GOGLA

# E-waste 101

## Introduction to e-waste for EARF borrowers

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## Poll 1:

Within my business, we actively manage the e-waste we produce and ensure consumers know how to dispose of their products once they stop working:

1. Strongly agree
2. Agree
3. Not sure
4. Disagree
5. What exactly is e-waste?!

# Agenda

1 E-waste – what is it and why is it important

2 E-waste in off-grid solar

3 Low hanging fruit for OGS companies

4 Where to learn more…

# E-waste and Off-grid solar

**54 million**

**Metric tonnes of e-waste generated globally in 2020.**

**Waste from off-grid solar products makes up only a small % of this – but many in the industry are driven to take action to mitigate the risk.**

*GEM 2020 - E-Waste Monitor (ewastemonitor.info)

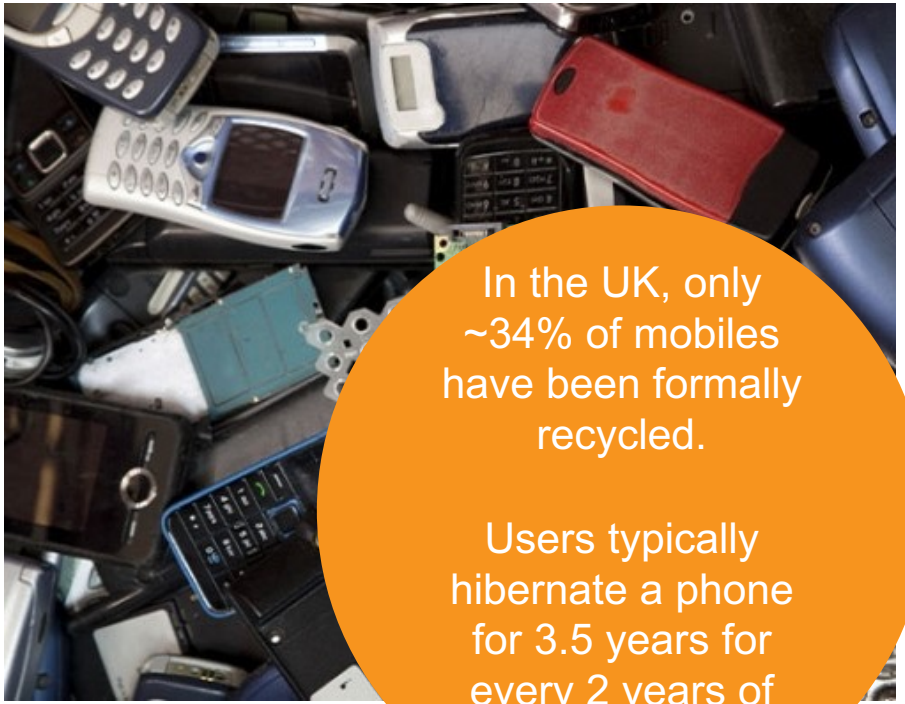
# E-waste: An introduction

- Also known as Waste Electronic and Electrical Equipment (**WEEE**)
- Globally, e-waste has grown by **21%** in 5 years
- Mainly due to **high consumption rates**, **short life cycles**, and **few options for repair.**

Credit: Solibrium, Kenya

# E-waste: An introduction

- Think about your last mobile phone…
- Where is it?
- How long has it been there…vs how long was it used for?
- **This is known as ‘hibernation’**



In the UK, only ~34% of mobiles have been formally recycled.

Users typically hibernate a phone for 3.5 years for every 2 years of use.

# The value of e-waste

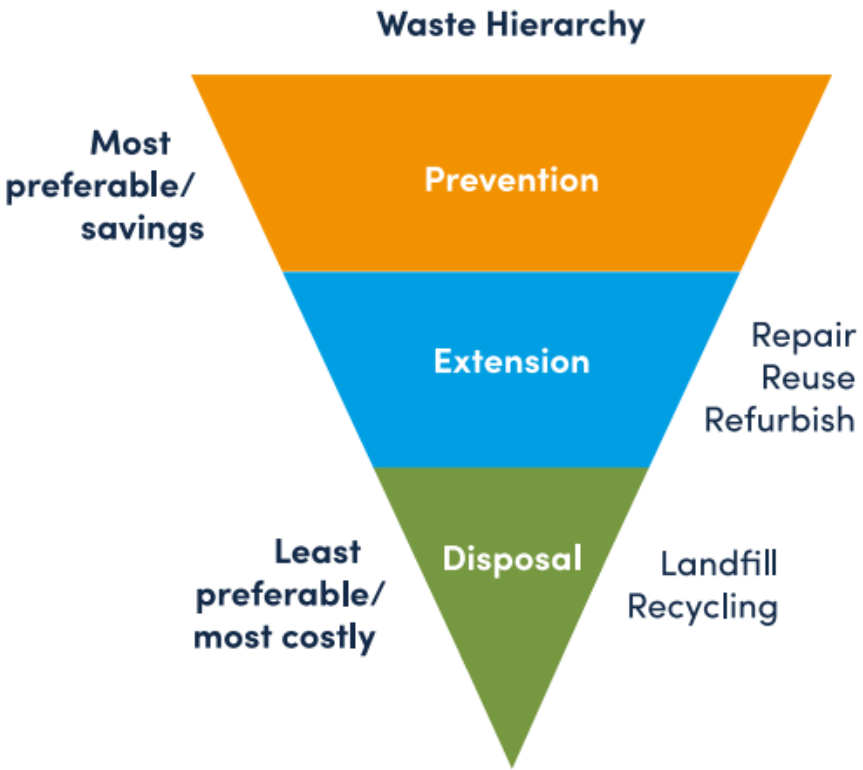
**$57 billion**

**The value of raw materials from e-waste that was most likely dumped or burned in 2020.**

**Including gold, silver, copper, platinum and other high-value, recoverable materials**

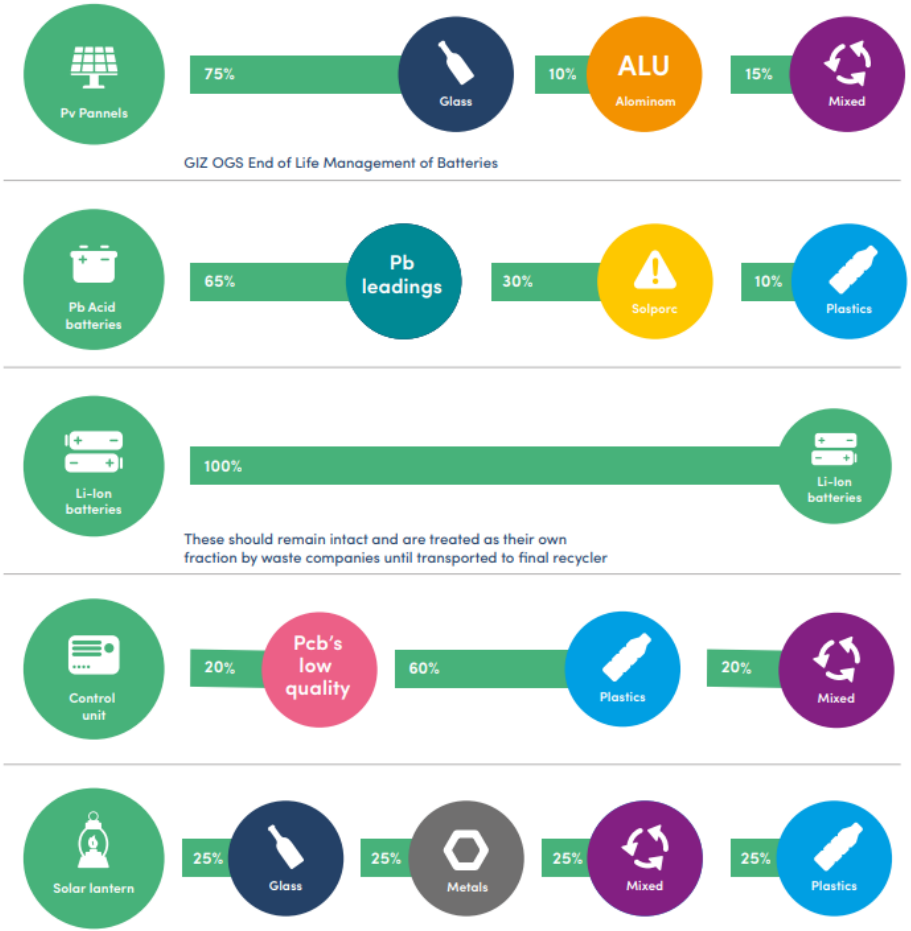
*GEM 2020 - E-Waste Monitor (ewastemonitor.info)

# Waste is leakage



# E-waste and off-grid solar

# E-waste fractions from off-grid solar products




- Lead acid batteries must be safely recycled to avoid harmful chemicals entering the environment and causing harm to consumers.
- Lithium-based batteries are safer, but if not properly stored may pose a fire risk.

# Sources of e-waste in OGS

**Repairs and returns**

Broken products and components recovered during in-warranty repairs.

**Write-offs and repossessions**

For PAYGo products, repossessed systems can often be in poor condition and not able to be refurbished or re-used.

**Broken in transit**

Last-mile, rural logistics is tough and some product… loss during transit… possible.

**Customer take-back schemes**

…wing customers to … end-of life … the supplier …ncrease e- …covered.

= Every OGS company has some e-waste, somewhere!

# Barriers to e-waste management

## Lack of consumer awareness

About the hazards of e-waste and options for responsible disposal.

Customers often hold on to broken products, or may dump them in informal refuse sites.

## Expensive

Recycling for a typical pico-lantern costs about $1.34/lantern.

Low volumes and shipping costs also make it more expensive.

When serving low-income consumers, affordability is key and companies do not wish to increase prices for customers.

## Lack of recycling infrastructure

Few off-grid markets have adequate e-waste recycling facilities.

Companies struggle to find appropriate solutions for disposal of end-of-life products.

## Difficulty accessing spare parts

Minimum order quantities and high importation costs make access to quality spare parts difficult for companies.

Repair and refurbishing is therefore costly and complex.

## Nascent legislation

As yet, only 13 off-grid markets have regulations for e-waste management.

Extended Producer Responsibility is the common approach taken by governments across the world to regulate responsible waste management.

# Imperatives for business action on e-waste

# E-waste ecosystem

# E-waste legislation

Map (globalewaste.org)

GSMA | E-Waste Legislative Framework Map | Mobile for Development

# Recycling services

- Kenya, Rwanda and Nigeria have facilities that are well equipped to manage e-waste from off-grid solar.
- Availability of services in other markets varies.

- Recyclers should provide a certificate of recycling which acts as assurance that waste has been safely and appropriately treated.

## Poll 2:

Effectively managing e-waste can benefit my business in the following ways (multiple choice)

1. It’s good PR and protects my brand
2. Compliance with government regulations (current or future)
3. Makes the business attractive to new investors
4. It’s the right thing to do
5. It can help me retain customers in the long term
6. All of the above
7. None of the above


# Low hanging fruit for OGS companies

# EARF ESMS E-waste requirements

## Product Quality Standards

Ensuring high quality products **prolongs the life-span** of products and **reduces the likelihood of malfunction or breakage**.

Make sure your products are certified to IEC standards (via VeraSol).

## Compliance with national laws

Understanding the legal requirements for e-waste management is key, especially as where laws are in place, the common principle is **Extended Producer Responsibility**.

Review at least annually.

## Safe management of hazardous waste.

Know what components are in your products and what the hazards are.

Implement procedures and training for **safe handling and storage** of e-waste as a minimum.

## Implement an e-waste management plan

Setting out your **ambitions and planning** for e-waste management before it becomes a problem is key.

This helps your **financial planning** and **demonstrates responsibility**.

## Educate your customers

Small changes can make a big difference in awareness.

Make sure disposal information is **clearly labelled** in product manuals, and **communicated during installation**, and at the **end of the warranty period/expected lifespan**.

# Where can I find more?

# GOGLA E-waste Toolkit and Blueprints

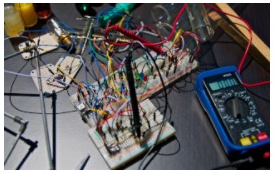
## E-waste Toolkit

Off-grid solar is delivering huge social impact to customers, mitigating greenhouse gas emissions from traditional polluting lighting sources, and supporting economic development in low-income countries. As the sector grows, companies and investors are increasingly focusing on resource efficiency and lifecycle of products – from design and manufacturing to end of life. In this hub, you will find resources aimed at helping address the main challenges in setting up sustainable recycling chains. This toolkit is a work in progress and content will be added regularly as modules are developed.

Looking for additional learning materials about e-waste management in the off-grid solar sector? Download materials from the e-waste festival.

### Introduction to Recycling

Module 1 is a high-level technical understanding of how each component is recycled and where to begin with identifying recycling partners. Learn more



### Design for Reduction of E-Waste

Module 2 will focus on waste reduction strategies within the off-grid solar sector, looking at circular design principles and how they can be applied. Learn more

### Financials of Solar E-Waste

Module 3 will look at the financials of solar e-waste by breaking down its supply chain, identifying where the costs lie and who is responsible for them. Learn more.

### Policy and Regulation

Module 4 of the E-waste toolkit aims to provide a high level introduction to e-waste legislation, existing typologies and their financing mechanisms. Learn more.

### E-waste and the Consumer

Module 5 focuses on the consumer experience, awareness and disposal behaviors upon product end-of-life. Learn more

### Take-back and Collection

Module 6 of the toolkit focuses on take-back and collection channels, challenges and incentive. Learn more.

## Circularity Toolkit: E-waste Blueprints

These E-waste Blueprints have been created to help off-grid solar companies implement and improve e-waste management across their operations. Companies are encouraged to follow the user journey and adapt the Blueprints to their business, operational, geographical and resource context.

**Start here: E-Waste Blueprints User Guide**

### 1. Assess

Use our assessment tool and conversation guide to better understand how e-waste management activities can be tailored to meet your company's goals.

### 2. Plan

Once your are ready to being your e-waste journey, start by building your OGS e-waste management policy, design e-waste processes and establish roadmap.

### 3. Execute

Find tools and resources to help you implement your e-waste management plan, including recommended KPIs, waste-processor selection and contracting, and training content.

# Insights from the Global LEAP Solar E-waste Challenge


- Good practice and learnings from 8 projects in Kenya, Zambia, Uganda, Rwanda and Nigeria.
  - Consumer awareness raising and incentivisation
  - Take-back and collection
  - Repair and refurbishment
  - Recycling
- Recommendations for companies

# Operational guidelines for storgae and handling

+ more!

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## Storage and handling of components

While handling e-waste, health and safety and environmental considerations are relevant for both regulatory and operational reasons. Although there are some general principles to be upheld when handling and storing e-waste, risks derived from fraction handling (not inherent hazards of fractions) can be mitigated by following good practices and a focus on quality operations. For example, while Pb [Lead] acid batteries should be transported whole, plastics should often be chipped and sent to plastic manufactures. This section will dive into how handling needs differ for each fraction, as well as provide practical information for storage and transportation.

### Staff safety – equipment and training

Staff health and safety is paramount; staff should be properly trained and use the correct personal protective equipment (PPE). The appropriate PPE depends on the components or fractions being handled by the facility and staff as well as the machinery used.

Common PPE to be used across most facilities include:

- Chemical resistant and sturdy gloves to protect hands from cuts, harmful dusts and chemicals.
- Safety glasses to prevent dust and debris fro… entering the eyes during dismantling.
- Coveralls to protect against dust. These shou… removed after exiting the facility to avoid tra… dust and chemicals to other areas.
- Work boots to protect against heavy objects … and sharp punctures from dismantled sectio…
- In some cases, a respirator and personal wor… ventilation systems when handling fractions … contain hazardous dust.

Wear personal protective equipment

Avoid dus… to batte…

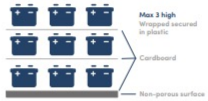
### Lithium Batteries

It is crucial that lithium batteries are either stored in their original product (i.e. not removed) or in a plastic drum between layers of sand (see below). E-waste management companies sometimes provide plastic bins for the storage in an exchange program (i.e. they loan you six, and, upon collection, replace with another set).


Plastic drum

The main risk of lithium-based batteries at end-of-life is fire. Lithium-Iron-Phosphate batteries (most common in off-grid solar) are the lowest risk in terms of **fire** but …

Example of poor storage. Phenix Recycling




Lithium-Iron-Phosphate batteries are less prone to thermal runaways (short circuit) than other lithium-based batteries, but they should still be stored within layers of sand and with their terminals taped and covered.

Lead-acid Batteries should be stored and transported on pallets (see image below). Similar sized batteries are placed next to each other. Every layer of batteries includes a layer of thick cardboard in between to absorb any leakage of battery acid. The batteries are stacked no further than 3 layers high.

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EEP Africa

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# E-WASTE TOOLKIT

Off-grid solar (OGS) technologies provide life-changing access to modern energy services for people and communities currently living without electricity. Yet these products can have negative impacts on human and environmental health if not disposed of properly. The risk of the adverse effect is particularly high for women and children.

Investment in anticipatory e-waste management strategies will reduce these risks and ensure the OGS industry's growth is sustainable over the long term. Efforts to recapture and recycle e-waste are gaining ground in Africa, but they are still limited by uneven regulations, low infrastructure and capacity, and a lack of consumer awareness.

…pping Report
…mary

…approaches to e-waste management

…**y for the off-grid solar sector.** Solar e-waste … and solar-powered appliances at their end-… nd SHSs have already reached their end-of-… f the 55,000 tons of total e-waste produced … f-grid solar e-waste is particularly challeng-

…m remote areas. The cost is high for two … hing dispersed users' homes and returning

# Thank you!

**Rebecca Rhodes**

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