Malawi flow battery technology

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A collaboration between the University and an energy storage innovator is aiming to simplify the reconditioning and maintenance of single-liquid flow batteries in emerging countries such as Malawi and Sri Lanka.

Researchers from the University"s Electrochemical Engineering group and the Department of Design Manufacturing and Engineering Management, along with industry partners, Edinburgh-based StorTera, are developing simplified processes for formulating and reconditioning single liquid flow batteries. They aim to enable battery installation, repairs and recovery to be carried out in-country by local engineers.

Project lead Dr Edward Brightman said: "The main objectives are to get the technology to the next stage of readiness and to find ways we can simplify the maintenance and reconditioning of StorTera"s single-liquid flow batteries.

"If you deploy complex systems in emerging economies, there is a lack of local expertise to maintain them. But we can prolong the life of the batteries by understanding how the liquid components degrade and come up with methods to recondition them. It means the main hardware itself doesn"t need to be replaced."

A key difference of the technology is that liquid flow batteries store energy in the electrolyte instead of at the electrodes, and the energy stored by the cell can be increased by adding a larger liquid tank, without a corresponding increase in power. Some flow battery technologies also operate well in widely varying temperatures, making them particularly suitable for use in harsh climates.

The combination of high capacity and long service life means the batteries are potentially well suited to supporting low-carbon energy grids in emerging economies. The technology also includes a novel cell configuration which enables the use of roll-to-roll manufacturing techniques resulting in very low projected costs when manufactured at scale.

StorTera has developed a potential solution, with a spiral flow battery that can be manufactured using a roll-to-roll process, leading to increased efficiency, cost savings and a higher production rate.

The project is one of five funded by The Faraday Institute as part of the Ayrton Challenge on Energy Storage - UK international development funding to support the clean energy transition. This is part of a wider programme focused on expanding energy access, facilitating emissions reductions, and supporting energy transitions in developing countries.

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