



# SOLAR E-WASTE CHALLENGE PROJECT SPOTLIGHTS

**ROUND 2**  
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GLOBAL LEAP AWARDS





## SOLAR E-WASTE CHALLENGE PROJECT SPOTLIGHT

# SOLARIS OFFGRID

Extending SHS life through replacable, durable and low-cost external energy storage units.

This project aims to address the issue of discarding functional solar home systems due to internal battery failure. Solaris Offgrid proposes to design a tamperproof external battery that can be easily replaced or attached to extend SHS life in the case that the internal battery fails.

Solaris Offgrid provides product design services and software solutions to support companies delivering essential services to bottom-of-the-pyramid customers. When solar home system (SHS) batteries reach their end-of-life (EoL), customers usually discard the entire system. To address this challenge, Solaris Offgrid will develop a tamperproof external battery that can be easily replaced and recycled or attached to a SHS to extend its life. When the SHS battery capacity gets low with age, the external battery can be added and continue to use the capacity of both the old and new batteries together. The battery will also enable clients to upgrade systems without needing to discard smaller systems for larger kits.

This new systems greatly extends the life of the SHS and reduces waste, while remaining more cost-effective than purchasing a new SHS. The solution also makes the replacement of batteries easy, without needing to replace all batteries.

**Over the life of the project, Solaris Offgrid aims to:**

- Design and develop two battery prototypes
- Produce 120 batteries
- Field test and lab certify the batteries



### AT A GLANCE

#### Project Location(s)

Tanzania, with opportunity for implementation across sub-Saharan Africa

#### Technology Type

Hardware

#### Focus

1. Extend product and component lifespan
2. Enhance product reparability
3. Facilitate more efficient product refurbishment, reuse or repurposing



## SOLAR E-WASTE CHALLENGE PROJECT SPOTLIGHT

# ACELERON

Re-designing and building recyclable and serviceable clean energy battery packs from waste cells collected from the off-grid solar sector.

This project aims to enhance the battery circular economy by extending the life of batteries, bring to market second-life energy storage units, reduce carbon emissions and increase clean energy access to off-grid communities.

Aceleron is an innovative clean technology company using patented battery assembly technology to manufacture advanced circular economy lithium-ion batteries that are serviceable, upgradable and recyclable - the most sustainable lithium-ion battery in the world. To date, Aceleron has tested more than 200,000 lithium cells from off-grid solar products and waste electronics, and built lithium-ion battery packs for solar energy storage.

Aceleron's patented technology up-cycles end-of-life lithium-ion batteries into low-cost, energy storage units that are durable and reliable. The lithium-ion battery can be repaired during its life, drastically reducing waste and cost. By extracting value from the batteries and repurposing them into new applications, Aceleron is able to address the issue of batteries being sent for material recovery prematurely.

Over the life of the project, Aceleron aims to:

- Test and recharge 48,000 waste solar battery cells
- Assemble more than 1,500 clean energy storage units
- Design a battery take-back process and incentives to end-users
- Develop partnerships with solar companies to collect, re-purpose and sell-back battery pack



### AT A GLANCE

#### Project Location(s)

Kenya & Rwanda

#### Technology Type

Hardware and software

#### Focus

1. Extend battery and/or component lifespan
2. Enhance battery reparability
3. Facilitate more efficient product refurbishment, reuse or repurposing

#### Partner(s)

Enviroserve (Rwanda)  
WEEE Centre (Kenya)



## SOLAR E-WASTE CHALLENGE PROJECT SPOTLIGHT

# M-KOPA LABS

Optimizing a smart battery management system for off-grid use.

The project aims to enable sustainable e-waste management through collection and analysis of battery usage data to create a bespoke battery management system (BMS) that can reliably predict battery health to reduce failure and degradation.

M-KOPA Labs is the arm of M-KOPA that undertakes research and development of products and services that are 12-18 months from market. A lack of battery diagnostic analytics, unoptimized BMS and ill-suited batteries have increased the e-waste quantities entering waste streams. The first step to address this challenge is to collect and analyze data.

Battery management systems (BMS) are the brains behind battery packs. BMS control vital functions, such as charging and discharging to ensure safe and correct operation of batteries. BMS also optimize battery performance and capacity. Through in-depth analysis of battery usage metrics, M-KOPA Labs intends to build a BMS optimized for usage in the off-grid solar sector.

Over the life of the project, M-KOPA Labs aims to:

- Gather data to design best-in-class off-grid solar (OGS) batteries that do not deteriorate prematurely based on usage patterns and climate
- Adapt OGS battery health algorithms and battery management system to maximise for longevity and customer value
- Enable replaceability of batteries to extend core solar system life



### AT A GLANCE

#### Project Location(s)

Kenya

#### Technology Type

Software

#### Focus

1. Extend product and/or component lifespan
2. Enhance product repairability
3. Facilitate more efficient product refurbishment, reuse or repurposing





## SOLAR E-WASTE CHALLENGE PROJECT SPOTLIGHT

# LAGAZEL

Developing second hand battery packs using an innovative battery management system.

The project aims to facilitate sustainable e-waste management through reuse of end-of-life lithium battery cells in second life battery packs and integrate an innovative battery management system (BMS) to enable individual cell usage and management.

There is currently no infrastructure to support li-ion battery recycling in sub-Saharan Africa. Stringent regulations for exportation also make it very difficult for solar distributors and recyclers to send batteries abroad. As a result, companies store stockpiles of Li-ion batteries at their EoL. Currently, companies discard all battery cells when the product reaches its end-of-life (EoL). Battery operation is dependent on the weakest cell in the pack, if one cell fails, the whole battery pack fails and is considered non-functional.

LAGAZEL aims to create second hand battery packs adaptable to three practical applications to allow for optimized cell usage and service continuity despite failed cells. Their project will create a productive use for the stockpiles of Li-ion batteries discarded by the off-grid solar sector in West Africa.

Over the life of the project, LAGAZEL aims to:

- Adapt BMS innovative technology for the off-grid energy sector
- Produce and test the first battery pack prototypes
- Use the developed battery technology to pilot 1000 collected cylindrical batteries



### AT A GLANCE

#### Project Location(s)

Benin & Burkina Faso

#### Technology Type

Hardware and software

#### Focus

1. Extend product and/or component lifespan
2. Enhance product repairability
3. Facilitate more efficient product refurbishment, reuse or repurposing

#### Partner(s)

The French Alternative Energies and Atomic Energy Commission (CEA)

Ateliers du Bocage



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