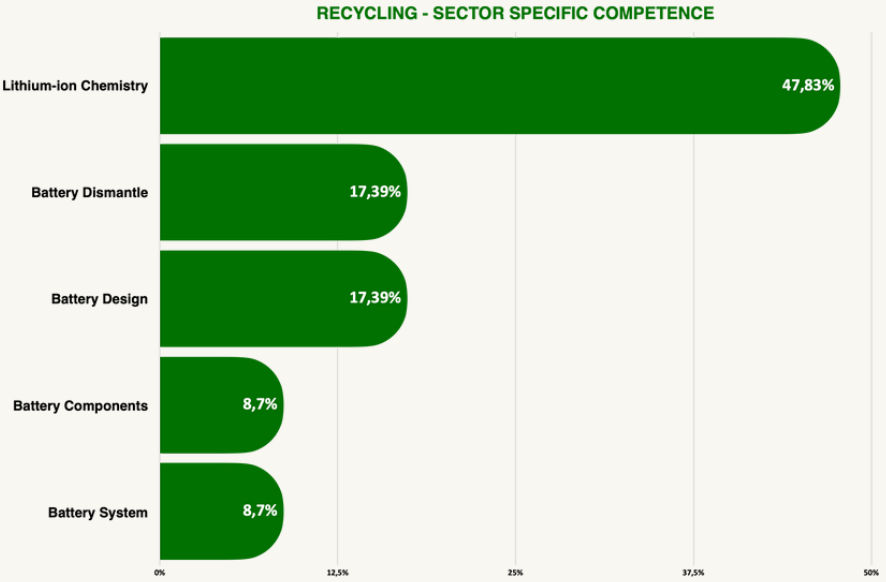
RECYCLING

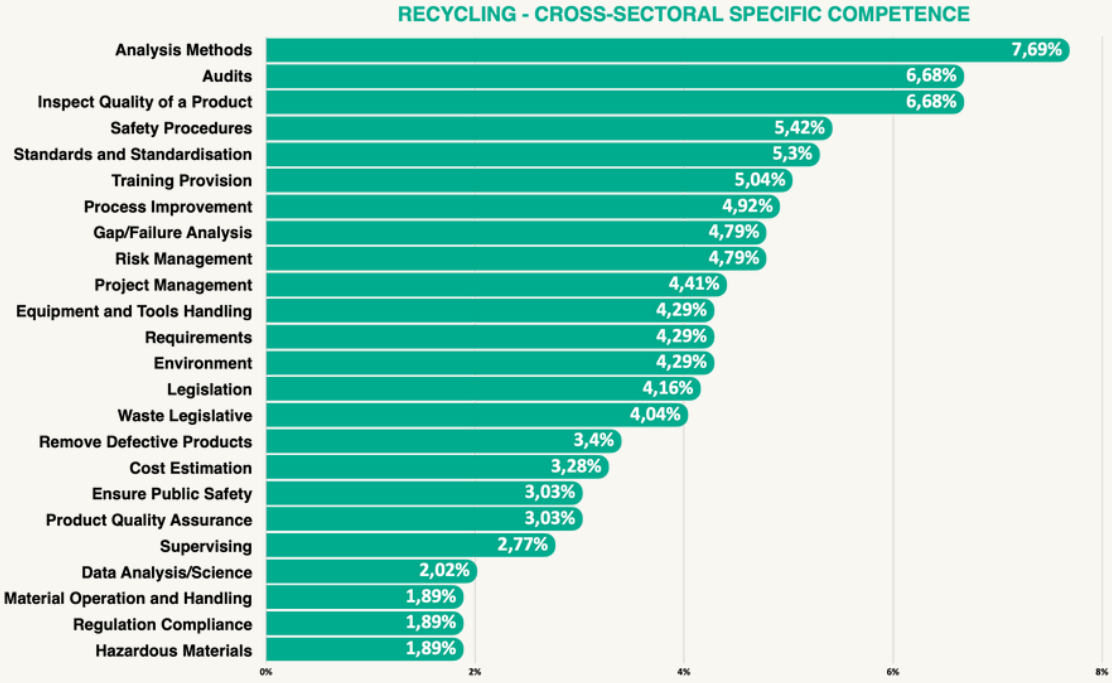
... JOB ROLES NEEDED

Observed Blue-collar workers are having expertise in **material handling**, **operation**, **machines** and **recycling**, among others.

White-collar workers are having expertise in **audits**, **safety**, quality and **process engineering**, among others.

NEEDED SKILLS / KNOWLEDGE





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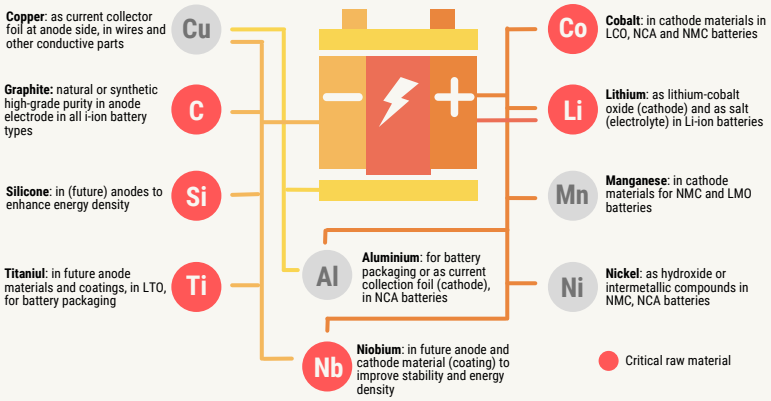
RAW MATERIALS & PROCESSING

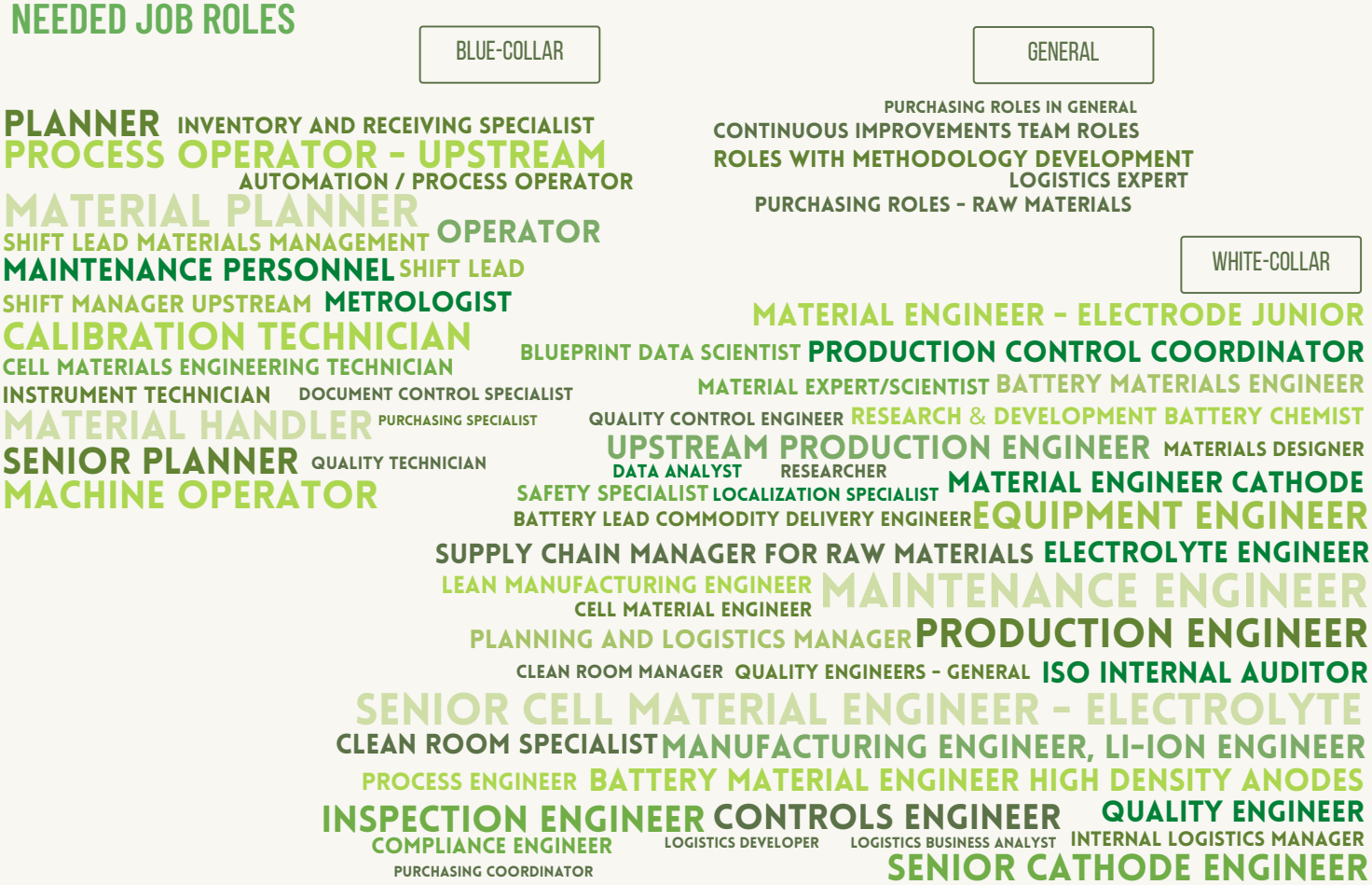
OVERALL NEEDS

- Strengthening the awareness on the critical raw materials questions for Europe and connected emerging trends and issues;
- Development of new skills needs for mining and refining of raw materials relevant for the battery production (and relevant training material);
- Cooperation on the skills agenda and organisation of education events with relevant stakeholders within the sector.



Critical raw materials in Europe

NEEDED JOB ROLES



Blue-collar workers expertise domains: process and machine operation, material planning, calibration and instruments/equipment, among others.

White-collar workers expertise domains: material engineering (electrode, cathode, electrolytes...), production control, inspection and quality, supply chain management, production, process and methodology improvement.

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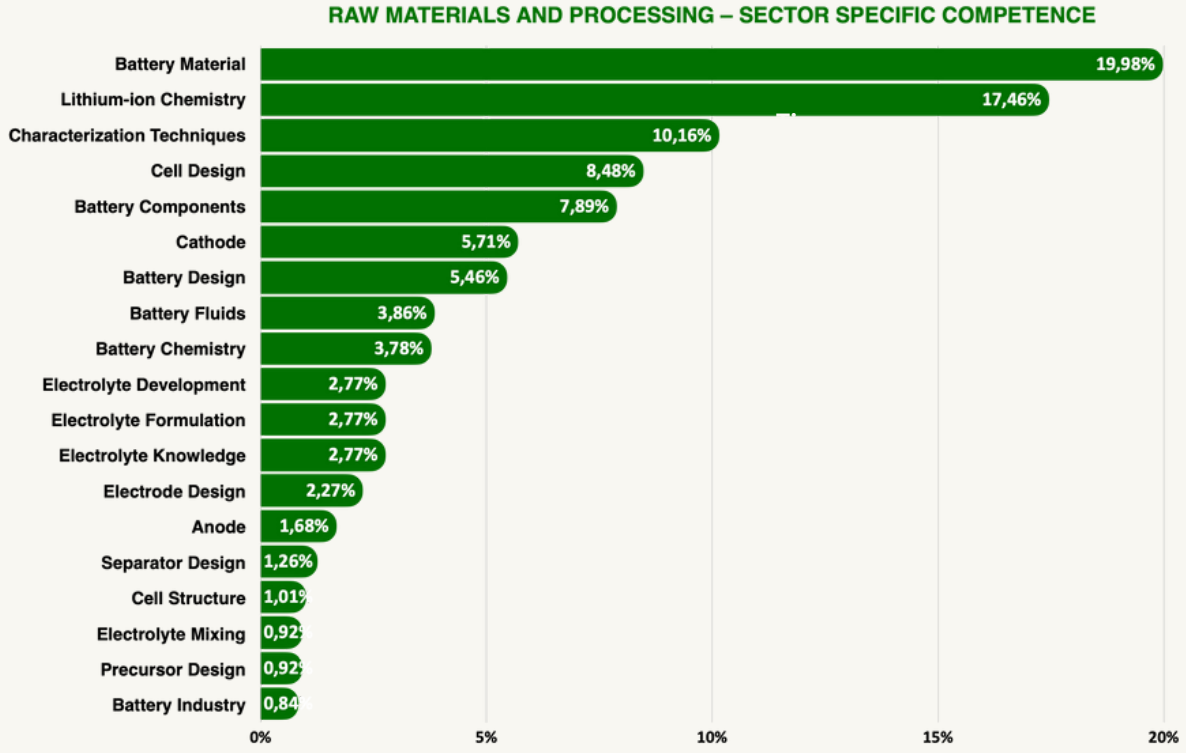
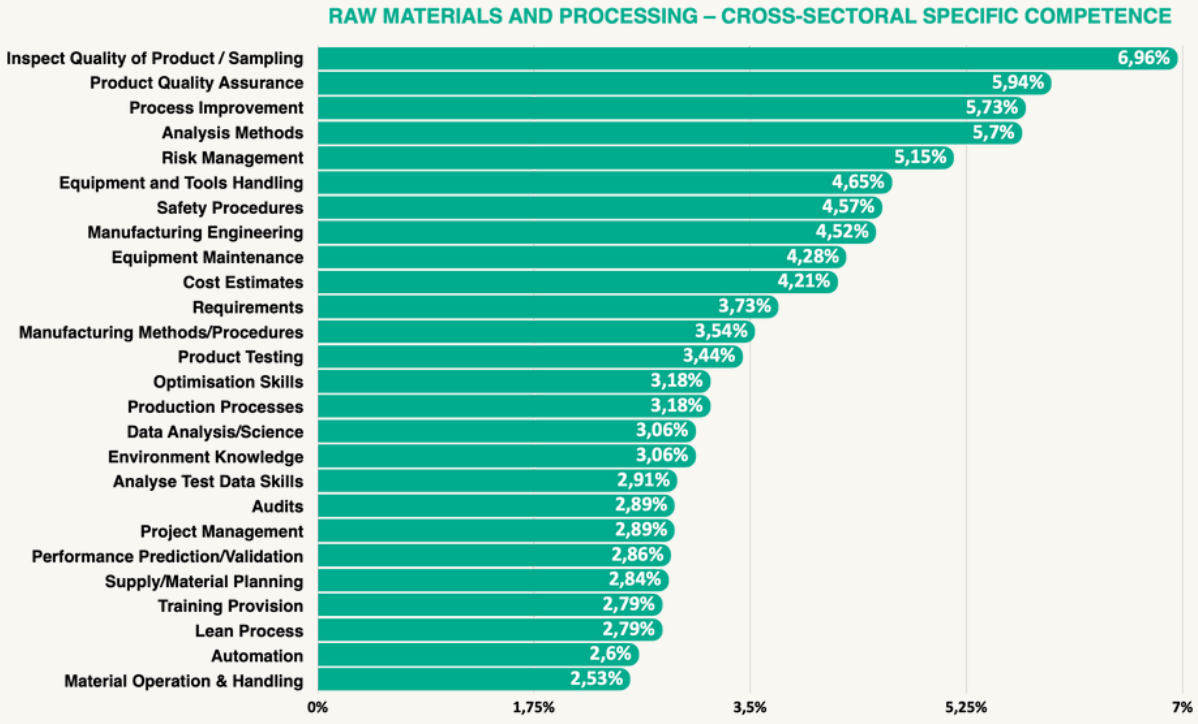
RAW MATERIALS & PROCESSING

NEEDED SKILLS / KNOWLEDGE





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CELL PRODUCTION & MAINTENANCE

OVERALL NEEDS

Production

- Understanding in the fields of **electrochemistry**, **electronics**, **mechanical engineering**, **process engineering**, **manufacturing technology**, **automation and digitalisation in manufacturing** (data analytics, maintenance and product process optimisation);
- In general, to speak and understand foreign languages, mainly English in working environment.

Production Maintenance

- Apart from the general battery related education, strengthening the skills and competences to ensure understanding of **setting up the production**, **preparing related structures**, **commissioning the machines**, **chemical and mechanical assembly**, **automation** experience and **mechanical** understanding of the **automated systems** combined with **calibration** and **software**
- Strengthening the **IT** and **data analytics** skills to cover future needs
- **Dry and Clean rooms** maintenance
- **Predictive** and **preventive** maintenance
- **Diagnostics**

NEEDED JOB ROLES

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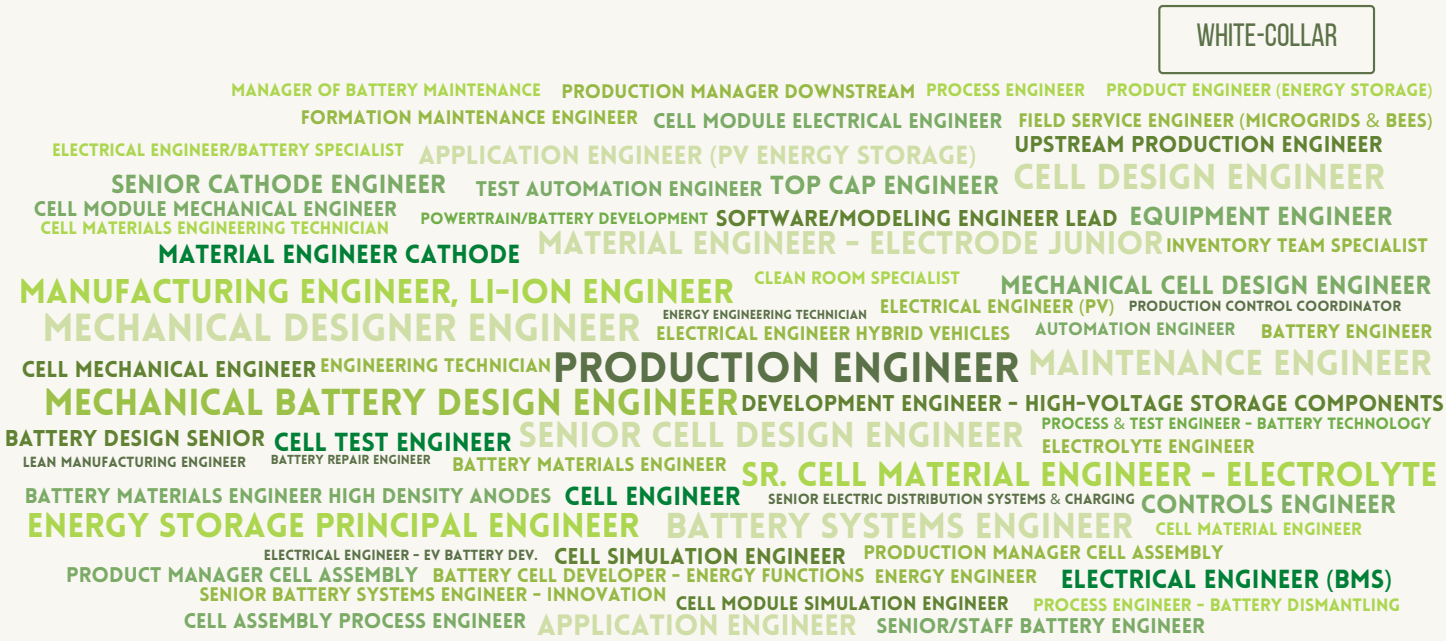
CELL PRODUCTION & MAINTENANCE

...NEEDED JOB ROLES



Blue-collar workers expertise domains: battery assembly; quality; machine/process operation and maintenance.
White-collar workers expertise domains: production engineering; material engineering; testing; electrical engineering; maintenance engineering; mechanical engineering;

BLUE-COLLAR

- **Up-stream** production – risks, envision safety issues and chemical behavior
- **Down-stream** production – machine understanding, 5S, troubleshooting
- Overall production system understanding
- Material handling, clean / dry room procedures, quality, sampling, material pressing, electrode process, fine mechanics, HMI (human machine interface)

WHITE-COLLAR

- Increasing competence in **production** and **material engineering**, **production planning**, **shift management**, **process engineering**, **cell design**, **machine learning** and **optimization, modelling and simulation**;
- Strengthening the focus on **large-scale manufacturing**, understanding of chemical processes, quality and risk/safety management;

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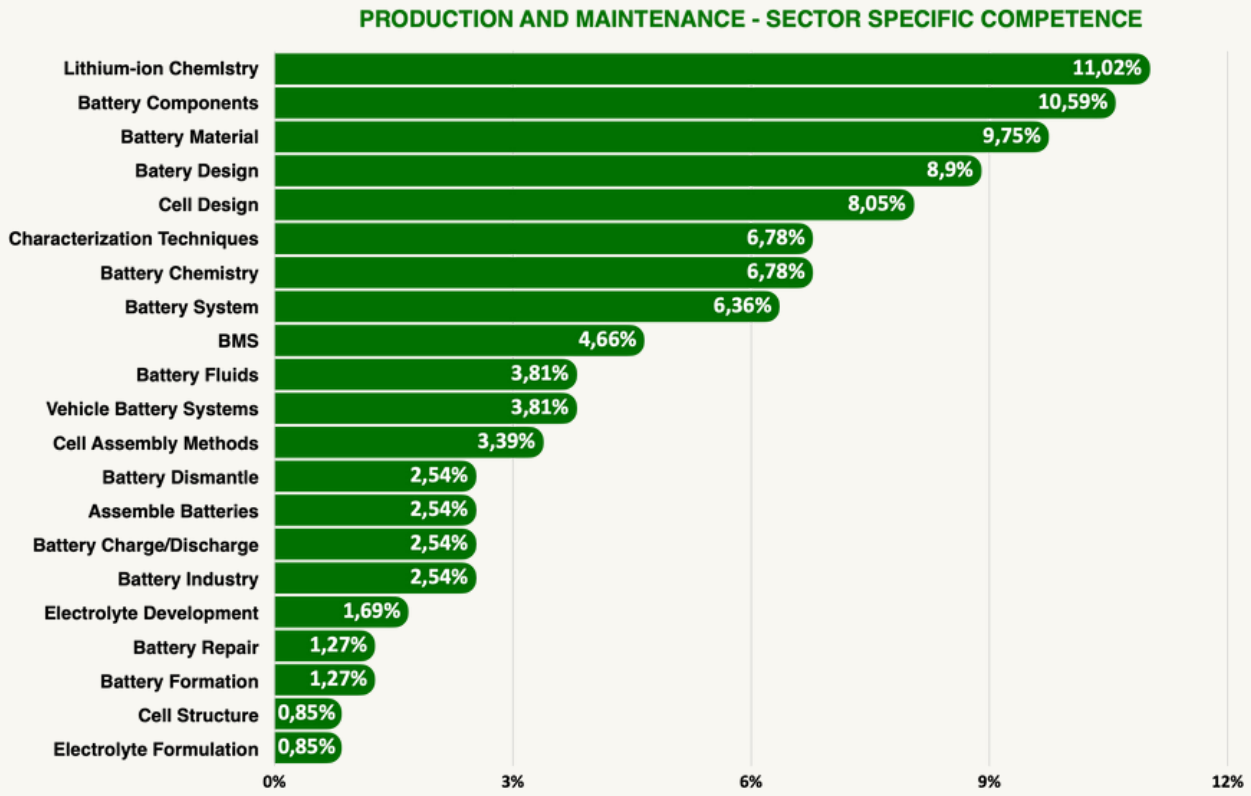
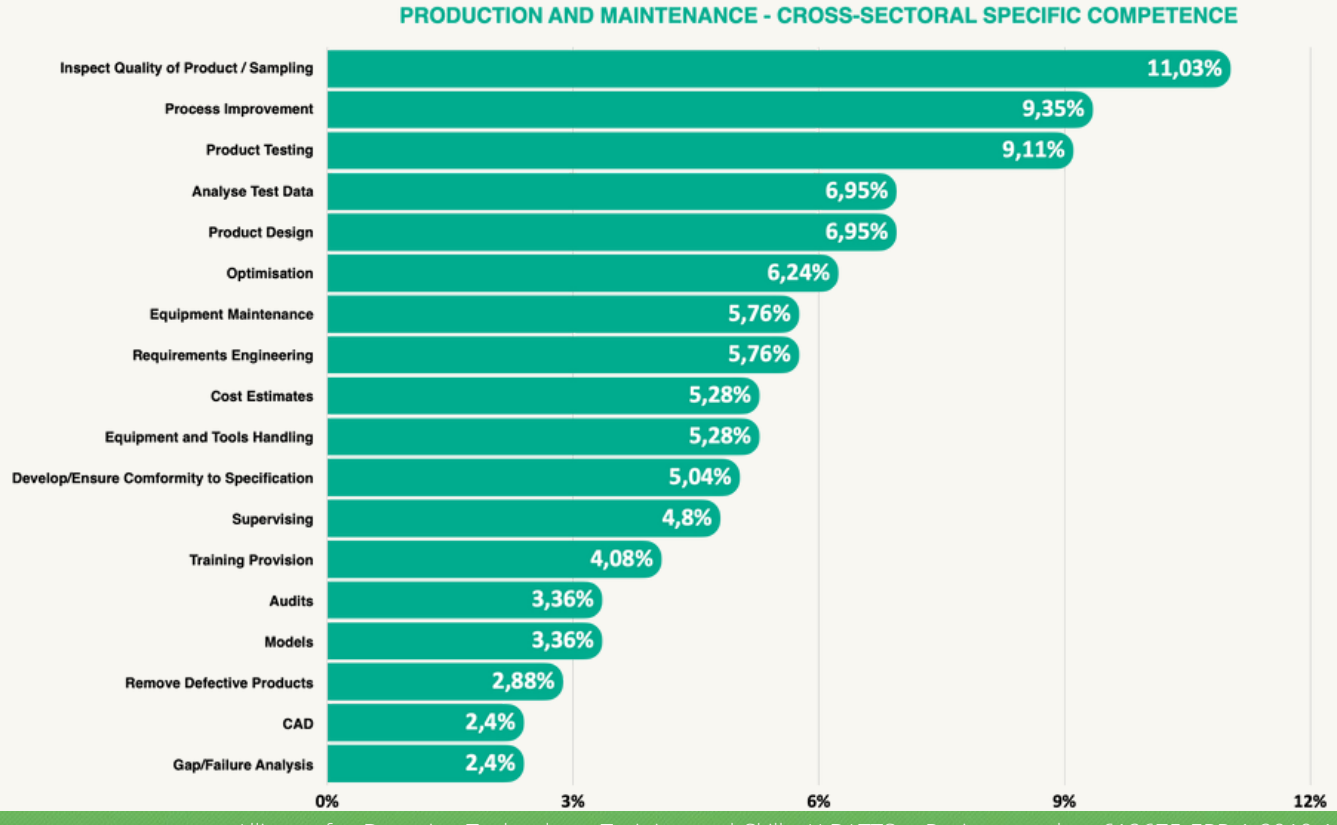
CELL PRODUCTION & MAINTENANCE

NEEDED SKILLS / KNOWLEDGE





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RESEARCH & DEVELOPMENT

OVERALL NEEDS

- Overall cooperation on the research and development on the future issues and connection to the training and education needed to facilitate those needs

- Strengthening the competences in **electrochemistry**, particularly those related to the **characterisation**, **cell evaluation**, **validation**, **electrolyte development**, **thermal management**, **cell design**, **battery components**, **lithium-ion battery chemistry**, **battery design** and **battery material**.

- ALBATTS Provided report on the current state-of-the-art of alternative chemistries:
  - Future of the Li-Ion Batteries
  - Lithium-Sulphur Batteries
  - Sodium-Ion Batteries
  - Structural Batteries
  - Supercapacitors and Ultracapacitors
  - Fuel Cells

NEEDED JOB ROLES

White-collar workers expertise: **material engineering**, **battery systems**, **manufacturing** and other.
Generic job roles are **scientists** and **researchers**.

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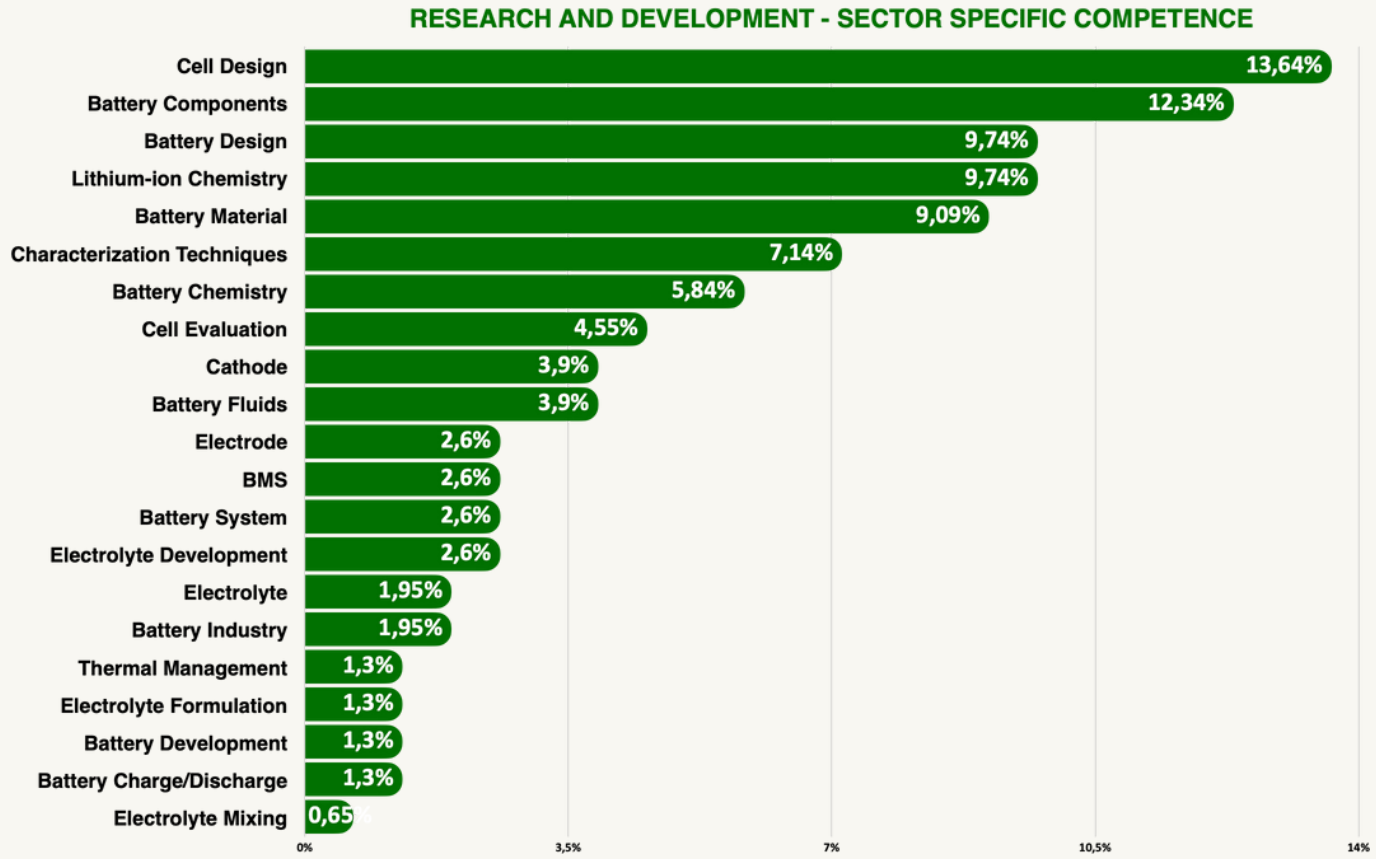
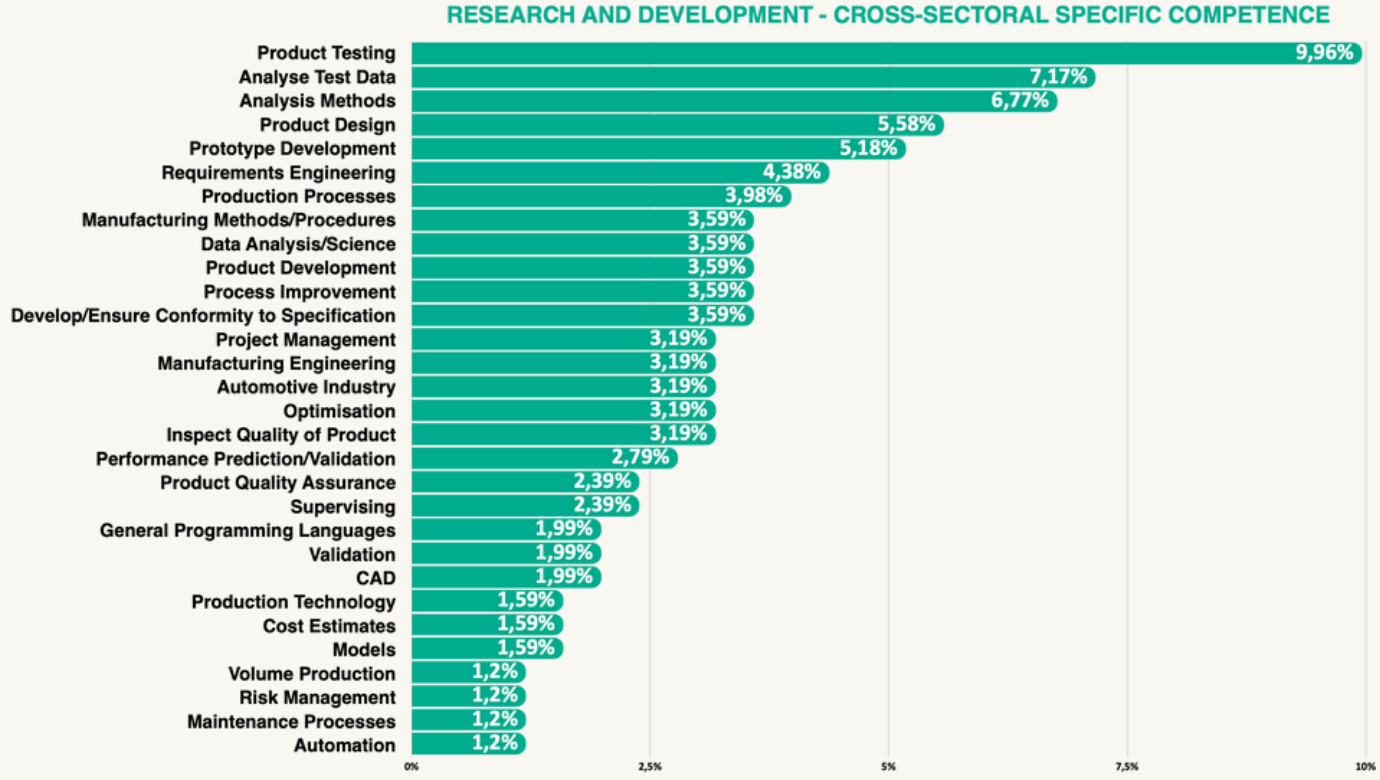
RESEARCH & DEVELOPMENT

NEEDED SKILLS / KNOWLEDGE





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