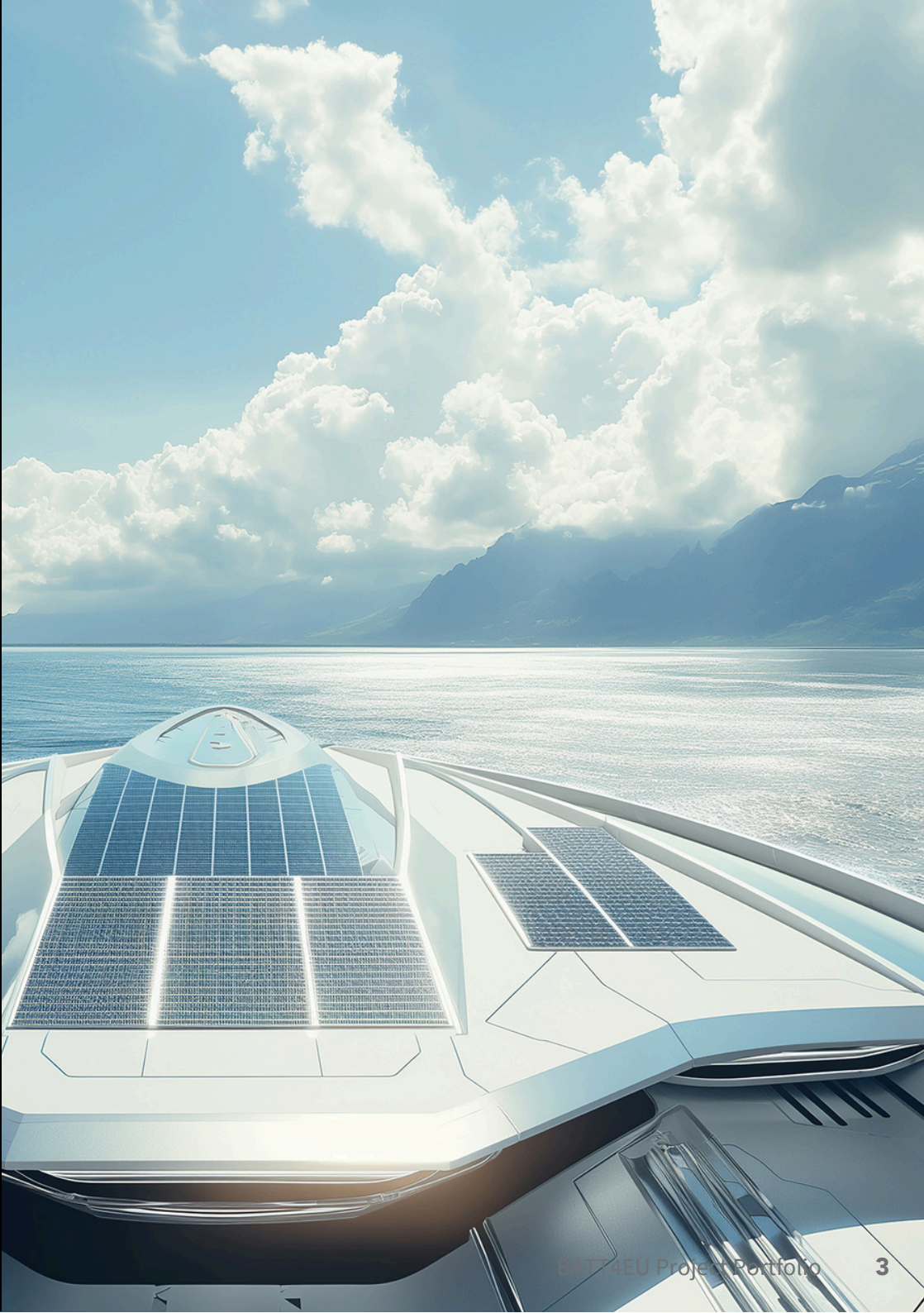
BATT4EU Batteries European Partnership

BEPA Batteries European Partnership Association

R&I DARE TO LOOK FORWARD

BATT4EU Project Portfolio 2023 Calls

Co-funded by the European Union



The Batt4EU partnership projects, starting from 2021, are steadily pushing the boundaries across the full European battery value chain. We are now seeing a strong R&I progress towards safe, high-performance, and affordable battery technologies. But more importantly, we are pushing the creation of a strong local value chain supporting cleaner and more efficient manufacturing and recycling.

Beatrice Coda

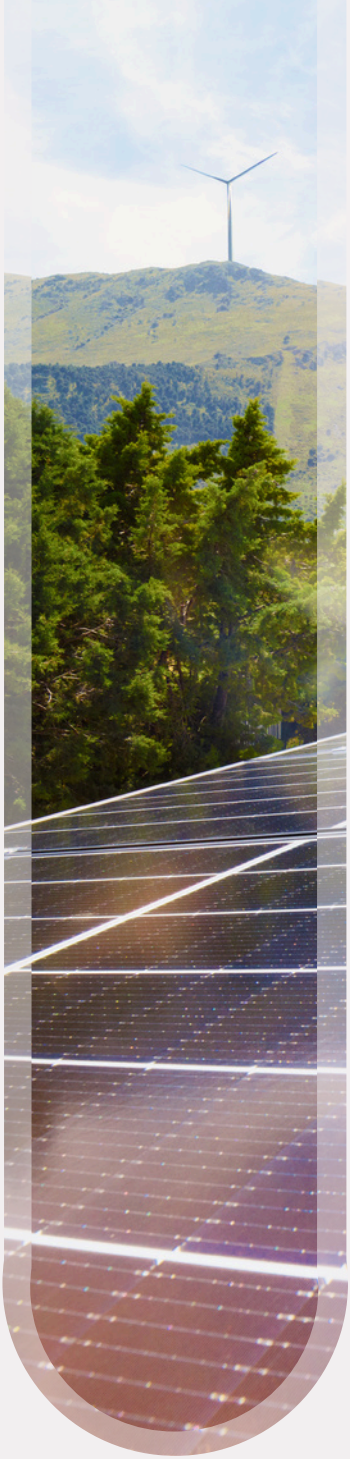
Director of Clean Planet Directorate, DG Research and Innovation, European Commission

Recognizing and embracing the work of the European battery R&D ecosystem is key, as is a strong European support to fund future activities.

Fabrice Stassin

Secretary General,BEPA

- Director Government Affairs, Umicore



FOREWORD

The Batt4EU Partnership is driving Europe's ambition to lead in battery technology, fulfilling the European Green Deal's objectives of promoting European competitiveness and environmental sustainability.

The Batt4EU Partnership aims to shape the future of electrification across many sectors, from road and non-road mobility to accelerating the deployment of renewable energy with competitive battery storage solutions.

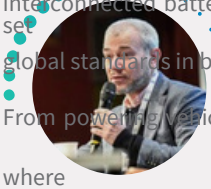
As part of the Horizon Europe research Programme, Batt4EU promotes innovations that will reinforce Europe's technological edge, advancing a circular and resilient battery ecosystem that supports both the energy transition and economic growth. Covering the entire battery value chain—from processing critical raw materials to developing advanced materials, manufacturing, and recycling technologies—Batt4EU strengthens Europe's strategic independence.

Horizon Europe projects are the main actors within the Partnership to implement Batt4EU's ambitions and goals. It is within these collaborative projects that cutting-edge research is being done, results are being readied for the market and a pan-European network of battery innovation is being forged.

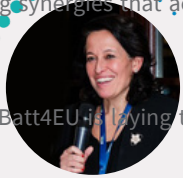
The projects presented to you in this portfolio reflect Batt4EU's commitment to performance, cost effectiveness, and environmental stewardship, positioning Europe at the forefront of sustainable, competitive battery technologies.

Through collaboration with other Horizon Europe initiatives, Batt4EU strengthens the interconnected battery value chain, encouraging synergies that accelerate Europe's ability to set global standards in battery applications.

From powering vehicles to stabilising the grid, Batt4EU is laying the groundwork for a future where Europe leads in both sustainable innovation and economic resilience.



Fabrice Stassin



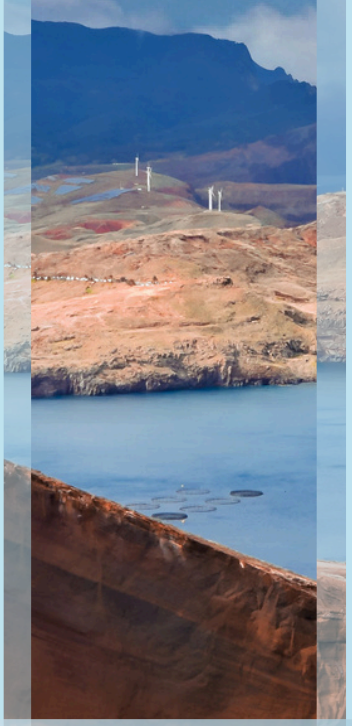
Beatrice Coda

"Batteries are a cornerstone of Europe's clean energy transition and a strategic technology for securing a sustainable, competitive, and resilient future. Sustained investment in research and innovation across the entire battery value chain is essential to build a strong European industrial ecosystem, enabling new ideas to move from the laboratory to large-scale manufacturing and real-world deployment. Battery innovation not only strengthens Europe's competitiveness, but also directly supports climate neutrality, energy security, and improved quality of life by enabling renewable energy integration, clean mobility, and circular use of resources.

To remain a global leader, Europe must reduce fragmentation and strengthen cooperation between industry, research organisations, and public authorities. A shared vision and coordinated action are critical to maximising impact and accelerating progress. In this context, the Horizon Europe Partnership Batt4EU plays a central role by aligning priorities, pooling investments, and establishing a common European research and innovation agenda. The Strategic Energy Technology Plan will build upon this to create a Europe-wide vision for the future by coordinating Member States' priorities and resources for battery research and innovation.

The Batt4EU partnership projects, starting from 2021, are steadily pushing the boundaries across the full European battery value chain. We are now seeing a strong R&I progress towards safe, high-performance, and affordable battery technologies. But more importantly, we are pushing the creation of a strong local value chain supporting cleaner and more efficient manufacturing and recycling. I am happy and proud to endorse this project portfolio, which shows the impressive progress made towards scientific and industrial leadership, and I hope it will inspire wide participation in shaping Europe's battery future.

Beatrice Covassi
Director of Clean, Planet Directorate,
DG Research and Innovation,
European Commission



ABOUT

THE BATTERIES EUROPEAN PARTNERSHIP ASSOCIATION,

BEPA gathers European battery stakeholders coming from different parts of the value chain who are interested in shaping the research and innovation priorities of the Horizon Europe Work Programme. With over 240 members, BEPA is also the place-to-be to find relevant partners for innovative projects and to get early information on the battery industry's roadmap.

Find more information about us on our website :
bepassociation.eu

THE BATT4EU PARTNERSHIP is a co-programmed partnership

under Pillar II of the Horizon Europe framework, specifically within the "Climate, Energy, and Mobility" cluster. As a collaborative effort between the European Commission and private stakeholders, it aims to accelerate the development of sustainable battery technologies in Europe. Members of the Batteries European Partnership Association (BEPA) play a crucial role in shaping the Work Programmes, providing valuable input and influencing the strategic direction of the partnership. However, the resulting calls for projects remain open to all, promoting inclusivity and fostering innovation across the battery value chain. BATT4EU/BEPA has no role in the selection of the projects (this is the remit of the European Commission through CINEA, the executive agency), but will follow up with the selected projects to monitor the results in R&D.

IKAA

In addition to the BATT4EU projects funded under Horizon Europe, the members of BEPA actively contribute to the achievement of the Partnership objectives through their own activities, known as In-Kind Additional Activities (IKAA). In 2023, the reported contributions represented a total of at least €645 million, which is more than a third of the EU funding of the Partnership for the whole period 2021-2027.

8 TOPICS

21 Funded Projects

€

TOTAL BUDGET ALLOCATED TO PROJECTS

WORK PROGRAMME 2023: 122,3M€

BATT4EU areas of action in 2023

WORK PROGRAMMES

Advanced Materials
6 projects, 37,1M€

Raw Materials
3 projects, 19,4M€

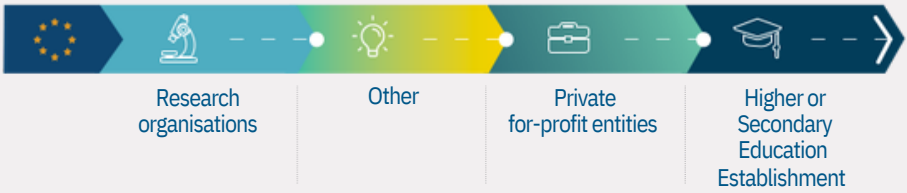
Cell Design & Manufacturing
2 projects, 11,5M€

Mobility and stationary Applications
6 projects, 34,7M€

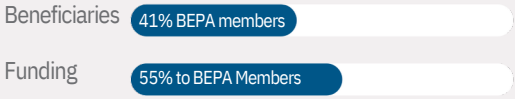
Dismantling & recycling
3 projects, 13,4M€

Transversal topics and coordination actions
1 projects 6,2M€

Who participated to the projects?



BEPA Membership and Funding Distribution (2023)



Projects are working together!

BATT4EU Project Clusters

- Materials for Batteries Hub
- Battery Heroes
- Solid4B
- EU-INGENIOuS
- BMS Alliance

Whathappenedbefore WP23

HORIZON 2020 AND WP21-22

Discover BEPA's booklet for WP21-22

51 Funded Projects

18 TOPICS

TOTAL

2021: 115M€

2022: 131M€

21/22: 246M€

24 Projects 2021

27 Projects 2022

42 Battery Projects Funded under Horizon 2020

Read about enabling the mobility transition through Horizon 2020

Discover BEPA's funded battery projects

TABLE OF CONTENT

BATT4EU projects and calls

2023 HorizonEurope Work Programmes

BATT4EU PROJECTS AND CALLS

2023 Horizon Europe Work Programme

STREAMS

SustainableTechnologies for Reducing Europe's battery raw Materials dependance

Call: HORIZON-CL5-2023-D2-01-01

website: https://streams-project.eu/

Start/end day:
1.1.2024-31.12.2026
Total EU funding:
6,108,632.00€

Coordinator:
Damian Cupid
damian.cupid@ait.ac.at

Cluster :
Cluster: Battery 2030+

PROJECT SCOPE AND OBJECTIVES

In STREAMS, a comprehensive portfolio of at least 12 scalable and flexible technologies and pilot-scale solutions for the sustainable production of battery-grade precursors and their respective anode and cathode active materials are developed, evaluated and successfully demonstrated. These technological processes are applied to materials from primary and secondary sources, including recycled battery mass and photovoltaic waste. This strengthens Europe's domestic battery materials supply chain and reduces Europe's dependency on imported critical and strategic raw materials supplies. The production technologies also increase Europe's resilience, competitiveness and strategic autonomy in the global battery manufacturing industry. STREAMS' technological solutions meet EU requirements for environmentally responsible design, scale up, and anticipate regulatory compliance by conducting techno-economic, environmental, social impact and integrated risks assessments combined with life cycle sustainability and circularity assessments. The cathode and anode active materials synthesised in STREAMS are used to manufacture 10 Ah battery cells at pilot scale using sustainable electrode processing. Prototype cells are tested according to established standards and subjected to advanced post-mortem characterisation. In addition, STREAM identifies optimal conditions for future exploitation of the project results.

PARTNERS

AIT

ETI BAKIR ANONIM SIRKETI/MAZIDAGI SUBESI

GLOCK TECHNOLOGY GMBH

SIPOW AS

INSTYTUT SORBTSIYI TA PROBLEM ENDOEKOLOHIYI NATSIONALNOYI AKADEMIYI NAUK UKRAYINY

OULUN YLIOPISTO

ACONDICIONAMIENTO TARRASENSE ASSOCIACION

TREIBACHER INDUSTRIE AG

UNIVERSITE DE LIEGE

NANOPOW AS

TURKIYE BILIMSEL VE TEKNOLOJIK ARASTIRMA KURUMU

SIEC BADAWCZA LUKASIEWICZ - INSTYTUT METALI NIEZELAZNYCH

ENVIVA IDIOTIKI KEFAIOUCHIKI ETAIREIA/ ENVIVA IKE

F6S NETWORK IRELAND LIMITED

UKRAINIAN RESEARCH AND DESIGN INSTITUTE OF ELECTROTHERMAL EQUIPMENT

Evolution Energy Minerals Limited

American Energy Technologies Company

IMPERIAL COLLEGE OF SCIENCE TECHNOLOGY AND MEDICINE

THE UNIVERSITY OF WARWICK

CICERO

MSA-basedcircular hydrometallurgy for sustainable, cost-effective production of NMC cathode materials

CALL: HORIZON-CL5-2023-D2-01-01

website: https://cicero-horizon.eu/

Start/end day:
1.11.2023-31.10.2027
Total EU funding:
6,998,828.00€

Coordinator:
Elena Matvejava
elena.matvejeva@kuleuven.be

Cluster :
Materials for Batteries Hub
AND
Battery 2030

PROJECT SCOPE AND OBJECTIVES

On 16 March 2023, the EC published the Critical Raw Materials Act (CRMA) proposal that sets “benchmarks along the strategic raw materials value chain and for the diversification of the EU supplies”. By targeting the domestic refining of three “strategic” battery-related CRMs, i.e. Ni, Co and Mn, the CICERO project addresses the second CRMA benchmark: i.e. > 40% domestic processing/refining. To tackle the twin problems of (1) Europe’s dependence on a few third countries (i.e. DRC, Indonesia, China) for the supply of Ni, Co and Mn for our NMC Li-ion battery production, and (2) the fact that these metals are currently produced at a huge cost in terms of environment, health and safety, CICERO puts in place a sustainable, cost-effective refining model for Ni, Co and Mn, and the downstream conversion into “made-in-Europe” NMC cathodes. The CICERO project is the first ever to develop a circular hydrometallurgical Ni, Co & Mn processing/refining scheme that uses methanesulphonic acid (MSA) – a commercial, green, REACH-compliant & affordable acid – rather than H2SO4. CICERO recovers, refines and converts Ni, Co and Mn from domestically available secondary raw materials: (a) post-mining raw materials (sulphide & laterite tailings) and (b) Ni/Co/Mn-bearing intermediates incl. MSP, FeNi, Ni-matte and Mn-anode sludge. To achieve this, CICERO develops a suite of novel metallurgical unit processes for advanced MSA leaching and solution purification, the conversion to battery-grade MSA salts, and the synthesis of NMC cathodes in MSA media, with sound reagent regeneration & iron recovery in line with the Twelve Principles of Circular Hydrometallurgy. This research is supported by advanced thermodynamic & kinetic modelling for solid-liquid & liquid-liquid equilibria relevant for Ni/Co/Mn processing/refining in MSA media. CICERO introduces a new paradigm for metallurgical processing/refining and increases society’s acceptance of, and trust in, sustainable CRM production in Europe.

PARTNERS


Input streams
Low-grade post-mining raw materials: laterite & sulphidic tailings
Intermediates: Ni-matte/FeNi & MSP/MHP & Mn anode sludge
Associated partners
BOLIDEN KOKKOLA OY
BOLIDEN HARJAVALTA OY
Case-study materials
Boliden Mn anode sludge Kokkola
Boliden high-S tailings Kevitsa
Terrafame NiSO4 Sotkamo
Boliden Ni-matte Harjavalta
Umicore CoSO4 Kokkola
Nikkelverk Ni/Co-metal Kristiansand
Norilsk NiSO4 Harjavalta
Umicore NiSO4 Olen
Aurubis Ni-recycling Olen
Nickelhütte Ni-recycling Aue-Bad
Eramet Ni-matte Sandouville
Euronickel FeNi Kavardao
Larco Ni-laterite mine & laterite tailings Evia
Larco FeNi Larymna
Project partners
KU LEUVEN
TEKNOLOGIAN TUTKIMUSKESKUS VTT OY
BUREAU DE RECHERCHES GEOLOGIQUES ET MINIERES
KUNGLIGA TEKNISKA HOEGSKOLAN
SINTEF AS
POLYTECHNEIO KRITIS
BOLIDEN MINERAL AB
GENIKI METALLEUTIKI KAI METALLOURGIKI ANONIMETAIRIA
AURUBIS BEERSE
BASF SE
ITALMATCH

Li4life

Novel domestic battery grade Lithium Carbonate value chain for green life

Call: HORIZON-CL5-2023-D2-01-01

website: https://li4life.eu/

Start/end day:
1.3.2024-28.2.2027
Total EU funding:
6,298,614.25€

Coordinator:
Adriana Gutierrez
director.general@icamcyl.com

Cluster :
Materials for Batteries Hub
AND
Battery 2030+

PROJECT SCOPE AND OBJECTIVES

Lithium, a key component in the push for clean energy, is unevenly distributed across Europe. Unlike the abundant brines of South America and Australia, EU deposits are embedded in complex mineral structures. This makes extracting and purifying lithium challenging. In this context, the EU-funded Li4Life project tackles this issue with cutting-edge technology. The initiative focuses on extracting lithium from complex ores and post-mining tailings, aiming to enhance Europe's battery-grade lithium supply. By 2030, Li4Life plans to boost the EU's domestic lithium supply by at least 5%. Their strategy involves developing innovative processing techniques and ensuring compliance with stringent environmental standards, paving the way for a more sustainable and self-reliant battery industry.

PARTNERS

UNIVERSIDAD DE OVIEDO

TECHNISCHE UNIVERSITAET BERGAKADEMIE FREIBERG

OULUN YLIOPISTO

Masarykova univerzita

MINING AND METALLURGY INSTITUTE BOR LTD

TEKNOLOGIAN TUTKIMUSKESKUS VTT OY

FRAUNHOFER GESELLSCHAFT ZUR FORDERUNG DER ANGEWANDTEN FORSCHUNG EV

CLUSTER PARA LA MINERIA SOSTENIBLE Y SERVICIOS ASOCIADOS DE LA PENINSULA IBERICA – IBERIAN SUSTAINABLE MINING CLUSTER

GESMINLE SL

INGENIERIA Y CONSULTORIA EN RECURSOS DEL SUBSUELO SL

CONSULTORIA GEOLOGICA SL

TECHNOLOGY METALS EUROPE SL

IDENER RESEARCH & DEVELOPMENT AGRUPACION DE INTERES ECONOMICO

MNLT INNOVATIONS IKE

CROWDHELIX LIMITED

L'ASSOCIATION EUROPEENNE DE LA MOBILITE ELECTRIQUE

FUNDACION ICAMCYL

REVITALISE

REcycling oflow Valuecomponents using high-purity pre-treatment, dIrecT recycling And green hydrometallurgical approaches for recycling of Lithium Ion and Sodium Ion BatteriEs

Call: HORIZON-CL5-2023-D2-01-02

website: https://revitalise-project.eu/

Start/end day:
1.11.2023-21.10.2026
Total EU funding:
3,477,606.00€

Coordinator:
Sulalit Bandyopadhyay
sulalit.bandyopadhyay@ntnu.no

Cluster :
Battery 2030+

PROJECT SCOPE AND OBJECTIVES

REVITALISE delivers a holistic solution for green, low-cost, and low environmental impact recycling of NMC (Hi-Ni), LFP and Na-Ion batteries, representing 85% of battery waste streams up to 2025. REVITALISE develops low-cost and green processes to recover a full range of battery materials, including NMC, LFP, Al, Cu, Li, graphite, fluorides, phosphates and plastics.

Overall recycling rates of 91%+ are proven at TRL4 for waste processed from post-production scrap and end-of-life battery black mass. REVITALISE develops innovative pre-treatment technologies based on electrohydraulic fragmentation, ultrasonication, magnetic and electrostatic separation that achieve very high levels of material stream purity. This enables commercially viable recycling of low-value parts. The approach will enable direct recycling of 40% of the cathode and anode active parts, with direct characterisation of the lithiation (or sodiation) being developed, which is used as a basis for a smart-reformation approach for reclaimed active materials. The remaining 60% is suitable for hydrometallurgical recycling based on leaching with green organic acids from food waste, such as vitamin C (ascorbates), vinegar (acetate) and citric acid (citrates) and inorganic acids produced from industrial wastes.

A further innovation is the development of water remediation with Li recovery from all

separation with direct Li recycling for Li in water concentrations down to 0.6mg/L. The recycled parts are assessed for (closed-loop) battery and other secondary applications for precursors and semi-products by industrial partners Verkor and Hydro, through reformulation and upcycling of battery materials and validation of remanufactured batteries. An optimised process flow is determined to achieve commercially viable recycling with maximised recovery rates and minimal environmental impact.

PARTNERS

- University of Aveiro
- NTNU
- REELEMENTS
- VERKOR
- MEET - University of Münster
- EURECAT
- Iconiq Innovation
- WATERCYCLE TECHNOLOGIES
- UNIVERSITY OF BIRMINGHAM

RENOVATE

Acircular and chemistry-neutral approach for recycling and recovery of battery waste feeds

Call: HORIZON-CL5-2023-D2-01-02

Website: http://www.renovate-project.eu

Start/end day:
1.1.2024-31.12.2026
Total EU funding:
4,995,343.00€

Coordinator: Eliana Quartarone
eliana.quartarone@unipv.it

Cluster :
Materials for Batteries Hub
AND
Battery 2030+

PROJECT SCOPE AND OBJECTIVES

The increasingly rapidly growing electric vehicle (EV) market results in higher growth rates in all the LIBs volume categories, from cradle to grave. This trend makes ever more urgent the boosting of battery recycling for several reasons, the most important ones being the preservation of the environment, and the development of a circular economy, reducing the demand for virgin materials and Europe's dependence on third countries. All these crucial aspects need to be handled through the development of new recycling and reuse concepts, fostering demonstrable effects in terms of efficiency and sustainability. RENOVATE aims at developing and demonstrating new circular economy solutions for the European battery value-chain, targeting the re-use of 100% of in-specification cell fractions (e.g. metallic foil, graphite, electrolyte, fluorinated compounds and cathode active materials) within the battery value chain, fostering a closed-loop circular approach that can reduce battery material waste going to landfill, increase the availability of battery precursors in the European battery eco-system, and demonstrate new added-value business cases for recyclers and battery materials users. All recycled materials are recovered from all potential streams (pre-customer scraps and End-of-Life products). The ultimate goal is to support the green and digital transformation of the European battery industry to increase its competitiveness and promote its just growth path. Holistic, flexible, and closed-loop processes for the recycling of EoL batteries based on both low and high energy density chemistries will be

designed and validated to allow a real and easily implementable “net zero carbon” process. A specific aim will also be smart reintegration of the side streams (e.g. waste chemicals/solvents) in the recycling processes and/or in other industrial activities to minimise the residues coming from battery production.

PARTNERS

- INSTM
- UNIVERSITÀ DI PAVIA
- UNIVERISITÀ DEGLI STUDI DI MILANO BICOCCA
- KARLSRUHER INSTITUT FUER TECHNOLOGIE
- POLITECNICO DI MILANO
- CIIAE
- SYENSQO
- BALANCE TECHNOLOGY CONSULTING GMBH
- FAAM
- ORGANIK KIMYA SANAYI VE TICARET AS
- ERP ITALIA SERVIZI
- LOMARTOV

ReUse

Efficientdirect REcycling for low-value LFP battery for circular and SustainablE waste management

Call: HORIZON-CL5-2023-D2-01-02

Website: https://www.reuse-batteries.eu/

Start/end day:
1.1.2024-31.12.2026
Total EU funding:
4,927,664.00€

Coordinator:
Claudia Stauch
claudia.stauch@isc.fraunhofer.de

Cluster :
Battery 2030+

PROJECT SCOPE AND OBJECTIVES

The development of sustainable, safe and efficient processes for battery recycling is crucial to improve the circularity and strategic autonomy of the European Li-ion battery (LiB) value chain, in line with the objectives of the Battery Partnership launched under Horizon Europe.

The objective of the ReUse project is to improve the circularity and sustainability of the entire low-value LFP battery waste stream - from production scrap to end-of-life LiB - by developing new recycling processes that maximise the recovery of input elements and components.

Specific
objectives include the development of automated sorting and disassembly strategies, the improvement of recycling efficiency and direct reuse of battery materials, and the assurance of sustainability through life cycle assessment, life cycle costing and social impact studies. With a focus on maximising material recovery, energy efficiency and purity, ReUse will develop a

robust,
flexible and sustainable direct recycling process for waste streams of varying composition and quality.

The project aims to increase the global competitiveness of the European battery ecosystem in

line
with the European Strategic Plan for a clean and sustainable transition towards climate neutrality.
Building on the BATTERY 2030+ Roadmap and the European Partnership on Batteries, ReUse

aims

The project will address the urgent need to address the shortcomings related to the technological, economic and environmental sustainability of recycling EoL LiBs, especially LFP batteries, which make up 46% of the global LiB market by 2030.

PARTNERS

SOLVE

Advancing SOLid-state battery development and production to driVE the future of electromobility

Call: HORIZON-CL5-2023-D2-02-01

Website: https://www.solveproject.eu/

Start/end day:
1.6.2024-31.5.2028
Total EU funding:
7,623,420.99€

Coordinator:
Andriy Kvasha
akvasha@cidetec.es

Cluster :
SOLID4B

PROJECT SCOPE AND OBJECTIVES

Solid-state batteries (SSB) offer a promising opportunity for the EU to become an early player and enhance its position in the global battery market. Supported by a consortium comprised of key industry and academic players in the battery field, SOLVE aims to capitalise on the extensive R&D base and contribute to the scaling-up efforts required for SSB Gen4b mass production.

To this end, SOLVE addresses the most significant barriers hindering sector growth by demonstrating innovations across the main stages of the value chain, optimising active and inactive materials, and associated processing techniques under industrially relevant conditions (TRL>=6). This helps achieve high-performing, cost-effective, and safe- and sustainable-by-design 20 Ah SSB prototypes and a proof-of-concept 0.25 kWh module based on: (thin, defect-free hybrid solid polymer based electrolytes (<=30 µm, >0.5 mS/cm @25-40ºC, >4.7 V); high loading solid state cathodes (>4.0 mAh/cm2) based on 4V-class cathode active materials (>200 mAh/g), and ultra-thin Li metal anodes (including cutting-edge lithophilic current collectors for the development of zero Li excess SSB) (<10 µm, >3.000 mAh/g), all of them produced through easily scalable and sustainable R2R processes.
This entire process is reinforced by the implementation and adaptation of predeveloped digital

imperative sustainability criteria to promote efficient resource utilisation through eco-design principles and the development of innovative recycling processes.

Finally, a robust dissemination, communication and exploitation strategy, including the development of tailor-made training activities and business models, is established to propel SOLVE's post-project commercialisation and future market success, ultimately contributing to the
decarbonization of the transport sector and the widespread adoption of electromobility.

PARTNERS

- CIDETEC
- ACCUREC RECYCLING
- ARKEMA
- CEA
- CENTRO RICERCHE FIAT SCPA
- DELFORT
- EMPA
- FRAUNHOFER GESELLSCHAFT ZUR FORDERUNG DER ANGEWANDTEN FORSCHUNG EV
- LOMARTOV
- OERLIKON
- PIPISTREL
- POLITECNICO DI TORINO
- PULSEDEON
- SAFT
- TAMPERE UNIVERSITY
- TENERRDIS

SOLIDBAT

Competitiveandsustainable lithium solid-state battery technology enabling large-scale production for automotive applications

Call: HORIZON-CL5-2023-D2-02-01

Website: https://solidbat.eu/en

Start/end day:
1.12.2024 -
30.11.2028
Total EU funding:
7,588,475.63 €

Coordinator:
MARIA MARTINEZ IBAÑEZ
https://solidbat.eu/en/contact

Cluster:
N/A

PROJECT SCOPE AND OBJECTIVES

SOLIDBAT aims to demonstrate a TRL6 solid-state battery (SSB) technology for EVs, combining high performance, safety, and sustainability. The goal is 500 cycles at 80% DoD, >400 Wh/kg, 1000 Wh/L, and a cost of 75 €/kWh by 2030. Key innovations include digital design tools, a water-processable nickel-rich NMC cathode, a 3D-textured lithium metal anode, a hybrid gel polymer electrolyte, and scalable manufacturing compatible with current lithium-ion technology. Sustainability is prioritised by reducing raw material use and eliminating organic solvents, ensuring a greener and cost-effective EV battery solution.

SOLIDBAT's methodology consists of development activities aimed at producing, testing, and validating safe and highly performant SSB prototypes. To reach these objectives, SOLIDBAT is structured in three main pillars that include the activity of all technical WPs:

1. Material pre-selection & interface optimisation
2. Prototyping & industrialization
3. Sustainability and recycling.

WP1 devoted to Project management and Scientific Coordination and WP8 consisting in the Impact Maximisation - Dissemination, communication and Exploitation will enable, support and enhance the technical work performed.

PARTNERS

CIC energiGUNE	CIC ENERGIGUNE
cea	CEA
cidetec energy storage	CIDETEC
Fraunhofer IKTS	FRAUNHOFER GESELLSCHAFT ZUR FORDERUNG DER ANGEWANDTEN FORSCHUNG EV
Technische Universität Braunschweig	TU BRAUNSCHWEIG
TOYOTA	TOYOTA MOTOR EUROPE
Specific Polymers	SPECIFIC POLYMERS
SCHOTT glass made of ideas	SCHOTT
RWTH AACHEN UNIVERSITY	RWTH AACHEN UNIVERSITY (RWTH)
LCE	LCE
InoBat	INOBAT
Hydro Québec	HYDRO-QUEBEC
EURIDA	EURIDA
AMPERE	AMPERE

HyList

Hybridlithium metal-based scalable Solid State Battery manufacturing

Call: HORIZON-CL5-2023-D2-02-01

Website: https://hylist.eu/

Start/end day:
1.1.2025 -
30.12.2027
Total EU funding:
7,830,052.75€

Coordinator:
Meisam Hasanpoor
meisam.hasanpoor@ait.ac.at

Cluster:
N/A

PROJECT SCOPE AND OBJECTIVES

All-solid-state batteries (all-SSBs) have recently emerged as a promising alternative to conventional batteries for use in electric vehicles and other applications, offering enhanced safety and higher energy density. The EU-funded HyLiST project aims to develop Generation 4b all-SSBs for vehicle and aeronautic applications. It uses a high-voltage (HV) spinel-structured lithium nickel manganese oxide (LNMO) cathode, a hybrid single-ion polymer electrolyte, and laser pulse-deposited lithium foil for the anode. The project improves production efficiency through wet coating for composite cathodes and dry processing for electrolytes, while minimising environmental impact by eliminating fluorinated binders. It also identifies essential steps for the large-scale production of SSBs for electric vehicles and aviation.

PARTNERS

SAFELOOP

SecurelyAdvancingFuture EVs with Li-IOn batteries through Optimised Pathways

Call: HORIZON-CL5-2023-D2-02-02

Website: https://www.safeloop.eu/

Start/end day:
1.6.2024-31.5.2027
Total EU funding:
4,749,117.50€

Coordinator:
Ulla Lassi
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Cluster :
Battery 2030+

PROJECT SCOPE AND OBJECTIVES

Envisioned battery demand of 735 GWh for electric mobility by 2025, escalating to a projected 125 million Electric Vehicles (EVs) by 2033, fuels our impetus for innovation. However, these prospects are marred by real safety concerns, evidenced by 2 harrowing ship fires involving luxury EVs, despite adherence to the most stringent safety protocols.

SAFELOOP is a collaborative effort involving 15 entities from 11 countries, representing a blend of research, manufacturing, and business across Europe. Transatlantic partners are joining forces to bolster competitive material-level technologies and supply chain logistics. Key goals include securing strategic raw material feedstock, reducing reliance on Asian supply chains, intensifying environmental sustainability, optimising energy-efficient processing, and demonstrating technological leadership.

SAFELOOP's focal point is Gen3 EU EV Li-Ion Battery (LIB) safety, encompassing the entire life cycle of LIBs within EVs. Safety is considered in a broader sense, not just at a cell level, while the latter remains a key pillar of the research at hand. To name a few, material handling, component processing, battery manufacturing, testing, transport, maintenance, and recycling of active materials are considered. A Eurocentric supply chain for EV-grade battery materials is established, minimising the environmental and cost impact of long-distance transportation. SAFELOOP ensures that batteries and their components adhere to EU safety and environmental regulations.

Beyond enhancing EU battery safety, the project seeks to develop the world's first EV-rated LIB using up to 25% recycled and fully rejuvenated battery-active materials. This initiative paves the way for an ambitious industry-wide recycling target of 90% within the next decade, akin to today's lead-acid battery industry's 95% recycling rate. These ecologically responsible solutions address key aspects of automotive battery safety within the EU and beyond.

PARTNERS

INERRANT

Integrating Novel matERials with scalable processes for safer and recyclAble Li-ioN baTteries

Call: HORIZON-CL5-2023-D2-02-02

Website: https://www.inerrant-batteries.eu/

Start/end day:
1.5.2024-30.4.2027
Total EU funding:
4,433,848.75€

Coordinator:
Spyros Yannopoulus
sny@iceht.forth.gr

Cluster :
Materials for Batteries Hub
AND
Battery 2030+

PROJECT SCOPE AND OBJECTIVES

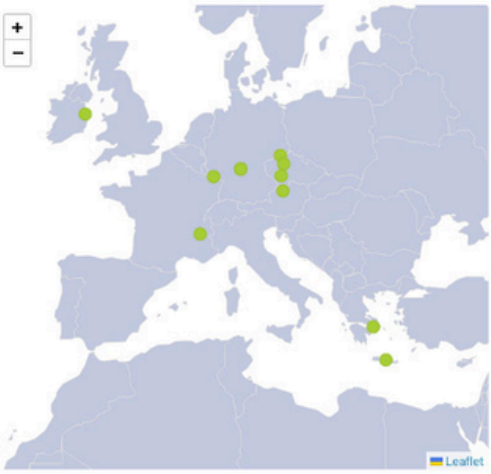
INERRANT aims to drive genuine advancements for safe-and-sustainable-by-design materials and eco-friendly processes, to ensure the economical and widespread utilisation of safer LIBs tailored for the expanding electromobility applications in our modern society. To realise this, INERRANT is formulating a holistic approach to enhance safety performance, extend cyclability and operational lifespan, and improve fast charging, all while maintaining cost-effectiveness, energy, and power density, and avoiding dependence on Critical Raw Materials. The pivotal S&T challenges encompass: development of functional materials, design of sustainable recycling processes and understanding of pertinent interfacial phenomena and degradation mechanisms. The project addresses current challenges for LIBs components related to:

1. Novel (nano)materials combinations for anodes and cathodes;
2. Smart-functioning separators;
3. Stimuli-responsive electrolyte formulations;
4. Novel sustainable recycling processes to improve the purity of recovered materials.

Novel electrochemical characterisation methods and operando spectroscopies, both at the materials and component level, are utilised. This includes the establishment of a metrological framework for traceable calibrations and the integration of machine learning methodologies

for swift and early LIB cell ageing predictions. Adopting fabrication methods that are inherently scalable, built upon existing pilot lines and proven safety testing, facilitates a swift progression to Gigafactory-relevant scales. INERRANT presents a compelling business case and clear exploitation strategy, rooted in the consortium's strategic insight, guaranteeing effective technology commercialisation. This approach supports the economical and eco-friendly production of LIB cells and systems, tailored for e-mobility applications. INERRANT comprises a consortium of 11 partners from the European Commission and one associated partner from the USA.

PARTNERS



- Austria
  - KEYS - Keysight Technologies GmbH
- Czech Republic
  - NST - nanoSPACE Technology s.r.o.
  - UJEP - Jan Evangelista Purkyne University in Usti nad Labem
  - IBG Česko s.r.o - IBG Česko s.r.o
- France
  - VERKOR - VERKOR
- Germany
  - EURICE - European Research and Project Office GmbH
  - Fraunhofer ISC - Fraunhofer Institute for Silicate Research
  - JMU - University of Würzburg
- Greece
  - FORTH - Foundation for Research and Technology Hellas
  - PLEIONE - PLEIONE Energy SA
- Ireland
  - UCD - University College Dublin

SAGELI

Advancedsafer materials and high-performing cells for the next generation of Li-Ion batteries suitable for mobility applications

Call: HORIZON-CL5-2023-D2-02-02

Website: https://sageli.eu/

Start/end day: 1.1.2025 - 31.12.2027
Total EU funding: 4,975,669.75€

Coordinator: Loic Simonin
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Cluster : Battery 2030+

PROJECT SCOPE AND OBJECTIVES

SAGELi aims to develop safer materials and cells that meet Batteries Europe's 2030 targets for safety, performance, lifetime, sustainability and cost, including EUCAR level < 3. SAGELi's new cathode active materials (CAM) contain no cobalt and are based on inherently safe manganese-rich oxides.

Additional safety is ensured by reducing CAMs' active surface area and developing an innovative coating and safer binders for better adhesion, lower swelling and better processability to prevent safety issues from cracks and inhomogeneities – along with flame-retardant electrolytes that target stability at high voltage.

PARTNERS

- CEA
- CIDETEC
- CIDECELL
- SAFRAN
- L'ASSOCIATION EUROPEENNE DE LA MOBILITE ELECTRIQUE
- CIC energiGUNE
- POWER4FUTURE
- ARKEMA
- UMICORE
- LOMARTOV
- FINCANTIERI SI

BatCAT

BatteryCellAssembly Twin

Call: HORIZON-CL5-2023-D2-01-03

Website: https://www.nmbu.no/en/research/projects/batcat

Start/end day:
1.1.2024-30.6.2027
Total EU funding:
5,106,384.00€

Coordinator:
Martin Thomas Horsch
martin.thomas.horsch@nmbu.no

Cluster :
Battery 2030+

PROJECT SCOPE AND OBJECTIVES

BatCAT is the project that realises the manufacturability programme from the BATTERY 2030+ Roadmap, creating a digital twin for battery manufacturing that integrates data-driven and physics-based methods. It develops a cross-chemistry data space for two technologies, Li-ion and Na-ion coin cells andredox flow batteries, addressing a triple challenge in digital manufacturing:

1. Design:

By improved product and process design and optimisation, product quality and process efficiency
increase. This requires decision support that makes complex decision problems accessible to human decision makers. The digital twin technology from BatCAT provides an interpretable industrial decision support system (IIDSS) based on multicriteria optimisation. Surrogate modelling connects the high-level analysis firmly to ground-truth data.

2. Operation:

Process operation and control are improved by acquiring and analysing sensory and operando data in real time, facilitating live interventions within an Industry 5.0 real-time environment. BatCAT follows a rigorous approach to actionable modelling, combining data-driven methods with deductive reasoning based on ontologies and formal methods (answer set programming and BPMN-based model checking) to guarantee a reliable behaviour.

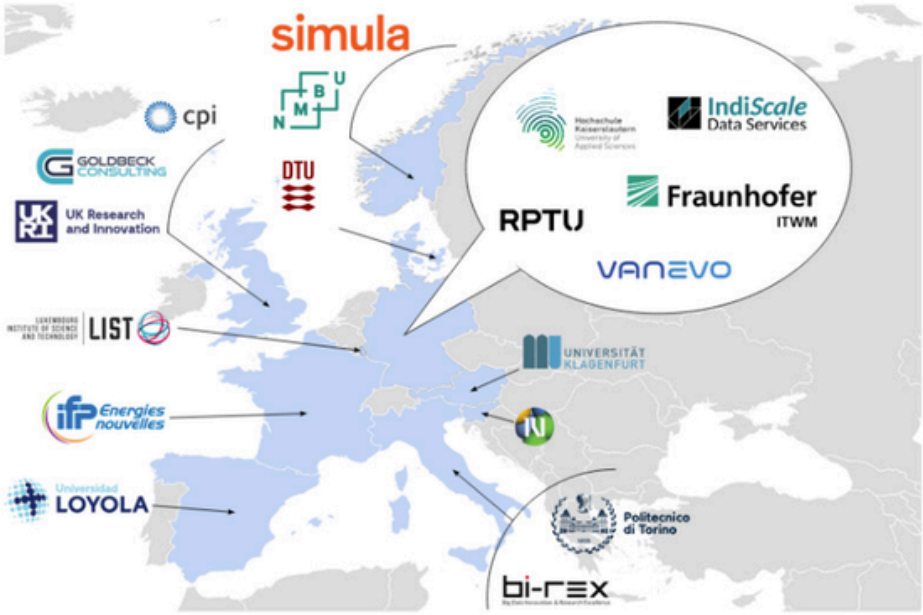
3. Trust:

The approach from BatCAT produces trustworthy models. Machine learning always retains a

clearly characterised connection to the ground truth, and any decision support or decision making from inductive reasoning is safeguarded by constraints through formal deductive reasoning. All our models and methods are explainable, and all our data are FAIR and explainable-AI-ready (XAIR).

The digital twin is validated in pilot production lines for coin cells and redox flow batteries, proving its transferability across chemistries. The project is closely connected to the Advanced Materials 2030 Initiative, BIG-MAP, BATTERY 2030+, BEPA, DigiPass CSA, EOSC, EMMC, and the Knowledge Graph Alliance, ensuring a community and industry uptake of the results.

PARTNERS



BATTwin

Flexible and scalable digital-twin platform for enhanced production efficiency and yield in battery cell production lines

Call: HORIZON-CL5-2023-D2-01-03

Website: https://battwin.net/

Start/end day:
1.12.2023-31.5.2027
Total EU funding:
6,355,218.00€

Coordinator:
Marcello Colledani
marcello.colledani@polimi.it

Cluster :
Battery 2030+

PROJECT SCOPE AND OBJECTIVES

Li-ion batteries are fundamental components for the energy transition of the European ecosystem. Currently, Europe lags behind Asia in terms of Li-ion battery cell manufacturing and more than 90% of the world's production takes place in China, Korea and Japan. To overcome this situation, there is an ambitious ramp-up plan of 25 new gigafactories in Europe with an expected value of €35 billion by 2030. However, in the ramp-up phase of these Gigafactories, a massive production of defects is expected, between 15% - 30%. The new European Gigafactories will also bring demand for €150 bn of battery manufacturing equipment. To support this demand, the EU production equipment industry needs to fill the current knowledge gap and gain competitiveness towards Asian providers, grounded on its worldwide leadership in high-tech, green technologies, enhanced by industry 4.0 digital solutions, exploiting the European Zero-Defect Manufacturing paradigm. The objective of BATTwin is to support this scenario by developing a novel Multi-level Digital Twin platform towards Zero-Defect Manufacturing in battery production, which will reduce defect rates in battery production lines. The solution integrates four pillars, namely:

1. a multi-sensor data acquisition and management layer, supported by data semantics through a Digital Battery Passport data model,

2. process-level digital twins, modelling the critical stages of electrode manufacturing,

cell assembly and conditioning through multi-physics, data-driven and hybrid approaches,

3. system-level digital twins, based on simulation and analytical modelling,

4. user-centric, goal-driven digital twin workflows, increasing the explainability of digital twins and driving the user in system design and control.

The approach will be tested in two industrial pilots producing different battery chemistries and geometries, validating the flexibility and scalability of the approach towards Zero Defect European Gigafactories.

PARTNERS

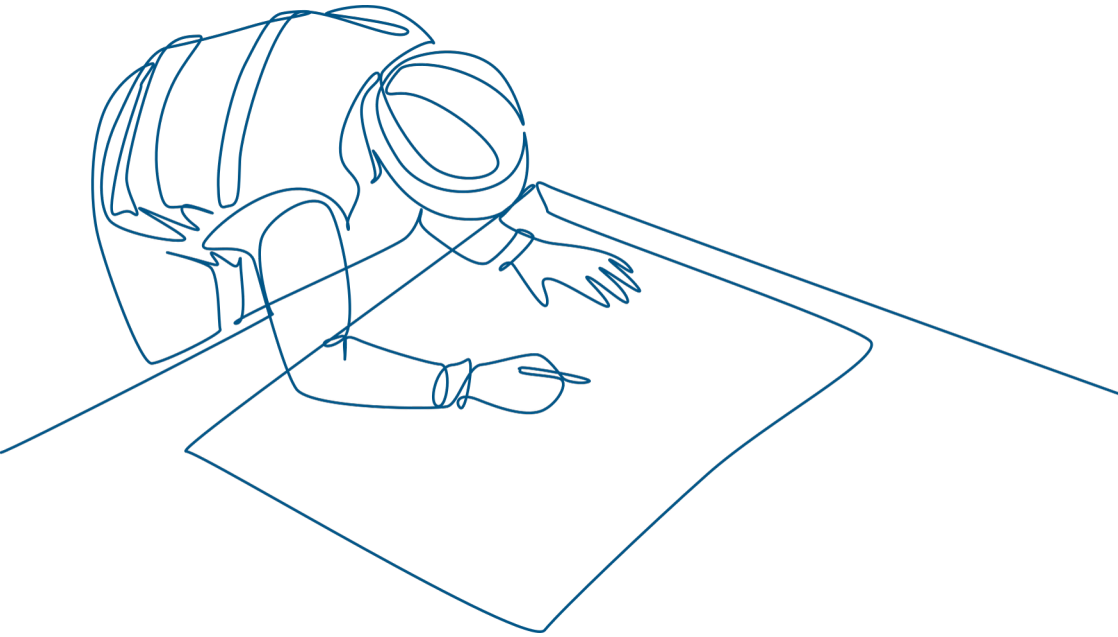
- Politecnico di Milano
- University of Oldenburg
- Verkor SA
- COMAU SPA
- The Royal Institute of Technology (KTH)
- Upcell Alliance
- Cambridge Nanomaterials Technology Ltd.
- HUN-REN SZTAKI
- Sunlight Groupenergy Storage Systems Industrial and Commercial Sociate Anonyme
- Ansys part of Synopsys
- Sivas University of Science and Technology
- Syxis Vsi
- N-ABLE
- Schneider Electric Automation GmbH
- Bureau Veritas Italia Spa

Arts et Métiers Institute of Technology (ENSAM)

CESI School of Engineering

Conservatoire national des arts et métiers

The University of Warwick



BIG LEAP

Next generation of Battery management systems to increase Interoperability, bridge the Gap between 1st and SL-BESS, Extend Adaptability and emPower battery value chains

Call: HORIZON-CL5-2023-D2-01-04

Website: https://bigleapproject.eu/

Start/end day:
1.12.2024 -
30.11.2028
Total EU funding:
7,588,475.63 €

Coordinator:
Imane Worighi
imane.worighi@bringvzw.be

Cluster :
REBORN and Battery2Life

PROJECT SCOPE AND OBJECTIVES

Batteries have been identified as an important technology to guide the clean-energy transition. Its presence in the automotive and energy storage industry is well-established and forecasts show its incoming market uptake. However, the current BMS of FLBs lack interoperability features, resulting in a time-consuming, expensive, and non-standardised reconfiguration process for SLB adaptation. These drawbacks complicate FLB repurposing for SLB applications, like ESS.

The BIG LEAP project focuses on developing solutions for the SLBs BMS and its reconfiguration process. Technology breakthroughs are made in its BMS, as a new three-layer architecture is designed to ensure interoperability, safety, and reliability. It is complemented with an adaptable ESS design to ensure BMS integration and expand the SLB's potential applications. Additionally, the BIG LEAP project intends to optimise the battery reconfiguration process by making it cost-effective, faster, and standardised.

The methodology for the development of these innovations includes the collection of EV, maritime E-Vessel, and ESS batteries that are dismantled and the data collected serves as the basis for the BMS architecture development. It contains adaptable SoX algorithms for accurate battery measurement, aDT for real-time monitoring, and a standardisation roadmap. The new BMS is integrated into the batteries, alongside the ESS and is tested in three demo sites. Two physical

demos will be in Paris and Prague, and a virtual demo will be in Morocco. They aim to validate the novel BMS and ESS, proving their optimisation and interoperability.

The BIG LEAP innovation includes a multidisciplinary consortium, a strong business case, and an Environmental Impact assessment. All with the intention of accelerating its market uptake with a cost-effective solution, positively impacting the European economy through the battery value chain and tracing its sustainable benefits.

PARTNERS

BRING	BRUSSELS RESEARCH AND INNOVATION CENTER FOR GREEN TECHNOLOGIES
Fraunhofer IKTS	FRAUNHOFER GESELLSCHAFT ZUR FORDERUNG DER ANGEWANDTEN FORSCHUNG EV
VTT	TEKNOLOGIAN TUTKIMUSKESKUS VTT OY
ikerlan	IKERLAN S. COOP
EDF	ELECTRICITE DE FRANCE
EATON	EATON ELEKTROTECHNIKA SRO
Corvus Energy	CORVUS ENERGY AS
octave .energy	OCTAVE
inegi	INEGI - INSTITUTO DE CIENCIA E INOVACAO EM ENGENHARIA MECANICA E ENGENHARIA INDUSTRIAL
AEIMIS	ASOCIACION ESPAÑOLA DE LA INNOVACIÓN EN EL MARKETING Y LA INVERSIÓN SOSTENIBLE
RES4AFRICA FOUNDATION	RENEWABLE ENERGY SOLUTIONS FOR THE MEDITERRANEAN AND AFRICA
siro	SIRO SILK ROAD TEMIZ ENERJI DEPOLAMA TEKNOLOJILERI SANAYI VE TICARET ANONIM SIRKETI
SoliTek	UAB SOLI TEK R&D

PARTNERS

MOROCCAN AGENCY FOR SUSTAINABLE ENERGY SA

BERNER FACHHOCHSCHULE

The Tata Power Company Limited

Battery2Life

BATTERYManagementsystem and System design for stationary energy storage with 2nd LIFE batteries

Call: HORIZON-CL5-2023-D2-01-04

Website: https://www.battery2life-project.eu/

Start/end day:
1.1.2024-31.12.2026
Total EU funding:
4,008,064.00€

Coordinator:
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Cluster :
REBORN and BIG LEAP

PROJECT SCOPE AND OBJECTIVES

Battery2Life facilitates the smooth transition of batteries to 2nd life use and boosts the innovation of the European Battery Industry by providing enablers to implement open, adaptable smart BMSes and improved system designs and proposing methods for the efficient and reliable reconfiguration of used batteries.

Battery2Life introduces two new battery system design frameworks serving the upcoming market needs: the first supports the business transition for the initial market by restructuring existing battery design patterns, while the second one introduces completely new design principles for 1st and 2nd life of the battery. A completely new BMS design mentality is introduced to the battery industry by delivering an open and interoperable hybrid BMS architecture (with an Embedded and a Cloud section) leading the transition from technology-driven BMS designs, to serve the needs of specific applications and battery technologies, to new data-driven and application-agnostic BMS designs, that can be easily adapted and updated to serve the requirements of different battery technologies and any 2nd life battery stationary storage application. Furthermore, Battery2Life introduces innovative embedded sensing and more accurate SOX estimation algorithms, new SOX indicators appropriate for 2nd life use -i.e. SOS (safety) and SOW (warranty) - and a new EIS

including the future passport exchange system, to facilitate monitoring and assessment. The project prototypes are demonstrated, within the context of two business cases, i.e. domestic storage application and utility-scale load levelling one.

PARTNERS

REBORN

Reusablebatterymodule and management system development for reliable 2nd life

Call: HORIZON-CL5-2023-D2-01-04

Website: https://reborn-project.eu/

Start/end day:
1.1.2025-31.12.2028
Total EU funding:
4,050,412.50€

Coordinator:
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Cluster :
BIG LEAP and Battery2Life

PROJECT SCOPE AND OBJECTIVES

Battery reuse offers multiple effective approaches that support the circular economy and environmental sustainability. The EU-funded REBORN project aims to optimise second-life battery pack use with advanced software and hardware innovations. It enhances assembly and disassembly by introducing solderless mechanical connections, wireless RF communications between cells and the Battery Management System (BMS), and a semi-automated robotic dismantling strategy. Secure cloud storage ensures cyber-safe data transfer. Using physics-based AI algorithms, the project develops unique performance indicators for ageing cells, aligned with the battery passport concept. Additionally, it accelerates post-characterisation through machine learning, enabling efficient screening and sorting.

PARTNERS

- VUB
- CEA
- LEITAT
- THI
- ICONS
- EVE

IREC

SIRO

EXTRA I+D

CSEM

JRC

SMHYLES

Safe,sustainable and Modular HYbrid systems for Long-duration Energy storage and grid Services

Call: HORIZON-CL5-2023-D2-01-05

Website: https://smhyles.eu/

Start/end day:
01.01.2024-31.12.2027
Total EU funding:
7,575,088.00€

Coordinator:
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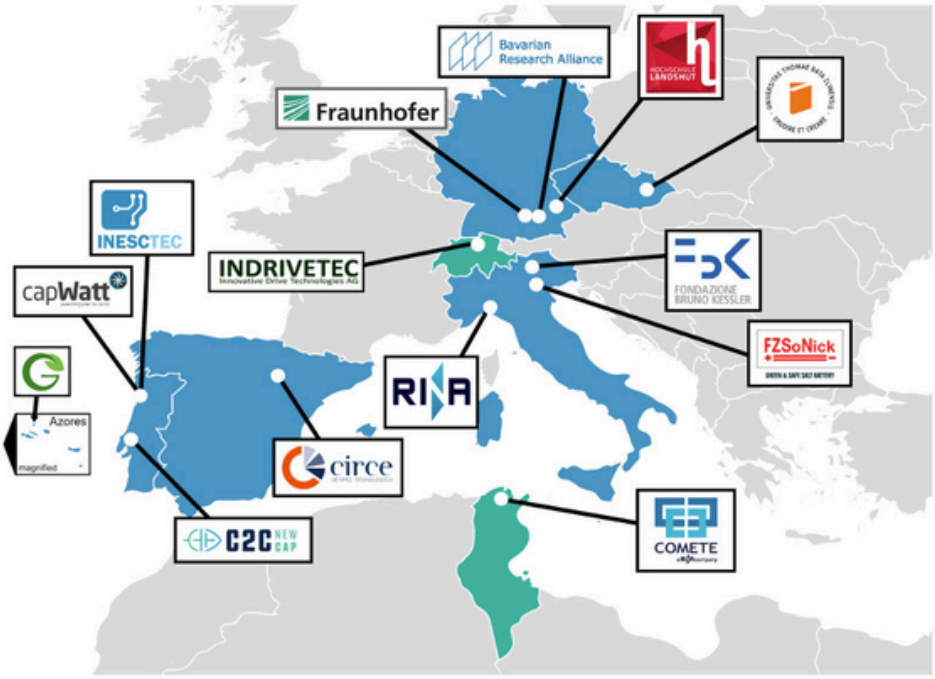
Cluster :
HAVEN, HiHelios, StoRIES

PROJECT SCOPE AND OBJECTIVES

The dramatic effects of the climate crisis are calling for a change in the electrical grid paradigm. The market of Energy Storage Systems is now undertaking continuous growth, boosted by the relentless penetration of renewables. In this context, state-of-the-art ESSs still have several limitations mainly due to technological constraints. Technology-dependent reaction times and rigid coupling between energy and power capacity choose a specific ESS for different use cases very cumbersome and seldom optimal from both the technical and economic point of view. The SMHYLES project proposes novel sustainable Hybrid Energy Storage Systems (HESSs) based on the combination of two low-CRM storage technologies, one with long duration capacity and one with very high-power density, providing ultra-fast ancillary services, managed in a combined control by smart EMSs. The projects comprehend the design, construction, deployment and demonstration of an Aqueous-based HESS (AHESS) and a Salt-based HESS (SHESS), as well as a storage duration expansion. Three demo sites in Portugal and Germany cover islanded grid, industrial microgrid, provision of grid services and EV charging use cases. Novel solutions for electrolyte recycling are also scaled up to an industrially relevant size. The project finalises techno-economic analyses to evaluate market segments for HESSs commercialisation and deal with life cycle assessment along the whole design process. Digital twins are developed to support the optimal design of HESS components and systems, define the strategies for HESS's real-time management, investigate the business potential of SMHYLES solutions for specific use cases and countries, and support and

test the energy management systems of the developed hybrid storage technologies. With high technological and economic advancements, SMHYLES unlocks novel, flexible and multi-purpose energy storage solutions and ensures a remarkable impact on the European energy market.

PARTNERS



HAVEN

High-performAnce Hybrid Energy Storage System for multi-serVicE provisioning

Call: HORIZON-CL5-2023-D2-01-05

Website: https://havenproject.eu/haven-project

Start/end day:
1.1.2024-31.12.2027
Total EU funding:
5,991,258.00€

Coordinator:
Imane Worighi
imane.worighi@bringvzw.be

Cluster :
SHMYLES, HiHelios

PROJECT SCOPE AND OBJECTIVES

HAVEN features a systematic, collaborative, and integrated approach to the design and demonstration of a cutting-edge, sustainable, and safe HESS capable of long duration storage and provision of multiple services for supporting the electrical grid and EV charging infrastructure by coupling complementary technology assets, namely, next-generation high-energy (HE) and high- power (HP) storage technologies, optimised power converter devices with innovative cognitive functionalities, advanced and cyber-secured energy management and control tools and strategies in a novel system architecture. HAVEN seeks to achieve a modular, scalable and cost-efficient solution with the capability to efficiently manage power and energy shares while optimising the system in terms of sizing, CAPEX/OPEX, ageing stress and store degradation depending on the specific application. In addition, the project goes a step further by developing a flexible Digital Twin (DT) of the system, valid regardless of the cell chemistry and application and adaptable for second-life battery modules, which enables predicting the performance and management of the system over its lifetime, while easing its design and predictive maintenance. All this, leveraged by the first-hand experience of leading academic and industrial players (7 companies). HAVEN's smart solution will be validated and demonstrated up to TRL 7 in 3 physical and 2 virtual Use-Cases (UCs), covering a wide range of grid support services and considering the specificities of multiple electricity and balancing markets, both in Europe and beyond. To pave the path towards a fast market uptake after the project, the work also includes the development of business models and industrial exploitation strategies, cementing HAVEN's position as a game-changer in the field of energy storage systems.

PARTNERS

- BRUSSELS RESEARCH AND INNOVATION CENTER FOR GREEN TECHNOLOGIES
- ASOCIACION ESPAÑOLA DE LA INNOVACIÓN EN EL MARKETING Y LA INVERSIÓN SOSTENIBLE
- BATTERY INNOVATION AND TECHNOLOGY CENTER (BITECH)
- DANMARKS TEKNISKE UNIVERSITET
- FRAUNHOFER GESELLSCHAFT ZUR FORDERUNG DER ANGEWANDTEN FORSCHUNG EV
- IKERLAN S. COOP
- INEGI - INSTITUTO DE CIENCIA E INOVACAO EM ENGENHARIA MECANICA E ENGENHARIA INDUSTRIAL
- IMECAR ELEKTRONIK SANAYI VE TICARET LIMITED SIRKETI
- INOVACIJSKO-RAZVOJNI INSTITUT UNIVERZE V LJUBLJANI
- MOROCCAN AGENCY FOR SUSTAINABLE ENERGY SA
- RES4AFRICA (RENEWABLE ENERGY SOLUTIONS FOR AFRICA)
- RELIABILITY & SAFETY TECHNICAL CENTER (RSTER)
- SOLITEK
- TOTALENERGIES
- The Tata Power Company Limited

HiHelios

Demonstratinga high-energy and high-power hybrid battery storage solutions platform for multiple grid services

Call: HORIZON-CL5-2023-D2-01-05

Website: https://www.hihelios.eu/

Start/end day:
1.12.2024 -
31.5.2028
Total EU funding:
5,997,359.13€

Coordinator:
https://www.hihelios.eu/contact-us

Cluster :
HAVEN, SHMYLES

PROJECT SCOPE AND OBJECTIVES

HiHELIOS aims to deliver a TRL 7 modular, scalable, circular-by-design and safe Hybrid Energy Storage System (HESS) that combines High-Power storage capabilities of LFP battery or supercapacitors, with High-Energy storage capabilities of second-life NMC batteries. To achieve this, HiHELIOS adapts the modular, flexible and scalable HESS architecture developed in the EU project SEABAT to grid applications and EV charging support. HiHELIOS aims to design the HESS based on the shelf battery modules and components, and repurposing EV 2nd life battery modules. Supported by digital models, HiHELIOS will custom-design and manufacture a HESS for 4 use- cases of problem owners to solve a real-life hybrid energy storage challenge.

In HiHELIOS, the use cases altogether cover storage services for supporting grid-connected microgrids and islanded grids; renewable energy uptake in weak and weak islanded grids; and EV charging, EV and E-boat fast-charging infrastructures, as well as ancillary services. The HiHELIOS HESS contains an innovative BMS and physics-based and data-driven PMS, EMS and cloud platform (based on the RED and Battery passport principles), enabling multiple (fast) services.

HiHELIOS immediately achieves impact, because the 4 HiHELIOS demonstrators stay in use at the use-case owners after the project, until their end of life. HiHELIOS develops a roadmap to TRL 9 together with main stakeholders in the energy sector, and creates fertile soil for market application with replication studies. HiHELIOS brings long-duration storage (>12 hours) within reach, against

storage costs of less than €0.05/kWh/cycle by 2030, with a projected cycling life of >5,000 cycles. Via BRIDGE, ETIP-SNET and CEN-CENELEC, the experience emerging from HiHELIOS is used as input to national and EU-level standardisation processes.

HiHELIOS brings together a consortium of 12 partners from 6 countries, of which 4 partners are SMEs and 3 partners are from widening countries.

PARTNERS

- UNIVERSITY OF LJUBLJANA (UL)
- JIMMA UNIVERSITY (JU)
- UNO-X MOBILITY
- VITO
- SINTEF
- WATT4EVER
- DAFNI
- CEA
- RHOÉ
- ENERGY POOL
- REVOLTA
- FLANDERS MAKE

BASE

Batterypassport for resilient supply chain and implementation of circular economy

Call: HORIZON-CL5-2023-D2-02-03

Website: https://base-batterypassport.com/

Start/end day:
1.6.2024-31.5.2027
Total EU funding:
6,154,314.00€

Coordinator:
Shahin Jamali
shahin.jamali@ieg.fraunhofer.de

Cluster:
N/A

PROJECT SCOPE AND OBJECTIVES

The battery, although central to the green transition of road transport, currently suffers from a supply chain that lacks traceability, sustainability, resiliency, and circularity. Critical Raw Materials (CRMs) are essential for battery manufacturing. The explosive growth of electric vehicles, driven by climate neutrality policy objectives, will pressure the CRM supply chain and increase EU dependency on third countries, resulting in decreased competitiveness for EU automotive and battery manufacturers. Implementing the digital battery passport (DBP) concept in the battery value chain could resolve these issues.

The main goal of the BASE project is to develop, validate, and implement a working DBP service, as mandated by the “Regulation.” This will be achieved by exploiting data collected through a number of constantly evolving tools and methods, ensuring a transparent, secure, and cost-efficient platform operation, while also catalyzing the growth of circular businesses. BASE will develop transparent methodologies to calculate battery performance and ESGE indicators, ensuring traceability down to the CRM level throughout the entire battery value chain. In the physical domain, this will be achieved through the mass balancing approach. On the data management side, by exploiting distributed ledger technology, BASE will ensure built-in data authenticity verification along the value chain, with no data duplication, avoiding data manipulation, assuring privacy by design, and promoting data interoperability.

The DBP will provide up-to-date and accurate data on battery performance indicators, remaining useful life, dismantling, material composition, and safety. This will allow for an increase in the useful service life of batteries and more efficient recycling, which will enhance resource efficiency, reduce waste, and decrease EU dependency on CRMs from third countries. The applicability of the DBP will be demonstrated through four pilot use cases.

PARTNERS

- FRAUNHOFER GESELLSCHAFT ZUR FORDERUNG DER ANGEWANDTEN FORSCHUNG EV
- TECHNOVATIVE SOLUTIONS LIMITED
- ADSCENSUS MB
- PARAKEET BV
- FORD OTOMOTIV SANAYI A.S.
- INND BATTERIES BV (CLEANTRON)
- ARTECH INTERNATIONAL
- CORVUS ENERGY AS
- MERCEDES-BENZ TÜRK A.S.
- SERAPH CONSULTING LIMITED
- UNIVERSITY OF SURREY
- ROK METALS SARL
- BEEPLANET FACTORY SL
- ROK METALS SARL
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- SQM SA
- EXITCOM RECYCLING A.S.
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