



BATTERY2LIFE



BATTERY2LIFE General Presentation



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Project funded by



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In a nutshell



BATTERY2LIFE

Project Name: BATTERY Management system and System design for stationary energy storage with 2nd LIFE batteries

Call identifier: Cross-sectoral solutions for the climate transition (HORIZON-CL5-2023-D2-01)

Duration: 36 months (January 2024-December 2026)

Business Cases: Domestic storage in Austria and Industrial (grid-scale) storage in Greece

Project Coordinator: Dr Angelos Amditis, Institute of Communication and Computer Systems (ICCS)

Consortium: 11 Partners from 5 countries

Funding: ~4M€

Website: battery2life-project.eu

Social Media:

- [@battery2life_eu](https://twitter.com/battery2life_eu)
- [BATTERY2LIFE Project](https://www.facebook.com/BATTERY2LIFEProject)





In the near future the number of electric vehicle (EV) batteries, which are no longer appropriate for automotive use, will dramatically increase. It is estimated that over 5 million metric tons of EV batteries will be inappropriate for mobility purposes by 2030. The average EV battery capacity loss is estimated to around 2.3% per year, thus, at the end of the warranty, the expected EV battery nominal capacity varies between 70-80%. This residual capacity can be still exploitable for other non-EV storage applications aiming to facilitate the green energy transition and promote the Renewable Energy Source (RES) share in all electricity grids.

- ➔ Lack of flexible and standardised packaging for efficient disassembly, assessment and reconfiguration method
- ➔ Lack of standardised, reliable and efficient means to monitor status, assess suitability and appropriately match used modules for 2nd life applications
- ➔ Transferring a BMS design from 1st life (automotive) to 2nd life (static storage) applications is a challenging task, since the requirements of the system, functions and safety are not the same



BATTERY2LIFE aims to facilitate the smooth transition of batteries to 2nd life use and boost the innovation of the European Battery Industry by providing enablers to implement open adaptable smart Battery Management Systems (BMS) and improved system designs towards reliable reconfiguration of used batteries.



Innovations ✓



BATTERY 2 LIFE

01

Open interoperable hybrid BMS adaptable to chemistries, technologies, protocols, application requirements

04

BMS with embedded Electrochemical Impedance Spectroscopy (EIS) for State of Charge (SoC)

02

Improved/New system designs for easy reconfiguration of used modules

05

Advanced diagnostic tool for 2nd life batteries

03

Smart reliability and safety functionalities embedded in the BMS State of Warranty (SoW) – to enhance battery operational efficiency

06

Generalized sizing tool for 2nd life use



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- Enable the **safe and efficient reconfiguration of the Battery Systems for 2nd life use**: *a) facilitate re-configuration on existing designs, b) propose new design frameworks for 1st & 2nd life batteries*
- Design & develop an **open cloud-based BMS, adaptable** to battery technologies and communication protocols for 1st or 2nd life storage applications
- **Embed smart monitoring and control functionalities in the BMS** to ensure safety and reliability in 2nd life operation (SoX estimators, EIS, sensors, active balancing algorithms)
- Develop AI-based **tools for the reliable and efficient assessment, sorting & recombination** of modules according to their suitability and needs for 2nd life applications
- Demonstrate and assess the **efficiency and the impact of the B2L solutions in domestic and utility-scale storage applications**
- Propose **sustainable business plans** to boost the **competitiveness of the European battery industry**



Expected Impact



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- ✓ **Battery pack & Battery Management System (BMS) design for single module operation or recombination** (reconfiguration) of modules or battery packs **for consolidated and new battery technologies.**
- ✓ **Safe, accessible and reliable operation of batteries and compatible with the battery passport concept.**
- ✓ Battery System (BS) design to enable **disassembly and reconfiguration** for 2nd life.
- ✓ Development of **fast and efficient qualification strategies and assessment of Electric Vehicle (EV) batteries for 2nd life applications** and quantify it with respect to state of the art in terms of time and efficiency.
- ✓ **Reduction of 30% of repurposing/refurbishment cost** for adapting EV batteries to stationary applications in 2nd life.
- ✓ **Environmental impact assessment**, from both positive and negative aspects, for adapting EV batteries to 2nd life applications.
- ✓ **Impact in the European economy** by a growth of the market and employment, by facilitating the uptake of stationary Energy Storage System feasibility of operation in the batteries extended life domain (2nd life).

Utility scale storage application

Efficient reconfiguration for 2nd life



Domestic storage application

New battery design principles





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Thank you! Any questions?



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