Horizon Europe Work Programme

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

D2.1 - Interoperable BMS Architecture design

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Executive Summary

The BIG LEAP project focuses on developing solutions for the Second Life Batteries (SLBs) Battery Management System (BMS) and its reconfiguration process. Technology breakthroughs will be made in its BMS, as a new three-layer architecture will be designed to ensure interoperability, safety, and reliability. It will be complemented with an adaptable Energy Storage System (ESS) design to ensure BMS integration and expand the SLB's potential applications. Additionally, the BIG LEAP project intends to optimize the battery reconfiguration process by making it cost-effective, faster, and standardized.

The methodology for the development of these innovations includes the collection of Electric Vehicle (EV), maritime E-Vessel, and ESS batteries that will be dismantled, and the data collected will serve as the basis for the BMS architecture development. It will contain adaptable State-of-X (SOX) algorithms for accurate battery measurement, a Digital Twin (DT) for real-time monitoring, and a standardization roadmap. The new BMS will be integrated into the batteries, alongside the ESS and will be 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 optimization and interoperability.

This document is the BIG LEAP deliverable No. 2.1, being the first deliverable of WP2. This work package is focused on the development of the novel BMS architecture, and the design of the electrical energy storage. This deliverable describes the BMS and its supported architectures, that will enable the creation of an open, reusable, multi domain BMS. This BMS will then support flexible and modular operation strategy of different battery systems, e.g., also for second life battery systems.