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next-generation energy storage

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SIMBA – Deliverable Report

D5.2
Battery Management system developed, both software and hardware characteristics

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Publishable summary

In our project, we undertook the development of a sophisticated Battery Management System (BMS) tailored specifically for sodium-ion batteries. The primary motivation behind this endeavor was the pressing need for a BMS that could effectively manage the intricacies of sodium-ion technology, which differs significantly from traditional lithium-ion systems. This unique requirement stemmed from the increasing demand for energy storage solutions and the inherent challenges posed by sodium-ion batteries.

Our approach to addressing this need was twofold, encompassing both hardware and software development. In terms of hardware, we integrated the BMS with an Electrochemical Impedance Spectroscopy (EIS) meter. This addition allowed for a more comprehensive understanding of the battery's behavior, enabling precise monitoring and control.

The software development aspect of the BMS was equally crucial. We engineered a robust software system that not only collected and analyzed data from the EIS meter but also facilitated seamless communication over the internet. This connectivity was a key feature as it enabled remote access and control. Through this capability, remote maintenance procedures could be executed, and vital data could be extracted to determine the State of Charge (SOC) and State of Health (SOH) of the sodium-ion batteries.

Furthermore, we designed and developed an intuitive Android application from the ground up. This application served as a user-friendly interface, allowing the BMS to be controlled and monitored from any compatible device. This custom app enhanced accessibility and usability, making it practical for operators to interact with the system effortlessly.

In essence, our newly developed BMS represented a significant leap forward in sodium-ion battery management technology. By combining cutting-edge hardware integration, sophisticated software development, and remote accessibility via the Android app, we created a comprehensive solution tailored to the specific needs of sodium-ion batteries. This innovative approach not only addressed the existing gaps in battery management but also positioned our project at the forefront of advancements in energy storage systems.

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