

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

Presentation at the NVL Conference in Skellefteå  
11/04/2024

Dr Anders Norberg,  
Coordinator,  
Skellefteå Municipality

# THE PROJECT



THE BLUEPRINT FOR SECTORAL COLLABORATION ON SKILLS IN THE BATTERY SECTOR

# What is an ERASMUS+ "Blueprint" project?



- Based in an action in the **European Skills Agenda** 2016; "Sector Skills Alliances"
- **One project** for each sector, 4 years, min 12 partners in 10 countries
- To examine relevant trends, changes, new job roles, new skills demands, education needs, solutions
- To strengthen **European competitiveness** - addressing skills mismatches by training and education
- To develop a **sectoral skills strategy**
- A part of EU **soft policy** - all countries have their own education systems
- From 2020, "alliances" are becoming "partnerships" in the "**Pact for Skills**" initiative

# Examples of ERASMUS+ Blueprints

## Wave 1 (2018-2022)



Automotive  
project-drives.eu



Maritime  
technology  
projectmates.eu



Space  
(Geo information)  
eo4geo.eu



Textile, clothing,  
leather & footwear  
s4tclfbblueprint.eu



Tourism  
nexttourismgeneration.eu

## Wave 2 (2019-2023)



Additive manufacturing



Construction



Maritime shipping



Steel industry

## Wave 3 (2020-2024)



Batteries for  
electro-mobility



Bio-economy: new  
technologies &  
innovation  
in agriculture



Defence  
technologies



Digitalisation  
of the energy  
value chain

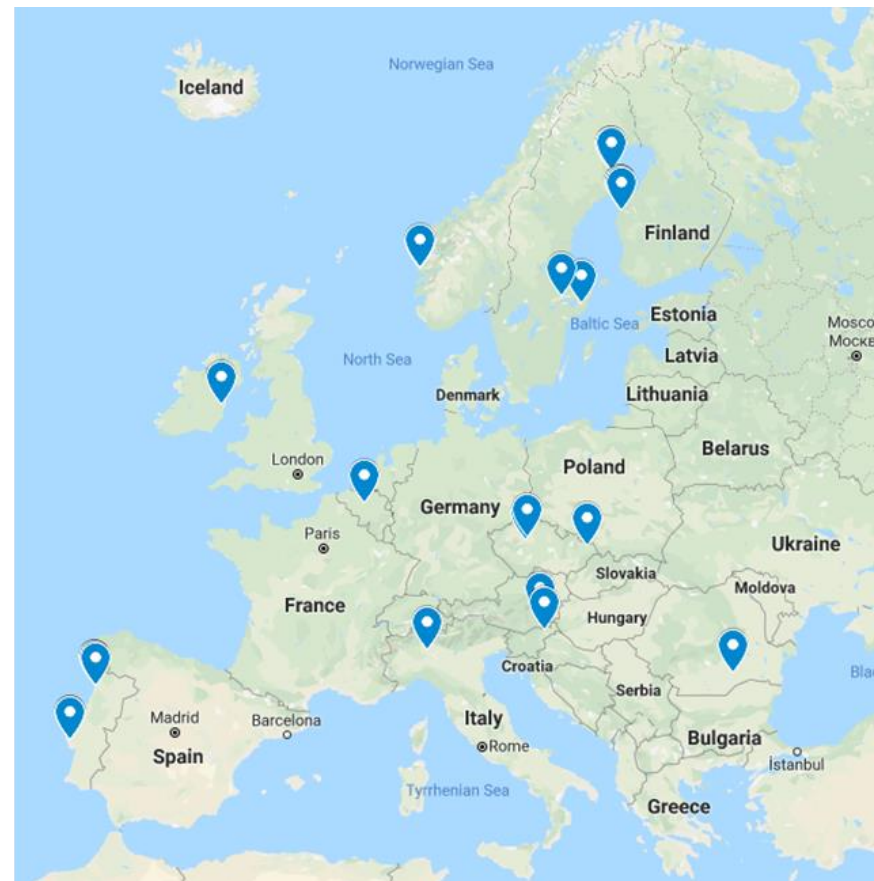


Energy-intensive  
industries/  
industrial  
symbiosis



Microelectronic  
manufacturing  
& design

# ALBATTI CONSORTIUM



21 partners in 11 countries



# ALBATTs STEERING COMMITTEE



THE ALBATTs STEERING BOARD PROVIDED SUPPORT, GUIDANCE AND OVERSIGHT OF WORK PROGRESS

# ALBATTIS Tackles Two Main Questions

1

WHAT IS ONGOING IN THE BATTERY SECTOR AND HOW DOES IT AFFECT JOB ROLES & SKILLS?

SECTORAL INTELLIGENCE

- Gathering **skills needs**
- Detailed description of **skills and job roles**
- Covering the **whole value-chain**
- Covering both **higher education and VET**

2

HOW CAN WE ADDRESS CURRENT CHALLENGES?

EDUCATION & TRAINING

- **FOCUSING ON** Vocational Education and Training (**VET**) & Higher Education (**HE**) **AIMED AT initial training and re-skilling and up-skilling of workforce**

# SECOND LIFE APPLICATIONS

EU companies associated with second-life batteries as of May 2023

Published by: **BATTERY-NEWS.DE**



- Collection & transport to the plant
- Identification & condition determination
- Selection of End-of-Life strategy
- Technical conditioning
- Integration & Installation

Norway

Corvus Energy

ECOSTOR

GBD  
GRØNVOLD'S  
BATTERY RECYCLING

Finland

fortum

Europe

STENA RECYCLING

reneos

Great Britain

**ZENOBE**

SNAM  
CONNECTED ENERGY  
offgrid energy  
BMW GROUP  
Second EV  
HONDA  
LITHIUM BATTERY  
PRAMAC  
LAND-ROVER

Σ = 81 companies

Sweden

cling  
BATTERYLOOP

Netherlands

EcarACCU  
FNT  
SPHERIS NEW TECHNOLOGIES  
BNA BATTERY

Belgium

ReVolta  
WATT4EVER BATTERIES FOR LIFE  
OUT4USE  
Octave

Germany

ACCURE  
DEKRA  
MHP  
NOVUM  
Q Coulomb  
SCHENKER  
STABL  
fenecon  
FeV  
EVA  
V  
numom  
LUEG.  
LegBATT  
circunomics  
Elektro-Automatik  
VOLUME GRAPHICS  
Mercedes Benz Energy GmbH  
encore  
betteries  
Ixxat  
Audi  
deppe  
ambibox  
gigabatt  
DellCon  
BELECTRIC  
riello  
CMS Technology  
FERCHAU ENGINEERING

Spain

ALTABATT+  
BePlanet  
cidetec  
ABERVIAN  
+MILLOR

Authors: Merlin Frank & Prof. Heiner Heimes (PEM RWTH Aachen University)

France

Renault Group  
BOUYGUES

Portugal

Evolution

Luxemburg

Circu Li-ion

Austria

Italy

CESVI MAP  
ANFIA  
enel x  
e-mobility service

Czech Republic

SKODA  
ibq

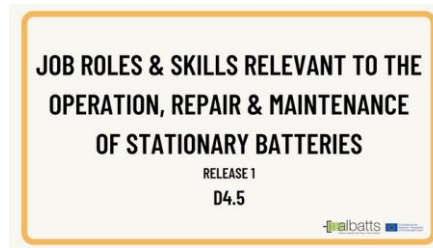
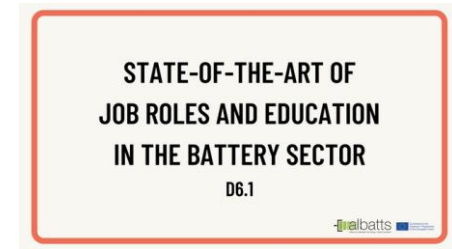
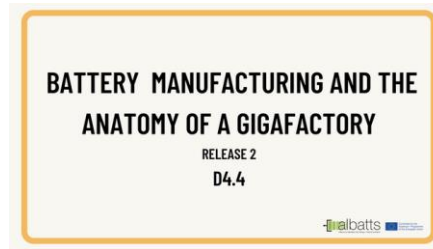
Slovakia

ztsv  
eaq

Source: Battery Atlas Europe



# ALBATTs REPORTS



MORE THAN 30 REPORTS RELEASED!

# MORE THAN 30 WEBINARS & WORKSHOPS

Regions and Skills in the Green Industry - Virtual Workshop

18<sup>th</sup> EUROPEAN WEEK of REGIONS and CITIES

Tue 13 October 2020 11:30 - 13:00

#EURRegionsWeek

DRIVES | albatts

Vessels of the future: Maritime Batteries - Job Roles and Skills

January 19, 2021 - 13:00-14:30 CET

Battery Cells Manufacturing - Job Roles and Skills

January 20, 2021 - 10:00-11:30 CET

Stationary Energy Storage in Grids and Telecom Applications: Safety & Future Job Roles and Skills

January 26, 2021 - 15:00-16:15 CET

Electric vehicle manufacturing & battery integration - future qualifications needed

January 27, 2021 - 14:00-15:30 CET

Skills Alliance and the forthcoming e-mobility Urging the ecosystem global competitiveness

ONLINE EVENT 18 March 2021 - 10:00-11:30 (GMT +01:00)

EU INDUSTRY WEEK

Servicing of electric vehicles: Future qualifications needed

September 29, 2021 - 10:00-11:30 CET

albatts interviews

European Battery Ecosystem: Job roles & competences now and in the future: Building a Gigafactory

With Katarina Borstedt, Director of Growth at Northvolt

15 September 2021 14:00-14:45 CET Online

albatts interviews

European Battery Ecosystem - Job roles & competences now and in the future: THE IMPACT OF THE BATTERY PASSPORT ON THE BATTERY VALUE CHAIN

With Claudia Giamon, Member of the European Parliament

12 October 2021 13:00-13:45 CET Online

New EU Battery Regulation Proposal: Possible Implications on Job Roles & Skills

October 22nd, 2021 - 11:00-12:30 CET

albatts interviews

European Battery Ecosystem - Job roles & competences now and in the future: BATTERY ENERGY STORAGE ENABLING SUSTAINABLE ISLANDS

With Duarte Conde Silva, Plant Manager at Grazioloca

17 November 2021 13:00-13:45 CET Online

Recycling Electric Vehicles' Batteries: Skills & Qualifications Needed in Auto Workshops

November 30, 2021 - 10:30-12:00 CET

Autonomous Operations and Virtual Reality in Maritime: Job roles & skills

December 7, 2021 - 13:00-14:30 CET

LITHIUM MINING & EXTRACTION: EUROPEAN SOURCING AND SKILLS

Wednesday April 27, 2022

OFFICIAL PARTNER

PREPARING A SUSTAINABLE CLEAN ENERGY ECOSYSTEM • SKILLS FOR BATTERY SYSTEMS

online workshop 13/10/2022 - 09:30-11:00 CET

REGISTRATION NOW OPEN

albatts

albatts interviews

FUTURE BATTERY TECHNOLOGIES: Job roles, skills & knowledge

Interviewing Tomáš Kazda, Associate Professor at the Department of Electrical and Electronic Technology of Brno University of Technology

26 October 2022 15:00-15:45 CET Online

albatts interviews

FUTURE BATTERY TECHNOLOGIES: Job roles, skills & knowledge

Interviewing Noshin Omar, Founder & CEO of Avesta Battery & Energy Engineering (ABEE)

14 November 2022 15:00-15:45 CET Online

albatts interviews

Second Life Bus Batteries in BESS Residential Applications: Job Roles, Skills and Competences

Interviewing Ylva Olofsson, System Design Engineer & Project Manager at Volvo GTT

22 November 2022 15:00-15:45 CET Online

Battery Management Systems and Control Systems: Job roles, skills & competencies

November 24, 2022 15:00-16:00 CET

Electrification of Heavy-duty Vehicles: What Skills & Competencies Will be Needed?

November 29, 2022 09:30-11:00 CET

Electrification of the Aviation Sector & Future Qualifications Needed

January 17, 2023 - 15:00-16:30 CET

albatts interviews

Future geopolitical challenges in the source of raw materials and the battery value-chain

Interviewing Daniel Cios, Policy Officer - Raw Materials, DG GROW, European Commission

19 January 2023 15:00-16:00 CET Online

Electrification of Inland Waterways & Future Qualifications Needed

January 26, 2023 - 13:00-15:00 CET

Safe Recycling and Second use of EV Batteries: Skills & competencies needed

January 27, 2023 - 09:30-11:00 CET

Skills Transition in the battery industry: Training people from other industries

February 9, 2023 - 15:00-16:20 CET

Safety aspects of Electric Vehicles' manufacturing, use, maintenance, repair & disposal

May 3, 2023 - 10:30-12:00 CET

TOWARDS A FUNCTIONING BATTERY ECOSYSTEM - BUILDING KNOWLEDGE AND REQUIRED SKILLS

June 28, 2023 - 11:30-13:00 CET

SKILLS AND TALENT FOR THE GREEN TRANSITION - BOOSTING REGIONAL COMPETITIVENESS

October 25th, 2023 - 14:30-16:00 CET

BATTERY POWERED TOUR FOR SKILLS

Česká Republika

Enabling a prepared education network for the battery ecosystem in Europe

Webinar TRENDOV A VOZĚLAŇACÍ POTŘEBY PRO E-MOBILITU A BATERIOVÝ PRŮMYSL

Sředa 22. 11. 2023, 9:30 - 11:00 (online)

albatts

BATTERY POWERED TOUR FOR SKILLS

FINLAND

Enabling a prepared education network for the battery ecosystem in Europe

Navigating the Challenges of the Establishment of Large-scale Battery Manufacturing: A Focus on Workforce, Education and Training

In person meet with the Hosts EnergyWeek

Wednesday, March 13<sup>th</sup> 2024 13:00 - 14:30 (local time)

albatts

BATTERY POWERED TOUR FOR SKILLS

SWEDEN

All etablera nätverk och hjälpmedel för utbildning i den europeiska batteri-värdekedjan

Onsdag, 20:e Mars 2023 13:00 - 15:00

albatts

BATTERY POWERED TOUR FOR SKILLS

PORTUGAL

Passibilizar uma rede educativa preparada para o ecossistema de baterias na Europa

Online Terça-feira, 26 de Março de 2024 15:00 - 11:00 GMT

Em parceria com: NET, atec

albatts

BATTERY POWERED TOUR FOR SKILLS

ITALY

Webinar Enabling a prepared education network for the battery ecosystem in Europe

Tuesday, March 26<sup>th</sup> 2024 14:30 - 16:30 (CET)

Event organized in collaboration with: ETEC, ETEC, ETEC

Supported by: ETEC, ETEC, ETEC

albatts

BATTERY POWERED TOUR FOR SKILLS

FRANCE

TENDANCES ET BESOINS ÉDUCATIFS POUR LA MOBILITÉ ÉLECTRIQUE ET L'INDUSTRIE DES BATTERIES

Mardi, le 27 mars 2024 14:00 - 16:30 CET Amphithéâtre, Université de Littoral Côte d'Opale Bâtiment des Daires - 59140 Dunkerque

Organisé par: Dunkerque, Dunkerque, Dunkerque

albatts

ALBATTS Decarbonisation Enabler Quo vadis battery value chain?

FINAL EVENT 09/04/2024 - 08:30-17:00

ACE, Av. d'Auderghem 22 - 1040 Brussels

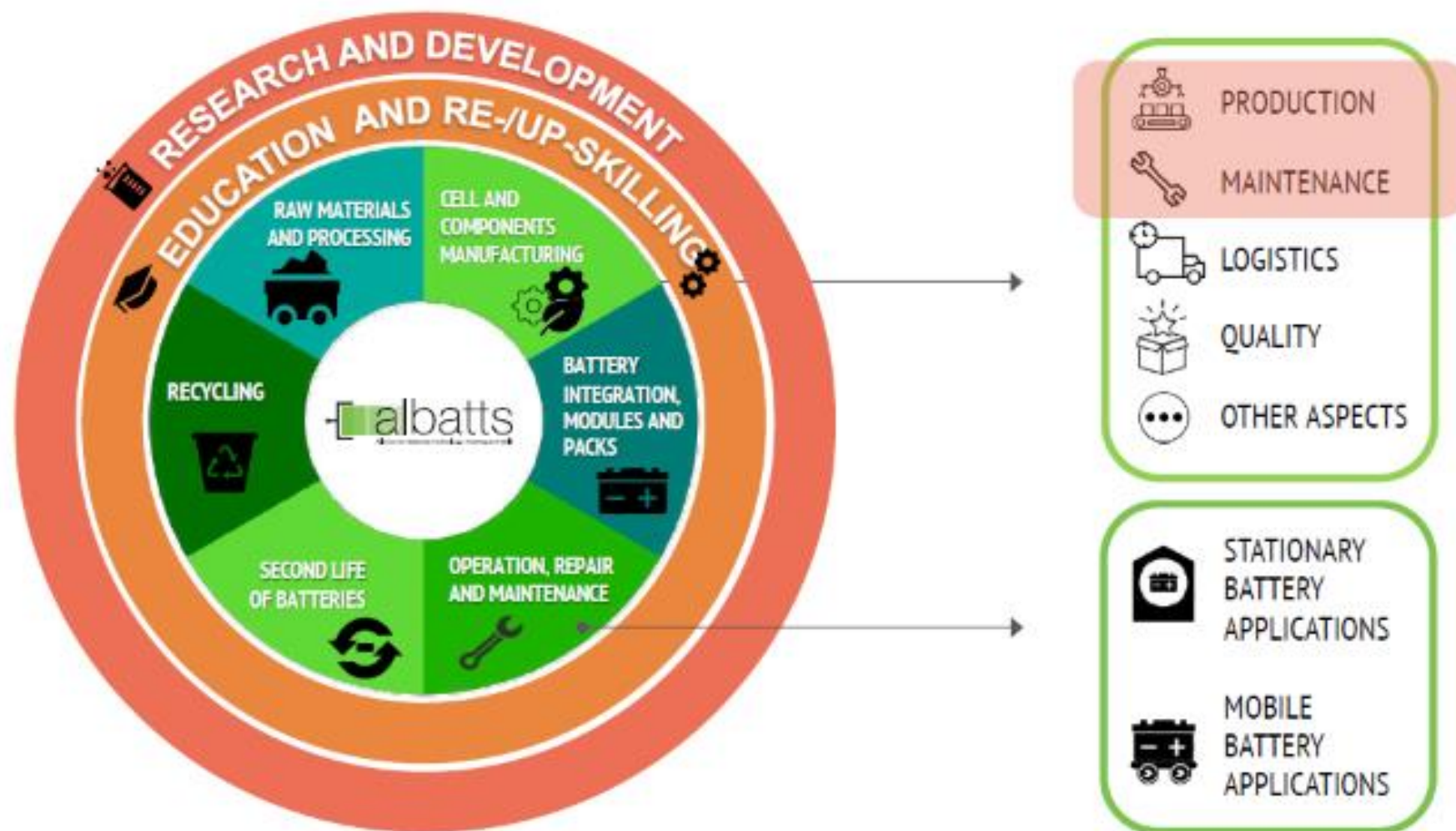
# SPEAKERS IN WEBINARS & WORKSHOPS



More than 80 speakers helped ALBATTs research over the project's duration.

# Glance on Needed Skills

## CELLS PRODUCTION & CELLS MAINTENANCE



Co-funded by the  
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# Cell Production



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



# Cell Production and Maintenance – Specific Needs

→ What Industry Demands



## PRODUCTION

- Apart from the general battery-related education, strengthening the skills and competencies to ensure understanding of setting up the production, preparing the related structures, commissioning the machines, chemical, and mechanical assembly, automation experience, and mechanical understanding of the automated systems combined with understanding the related software and calibration.
- Strengthening general IT and data analysis skills to cover future needs.
- Battery skills (also mentioned in the context of Production)
- "Dry and clean room" maintenance (including room contamination measurement)
- Predictive and preventive maintenance
- Diagnostics

## WHITE-COLLAR SPECIFIC NEEDS

- Increasing competencies in **production and material engineering, production planning, production management, shift management, process engineering, cell design, machine learning and optimisation, modelling and simulation;**
- Strengthening the focus on **large-scale manufacturing**, understanding of **chemical processes** and **quality, risk and safety management;**
- **Battery industry-related knowledge skills:** battery material, battery chemistry, battery fluids, battery components, battery testing, defective products removal

## BLUE-COLLAR SPECIFIC NEEDS

- "Upstream" production - increasing knowledge to understand the **risks, envision the safety issues**, and how **chemicals** behave;
- "Downstream" production - increase **machine understanding, 5S skills**, and the ability to **troubleshoot;**
- Overall production system understanding;
- Knowledge/skills: **material handling, Clean/Dry Room Procedure/Validation, Inspect Quality of Product / Sampling, material pressing, electrode process, fine mechanics, HMI (Human Machine Interface)**

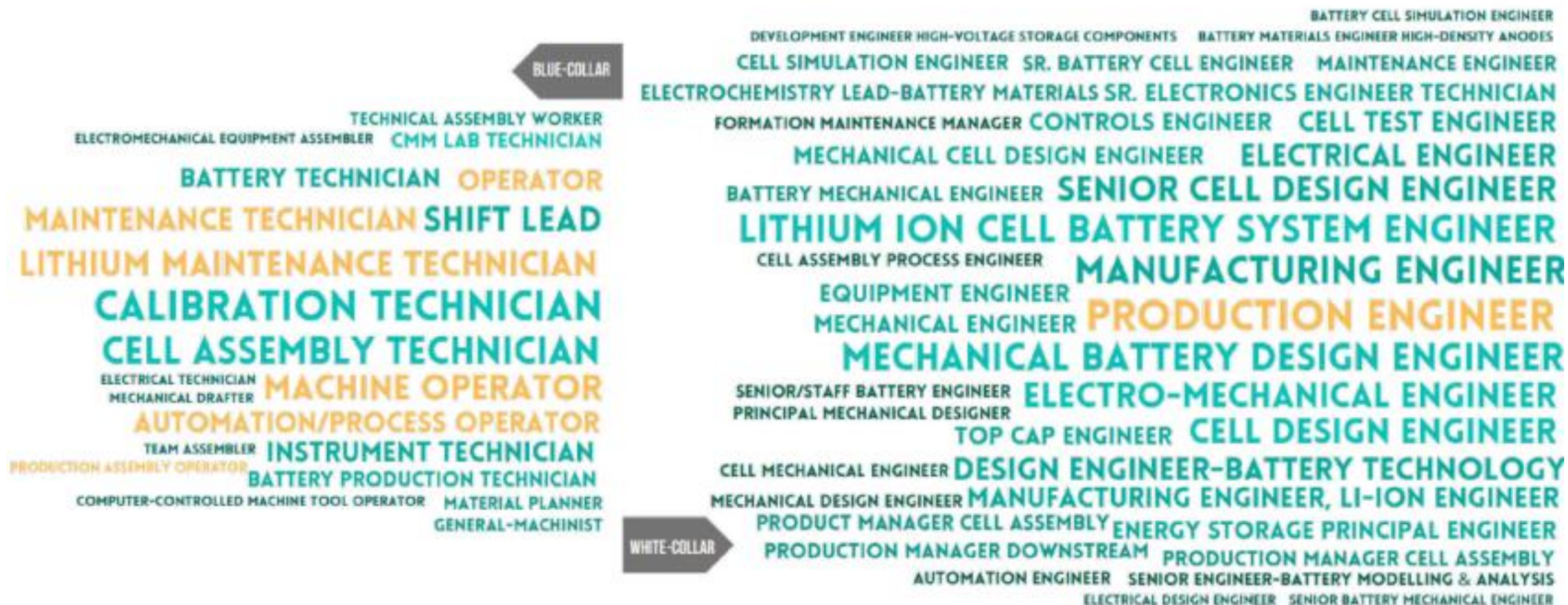


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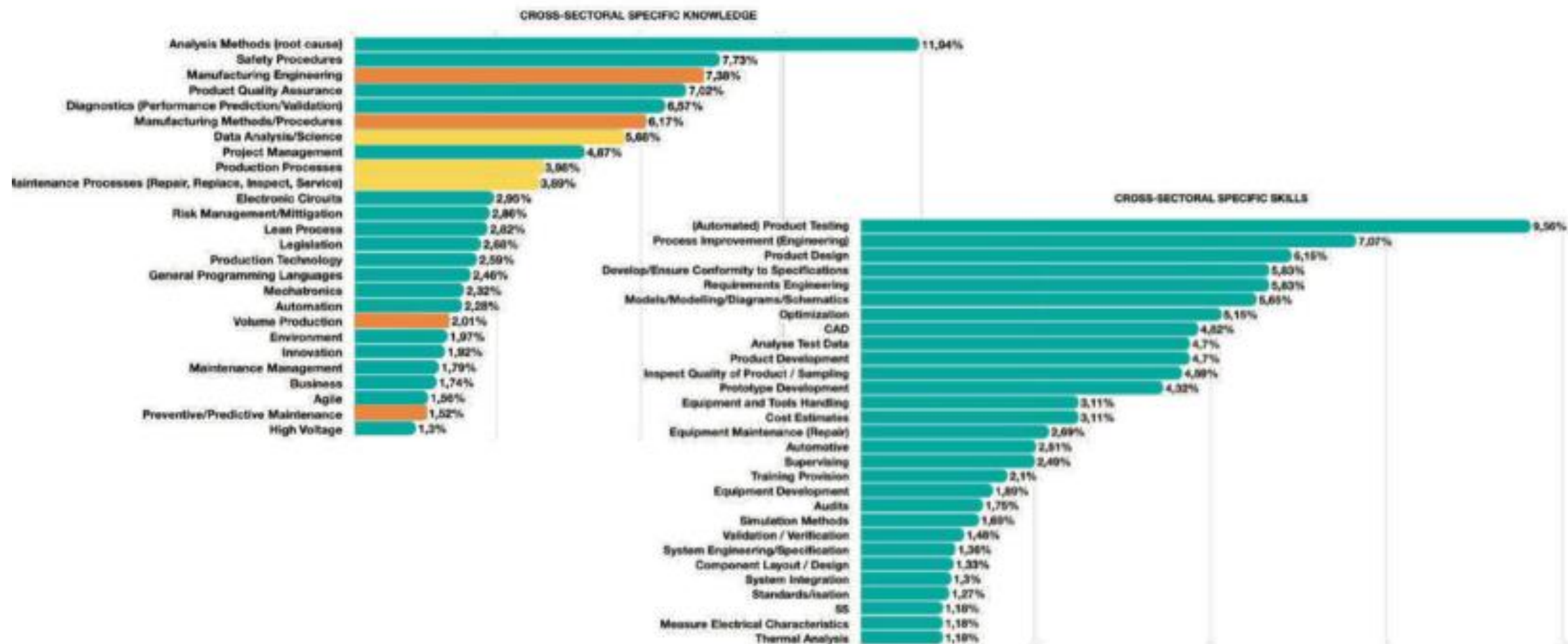
# Production and Maintenance

→ What Industry Demands



# Production and Maintenance– Skills and Competence

→ What Industry Demands



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# SKILLS CARDS

**PRODUCTION & MANUFACTURING ENGINEER**

A battery manufacturing and production engineer is responsible for the design, development and execution of the manufacturing processes for batteries.

They work with a team of engineers and scientists to create efficient and cost-effective manufacturing methods for electric vehicles, consumer electronics, and other applications.

They are responsible for overseeing the production of battery cells, packs, and systems, ensuring that they meet the required quality standards and performance specifications.

**BATTERY MODULE ASSEMBLING TECHNICIAN**

A battery module assembly technician is responsible for assembling battery modules in a manufacturing facility.

They work with a team of engineers and scientists to assemble, test, and package battery modules for various applications such as electric vehicles, consumer electronics, and grid storage.

They are responsible for assembling the various components of the battery module, such as the battery cells, wiring, and protective housing. They also need to ensure that the assembled modules meet the required quality standards and performance specifications.

**BATTERY CELL MODULE ENGINEER**

A battery cell module engineer is responsible for designing, developing, and testing battery cell modules for various applications.

They work with a team of engineers and scientists to create efficient and cost-effective energy storage solutions for electric vehicles, consumer electronics, and other applications.

They may also be involved in the selection of materials and components for the battery cell modules and in the optimisation of the manufacturing process. They should have a strong understanding of electrical engineering, materials science, and manufacturing processes, as well as experience with battery management systems and safety protocols.

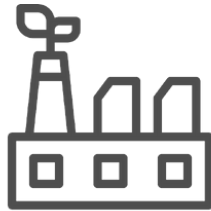
**QUALITY TECHNICIAN**

A battery quality technician is responsible for ensuring the quality of batteries and battery systems during the development and production phases.

They work with a team of engineers and scientists to establish and maintain quality standards and procedures for the design, development, and production of batteries and battery systems.

They are responsible for identifying, analysing and preventing defects in the batteries and systems, and for implementing quality control measures to ensure that the products meet the required specifications.

The Skills Cards are a practical and helpful tool for..



INDUSTRY/COMPANIES

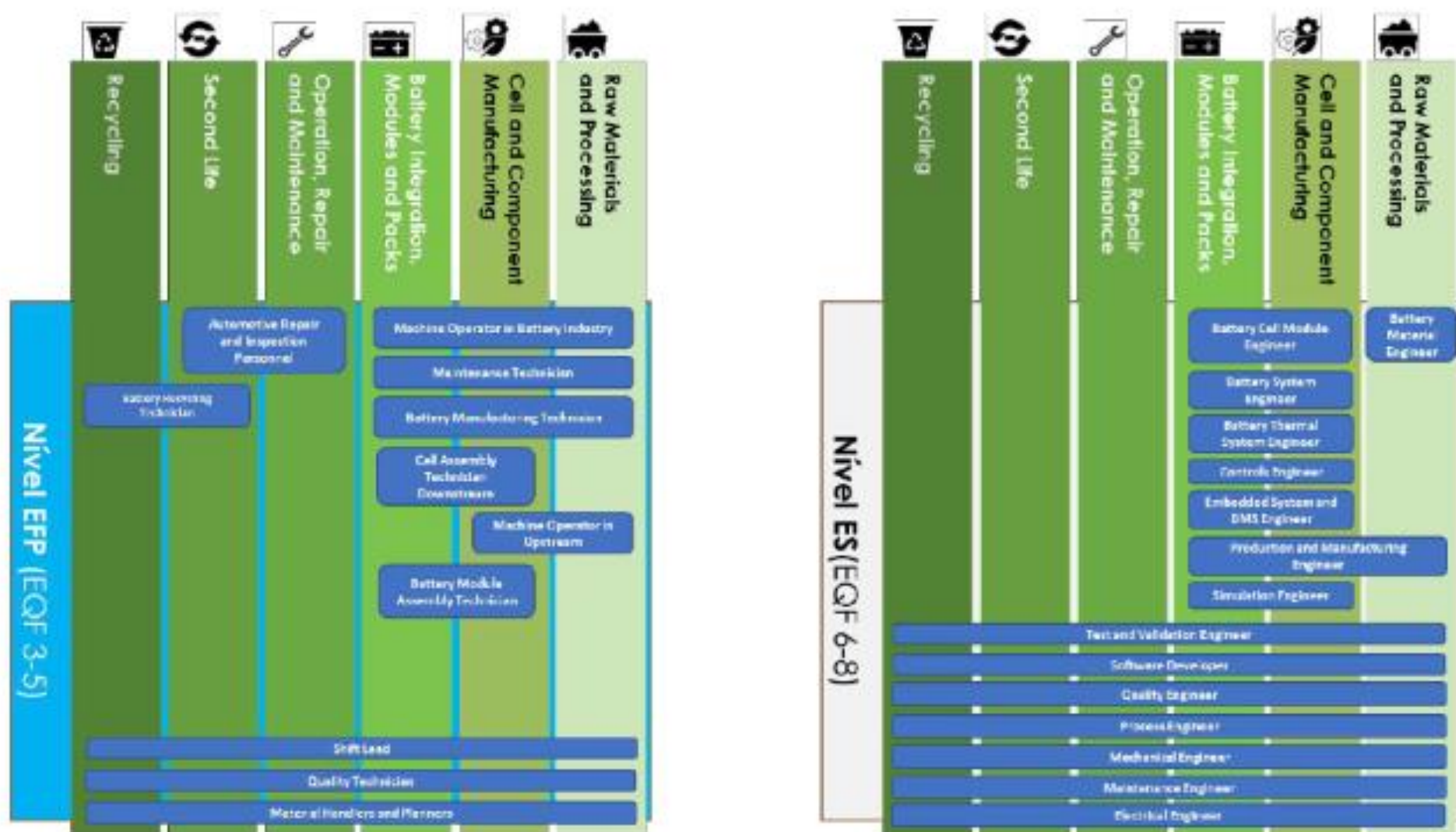


SCHOOLS (VET & HE)



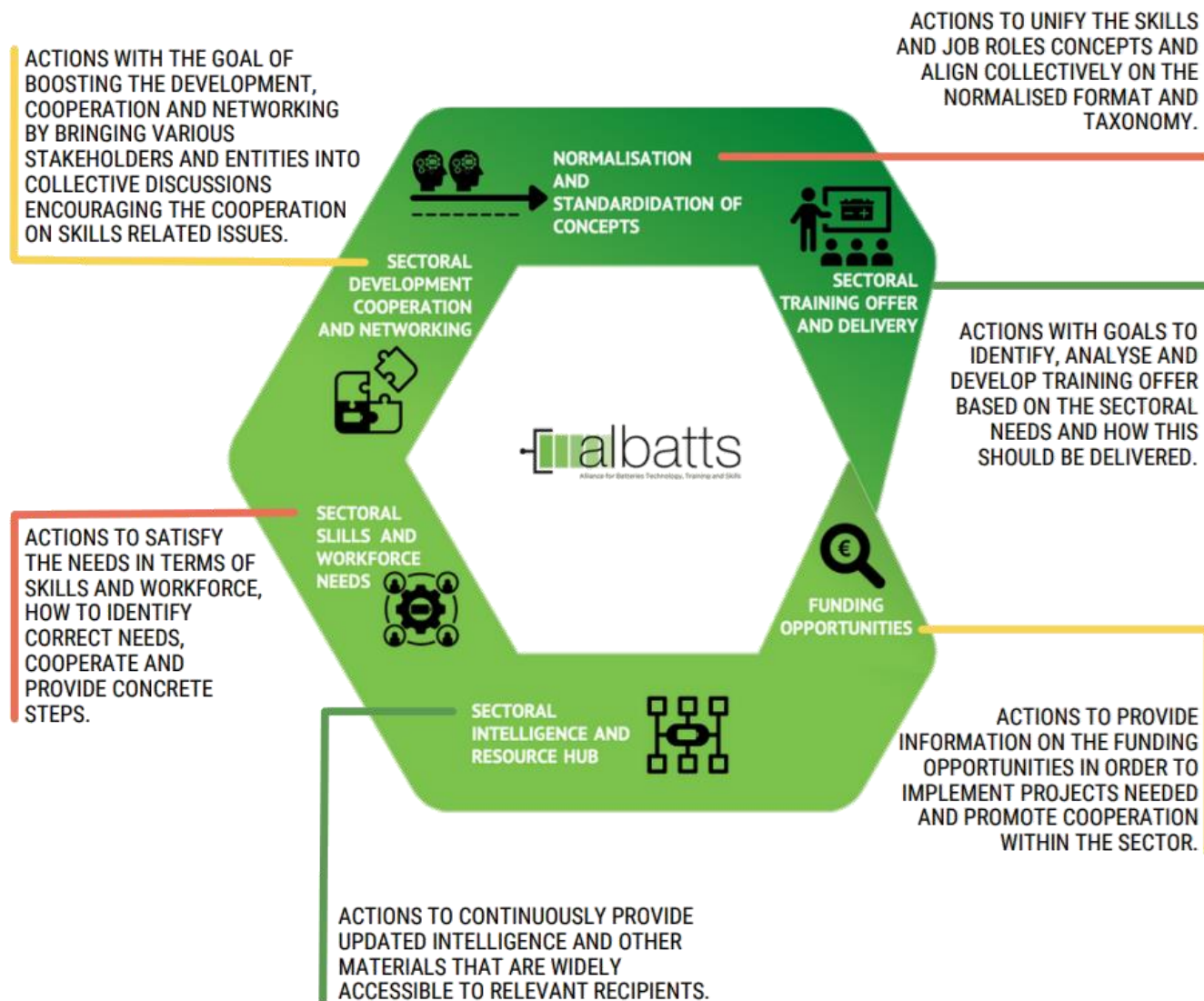
EDUCATION AUTHORITIES

# Skills Cards

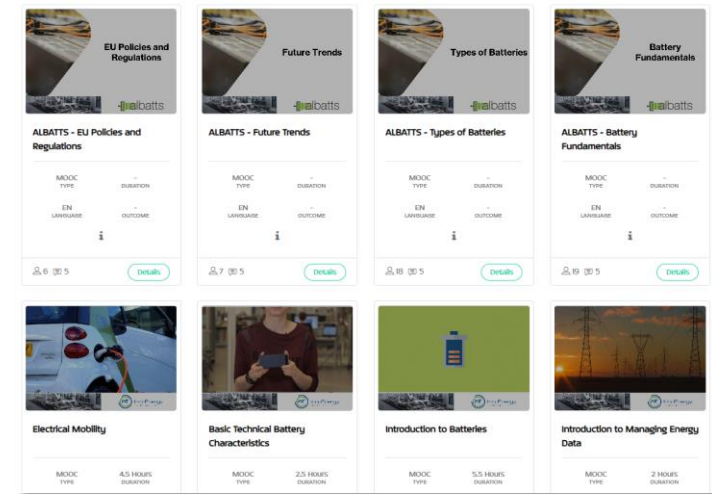
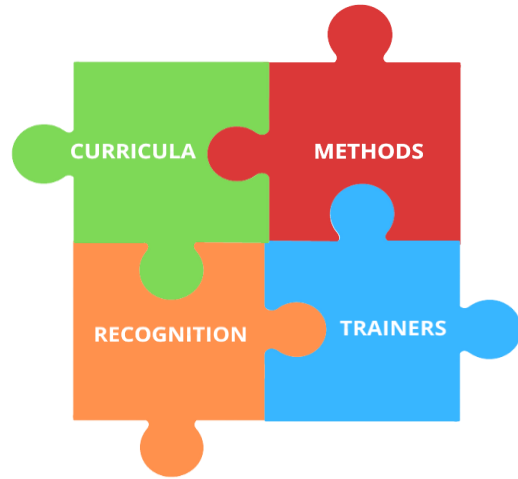


# SKILLS AGENDA AND STRATEGY

- The overall assessment is supported by a strategy
- The whole value-chain and all levels of education need to be addressed
- Competencies can be sector specific and cross-sectoral



# ALBATTS Tackles Two Main Questions



2

HOW CAN WE ADDRESS CURRENT CHALLENGES?

EDUCATION & TRAINING

- **FOCUSING ON** Vocational Education and Training (**VET**) & Higher Education (**HE**) **AIMED AT initial training and re-skilling and up-skilling of workforce**

# Education & Training Framework

## Pillar 1 Curricula for all levels

- EQF levels 3 to 8
- Learning outcomes approach
- Modular approach based on micro-learning
- Reference of transversal, cross-sectoral, sector-specific and occupation-specific skills

## Pillar 2 Innovative and flexible learning

- Inclusive training methods
- Training methods adapted to initial and up/re-skilling
- Work-based learning
- ICT based on open educational resources
- Adaptive learning solutions
- Joint educational programs, including transnational learning



- Continuous train the trainer programs for sectoral skills update
- Digital skills development programs
- Language skills (VET)
- Companies' tutors development programs (Dual system)
- Mobility programs for teachers/trainers in companies
- Expert and discussion international forums

## Pillar 3 Competent trainers and tutors

- Reference to other frameworks
- Micro-credentials / Digital badge
- Adapted to national and regional frameworks
- Validate and recognition of Competence
- Training recognition
- Sectoral Skills Strategy Alignment
- European Vocational Core Profiles

## Pillar 4 EU wide recognition

# Courses

11 Courses already available

Manufacturing Processes



albatts ONLINE COURSES

Introduction to the Battery Sector



albatts ONLINE COURSES

Future Trends



albatts ONLINE COURSES

EU Policies and Regulations



albatts ONLINE COURSES

Types of Batteries



albatts ONLINE COURSES

Battery Fundamentals



albatts ONLINE COURSES

Available through the Automotive Skills Alliance (ASA), an association created through the bridging of the projects ALBATTs and DRIVES activities and to sustain project results

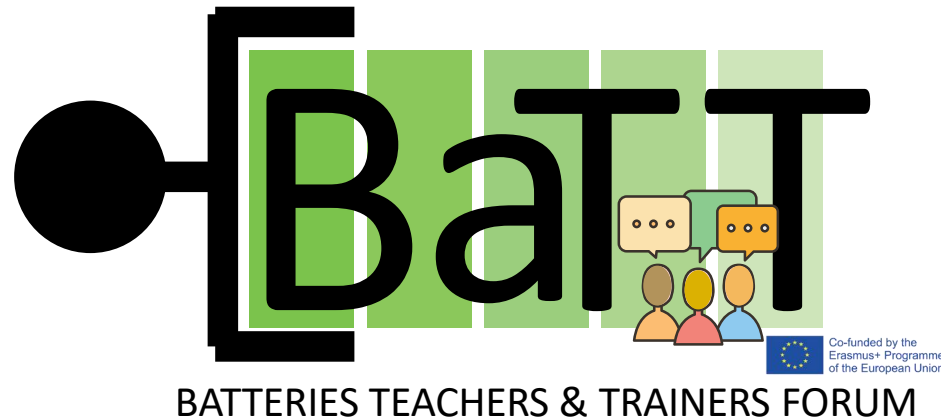


ALBATTs COURSES

*Examples of available courses*

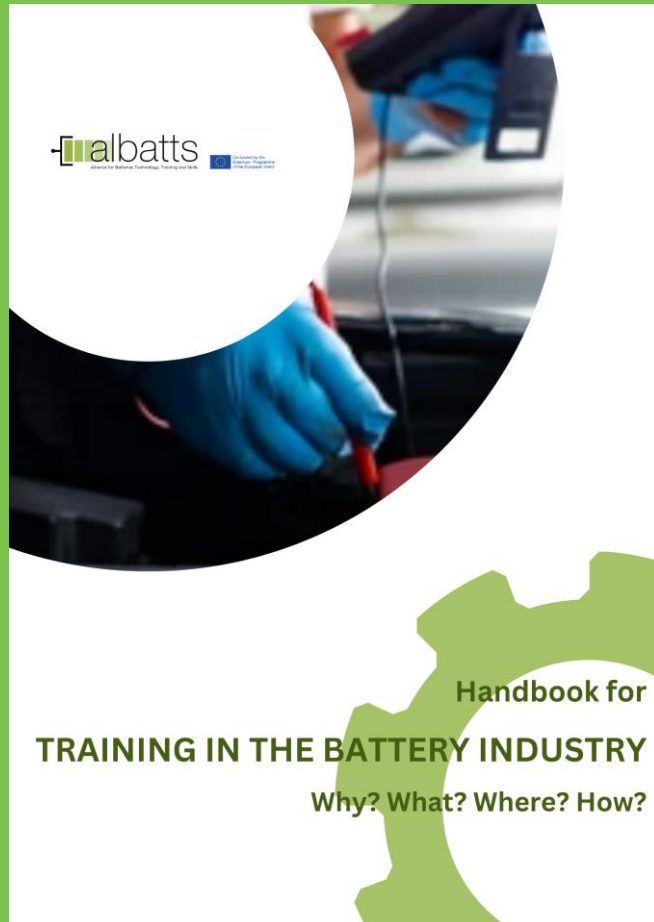
# BATTERIES TEACHERS & TRAINERS FORUM

The **BaTT Forum** is an initiative that was launched by ALBATTs with the purpose of **gathering** current and future teachers and trainers to share **ideas** and **good practices, work together** and deepen their **knowledge** about the battery sector.



The BaTT Forum is now funded and further developed through the CaBatt - Capacity Building for Battery Teachers in VET, an Erasmus funded project developing a sustainable model for offering Erasmus+ courses for VET teachers.

# HANDBOOK



- Published in March 2024
- Available through the ALBATTTS website
- Target group: education providers, teachers, companies, education authorities



# Some other outcomes of the ALBATTIS project

## Dunkerque, Capital of the new European Battery Valley



**8,5 billion €**

will be invested over the next few years  
in the industrial port zone to produce  
and recycle electric batteries (total  
production of around 64 GWh by 2030)

## Gains and opportunities with the **Albatts project**



## A battery school to further grow those talents

# edib+

L'école de la batterie

### Battery School

Born in France in 2022 with recognised universities and schools  
Leading by Verkor  
Supported by French Government

01

**1,600 people trained**

every year from 2026

02

**100 initial & continuous trainings**

03

**From vocational training to Doctorate**

04

**At anytime of life**

#### Training for trainers

- Electric vehicle - Level 1 with Verkor, TOLV, WattAlps & PowerUp (2 days)
- Design of test benches courses with Verkor and Critt M2A (8 days)



#### Operator trainings

- AFPA x Verkor "Battery Operator" training course - 1st class (March-June 23) and 2nd class (Oct-Jan 24)  
Creation of a dedicated "Bac+1" by Cnam





## Further information on the battery expertise trios

- Development of battery expertise in Saarland (ABAKOS)
- Battery Education Network Bavaria (B<sup>3</sup>)
- Bildungsverbund Batterie Mitteldeutschland (BatteryMD)
- Developing expertise for battery cell production in the capital region (KOMBiH)
- Qualification measures in the Baden-Württemberg battery ecosystem (QualiBattBW)
- Qualification and further training of specialists along the entire value chain of sustainable lithium-ion batteries (QuW-LiB)

Fig. 2: More skilled labour for the battery industry in Europe - VDI/VDE-IT implements funding. <https://www.vdi-vde-it.de/dahme-fachkraefte-fuer-die-batterieindustrie-europa-vdi-vde-it-setzt-foerderung-um>

## KOMBiH activities with ALBATTs

Own further training through the webinars

Good basis for shaping the KOMBiH project

Input at the 1st Battery Forum in Berlin-Brandenburg, March 2023

Integration into all German qualification projects (battery trios)

Participation in the ALBATTs teachers' forum

We translate all materials into German

Make these and your own results available via the ALBATTs platform

We discuss the integration of the courses developed by KOMBiH on ALBATTs

## **Case: New optional unit for battery industry**

- EDUFI renew two vocational qualifications in 8/2022-5/2023
  - Vocational Qualification in Mechanical Engineering and Production Technology, 180 cp
  - Vocational Qualification in the Process Industry, 180 cp
- Our vision was to develop these vocational qualifications at the same time and find the similar optional units for these vocational qualifications
- There were lot of talk about battery industry and how we can recognize the needs of battery industry and different kind of job descriptions
- There were not lot of information about job descriptions until we found out about ALBATTIS-project and we contacted with Katarina Sandbacka from VAMIA

# Examensdel i den finländska läroplanen

## – Arbete inom batteribranschen 15kp

- Baserat på innehåll från ALBATT-projektet har det gjorts en examensdel för den nationella läroplanen i Finland.
- Examensdelen träder i kraft 1.8.2024 för Grundexamen inom Processindustrin och Grundexamen i maskin- och produktionsteknik.
- Examensdelen kommer även att erbjudas till andra grundexamen då de förnyas
- Examensdelarna i Finland kan användas både för grundexamen men även för up-skillning and re-skillning
- Det finns planer på att göra nya examensdelar så fort behov uppstår.
- [Grundexamen i maskin- och produktionsteknik - eGrunder \(opintopolku.fi\)](https://opintopolku.fi)



## Pact for Skills

Home

About the Pact for Skills

Community resources

Stakeholders and business

European Commission > Pact for Skills

# Welcome to the Pact for Skills

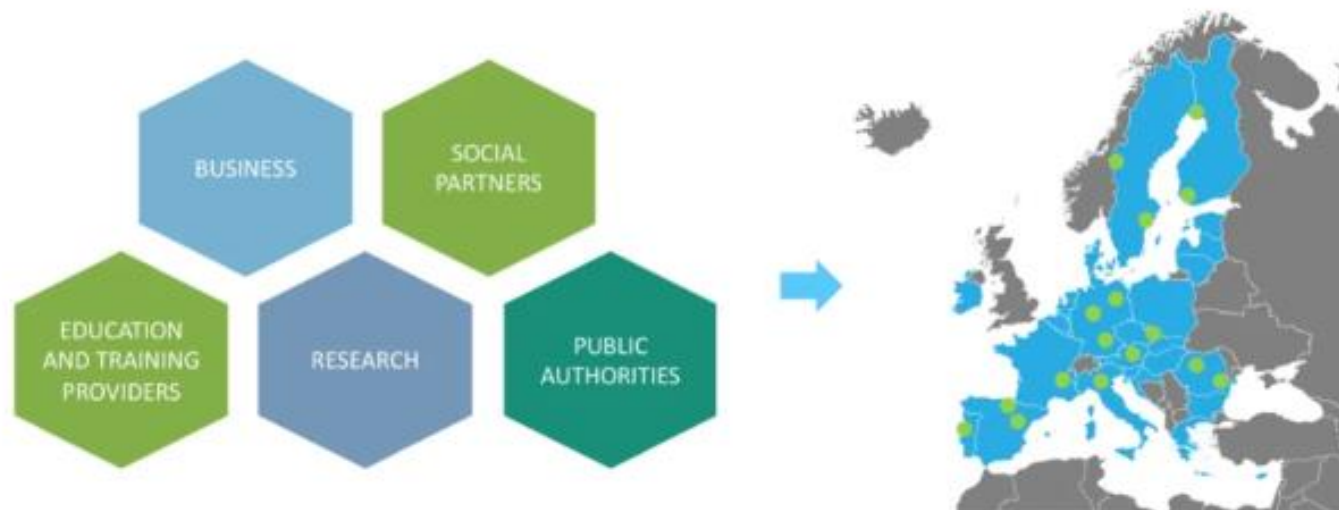
The Pact for Skills aims to get public and private organisations together and encourage them to make concrete commitments to upskilling and reskilling adults.

Join the Pact >

# Automotive Skills Alliance

- **Europe & Stakeholder-wide Partnership** for collaboration on **Skills Agenda in the Automotive-Mobility Ecosystem**
- The ASA was announced and officially **launched in November 2020**
- **The ASA became a legal entity** (non-profit organization) in **January 2022**

The **Automotive Skills Alliance (ASA)** is focused on the **re-skilling and up-skilling** of workers in the automotive sector, developing intelligence and fostering dialogue among all relevant partners and stakeholders in the sector, and supporting the elaboration of **specific plans for re-skilling, up-skilling and training of workers in the EU automotive sector**.





# What is happening after the ALBATTS project duration?





- ⦿ **Large-scale Pact for Skills Partnership in the Mobility-Transport-Automotive Ecosystem** to strengthen collective actions on skills
- ⦿ Announced and officially **launched in November 2020**
- ⦿ ASA became **legal entity** (non-profit organization) **in January 2022**
- ⦿ More than **110 members** up to now



An Initiative of the European Commission

# ASA STRUCTURE – MEMBERS PARTICIPATION & COLLABORATION

ASA Partnership participate in Topic Committees, Working Groups & Task Forces

&

ASA builds upon the work carried out by strategic projects in the skills agenda for the ecosystem & **promotes and facilitates initiation of new projects/initiatives or support mainstreaming the existing once**

TECHNOLOGICAL TOPICS

EDUCATION AND TRAINING &  
PROMOTION OF INITIAL/LLL EDU

DIVERSITY & ATTRACTIVENESS  
& SOCIAL ELEMENTS

REGIONAL COLLABORATION AND  
IMPLEMENTATION



TRIEME

VOLTAGE

[ESCO Database](#)


(Catalogue, Micro-credentials, Reference definitions of Job Roles)



(hosted by individual providers/universities/VETs on their own costs)

(LMS, hosting free MOOCs)



Learning Platform

Other already existing courses/Modules

Training Module 1 (Online)

Training Module 2 (Online)

Other already existing courses/Modules across the EU (irrespective of funding – private/public) - Paid or free

Training Course 1 (on-site, MOOC, VR, Lab Course)

Training Course 2 (on-site, MOOC, VR, Lab Course)

- Microlearning modules
- Learning Path -Combination of Modules
- Etc.

- **Learning Path – Combination of Modules/Training Courses** from different Providers to reach desired Job Role/level of Skill (combination of MOOC courses, onsite, etc.)
- **Issue micro-credentials – digital certificates**

## Vocational Education

Support FLEXIBILITY & COLLABORATION  
=> SPEED UP REACTION TO THE CHANGES

### EU-level:

- Encourage flexible modular approach
- Encourage cross-disciplinary content
- Promote cooperation between VET & HE
- Funding for labs, on- and offline

### Regional/National level:

- Green skills in curriculum
- Flexible modular approach – easy to update and adapt, cross-disciplinary content
- Training in English and soft skills
- Funding for labs, on- and offline, teacher training
- Funding encouraging education providers to

### VET provider level:

- Cooperate – universities - industry, - other VET providers, municipality, authorities
- Be proactive! Don't wait!

### Industry /Working life:

- Communicate with VET providers!
- Help with training material and content
- Offer on-site experience for teachers and trainers!

# Recommendations /University Education!

## Challenge:

- **Universities teach only what they research...**but few universities have eg. battery research
- **Incentives** for European universities to cooperate not only in research, but also in education offerings, also on Bachelor level

## Recommendations:

- **Subcontract** a research-specialised university for the needed course!
- **Wrap** a MOOC course from a good university!
- **Introduce optional green-skills courses! In all relevant programmes, now!...**while program development speeds up...



# THANK YOU !



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