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SF partner Aceleron - co-funded with UK aid from the UK government and supported by Tripleline - has produced a report showing how lithium battery technology can play a critical role in reducing this deficit and deliver the SDG target of universal access to affordable, reliable and modern energy services across Africa by 2030.

Lithium batteries have many advantages over their traditional lead acid counterparts. They are lighter and smaller, have an extended life cycle, can charge and discharge at a high rate, are more resilient in harsh climates, require limited maintenance and have a low self-discharge rate.

However, despite their versality, lithium batteries still face challenges in their application across Africa. They are more expensive to manufacture than other batteries, making them less affordable for the communities where they are most needed. As well as this, their end-of-life management is challenging as metals can readily leak from the casing of discarded batteries and contaminate soil and groundwater, threatening ecosystems and health.

Aceleron"s lithium battery technology has the potential to address both challenges. The battery"s "core" can be easily taken out of the box, facilitating easy upgrading, or servicing, making it easier to realise residual value, and therefore reducing through life costs and raw material use. The batteries are also made from recycled materials, further reducing costs and creating a circular economy that keeps waste and environmental impact to a minimum.

The company"s recent business model innovations have contributed to further reductions in production costs and improved affordability. Aceleron"s initial supply chain model, which involved shipping component parts from China to the UK for battery build and onward shipment to Africa, has been streamlined, with parts now shipped directly from China to Africa for build in-country. As a result, production costs have fallen significantly, emissions have been reduced and the supply chain is more reliable and responsive to local demand.

Aceleron have successfully used unskilled labour to produce high quality battery packs. Using the Aceleron battery design, the packs can be assembled by hand. Standard operating procedures have been established which are highly interactive, utilising images and videos alongside steps in the build process. Quality control programmes were also put in place to assess any issues. These efforts have led to sustainable job creation and improved workforce skills and productivity.

Building locally also strengthens the circular economy by providing secure and low-cost access to end-of-life batteries for recycling. The need for local waste management across Africa is increasingly apparent. Aceleron

therefore plans to develop a mobile battery repurposing facility which can provide manufacturing, maintenance and re-manufacture of batteries and easy access to waste disposal facilities.

Aceleron"s technology and recycling process enables it to provide total care of battery packs from production through to recycling. This approach facilitates the provision of Energy Storage as a Service (ESaaS) where - for a monthly subscription - service, maintenance and end-of-life disposal is also included in the battery cost, as opposed to a simple upfront sale of a battery asset. By offering the battery at a lower total cost and spreading the payments out over an extended period, ESaaS models make access to lithium batteries more affordable and flexible.

Lithium battery manufacturers should adopt certifications systems to enable funders and end users to have confidence in battery safety and capability. Aceleron has reviewed global certification requirements in battery manufacture and their application e.g. in grid connections, uninterrupted power supply and smaller electric vehicles and has decided to certify to a higher standard to enable the use of energy storage products in various applications without the requirement for additional certification by the customer.

Renewable energy resources - such as wind, water or solar solutions - hold great promise. They could provide energy while overcoming Africa"s infrastructural challenges. But this energy would still need to be stored. Lithium ion batteries might provide a solution. The Conversation Africa asked Bernard Jan Bladergroen about the challenges and opportunities.

Lithium ion, or Li-ion, batteries are a type of rechargeable battery. They are a popular choice because when well looked after, they can be drained and charged literally thousands of times which makes them superior to commonly used lead acid batteries.