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Affordable High-Performance Green Redox Flow Batteries

GRANT AGREEMENT No. 875613



## HIGREEW – Deliverable Report

D4.4 – Report on the Power Electronics Design & Testing



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## Publishable summary

The HIGREEW project sets out to design, build, and demonstrate a prototype based on a new generation of Aqueous Organic Redox Flow Battery (AORFB) based on a water-soluble low-cost organic electrolyte and featuring low-cost components and long service life. A fully functional AORFB prototype would be one of the major outcomes of the project and this shall come after initial development of the chemistry in WP2. The scope of WP4 is to build the prototype which entails the transition from lab scale to final integration in La Plana (WP5). There are several steps or milestones to be achieved within the major tasks, Task 4.3 Power electronics HW integration and control adjustment is a key task to ensure a smooth transition to the integration and testing in a real-case scenario.

Power electronics is an essential part of the HIGREEW battery system and shall be used to adapt the output DC voltage from the stacks (scope of WP4) to the AC voltage at the point of electrical connection in La Plana. HIGREEW's scope for selecting the power converters does not include designing them from scratch, but rather choosing an appropriate commercial model from the market that complies with the battery specs.

The starting point of this task is to understand the specs of the battery which outline the minimum requirements of the power converters. The first piece of information that should be available is the resulting cell voltage based on the developed electrolyte chemistry (scope of WP2). After that, it is important to understand the stack construction and configuration (cell size, No. of cells per stack, No. of stacks, series or parallel connection, total power and voltage).

The selected converters will be integrated as part of the battery energy storage system (BESS) in a 10-ft container, to be tested and validated in La Plana (scope of WP5).

Deliverable report 4.4 summarizes the work done as part of Task 4.3, from listing the converters requirements, to identifying the available suppliers. It also shows the converters as part of the bigger system in terms of electrical connection, and the control & communication between them and the rest of the system (SCADA, EMS, BMS).