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Solutions for large batteries for waterborne transport

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D6.6. Roadmap for type approval / certification report

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Document History

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Project Abstract

The goal of the SEABAT project is to develop a full-electric maritime hybrid battery concept that is based on:

- Modularly combining high-energy batteries and high-power batteries,
- Novel converter concepts and
- Production technology solutions derived from the automotive sector.

The modular approach will reduce component costs (battery cells, converters) so that unique ship designs can profit from economies of scale by using standardized low-cost components. The concept will be suitable for ships requiring up to 1 MWh of storage or more.

Public summary

About the Report:

This report details the progress and outcomes of Task 6.5 within the SEABAT project, focusing on the development of a certification and classification roadmap for fully integrated battery systems tailored for marine applications. The task is pivotal for aligning the project's technical outputs with regulatory standards required for marine equipment, ensuring that the innovative battery systems developed can be safely and effectively integrated into the marine industry.

Context within SEABAT:

Task 6.5 is an integral part of the SEABAT project, which aims to enhance the regulatory compliance of marine battery systems. This specific task addresses the need for a clear and actionable pathway towards the certification of these systems, providing a structured foundation for meeting international standards and facilitating their deployment across various marine platforms. However, it is important to note that the scope of the SEABAT project is distinct from the overall system implementation. The roadmap serves as a starting point, while elements such as the battery room and other system-specific components fall outside SEABAT's scope.

Goals and Motivation:

The primary goal of this task is to facilitate the seamless integration of cutting-edge battery technologies into the marine sector by establishing a starting point for the implementation of a robust certification framework. This framework is designed to address the regulatory, safety, and operational requirements that are critical for the adoption of new technologies in marine applications. The motivation behind this effort is to bridge the gap between technological innovation and regulatory approval and market acceptance, accelerating the market readiness of advanced marine battery solutions.

Methods:

The approach taken in this task involved a collaborative effort among various project partners, led by ABEE. Key activities included:

- Design coordination to ensure that system designs are conducive to certification.
- Technical analysis by ABEE to set up appropriate certification protocols, within the technical scope of SEABAT.
- Regulatory steps led by RINA to outline preliminary approval processes.

Results:

The task initiated the setup of a detailed certification roadmap, identifying critical compliance checkpoints and necessary testing phases. It highlighted the full compliance of the Battery Management System (BMS) and addressed gaps in Uninterruptible Power Supply (UPS) functionalities, proposing external validation to meet project scopes.

Discussion and Conclusion:

The completion of Task 6.5 marks a milestone in the SEABAT project, providing a starting point for a pathway to certification that enhances the integration of innovative marine battery systems

into the market. The roadmap developed is focused on the functional requirements of the HESS, addressing both existing and emerging regulatory standards, which facilitates the broader acceptance and implementation of these systems in marine applications. The collaborative approach, frontloading compliance verification is an encouraged method for future initiatives, aiming to merge technological advancements with regulatory compliance in the marine industry. While SEABAT lays the foundation for certification, it is crucial to recognize that aspects such as battery room specifications, ship integration and whatever outside of the HESS, falls outside its scope and will need to be addressed separately in broader system-level considerations. Additionally, future efforts should focus on further refining the roadmap by incorporating lessons learned from real-world deployments, engaging with regulatory bodies for continuous updates, and conducting further testing especially on the integration level to ensure compliance with evolving maritime safety standards.