Solid-statE lithium metal bAttery wiTh in situ hyBrid ELecTrolyte

Horizon Europe
THE NEXT EU RESEARCH & INNOVATION INVESTMENT PROGRAMME (2021 - 2027)
HORIZON-CL5-2021-D2-01
DG/Agency: CINEA

HORIZON EUROPE PROGRAMME – HORIZON-CL5-2021-D2-01-03
Advanced high-performance Generation 4a, 4b (solid-state) Li-ion batteries supporting electro mobility and other.

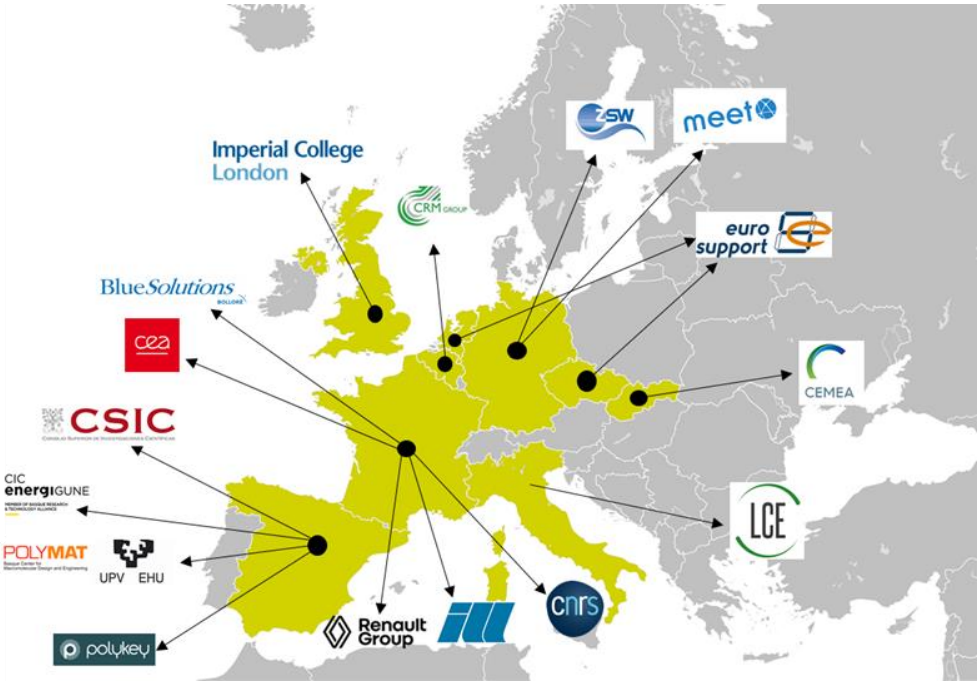
SEATBELT project – Grant Agreement no. 101069726

DELIVERABLE 1.2
Sustainability assessment Methodology

Funded by
the European Union

SEATBELT consortium

No.	Participant	Acronym	Type	Role	Country
1	Centre National de la Recherche Scientifique	**CNRS**	RTO	Coo.	FR
1.1	Université Savoie Mont-Blanc	UNIV-SAVOIE	UNI	AE.	FR
1.2	Université Grenoble Alpes	UGA	UNI	AE.	FR
1.3	Institut Polytechnique de Grenoble	IPG	UNI	AE.	FR
2	Commissariat à l'Energie Atomique et aux Energies Alternatives	**CEA**	RTO	Ben.	FR
3	Polykey Polymers	**PK**	SME	Ben.	ES
4	Life Cycle Engineering	**LCE**	SME	Ben.	IT
5	Centre De Recherches Métallurgiques	**CRM**	RTO	Ben.	BE
5.1	Advanced Coatings & Construction Solutions	AC&CS	IND	AE.	BE
6	Consejo Superior de Investigaciones Científicas	**CSIC**	RTO	Ben.	ES
7	Blue Solutions	**BS**	IND	Ben.	FR
8	Münster Electrochemical Energy Technology	**MEET**	UNI	Ben.	DE
9	Universidad Del Pais Vasco	**UPV**	UNI	Ben.	ES
10	Zentrum für Sonnenenergie- und Wasserstoff-Forschung Baden-Württemberg	**ZSW**	RTO	Ben.	DE
11	CIC energiGUNE	**CICe**	RTO	Ben.	ES
12	Institut Laue-Langevin Europe	**ILL**	RTO	Ben.	EU
13	Renault	**Renault**	IND	Ben.	FR
14	Euro Support Advanced Materials BV	**ES**	IND	Ben.	NL
14.1	Euro Support BV	ESBV	IND	AE.	NL
14.2	ES Special Products BV	ESSP	IND	AE.	NL
15	Imperial College of London	**ICL**	UNI	AP.	UK
16	Centrum Pre Vyuzitie Pokrocilych Materialov SAV	**CEMEA**	IND	Ben.	SK



1 Overall project presentation

As of 2025, new generations of Li batteries based on silicon/carbon (Gen. 4a) and Li metal (Gen. 4b) anode, where flammable liquid electrolyte is replaced by a non-flammable solid-one, will take over the current Li-ion device. However, only all-solid-state Gen. 4b Li batteries are expected to fulfil the needed cell gravimetric energy density specifications demanded by electromobility and stationary applications. Therefore, SEATBELT ambition is to generate a local EU industry that revolves around a cost-effective, robust all-solid-state Li battery comprising sustainable materials by 2026. SEATBELT intends to achieve the first technological milestone of developing a battery cell (TRL5) meeting the needs of Electric Vehicle (EV) and stationary industry. The low-cost SEATBELT cell is safe-by-design with sustainable and recyclable materials, reaching high energy densities (>380 Wh/kg) and long cyclability (>500 cycles) by 2026 in line with the 2030 EU targets. The cells are produced by low-cost solvent-free extrusion process comprising a combination of innovative materials: thin Li metal, hybrid electrolyte, a safe cathode active material without critical materials and thin Al current collector. The cell design being optimized by interface (operando and atomistic modelling) and process (machine learning) methodologies. In addition, new in situ imaging instrumentation will be developed to investigate safety properties and mechanical deformation to assess cell safety in real conditions. An innovative recycling cycle from materials to cell level will be also established. Thus, SEATBELT will be the start point of a first EU all-solid-state battery value chain, whose main players in Research and Technological Development (RTD) and Industry sectors are within the consortium. So, cells and modules will cycle using industrially relevant protocols dedicated to EV and stationary applications. SEATBELT consortium is composed of 14 beneficiary partners and 3 affiliated entities, and one associated partner, from 7 European countries.

More information at:

Project website: https://seatbelt-project.eu/
CORDIS website: https://cordis.europa.eu/project/id/101069726

2 Public summary

This document describes the activities that are being carried out within Work Package 1 (Cell Target Requirements). Methodological approach and introduction to the topics are made clear to the consortium and commission. Further details about the execution of the tasks and the results will be reported in a further deliverable later in the project (M42).
As the project is still at an early stage, no complete data are available, and experiments are still ongoing to understand and characterize relevant substances involved in the project. Therefore, any assessment based on incomplete, lab-scale information would lead to unreliable or incomplete results. On the other hand, at this time the process flowchart has been identified, and a general idea about the involved activities and processes is available. For these two reasons, this deliverable aims at describing the framework which will be applied to evaluate, in the following months, the sustainability performances of the technologies developed within the project, from the environmental social and economic points of view. With such an approach, this deliverable becomes the theoretical reference which will help in the interpretation of the results at the end of the project, avoiding repetition of information in the final version of the document (D1.2, Final sustainability assessment, due M42).

Disclaimer

Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or CINEA. Neither the European Union nor the granting authority can be held responsible for them. This project also contributes to the objectives of the Batt4EU Partnership under call topic ID: HORIZON-CL5-2021-D2-01-03 (Advanced high-performance Generation 4a, 4b (solid-state) Li-ion batteries supporting electro mobility and other applications).