Electronic Waste Management in Displacement Settings

Report from a Field Mission in Rhino Camp Refugee Settlement, Uganda

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

In cooperation with

sofies leading sustainability

Certified B Corporation

As a federally owned enterprise, GIZ supports the German Government in achieving its objectives in the field of international cooperation for sustainable development.

Published by:
Deutsche Gesellschaft für
Internationale Zusammenarbeit (GIZ) GmbH

Registered offices
Bonn and Eschborn, Germany

Address
53113 Bonn, Germany
T +49 228 44 60-0
F +49 228 44 60-17 66

E cathleen.seeger@giz.de (lead) / natalie.rzehak@giz.de (technical)
I https://energypedia.info/wiki/Energy_Solutions_for_Displacement_Settings

Programme description:
Support to UNHCR in the implementation of the Global Compact on Refugees in the Humanitarian-Development-Peace Nexus
Energy Solutions for Displacement Settings (ESDS)

Project Management
Federico Magalini (federico.magalini@sofiesgroup.com)

Authors
Boris de Fautereau (boris.defautereau@sofiesgroup.com)
Joséphine Courtois (josephine.courtois@sofiesgroup.com)
Alexander Clarke (alexander.clarke@sofiesgroup.com)
Ruweyda Stillhart (ruweyda.stillhart@sofiesgroup.com)

Photo credits
Customer's rechargeable lamp at Ofua 3,
Uriama Sub-County in Terego District, Uganda.
© GIZ/Naziru Musungu (Title)

On behalf of
German Federal Ministry for Economic Cooperation and Development (BMZ)
Referat 221
10963 Berlin, Germany

Bonn, 2022

Federal Ministry
for Economic Cooperation
and Development

Energy Solutions for Displacement Setting
Uganda

Project Info: **SUN-ESDS**

The BMZ commissioned Global Program "Support to UNHCR in the implementation of the Global Compact on Refugees in the Humanitarian-Development-Peace Nexus (SUN)", implemented by GIZ, seeks to support UNHCR in its role as facilitator of the implementation of the **Global Compact on Refugees** (GCR) and the Comprehensive Refugee Response Framework (CRRF) in selected refugee contexts and sectors. The program is part of the German Special Initiative "Tackling the Root Causes of Displacement, (Re-)integrating Refugees". It currently provides advisory services to UNHCR on a global level and supports UNHCR in creating and mainstreaming knowledge on the operationalization of the GCR.

The Energy Solutions for Displacement Settings (SUN-ESDS) component works closely with UNHCR and local partners to provide energy solutions that cater to the needs of both refugee and host communities in our project countries- Uganda, Kenya, and Ethiopia. SUN-ESDS is also the German contribution to the **Clean Energy Challenge** issued by UNHCR in 2019 with the following objective: **"All refugee settlements and nearby host communities will have access to affordable, reliable, sustainable and modern energy by 2030."**

The SUN-ESDS project works through three intervention areas:

Improving the policy framework through providing advisory services to governmental stakeholders to promote the inclusion of refugees into national service delivery systems. The project collaborates with the affected communities, and governmental, non-governmental and private sector partners to develop more sustainable energy solutions.

Greening infrastructure in displacement settings through supporting the solarization of UNHCR offices as well as settlement/camp and communal infrastructure, thereby promoting more environmentally sustainable and cost-efficient energy solutions. The project develops energy delivery models that are attractive to the private sector.

Increasing energy access through developing self-sustaining markets for basic energy related services and products, improving access to finance and promoting participatory design processes benefitting households, social services, and small businesses of both refugees and host communities while reducing the pressure on the environment.

We contribute to the following SDGs

Table of contents

List of Tables

List of Figures

1 Abbreviations

ADLG	Arua District Local Government
ARRA	Administration for Refugee and Returnee Affairs
CRRF	Comprehensive Refugee Response Framework
COVID	Coronavirus
DCA	Dan Church Aid
EEE	Electrical and Electronic Equipment
EoL	End-of-Life
EPR	Extended Producer Responsibility
ESDS	Energy Solutions for Displacement Settings
GIZ	Gesellschaft für Internationale Zusammenarbeit
IDP	Internally Displaced Persons
OGS	Off-Grid Solar
OPM	Office of the Prime Minister
UNHCR	United Nations High Commissioner for Human Rights
USD	United State Dollar
WEEE	Waste Electrical and Electronic Equipment, e-waste

2 Introduction

Access to safe, cost-efficient, and sustainable energy is crucial to increase the self-reliance of vulnerable people and reduce social tensions in displacement settings. "All refugees, host communities and support structures should be able to satisfy their energy needs in a sustainable manner, without fear or risks to their health, well-being and personal security, while ensuring the least possible environmental impact" (UNHCR, 2019). However, this increasing amount of e-product inevitably results in more e-waste contaminating the environment and people's health when not managed appropriately. E-waste thus requires a tailored solution through a both top-down and bottom-up approach.

To design such solutions and recommendations, an initial analysis of the legal framework, the Electrical and Electronic Equipment (EEE) flows and the stakeholders involved in Ethiopia, Kenya and Uganda was conducted and summarized in a Baseline report.[1] The analysis uncovered the lack of a policy framework to ensure proper e-waste management. Extended Producer Responsibility (EPR) is not currently used in these countries despite the policy tool's potential to hold producers responsible for the end-of-life management of their products. In addition, interviews with various stakeholders confirmed that e-waste management relies on substandard practices which maximize the spread of toxic substances in the surroundings. Based on this analysis, a set of recommendations were designed, aiming to minimize the negative impacts of WEEE on displaced populations and their environment.

To cross-check existing data, get in touch with the stakeholders in the settlement, update the hypothesis of the current situation and validate the set of actionable recommendations, a field trip to Rhino Camp Refugee Settlement in Uganda was organized in August 2021. Given the global pandemic and international travel restrictions, the mission was carried out by local consultants under the supervision of Sofies. Due to successive lockdowns, accessing Rhino Camp Refugee Settlement remained challenging and interviews (see Annex 2) with relevant stakeholders were limited.

Nonetheless, the fieldtrip allowed to validate and/or complement 22 out of 24 hypotheses listed in the main report. The cross-checks and new insights into e-waste management and the local infrastructures highlighted both pain points but also potential opportunities that can be leveraged on to successfully implement a WEEE collection and recycling scheme.

Therefore, in addition to summarizing the insights of the field trip, this report concludes with:

- A couple of sample blueprints/designs for WEEE schemes in displacement settings.
- A decision-making framework enabling the design of a blueprint for a specific displacement context.
- A suggestion for a specific blueprint/design for the Rhino Camp Refugee Settlement
- A detailed roadmap for implementing a given blueprint/design – both generally but also specifically for the case of the Rhino Camp Refugee Settlement.

1 Link to the baseline report: https://energypedia.info/images/4/4c/GIZ_ESDS_E-Waste_EPR_Displacement_Settings.pdf

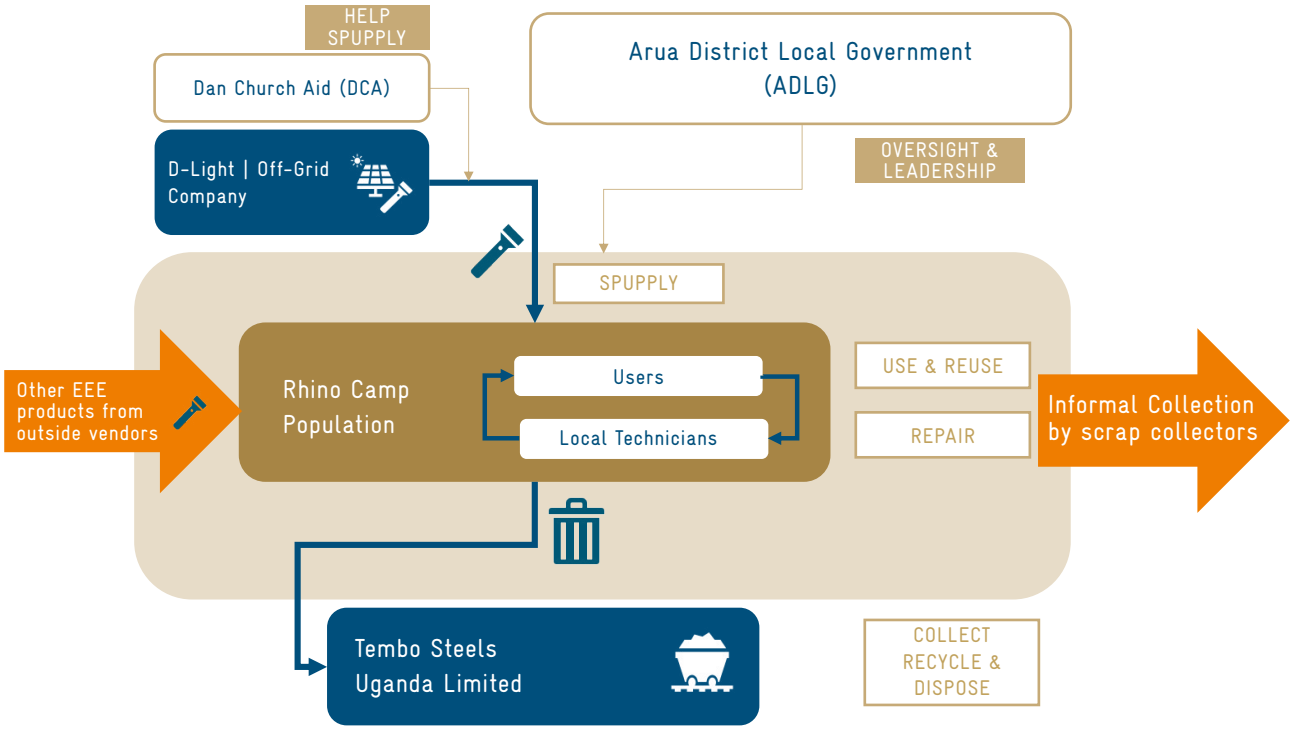
3 Background to the Rhino Camp Refugee Settlement

1.4 million displaced people are currently settled in Uganda, the fourth biggest refugee-hosting country in the world after Turkey, Colombia, and Pakistan. The Rhino Camp Refugee Settlement opened in 1980 and expanded in the wake of the South Sudanese civil war with the establishment of the Omugo zone in addition to the six original zones: Ocea, Siripi, Eden, Tika, Odubu, and Ofua. With over 60% refugees in the country coming from Sudan, Rhino Camp Refugee Settlement today hosts more than 120,000 refugees (UNHCR, 2018).

Several stakeholders are involved in the EEE value chain and influencing the e-waste flows in the Rhino Camp Refugee Settlement. There are a number of **formal stakeholders**: government agencies that coordinate the work and lead the refugee camp, an off-grid company such as D.Light, which provides high quality solar lamps, and a recycler, Tembo Steels Uganda Limited, which receives collected scraps.

Figure 1 provides a visual mapping of these stakeholders, including **informal agents**, which are also responsible for electronics entering and leaving the settlement. Table 1 provides an overview their roles and activities.

Figure 1. Mapping of e-waste stakeholders at Rhino Camp



Tembo Steels currently receives most of the collected e-waste from the refugee settlement. The company, which is the largest iron ore plant in eastern Uganda, has some capacity for material recovery. Up until June 2021, there were no known formal e-waste recyclers in the country offering the full range of e-waste management activities at international standard. In June 2021, an official announcement was made about the launch of a national e-waste management center[2] operated by Luwero Industries, a branch of the Ugandan army specialized in industrial operations. The existence of such a structure could drastically improve local perspectives by providing a compliant recycling option at a reasonable cost. The project still seems to be at an early stage – as attested by several unsuccessful attempts to reach out to the company.

Table 1. Role of stakeholders in Rhino Camp Refugee Settlement

Stakeholder Name	Description	Role in EEE
Office of the Prime Minister (OPM)	Government representative body which leads on refugee management, humanitarian aid and migration topics under the Executive arm of the government.	Monitoring the movement of goods in the settlement. OPM provides the overarching policy and coordination framework of the refugee response in Uganda.
Arua District Local Government (ADLG)	Under the overall leadership of the OPM, ADLG ensures that interventions for refugees and in refugee-hosting areas are in line with national sector policies and guidelines.	ADLG supports the coordination of the government response towards displaced populations and refugees.
D.Light	Founded in the US in 2007, D.Light is one of the largest producers of pico-solar products in the world, selling over 20 million products across Africa, China, South Asia and the United States.	Key player in the life cycle of EEE, largely due to its high-quality low-cost products that can be bought across East Africa. Though they started selling in Rhino Camp Refugee Settlement only recently, their solar lanterns are also present due to informal networks.
Tembo Steels Uganda Limited	Tembo steels has the largest iron ore plant in eastern Uganda. Much of the scrap and e-waste collected in Arua town is transported to Tembo steels for recycling.	Receives most of the collected scrap and e-waste from Rhino Camp Refugee Settlement.
Local Technicians	Independent technicians for maintenance activities.	Technicians within the settlement conduct maintenance activities of EEE and collect e-waste, mostly phones.
Dan Church Aid (DCA)	DCA is the leading implementing partner for UNHCR in the environment and energy sector in the settlement.	DCA helps supplying clean and environmentally friendly energy products to the settlement.

2 "Uganda launches national e-waste management center", Xinhua, June 2021, http://www.xinhuanet.com/english/africa/2021-06/09/c_139996955.htm

4 Field Observations

4.1 Map of current e-waste flows

Field observations show that there is scarce information and no official monitoring on the volume and type of EEE/WEEE products entering or leaving the settlement. Since the settlement area is open for passage, many entrepreneurs purchase EEE from nearby towns and sell them in the settlement (Figure 2), hindering the opportunity to measure incoming and leaving EEE volumes. Interviewees mentioned that the densely populated settlement has a large concentration of waste (Figure 3), but quantifying these amounts is not currently done.

Figure 2.
Electronic products on display at Ofua Zone, Rhino Camp Refugee Settlement.

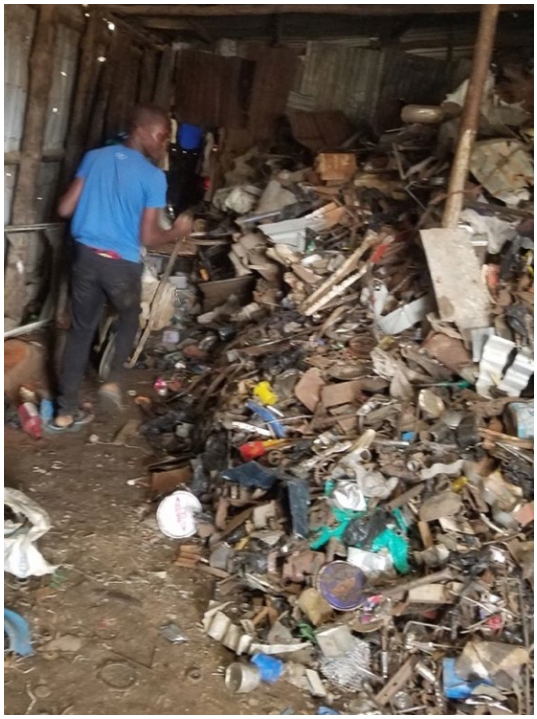


Figure 3.
Mixed metals, plastics and WEEE collected in Rhino Camp Refugee Settlement.

4.2 E-waste management and disposal practices

While there is a sizeable amount of e-waste generated in Rhino Camp Refugee Settlement, no formal initiatives are in place for e-waste management. As a result, product owners are in charge of their waste, which results in open dumping or keeping it at home – which is also known as hibernation. Interviewees mentioned informal collectors passing through the settlement to collect hibernated value-positive products in exchange for cash, but in an informal capacity. Informal collectors then store these valuables in Arua town before transporting it to the Tembo Steels Ltd recycling facility.

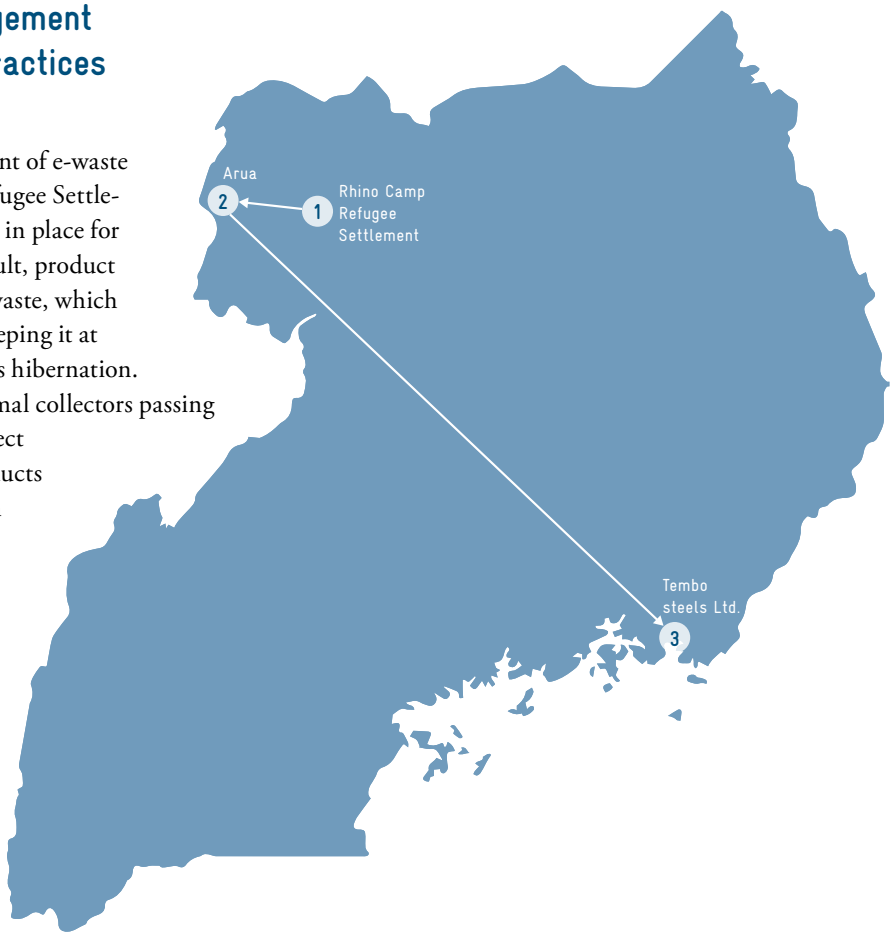


Figure 4.
Map of e-waste flow through Uganda

Figure 5. Collection of lead-acid batteries, Rhino Camp Refugee Settlement.

4.3 Potential opportunities and barriers to implementing a business-driven WEEE scheme

Hypothesis validation

The desk research, expert knowledge, and initial interviews that took place during the first phase of the study (summarized in the Baseline report) resulted in a set of potential opportunities and barriers for the development of a business-driven WEEE scheme for e-waste management. The field trip allowed to cross-check, validate, and correct these opportunities and barriers in line with the current situation and local perspectives. Of the 24 formulated in Phase 1, 19 were validated, 3 were complemented and 2 were corrected. Table 2 provides a summary of the hypotheses across eight main areas, and of the 24 initial hypotheses as

Table 2. Current situation hypothesis for a business-driven WEEE scheme

Issue	Phase 1 findings	Field trip validation
EEE and WEEE flows	Free movement of individual people and their goods in and out of the settlement. According to UNHCR, WEEE represents less than 1% of solid waste in settlements.	Yes
Presence / distribution of solar equipment	• Some water systems powered with solar energy • Solar streetlights around some key installations: health centres, schools, water points etc. • 40,000 solar lanterns distributed to households by UNHCR and partners in Arua district. • Existence of Energy kiosks • Solar systems on social institutions	Yes
Waste management practices	• Solid waste mostly disposed of in the open or in informal collection points • Few to no existing landfilling/incineration systems • E-waste is not segregated • Existence of a few phone repair shops operated by local people	Yes
Collection points	• Institutions (market, health centre…): waste bins or waste banks • Households: waste pits in the open • Collection points are never emptied	Yes. The main disposal methods observed in Rhino Camp Refugee Settlement are in-house storage and open dumping.
OGS companies involvement	Businesses need permission from the OPM to enter a settlement for commercial purposes	Yes
WEEE recyclers involvement	No WEEE recycler exists in Uganda	Yes
Take-back scheme for UNHCR	• Field offices: all waste is disposed of in waste banks. • Large WEEE items: are sent to Kampala headquarters for disposal.	No. Little information is known on e-waste and no disposable and management mechanisms are in place for proper disposal of e-waste in the settlement areas thus leading to open dumping and hibernation.
Costs	Rough estimate at 1,5 USD/kg to cover collection and recycling operations.	No. This cost is plausible with compliant recycling activities. Currently, scrap agents buy valuable fractions at an average 0.31 USD/Kg, though it's mostly limited to metallic fractions without proper recycling.

shown by the tables below. Importantly, the field observations highlighted a critical general lack of knowledge on e-waste, deficiency of collection points, and no presence of UNHCR take-back programs. Most of all, while it was estimated that collection and recycling operations costs would amount to roughly 1,5 USD/kg, the amount of investment needed is likely to be higher. As no formal recycling activities are established in the settlement, today informal scrap agents buy back valuable fractions at an average of 0.31 USD/Kg.

Validating the hypotheses allowed to identify key opportunities and barriers to the development of a business-driven WEEE scheme, across key areas, as depicted in Table 3.

Table 3. Opportunities and barriers to the development of a business-driven WEEE scheme

Issue	Opportunities	Barriers
EEE and WEEE flows	Easy access to the settlement	No monitoring or estimations for volumes and compositions of EEE/WEEE flows.
Presence / distribution of solar equipment	Significant volumes have already been distributed, confirming the relevance of a waste collection scheme	Little or no information is available due to scarce awareness
Waste management practices	Waste is easily accessible, with no existing competition	Sensitization level is very low resulting in potential difficulty in inducing behavioural change.
Collection points	Abundance of potential collection and storage points	No waste segregation, no maintenance of waste collection points.
OGS companies involvement	All interviewees were seeking to be involved in a waste management system *E.g. e-waste management policy are included in sales agreement: visit service center if issue or system failure.*	High perceived complexity to access to the settlement. Distribution usually done by third-party sellers.
WEEE recyclers involvement	Possible to consider recyclers from neighbouring, more advanced countries (Kenya, Rwanda…) *A partnership between Zero Waste and Enviroserve in Rwanda could be made operational*	Transportation is costly due to the distance, and complex due to border crossing.
Take-back scheme for UNHCR	Field offices can manage their waste through the schemes that will be set up	
Costs	Overall costs low due to low volumes of waste	

Operational mechanism

Due to lack of awareness on waste management, little is yet known on how e-waste can be collected from the communities. Among the interviewees, both a GIZ field representative and an Energy Kiosk manager recommended setting up collection points throughout Rhino Camp Refugee Settlement, providing employment opportunities and fixed return points for e-waste holders. Energy Kiosks can be used as a collection point although some other relatively cheaper facilities could be set up. Local technicians and Energy Kiosks owners are willing to coordinate the collection process so long as the community is incentivized to bring back e-waste.

Figure 6. Energy Kiosk Outlet in Ocea zone, Rhino Camp Refugee Settlement.

Figure 7. Sales and Distributor personnel at Ofua Zone, Rhino Camp Refugee Settlement.

In addition, the presence of informal EEE stakeholders in the settlement, including technicians, sales and distribution agents is visible. EEE is a source of employment for locals, and it is recognized by those living in the settlement. These people could also be mobilized as a basis for coordinating collection efforts.

Awareness raising

The interviewees also mentioned the need to bridge the knowledge gap on e-waste disposal. According to an Energy Kiosk manager, the settlement's population is lacking awareness and incentives to collect e-waste. Interviewees also mentioned the potential use of resources from local organizations such as WRAP to help roll out awareness raising campaigns and collection activities using posters, bin stickers, training materials etc. The radio was also mentioned as a powerful medium to educate on the dangers of poor e-waste disposal and the benefits of proper take-back.

Figure 8. Local technicians in Rhino Camp Refugee Settlement explaining EEE and WEEE.

5 Operational roadmap for an e-waste collection and recycling mechanism within Rhino Camp Refugee Settlement

As showcased above, the field mission in Rhino Camp Refugee Settlement highlighted some pain points but also potential opportunities that can be leveraged on to successfully implement a WEEE collection and recycling scheme. These additional insights make it possible to suggest a more concrete way forward, as described in this section.

In general, different designs for WEEE schemes in displacement settings are possible, depending on the local context. Table 4 below summarizes a couple of sample "blueprints" for implementation, providing a snapshot of key building blocks and differences between designs.

The decision on the best blueprint/design in a specific context hinges on a set of checks that need to be carried out (e.g. stakeholder, regulatory, etc.). Table 5 summarizes these and provides guidance on different options, depending on what the checks show.

At the same time and based on the above, Table 6 suggests a blueprint for the specific setting of Rhino Camp Refugee Settlement. Table 7 then goes to show a detailed roadmap for implementing a blueprint/design – both generally but also specifically for the case of Rhino Camp Refugee Settlement.

Table 4. Sample designs/blueprints for WEEE schemes in displacement settings

Sample blueprints	Design A: Centralized - power to the service integrator (a PRO)	Design B: Decentralized - power to the waste entrepreneurs	Design C: Hybrid
Stakeholders	• **Supervisory body (SB)** – UN agency and representatives from local government • **Service Integrator (SI)** – new organization - collects fees from producers, manages the collection and recycling system, and periodically audits the various stakeholders involved such as WO and SDs • **Waste Operator (WO)** – existing recycling company and its partners, responsible for waste transport and treatment out of the compound. • **Solar producers and distributors (SD)** – payment of fees to SI.	• **Waste entrepreneurs (WE)** – existing and new micro-enterprises within compound, often informal, which provide repair and waste collection services. • **Service Integrator (SI)** – new organization – provides capacity building to WEs, manages relationship with WO, audits WEs. • **Waste operators (WO)** - existing recycling company and its partners, responsible for waste transport and treatment out of the compound.	• **Supervisory body (SB)** – UN agency and representatives from local government • **Service Integrator (SI)** – new organization – provides capacity building to WEs, manages relationship with WO, etc. • **Waste entrepreneurs (WE)** – existing and new micro-enterprises within compound, often informal, which provide repair and waste collection services. • **Waste Operator (WO)** – existing recycling company and its partners, responsible for waste transport and treatment out of the compound.

Sample blueprints	Design A: Centralized - power to the service integrator (a PRO)	Design B: Decentralized - power to the waste entrepreneurs	Design C: Hybrid
Operational mechanism	• **Access to waste** – consumer is incentivized to leave it at collection points • **Collection** – collection points set by SI at existing infrastructures; storage in centralized depo in compound. • **Transport and treatment** – WO tendered to transport waste out of the compound. • **Oversight** – SB oversees work of SI and system	• **Access to waste** – consumer is incentivized to give it to WEs • **Collection** – collection points with WEs; sorting done through WEs, storage in centralized depo in compound. • **Transport and treatment** – WO tendered to transport waste out of the compound.	• **Access to waste** – consumer is incentivized to give it to WEs or leave it at collection points • **Collection** – collection points set at existing infrastructures and at WEs, sorting done through WEs, storage in centralized depo in compound. • **Transport and treatment** – WO tendered to transport waste out of the compound. • **Oversight** – SB oversees work of SI and system
Financial / business mechanism	• System financed through grant and EPR fees. • SI (system maker) is non-for-profit, financed through grant and EPR fees paid from producers and distributors • WO (transport and treatment) to be tendered out and paid for through SI budget. Tender prep also requires financing. • Awareness raising and incentives to end-consumers, collection points (bins, design, etc.) all coming through SI budget.	• System financed through a grant. • WEs get paid for carrying out waste collection, disassembly, etc. • WO (transport and treatment) to be tendered out and paid through grant. Tender prep requires financing. • Incentives and awareness raising for end-consumers, collection points infrastructure (bins, design), capacity building and monitoring of WEs etc. all coming through grant.	• System financed through a grant and EPR fees. • SI (system maker) is non-for-profit, financed through grant and EPR fees from producers and distributors. • WEs get paid for carrying out waste collection, disassembly, etc. • WO (transport and treatment) to be tendered out and paid for through SI budget. Tender prep also requires financing. • Incentives and awareness raising for end-consumers, collection points infrastructure, capacity building and monitoring of WEs all coming through SI budget.
Enforcement and control	• SD to report the volumes of EEE introduced in compound and to pay the corresponding fee. This is part of their license to operate in the compound. • Grant to cover treatment of illegal / undefined EEE	• WEs report volumes of e-trash, after training on how to do this.	• SD to report the volumes of EEE introduced in compound and to pay the corresponding fee. This is part of their license to operate in the compound. • WEs report volumes of e-trash reaching them, after training on how to do this. • Grant to cover treatment of illegal / undefined EEE
Others	• Awareness campaign for end-consumers, introduction of incentive scheme for end-user returns critical	• Awareness campaign for end-consumers, introduction of incentive scheme for end-user returns, capacity building and financing to WEs critical	• Capacity building and financing for WEs, awareness raising for end-consumers critical.
Challenges	• Developing a new entity (SI) can be time-consuming and challenging (legally, financially, etc.) • Tender process might not find reliable WO due to challenging conditions		
	• Informal sector (distribution and collection) not properly addressed, leaving a key existing system not catered for and job opportunity for displaced people on the table	• A decentralized system is very hard to organize.	

Sample blueprints	Design A: Centralized - power to the service integrator (a PRO)	Design B: Decentralized - power to the waste entrepreneurs	Design C: Hybrid
Opportunities	• Business model (i.e., EPR fees) at the core of the system ensures efficient cost allocation and functioning • Centralized approach promises better control and oversight over the system		• Business model (i.e., EPR fees) at the core of the system ensures efficient cost allocation and functioning • Centralized approach promises better control and oversight over the system
		• Hugely rewarding in terms of displaced people empowerment and job and skill creation	
Financing	• SI start-up and operation grant • Private-sector financing from SDs	• SI start-up and operation grant	• SI start-up and operation grant • Private-sector financing from SDs
	200K to set-up and evaluate pilot for scale-up	**300K** to set-up and evaluate pilot for scale-up	**300K** to set-up and evaluate pilot for scale-up

Table 5. Decision making framework for designing a WEEE scheme in displacement settings.

Decision making block	Scenarios / possibilities	General approach/guidance
Check the status of WEEE-related regulations in the country of operation	Specialized WEEE regulations at country level exist (e.g. WEEE EPR bill)	• List all stakeholders with regulatory obligations regarding WEEE, e.g. importers, distributors, professional users, etc. • List all stakeholders with relation to creating and enforcing WEEE rules on national level - authorities, ministries, associations, etc. • Study how to leverage these obligations to set up, operate and fund a WEEE take-back scheme in the settlement. • Get a list of authorized collectors and recyclers from relevant authorities (if existing).
	Non-specialized WEEE regulations exist - i.e., WEEE falls under general toxic waste regulations	• Same as above but with toxic waste. • Study if that non-specialized regulation allows for harmful practices with WEEE. If so, define an internal standard which rules them out.
	WEEE-related regulations are non-existent	• With no existing obligations, UNHCR needs to choose and uphold its own collection and recycling standards based on BAT/BEP.
Study the existence of an EPR for WEEE at the national scale, including a financial mechanism for WEEE	Yes, compulsory or voluntary EPR scheme for WEEE exists in the country of operation.	• Contact the entity in charge of supervising the EPR mechanism (e.g. a PRO) in order to use their funding for the collection and recycling of WEEE from the settlement.
	No, a compulsory or voluntary EPR scheme for WEEE does not exist in the country of operation.	• To find the best fitting financing scheme/model for the WEEE set-up, verify the pre-conditions that economic stakeholders need to fulfil to operate inside the settlement (below). In case EPR fees can be realistically requested from major economic stakeholders (e.g., as a license to do business in the compound), rely mostly on them to finance the scheme. In case EPR fees cannot be requested, rely mostly on a grant-driven scheme.

Decision making block	Scenarios / possibilities	General approach/guidance
Verify the pre-conditions that economic stakeholders (e.g. electronics or solar distributors, sales agents) need to fulfil to operate inside the settlement	Authorization by a national or local authority is required and strictly enforced for any economic activity carried out in the settlement.	• Obtain a list of authorized operators bringing EEE inside the settlement. • Insert participation to the WEEE financial mechanism (i.e., requirement to pay EPR fees) as a requirement to obtain/renew their authorization/ license to operate in compound. • Study the proportion of unauthorized business activity in the settlement, to see if the authorized one is prevalent. If not, see option 3 below for more targeted steps.
	No authorization is needed - but creating one is feasible and seen as beneficial	• Create, with the relevant authorities, a compulsory authorization for stakeholders bringing EEE inside the settlement for commercial purposes. • Insert participation to the WEEE financial mechanism (i.e., requirement to pay EPR fees) as a prerequisite to the delivery/renewal of an authorization. • Study the proportion of unauthorized business activity in the settlement, to see if the authorized one is prevalent. If not, see option 3 below for more targeted steps.
	No authorization needed - and not possible or seen as beneficial to request one	• It is not possible to easily monitor the full EEE movement. • It is not feasible to limit the type or number of economic stakeholders bringing EEE in the settlement (e.g., a lot of unregistered activity is already happening); • Funding for the EEE collection and recycling must come from UNHCR and/or financial partners (e.g., grants)
Study the local WEEE recycling industry	Formal WEEE dismantling and recycling units exist inside the country.	• Check legal authorizations of units. • Audit for acceptable practices / assure quality. • Request quotes and discuss partnership opportunities
	Formal WEEE dismantling and recycling units inside the country do not exist, but other formal activities that take in WEEE parts do (e.g. metallurgy)	• Check legal authorizations of units. • Audit for acceptable practices / assure quality. • Based on audit results, determine if they could manage WEEE or certain components of WEEE. • Request quotes and discuss partnership opportunities.
	Formal WEEE dismantling and recycling units are non-existent - only informal activities exist	• Look for WEEE recyclers in neighbouring countries • Determine if transboundary movement in neighbouring countries for recycling purposes is possible and estimate costs (administrative, transport, storage, etc.) • Otherwise consider export to the EU by sea

Decision making block	Scenarios / possibilities	General approach/guidance
Evaluate the waste management operations currently taking place inside the settlement	None	• Install new and/or leverage on existing formal and/or informal infrastructures • Think how to increase return rates and improve waste operations, e.g. what incentives for end-users to return to collection points could be put in place, which collection points will be best placed for highest foot traffic, etc.
	Informal/individual/ disorganized waste management only	• Empower the informal sector and leverage on its infrastructures (e.g. sales or collection points) and management practices • Think how to increase return rates and improve waste operations, e.g. what incentives for end-users to return to collection points could be put in place, what training might informal actors need to participate in a formal scheme, etc.
	Formal/organized waste management	• Leverage mainly on existing infrastructures (e.g. sales or collection points) and management practices • Think how to increase return rates and improve the waste operations, e.g. what incentives for end-users to return to collection points could be put in place, which collection points will be best placed for highest foot traffic, etc.
Study which local authorities and other agencies oversee and work with the compounds/settlements, as well supervising waste management in the settlement's surroundings	International	• List all the identified stakeholders • Decide on the most appropriate entry points for engagement (e.g., UNHCR settlement branch or country head office) • Study the strategic agendas (e.g., priority topics, upcoming plans) of listed stakeholders as well as their capacities to get involved. • Study the potential to establish new organizations (e.g., a supervisory body or service integrator) as well as cross-department collaborations, etc
	National	
	Regional	
	Local	
Study which NGOs, implementing partners and other entities are involved in waste, e-waste, and solar energy programs	National	
	Regional	
	Sub-national	

Table 6. Specific designs/blueprint for a WEEE schemes in the Rhino Camp

Specific blueprint	Design C: Hybrid
Stakeholders	• **Supervisory body (SB)** – UNHCR, ADLG, OPM • **Waste entrepreneurs (WE)** – existing and potentially new micro-enterprises within compound (e.g. scrap dealers, solar kiosks, phone repair shops), incl. informal, to provide repair and waste collection services. • **Waste Operator (WO)** – existing recycling companies (e.g., Tembo Steels Ltd., new national recycling center, recycler in a neighboring country) and transport companies, responsible for waste transport and treatment out of the compound. • **Solar producers and distributors (SD)** – existing companies working in the settlement or companies which wish to get involved pay fees to SI to have a license to operate. • **Service Integrator (SI)** – new organization – coordinates all activities, incl. establishing partnerships and managing relationships with key stakeholders (e.g. WOs), awareness raising and training of WEs and end-users, etc.
Operational mechanism	• **Access to waste** – consumer is incentivized to give it to WEs/collection points • **Collection** – collection points set at existing infrastructures (energy kiosks, other WEs) as well as new infrastructures (where gaps exist), sorting done through WEs, storage in centralized depo in compound. • **Transport and treatment** – WO tendered/contracted to transport waste out of the compound.
Financial/business mechanism	• **System** financed through both a grant and EPR contributions. • **SI** (system maker) is non-for-profit, financed through grant(s) and EPR fees from official producers and distributors (e.g. d.Light). • **WEs** get paid for carrying out services like waste collection, basic reporting, etc. • **WO** (transport and treatment) to be contracted and paid for through SI budget. Tender prep also requires financing. • The payments for incentives and recurrent awareness raising for end-consumers, collection points infrastructure, capacity building and monitoring of WEs all coming through SI budget.
Enforcement and control	• **SDs** (d.Light and others) to report the volumes of EEE introduced in compound and to pay the corresponding fee. This is part of their license to operate in the compound. • WEs also report volumes of e-trash reaching them, after training on how to do this. The difference between official volumes and reported volumes could be covered by grant money (even if giving unfair competitive advantage to unlicensed products, so this should be avoided)
Others	• Capacity building and incentives for WEs to participate (e.g. wage payments), awareness raising for end-consumers critical.
Challenges	• Developing a new entity (SI) can be time-consuming and challenging (legally, financially, etc.) • Tender process and discussions might not find reliable WOs due to challenging conditions, high costs, non-existing entities, or existing entities which do not want to get involved. • A decentralized system is very hard and costly to organize and mostly – monitor.
Opportunities	• Hugely rewarding in terms of displaced people empowerment and job and skill creation
Financing	• Grant for SI start-up and operations • Private-sector financing from SDs
Pilot size	• Recruit and enable (through training, financing, and other support) 3-5 collection points to become official WE in the set-up • Start working with 1 recycler and transporting waste for treatment outside of the compound in an organized manner • Raise the awareness of at least 50 people on e-waste and its challenges and opportunities

Table 7. Roadmap to implementation of a WEEE scheme in a displacement setting

Phases	Steps	Applied to Rhino Camp
Phase 1: Scoping/screening		
Carry out targeted stakeholder analysis	Run desk research and verify through conversations and observations the key system stakeholders that could be involved in an e-waste management program: • Local authorities • WEEE recycling industry • Waste operators/entrepreneurs [AC2]inside the settlement • Formal and informal EEE-related economic stakeholders inside settlement (EEE shops, OGS distributors, repairers, energy kiosks, etc.) • NGOs and other organizations involved in energy, waste, or other programs (e.g. empowerment programs) locally	• ADLG, ARRA, and OPM would need to be coordinated with for program/system design • No formal recycling options locally. Tembo Steels metallurgy plant, Luwero Industries, Zero Waste, and Enviroserve Rwanda to be further explored as in-country and regional waste-related partners. • WRAP could be partnered with to provide awareness raising of micro-entrepreneurs and/or end-users on e-waste in the settlement • d.Light and Church Aid bringing in clean energy products in the settlement, but often through independent third-party distributors • Energy kiosks and numerous informal EEE stakeholders in the settlement, including phone repair shops, technicians, sales and distribution agents working with various electronics • Informal collectors passing through settlement to collect hibernated energy products against cash
Carry out regulatory analysis	• Status of WEEE related regulations • Existence of a national EPR with funding mechanism • Pre-conditions to operate inside settlement • Pre-conditions for starting new organizations and businesses in the country	• None of the existing policies and strategies for Uganda are legally binding; the government is working on having a legally binding piece of legislation concerning e-waste (i.e., potential EPR legislation) in the future. • Businesses need permission from the OPM to enter Ugandan-based settlements for commercial purposes. However, unlicensed and informal sales agents are in abundance.
Create an internal task force to champion design and implementation	• Create a taskforce, with clear mandate and responsibilities • Identify the key authorities, implementing partners and local actors which could take part in the setup and supervision of a take-back scheme	• Appoint task force within UNHCR to act as champions and drive the design, coordination, and implementation • Target OPM, ADLG and ARRA. No other NGOs, IP or local stakeholders were clearly identified as relevant, but solar/energy kiosks are willing to get involved in the implementation phases.
Rapid analysis of waste and e-waste management practices and infrastructures inside the settlement	• Speak with NGOs and other entities involved in waste programs locally • Targeted survey and field visit to settlement	• WEEE represents less than 1% of solid waste in settlements. • Solid waste mostly disposed of in the open or in informal collection points • Informal collectors passing through settlement to collect hibernated clean energy products as well as some other metal-rich ewaste fractions against cash • The only downstream option for e-waste is currently Tembo steels, a metallurgy plant • Large WEEE items from UNHCR are sent to Kampala headquarters for disposal. • Few to no existing landfilling/incineration systems • E-waste is not segregated in the compound

Phases	Steps	Applied to Rhino Camp
Phase 2: Preparation		
Create supervisory body (SB)	• The already established task force to create formal partnership with governmental agencies and NGOs etc. to establish supervisory body and its basic procedures of operation	• The supervisory body could be a dedicated task forces with members from UNHCR, OPM, as well as other institutions (if deemed relevant)
Confirm the type of financial/business mechanism to use to finance the system and how its viability will be tested	• Analyze what financing makes most sense in the given settlement: 1) EPR fees enforced at national level through existing national policy 2) EPR fees self-enforced by UNHCR at settlement level 3) mostly voluntary EPR industry effort and payments 4) mostly grant-based system 5) financing blending grants and private-sector payments. • Engage with solar distributors to establish their willingness to pay for the e-waste program voluntarily. • Engage with NGOs with e-waste programs locally and applicable donor/funder channels to establish their willingness to invest in the e-waste program voluntarily.	• Elaborate a system (incl. an initial idea of how its viability will be tested) which relies on the need for OPM permission to enter the settlement for commercial purposes. • Try to rely on obligatory EPR fees for financing the scheme - plan how to implement them effectively (e.g. progressively identifying and integrating free-riders) • Bring d.light, Dan Church Aid and other major OGS distributors to the table to discuss, explore their willingness to engage and pay viable fees for OGS devices • Explore other waste-related funding sources such as environment and/or energy IPs and their funders.
Confirm the type of operational mechanism to setup and test	• Visualize a system/process that covers at least the following stages and outlines infrastructures, activities, and stakeholders involved at each: ◦ Access to waste e.g. where waste will be received from end-users, how end-users will be incentivized to do returns, how competitive use of the waste will be targeted, ◦ Collection e.g. collection and storage points, involved stakeholders (e.g. formal and informal stakeholders), activities flow, incentives to participate (e.g. wage payments) ◦ Transport e.g. when, who, how, to where. ◦ Treatment and recycling, e.g. who, link with transport, etc. ◦ Training facilities for different stakeholders (e.g. collection points, end-users) ◦ KPIs for the system, process for corrective action	• Access to waste relies on people voluntarily bringing back e-waste against incentives • Primary collection points are local commercial EEE stakeholders such as energy and solar kiosks, phone repair shops, as precisely mapped at later stages of the process. Collection points have to be incentivized to participate. • A storage point remains to be identified for settlement-wide aggregation of the WEEE flow • Transport to storage/aggregation point to be managed by a third party, contracted by the Service Integrator • Training on collection points and even end-users could be done in one of the existing solar kiosks • Pre-identified transport and recycling stakeholders will be compared through auditing, quotations overview, and partnership discussions.
Shape up the service integrator (SI)	• Check the legal and administrative forms that the SI can take as a 3rd party, given the remit of activities it would have to perform • Task force to outline system design and activities of SI and coordinate with other stakeholders to enable its formation.	• The supervisory body should be a third party which works not-for-profit. • A potential tender can try to find a "market maker" institution which can work with the task force to outline system design and activities of SI, assist with its official registration/formation, etc.

Phases	Steps	Applied to Rhino Camp
Map and survey collection points	• Map (through GIS software) the positions of existing sales points, electronics technicians, solar and energy kiosks, institutions (health centers, etc.) and waste entrepreneurs to visualize the possible e-waste collection points in the settlement. • Study the willingness and ability to get engaged in the collection process of different collection points. E.g. in case unregistered micro-enterprises in the settlement will be engaged in the e-waste system – study the potential "business models", organizational structures (e.g. are the micro-enterprises run only by displaced person, run by local entrepreneur, co-run by local entrepreneur and displaced person, etc.), and willingness and ability to participate in an official e-waste collection scheme. • Coordinate to manage unnecessary competition among e.g. collection points, displaced population and host population, inside-the-campers and outside-the-camp-ers.	• Map the positions of existing sales points, electronics technicians, solar and energy kiosks, institutions (health centers, etc.) and waste entrepreneurs to visualize the possible e-waste collection points in the settlement. • Study their willingness and ability to get engaged in a collection mechanism • Close the gaps in the resulting network of potential collection points by looking for even more stakeholders in the area willing to participate in a take-back mechanism
Select appropriate waste operators outside of the settlement and get quotes for their services	• Use list of previously identified waste operators (recyclers, dismantlers, etc.) to contact them and start a conversation around partnerships, rates, etc.	• Visit Tembo Steels to determine what e-waste fractions they accept and how they treat them. Discuss current informal transport links that happen with the Rhino settlement. • With the help of the PM Office, if necessary, initiate contact with the new national e-waste recycling center. If they are already in activity, request a quote for the transport and treatment of an average truckload (5 tons) of mixed e-waste from Rhino Camp Refugee settlement. Discuss the envisioned program and partnership opportunities. • Contact Enviroserve Rwanda to request a similar quote including both transport and treatment • Discuss the envisioned program and partnership opportunities. • Compare and contrast the different options, selecting the most appropriate one for the context. • In case none of them provides sufficient standards for certain e-waste fractions, envisage exportation to better recyclers (e.g. in neighboring or EU countries) and include it in the cost analysis of the overall model.
Run studies on appropriate incentives for end users	• Run a survey or an experiment to establish the most appropriate incentive scheme for end-users to participate in the envisioned e-waste collection	• Pre-selected incentive is to distribute small products for free to end users in exchange for e-waste. • The SB and SI to reflect on which products should be used for that purpose. • Run additional local surveys and observations to establish the most appropriate incentive scheme based on local data.
Establish basic awareness raising needs within the settlement and among key stakeholders when it comes to e-waste	• Envision the type and content of awareness raising activities needed for end-users and economic stakeholders in the settlement • Find potential partners for awareness raising - check those involved in health, environment, energy and waste topics.	• Contact WRAP to establish if they would be interested to design a program for awareness raising in the settlement • Contact other Implementing Partners and NGOs already involved in awareness raising within the settlement, especially on health, environment, energy and waste topics.

Phases	Steps	Applied to Rhino Camp
Phase 3: Experimentation at pilot scale		
Define the scope of the pilot	• Establish available budget size – incl. fixed and variable cost items e.g. max. number of incentive payments, collection infrastructure costs, transport, export, awareness raising costs, internal HR costs, etc. • Secure budget for pilot, ideally from mixed sources – e.g. private-sector contributions from major official distributors in the settlement as well as public/ humanitarian grants. • Elaborate on duration, target e-waste volumes, precise location, key flow of activities and responsible HR (e.g. from partners, task force, etc.)	• UNHCR to define a budget for the pilot, based on envisioned optimal size for testing • Differentiate the fixed costs from the progressive (volume-dependent) costs. • Calculate a target volume based on the target budget.
Design M&E framework to monitor pilot and implement corrective actions but also gather lessons learned for scale-up	• Define pilot success and break down into KPIs • Establish lean ways to gather data and monitor performance in a timely manner • Make sure the M&E process has an owner who is responsible for the process and its successful implementation (e.g. specific HR in the SI)	
Implement operational mechanism at pilot scale	• Recruit, select existing or create new collection points • Put in place the selected incentive scheme (s) for end-users – find partners (if incentives need it) • Equip collection points with knowledge, bins, end-user communication materials and approaches (e.g. on incentive scheme), etc. • Establish other needed infrastructure (e.g. an aggregation point that provides safe storage for all the gathered e-waste) • Design appropriate materials and provide awareness raising to end-users on e-waste and incentives to participate in e-waste return/take-back/collection • Find, train, and incentivize local champions in the settlement to advocate for proper e-waste handling. • Contract and partner with recycler(s) and transport provider(s) for the duration of the pilot, ensuring it is understood that a longer-term engagement is on the table provided good performance during the pilot	• Recruit/select e.g. 3-5 collection points (incl. informal ones) who will get engaged as official waste collection points/entrepreneurs. • Provide initial training to the selected 3-5 collection points – on health and safety, reporting of e-waste volumes and value, skills and business development etc. Ensure reoccurring training is planned for, esp. after each 6 months. • Design and provide awareness raising to end-users on e-waste to at least 50 people (potentially designed and carried out by WRAP or other implementing partners) • Find, train, and incentivize 2-3 local champions who can informally advocate for proper e-waste handling in the settlement. • Put in place the incentive scheme (as shown by survey/experiment from preparatory stages) for end-users – find partners (if incentive needs it), train how to communicate on it, work with WRAP to raise awareness among end-users. • Partner and contract at least 1 recycler and 1 transport partner (can be also offered from recycler) for the duration of the pilot
Implement financial/ business mechanism at pilot scale	• Focus on the selected financing/business model - continue elaborating on it/testing viability, try to make sure payments (e.g. EPR fees, grants) enter the system during the duration of the pilot, continue discussing with partners who and how can provide recurrent financing.	• Work closely with d.light, Dan Church Aid and other major OGS and electronics distributors to establish viable fees that can be paid in a recurrent and continuous manner • Explore other waste-related funding from environment and/or energy IPs and their funders, to see which can be paid in a recurrent and continuous manner
Prepare for scaleup	• Evaluate pilot using M&E framework and key stakeholders, with the aim to establish if it is successful (using the definition adopted) • Use lessons learned to pinpoint needed re-adjustments in design and start elaborating on a plan for scale-up	

6 Conclusion

After the initial findings from the Baseline report[3] on e-waste management in displacement settings in Uganda, Kenya and Ethiopia, the field trip to Rhino Camp Refugee Settlement provided a local perspective, crucial to cross-checking the hypothesis on the development of a business-driven WEEE scheme. The fieldtrip also allowed to identify key elements for its development including preexisting e-waste collection and management activities within the settlement area, as well as relevant and proactive stakeholders who could be engaged in the implementation of a collection mechanism. This presented opportunities for the implementation of the business-driven WEEE scheme.

Unfortunately, the mapping and flow of EEE and WEEE in and out of the settlement remain unknown and would likely be impossible to monitor. This confirmed that an EPR mechanism at settlement scale will be of limited effect, highlighting the necessity of advocacy to improve national legislation, regulations and enforcement on the topic of EEE/WEEE, but also the need for a business-driven WEEE mechanism at settlement level and potentially the necessity to blend in grant funding.

Stemming from these findings, a detailed business-driven blueprint for Rhino Camp Refugee Settlement WEEE scheme was designed and used as a basis for a replicable roadmap to other displacement settings in the world. Composed of three main phases: 1. Scoping and screening, 2. Preparation, and 3. Experimentation at pilot scale, this detailed step-by-step approach shows all necessary actions to develop an appropriate e-waste management system in settlement areas, tailored to each unique setting. Additionally, a decision framework to help a decision-maker adopt the appropriate orientation depending on the specifics of the local settings was also provided.

These guidelines can be readily applied in the context of other displacement settings. They can also serve as a solid basis to reflect on the implementation of e-waste take-back schemes in any settings of national or local scale where an Extended Producer Responsibility mechanism is not in place.

3 Link to the baseline report: https://energypedia.info/images/4/4c/GIZ_ESDS_E-Waste_EPR_Displacement_Settings.pdf

7 Annexes

Annex 1: List of Stakeholders

Stakeholder Name	Able to contact Yes/No
UNHCR	Yes
GIZ	Yes
OPM	No: Failed to reach them twice due to busy schedules in implementation of national covid relief programs during this period
OGS Company	Yes
Informal Recyclers	Yes
Formal Recyclers	No: They were unreachable.
E-Waste Companies	Yes
NGOs	No: They were unreachable due to lockdown restrictions.

Annex 2: Summary of formal interviews carried out during the assignment

Category	Stakeholder	Reason for contact	Response
Representatives	UNHCR Kampala Office	• Collect data on present and past E-waste and solid management initiatives • To understand the importation process of EEE in Rhino camp Refugee settlement. • Understand WEEE reverse logistic model • Understand whether NCR has been able to conduct awareness creation activities. • Collect data on some of the strategies put in place for E-Waste management	• Different methods were cited i.e Donations, Partnership agents, OGS companies and open market. • No reverse logistics model used because costs are high leaving customers with no option but open dumping and inhouse storage. • E-Waste is a new venture and little work has been done in sensitizing the masses about it. • No E-waste management strategies have been designed yet.
	GIZ Kampala Office	• To understand the role of GIZ in the E-Waste life cycle in the settlement areas • To understand E-Waste's reverse logistic process.	• GIZ offers advisory and financial assistance but does not have a mandate to implement strategies • Little information has been put across in regards to EEE thus not much information is known for WEEE management.
OGS companies	Engie Energy Access - Formerly Fenix International	To understand; • Whether there exist E-waste policies in regard to disposal at EOL • Its position in regard to the EPR business scenario. • Check whether they distribute SHS in settlement areas	• Products are periodically distributed to the settlement through a third-party player i.e NGOs that purchase in bulk • Collection and take-back schemes are incorporated in their After-sales services.

Category	Stakeholder	Reason for contact	Response
Representatives	GIZ- Field office	Held interviews on ; • The role of GIZ in the E-waste collection/ disposal in the settlement area. • Discussed the different barriers and opportunities for E-Waste collection. • Test the feasibility of the different recommendations to GIZ suggested by Sofies. • The feasibility of the EPR scenario and its relevance in the Rhino camp Refugee Settlement	Need to understand that GIZ only advises and offers financial support to the settlement working alongside other organizations but has no mandate for implementation (always done by OPM and UNHCR) . **Opportunities discussed** • Waste is available. • legislative discussions have started at the top level with different stakeholders (OPM, UNHCR) about waste management in the settlement areas • GIZ can provide some financial support to result-based financing companies to encourage a takeback scheme **Barriers** • Communities are not aware of the environmental and human impacts of waste. • Communities need to be incentivized in order to return products at EOL **Thoughts on EPR** EPR may have a negative effect on the pricing of the products which may affect energy access levels.
Informal Sector	Solar kiosk manager?	• Wanted to know how some products enter the settlement area, • Mechanisms used to handle spoilt products and know where EOL products are stored	• Some products are bought from the open market. • Informal sector collects waste once a year. • People keep their wastes at home
	Local E-waste management stakeholders.	Carried out interviews to know what kind of waste is collected, pricing of the weighted / collected products, what happens to the collected products and how much time it takes to dispose of them to the final recycler and the process involved.	• Both E-waste, Solid and plastics are collected to increase mileage but priced differently. • A kilo of E-waste is Avg.$0.8 while plastic is $0.5. • After collection, products are also sold to an informal recycler (Tembo Steels Ltd)
	Technicians	To know the relevance of technicians in the E-waste life cycle	• At EOL, some customers return the products like Phones and sell them off to be used as spare parts. • Technicians store E-waste in sacks with the assumption of re-using some parts later in the future.
E-Waste Company	Zero Waste	To understand; • Nature and types of incentives offered to collection agents. • Sorting and dismantling process.	Collected items are delivered to the sorting area, reusable and valuable items are sorted and exported for recycling.

Bibliography

SOFIES. (2020). E-Waste Management in Displacement Settings in Ethiopia, Kenya, Uganda
https://energypedia.info/wiki/E-Waste_Collection_in_Displacement_Settings

UNHCR. (2020). Revised Uganda Country Refugee Response Plan July 2020 – December 2021, August 2020
https://data2.unhcr.org/en/documents/details/84715

UNHCR. (2018). Uganda Refugee Response Monitoring Settlement Fact Sheet: Rhino Camp, January 2018
https://reliefweb.int/sites/reliefweb.int/files/resources/reach_uga_factsheet_rhino_settlement_gap_analysis_29may2018.pdf

UNHCR. (2019). Rhino Camp Refugee Settlement Performance Snapshot, December 2019
https://data2.unhcr.org/en/documents/download/76220

UNHCR. (2017). A population-based assessment of community lighting in Northern Uganda's Rhino Camp refugee settlement, December 2017
https://www.unhcr.org/5b3cb5bb7.pdf

Deutsche Gesellschaft für
Internationale Zusammenarbeit (GIZ) GmbH

Registered offices
Bonn und Eschborn

Friedrich-Ebert-Allee 32+36
53113 Bonn, Germany

T +49 228 44 60-0
F +49 228 44 60-17 66

Dag-Hammarskjöld-Weg 1-5
65760 Eschborn, Germany

T +49 61 96 79-0
F +49 61 96 79-11 15

E info@giz.de
I www.giz.de

On behalf of

Federal Ministry
for Economic Cooperation
and Development