

Circularity Guidelines

on end-of-life battery management

Batteries are used in many applications from cars to distributed renewable energy (DRE) systems, such as clean energy mini-grids. As the proliferation of DRE solutions inevitably increases to address the growing energy demand in Africa and to electrify the more than 675 million people lacking access to electricity, so will demand for batteries. This increasing demand will also lead to growing end-of-life battery volumes that need to be soundly managed and recycled to ensure a sustainable future for people and planet.

Environmentally sound and safe management of used and end-of-life batteries is possible and would avoid negative impacts on human health and the environment. It would also recover embedded raw materials and create safe jobs and income in a high standard recycling industry.

However, in many regions of the world, recycling takes place in substandard, highly dangerous and unsafe conditions, exposing workers and neighbouring communities to toxic substances. In many low- and middle-income countries unsound lead-acid battery recycling is a major public health concern and has negative short-, medium- and long-term implications on health and wellbeing of societies, with children being the most affected population group. While end-of-life management of Li-ion batteries has not reached comparable scales as lead-acid batteries yet, also here, unsound practices will likely lead to adverse effects on workers and communities.

The responsibility for adequate and effective recycling does not solely lie with battery manufacturers and recyclers. Indeed, all stakeholders involved in the provision of renewable energy solutions which include batteries, can play an important role in ensuring appropriate end-of-life management of batteries.

Therefore, the [Alliance for Rural Electrification \(ARE\)](#) has launched the Circularity Guidelines on end-of-life battery management, setting minimum standards in the renewable energy space in low- and middle-income countries and calling for renewable energy companies to endorse and embed these guidelines within their daily operations.

The initiative for these Guidelines is also supported by the project “Partnership for Responsible Battery and Metal Recycling” (ProBaMet), which is funded by GIZ’s [Initiative for Global Solidarity \(IGS\)](#) and implemented by [Oeko-Institut](#), together with [ARE](#), [Sustainable Research and Action for Environmental Development \(SRADev Nigeria\)](#) and [Plattform Blei/Plattform Lead](#).

Guidelines

1. Quality & durability

- **Procure** batteries which are known for their **durability and longevity** to minimise early replacements.
- **Use internationally recognised databases or standards programmes** for off-grid products to help in decision-taking on the right technology.
- **Partner with reliable battery manufacturers** with a track record of producing high-quality products, and who can demonstrate transparent and sustainable value chains.
- **Implement stringent quality control measures and embed certified design for repair systems and installation training across low- and middle-income countries** to ensure only durable batteries are installed in DRE systems.
- **Minimise the content of hazardous substances** in products as much as possible reducing pollution problems during end-of-life management.

2. Warranties, maintenance & repair

- **Employ repairable and recyclable system designs** to reduce waste and replacement needs and verify availability of spare parts from manufacturer.
- **Set up collection systems** based on warranties and servicing structures.
- **Negotiate extended warranties** with battery suppliers to provide clients with peace of mind regarding battery performance.
- **Offer comprehensive maintenance packages**, including regular inspections and preventive maintenance for batteries. This may also include modern state of health monitoring solutions, which can identify potential issues at an early stage and support in determining whether the battery must be recycled or can be still used.
- **Establish and roll-out training of domestic skilled and certified technicians** for quality installation, as well as operations, maintenance and prompt repair services to minimise downtime and extend battery lifespan.

3. Take-back

- **Prioritise reuse and reconditioning** upstream of recycling to decrease volume of waste.
- **Implement a money-on-return strategy** to foster collection and return of end-of-life, used and abandoned batteries to recycling centres.
- **Ensure a joint take-back scheme** is in place, decreasing the unit costs for the participating projects or companies.
- **Arrange convenient collection points** or collaborate with local recycling facilities for efficient battery retrieval.
- At their end-of-life, **ensure sound management of all batteries** under your direct control and under control of your contractors (e.g. installation companies, maintenance service

providers) by applying best available practices in storage, transport and treatment available in your region of operation.

- **Collect and manage equivalent amounts of end-of-life batteries** as brought onto the respective national markets (either individually or collectively with other players).
- **Monitor battery collection and end-of-life management efforts** and keep evidence of achieved collection and management results.

4. Sound end-of-life management

- **Partner with best available certified repurposing and recycling facilities** in your region of operation to ensure that lead-acid batteries, as well as other batteries are handled according to best practices.
- **Ensure compliance with environmental regulations** for the safe transport, disposal and recycling of used batteries.
- **Keep records and certificates** on sound end-of-life management of all batteries.
- **Prioritise sound management** of used lead-acid battery in the short- and mid-term.

Call to action and for endorsement

An **endorsement of these Guidelines** signifies that the organisation aims to align internal practices with the Circularity Guidelines and commits to implement them in daily operations within two years of signing the endorsement. The guidelines may be endorsed by any renewable energy stakeholder that subscribes to guidelines. This may, amongst others, include project developers, installers, manufacturers, investors, international funding partners and governments. For example, investors and international funding partners that endorse the Guidelines may request companies to fulfil the minimum standards of practice in their end-of-life lead-acid battery management when financing them. Should there be a need for support on the implementation of the Guidelines, the Alliance for Rural Electrification can connect you with relevant stakeholders.

To 'endorse' the Guidelines, please send a signed letter using [this](#) template to Julia von Franz, Policy & Advocacy Officer: j.vonfranz@ruralelec.org