Sustainable E-Waste Management: Best Practices for the Off-Grid Sector

Workshop Report
October 2019

BACKGROUND

The Scaling Off-Grid Energy (SOGE) Grand Challenge for Development has an objective to assist companies to deliver clean, affordable, and reliable off-grid energy services to millions of households and businesses across sub-Saharan Africa. Given the volume of product inventory this target will require, SOGE has a vested interest in the social and environmental impacts of the product design, manufacturing, use, and end- of-life decommissioning and disposal of current solar home systems being distributed in off-grid communities.

Recent advancements in pay-as-you-go technology has enabled solar home system (SHS) companies to increase energy access in off- and weak-grid communities at an unprecedented rate. However, despite the significant environmental and health benefits of displacing kerosene and wood-burning fuel in a household, solar products are often sold in regions without existing waste management infrastructure, creating few disposal or recycling options for a customer when a product reaches end-of-life. There exists incredible opportunity for the industry to optimize business models for sustainable e-waste management through product take-back programs, recycling, and repair.

E-waste generated by the off-grid solar sector represents less than 0.1% of global e-waste streams, but investment now will ensure the industry's growth is sustainable over the long term and further enhance the sector's reputation as a leader in environmental responsibility.

OVERVIEW

On October 15th in Dakar, Senegal, with support from Power Africa, USAID and SOGE hosted a workshop on sustainable solar e-waste management. The workshop included research presentations from the ResilientAfrica Network (RAN) and Innovations for Poverty Action. RAN, a partnership of 20 African universities across 13 countries, the University of California Berkeley, and the University of Dakar concluded a USAID-funded research study on sustainable solar e-waste management and emerging battery technologies. This report seeks to promote critical industry advocacy and inform responsible corporate waste management policy around end-of-life disposal, recycling, and repair of solar home systems.

During the event, the Efficiency for Access Coalition also presented solar e-waste market scoping research and announced an upcoming Global LEAP Awards Solar E-Waste Challenge, focused on battery technologies and product design for sustainability.

OUTCOMES

The event included breakout sessions that focused on specific topic areas: Product Design & Battery Technologies, Policy & Regulation, Informal Sector Engagement, Logistics and Processing, and Incentives. Participants collectively identified and prioritized actions in each area to focus upcoming solar e-waste management efforts, including the first and second rounds of the Global LEAP Awards Solar E-Waste Challenge.

Product Design & Battery Technologies

- Introduce more facilities in sub-Saharan Africa that have the capacity to recycle diverse battery types
- Innovate on ways to bring down the cost of product and battery recycling
- Explore different compositions of batteries which allow for recharge/reuse
- Design solar products with a consideration for sustainability so it is easier for them to be recycled, repaired or refurbished
- Consider plastic composition in the product manufacture phase: some plastics are easier to recycle than others

Policy & Regulation

- Implement and enforce standards and compliance regulations for quality and non-quality verified products
- Prioritize finance mechanisms to monetize e-waste
- Generate awareness on e-waste management best practices
- Develop safety standards and licensing
- Implement Extended Producer Responsibility (EPR) programs
- Consult the private sector and engage with the informal sectors as policies are developed

Informal Sector Engagement

- Increase education and awareness among the informal sector on the health and environmental hazards posed by e-waste
- Formalize partnerships with the informal sector through equipment sharing/leasing, organization, upskill programs, etc
- Engage with informal sector through available communication channels: WhatsApp, texting, Facebook
- Sensitize donors and investors on the utility of informal sector engagement

Logistics & Processing

- Increase e-waste forecasting through data collection on: waste streams, tracking mechanisms, e-waste collectors, and industry actors.
- Conduct consumer awareness campaigns on proper e-waste management and disposal
- Train e-waste collectors and repairers on proper fraction harvesting
- Develop opportunities for product second use and refurbishment
- Standardize product deposit at point-of-sale or recycling centers

SCALING OFF-GRID ENERGY: A GRAND CHALLENGE FOR DEVELOPMENT

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Incentives

- Conduct research to explore consumer experiences and e-waste management practices in disparate markets across the continent
- Incentivize consumers to return broken or faulty products through discounts on subsequent products or repair services
- Innovate on business models to monetize e-waste
- Gather further data on solar e-waste value

"I really appreciated the opportunity to interact with professionals from various disciplines who are all passionate about solar e-waste management. The biggest take-away for me was on industry best practices and recommendations. We will take these recommendations into consideration as we build up our e-waste management systems."

Hardley Malema, Solibrium Solar

"The workshop was a great opportunity to re-connect with the other Global LEAP Solar E-Waste Challenge winners to share learnings from our projects. The presentations helped me refine the take-back incentive model WeTu plans to test in the Lake Victoria region, Kenya."

Marah Koberle, Siemens Stiftung

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RECOMMENDATIONS

At the conclusion of the workshop, the Efficiency for Access Coalition summarized recommendations and best practices for the key actors in sustainable solar e-waste management. These recommendations are outlied below:

Industry

Business Models: test and innovate on business models that match the nascent e-waste market in SSA.

Data Collection: provide & track past, current, and predictive future solar e-waste volumes to disseminate reliable data.

Consumer Awareness: decentralize consumer awareness programs to point of sale & integrate with after-sales services to ensure proper e-waste management practices.

Collection & Take-back: decentralize collection points (with informal sector actors), consumer incentive schemes, & data tracking to close the gap in the e-waste supply chain.

Product Design: embed recyclability and repairability into the design of SHS components.

Battery Technologies: invest in affordable & sustainable battery technologies,consumer awareness on proper battery usage and disposal, and innovate on second-life battery extension programs.

Extended Producer Responsibility: test innovative ways to finance e-waste or embed costs of life cycle into the sale of products.

Informal Sector Engagement: utilize informal sector partnerships on repair & product collection at EoL.

Government

Legislative Action: implement standards & compliance policies that enhance the market for quality-verified products.

Public E-waste Management Infrastructure: invest in public e-waste management infrastructure for solar e-waste products.

Synchronize Regional and Continental Efforts: collaborate with regional & national governments to synchronize e-waste management regulation and infrastructure.

Informal Sector Engagement: ensure inclusion of the informal sector in policy development & collaborative efforts on e-waste management.

Donors & Investors

Research: invest in research initiatives aimed at tracking & identifying e-waste quantities, pathways, and streams. Support research on sustainable product design.

Consumer Feedback: ensure companies are accountable to consumers through strong community-based feedback systems that address customer complaints.

Public-Private Partnership: accelerate investment in local, well-equipped e-waste recycling facilities that process e-waste beyond solar products.

Build Awareness: bring private, public, and non-profit sectors together to ensure new solar technology is accompanied by strong policy for end-of-life management.

Informal Sector Engagement: ensure companies & governments are including informal sector actors in e-waste management efforts. Measure impact of engagement through job creation & improvement of living standards metrics.

RELEVANT RESOURCES

Solar E-Waste Market Scoping Report

In an effort to catalyze partnerships and support innovation for off-grid e-waste management, the Global LEAP Awards launched the inaugural Solar E-Waste Challenge. This Solar E-Waste Market Scoping Report outlines the current state of knowledge and activities on solar e-waste management in sub-Saharan Africa, as well as several barriers the Solar E-Waste Challenge should seek to address.

Sustainable Solar E-waste and Battery Technologies:
A Qualitative Study of Off-Grid Solar Markets Across Uganda and Senegal

This report from the ResilientAfrica Network, the University of California-Berkeley, and the University of Dakar, supported by USAID, presents a qualitative exploration of the operational and logistical challenges that SHS distribution companies currently face in the efficient management of solar e-waste. The Sustainable Solar E-Waste and Battery Technologies Report presents key insights from local solar companies operating across Uganda and Senegal, as well as a household survey exploring consumer behavior around solar e-waste collection, recycling, and repair.

RELEVANT RESOURCES

GOGLA E-Waste Toolkit and Guidance for Governments

As the off-grid solar sector grows, companies and investors are increasing focus on resource efficiency and lifecycle of products- from design and manufacturing to end-of-life. GOGLA has consolidated resources aimed at helping address the main challenges in setting up sustainable recycling chains. The E-Waste Toolkit explores key modules of e-waste management: Technical Introduction to Recycling Off-Grid Solar, Design for Waste Reduction, the Financials of E-Waste, Policy & Regulation, and forthcoming modules on E-Waste and the Customer, and Increasing Take-Back.

GOGLA, with support from the World Bank/IFC Lighting Global Program, Power Africa, Sustainable Energy for All, and the African Development Bank, developed a guide and advice to governments in designing effective policies and regulations that will enable and promote the off-grid solar sector. Read the full Guidance for Governments.

Launch of the Second Global LEAP Awards Solar E-Waste Challenge

The Efficiency for Access Coalition announced the launch of the Second Global LEAP Solar E-Waste Challenge at the conclusion of the workshop. The Challenge, funded by USAID, will provide up to $1.2 million in grant funding to support the research and development of more sustainable solar home system and battery technologies for the off-grid solar sector across sub-Saharan Africa. Applications are open until 15 December, 2019. Interested parties are encouraged to apply at www.globalleapawards.org/e-waste.

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