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BatrawProjectEU

BATRAW

Recycling of end of life battery packs for domestic raw material supply chains and enhanced circular economy

Innovative pathways for battery material recovery, from contactless sorting and automated disassembly to hydrometallurgy

*Angel Manuel Escamilla Pérez, Elsa Briqueleur, Aiman Chbani Beggar, Pere Lleonart Angles, Ignasi Díaz Juan, Marc Belenguer Rizo, Milad Madinehei, Jordi Magdaleno Maltas, Marcel Colet Velasco, Abdu Alajami, Clara Bagan, Beatriz Guerrero, Sandra Martinez, Gerard Pérez Pi, Christophe Aucher,
**Alain Bengaouer, Adrien Boulineau, Marlene Chapuis, Frederic Dewulf, Antoine Driancourt, Dimitri Gevet, Francis Guillaud, Béatrice Icard, David Peralta, Delphine Pinto, Dane Sotta, Aurelien Azam,
***Eduardo Aparicio , Ruben Compains, Sonia Compains, Txema Lander, Alberto Raposo, Martin Urrutia,
****Ruben Aparicio Mourelo Alonso, Jose Maria Cancer Aboitiz, Enrique Zapico Alonso, Sandra Pérez, Juan Carlos Hernández, Pablo Lopez,
*****Jon Asin, Juan Barroso, Agustin Idareta, Carlos Pueyo, Carlos Zamarreño,

* Leitat, Research and Devlopment Department, C/ de la Innovació, 2, 08225 Terrassa, (Barcelona), Spain. ** CEA-Liten, 17 Avenue des Martyrs, 38000 Grenoble, France.
*** COMANAI, Polígono Industrial, Calle Ipertegui 1, nº22, 31160 Orcoyen, Navarra, Spain. **** CESVIMAP, C/ Jorge de Santayana, 18, 05004, Ávila, Spain.
*****BeePlanet, Polígono Ipertegui II, Nº12, 31160 Orkoien, Navarra, Spain.

Contact: amescamilla@leitat.org

48	12,3 M€	17	7
months	total budget	partners	countries

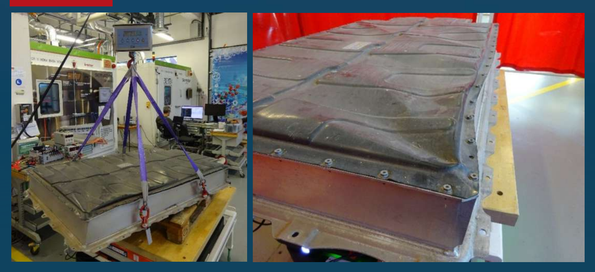
BATRAW **PROJECT**

BATRAW is pioneering EU initiative advancing sustainable and scalable recycling of end-of-life (EoL) batteries from electric vehicles and domestic sources. BATRAW focuses on two pilot systems: one for semi-automated dismantling of battery packs with 95% component recovery, and another for continuous hydrometallurgical recycling achieving 90–98% selectivity for critical raw materials (CRMs) like Co, Ni, Mn, Li, graphite, Al, and Cu. Other projects complement this by developing a holistic process that recovers valuable materials often lost in conventional recycling such as electrolytes, binders, and cathode active materials and through improved upstream sorting, safe pre-processing, and downstream refining to battery-grade standards. This family of initiatives promotes circularity, eco-design, and second-life applications, supported by blockchain-based traceability (Battery Passport), LCA/SSbD validation, and stakeholder engagement. This series of projects aim to reduce EU dependency on imported CRMs and meet 2030 CRMA targets, while maximizing market uptake through innovative business models and policy integration.

CESVIMAP

The **Public Deliverable 2.6 available in CORDIS**, analyzes EV battery construction methods and explores repair options through partial component replacement to support circular economy principles. **14 EV packs** were studied for dismantling, repair, and reassembly in vehicles where possible. Repair feasibility depends on the ability to safely open, disassemble, and reassemble batteries without compromising performance or safety, excluding designs using welding or strong adhesives. Challenges include lack of manufacturer support, spare parts, and standardized SOH assessment. Future EU regulations will mandate easier battery removability, access to repair information, and SOH data, fostering repair over replacement, new component markets, and job opportunities in EV maintenance.

cea



The **Public Deliverable 3.3 available in CORDIS** details manual deactivation and dismantling of EV battery packs down to cell level to define best practices. CEA studied **4 battery packs**, providing guidelines for safe deactivation when BMS access is unavailable, addressing recycling, remanufacturing, and second-life use cases. It includes dismantling instructions, component bills, and links to Tasks 3.4 and 3.5. Each component will receive a product passport via BATRAW's Minespider blockchain platform.

Dismantling

SoH & Discharge
EV Batteries

Repair

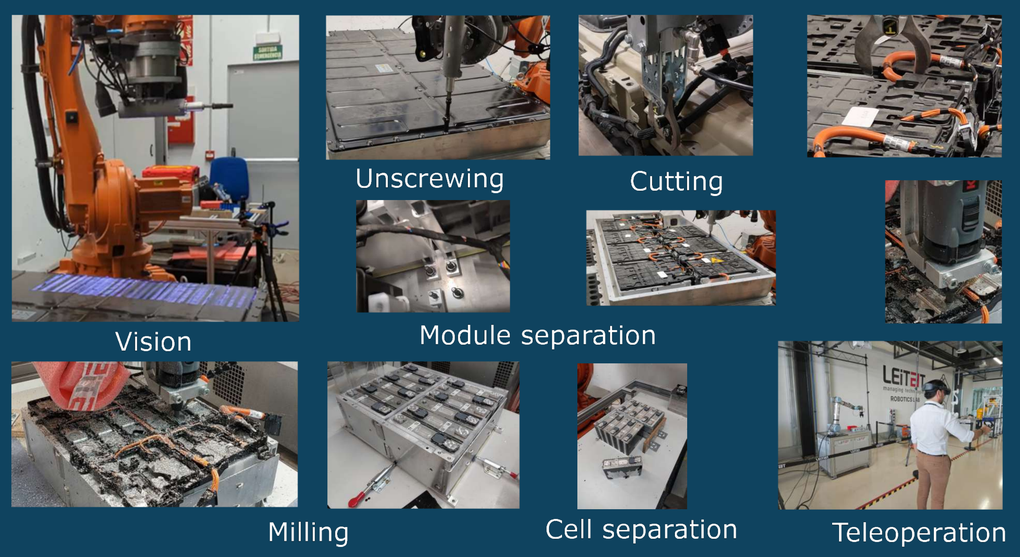
Contacless Sorting
Domestic Batteries
RESTORE sister project

Dry discharging
Domestic Batteries
RESTORE sister project

BeePlanet factory

BeePlanet uses Incremental Capacity Analysis (ICA) to **estimate battery State of Health** in under 15 minutes. An ESS repurposes 34 NMC EV modules to deliver 80 kWh of nominal capacity at 744 Vdc, operating between 670–850 V with up to 55 A current. Designed for durability, it supports >5,000 cycles at 85% DoD and 0.5C. The cabinet weighs 650 kg, offers IP54 protection, natural ventilation, and modularity. Communication interfaces include CAN Bus, ModBus-TCP, and Ethernet, ensuring seamless integration. Built with sheet steel and NEMA 12 compliance, it guarantees safety and resistance to corrosive environments, making it ideal for second-life energy storage applications.

LEITAT managing technologies



Leitat and partners developped the semi-automation of EV battery pack disassembly covering pack, module, and cell levels. The team is also exploring the integration of augmented reality and teleoperation to enhance safety during dismantling operations. By enabling the targeted extraction of battery cells and their individual components, the process facilitates the production of higher-purity black mass and opens the possibility for direct regeneration of cell components bypassing conventional mechanical shredding and the intermediate recovery of metallic salts.

COMANAI SMARTER ENGINEERING

Repurpose

Recycling
Black Mass

Recycling
Pre-CAM

Recycled Active Material
Graphite & CAM

M104BATRAW2032

Co-funded by the European Union

UK Research and Innovation

This project has received funding from the European Union's Horizon Europe research and innovation programme under grants agreement No 101058359.
ISLE UTILITIES LTD participant in Horizon Europe Project BATRAW is supported by UKRI