



Alliance for Batteries Technology, Training and Skills

2019-2023

**ALBATTs Workshops:
Stationary Battery Applications,
Job Roles & Skills**



Deliverable D4.6 - Future Needs Definition for sub-sector

ISIBA - Release 2



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EXECUTIVE SUMMARY

We kept the second workshop round of seven online events in autumn 2021. It was organised in the form of webinars, and then also a new concept was introduced, one-to-one interviews with experts representing various topics of interest.

These online events consisted of the following interviews:

- ◆ **Building a Gigafactory**
- ◆ **The impact of the Battery Passport on the battery value chain**
- ◆ **Battery energy storage enabling sustainable islands**

And the following webinars:

- ◆ **Recycling Electric Vehicles' Batteries**
- ◆ Servicing of Electric Vehicles
- ◆ Impact of the New EU Battery Regulation Proposal
- ◆ Autonomous Operation and Virtual Reality in Maritime Applications

This Work Package 4 deliverable covers the above-listed interviews and one webinar, “Recycling Electric Vehicles’ Batteries.” The webinar is a WP4&5 collaboration crossing the border to the mobility side. We decided to conduct it this way due to WP4 dealing with recycling-related topics in the previous deliverables and recycling concerns, both stationary and mobile batteries. The parallel WP5 deliverable covers the other webinars.

With this WP4 deliverable, skills, competencies, job roles, and training mechanisms were identified during the analysis of these interviews and the webinar. Some of them are described in the Key Findings section of each chapter. However, they will be described and analysed more profoundly in the coming D3.8 Analysis of Future Needs - Release 2 of Work Package 3. It will be published in May.

Is there competition for talents – the need for skilled and competent employees

Chapter 2 analyses what it means to build a Gigafactory from the skills and competencies’ point of view with Katarina Borstedt, Director of Growth department at Northvolt. This interview continues the WP4 desk research last summer that mainly covered the anatomy of

a Gigafactory and its job roles and needs for different competencies in its numerous departments and functions.

Recruitment challenges, for example, with finding the correct type of experience with batteries, greenfield building, and production are experienced. Both blue-collar and white-collar workers are in demand. At the same time, various industry entities in the battery value chain are mushrooming around the world, headhunting skilled and competent people.

In the interview, Mrs Borstedt explained how they had approached this problem with various strategies, from global recruitment to collaboration with municipalities and education providers. Additionally, new technologies enabling training in volumes were addressed.

What happens when EU legislation meets QR tags and what has that to do with batteries

Chapter 3 talks about Battery Passport that as a part of the coming Sustainable Batteries Regulation, was the topic in an interview with a Member of EU Parliament, Ms Claudia Gamon. WP4 covered the topic area already in the second desk research last summer, and the interview continued further with the topic.

The Battery Passport will be an electronic record of individual industrial batteries, including those in vehicles. The record is stored in an online database is accessible with a QR code in the Digital ID card associated with each battery sold in the EU. The purpose of the passport, together with the related regulation, is to provide transparency in the form of information for all the stakeholders, producers, consumers, secondary market, recyclers and beyond. It supports sustainability, complying with legislation and increasing European competitiveness.

How does an isolated island in the middle of the Atlantic Ocean apply battery energy storage together with renewables

Chapter 4 analyses an interview with Mr Duarte Conde Silva, a Plant Manager in a hybrid power plant on Graciosa Island in the Azores. He discussed how the electricity is provided on an isolated island with the challenges they have encountered. We learned how the introduction of renewable energy systems and battery energy storage has brought significant improvements to the power quality and generated 5000 tonnes of CO2 reductions annually.

Recycling - what it means with the ongoing transformation process to the electrification of traffic

Chapter 5 analyses a webinar that focused on recycling electric vehicle batteries and the skills and qualifications needed. We learned how Recycling Li-ion batteries provide significant economic benefits, reduces new mineral extraction, increases resilience, and decreases weak steps in the supply chain. We analyse what skills are required in the recycling-related functions, from battery disassembly to the technology and processes of recycling. That leads us to the training aspect. The webinar introduced us to an Ireland-based ELVES programme and how they deal with the training related to collecting and recycling vehicle batteries.

The webinar brought together an interesting group of experts to cover these topics: Mr James Copping from the European Commission, Mr Jakub Štolfa from VSB Technical University of Ostrava, Mr Rene Schroder from EUROBAT, Ms Elena Wrelton from ELVES, Ms Amélie Sophie Salua from ACEA and Mr Stewart McKinlay NMIS Manufacturing Skills Academy.

LIST OF ABBREVIATIONS

ACEA	...	The European Automobile Manufacturers' Association
ADR	...	European Agreement concerning the International Carriage of Dangerous Goods by Road
AFIR	...	Proposal for the Alternative Fuels Infrastructure Regulation
AI	...	Artificial Intelligence
ATF	...	Authorised Treatment Facilities
BESS	...	Battery Energy Storage Systems
BEV	...	Battery Electric Vehicle
CEV	...	Combustion Engine Vehicle
CO ₂	...	Carbon Dioxide
DEKRA	...	Dekra controle technique? Page 57
DG Grow	...	Internal Market, Industry, Entrepreneurship and SMEs
ELVES	...	Approved End-of-Life-Vehicle (ELV) compliance scheme for Ireland
EQF	...	European Qualification Framework
Erasmus	...	EU's programme to support education, training, youth and sport
EU	...	European Union
EUROBAT	...	Association of European Automotive and Industrial Battery Manufacturers
EV	...	Electric Vehicle
HEV	...	Hybrid Electric Vehicle
HR	...	Human Resources
HVT	...	High Voltage Transformer? Page 56
ID	...	Identification
IDIS	...	International Dismantling Information System
IMCO	...	Internal Market and Consumer Protection (EU Committee)
IT	...	Information Technology
LIB	...	Lithium-Ion Battery
LLL	...	Lifelong learning
LTO	...	Lithium Titanate Oxide (battery)
mil	...	One million (1,000,000)
NASQTECH	...	Research Center of University of Porto
NMIS	...	National Manufacturing Institute in Scotland
NV	...	Northvolt
OEM	...	Original Equipment Manufacturer/Manufacturing
PhD	...	Doctor of Philosophy
PHEV	...	Plug-in Hybrid Electric Vehicle
QR	...	Quick Response
R&D	...	Research and development
SME	...	Small and Medium-Sized Enterprise
TUV	...	Product Certification Company
VET	...	Vocational Education and Training
VR	...	Virtual Reality
VSB	...	Technical University of Ostrava

1 INTRODUCTION

In addition to the workshop format with several panellists applied in the first round of webinars a year ago, we decided to try something different with this second round. In late spring 2021, we introduced an “ALBATTS Interviews” concept whose purpose was to identify and have one-to-one interviews with persons of interest. And with pre-created questions, we could potentially get more insight into interesting topic areas. The pre-interview created questions would be first all discussed and brainstormed by us, the organiser team and then shared with the interviewee (and interviewer) to enable him or her to

- ◆ provide feedback on the questions (for example: if they cannot be answered or they need to be changed)
- ◆ get prepared to answer the questions in the best possible way.

Focus and organisation of the webinars and interviews

The procedure with the interviews

The preparation occurred in mini-meetings in smaller groups. Additionally, general regular workshop follow-up meetings occurring every second-week involving partners from Work Package 4, 5 and beyond were also starting to be kept in September. In these meetings, tasks were assigned, and the work process status was followed up.

Before the event, there was coordination and communication between the interviewer, interviewee, and the organiser team. In collaboration with our team as well as the interviewee and interviewer we created the list of questions that could be followed in the interview (not necessarily 100 % accurately depending on how the interview goes and what kind of questions appear from the viewers). The platform used with the interviews, Webex, was practised and tested. The platform related guidance and administration during the tests and the live events was executed by Eupportunity (WP2).

The procedure with Recycling Webinar

As a usual procedure, after agreeing on the date with the speakers, a “SAVE THE DATE”

message was sent to the ALBATTs stakeholders. In recurrent mini-meetings between the partners in WG4 and WG5, we agreed on the final agenda timing, set the webinar script with the moderator and made the final adjustments to the whole program. We scheduled a rehearsal session one week in advance for a smooth run of the webinar. A mingling and discussion session was organised using Wonder.me platform for the first time. In that forum, after the webinar, participants freely discussed issues related to batteries, recycling batteries and other aspects connected with this topic. Also, the webinar was promoted on the LinkedIn network, where it had more than 770 unique event visits.¹

The dissemination of the interviews and the recycling webinar analysed in this deliverable

Regarding the marketing or dissemination of the event, we collaborated with WP2 (Eupportunity) and created the following dissemination procedure that was followed up:

- ◆ Save the Date
- ◆ Pop-Up in the Website
- ◆ Event on the Website
- ◆ Block the calendar
- ◆ Registration Open
- ◆ Email to Stakeholders
- ◆ Agendas in the Website
- ◆ Bios on the website
- ◆ First Reminder
- ◆ Last Reminder
- ◆ Email Reminder
- ◆ Workshop
- ◆ After Workshop Email
- ◆ Publication of the video+presentations

¹ <https://www.linkedin.com/events/recyclingevbatteries-skillsandq6866006129734926336/>, accessed on 01.03.2022

2 BUILDING A GIGAFACTORY

“European Battery Ecosystem - Job roles and competencies now and in the future: Building a Gigafactory” was the first event in the second round of webinars under Task 4.4. The event was organised on the 15th of September 2021. The interviewee was Mrs Katarina Borstedt, Director of Growth at Northvolt.

The purpose of the interview was to understand the challenges of building a Gigafactory related to creating available positions and the required skills and competencies. How does a battery-related business start? Which steps to take to make the business successful? What job roles, competencies and skills were and are required?

Choosing the topic

We covered the anatomy of a Gigafactory in the WP4 deliverable D4.4. Continuing with the Gigafactory topic with the first interview was thus natural in anticipation of having more up-to-date information. It was also natural for us to approach Northvolt since they are members of ALBATTs. Mrs Katarina Borstedt was identified as the potential interviewee candidate due to her human resources related position as a Director of Growth. When considering the suitable interviewer candidate, Mr Svatopluk Stolf, Project manager and Assistant professor at VSB Technical University of Ostrava, was chosen.

We received 69 registration requests from 18 countries, 5 of which were outside the EU. Most of them represent industry and education sectors. The top 3 countries in terms of the number of registered were the Czech Republic, Finland, and Sweden.

The number of viewers was 81, about which 42 followed the event's live stream. The rest have accessed the recording on the ALBATTs website. Viewers were following the live stream also on ALBATTs's Facebook profile.

Interview participants



The banner features the albatts logo, the text 'Interviews', a microphone icon, and a portrait of Katarina Borstedt. The main text reads: 'European Battery Ecosystem: Job roles & competences now and in the future: Building a Gigafactory'. It also mentions 'With Katarina Borstedt, Director of Growth @ Northvolt' and the date '15 September 2021 14:00-14:45 CET Online'.

Interviewee

Mrs Katarina Borstedt works as a Director of Growth at Northvolt, and she has been in that position for over three years. Her educational background is business administration. She has experience working as a management consultant for many years. Her background also includes strategic HR working with leadership, strategic competencies development and attraction related questions in the paper and pulp industry. She has some background in working in a production organisation as well.

Interviewer

Mr Svatopluk Stolfá has been working as a Project manager and Assistant professor at VSB Technical University of Ostrava since 2005. Additionally, he functions as a Partner and Consultant at SCOVECO, an Ostrava, Czech Republic-based company providing consulting and IT solutions. Mr Stolfá's educational background is in Computer science and applied mathematics (PhD and Master's degrees).

Interview

Could you please make a small introduction of yourself?

- ◆ Almost three years at Northvolt
- ◆ Experience: management consultant, strategic HR, strategic competencies development

- ◆ Educational background: business administration

What is the status with the Gigafactory, Northvolt Ett?

- ◆ In most process areas, they are in a commissioning stage with the machines being installed/set up. The c-samples will be produced for the customers in the coming months.
- ◆ They have a total of 2000 employees with production organisation having 300 people. The target for production is 3000 2025-26 at Northvolt Ett.
- ◆ They have encountered challenges with recruitment. There is a great interest in joining the industry, with more than 10 000 applications received weekly, but they are still experiencing difficulties finding people with the right type of experience.
- ◆ There is a lack of battery experience, but it is also challenging to find people with experience building a factory in greenfield and large scale production.
- ◆ Finding cell developers requires going abroad (Asia) to find experienced people.
- ◆ With volume roles, you see similar challenges with operators with finding the correct number of people to fill the positions in the coming years while not necessarily right now.

The demo production line in Västerås – does it support the training of machine operators?

- ◆ The demo line is NV's industrialisation line (plant) that also has the company's R&D facilities. It is essential for them since it was built first, and they learned a lot from it.
- ◆ The line functions as a learning platform from which they can benefit in NV Ett.
- ◆ The industries still need machine operators, and they use the Västerås facility for training purposes. Most of the operators have a training period at the Västerås facility.
- ◆ The importance of having people with experience with battery production was emphasised.

How does Northvolt plan to reach its production staff targets? Which kind of tools are planned?

- ◆ The recruitment process is expected to intensify over the coming years, and they are developing the training tools. They will have training programs that train the

workforce in volumes, and they look into introducing more tools such as those supported by VR.

- ◆ They are a start-up in early-stage, and thus many things will need to be adjusted. Thus bringing those planned tools into use too early may mean readjustment in the future.
- ◆ Massive growth is expected in the factory in the next 4-5 years.

You are not only recruiting from Sweden but around the world? How does NV deal with this?

- ◆ Northvolt is recruiting worldwide and has 85 nationalities currently.
- ◆ Many of the competencies they are looking for are difficult to find, such as those needed to build a Northvolt Ett kind of factory facility. They need to bring these competencies to Skellefteå to make the facility operational according to the schedule and quality standards.
- ◆ It is important to attract different worker types to move to Skellefteå.
- ◆ The local labour market has one of the lowest unemployment rates, which means that not enough people are available for recruitment in different competence levels.

How has Covid changed your plans?

- ◆ They have required many adaptations, but Covid has not changed their plans.
- ◆ It has been problematic for some people who have decided to move from outside Sweden due to the need for testing. And they may not have had the possibility to visit beforehand.
- ◆ Global recruitment has continued during the Covid era.

Audience question: “Are you planning any apprenticeships?”

- ◆ They have summer internships with over 200 interns (in 2021) that work 2-3 months in different sites at NV. Many of them become employees after the internship.
- ◆ They have apprenticeships running around the year with various entities at NV.

How do you see the recruitment process technics developing in the future with AI, machine learning etc.?

- ◆ To be able to handle volume recruitment efficiently needs a lot of development.

- ◆ They develop ways to evaluate abilities and not only experience and education in a recruitment situation.
- ◆ VR could benefit them a lot by giving insight into the factory and helping new employees understand the workplace before the first day at work.

What kinds of job roles and competencies have been identified and needed by NV (in the early stages)?

The skills and roles that have been among the most significant needs in the early days:

- ◆ Much focus has been on cell design and how the battery looks, its chemistry, and creating a production process around the battery.
- ◆ Digitalisation related skills are also in demand.

Do you have any images you would like to show?

- ◆ Figure 1 shows where they are in the first phase when they have built slightly less than half of the future factory. The descriptions of the buildings have been added later based on the interviewee's description.

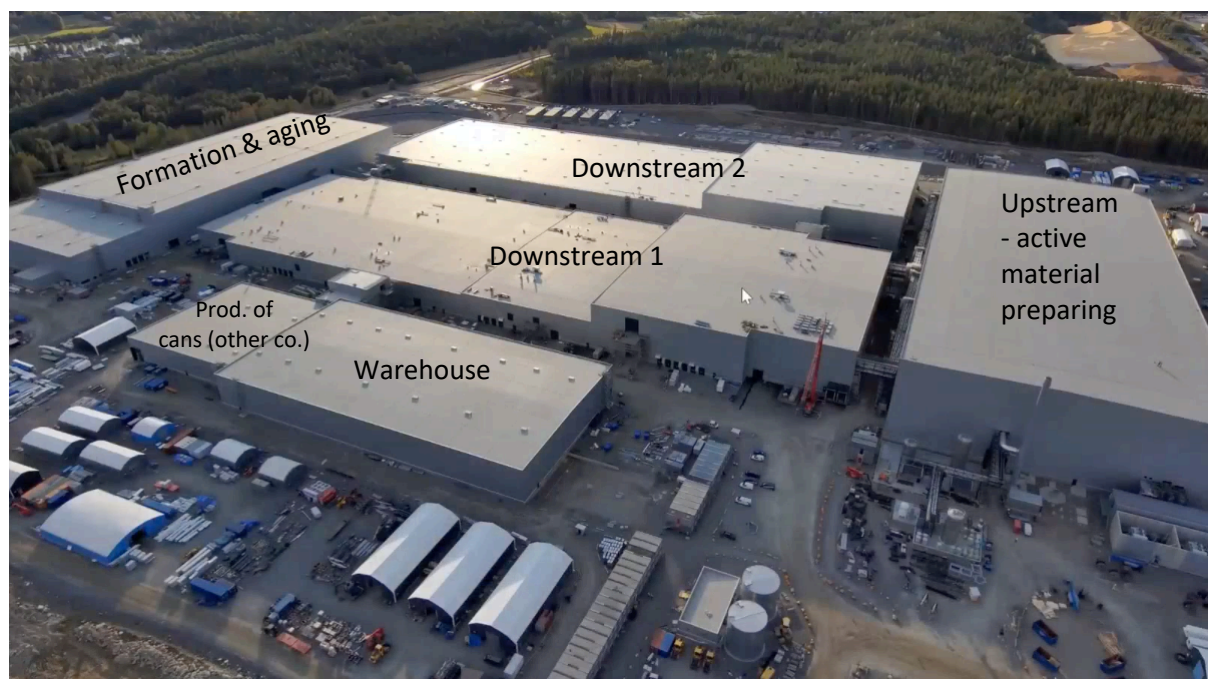


Figure 1. Northvolt Ett at the time of the interview (September 2021).

Is Northvolt planning to produce batteries also for stationary applications?

- ◆ They aim to be among the top suppliers of high-performance green BESS.

- ◆ Today, they have a smaller manufacturing facility in Poland, and they are also now building a new Gigafactory for its systems with different partners.
- ◆ They are focusing on both, the cells, and the systems

Audience question: “Do you cooperate with education providers”?

- ◆ They collaborate to build an educational platform, both **long-term**, ensuring there is education that provides the right competencies to the industry and **short-term** to enable to support them in the massive growth journey they are in now.
- ◆ **At the university level**, they have discussions about the master's programs for the industry.
- ◆ They have summer chemistry courses for the battery industry to create awareness among chemists around Europe and inform them about future opportunities.
- ◆ They aim to create fast tracks for people who have already arrived in Sweden with an education but who have not been able to enter the Swedish labour market yet.
- ◆ **With vocational education**, they have launched a 20-week training program to educate operators who can work in an automated industry with a focus on cell production.
- ◆ They pilot setups that would be used with enough capacity for volumes of students.
- ◆ There needs to be an education system for **young people** interested in a career path in the battery industry and those in the working life who **need re- and up-skilling**.

Are there plans for other Gigafactories in Europe by Northvolt? What could be the impact on recruitment? Are they afraid of the competitors taking the talents?

- ◆ Not that afraid, but **in the short-term perspective**, it is a challenge. There will be a war on talents with relevant experience and background in the coming years. They see it already.
- ◆ In the **long-term perspective**, growth is a positive thing due to the positive environment aspect. There will be more people with the right skills to be recruited in the long term. Also, with more companies in the business, there is more pressure to have educational platforms accepted and all the needed infrastructure in place benefitting all.

What variables affect deciding on a new location for a Gigafactory?

For Northvolt, there are many, but Mrs Borstedt mentioned the following as essential:

- ◆ **Access to a sufficient amount of green energy**
- ◆ **Availability of land for constructing sizable facilities**
- ◆ **People** (availability for recruitment, others such as housing availability, etc.)

Audience question: “Are there challenges with recruiting from outside Europe?”

- ◆ There are practical elements and challenges, which are primarily solvable, such as organising work visas, relocation of families and systems supporting employment such as schools.
- ◆ Supporting systems are essential in attracting people and making them stay longer.

What does the Growth department do at Northvolt (other than just recruitment and HR)?

- ◆ The department is about enabling recruiting people to the positions where they are needed.
- ◆ They need to have the education available internally and externally to ensure that the people get the right skillsets to produce the batteries and other tasks required.
- ◆ They work with the municipality of Skellefteå, and the close partnership with them is an important success factor. They cooperate to address the needed growth with housing, schools, services etc.
- ◆ Having the municipality involved from the beginning is important. Since development takes time, it is essential to ensure that the needed infrastructure is in place as early as possible.

Considering the plans for a high level of automation, what is the future of blue-collar positions?

- ◆ 75-80 % of the employees are blue collars, and the requirements are getting higher.
- ◆ Working in an automatised industry is less manual work, and it is about controlling machinery, troubleshooting, preventive maintenance instead.
- ◆ It is important to pilot base educational training setups early on to ensure that they get the right skillsets for the people that join the company.

- ◆ The ability to understand where one is in the process, and the consequences of things, is important. One has to understand the operating environment to “smell” if something is not working as it should.
- ◆ Automatisations is not considered to decrease the need for blue-collar workers. The forecasts about their staff needs are based on having their production on a high automation level.
- ◆ The production needs many people, especially downstream production in the cell assembly section. People are required to monitor, operate, and solve production issues. The production runs 24/7, adding to the need to have a lot of staff.

Do you have any conclusions at the end of this interview?

- ◆ Projects such as ALBATTS where they can learn are important by enabling them to fast-track the availability of competencies since that will be one of the biggest challenges.
- ◆ They will need to create a good mix of
 - people with experience from the battery industry,
 - people with expertise from other relevant industries,
 - people who come from education and
 - people who need to be re-skilled.

The relevant questions in the chat have been integrated into the above question list.

Information about the event with a recording can be found on the website of the ALBATTS project.

Post-event satisfaction survey

After the workshop, a satisfaction mini-survey was sent to the participants. The response rate was very low, with only three people answering. Overall, the participants were very satisfied with the workshop.

What is your overall assessment of the event?		
Choice	Answers	%
1=Insufficient	0	0 %

2	0	0 %
3	0	0 %
4	1	33 %
5=Excellent	2	67 %
Total	3	100 %

Two of the participants claim they learned something from the workshop. The third one claims they did not learn anything new.

Knowledge and information gained from participation in this event?		
Choice	Answer	%
Yes	2	67 %
Somehow	0	0 %
No	1	33 %
Total	3	100 %

Written feedback:

- ◆ How do you think the webinar could have been made more effective?
 - *"Good as it was"*
 - *"More intervenants" (potentially meaning "more interviewees")*
- ◆ In your opinion, what are the battery relevant future jobs and skills needed in the battery production sector and why?
 - *"Quality awareness, problem solving"*
 - *"More battery elements and production methods knowledge. Operation, maintenance and handling knowledge"*
- ◆ Comments and suggestions (including activities or initiatives you think would be useful for the future).
 - "Interview with some researcher on new battery cell technology"*
 - "Comparing experiences in building a battery factory from scratch to building from existing 'lead-acid' factory - are there any shortcuts?"*

Recommendations for the organisation of future webinars

- ◆ The post-event survey had a poor response rate, and participants should somehow be attracted to respond in greater numbers.
- ◆ It was possible to see everyone who had joined the interview. Sometimes the Webex platform would focus on the participants rather than Katarina or Svatopluk.
Participants may not know how to overcome the problem. Two solutions were found:
 1. Always maintain one slide open to limit the people on the screen.
 2. Change the definition of Webex so only the speakers, moderators, and organisations are visible to the audience.
- ◆ The audience focus was on technical questions. More emphasis should be given to job roles, skills & competencies
 1. During dissemination, the goal of determining the job roles, skills and competencies should be emphasised;
 2. Questions should focus more on job roles, skills, and competencies and less on the environment of the interviewee/company/topic.

2.1 KEY FINDINGS

- ◆ A War on Talents is expected and seen already. Recruitment challenges with finding the correct experience with batteries, greenfield building, and large-scale production.
- ◆ They recruit worldwide. Finding experienced cell developers requires going abroad with volume roles similar challenges with operators expected in the future.
- ◆ Supporting systems such as schools, housing, and other services are essential in attracting people and making them stay longer.
- ◆ Cooperation with the local municipality to address the above systems is important.
- ◆ Workforce training in volumes: programs and tools (VR etc.) are being developed.
- ◆ Many of the summer interns and apprentices become employees.
- ◆ Evaluating abilities (and not only experience and education) is developed.
- ◆ The demo production line is used to train, for example, operators.
- ◆ Stationary batteries produced as well: high-performance green BESS cells and systems
- ◆ Active collaboration with education sector
 - vocational education programs (automation, focus on cell production)

- university master programs (for the battery industry)
- summer chemistry courses (also to generate awareness about the industry)
- fast-tracks for educated unemployed immigrants
- The aim: educating young and re-/upskilling those in working life
- ◆ The importance of piloting educational training setups early on to ensure the generation of the right skillsets for the people joining the company is emphasised.
- ◆ Blue collars (75-80 % of the staff) experience growing competencies requirements.
- ◆ Increasing level automatisisation is not expected to decrease their need for blue collars.
- ◆ The long-term perspective of the growth is positive due to the positive environment. Also, with more activity in the sector, there is more pressure to have educational platforms accepted. There will be more skilled people to be recruited in the long term.

Job roles, skills, training tools and recommendations were identified in the webinar. These will be covered in the Work package 3 report that will be published in May 2022.

3 THE IMPACT OF THE BATTERY PASSPORT ON THE BATTERY VALUE CHAIN

“European Battery Ecosystem - Job roles and competencies now and in the future: The impact of the Battery Passport on the battery value chain” was the second event in the second round of webinars under Task 4.4. The event was organised on the 12th of October 2021. The interviewee was Ms Claudia Gamon, a Member of the European Parliament.

The purpose of the interview was to have first-hand information from an instance working with Battery Passport. There will be a profound impact by Battery Passport on how data on individual batteries can be accessed and applied in the future. There will also be implications, along with the Sustainable Battery Regulation that it supports, to the future competitiveness of the European green batteries.

Choosing the topic

Battery Passport was covered in Desk Research 2. We felt that potentially additional information is needed, and we also wanted to have an update about the status with it and the coming Sustainable Battery Regulation. When considering potential interviewees for the webinar, we decided to approach Ms Claudia Gamon. She functions as a Member of the European Parliament and is involved with planning the Sustainable Battery Regulation and Battery Passport. When considering the suitable interviewer candidate, Mr Tauno Kekäle, a Project Manager at Merinova Technology Centre, Vaasa, Finland, was chosen.

We received 100 registrations requests from 20 countries, of which seven were from outside the EU. Most of them represent industry and education sectors. The top 3 countries in terms of the number of registered were Germany, Finland, and Sweden.

The number of viewers has been 115, about which 62 followed the event's live stream. The rest have accessed the recording on the ALBATTS website. Due to technical issues, viewers could not follow the live stream on the ALBATTS Facebook profile.

Interview participants



albatts
interviews

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European Battery Ecosystem - Job roles & competences now and in the future:

THE IMPACT OF THE BATTERY PASSPORT
ON THE BATTERY VALUE CHAIN

With Claudia Gamon,
Member of the
European Parliament

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

Interviewee

Ms Claudia Gamon, Member of the European Parliament, is an Austrian politician and former student union functionary elected to the European Parliament in 2019. Ms Claudia Gamon has been a member of the National Council of Austria since October 2015.

Interviewer

Mr Tauno Kekäle is a Project Manager at Merinova Technology Centre (Vaasa, Finland) and a Docent (quality management) at Hanken School of Economics. His earlier work history includes nearly a decade as the President of Vaasa University of Applied Sciences.

Interview

What is Battery Passport?

- ◆ Ms Claudia Gamon expects an interesting process in the next couple of years when the legislation will be implemented and how it will change the European battery market.
- ◆ Has to work for all European citizens
- ◆ An electronic record of individual industrial batteries, including those in vehicles
- ◆ There will be a Digital ID card associated with batteries

- ◆ To make sure there's more transparency on the most important information aspects on each battery for the producers, consumers and the secondary market
- ◆ The following information should be accessible via Battery Passport
 - Type
 - Characteristics
 - Performance, etc.
- ◆ The above information is stored in the associated database
 - Updated by the manufacturers
 - Accessible for the consumers and others via a QR code
- ◆ The Commission will be responsible for implementing this idea and ensuring that it's easily implementable by all the manufacturers of batteries, and that's the main concept behind it.

How does Battery Passport support Europe's climate and sustainability goals?

- ◆ The main aspects on how it works, for example, by increasing transparency and how that affects the climate and sustainability goals:
 - I very much believe in market-based solutions for climate change. Consumers can make informed decisions. That is where the power of the market can produce innovative and new products that are much more climate-friendly and sustainable. It also supports our **Fit for 55²** initiative.
- ◆ **Battery Passport serves three types of relevant stakeholders**
 - **The producers** can monitor their compliance with the battery legislation.
 - **Consumers** can compare batteries and have much more easily accessible information.
 - **The second life operators**, since it is essential for them to have the information via Battery Passport to plan their operations.
- ◆ **Recycling, the application of big data and monitoring**
 - Battery Passport improves, for example, recycling efficiencies, but there are also more opportunities.

² <https://www.consilium.europa.eu/en/policies/green-deal/eu-plan-for-a-green-transition/>

- Battery Passport related database potentially provides a good blueprint for other kinds of legislation that will need this kind of information management.
- The power to harness big data, for example, by governments and producers enables the use of information to monitor the success and, for example, what batteries there are in the market.

What kind of schedule do you have with Battery Passport and related legislation?

- ◆ The aim is to implement it by the 1st of January, 2026. There are different goals, such as when the different recycling targets will be met. What needs to be in place by 2026 is also the Battery Passport database.
- ◆ We rely on the Commission to implement it all. They will need to be in constant contact with the manufacturers. The aim is to have a less bureaucratic burden, especially for the smaller producers, which is a question of implementation and not necessarily legislation. The idea is also to give smaller battery producers the chance to ensure consumers know they have a better product.

Can the objective of strengthening the competitiveness of the circular economy be achieved with the requirements defined in Article 8 of the proposal?

- ◆ It's hard to answer any question regarding competitiveness, but we have to ensure that we are not setting up contradictory goals. Regarding competitiveness, the manufacturers will be the best to answer how this will affect them also in the global market.
 - When we are trying to build a **circular economy**, we have to constantly ask ourselves such questions as **is this feasible** or **can it benefit European producers compared to producers from other countries?**
- ◆ When it comes to article 8, the questions are
 - Will we have sufficient secondary raw materials?
 - How fast will we have sufficient secondary raw materials?
 - Will they only be suited for battery production, or can we use them also in other appliances?

Have you initiated any special education or skills needs for different actors in the battery value chain?

- ◆ We have a massive shortage of skilled workers in different industries in the EU. It's especially noticeable in the high-end specific industries.
- ◆ The shortage probably cannot be solved by European institutions. This challenge needs to be solved on the national level while the European Union provides a great way to exchange best practices between member states. It is not something that we can change with legislation to decrease skills shortage.

What are the ambitions regarding green batteries in Europe? Are we aiming to be “the greenest of the continents”?

- ◆ It is not about being the greenest but having a functioning circular economy behind it through the goals we set.
- ◆ With sustainable batteries, we also have the question about sustainable mining with respect to human and labour rights.
- ◆ We want to achieve political and strategic goals on global competitiveness for the European market with the battery legislation.
- ◆ We will need a lot of battery raw materials in the European Union to achieve the other green deal goals and be a self-sufficient battery producing continent.
- ◆ It is an important strategic goal also for European foreign policy because we make ourselves vulnerable if we rely too much on the producers outside of Europe.

Is the regulation text accepted, or is it still being debated?

- ◆ Right now, we are considering amendments in all different committees that are responsible for that.
- ◆ I work on it in the IMCO committee, which is trying to look into it from **the sustainability** and **the internal market** perspectives. We want to have a functioning battery market to meet the sustainability goals.

How should companies follow this? Is there an idea that every company should follow the same guidelines on their classifications? Is Battery Passport only informative?

- ◆ There are differences between the types of batteries. We are debating how to differentiate between these different types and where this differentiation should occur.

- ◆ While Battery Passport is only informative, it is supposed to serve as a tool for the different stakeholders.
- ◆ The rest of the legislation deals with the types of responsibilities producers have with batteries and what kinds of aspects they must meet. It does not necessarily have something to do with Battery Passport. It just defines what the batteries will look like and what information there will be in Battery Passport.
- ◆ The legislation defines for producers **what is a Europe produced sustainable battery**.

The legislation has different parts, such as

- **A QR code** (with Battery Passport) to enable access to the information about what a battery contains, how does it work, and the specification details
- **A declaration, for factories and importers**, functioning as quality control of the activities of all the actors in different parts of the value chain

How Battery Passport will be disseminated and campaigned?

- ◆ There will potentially be a lot of effort to provide information from the side of the Commission, and their national bodies are responsible for the implementation.

The importers of batteries from outside the European Union: do they need to comply in the same way? How do we monitor the compatibility of the batteries?

- ◆ There is an authority that is responsible for monitoring the compliance of producers.
- ◆ Eventually, we will see how the implementation goes and how it will work in practice to address if changes are needed with the monitoring, but currently, it's a functioning solution.
- ◆ Producers outside Europe must comply with the same rules³, which is actually what the battery legislation is also about. That is making sure that European manufacturers operate on an equal playing field, which is one of the biggest questions in the Green Deal and the Fit-for-55 packages.
- ◆ We have to make sure that European manufacturers and producers do not have negative consequences in the market because they have to comply with higher sustainability standards.

³ https://ec.europa.eu/commission/presscorner/detail/en/qanda_20_2311

- ◆ We should also try to be more creative on how we can change the entire world by using the market power of the European internal market as leverage to encourage the other parts of the world to comply with our standards with sustainability.
- ◆ We will achieve this since they will comply with European legislation if they want to enter the European market.

Are there any kinds of restrictions on technologies with the legislation?

- ◆ In general, the legislation, especially when it comes to technological innovation, should leave room for innovation. We will have to check this in the parliament whether or not the legislation is flexible enough to really make sure that we allow that.

Audience question: What should consumers know about Battery Passport?

- ◆ It's a tool that is primarily also directed at consumers, and with it, they can access information about the batteries.
- ◆ There will potentially be an entire industry that will emerge to innovatively deal with Battery Passport related data (different digital devices and platforms) in the market.

Where will Battery Passport be located in batteries or devices with batteries?

- ◆ This belongs to the questions that are still being debated due to practicality.

Audience question: How to deal with the information for the consumers? Is there a programme on that?

- ◆ We have to make sure there is a certain responsibility for legislators and a certain responsibility for the state itself, but it does end somewhere. The market should start to provide the information and make sure that consumers also know what they're doing with Battery Passport.
- ◆ That should leave a lot of room for innovation for start-ups to create new business models out of this sustainable battery market and the information provided with the (Battery Passport related) database.

Where can one get the latest information and updates on Battery Passport?

- ◆ You should follow the progress and the debates on the website of the IMCO committee⁴ on the different aspects of the battery legislation, and we will see after the dialogues what will be the outcomes.

Audience question: What are the most debated parts of the regulatory text?

- ◆ Recycling goals and the criteria about the targets that should be met and when they should be met
- ◆ What consumers should be able to do with a battery in their device (for example, they can remove a battery by themselves or not)
- ◆ Where the responsibilities lie

Audience question: Will Battery Passport enable transparency to provide information, such as child labour in mining?

- ◆ Battery Passport is more about other things, but this is what we are discussing now. If a battery's materials were sourced with child labour, it should not be sold in the European Union.
- ◆ We are trying to do the legislation that makes sure that the European Union plays a part in ensuring that the battery materials mined worldwide are meeting European standards. We are playing our part in ensuring that these practices (child labour) do not exist anymore. That is what we are trying to achieve with this legislation.

The relevant questions that appeared in the chat have been integrated into the above question list.

Information about the event with a recording can be found on the website of the ALBATTs project.

Post-event satisfaction survey

After the workshop, a satisfaction mini-survey was sent to the participants. The response rate was very low, with only two people answering.

One of the participants considered the workshop excellent. The other one gave a medium classification.

⁴ <https://www.europarl.europa.eu/committees/en/imco/home/newsletters>

What is your overall assessment of the event?		
Choice	Answers	%
1=Insufficient	0	0 %
2	0	0 %
3	1	50 %
4	0	0 %
5=Excellent	1	50 %
Total	2	100 %

One of the participants claims he/she somehow learned something from the workshop. The other one claims he/she learned something new.

Knowledge and information gained from participation at this event?		
Choice	Answer	%
Yes	1	50 %
Somehow	1	50 %
No	0	0 %
Total	2	100 %

Written feedback:

- How do you think the webinar could have been made more effective?
"real process not so abstract"
- In your opinion, what are the battery relevant future jobs and skills needed in the battery production sector and why?
"Process know how"
"Battery Electronics, Battery Infrastructure, Battery recycling"
- Comments and suggestions (including activities or initiatives you think would be useful for the future).
No answers

Recommendations for the organisation of future webinars

- ◆ The same as with the first interview: "Building a Gigafactory"

Key findings

- ◆ **Battery Passport belongs to the coming Sustainable Batteries Regulation**
- ◆ The implementation schedule target: **the 1st of January, 2026**
- ◆ Battery Passport is **an electronic record of individual industrial batteries**, including also those in vehicles
 - stored in a database
 - accessible via a QR code
- ◆ There will be a **Digital ID card with a QR code** associated with individual batteries
- ◆ **Provides battery information** for producers, consumers, and secondary market
- ◆ **Transparency** helps **consumers** to compare batteries and make **greener choices**
- ◆ **Leverage the power of the market** to support sustainability goals by encouraging **producers** to
 - monitor their compliance with the legislation
 - innovate climate friendlier products
- ◆ **Second life operators** can access information via Battery Passport to plan operations.
- ◆ Battery Passport improves **recycling efficiency** and supports **circular economy**
- ◆ **Harnessing big data** enables **governments** and **producers** to use the information to monitor the success and battery market data
- ◆ To **support global competitiveness and raw material self-sufficiency** of Europe with the Sustainable Battery Legislation
- ◆ **Dissemination and campaigning:**
 - Information provided by the Commission
 - The national bodies responsible for the implementation
- ◆ **EU approved authorities** responsible for monitoring the product compliance
- ◆ **Batteries imported** into the EU **have to comply** with the legislation. It supports European greener battery producers in operating equally with the competition, which is among the largest questions with Green Deal and Fit-for-55 packages.

Job roles, skills, training tools and recommendations were identified in the webinar. These will be covered in the Work package 3 report that will be published in May 2022.

4 BATTERY ENERGY STORAGE ENABLING SUSTAINABLE ISLANDS

“European Battery Ecosystem: Job roles and competencies now and in the future: Battery Energy Storage enabling sustainable Islands” was the third event in the second round of webinars under Task 4.4. The event was organised on the 17th of November, 2021. The interviewee was Mr Duarte Conde Silva, Plant Manager on Gracióllica Island, Azores archipelago.

The purpose of the interview was to learn about the challenges of installing and using a Battery Energy Storage System (BESS) in isolated island conditions and, in this case, in the Azores, a group of islands in the middle of the Atlantic Ocean. Why are BESS systems needed in the context of a grid application on an island? Which functionalities are required? What are the most important job roles, skills, and competencies?

Choosing the topic

BESS as a topic area has been visited before in the ALBATTs project. The first WP4 desk research addressed stationary batteries' operation, repair, and maintenance and looked into various application areas. Where the BESS, together with renewable (and other) energy systems, brings perhaps the clearest benefit and is actually the only electricity providing solution, is an isolated off-grid system located far beyond a national grid. Therefore the idea of how islands situated in the middle of an ocean can utilise BESS systems and what it means in terms of skills and competencies sounded fascinating. When considering potential interviewees for the webinar, we decided to approach an existing contact of our partner, EFACEC. Mr Duarte Silva works as a Plant Manager at Gracióllica island in the Azores, and he accepted our invitation to the interview.

We received 72 registrations requests from 23 countries, 6 of which were outside the EU. Most of the registered represent industry and education sectors. The top 3 countries in terms of the number of registered were Portugal, Finland and Germany. The EU islands network, euislands.eu, was specially invited and announced the webinar on its website. The number of viewers has been 55, of which 43 followed the live stream event. The rest have accessed the recording on the ALBATTs website. Viewers could also follow the live stream on the ALBATTs

Facebook profile where the recording is still available.

Interview participants



Interviewee

Mr Duarte Conde Silva has been working as a Plant Manager in a hybrid power plant on Gracióllica Island in the Azores for over five years. Before that, he worked as an Assistant Site Engineer at the renewable hybrid system construction on the island. He has a master's degree in electronic engineering with electric power systems.

Interviewer

Mr Jakub Gajdušek is a Project Manager and Marketing Assistant at HE3DA in Prague and Ostrava, Czech Republic. He has, for example, coordinated the company's participation and meetings in Brussels with European Battery Alliance and Commission. His educational background is in Business Administration and Marketing Strategy.

Interview

- ◆ Mr Jakub Gajdusek opened the interview by first presenting the ALBATTTS project

Could you present yourself and the context of installing a BESS in the Gracióllica island?

- ◆ He works as a plant manager in a new hybrid power plant on Gracióllica
- ◆ His educational background comes from Electrical Engineering (2015)
- ◆ Firstly, involved within the project in Construction Commissioning and then moved into a job position as being Operation manager in charge of the project

- ◆ Mr Silva explained the parts of the Hybrid Power Plant as seen on his presentation slides (Figure 2 and Figure 3).

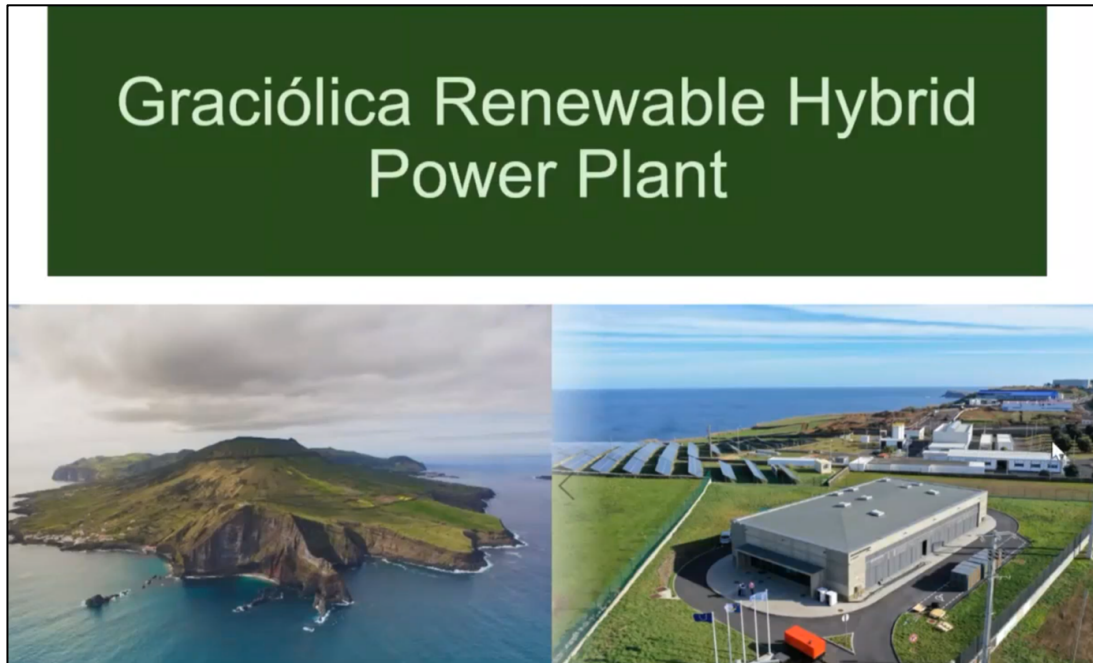


Figure 2. A screenshot of Mr Silva's slides. An aerial view of Gracióllica and the plant.

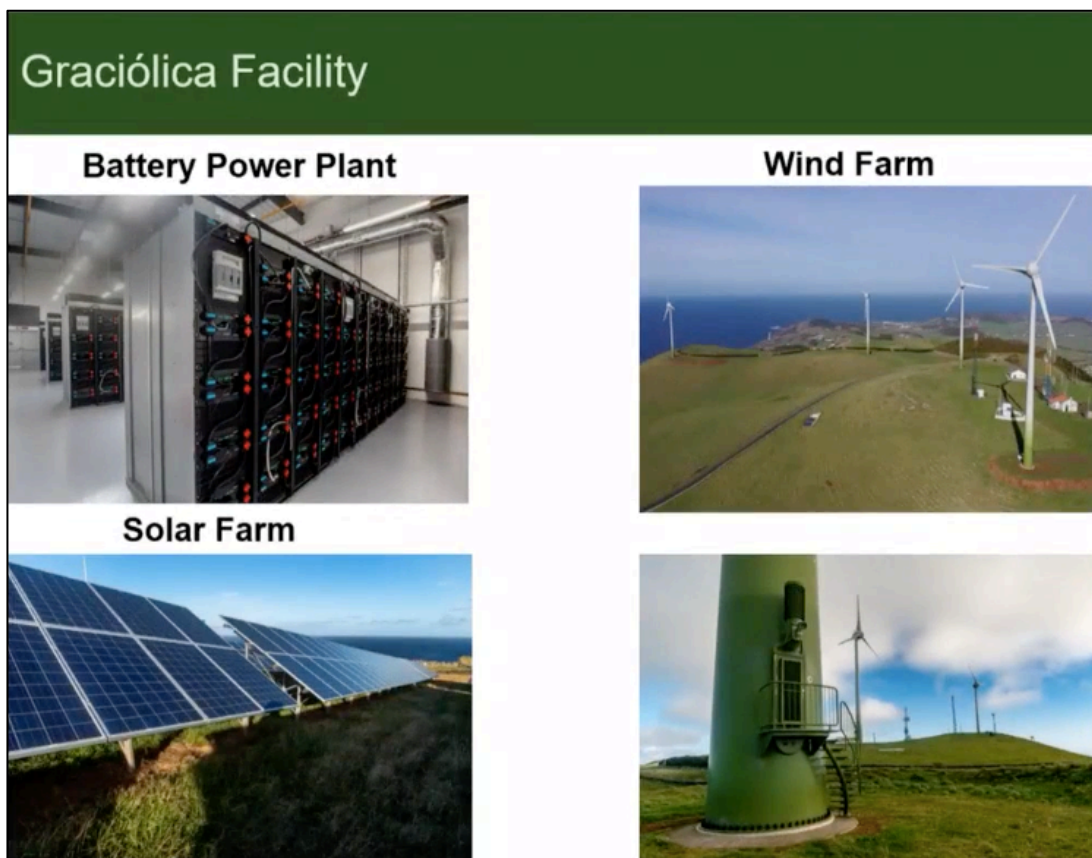


Figure 3. A screenshot of Mr Silva's slides. The facilities.

Why is the BESS a valuable asset in the power plant installed in Gracióllica island?

- ◆ The idea behind creating the project goes back to 2005 with great support from local government and utility companies. The island was chosen for the first small prototype to present its results for future larger-scale projects or even land projects.
- ◆ Island is located approx. 4000km from Spain in Azores Islands.

Electricity quality is an issue when talking about a small grid, as is the case of an island isolated in the middle of the ocean. What contributions does the BESS have to electricity quality and electric grid reliability?

- ◆ Significant improvements in power quality across the islands
- ◆ There are days when the island works 100% from renewable energy. Overall it runs 62% of the year from renewable energy sources only.

Is the sustainability and reduction of CO2 emissions related to electricity generation on the agenda for Gracióllica?

- ◆ Real reduction of 2 million litres of diesel fuel per year generates 5.000 tonnes of CO2 reductions annually.

What were the main challenges of projecting and installing the BESS?

- ◆ The very remote place was a great challenge for the logistics and transportation of hybrid power plant equipment from different countries.
- ◆ Also quite challenging to connect the power plant to the local utility grid using different technical approaches and sources.

The Azores are located in an area prone to some environmental hazards. Which have the highest impact, and how did you tackle them?

- ◆ The project's speciality was mainly to properly construct and build the buildings and energy sources to avoid damages from unpredictable weather conditions.

The plant is currently running, then issues during operation may arise. How does Gracióllica tackle them? And what is your approach to training?

- ◆ The main requirement is a minimum of two electrical engineers on-site for the current system optimisation processes meaning the renewable energy optimisation for the grid.
- ◆ Also qualified electricians for maintenance
- ◆ Electricians are required to have skills in power electronics as well.
- ◆ Mostly full-time employment and also outsourcing is used sometimes.
- ◆ Training for new employees is held by current staff on the island, and currently no direct cooperation with universities.
- ◆ In the early stage of the project, they have worked closely together with NASQTECH (Research Center of the University of Porto) to establish the process with a utility connection system.

What are the plans for the future of the Gracióllica power plant?

- ◆ Currently, we are optimising the renewable energy penetration to push the results higher.
- ◆ The aim is to be 100 % renewable in the Azores Islands one day.

Question from the Audience: Are the islands connected to each other by the grid?

- ◆ The nine islands are independent of each other, each having its own system.

Question from the Audience: The financing of the project?

- ◆ The project is expected to be paid back in 10-15 years

Question from the Audience: Do you plan to harness geothermal energy in the future?

- ◆ There are two islands in the Azores with a geothermal energy power plant.

Question from the Audience: How would you comment on the results after the power plant's battery system was put online?

- ◆ Mr Silva showed graphs of real improvements in the power stability when integrating BESS combined with renewables to the grid (2019) compared to the earlier situation with Diesel generators only, as shown in Figure 4.
- ◆ In terms of real power, the wind power plant is 4,5 MW, solar is 1MW and 2,6 MW power of usable capacity and 7,5 MWh capacity power.
- ◆ The voltage and frequency profile and its massive improvements when batteries were connected and nicely flattened the graphs (Figure 4)



Figure 4. A screenshot of Mr Silva's slides. Various graphs show the effect of transforming from using only Diesel generators to renewables combined with BESS.

Question from the Audience: Are there any internship or entering job positions apart from highly skilled workers currently employed at the power plant?

- ◆ There are currently no open job positions, but internships are welcomed and could be possibly evaluated

Question from the Audience: Do you have a future due date to put the batteries into recycle process, and what kind of battery technology do you use?

- ◆ The type of battery we use is LTO (Lithium Titanate Oxide).
- ◆ The recycling process is up to the manufacturer of the batteries. Internally there are no rules or any special way to do it.

Question from the Audience: Are there predictions to go from 50% energy currently using renewable energy sources into 100%?

- ◆ The longest consecutive period running 100 % on renewables was five days, but the cumulative value throughout the year was 121 days meaning 35% of the total time last year.

Question from the Audience: Is tidal power a feasible energy source for the island?

- ◆ Possible for our island while using the optimised energy system using batteries and maintaining the engines voltages and frequencies on the continual levels

Question from the Audience: How fast could you get support from the service centres if something is not properly working?

- ◆ For the wind power plant, the service team is available on the Azores islands – it takes them a couple of days to arrive
- ◆ For other utilities, it is the same

The relevant questions that appeared in the chat have been integrated into the above question list.

Information about the event with a recording can be found on the website of the ALBATTs project.

Post-event satisfaction survey

After the workshop, a satisfaction mini-survey was sent to the participants. The response rate was nearly non-existent, with only one person answering. That single person appeared to be very satisfied with the workshop.

What is your overall assessment of the event?		
Choice	Answers	%
1=Insufficient		
2		
3		
4		
5=Excellent	1	
Total	1	100 %

The participant claimed he/she learned something from the workshop.

There was no written feedback.

Recommendations for the organisation of future webinars

In addition to the recommendations already addressed in the context of the first interview:

“Building a Gigafactory”:

- ◆ One-on-one interviews focus more on details due to more time and less organisation while recording LIVE.
- ◆ A great interview must always have a proper training and fulfilled checklist before going LIVE, which we have achieved well.
- ◆ Always remind the audience to ask questions addressed to the interviewee at the end of the webinar.
- ◆ Check your conversations with your staff on WhatsApp and stick to the webinar timeline per the original programme.
- ◆ Something has to be done with attracting the audience to respond to the post-event satisfaction survey. Maybe reminders of it at the beginning and the end of the event in addition to just emailing participants an invitation have to be provided.

4.1 Key findings

- ◆ The application of LTO based BESS together with renewables has resulted in major improvements in power quality across the islands. The grid runs 62 % of the year with renewable energy sources.
- ◆ Annual reduction of 2 million litres of diesel fuel: 5000 tonnes of CO2 reductions
- ◆ The remote place was a great challenge for logistics and transportation.

- ◆ Local utility grid connection to the plant was challenging with different technical approaches and sources
- ◆ The plant is designed to withstand unpredictable weather conditions.
- ◆ The main requirement is a minimum of two electrical engineers on-site for the current system optimisation processes meaning the renewable energy optimisation for the grid.
- ◆ Also, qualified electricians are needed for maintenance.
- ◆ Electricians are required to have skills in power electronics.
- ◆ Training for new employees is held by current staff on the island, and currently no direct cooperation with universities.
- ◆ In the early stage of the project, they worked closely with NASQTECH (Research Center of the University of Porto) to establish the process with a utility connection system.
- ◆ The aim is to be 100 % renewable in the Azores Islands one day.
- ◆ The wind power plant is 4,5 MW, solar is 1MW and 2,6 MW power of usable capacity and 7,5 MWh capacity power
- ◆ Connecting BESS generated massive improvements to voltage and frequency profiles

Job roles, skills, training tools and recommendations were identified in the webinar. These will be covered in the Work package 3 report that will be published in May 2022.

5 RECYCLING ELECTRIC VEHICLES' BATTERIES

Recycling and circular economy are common areas of interest with WP4 and WP5. While recycling has been covered in the earlier WP4/5 deliverables of the ALBATTTS project, further information and up-to-date information was regarded as needed in the form of an expert forum. WP4 has been authoring the topic in Desk Research 1. Desk Research 2 and this second round of webinars looked into the coming Battery Passport and related legislation. Consequently, this recycling workshop is studied and discussed in the context of this WP4 deliverable. The event was organised by a team of various ALBATTTS members led by APIA.

The webinar **“Recycling EV Batteries: Skills and Qualifications Needed in Auto Workshops”** was held on **the 30th of November, 2021**, from 10.30 to 12.00 CET.

During this event, the following issues were discussed, and the participants answered with the support of experts, practitioners from the private sector and educators the following questions:

- ◆ How to create an effective system of training for employees?
- ◆ How to use existing competencies and update them with the new, green ones – in the circular economy context?
- ◆ Are employers prepared to engage in teaching and training those new skills?
- ◆ What kind of support do they expect from the local, national, and European authorities?

Agenda

 Alliance for Batteries Technology, Training and Skills  Recycling EV Batteries: Skills and Qualifications Needed in Auto Workshops AGENDA November 30, 2021 10:30-12:00 CET 	WELCOME BY THE MODERATOR	 10:30	EU's policy in the automotive sector - developing policies and strategies related to electric vehicles and their end of life James Copping , DG GROW, European Commission
	PRESENTATION OF THE ALBATTS PROJECT	 10:40	Blueprints on skills in battery industry and automotive sector Jakub Štolfa , ALBATTs Project WP Supervisor and DRIVES Project Coordinator
	EXPERTS PANEL	 10:50	<ul style="list-style-type: none"> ➤ <i>Current legislative requirements and compliance therewith (ELV Directive – 2000/53/EC and Battery Directive – 2006/66/EC)</i> ➤ <i>The cooperation between the automotive industry and the recycling industry in general and on the EV battery subject in particular</i> ➤ <i>Focus on worker's skills, training needs and other implications in workforce in the context of the circular economy in the automotive sector</i> ➤ <i>Re-skilling and up-skilling of technicians and workers</i> <ul style="list-style-type: none"> • Rene Schroeder, Executive Director, EUROBAT • Elena Wrelton, Environmental Compliance Manager ELVES Ireland • Amélie Sophie Salau, Environmental Policy Director, ACEA • Stewart McKinlay, Skills Director, NMIS Manufacturing Skills Academy, University of Strathclyde Glasgow, Scotland, UK
	DEBATE	 11:30	Panellists & Audience
	CLOSING REMARKS	 11:50	James Copping , DG GROW, European Commission
	AFTER EVENT	 12:00	Mingling discussions in Wonder.me! "Recycling EV batteries" room is waiting for you!

We received 199 registration requests from 28 countries, of which nine were outside the EU. Most of them represent industry and education sectors. The top 3 countries in terms of the number of registered were Spain, Portugal, and the Czech Republic.

The number of viewers has been 124, about which 106 followed the event's live stream. The rest have accessed the recording on the ALBATTs website. Viewers were following the live stream also on ALBATTs's Facebook profile. The stream remains available there.

Moderator and speakers



Recycling EV Batteries: Skills and Qualifications Needed In Auto Workshops

SPEAKERS

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




Recycling EV Batteries: Skills and Qualifications Needed In Auto Workshops

SPEAKERS

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





James Copping is a Policy Officer at DG GROW, European Commission, working in the Automotive Unit, coordinating the Commission's policy on electro-mobility and, in particular, on supporting the work of the European Battery Alliance. This included contributing to the drafting of the Commission's Strategic Action Plan for Batteries and to the recent Sustainable and Smart Mobility Strategy. Within these responsibilities, he is working on a number of EU skill-related projects including ALBATTs. He joined the European Commission in 2001 and has worked in different units within the Directorate General responsible for industrial policy.



Jakub Štolfa is the program manager and academic staff member at VSB – Technical University of Ostrava, where he has also received his Ph.D. He is responsible for the skills agenda in the Automotive ecosystem. He coordinates the DRIVES project, a Blueprint for the Automotive sector, and is a WP leader in the ALBATTs project. His recent activities focus on a sustainable and pragmatic approach towards the skills agenda in the Automotive Ecosystem, establishing the Automotive Sector Skills Alliance, as Pact for Skills in Automotive Ecosystem. He has experience in project/program management, development of training and educational programs, technical background in Informatics and Mechatronics in the Automotive ecosystem.



Rene Schroder, German nationality, works as Executive Director for EUROBAT, the automotive and industrial battery manufacturers association. He previously worked at a European federation in the waste industry and held internships at the European Parliament and Commission, as well as at CEFIC the chemicals industry association. Rene has a Postgraduate Master in European studies from the College of Europe, in Natolin, Warsaw, Poland and a Master in Political Science from the University of Rostock, Germany.



Elena Wrelton is the Environmental Compliance Manager at ELVES (ELV Environmental Services CLG) the compliance scheme for End-of-Life Vehicles. Prior to joining ELVES, she worked for a number of years at the Ministry of Environment in New Zealand on a range of waste and resource management issues including the operation of waste policy (waste disposal levy, voluntary and mandatory product stewardship, waste advisory board), the implementation of a nationwide take back scheme for televisions, and funding for waste and environmental projects. She recently completed an MBA in Innovation, Enterprise and the Circular Economy through Bradford University School of Management.



Amélie Sophie Salau joined ACEA in August 2020 as Environmental Policy Director. She is on a secondment for Volkswagen. She worked over 15 years for the Volkswagen group in different areas. She is a political scientist by education.



Stewart McKinlay graduated with a Masters in Manufacturing Sciences and Engineering from the University of Strathclyde, before moving to Aberdeen to start a manufacturing plant making Helium Speech Unscramblers. Later he worked for the Sector Skills Council in Scotland responsible for the Engineering Modern Apprenticeship framework, growing the number of new starts from 850 to 1500 per year before moving to the University of Strathclyde's Engineering Academy. This was launched to support employer's talent pipelines and the Scottish Government widening access agenda. Whilst there he was one of a small team who created the engineering Graduate Apprenticeship programme and led the University to become the first in Europe to join the European Alliance of Apprenticeships. This year he joined National Manufacturing Institute Scotland - NMIS as Skills Director, for NMIS Manufacturing Skills Academy. Previously as Chair of the Scottish Association for Engineering Education, he selected the first female Chair and led the executive committee in reaching 50/50 gender balance. Stewart currently sits on the Steering Board of Equate Scotland, the SDS Engineering Skills Leadership Group, and the Transport Scotland HGV Decarbonisations Skills Work stream.

Moderator

Mr James Copping, DG GROW, European Commission

Key messages:

- ◆ Recycling is not just good for the environment but also a source of key raw materials
- ◆ it takes a particular set of skills to recycle used batteries safely and effectively.

- ◆ Batteries are the key enabling technology for zero-emission mobility and energy storage, and there is a determination to turn Europe into a global player in this technology.
- ◆ Since 2017, the Commission has targeted its resources to support the emergence of a complete competitive and sustainable battery value chain in the EU.
- ◆ This has been successful in the case of 70 major projects, including more than 20 Gigafactories under development within the EU.
- ◆ It is challenging to find competencies across all steps of the value chain. Thus the Commission has supported the launch of initiatives to identify strategies regarding future skills, competencies and job roles.
- ◆ The knowledge of the physical and chemical recycling processes is needed and is supported with skills and knowledge on the environment, circular economy, battery design, and the design of components. The challenge is to adequately address and support these education training needs.

Speakers

Mr Jakub Stolf, ALBATTTS Project WP Supervisor and DRIVES Project Coordinator

Key messages:

- ◆ We are looking from the long-term perspective the shift to zero-emission, digital mobility and the new mobility concept, or carbon neutrality by 2050.
- ◆ We are looking at the people working in the automotive sector and keeping an eye on the millions of Europeans working in all industry sectors.
- ◆ We have launched the Automotive Skills Alliance (ASA) within the Pact for Skills, a stakeholder-wide collaboration on the automotive mobility skills agenda.
- ◆ We focus on mainstreaming the results of different initiatives sharing good practices to support the massive upskilling and re-skilling activities.

The overall needs with recycling-related skills and job roles and related recruitment:

- ◆ The biggest challenges are with engineers and researchers in the early stage (recycling facility setup). The emphasis shifts from the white collars to the blue collars as the plant is in the later stage of maturity.
- ◆ The technology and processes with chemical and physical recycling techniques need to be educated along with other knowledge and skills.

- ◆ The environmental management and the circular economy
- ◆ The design of battery and components to be easily recycled at the end of the lifecycle
- ◆ The Battery materials, material science and flow chemistry and electrochemistry
- ◆ The Vehicle battery system and battery systems in the overall
- ◆ Innovations and use of automation in the recycling process
- ◆ Strategies for used battery collection: needed methods/techniques to be developed
- ◆ Blue collars: expertise in material handling, operation, machines, recycling etc.
- ◆ White collars: expertise in audits, safety, quality, process engineering etc.

Mr Rene Schroeder, Executive Director for EUROBAT

Key messages:

- ◆ The European Battery Alliance is an important milestone for developing the related policy. Fit-for-55 is an important driver for the battery industry.
- ◆ Also, looking into the circular economy action plan, the battery regulation, and topics such as the forthcoming revision of the industrial emissions directive regarding the permitting process chemicals policy. We are looking at sustainability besides the batteries regulation for all of them.
- ◆ The importance of the End-of-life batteries
- ◆ The policy of the battery regulation is under discussion in the EU.
- ◆ The demands of the Battery legislations (content target, competitiveness etc.)
 - Essential to ensure the legislation does not weaken the competitiveness
- ◆ High voltage batteries, employee training and dialogue with standardisation bodies
 - how the standardisation bodies make sure they have the right type of education and qualifications to conduct their work with high voltage batteries
 - employee safety assurance
- ◆ Training along the whole value chain for batteries includes car manufacturers, battery manufacturers, service companies, waste management companies, battery and material recyclers, producers, cell manufacturers, and so far, is needed. In this regard, **cooperation with academia and VET providers** is essential to be developed.

Ms Elena Wrelton, Environmental Compliance Manager, ELVES Ireland

Key messages:

- ◆ Training and information provided to the ATFs (Authorized Treatment Facilities)
- ◆ Collection and recycling of electric vehicle batteries from ATFs and aftersales provided
- ◆ ELVES: The program was developed in 2018 when electric and hybrid vehicles started to come in volumes to Authorized Treatment Facilities (ATF).
- ◆ Funding - **Core programme**:
 - Collection and recycling – **by marque**, as per Batteries Regulations
 - Training and information support - **by all vehicle producers** through ELVES
- ◆ R&D Funding
 - Application into Sustainable Energy Authority Ireland, in partnership with University College Dublin and Maynooth University
 - Testing: battery re-purposing in line with incoming Battery and ELV Regulations
- ◆ There is a dismantling manual for electric and hybrid vehicles on safely removing the battery for every model in the European market, etc.
 - International Dismantling Information System (IDIS) - Marque and model dismantling
- ◆ How to pay attention to small companies as well regarding the training (battery recycling steps and methods; maintenance and repair)

How to recycle:

- ◆ Each car would need guidance on how to unplug a battery from the vehicle systems
- ◆ Three steps
 - Transport/handle EVs – including damaged vehicles
 - Depollute vehicle – safely remove the EV battery
 - Safely store battery before collection for recycling

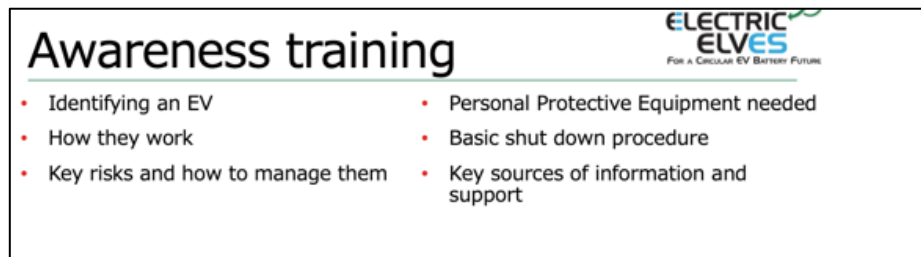


Figure 5. A screenshot from the presentation of Elena Wrelton

- ◆ Identifying vehicles
 - Identifying different hybrids
 - **Mild hybrids** are difficult to spot while containing Li-ion batteries (not as high-voltage)
 - Differences between models can be addressed with the IDIS system
 - International Dismantling Information System (IDIS) – Marque (brand of a manufactured product) and model dismantling information

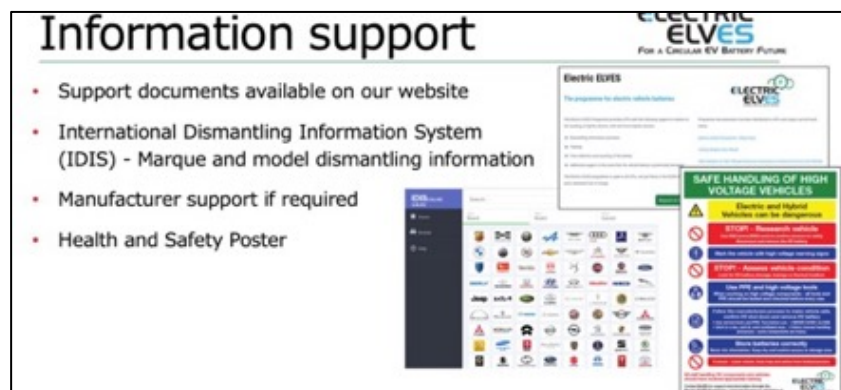


Figure 6. A screenshot from the presentation of Elena Wrelton

- ◆ Key risks: electric shock and electrolyte leakage
- ◆ Personal protective gear: rubber boots etc.
- ◆ Basic shut-down
- ◆ Safely storing of a battery after removal

Ms Amélie Sophie Salau, ACEA Environmental Policy Director

Key messages:

- ◆ There will be an increasing number of electric vehicles in the future. Therefore, the AFIR⁵ directive that is currently under revision and the battery regulation, which is also in discussion at the moment, should work together.
- ◆ From the perspective of the automotive industry, the electric vehicle is one product. Even if we talk about a car and the battery, it is still one product. The battery itself should not be seen as an independent black box either.
- ◆ Most auto industry OEMs are also becoming battery producers, and they also will need to deal with recycling.
- ◆ Battery Waste Directive under discussion
- ◆ Potential things to be paid attention to with batteries that are recycled:
 - Recycling of CEVs is already happening, and skills transition to recycling of EVs needs to be addressed with upskilling/re-skilling.
 - When transforming from CEVs to EVs, we are experiencing a simplification of engine complexity and thus may be easier to recycle EVs than CEVs
 - Key questions: is there enough material available, and is it of consistent quality?
- ◆ Authorised operators must perform repair, reuse, re-manufacturing, and re-purposing/recycling in repair shops. The personnel need to be trained to assess the battery's status and be able to decide if it goes to recycling or its second life.

⁵ <https://www.acea.auto/publication/position-paper-proposal-alternative-fuels-infrastructure-regulation-afir/>

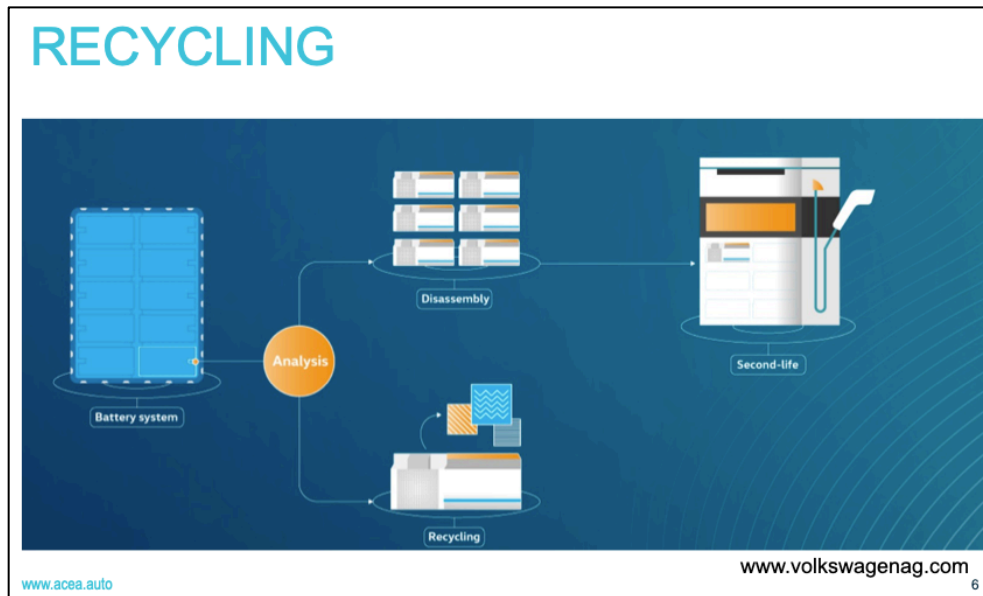


Figure 7. A screenshot from the presentation of Amélie Sophie Salau

The by authorised personnel at repair shops has to be trained with

- ◆ Analysing the status of a battery
- ◆ Hi-voltage systems
- ◆ Repair, reuse, re-manufacturing, and Re-purposing/recycling
- ◆ An analysis of the battery health to assess whether the following process with a battery means forwarding **to recycling or second life**
- ◆ Battery disassembly
- ◆ Definition of waste: Waste battery, 2nd life battery or potentially reusable in a car?

Skilled personnel will be needed with the early stage of recycling in

- ◆ ATFs (Authorized Treatment Facilities)
- ◆ Repair shops that will need to assemble/disassemble a vehicle with a battery. For safety and functionality, it is vital to pay attention to the existence of a battery.

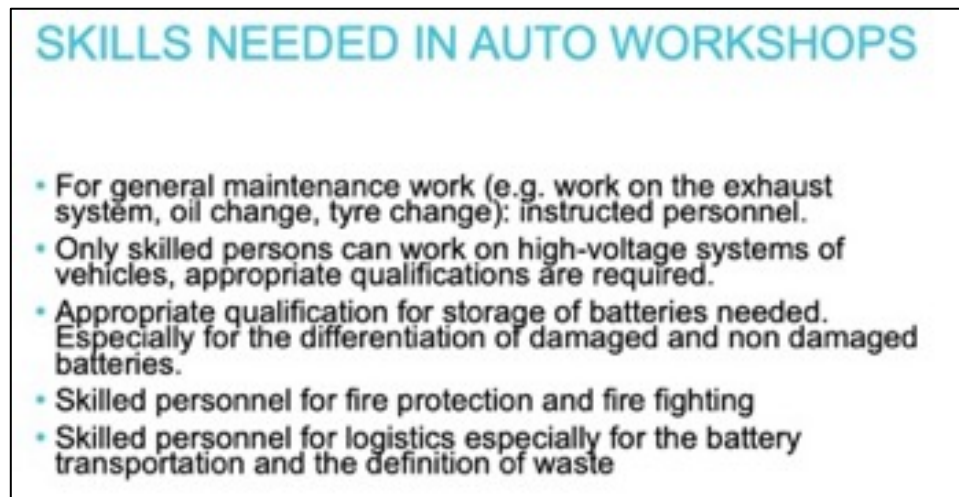


Figure 8. A screenshot from the presentation of Amélie Sophie Salau

Mr Stewart McKinlay, Skills Director, NMIS Manufacturing Skills Academy, University of Strathclyde Glasgow, Scotland, UK

Key messages:

- ◆ At NMIS Manufacturing Skills Academy, re-manufacturing, remaking, and recycling are of critical importance.

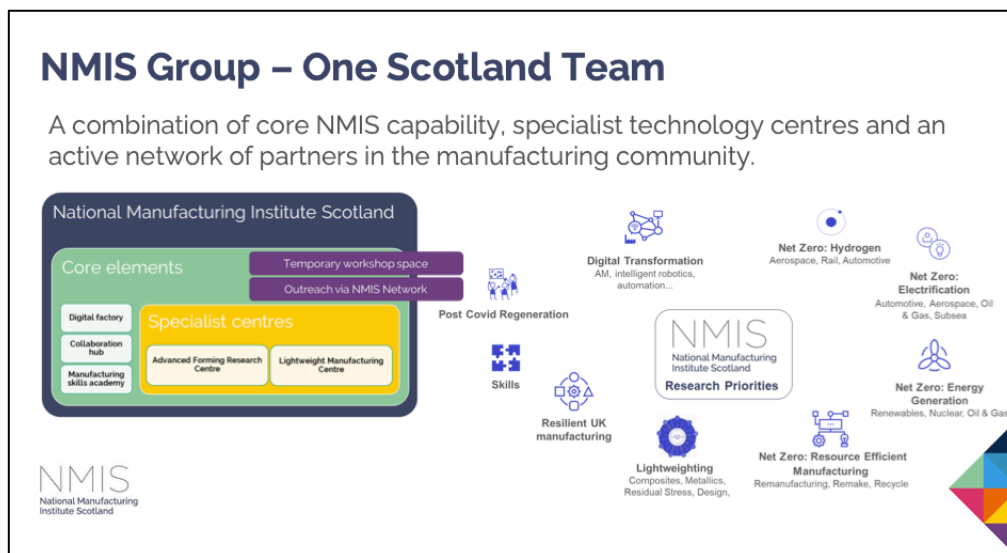


Figure 9. A screenshot from the presentation of Stewart McKinlay

- ◆ A list of some of the available Scottish VET courses (notice that Scottish SCQF L3 = European EQF L1). **Figure 10**

Skills Context – VET delivery and Research

College Name	Course Name	Notes
Dundee & Angus	Level 1 Electric/Hybrid awareness Level 2 Award in Electric/Hybrid Vehicle Hazard Management for Emergency and Recovery Personnel Level 2 Award in Electric/Hybrid Vehicle Routine Maintenance Activities	Courses range from 3 hours to 2 days
Edinburgh	IMI Level 1 Award in Electric/Hybrid Vehicle Awareness IMI Level 2 Award in Electric/Hybrid Vehicle Routine Maintenance Activities IMI Level 3 Award in Electric/Hybrid Vehicle System Repair and Replacement	IMI (Institute of Motor Industry)
Fife	L1 Award in Electric Vehicle Awareness L2 Electrically Propelled Vehicle Hazard Management L2 Hybrid electric vehicle operation and maintenance L3 Electrically Propelled Vehicle Repair and Replacement	Day release and evening classes
West Lothian	L2 Award in hybrid electric vehicle operations and maintenance L3 certificate in electric and hybrid vehicle awareness L3 Award in hybrid electric vehicle repair and replacement	SCQF L3 - EQF L1

<https://www.transport.gov.scot/publication/skills-for-low-carbon-heavy-duty-vehicles-hdvs/>

NMIS
National Manufacturing Institute Scotland

Figure 10. A screenshot from the presentation of Stewart McKinlay

- ◆ There are also graduate apprenticeships available. They have matched the practical competencies of becoming a professional engineer with a degree program where people are employed during the apprenticeship. **Figure 11**

Skills Programmes

1. Modern Apprenticeships @SCQF L6 Engineering (EQF L4)
 - i. To factory gate
 - ii. After factory gate
2. Graduate Apprenticeships in Engineering Design and Manufacturing
3. VET courses previously outlined
4. Degrees
5. Doctorates
6. Micro-credentials

NMIS
National Manufacturing Institute Scotland

Figure 11. A screenshot from the presentation of Stewart McKinlay

- ◆ Micro-credentials mentioned in **Figure 11**, bundled into modules, address skills challenges that the industries encounter by providing upskilling for those who are working and don't have time for full-time education.

Debate & questions

The speakers' presentations were followed by a debate and question part of which key messages are listed here.

- ◆ **There are batteries without the option to recycle them in the market.** This is because, for example, cars have long life cycles. When they were produced, the legislation differed from the current one and what is planned.
- ◆ There are two important pieces of legislation in force, at the moment, concerning the traction batteries: **the batteries directive** and **the end-of-life vehicles directive**.
- ◆ **There is new comprehensive battery legislation being discussed in the European Parliament.** It includes obligations on financing and organising collection and treatment of waste, providing information to end-users, reporting to authorities, collection rates, recycling efficiency, material recovery targets, and obligations to support the second life of batteries, re-purposing, and re-manufacturing.
- ◆ **Regarding safety in ATFs etc.,** the training has paid off with the ELVES programme (Ireland), as there are no serious incidents. It is vital to pay attention **to the training of also those who do not work directly with vehicles.** The entire staff needs to know how to operate to avoid incidents and how to respond if an incident occurs.

- ◆ With ELV regulations and directives currently in place, the current targets are **85 % with Reuse & Recycling** and **95 % with Reuse & Recovery**.
- ◆ Under current **battery regulation**, there is a **50 % recycling efficiency target** covering industrial and Li-ion batteries in hybrid and electric vehicles.
- ◆ There are **new versions of the legislation** coming with **ELV directive** that will increase recycling target for Li-ion batteries and **Sustainable Batteries directive** to deal with, for example, with battery second life, EV batteries, BMS and beyond.
- ◆ The relevant training and education with secondary, VET schools and universities must be supported.
- ◆ Lifelong learning (LLL) is needed to lead the transition with the people who are now in the working age. The related training needs to be implemented through apprenticeship and different types of education.
- ◆ Regarding the above, the recognition of those training programmes is very important. It is also essential to have mutual recognition so that when people go through training, one can be sure that the quality and the level of the skills achieved is the same, no matter who provided the training.
 - There are two key factors (1) Accredited, recognised certificates on training (enables worker mobility in Europe) and (2) It is also important to map the training against the skills that are needed
- ◆ For example, in Scotland with NMIS, they widely use apprenticeships from children at school to more extensive apprenticeships in the universities. Additionally, there are apprenticeships for those working, and some of them are up to their 50s.
- ◆ Digitalisation, AI and VR are regarded as essential. They also enable us to provide sustainable training (for example, welding: practising with VR saves energy and resources).
- ◆ It is important to tailor training to meet one's capabilities to participate (eliminate barriers for joining): for example, 1-day course (save time) instead of 2-3-courses.
 - The availability of the learning platforms (online, 24/7)
- ◆ Sharing knowledge up and down the value chain is also essential.

- ◆ **Cooperating and sharing of good practices** as well as **cooperation on the existing training courses**
 - Awareness of courses
 - An EU wide database of courses that would essentially be useful for SMEs
 - Bigger companies may have their own overview of available courses
- ◆ Identification of declining industries and people with suitable skills in them that can move to new growth sectors.
- ◆ The challenge with the above transformation can be addressed, for example, by finding teachers with the right skills by approaching people in the end phase of their careers. Thus their long experience can be beneficial.
- ◆ Recycling is going to be a key part of the industry in terms of the commitment to sustainability

Relevant comments from the chat

- ◆ In Finland, we had one accident where a salvage yard worker tried to remove a PHEV battery with a heavy grab (which should not be done), and it bursted in flames.
- ◆ Then we have had some near-misses in workshops that do not directly relate to high voltage but the HEV systems. A mechanic had the oil pan opened, but the car was not de-energised (off), and the engine suddenly started (when the HEV system decided that the traction battery was low).
- ◆ We are working with emergency services - recovery of crashed HEV and BEV. Definitely, an area where we need to change our systems in line with higher numbers of EVs on the road.
- ◆ The latest Spanish regulation on ELVs includes the skills and training workers at ATFs need to have to manipulate EVs. We believe it is essential because it gives legal security for ATFs. ATF workers manipulating EVs must have a certification that they have the skills required in the legislation. The certification process has already started, and we expect to have certified workers at the beginning of 2022.
- ◆ The European Union should push legislation that forces the manufacturers to open the documentation for battery repair and diagnostics. The current legislation does not ensure it (by the current legislation, you can buy the workshop manuals, but they usually do not include a battery's internal information). Currently, it depends very much on the make and model of how well the information is available. Some vehicles are easy to access, for instance: https://www.youtube.com/watch?v=TR4CN2_rRh4.
- ◆ A couple of examples of regulation/training in Europe. In Germany, they had this as early as ten years ago (The pdf material is free, and there is even an up-to-date version available but only in German, not English): <https://www.arbeitssicherheit.de/schriften/dokument/0%3A5775990%2C18.html>.

- ◆ As a person who has been involved in recycling lithium industrial batteries since 2014, I have only seen three batteries that have started thermal runaway or in over 1200 batteries recovered. These can be dealt with, and recycling for recovery of cells/module for reuse is already ongoing, recycling for recovery of nickel/cobalt's etc. is happening. Issues around getting trained staff is a problem as demand is high. Dismantling batteries that have welded cells/modules or are glued to the shell base make life difficult.
- ◆ The Dutch have a standard: <https://www.nen.nl/en/nen-9140-2019-en-261752>
- ◆ In Finland, we use the SFS 6002 based on EN 50110; it has an attachment for electrical vehicle work too:
<https://sales.sfs.fi/en/index/tuotteet/SFSsahko/SFS/ID2/6/772843.html.stx>

Relevant comments from the post-webinar Wonder.me session

The mingling session was a good opportunity to ask for finer details on the issues presented and discussed during the webinar. The most important ideas condensed after the mingling session are presented below:

- ◆ The EV battery recycling is a fastidious business in the way that over the entire process (from pick-up & shipping all the way to dismantling and processing), the people involved must be adequately trained and dedicated (lack of attention and failure to comply with the requirements may result in severe injuries of the people involved and considerable material damages).
- ◆ Spent batteries are bought in the USA and Asia. In Europe, most operators expect them to be given away (handed over for free).
- ◆ Current recycling technology does not produce reusable material, and the recycling rate is still modest.
- ◆ All traction batteries need some bespoke shipping hardware, as it is not possible to just dump them into a truck with a forklift or a crane, as an old internal combustion engine or a gearbox. There are two main types of hardware dedicated to shipping traction batteries: simple ones (cradles - that only provide proper latching and

tethering of the battery for slamming protection) and safe ones (cases - that are leakproof provide fire containment capabilities and temperature monitoring on top of the slamming protection). There is a major price gap between the first and the second category, given that the price of a safe case peaks at around £10.000/unit.

- ◆ All unstable or uncertified spent batteries are transported inside safe cases.
- ◆ Furthermore, all shipping auxiliaries used to move around spent batteries (cradles and cases) need to be tailored to dimension. Small, compact batteries can be transported in smaller cradles/cases. Flat/large batteries need big cradles/cases and therefore higher shipping costs.
- ◆ Even though some spent batteries are deemed/considered stable by the workshops, most operators prefer to ship around all batteries, regardless of their safety status, in safe units to preclude even the slightest mishaps. Furthermore, the trucks used to deliver unstable/uncertified batteries must be ADR equipped and certified (Accord relatif au transport international des marchandises Dangereuses par Route) and the drivers thereof hence the high shipping costs.
- ◆ The cost of recycling today is around 3-5 GBP per kilogram (4-6 €), depending on the chemistry and the “state-of-health” of the battery.

Post-event satisfaction survey

After the workshop, a satisfaction mini-survey was sent to the participants. The response rate was very low, with only nine people answering.

What is your overall assessment of the event?		
Choice	Answers	%
1=Insufficient	1	11.1
2	0	0
3	1	11.1
4	2	22.2
5=Excelent	5	55.6
Total	9	100 %

Participants claim they learnt a lot (88%) from the workshop.

Knowledge and information gained from participation at this event?		
Choice	Answer	%
Yes	7	77.8
Somehow	1	11.1
No	1	11.1
Total	9	100 %

Written feedback:

- How do you think the webinar could have been made more effective?
 - There should be new sessions
 - To organise a series of webinars on the same topics
 - To invite specialists
- In your opinion, what are the battery relevant future jobs and skills needed in the battery production sector and why?
 - HVT, batteries maintenance, recycling
 - IT and communication skills
 - The jobs related to safety and quality control
 - Dependent on needed production skills, not really something special
- Comments and suggestions (including activities or initiatives you think would be useful for the future).
 - Training and qualification centres
 - A second-round ref skills in certification needed in recycling activities
 - What really basic skills will be required in the future? For example, private property heating/energy: who supplies the proper information and can assist an adequate layout and who can do the installation, i.e., physically and control units, which are usually still a disaster. This is the main opportunity for programs like Erasmus.

During the Wonder.me session (after the webinar), there were about 20 participants. The main discussed topics focused on recycling regulations, targets, training of the persons and ways to improve their training. One proposal was to organise next year another webinar

focused on certification training for staff in car distribution companies and ATFs, with direct involvement from the certification companies (TUV, DEKRA),

Lessons Learned and points to be improved:

- ◆ Ask for questions in advance in the Registration Form
- ◆ Promotion & dissemination campaign more aggressive (in terms of time and frequency) on social media and partner's networks
- ◆ Mingling session (after the webinar) more dynamic

Key Findings

- ◆ Recycling Li-ion batteries provide important economic benefits, reduces new mineral extraction, increases resilience, and decreases weak steps in the supply chain.
- ◆ The challenges with battery disassembly are many, either legislative or technical.
- ◆ High voltage batteries need qualified employees with high-voltage training and special tools for dismantling to prevent electrocution of operators or pack short-circuiting.
- ◆ Competencies via re-skilling/upskilling of employees needed with the circular economy.
- ◆ Batteries are the key enabling technology for zero-emission mobility and energy storage.
- ◆ Commission supports identifying strategies for future skills/competencies and job roles.
- ◆ Knowledge of the physical/chemical recycling processes is needed and supported with environmental skills/expertise, circular economy, design of batteries and components.
- ◆ The biggest challenges are with engineers and researchers in recycling facility setup. The emphasis shifts from white to blue collars when entering a later stage of maturity.
- ◆ The technology and processes with chemical and physical recycling need to be educated along with other knowledge and skills.
- ◆ Design of battery and components with an aim at recyclability at the end of the lifecycle.

- ◆ Innovations and use of automation in the recycling process
- ◆ The demands of the Battery legislations (content target, competitiveness etc.)
- ◆ Cooperation with academia and VET providers is very important to be developed.
- ◆ For example, ELVES (Ireland) Core programme and its funding:
 - Collection and recycling of electric vehicle batteries from ATFs and aftersales provided
 - Collection and recycling – by marque, as per Batteries Regulations
 - Training and information support - by all vehicle producers through ELVES
- ◆ Attention to SMEs with training (battery recycling steps/methods; maintenance/repair)
- ◆ Auto industry OEMs are becoming battery producers needing to deal with recycling
- ◆ New versions of the legislation: an ELV directive that will increase recycling target for LIB and Sustainable Batteries directive to deal with 2nd life, EV batteries, BMS etc.
- ◆ There are two key factors (1) Accredited, recognised certificates on training (worker mobility) and (2) It is important to map the training against the skills that are needed
- ◆ Apprenticeships are considered an effective training mechanism.
- ◆ Digitalisation, AI and VR will be essential in the future (already now).