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HIGREEW – Deliverable Report

<< D6.1 – Life cycle assessment >>

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Publishable summary

On the main goals of the HIGREEW project is to develop an organic-based redox flow battery with a reduced environmental impact. For that purpose, a Life Cycle Assessment has been conducted based on the inventory of the pilot-scale battery constructed during the project. The Life Cycle Assessment provides information on a series of potential environmental impacts, including CO_2 footprint. The potential impacts of HIGREEW battery, evaluated through the CML method, are compared to those of a Vanadium Redox Flow battery (VRFB), based on the most recent inventory provided for this type of battery.

In the first work packages of the project the focus was put on the development of materials and integration in a device based on their performance. During the iterative process of testing and combination of materials sustainability and cost have also been considered as drivers of the technology. Data has been collected throughout this development process to feed LCA.

In redox flow battery, the electrolyte is a key component, not only for performance but also for LCA. In fact, the electrolyte is one of the main components in volume and mass and it is also the components responsible of the electrochemical reactions and therefore the most reactive component within the battery.

Due to the novelty of the HIGREEW battery and the organic materials implemented, data for the inventory of the electrolyte is not readily available, especially in terms of energy balance and end of life management of the battery.

In this report a detailed study considering mass and energy balance to determine key aspects of the battery as the CO_2 footprint. Final conclusion, is that the HIGREEW battery footprint is of the same order of magnitude as for a VRFB during the manufacturing stage. Estimations and projections have been done for the assessment during the use phase (20 years). Information of the new generation redox flow batteries with respect to lifetime, end of use management (processing, recycling, incineration), always linked to the operation conditions and application, is expected to be gained as those batteries are further evaluated.

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Project partners:

#	Partner	Partner Full Name
1	CICe	CENTRO DE INVESTIGACION COOPERATIVA DE ENERGIAS ALTERNATIVAS FUNDACION, CIC ENERGIGUNE FUNDAZIOA
2	GAMESA	GAMESA ELECTRIC SOCIEDAD ANONIMA
3	UAM	UNIVERSIDAD AUTONOMA DE MADRID
4	CNRS	CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE CNRS
5	C-TECH	C-TECH INNOVATION LIMITED
7	UWB	ZAPADOCESKA UNIVERZITA V PLZNI
8	PFES	PINFLOW ENERGY STORAGE, S.R.O.
9	UNR	UNIRESEARCH BV
10	SGRE	SIEMENS GAMESA RENEWABLE ENERGY
11	FRAUNHOFER	FRAUNHOFER-GESELLSCHAFT ZUR FÖRDERUNG DER ANGEWANDTEN FORSCHUNG E. V.

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