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# E-MAGIN GHANA

## E- Waste Management in Ghana

From Grave To Cradle

# Trust be Key

Exploring Pathways to Formalisation in Ghana's E-waste Sector



UNIVERSITY OF CAPE COAST



City Waste Recycling Ltd.

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## **EXECUTIVE SUMMARY**

Due to the absence of a level playing field and enforcement of formal management practices, the majority of e-waste in Ghana is largely managed by the informal sector. While these activities generate value and provide livelihoods for the many workers, it adversely affects public health and the environment. Fundamental changes are therefore necessary and these changes must systematically address the informal sector. Following the introduction of the Hazardous and Electronic Waste Control and Management Act, 917, the Legal Instrument (LI) 2250 and the Technical Guidelines on Environmentally Sound E-Waste Management for Collectors, Collection Centres, Transporters, Treatment Facilities and Final Disposal in Ghana, informal workers are required to formalise by registering with state authorities and move under the legal ambit of the law.

In this light, the European Commission's SWITCH Africa Green program is funding a four-year project on E-waste Management in Ghana (E-MAGIN Ghana). Implemented by a consortium comprised of University of Cape Coast (lead), Ghana National Cleaner Production Centre, City Waste Recycling and adelphi between 2018 and 2021, the project supports the effective implementation of Act 917 by supporting the formalisation of informal stakeholders, establishing a nation-wide collection mechanism, conducting trainings and capacity building programs and providing decision-support to decision makers through dialogue events, studies and policy briefs.

Against this background, this study explores existing partnerships between formal and informal actors in Ghana, identifies good practices, highlights learning opportunities and provides recommendations on formalisation at national level. Extensive literature review and qualitative interviews with 13 initiatives operating at the crossroads of formal and informal e-waste management in Ghana form the basis for this study. Additional insights on management practices were collected from stakeholders who are operating in the waste management sector and who work together with informal workers in Ghana. Based on this research, a number of recommendations to public and private stakeholders as well as to the civil society were developed.

A set of 5 in-depth case studies on business models studies of initiatives operating in the Ghanaian e-waste sector portrays their underlying reasons for their drivers and barriers. The main challenges for formal-informal partnerships in Ghana mostly relate to the provision of adequate levels of funding and access to finance for operations, competition with other companies and the informal sector. Business illiteracy and mutual mistrust between business partners are also common problems. Based on this analysis, a set of recommendations was developed that cover the most crucial aspects in the sector:

- Formal recyclers should expand relationships with scrap dealer associations and offer support for their professionalization.
- Formal recyclers should offer financial incentives that are at least equally attractive as market price payments in order to ensure a steady influx of e-waste from collectors.
- Formal recyclers should consider non-monetary incentives as powerful complementary instruments to establish long-term, trustworthy partnerships with collectors.
- Formal recyclers should use adequate agreements that reflect the socio-economic needs and constraints of their partners.
- Public authorities should provide financial and technical support to accelerate the pace of formalisation in the Ghanaian e-waste sector via scrap dealer associations.
- Public authorities need to ensure the enforcement of existing legal requirements and create a level playing field amongst stakeholders from the formal and informal sector.
- Non-governmental organisations should operate as intermediaries to facilitate the formalisation process and can take the role of mediators between formal recyclers and informal collectors.

For more information about the EU-funded E-MAGIN project implemented under the European Commission’s SWITCH Africa Green program, please refer to <https://e-magin-ghana.com/> or contact [info@e-magin-ghana.com](mailto:info@e-magin-ghana.com).

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## **LIST OF ABBREVIATIONS**

AMA	Accra Metropolitan Authorities
BMZ	German Federal Ministry for Economic Cooperation and Development
CSR	Corporate Social Responsibility
CTL	Closing the Loop
CWR	City Waste Recycling
EEE	Electrical and Electronic Equipment
EPA	Environmental Protection Agency
EPR	Extended Producer Responsibility
ESPA	Environmental Services Providers Association
GASDA	Greater Accra Scrap Dealers Association
ICT	Information and Communication Technologies
ILO	International Labour Organisation
MESTI	Ministry of Environment, Science, Technology and Innovation, Ghana
MMDA	Metropolitan and Municipal and District Assemblies
MoU	Memorandum of Understanding
MRI	Mountain Research Institute
MSMEs	Micro, Small and Medium-sized Enterprises
OEM	Original Equipment Manufacturer
OPEX	Operational Expenditures
PPE	Personal protective equipment
PPP	Public Private-partnership
PRO	Producer Responsibility Organisation
TREND	Training, Research and Networking for Development
WEEE or e-waste	Waste from Electrical and Electronic Equipment
WPs	Work Packages

# 1 INTRODUCTION

## 1.1 Background

Ghana’s most infamous dumpsite Agbogbloshie has gained international notoriety for malpractices in the handling and final disposal of waste from electrical and electronic equipment (WEEE or e-waste). Common informal practices at the site include crude manual dismantling, burning items to extract valuable components and improper disposal of hazardous chemicals. Such activities are known to be harmful to the environment and detrimental to human health. While the situation in Agbogbloshie has improved in the recent past, numerous other e-waste dumpsites exist across the country but remain largely invisible, dispersed and inaccessible to the public.

The growing generation of e-waste can be linked to an increasing use of Information and Communication Technologies (ICT) in Ghana. A growing demand for Electrical and Electronic Equipment (EEE) led to mass import of primarily second-hand devices – and, more recently, sub-standard first-hand equipment – with short lifespans. In 2015, approximately 245,000 tonnes of used EEE were imported of which 15% was non-functional upon arrival and 20% was non-functional after two years of use (Ghana NCPC 2020). Due to the absence of a level playing field and enforcement of formal waste management practices, the majority of e-waste is taken care of by Ghana’s informal sector. Informal workers manage e-waste by collecting, aggregating, dismantling, extracting and finally selling valuable components to national and international companies. These activities generate value and provide livelihoods for the many workers involved in it.

In a study by Bob-Milliar and Obeng-Odoom (2011), the informal sector is described as “an employer, a nuisance and a goldmine”. It provides employment to many workers with few employable skills or training and requires little education and low upfront investment – often not more than a wooden cart or tricycle to start collection. According to past assessments, it is estimated that approximately 4,500 to 6,000 people in Ghana are directly employed by the informal e-waste sector, with some further 30,000 indirectly depending in the sector (Prakash und Manhart 2010). Yet, many informal workers are unaware, ignore the health and environmental risks associated with extraction processes and/or lack investment capital for protective gear, appropriate tools and machinery. The informal sector thus provides attractive job opportunities but also poses threats to human health and the environment.

As a result of this dichotomy, it is widely agreed that fundamental changes are necessary in e-waste management in Ghana – and that such changes must systematically address the informal sector. The Government of Ghana thus passed the Hazardous and Electronic Waste Control and Management Act, 917, the Legal Instrument (LI) 2250 and the Technical Guidelines in 2016 and 2018 respectively. Within the legal framework, informal workers are required to formalise by registering with state authorities and move under the legal ambit of the law (EPA and SRI). The requirements vary in accordance with the performed activities, i.e. collection, aggregation, dismantling, recycling and final disposal. While there is consensus that sound e-waste management solutions must address and include the informal sector, practical inclusive strategies on formalisation in Ghana are scarce and there is no overarching, uniform approach for how formalisation of Ghana’s informal e-waste workforce will take place in practical terms.

A sustainable approach to formalisation needs to address all relevant stakeholder and must lead to improvements along the entire value chain.

To provide a better understanding of the current situation of formalisation, this study thus seeks to explore existing partnerships between formal and informal actors in Ghana and on an international level by portraying a number of case studies operating at this intersection. The case studies presented identify good practices and offer learning opportunities, which lead the way towards a formal e-waste economy by successfully linking formal and informal actors. It sheds light on how these partnerships developed, what business and partnership models exist, what challenges they face and how they can be overcome. The study further provides recommendations for pathways under which informal workers can be integrated into the formal e-waste value chain without jeopardizing their livelihoods.

## **1.2 E-MAGIN Ghana: project background and objectives**

While the introduction of Act 917, LI 2250 and the Technical Guidelines represent landmark achievements, their successful implementation will ultimately depend on the dissemination of knowledge among a wide range of stakeholders across the entire country. Previous projects sought to address e-waste management practices in selected regions across Ghana, especially those taking place at the Old Fadama Scrap Yard in Accra, also referred to as Agbogbloshie. This particular site has received considerable public attention as Africa’s presumably largest dumping ground for e-waste. Few additional projects have addressed Kumasi and Tema as other focal points of e-waste processing (Switch Africa Green 2016). However, urgent actions need to be taken in other regions to achieve positive impact on a national scale and to create conducive conditions under which the informal sector can continue to pursue its livelihood whilst avoiding damages to human health and the environment.

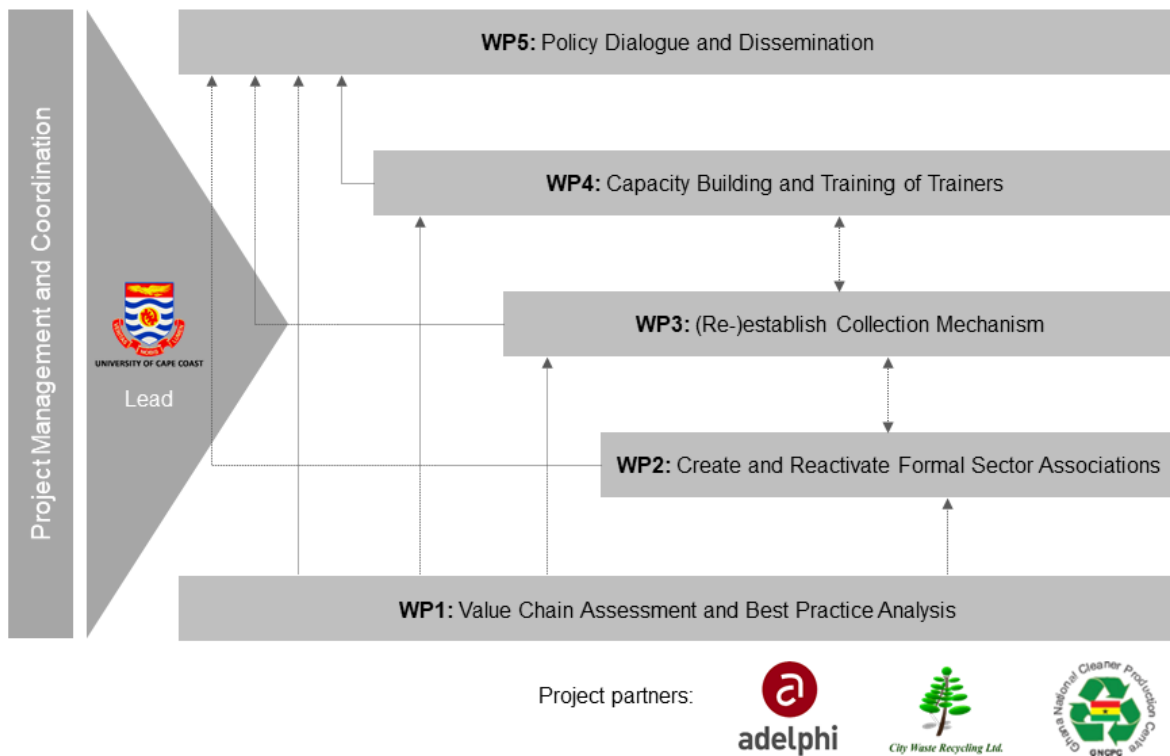
Against this background, the European Union is funding a project on E-waste Management in Ghana (E-MAGIN Ghana). Being implemented under the EU’s SWITCH Africa Green program (phase II), the project targets regions across the entire country beyond the metropolis of Accra where a considerable number of informal collectors, dismantlers and recyclers are located, namely Greater Accra, Ashanti, Brong Ahafo, Western, Eastern, Central, Northern and Volta Regions. The project is implemented by a consortium of University of Cape Coast, Ghana National Cleaner Production Centre, City Waste Recycling and adelphi over a period of four years (i.e. from January 2018 till December 2021).

### ***Trust be Key***

A creole expression used by an interviewee to lay emphasis on trust as a key ingredient in building long-lasting partnerships between formal and informal workers in the e-waste sector in Ghana.

E-MAGIN’s overall objective is to improve management of e-waste in Ghana towards sustainable consumption and production through an integrated multi-stakeholder approach, thus promoting sustainable growth, alleviating poverty, increasing human well-being and preventing environmental pollution. More specifically, the project seeks to contribute to an effective implementation of the Ghana Hazardous and Electronic Waste Control and Management Act, Act 917 by implementing a number of integrated work packages (WPs). WP1 seeks to improve the knowledge base on e-waste management

in Ghana by taking a closer look at the sector’s value chain; WP2 aims at fostering formalisation of informal Micro, Small and Medium-sized Enterprises (MSMEs), thus enabling them to continue operating under the legal ambit of Act 917; WP3 seeks to establish a collection mechanism for e-waste at a national scale; WP4 disseminating best practices through capacity building and training of trainers; lastly, WP5 provides decision support for policy makers and creates awareness amongst consumers. This approach is presented in Figure 1 below.



**Figure 1: Structure of the E-MAGIN Ghana project**

Source: own depiction

Within this context, the best practice analysis presented in this study forms part of WP1 and represents one of the major outputs of the E-MAGIN project. Drawing from extensive data collection, the purpose of this study is to deepen the knowledge about partnerships between the formal and the informal sector in Ghana. The study presents a comprehensive assessment on this issue in Ghana and seeks to contribute towards the achievement of E-MAGIN’s objectives.

### 1.3 Methodology

Data collected for this study primarily drew from an extensive literature review as well as qualitative interviews with 13 initiatives operating at the crossroads of formal and informal e-waste sector in Ghana. Additional insights on management practises were collected from stakeholders who generally are operating in the waste management sector and who work together with informal workers in Ghana. Representatives of the initiatives were approached and interviewed between 2019 and 2020. Interviews were conducted face-to-face whenever possible, otherwise remotely through calls – especially after the advent of COVID-19, which largely hampered the ability to hold physical meetings.

The interviews were conducted in a semi-structured, exploratory style that allowed topics to arise organically throughout the conversations. To guide discussions, a comprehensive interview guide was developed (see Annex I). The interview guide provided a set of questions that address the main areas of interest, namely background information, key incentives, agreements, challenges, solutions, impacts and lessons learnt. The interview guide was drafted and peer-reviewed by the project consortium. Upon finalization, the guide was shared with interview candidates in advance in order to provide the opportunity for adequate preparations.

In order to document the findings, notes were taken during the interviews. These were transcribed and shared with the interviewees upon finalization. The interviewees were encouraged to review the transcript, complement where helpful information was missing and communicate if parts of the transcript were inaccurate or should not be included in the report for reasons of confidentiality. After receiving interviewees’ inputs, the interview transcripts were adjusted accordingly and used for the report. Annex II holds a list of interviewees who contributed to the data collection of this study.

It is noteworthy to highlight that the study’s methodology is inherently qualitative and exploratory. This approach produces a rich and fine-grained picture of formal-informal partnerships in the Ghanaian e-waste sector. Yet, the results should be interpreted carefully and may not serve as role-models for other socio-cultural contexts outside of Ghana. To George M. Bob-Milliar und Franklin Obeng-Odoom 2011 for instance, the “the root of the problem [i.e. a lack of formalised e-waste management structures in Ghana] is a misunderstanding of local knowledge of the nature of informality, the problem of scale, and a preference for approaches that have been “successful” in other countries”. Nonetheless, this study may provide a starting point for discussions on models to formalisation and may inspire further research on formal-informal partnerships in other contexts.

Methodologically and structurally, the approach of this study is based on a report called “Building the Link: Leveraging Formal-Informal Partnerships in the Indian E-Waste Sector” (Henzler et al. 2017). The report investigates partnerships between formal and informal actors in the Indian e-waste sector and provides recommendations for scaling up successful approaches. For the purpose of the E-MAGIN project, the approach of this report lay the methodological groundwork and provided a valuable opportunity to examine the drivers and barriers to formalisation on the basis of different case studies. Therefore, the approach was adapted and further refined to fit the national context and produce warranted findings on formalisation in Ghana.

## **1.4 Outline**

The report structured as follows. Findings of the literature review are presented first, covering a global perspective on formal-informal partnerships as well as an in-depth look on the situation in Ghana. Chapter 3 presents 5 selected initiatives and explains their business models, challenges and solutions applied to sustainably link formal and informal stakeholders to one another. The initiatives’ activities are illustrated by flow charts showing agreements, financial and material flows. Chapter 4 connects findings from the interviews with the trajectory of e-waste management in Ghana. Chapter 5 draws conclusions from the findings to formulate recommendations to public and private actors and to the civil society. The

Annex provides further readings and detailed information, such as the interview guidelines, more case studies and aggregate findings of the interviews.

## 2 FORMAL-INFORMAL PARTNERSHIPS: GLOBAL AND GHANAIAN PERSPECTIVES

### 2.1 Global perspectives

In the past, various studies have addressed the topic of formalisation in emerging countries. While there is no uniform definition of informality, the International Labour Organisation describes informal working practices as predominantly “small scale, labour intensive, largely unregulated and unregistered (often without trading licences)” and being “associated with evasion of taxes and low-technology processing in the provision of services, such as primary collection” (International Labour Organisation 2014). The types of activities carried out on an informal basis vary significantly and may involve various steps along the value chains, such as discarding, collecting, aggregating, trading, dismantling, refurbishing, end-processing and exporting. Each of these activities is associated with different levels of value-addition, with aggregation and export tending to be most profitable due to the centralized, gate-keeping character of intermediary aggregators and exporters towards high-paying off-takers (Hinchliffe et al. 2020).

Just as the definition of informality remains ambiguous, the process of integration informal workers into formal value chains is not always clear-cut. Instead, it can be understood as a continuum between rather loose, non-binding approaches at one end and structurally integrated models that exist on a permanent basis on the other. Anne Scheinberg (GIZ 2018; Hinchliffe et al. 2020) differentiates a number of approaches, which are presented in the following table.

**Table 1: Approaches to integration of informal workers in the waste sector**

Approach	Description
Cooperation	Mutual intention to communicate and work together; may be binding or non-binding in nature
Inclusion	Unilateral, normative approach with a focus on providing basic rights to informal workers
Legalization	Unilateral, transparent and facts-based process seeking to provide legal protection and official status
Fiscal legalization	Unilateral, transparent and facts-based process seeking to bring informal workers register and operate within the legal ambit of a taxation system
Formalisation	Unilateral, professional, ethical demand or requirement for informal recyclers to take specific actions that will entitle them to participate in end-of-life operations

Structural integration	Bilateral, practical and permanent (i.e. not project-based) integration of informal actors into formal value chains; representing lasting change
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*Source: adapted from Anne Scheinberg in GIZ 2018 and Hinchliffe et al. 2020*

In order to implement these approaches, the International Labour Organisation (ILO, 2014) suggests that innovative strategies are required to effectively tackle current challenges in (electronic) waste management. Such innovative strategies are believed to allow for the entrepreneurial and innovative character of the sector to be maintained in a transition to a more sustainable management. They can take many forms. For instance, formalising the activities of informal workers under the umbrella of cooperatives can reliably link formal and informal actors and show tangible advancements in a variety of countries, such as Brazil, India, Serbia and Bolivia (ibid.).

In the cases reviewed by ILO, the informal sector was consistently more competitive than the formal sector in e-waste collection. Low wages and a lack of appropriate technology and compliance with health or environmental allow informal collectors to offer lower prices. Thus, it becomes harder for formal operators to compete, especially if they run short on e-waste supply and cannot operate at full capacity. Informal workers appear to be particularly competitive in carrying out collection and pre-processing as these stages require low to nil investment, are labour intensive and mostly carried out by an unskilled labour force. Hence, formalising the informal workforce via the umbrella of formal cooperatives may also contribute in developing a level playing field and preventing malpractices.

Similar strategies are presented by Chaturvedi et al. (2005), albeit focusing more narrowly on successful case studies from India and Brazil. According to the authors, cooperatives bear the advantage for collective negotiations and can pool resources amongst members, thus creating economies of scale. So far, waste collectors mostly gather scrap in small quantities and sell it through middlemen (often agents) to industrial processors. This means collectors are highly dependent on middlemen and have little bargaining power in the negotiation of prices.

Ezeah et al. (2013) also underline the importance of the informal sector and propose following socio-economically adequate integration strategies to formalisation. The authors suggest that the main drivers for successful integration of the informal sector are social acceptance, political will, and mobilization of cooperatives, partnerships with private enterprises, management and technical skills, as well as legal protection measures. Their analysis mainly draws from insights into five countries, namely Egypt, China, India, South America and South Africa.

A more recent analysis by Hinchliffe et al. (2020) focuses on approaches to formal and informal partnerships in sustainable e-waste management and provides insights into case studies from India, Peru, Nigeria, South Africa and Ghana. Notably, the authors list a number of benefits arising from formal-informal partnerships, differentiated by stakeholders and emphasize the role of the informal sector in meeting legal requirements under extended producer responsibility (EPR) schemes. In this context, producer responsibility organizations (PROs) can help their clients (i.e. producers, importers) in meeting collection targets by leveraging on the wide-spread network of informal collectors. By partnering with



informal collectors and aggregators, recyclers can maintain a steady influx of materials and can capitalize on the informal sector’s knowledge about the economic value of different e-waste fractions.

Despite the plethora of potential advantages, many authors acknowledge that establishing partnerships between formal and informal actors poses difficult challenges, too. Notably, the creation of trustworthy, reliable relationships is amongst the most prevalent ones because, by definition, partnerships often rely on some degree of informality and may not always be based on mutually binding agreements that can be readily enforced by legal authorities. Yet, available literature overwhelmingly reflects the normative agreement that integrating the informal workforce into formal value chains – e.g. by means of partnerships, cooperatives or other forms of cooperation – is socially, environmentally and economically imperative in order to protect the livelihoods of informal workers, boost collection rates of valuable and non-valuable materials and create business opportunities in markets for secondary resources.

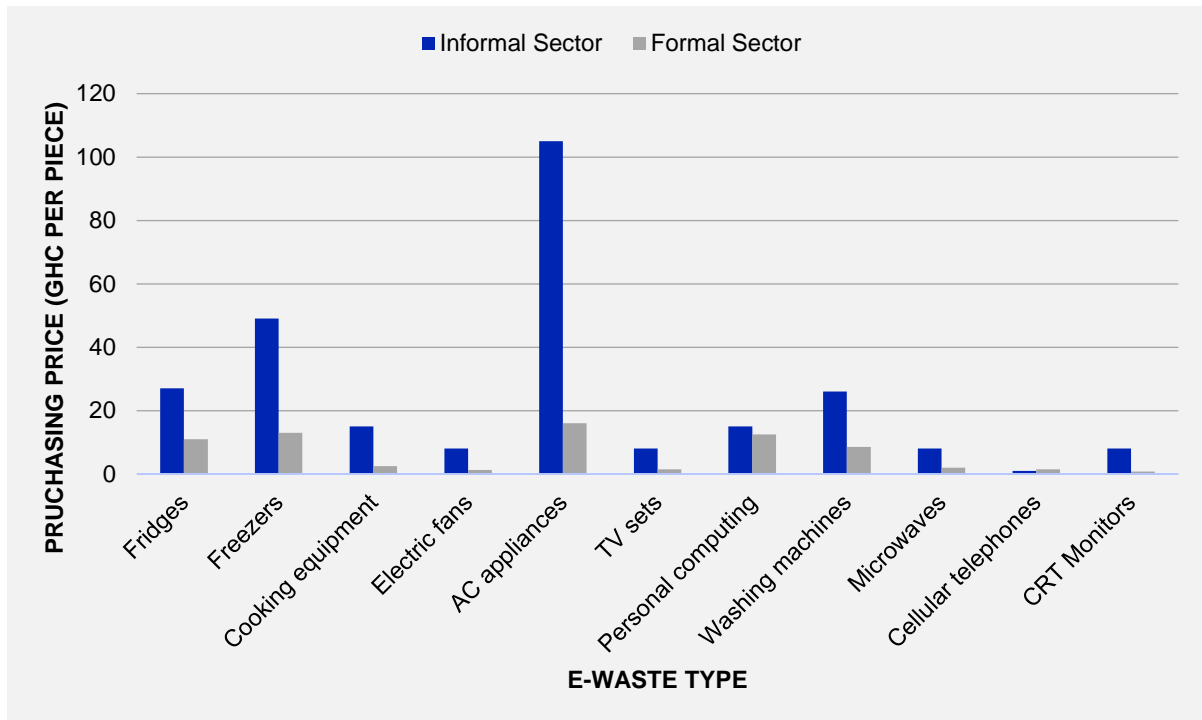
## **2.2 Ghanaian perspectives**

Informal e-waste management practices are an issue of growing concern in Ghana. Yet, so far, the integration of the country’s informal workforce into formal value chains has been progressing slowly. Oteng-Ababio (2011, 2012) sheds light on practices applied by the informal sector and analyses the socio-economic implications of e-waste scavenging as a livelihood strategy for informal workers. In this context, Oteng-Ababio highlights that the coexistence of formal and informal urban systems requires an “appropriate mix” of the two, thus criticizing emerging foreign-based models of solid waste management in Ghana and calling for the integration of informal actors in management systems (Oteng-Ababio 2011). In addition, Prakash and Manhart (2010) also give an extensive account on socio-economic aspects including an overview of informal management systems as part of a feasibility study of sustainable management of e-waste in Ghana. Oduro-Appiah et al. (2017) present experiences and learnings of including informal workers into municipal solid waste management systems in Accra.

More recently, Daum et al. (2017) contend that “a formal employment regime” can decrease workers’ health risks through implementing appropriate safety measures in Ghana. The authors suggest linking “informal faceless pickers engaged in dirty work with global, branded green recycling companies” to “modernize outdated perceptions about employment roles within the waste economy, thereby bringing e-waste into the mainstream and promoting a greener future”. The authors further explored trajectories of e-waste policy by reviewing literature of a decade of e-waste research in Ghana. The authors conclude that the development of “more sustainable solutions that are participatory and fair to low-income workers” (ibid.) poses one of the biggest challenges to formalisation.

Research conducted by the E-MAGIN project suggests that the Ghanaian informal sector consistently offers higher prices for e-waste than the formal sector during the collection process (see figure below). This can be attributed to the fact that formal recyclers typically incur higher costs when processing e-waste fraction, e.g. due to more complex practices or the application of advanced technologies with high operational expenditures (OPEX). In addition, formal companies need to comply with legal requirements (e.g. audits), are obliged to pay minimum wages, offer social security and adhere to environment, health and safety standards. In contrast, informal workers often neglect such standards and compete by

externalizing costs for treatment and disposal. In many places in Ghana, this is most vividly illustrated by open fires from plastic coated copper cables. As a result, registered companies often have difficulties to ensure a sufficient influx of e-waste and thus position themselves in niche markets, e.g. by cooperating with institutional bulk disposers, which are legally required to dispose of their e-waste via authorized recyclers only (Kumi et al. 2019).



**Figure 2: Purchasing prices of different types of e-waste in the formal and informal sector**

Source: Kumi et al. 2019

Through recent years, some recycling companies, mostly non-profits, have started to bridge the gap between formal and informal waste collectors. These companies latched on to the important role of informal waste collectors and have recognized that their absence may adversely affect the (e-waste) value chain. One example is the collection of solid waste in peri-urban areas in Ghana where the informal sector provides critical infrastructure regarding collection and disposal. This applies particularly to districts that are hard or impossible to reach with trucks, such as housing areas or market centres. Yet, income distribution in the e-waste sector remains highly unequal. Based on assessments carried out in Agbogbloshie, incomes range from just USD 20 per month for a child labourer to USD 1,500 per month for an established scrap dealer, representing 36.6% and 2747% of Ghana’s daily minimum wage respectively.

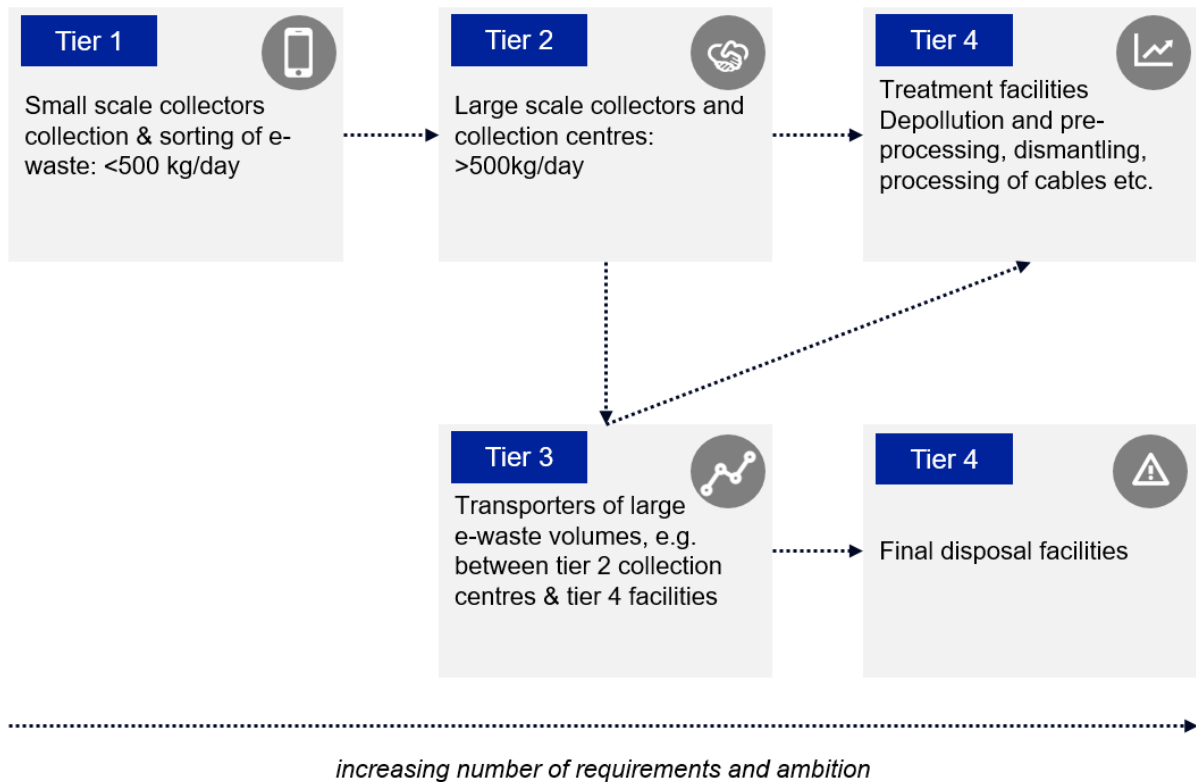
**Table 2: E-waste labor segments and worker incomes reported from Agbogbloshie**

Role	Average income/month*	Relation to minimum wage/day*	Activities
Global firm	n/a	n/a	Global recycling company that imports raw and processed scraps from abroad and from within Ghana. Performs more sophisticated refining of materials and exports products to global clients.
International firm	USD 20,000 or more	n/a	Formal recycling export firm located in export processing zone in Tema. Buys from scrap dealers and finances own scrap collectors.
Scrap dealer	USD 1,500	2747%	Commands e-waste operations at the top of the e-waste trade hierarchy; negotiates deals with players in the formal economy.
Middleman	USD 1,050	1923%	Acts as an intermediary between scrap dealers and recyclers. Well-connected individuals who prepare recycled scraps for resale.
Refurbisher	USD 190 to 250	348 to 458%	Repairs non-functioning electronic goods to be sold in the Ghanaian second-hand electronics market.
Recycler	USD 175 to 285	321 to 522%	Picks through e-waste in order to extract metals. Individuals may or may not choose to specialize in a particular type of electronic. Many recyclers partake in open burning as an extraction technique.
Scrap collector	USD 70 to 140	128 to 256%	Collects obsolete electronics in carts or rentable cars-for-hire. Collectors either buy e-waste from consumers or scavenge for parts at dump sites.
Child labourer	USD 20	36.6% or less	Males participate in recycling or collecting. Young girls may be found distributing water for consumption and fire control.

\* Income and wage figures are calculated using the March 2016 exchange rate of 1 USD = 0.26 GHC.

Source: adapted from Daum et al. 2017

With the introduction of the Technical Guidelines in February 2018, Ghana’s Environmental Protection Agency (EPA) has set out a framework to govern the roles and responsibilities along the e-waste value chain in Ghana, which also covers (formerly) informal actors that are dependent on e-waste management for their livelihoods.



**Figure 3: Tiers and relationships for different actors set out in the technical guidelines**

Source: adapted from Hinchliffe et al. 2020

While the literature mentioned above examines the nature of the informal sector in Ghana in much detail, there is currently no documented research on the assessment of linkages between formal and informal stakeholders in Ghana’s e-waste management sector. During later research in Ghana, the E-MAGIN consortium perceived it to be useful to differentiate between three types of informal stakeholder in Ghana, namely Type 0, Type 1 and Type 2 Aggregators. Drawing from an extensive value chain analysis with over 120 data points, the consortium developed a preliminary typology presented in the table below.

**Table 3: Draft typology of informal stakeholders in Ghana**

**Type 0 Aggregators – Condemn:** Informal collectors popularly known as “condemn”, owing to the way they attract attention by shouting “condemn!” in the streets of Ghana. Usually wearing simple clothing, they move around residential and commercial areas with handcarts in order to purchase or pick up e-waste. They may work individually or in pairs, visiting dumpsites and sifting through waste with tools (e.g. sticks and metal rods) to find valuable e-waste. Mostly travelling to outskirts of towns, they aggregate e-waste and transport them by handcarts to a scrap yard for dismantling. When the e-waste cannot be transported by their handcarts, tricycles and mini-trucks are hired to collect waste on behalf of Type 1 or 2 Aggregator (see below). Characteristically, many informal e-waste collectors are young, migrant males (e.g. from Northern Ghana, Burkina Faso, Niger and beyond) with low formal education. Seeking better job opportunities, they often enter the e-waste business as collectors due to its relatively low capital requirement – a locally made handcart costs approximately GH¢ 400. The picture shows a Type 0 Aggregator in Accra (© Ebenezer Kumi).



**Type 1 Aggregators – Small, small:** The name of this group reflects their ambition to start small and grow large over time. As such, they often represent former Type 0 Aggregators who have substantially increased their capital base and grown their business to become aggregators of larger quantities over time. They typically have temporal arrangements with few collectors who supply them with e-waste. At their relatively small yards (often found to be makeshift sheds of sorts) they engage in and oversee manual dismantling of e-waste by using basic tools (e.g. chisels, hammers and screwdrivers). They also regularly burn cables to recover metal fractions. Moreover, they typically focus on handling few vital fractions or may focus exclusively on dismantling and recovering printed circuits boards (PCBs) from computers, laptops and DVDs. Valuable fractions are typically sold to Type 2 Aggregators or plastics granulators within close vicinity of their yards. The picture depicts a Type 0 Aggregator in Cape Coast (© Ebenezer Kumi).



**Type 2 Aggregators – By his Grace:** This group of stakeholders are named after an aggregator in Volta Region who epitomizes this group in the views of the E-MAGIN consortium. They typically have well-constructed or established workshops and operate as large scrap dealers who have a sizeable number of collectors under their supervision. In addition, they bid for scraps during auctions from (for instance) Electricity Company of Ghana, Ghana Water Company, schools and other formal institutions. Just as Type 1 Aggregators, Type 2 Aggregators mainly dismantle through basic tools. However, since their capital base is larger, many Type 2 Aggregators buy and dismantle not only e-waste, but also scraps of vehicles and heavy-duty construction machines. In such cases, Type 2 Aggregators hire and use more advanced technologies such as laser cutting machines for dismantling. Type 2 Aggregators commonly apply malpractices such as open burning of cables. The picture shows a Type 2 Aggregator in Ho (© Ebenezer Kumi).



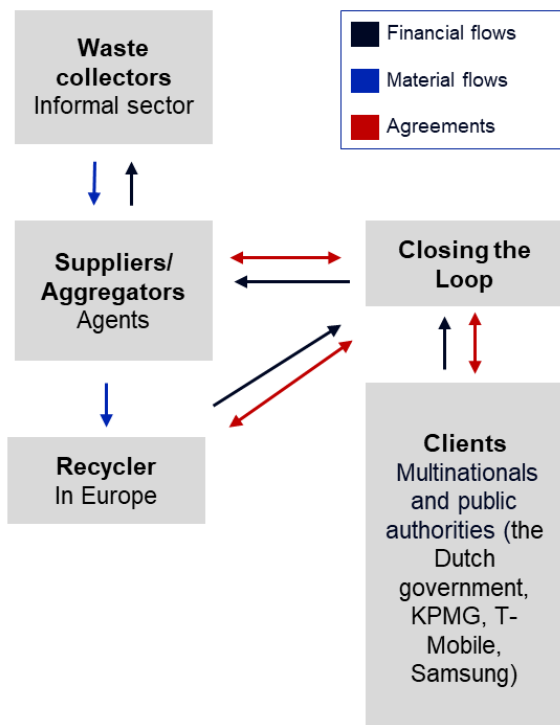
Source: adapted from Kumi et al. 2019

### 3 DEEP-DIVE CASE STUDIES ON FORMAL-INFORMAL PARTNERSHIPS IN GHANA

The business models of five organisations are described in the following section. More case studies of initiatives operating in the Ghanaian e-waste sector can be found in Annex III. The information presented in this chapter stems from an in-depth literature review and was further enriched by qualitative interviews, following the structure of the interview guide displayed in Annex I.

#### 3.1 Case Study #1: Closing the Loop

Closing the Loop (CTL) is a for-profit social enterprise based in the Netherlands and was founded in 2015. At the core of CTL’s business model is the so-called “one-for-one model”. The model draws from the approach of carbon credit systems (offsetting schemes) and allows clients to compensate the negative impacts of buying a new phone by paying a fee to CTL. This fee is subsequently used to retrieve and recycle a discarded phone from (mostly) African countries, including Ghana. Upon collection, the phones are shipped to state-of-the-art end-processors in Europe in order to ensure sound recycling and extract materials for further use.



**Figure 4: Overview of case study #1: Closing the Loop**

Source: own depiction

CTL initially sought to function as a broker for recycling services by buying discarded phones from African countries, shipping them to Europe where they would be recycled under safe conditions and profiting off the material value of the recycled items. However, this business model turned out ill-suited for operating in African countries where collection is usually not backed up by financial support



mechanisms, such as EPR schemes. Thus, CTL started to explore innovative business models that would enable them to operate by mobilizing funding from private sector clients. The revised business model became operational in 2016. Since then, CTL operates as a verified third-party service provider for offsetting the negative impacts of smartphones in countries of the Global North.

CTL’s major clients include multinational companies, such as KPMG and Schiphol Airport as well as public sector agencies (Dutch government institutions, municipalities), mobile operators (T-Mobile Netherlands) and producers (Samsung and Fairphone). Most frequently, these clients choose CTL as a strategic partner as part of their Corporate Social Responsibility (CSR) policies but linked to their commercial goals. At times, the cooperation is viewed as a marketing tool to demonstrate positive impact on environmental sustainability and job creation as well as a means to increase their overall sustainability score to gain a competitive edge in tenders. More recently, CTL initiated a pilot cooperation with Original Equipment Manufacturers (OEMs); however, more details of this type of cooperation are yet to be negotiated.

Operationally, CTL focuses their collection activities on selected African countries in order to bundle resources and focus on where most of the opportunities for e-waste are. Most of CTL’s collection activities take place in Ghana, Nigeria and Cameroon through well-established local networks. In Ghana, mobile phones are collected through a network of informal collectors which is accessed via Maiden Environmental Services and local agents acting as intermediary collection brokers. After quitting cooperation with a previous commercial partner for collection of discarded phones, CTL and Maiden Environmental Services now partner with more than 10 individual agents in multiple regions of Ghana (including Ashanti, Northern and Eastern regions) who serve as suppliers and aggregate phones from a network of informal e-waste collectors.



**Figure 5: Scrap agent who collects discarded mobile phones on behalf of CTL**

Source: CTL 2017

Besides market price payments, CTL describes trust and reliability as the main incentives for the agents and collectors to cooperate on a long-term basis and ensure steady supply of discarded mobile phones. Trustful relationships have been built through demonstrated commitment, reliability and direct contact,

in some cases over the course of 5 or more years. CTL prefers building bilateral partnerships so as to ensure that the collectors feel that they can make positive contributions towards something bigger. Prices of discarded phones are agreed upon once a partnership is initiated. These correspond with local (informal) market prices as far as they can be determined. Notably, dismantled phones are bought at lower price in comparison to intact phones as they bear the risk of having been stripped of the most valuable parts. CTL has entered written agreements with agents and collectors that include compliance with various social, environment, health and safety standards.

Key barriers to increasing the rate of formalisation include business illiteracy and lack of book keeping skills among collectors. CTL seeks to work around this barrier by collaborating with Maiden Environmental Services as a local interface agency which represents and communicates the interests of informal e-waste collectors. Yet another factor that inhibits the expansion of the informal collection network includes institutional barriers (i.e. bribes) to requesting export permits. As CTL refuses to engage in any illegal activities, including ‘facilitation money’, exports are frequently subject to heavy delays. In turn, this often results in loss of time and financial resources.

In addition, repeated changes in policies of various shipment companies have turned out to be major bottlenecks to exporting scrap mobile phones. Technically (in many African countries), scrap mobile phones are classified as hazardous waste and thus, exports must follow the notification requirements of the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal. Even when CTL possesses all required permits, many shipment companies remain unwilling to export hazardous waste on their behalf because it needs a notification.

In terms of impacts, it is estimated that 2,000 to 3,000 informal collectors have benefitted from its network and improved their livelihoods by channelling discarded mobile phones through CTL. Since its initiation, about 3 million phones were collected, 200,000 of which in Ghana alone. The company is currently scaling up with a clear increase in demand for the compensation of waste along their model. This demand is coming from both users (governments, other companies) and the industry (mobile operators and producers). With a scale-up, the CTL projects to collect 20 million phones annually by 2023.

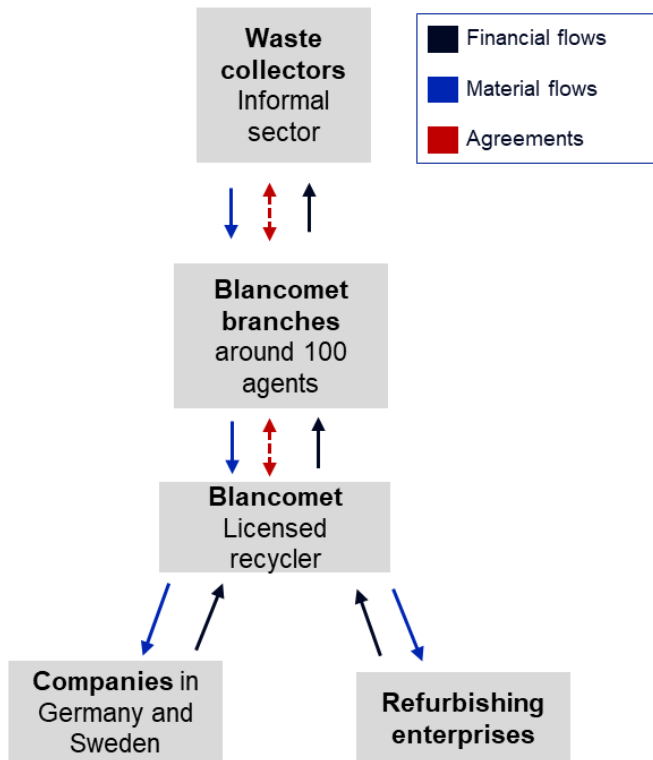
### **3.2 Case study #2: Blancomet**

Blancomet is a formal recycling company that was founded in 2009. Its head office is located in Accra but its operations extend beyond the country’s capital and include Kumasi and Takoradi. Blancomet is a for-profit company specializing in collection and dismantling of scraps and wastes that contain non-ferrous metals like copper, brass, zinc, stainless steel. In addition, it also collects and processes various types of e-waste, such as computers, laptops and formerly batteries. Upon collection, items are dismantled so as to extract functional components which are sold to local refurbishers. More complex materials (e.g. printed circuit boards; PCBs) are shipped overseas to European countries including Germany and Sweden for final treatment and precious metals refining.

Blancomet directly sources e-waste from informal workers who drop off e-waste at designated collection points throughout the country. Being spread across the country, these collection points are operated by Blancomet’s agents who collect waste and store them in containers. The company encourages



collectors to bring all types of materials in order to prevent burning. Once sufficient amounts of materials are collected, the scraps are brought to Blancomet’s processing facility. More than 100 agents work for Blancomet in Ghana and beyond, reaching as far as Togo and Ivory Coast, amongst others.



**Figure 6: Overview of case study #2: Blancomet**

*Source: own depiction*

The main incentive provided to informal collectors for collaboration with Blancomet is cash. The company seeks to offer prices slightly above the market price in order to boost collection rates. Furthermore, Blancomet also pre-finances some agents and informal collectors. Collectors who have a permanent location may receive between 2,000 and 5,000 GHC, while agents who have containers and recognized businesses can receive up to 20,000 GHC. Since pre-financing arrangements with informal workers entail significant risks, they are only granted if an individual has proven to be a trustworthy and reliable business partner. In addition, during festive occasions (e.g. Christmas) informal collectors are provided small incentives such as extra cash or second-hand phones.

Most agreements with agents and collectors are bilateral, verbal and non-binding in nature. If binding agreements are made, they are written down. In case a pre-financing arrangement is entered and advance payments are granted, the balance is documented in written form. Pre-financing agreements are rather flexible and can be negotiated on a needs basis. If an agent is not able to repay at a given time, he will be given a longer repay-period.

A major challenge for Blancomet is to establish trustful relationships with informal collectors and agents. Even with longstanding relationships, the company experiences breaches of trust and workers disappear without repaying pre-financing. The informality of the sector aggravates this problem because identities of collectors and agents may remain unknown. Furthermore, keeping up with competition can

be difficult. There are competing companies that are also purchasing e-waste and Blancomet needs to offer competitive prices to ensure a steady supply of materials.

Buying genuine scrap is another key challenge. The company experiences problems with accusations from the police about stolen items and has not yet found a way to solve this issue because for Blancomet, the documentation of every piece of material is not feasible in light of the informal nature of the collection network. Since Blancomet discourages improper disposal of e-waste and thievery of non-scrap materials, it therefore highlights the need for the government to strictly enforce regulations. Also, the company believes a level playing field should be created. Formal organizations can hardly keep up with informal competition since the latter can use the cheapest (and mostly very harmful) processing methods. For example, Blancomet pays for controlled disposal of acids from lead-acid batteries while actors in the informal sector do not and dispose of such materials by disregarding environment, health and safety requirements.

For tackling the trust issue, Blancomet highlights that scrap dealer associations (unifying collectors and agents) can be of help. When an individual disappears with a pre-finance, the respective association the collector belongs to can assist in tracing or can be held accountable. The power of associations is limited though in the company's view because when individuals discontinue contact with Blancomet they often relocate and are not part of the associations anymore.

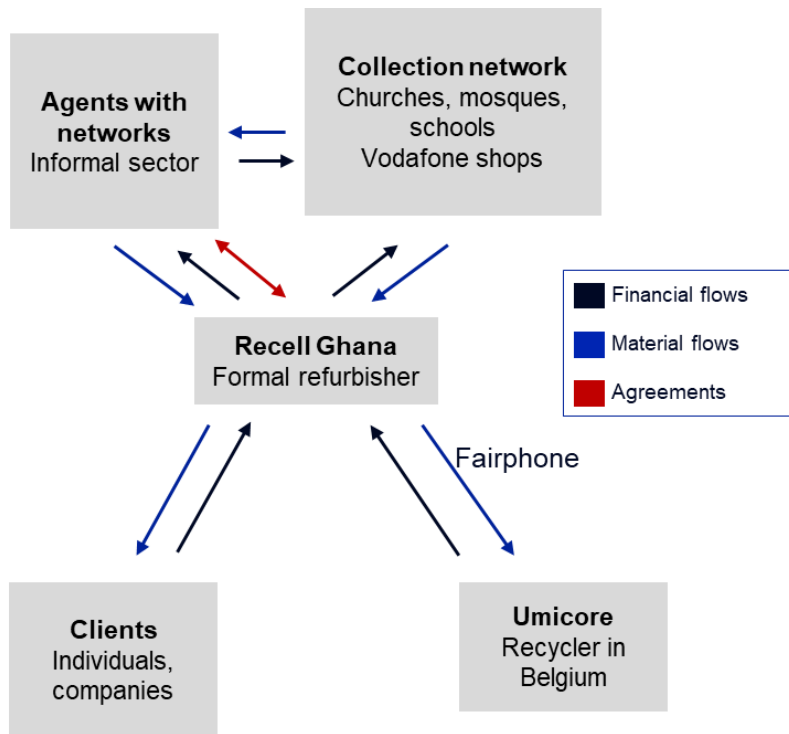
Numbers of informal waste pickers benefitting from Blancomet's collection model are currently unavailable. However, as a direct employer, Blancomet has grown from a staff of 20 in 2009 to 300 in 2019 (a few individuals have benefitted from small scholarships). Altogether the company collects and processes 500-600 tonnes of waste per year. Computers constitute about 50 tonnes and metals (e.g. copper) about 100 tonnes. Fitting several branches into one mother branch has impacted the output of the company. The most needed resource is funding. It is the company's goal in the near future to relocate its head office to a large land area in the outskirts of Accra where bigger machinery can be mounted and can be used to treat many components.

### **3.3 Case study #3: recellGhana**

recellGhana was founded by Moses Adoo from the Eastern Region of Ghana and operates as a for-profit business with limited liability. Mr. Adoo initiated the business after noticing a strong demand for affordable ICT equipment among individuals with low willingness to pay (e.g. students). He started a business of collecting, repairing and refurbishing damaged phones and tablets to offer them at an affordable price. Today, recellGhana maintains a network of up to 25 agents who collect damaged ICT equipment in the whole country.

recellGhana cooperates with churches, mosques and schools for collection. There are partnerships with about 10 churches in Accra alone. Another major collection point in Accra is Agbogbloshie. Further, agents collect from villages, mosques and repair shops (amongst others) and have their own network of operations. recellGhana helps the agents in the initial phase to build up the network and operations after which the agents then take over. Collected items include phones, tablets, PCBs and recently computers that are refurbished for usage at schools. Clients are mainly individuals and companies. The

company’s office is in Accra where agents bring their collected items. The office also has a repair and refurbishing centre and cooperates with international and national organizations such as Closing the Gap in Belgium, Fairphone in the Netherlands and Vodafone Ghana for the collection and refurbishment of computers for schools. For instance, the Ghanaian branch of Vodafone has set up collection boxes for used mobile phones at shops which are handed over to recellGhana.



**Figure 7: Overview of case study #3: recellGhana**

Source: own depiction

Items that cannot be repaired are stripped off components that are useful for refurbishment. Phones beyond repair are shipped to Umicore in Belgium for subsequent recycling and end-refining. The minimum provision amounts to about 4 tonnes of materials. Aside paying a competitive market price, recellGhana provides technical support to agents in difficult situations. If collectors face personal problems such as family or health issues, recellGhana offers to sit down together and find a solution. recellGhana can provide loans in form of advance payments on a micro-credit base in such situations. To further incentivize collection agents, recellGhana provides trainings in its office where it shares the company’s best practices, activities and objectives in a transparent way and creates visibility about the positive impact that it is making.

With regards to agreements, recellGhana makes official written contracts with agents, which contain expectations, prices and conditions of business. Usually, phones are bought per piece while PCBs are paid per kg. Since the business is based on EUR currency, prices are subject to changes in exchange rates. recellGhana pays the GHC equivalent of items’ value in EUR to agents and regularly pre-finances their agents’ operations because they often lack the necessary working capital. The company pays for transportation once a week; communication with agents takes place via phone and instant messenger. Whenever agents come to Accra for deliveries, recellGhana schedules face-to-face updates.



**Figure 8: Mobile phone being repaired by recellGhana**

*Source: Fairphone 2017*

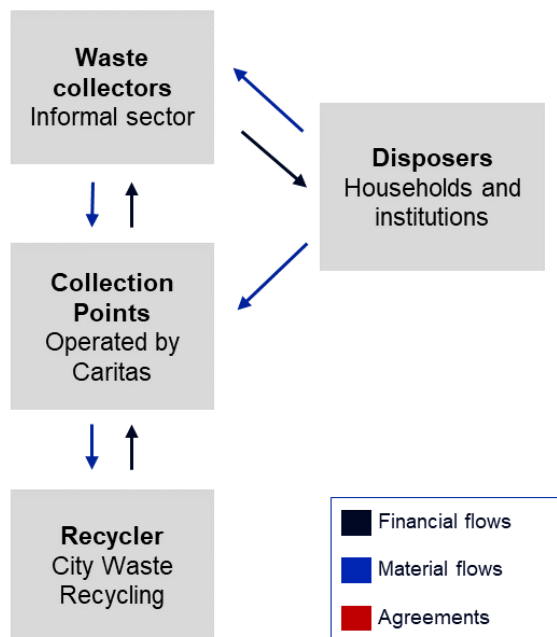
Keeping up with prices and financing the business through sourcing funds is a major challenge for recellGhana. There are also high risks involved when agents are pre-financed. Another challenge is the expectations from agents and human relationship aspects. Relationships need to be handled well since otherwise they become a strong demotivating factor for agents; hence continuous, trustful communication is key in keeping agents engaged. In addition, exporting goods is a time-consuming barrier in the business’ operations due to bureaucratic procedures in securing permissions for shipping. In order to develop its business, recellGhana sources from its network for recruitment of new agents to find trustful individuals.

Currently, recellGhana collects 10 tonnes of mobile phones per year. Around 15-20 computers are collected daily. The company estimates that some 2,000 people are directly and indirectly employed through its collection, recycling and refurbishment activities. The company’s turnover is around 40,000 EUR per year. However, with additional investments it could be scaled up to 180,000 EUR and could achieve a collection rate of 2 tonnes of phones/per month. Its self-declared vision is to be the biggest e-waste collection company in Africa within 5 years’ time.

### **3.4 Case study #4: Caritas e-waste project “Care For Our Common Home”**

Caritas Ghana is the relief or charity organization of the Ghana Catholic Bishops’ Conference and a member of the global Caritas Confederation. The organization seeks to serve humanity regardless of creed, faith and ethnicity. It is involved in a wide range of social development issues and advocacy. Although the Department of Human Development of the National Catholic Secretariat effectively represented some charity aspects in earlier stages, Caritas Ghana was formally registered and started operations as a legal entity in 2016.

In the quest to serve humanity, Caritas Ghana is involved in several operational activities or projects in the fields of electronic waste management, migration, anti-corruption, anti-illegal mining, anti-land grabbing and most recently COVID-19 response, amongst others. As a not-for-profit organization, Caritas Ghana is presently undertaking the Care for our Common Home E-waste Campaign, which is implemented through a social impact investment approach. The mandate of this campaign is to save the environment and create decent job opportunities for some unemployed youth of Ghana. Notably, the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) and the Embassy of France in Ghana have periodically provided funds as a means to support the project’s mandates.



**Figure 9: Overview of case study #4: Caritas e-waste project**

*Source: own depiction*

As part of this program, Caritas Ghana works together with institutions and Parishes where collection centres are located. Collected items are thoroughly recorded and documented. A memorandum of understanding (MoU) with City Waste Recycling (CWR) Company Ltd allows the collected waste to be passed on for state-of-the-art end-of-life processing (recycling). Currently, there are seven functional collection points (containers) in Accra and three in Tamale with a target of 40 collection points. The national Environmental Protection Agency (EPA) has formally granted Caritas Ghana a permit in respect of its e-waste transactions. Efforts to expand the collection network also includes public education with the FAITH in Ghana Alliance and advocacy towards Government for the implementation of relevant laws.

As part of the advocacy activities, Caritas Ghana, with the help of the French Embassy’s funding, brought together religious leaders and the Government Agencies in a stakeholder policy dialogue on the implementation of the Act 917 and LI 2250 on effective E-waste Management in Ghana. According to Caritas Ghana, the biggest incentive for people donating e-waste to a collection point is to safeguard the Environment as inspired by Pope Francis’ encyclical “*Laudato si*”.



**Figure 10: Caritas Ghana's collection point located at the National Catholic Secretariat**

Source: City Waste Recycling 2019

Practically, the organization faces several challenges, most prominently limited financial resources. Initial investment costs (capital expenditures) are difficult to cover with one collection point costing approximately GHC 15,000.00 (as at February 2020). In the near future, the organization seeks to explore more funding opportunities for internal operations of the project at its initial stages while aiming at being self-sufficient with time.

### **3.5 Case study #5: MESTI-GIZ pilot payment scheme**

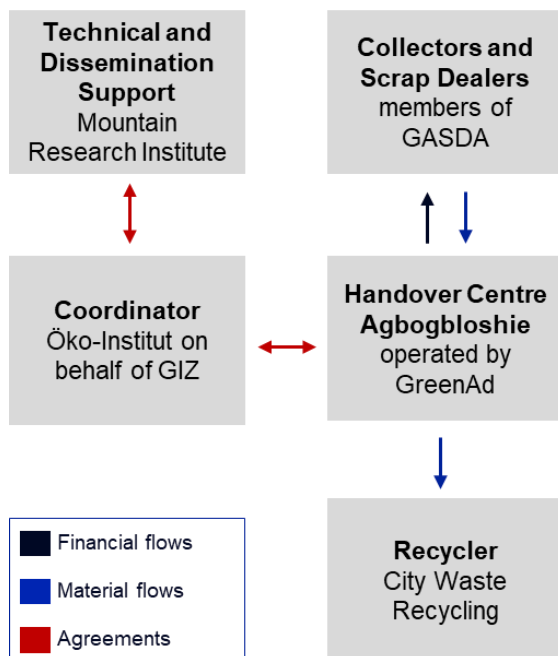
To improve the conditions for sustainable management and disposal of e-waste in Ghana, the German Federal Ministry for Economic Cooperation and Development (BMZ) launched a dedicated e-waste project in 2016. The project is implemented by GIZ in partnership with the Ghanaian Ministry of Environment, Science, Technology and Innovation (MESTI) and is thus commonly referred to as the MESTI-GIZ E-waste Project. At its core, the project supports relevant stakeholders to transform e-waste management from a widely unregulated and polluting sector into a modern and environmentally sound industry by introducing economically viable business models and conducting capacity building measures amongst stakeholders from the informal sector (GIZ)<sup>1</sup>.

As part of the project, an incentive and payment scheme for selected e-waste types was tested and piloted (Manhart et al. 2020). The pilot system was implemented within the Old Fadama Scrap Yard and focused on cables as the main choice of materials. The pilot was mainly implemented by the German Öko-Institut in close collaboration with the local NGO GreenAd, which owns a container-

<sup>1</sup> The project has two components: the technical cooperation component is implemented by GIZ and the financial cooperation component is implemented by MESTI project implementation unit (PIU) and financed by KfW.



based structure in the scrap market (known as the Agbogbloshie Recycling Center). GreenAd was responsible for local market surveys, purchasing test batches of cables, upgrading of the physical infrastructure and the on-ground implementation of the pilot (incl. running the handover centre, accepting and compensating cables at previously defined conditions as well as managing the incentive budget). In addition, the pilot scheme also involved City Waste Recycling as a formal recycler in Ghana and engaged them for environmentally sound recycling of collected cables and supporting the analysis of the collected waste. Strong institutional support was provided by MESTI, EPA and the Greater Accra Scrap Dealers Association (GASDA) (ibid.). GIZ repeatedly visited the pilot unannounced. Moreover, Mountain Research Institute (MRI) was contracted in order to support GASDA in outreach and dissemination activities.<sup>2</sup> Exchange of information between MRI, GIZ and GASDA was another critical aspect of the project, which lead to eventually to support from the Association. Workshops on pricing with MRI/ GIZ and GASDA are examples of this practise.



**Figure 11: Overview of case study #5: MESTI-GIZ pilot payment scheme**

Source: Manhart et al. 2019

The project determined an initial incentive level for cables, which was slightly above the local material value of waste cables, and included a service fee for collection and transport of the material (between 2.57 GHS/lb and 4.12 GHS/lb). As market reactions to these levels proved unsatisfactory, the price was increased stepwise (6.7 GHS/lb for high grade and 4.05 GHS/lb for low grade cables; 0.5 GHS/lb for plugs). The background of the incentive level was clearly communicated, equally the periodical review of the levels based on LME prices for copper, the exchange rate between USD and GHS and the required service fee to keep the system attractive for scrap collectors. The system became attractive to the collectors starting from week 7 into the project. Increasing trust into the system and a growing

<sup>2</sup> For a more detailed information, please refer to the project’s summary report, which is available for download at: [https://www.giz.de/en/downloads/giz2020\\_en\\_incentive\\_based\\_collection\\_e\\_waste%20ghana.pdf](https://www.giz.de/en/downloads/giz2020_en_incentive_based_collection_e_waste%20ghana.pdf)

awareness amongst the scrap workers, that incentive levels are above revenues from burning-based recycling activities were named as reasons for this development (see also figure below).

A handover centre was established within the scrap market where suppliers can deliver cables and get financially compensated immediately with mobile money to reduce security risk. Mobile money additionally offered the advantage that it was easy to handle and allowed for transparent book keeping. Every transaction was documented digitally (including photos) with a specific software for verification purposes. Additionally, cross-checks of the delivered material were conducted to increase transparency. During workshops representatives from GASDA and interested scrap dealers could get information about the incentive scheme during the initiation phase. The operating staff was paid a fixed salary.

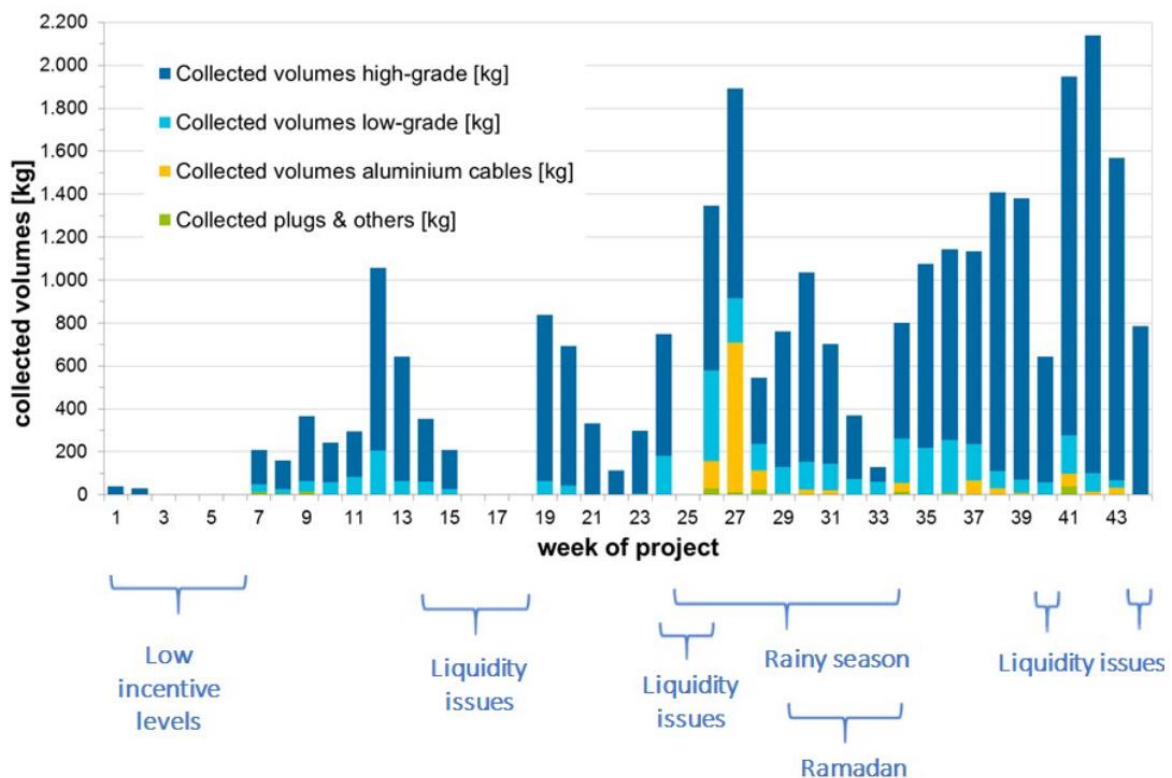


Figure 12: Weekly collection volumes over time (calendar weeks 43/2018 to 34/2019) of pilot payment scheme

Source: Manhart et al. 2020

Initial challenges mainly referred to the determination of appropriate incentive levels, which were sufficiently above the average market price in order to avoid open burning of cables. In its early stages, the scheme would also experience lower acceptance levels due to a newcomer effect: given the pilot character of the incentive payments, most collectors and scrap dealers were hesitant to terminate relations to former business partners in favour of entering a cooperation with the newly established handover centre. Further challenges resulting in lower quantities of collected cables on a short-term basis included liquidity issues as well as reduced activity and mobility during the rainy seasons and Ramadan.

While the scheme had to be gradually adjusted over the course of several weeks, operations eventually ran smoothly and demonstrated that the approach “has the potential to dry-out highly polluting cable



burning, while not ignoring existing players and structures in scrap collection and handling” (ibid.). The scheme ended up collecting a total of 27.5 tonnes of cables in 1389 individual transactions and contributed to a visible reduction in open burning of cables, thus also contributing to reduced air pollution in the immediate vicinity of the Old Fadama Scrap Yard. Data on the number of livelihoods affected was not assessed and thus remains unknown. The summary report concludes that the scheme has been proven to be successful. Thus, it may be replicated and adapted in other contexts. By linking collectors to formal handover centres, the approach can help eliminate hazardous working practices on a sustainable basis.

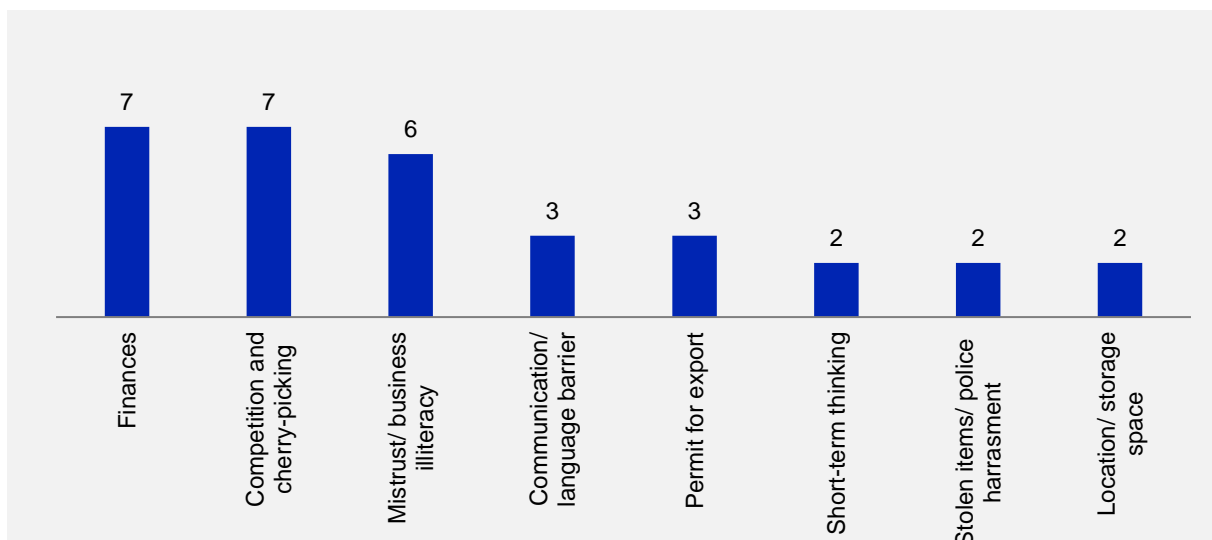
Notably, the approach was resumed in June 2020 in order to continue operations on a sustainable, long-term basis. Funding is provided by the German KfW as part of a financial cooperation project with the MESTI project implementation unit (MESTI-PIU). Upon resuming the scheme, the initial acceptance was good and it is thus planned to expand its scope to also cover other e-waste fractions besides cables (personal communication with A. Manhart, 2020).

## 4 AT THE CROSSROADS: PARTNERSHIPS BETWEEN FORMAL AND INFORMAL STAKEHOLDERS IN GHANA

The following section illustrates aggregate findings of the interviews on how to overcome some challenges to formalisation by going beyond individual case studies presented in the previous chapter. A tabular overview of the most important interview results can also be found in the Annex IV.

### 4.1 Challenges

Based on the interviews and stakeholder consultations, the following three aspects were identified as the most crucial challenges to the creation of long-lasting formal-informal partnerships: a lack of finance/access to finance; competition between formal and informal entities; and business illiteracy/mutual mistrust between business partners (see figure below).



**Figure 13: Challenges of formal-informal partnerships (number of mentions in interviews)**

Source: own depiction

*“Education is key. Due to ignorance many informal scrap dealers die young of lead poisoning but no one notices.”*

- Formal recycler

Some interviewees stated that a major challenge is a lack of understanding of business models and the positive impacts of proper waste management practices. This results in an absence of a formalised waste sorting culture, reduces the efficiency of waste management processes and ultimately increases the costs of operations. Many interview candidates thus propose to increase awareness about e-waste and its environmental and health implications in general. Awareness on specific good waste practices, such as waste sorting at the source as well as the provision of containers was highlighted as crucial by several respondents.

According to the interview respondents, business illiteracy is common and poses a great challenge for the sector as a whole. This entails lack of book-keeping, a lack of awareness on value generating practices and initial mistrust towards more formal business structures and written contracts. Most interviewed partners therefore advocate for additional training and building capacity in the sector. This should entail understanding of the regulatory framework (especially with regards to the Technical Guidelines), potential health hazards from mismanagement, business operations and non-monetary benefits of formal-informal partnerships. For more short-term solutions, it is recommended to involve intermediaries and associations to overcome the problem of illiteracy.

Additional benefits arise when engaging with associations, especially when starting new operations. However, establishing a trustful relationship with workers can be a great challenge and it was repeatedly emphasized that workers may break their promise and disappear with cash or equipment belonging to their financiers or may break rules on their assigned areas. Such claims make the involvement of associations more crucial as they can serve as intermediaries allowing members to be tracked and held accountable.

Other interviewees also point to that fact that choosing the right partner is critical and should not be underestimated, just as maintaining those trustful relationships. recellGhana for example benefits from its network and receives recommendations from partners for new agents. It was emphasized that continuous communication is a major factor to keep these agents engaged and resources should be allocated accordingly. Particularly critical for any interaction with local actors is knowledge of the local conditions as representatives of many organisations stated during the interviews. Several interviewees, including the Agbogloboshie Shine Initiative, recommend a thorough study of local conditions before starting any activities in the sector. Environment360 further advises the support of local organisations to benefit from their knowledge and to promote actions within the informal sector. For specific activities it is recommended to involve middlemen that are already established in the local community as well as interpreters fluent in local languages to overcome language barriers, which was named as a challenge by some respondents.

*“Formal organizations can hardly keep up with informal competition since the latter can use the cheapest (and mostly very harmful) processing methods. We pay for the disposal of acids while actors in the informal sector do not and dispose improperly.”*

- Formal recycler

Moreover, most respondents reported that access to funding is among the key challenges to building and scaling successful formal-informal partnerships. They note that donor funded initiatives are helpful in starting activities but lack sustainability. Representatives of formal recyclers indicated there are no funds for (secondary) recycling as well as start-up capital for trainees yet – although this may change with the disbursement of the funds collected under Act 917. Moreover, one respondent claimed that while no official subsidies are available, required tax payments and problems with the acquisition of funds, such as bank loans, make operations even more challenging.

Meanwhile according to the interviewees, the capital expenditures required for starting up operation in the e-waste sector is considerable as it typically involves investments in equipment, storage space and training measures. Such capital investments are perceived as high-risk as they may not be paid back when establishing and running an e-waste businesses.



**Figure 14: Fridge motors and cables bought by Fidev Company Limited from its agents**

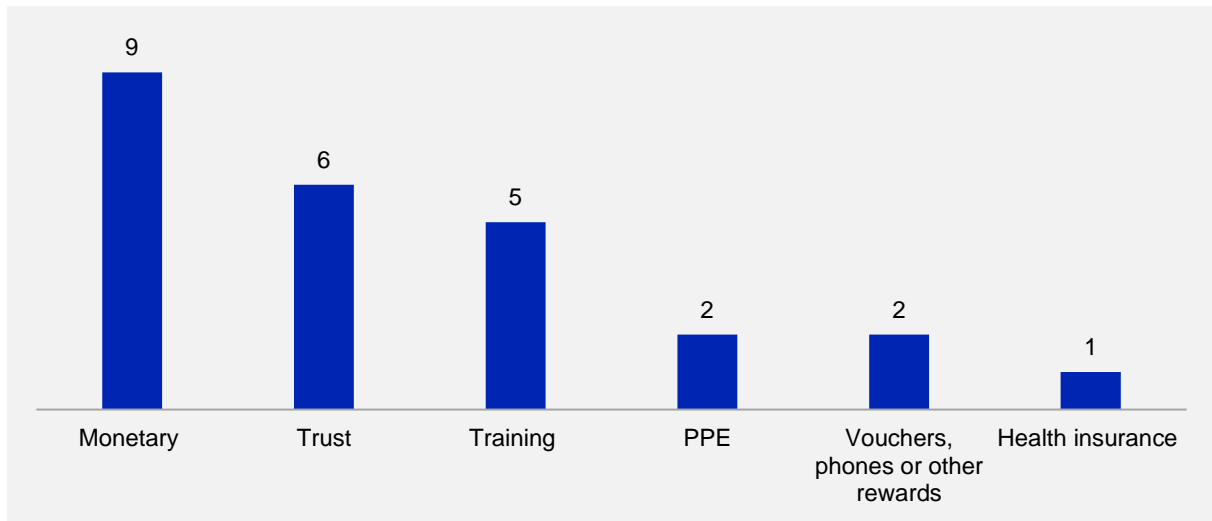
*Source: Ebenzer Kumi 2019b*

The high capital expenditures paired with intensive price competition coming from informal channels makes operating formal recycling businesses extremely challenging. Solutions to overcome funding gaps suggested include a proactive approach towards resource mobilization via external funding for initial activities (i.e. banks) and a broad portfolio of formal and informal suppliers to overcome a lack in material supply. Other challenges include selection of a right location, inadequate storage and treatment space as well as frequent accusation by the police on handling of stolen items. The latter challenge is worsened by some organizations’ inability to document every single piece of e-waste, which makes interaction with police forces challenging. A solution suggested by respondents was the implementation of exemption clauses for stolen goods on the receipts for collectors, which take the responsibility away from the formal organizations itself.

## **4.2 Incentives**

All organisations offer some kind of incentives to their business partners particularly their suppliers or informal collectors. Most common are monetary incentives: 9 organizations offer money to their collectors (see figure below). However, alternative benefits for business interactions have proven successful, too. City Waste Recycling for instance reports that their pioneering of health insurance incentive for collectors is working extremely well. Other organizations provide trainings, personal

protective equipment (PPE) and vouchers. Yet, trust and long-living relationships appear to be the second most relevant incentive, which is emphasised by several interview partners.



**Figure 15: Types of incentives offered by the organisations**

Source: own depiction

When analysing interview responses in the aggregate, it is evident that the key incentive for establishing links between formal and informal groups in the e-waste sector is financial in nature. These can take different forms, three of which were clear from the responses:

- First, *market price*: The key motivation for informal collectors is to receive a good market price, be it formal recyclers or (informal) intermediaries. All respondents mentioned that informal waste dealers’ first consideration for bringing waste to them is the prevailing market price they receive for it. Indeed, formal recyclers reported they would at times need to pay a price premium above the usual market price in order to ensure a steady influx of materials. As mentioned by one respondent, “any delay in paying for the goods from collectors means next time they will send it to another company” (personal communication 2019).
- Second, *pre-financing*: Pre-financing is a key incentive that is fostering partnerships between formal and informal e-waste dealers. This is mainly a result of the nature of the e-waste sector: “the scrap business is a cash and carry business” (personal communication 2019). Respondents report that they have built long term relationships with informal collectors and are able to pre-finance agents or informal dealers to a certain amount, depending on the longevity of the relationship. They conceive that pre-financing modalities are still risky but are willing to do it to allow informal dealers to supply large quantities that they would otherwise not have the financial capability to supply. For informal actors, pre-financing comes handy in giving them an edge over their competitors.
- Third, *vouchers*: Providing vouchers is another form of financial incentives that some few formal companies use to motivate consumers to bring their e-waste to their in-shop agents. The agents take broken or obsolete phones and computers from consumers and in return, consumers are given vouchers for accessory pickup or phone replacement. The value of the voucher given

depends on the extent of damage of the obsolete or discarded item. The vouchers are redeemable at the premises of formal recyclers and partner telecommunication networks.

### **4.3 Agreements**

All respondents operating at the crossroads between the formal and informal sector have some sort of agreements established with their business partners. However, the types of agreements differ and range from informal, verbal agreements to formal Memoranda of Understanding (MoU). Most are tailored to the type of partnership, the type of business model and other take into account other considerations.

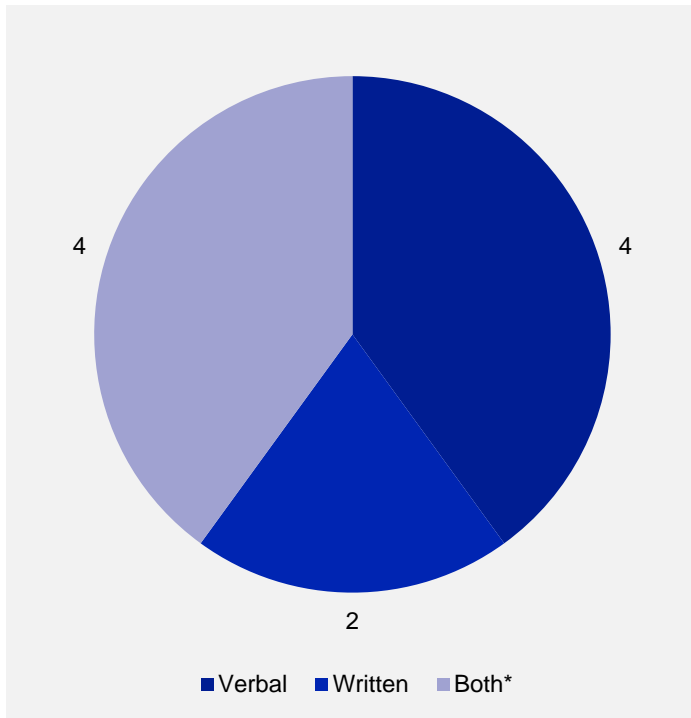
Based on the interview responses, it is evident that most agreements between formal and informal players are oral, bilateral and non-binding in nature. Such agreements are occasionally enforced by the use of pictures, e.g. as proof for the refurbishment of items. This approach appears to work well as informal players feel comfortable and do not have to worry about the burden of contractual arrangements due their lack of experience and capacities with formal paperwork in the sector. According to one respondent, “informal collectors are normally scared of paperwork” (personal communication 2019).

However, these fluid and non-documented agreements are inherently risky and not always reliable. Thus, some initiatives plan to establish simple, written contracts in the future to strengthen business relationships between both parties. One respondent indicated that it will offer trainings on the establishment of business operations to build capacities amongst their partners, with a special focus on women. Another seeks to build more professional agreements with simple contracts (i.e. 2-3 pages that do not entail complex content) and a “transparency tool” (not further specified). Accordingly, such contract will state: i) that the collector will sell an item to the contractor in a specific condition (not dismantled); ii) that the collectors agree to adhere to certain guiding principles (e.g. OECD principles and UN Guidance Principles of labour); and iii) that collectors agree with the story for marketing. Similarly, another respondent enters official contracts with agents that are signed by both parties and contain expectations of prices and working conditions of business.

City Waste Recycling for instance maintains direct contracts both with local collectors and the operator of the collection point (e.g. Caritas), who in turn have agreements with the collectors, too. The company also has a formal MoU with the scrap dealer association. Other initiatives operate in a similar way and maintain relationships with market women (collectors) through the Ashaiman Municipal Assembly, with whom they have signed a MoU. They hold non-binding and verbal agreements with their local partners and service agreements with formal companies such as multinationals and other waste companies. Those service agreements include “do’s and don’ts” of operations and specifics on the waste accepted, such as the conditions and types of waste that can be sent to the facility.

Other formal recyclers have informal agreements with their partners and pre-finance activities after long-lasting business relationships. For untrusted partners, a daily reimbursement for their services is common procedure. For agents who have proven to be trustworthy, pre-finances are based on their operational location and business type; they can go up to GHS 20,000. There is also the option for larger pre-payment amounts but those require a formal, written agreement. For a new dealer a guarantor

needs to co-sign the agreement and a background check is required. Moreover, an exemption clause for stolen goods is enclosed in the contract.



**Figure 16: Types of agreements between organisations and other actors in the sector**

Source: own depiction

The variety of business agreements show that it is elemental to tailor the type of agreement to the specific situation in the field. Formal written agreements might be useful for the interaction with larger companies or governmental offices, while informal verbal agreements are more practical for relationships with local collectors. Flexibility and continued re-evaluation of the situation may foster long-lasting and trustful business interaction. Moreover, training of business partners cannot only provide incentives for a successful cooperation but also enables vulnerable groups while strengthening business relations for both sides.

#### 4.4 Enabling conditions

*“The government can also help boost the scrap business by lifting ban on export of ferrous metals. As a result of the ban, few large scale foreign owned-companies enjoy monopoly yet are many times unable to pay supplies promptly. This is crippling the business.”*

- Formal recycler

In addition to the design and implementation modalities of formal-informal partnerships, the respondents further mentioned a range of enabling conditions that can pave the way for scaling models for formalisation. For instance, some initiatives mentioned that the export of recycled goods holds great challenges for recycling businesses. Permits are required to export recycled material and a lot of time and patience is required for the acquisition of these permits. Some report that the bureaucracy and informality in public authorities represents a major challenge in these processes and requires more

resources than necessary. Hence, adequate enforcement of public protocols was perceived as a key enabling criterion. Yet, even with available permits, some shipping companies may refuse loading the material. One respondent therefore emphasized the potential of building a prosperous recycling industry in Ghana. With more agile and modern companies on the market creating proof for successful operations within the country, challenges with export could be overcome and more value generating operations could benefit for the local economy.

*“To decrease dependency from the informal sector and affiliated risks, the company has a broad portfolio of suppliers, including formal companies. What we wish for is enforcement of legislation to create a level playing field. A solution can only be found through law enforcement, otherwise efforts will be without impact once a project stops. “*

- Formal recycler

Overall, more support from the government is requested by most of the initiatives. This relates to the accessibility of funds and tax benefits for environmentally and socially sound operating businesses. Yet, the creation of a level playing field and increased (financial and legal) recognition of formal recycling activities was perceived to be equally important. One respondent suggests that funds for proper recycling activities could be included in the legislation (going beyond Act 917) whereas others called for more cooperation and support from public institutions. Further, enforcement of existing legislations would help to level the field among all actors and support those business, who comply with the law and operate with proper practises. Notably, another suggestion was to involve religious leaders in policy discussions as a key enabling criterion to activate governmental actors.



## **5 WAY FORWARD: TOWARDS A FORMAL E-WASTE SECTOR IN GHANA**

Based on the findings from the literature review, expert interviews and stakeholder consultations, this chapter proposes a number of recommendations to create pathways towards large-scale formalisation of e-waste management in Ghana.

**Formal recyclers should expand relationships with scrap dealer associations and offer support for their professionalization.**

In the context of formalisation of the e-waste sector, the role of scrap dealer associations cannot be stressed enough. They can be, and have indeed proven to be, a well-suited vehicle for formalising the activities of informal workers in a step-wise approach while equally representing a reliable business partner for formal recycling industries. Formal recycling companies such as Blancomet, Fidev and Presank have referred to such associations as a facilitators of cooperation with informal workers, since they act as contact points to individual collectors. Hence, by maintaining and expanding relationships with scrap dealer associations, formal recycler can ensure a steady influx of materials and expand their collection network.

However, the loose nature and limited resource available to existing scrap dealer associations in Ghana suggest that their current capacities are insufficient in linking informal and formal players on a larger scale. At times, administrative operations are limited or completely absent, meaning that there are few to no member registries or records of activities. In addition, a lack of technical and legal know-how amongst associations gives rise to legal insecurities and transactional insecurities. Associations themselves need to optimise their administrative operations to be recognised as professional business partners. In this context, formal recyclers can offer their support and create value-added for associations to further professionalise.

To some extent, the E-waste Roundtable Association (E-WROTA<sup>3</sup>) already has embraced this task and works towards further professionalization across the sector. According to stakeholder consultations conducted for the purpose of this report, scrap dealer associations face the greatest need for support in regards to documentation of activities and member registries, the opening and maintenance of bank accounts, the facilitation of regular meetings with all members and the provision of identification cards of their members.

**Formal recyclers should offer financial incentives that are at least equally attractive as market price payments in order to ensure a steady influx of e-waste from collectors.**

Since informal recycling is mostly more cost-effective compared to formal recycling, many formal recycler report that accessing sufficient amounts of e-waste can be challenging. Till date, the single

<sup>3</sup> <http://ewrotagh.com/>

largest incentive for collectors to channel e-waste towards informal or formal recycling channels in Ghana are financial returns. This is predominantly perceived as competitive market-price payments. While the gap between formal and informal prices (cf. Figure 2) cannot be bridged by formal recyclers alone and will be addressed by the gradual implementation of Act 917, formal recyclers should consider offering alternative monetary incentives that make it attractive to informal collectors to enter long-term partnerships. Depending on the recycling process and the stakeholder involved, different options may be considered.

For instance, some recyclers have successfully established partnerships by offering contributions to pension funds or health insurance (e.g. City Waste Recycling). Others have decided to provide advance payments that, although perceived as risky, create the opportunity for collectors to acquire larger amounts of e-waste than usual. Regular payments of fixed salaries (per week or month) can be offered instead of payment per delivery. This allows for a reliable income, even if the overall payment might be lower (Hinchliffe et al. 2020). Regardless of the instrument involved, right pricing and adequate modes of payments are paramount. Clear pricing mechanisms and transparent reporting requirements can help to overcome challenges in collaborating with collectors.

**Formal recyclers should consider non-monetary incentives as powerful complementary instruments to establish long-term, trustworthy partnerships with collectors.**

Beyond financial incentives, several other non-monetary incentives can motivate the formation of formal-informal partnerships and can offer value to collectors or scrap dealer associations. Non-financial incentives can be provided by public authorities but are more likely to be provided by stakeholders from the private sector. In the case of recellGhana and Atlantic Recycling for instance, non-monetary incentives are offered in form of trainings on collection, dismantling and business development. Such trainings can reduce risks of pollution and injury and.

Further non-financial incentives may include access to public or private services, technical support to formalise as an individual or a group (i.e. forming an association of scrap workers or acquiring TIN numbers) and access financial services (e.g. by assisting in opening of a bank account, mobile money accounts or insurances). Moreover, other useful incentives can be provided in the form of equipment (e.g. access to recycling or logistics technologies), protective gear or uniforms for collectors or groups of collectors, ID cards that create public recognition as official service workers and technical assistance for filing tax returns or other legal requirements. Collectively, collectors may also benefit from advocacy activities to promote their rights as e-waste workers and certificates or other forms of compliance verification which protect collectors from unjustified legal prosecution. Lastly, Hinchliffe et al. 2020 suggest that promoting access to bulk consumers that dispose of larger amounts of e-waste can be regarded as a non-monetary incentives that also has positive financial implications due to increased revenues.

Amongst the plethora of potential non-monetary incentives however, trust and reliability appear to be the most crucial ones for establishing long-lasting partnerships. All of the interviewed stakeholders reflect that trust building is key in the e-waste business. While prices for e-waste items can vary

significantly, a reliability has proven to be beneficial for negotiation of prices (Kumi et al. 2019). Such relationships often need to evolve over prolonged periods of time and through repeated direct interactions. From the perspective of formal recyclers, such interactions should thus be understood as investments and opportunities for business development that can increase collection rates and thus boost revenues from recycling activities. Despite the power of non-monetary incentives, they are unlikely to work in isolation. Hence, formal recyclers are strongly encouraged to provide adequate financial returns in order to incentivise collection of e-waste.

**Formal recyclers should use adequate agreements that reflect the socio-economic needs and constraints of their partners.**

Agreements between formal operators and informal actors can take different forms, but lasting partnerships almost always rely on some sort of agreement. In most cases, the interviewed experts and formal recyclers confirmed that agreements between the involved parties are in place. These agreements can be verbal or in writing, depending on the nature of partnership. For instance, the ESPA tricycle initiative advocates for formalisation and utilizes written agreements to ensure that informal collectors are registered under an association under ESPA. Due to the transactional nature of the partnership – informal collectors can make purchase of tricycle at the price of GHS 9,500 – a written contractual agreement is required. However, some collectors may not possess the financial means nor the ability to sign written agreements due to a lack of formal education. In this case, other forms of agreement need to be entered.

Examples include agreements between Environment360 and Safi Sana vis-à-vis informal collectors. These are almost entirely based on verbal communication and are reported to strengthen the partnership significantly. Similarly, at the time of the interview with Closing the Loop, the organisation operated almost entirely on the basis of oral agreements that asked a local partner to establish relationships with a network of collectors. While oral agreements have a proven track-record or may represent the only viable option in certain conditions, more formalised contracts may be required for long-term business relations. Depending on the ability of the contractual counterparts, these contracts should be clear and comprehensible (e.g. 2-3 pages max) because many workers have never signed such documents before.

Going forward, written agreements are likely to become increasingly important. The main drivers behind this is push for formalisation by the implementation of Act 917 and LI 2250 where individual collectors and dismantlers are encouraged to register and/or form associations. For practical purposes, formal companies will effectively need such formal agreements and MoUs to monitor the activities of associations.

**Public authorities should provide financial and technical support to accelerate the pace of formalisation in the Ghanaian e-waste sector via scrap dealer associations.**

Despite a range of individual initiatives that have successfully formalised informal collectors in Ghana, accelerating the pace of formalisation will ultimately depend on the scale of governmental support. Such support can take many forms. For instance, governments can provide access to finance and tax benefits

to reward organisations that run environmentally and socially sound operations. At the central government level however, the disbursement of the e-waste fund established under Act 917 will be crucial in order to bridge the price-gap between formal and informal operations and incentivise collectors to channel e-waste towards authorised recyclers. In this context, the MESTI-GIZ pilot payment scheme offers valuable insight in regards to the required incentive set-up.

Looking at potential technical support measures, governmental authorities may consider conducting capacity building measures and initiating large-scale upskilling programs for not-yet-formalised workers in the e-waste sector. The role of associations could be further strengthened, e.g. by providing support and training programs that help their leaders to understand how the legal requirements stipulated by Act 917, LI 2250 and the Technical Guidelines should be transposed into the daily routines of e-waste workers. In addition, capacity building measures for administrative operations and business literacy may be provided. In the context of Act 917, clear guidance on how the financial resources of the e-waste fund can be utilised should be clearly communicated.

In the public space, scrap dealer associations should be recognised as important vehicles for formalisation in the e-waste sector. MMDAs need to recognise the operations of associations at the local level by openly engaging with them, simplifying business registration and creating opportunity spaces for formalised activities. This includes the provision of land in coordination with other relevant authorities so that well-organised and registered scrap dealer associations can operate safely and under scrutiny of the rule of law.

**Public authorities need to ensure the enforcement of existing legal requirements and create a level playing field amongst stakeholders from the formal and informal sector.**

A key barrier to formalisation of informal collection and recycling activities in Ghana is the prevailing price delta of informal transactions vis-à-vis formal transactions. At its core, the primary cause is that informal recyclers tend to compete at the neglect of environment, health and safety conditions and thus externalise costs to the general public. In this context, many of the interviewed stakeholders mentioned the need for increased monitoring and enforcement of existing regulations to reduce the prevalence of illicit practices.

To the extent possible, it is advisable to focus on the most polluting operations of the e-waste value chain first. One of more visible ill-practices include the open burning of cables, for which remarkable progress has been achieved already. Yet, less visible but equally polluting activities (e.g. inadequate disposal of lead acid batteries, crushing of CRT screens) continue to thrive. The enforcement of existing regulations is likely to throttle such activities and, in the long run, will ensure that formal collectors and recyclers are supplied with sufficient materials to create economies of scale, increase revenues and grow their business.

However, the application of existing regulations also touches upon other important aspects that lie somewhat outside the scope of Act 917, LI 2250 and the Technical Guidelines. Some of the interviewed stakeholder suggested that more support is needed for formal collectors and recyclers that want to export collected materials that cannot be recycled in Ghana. Business operations are often hindered or

interrupted due to export restrictions that require more enforcement to reduce bureaucracy for the authorisation of export permits.

**Non-governmental organisations should operate as intermediaries to facilitate the formalisation process and can take the role of mediators between formal recyclers and informal collectors.**

Although the success or failure of formalisation in Ghana will largely depend on the interplay between stakeholders from the public (e.g. enforcement agencies) and the private sector (e.g. formal recyclers), the role of non-governmental organisations (NGOs) should not be underestimated. Despite creating public awareness around important environmental issues in the e-waste space, NGOs can create a constituency for informal workers that are otherwise unheard of in political discourse. In addition, they can act as conduits for informal workers to gradually move under the legal ambit of the law and formalise their operations. Various case studies have shown that this approach can catalyse the rate of formalisation.

One notable example is Environment360, a non-profit organisation that is mostly involved with waste collectors and provides important support services such as capacity development and trainings on sorting and collection. It supports collectors with forming cooperatives. According to Environment360, cooperatives are “more appropriate than traditional business approaches as [they] appear to be more indigenous to Ghana”. By facilitating the process of formalisation, the NGO effectively serves as mediator that helps to aggregate waste and negotiate higher sales prices on behalf of independent collectors, depending on degree of purity. Instead of 30 to 50 pesewas per kg of PET, collectors receive 70 pesewas through the negotiations Environment360 has made with off-takers.

## **6 CONCLUSION**

With the introduction of Act 917, LI 2250 and the Technical Guidelines, the Government of Ghana has embarked on an ambitious journey to transform the country's e-waste sector from a system that is mainly driven by informal and highly polluting activities towards one that emphasises environment, health and safety standards and closed-loop approaches. In this context, the formalisation of informal workers in the Ghanaian economy represents an unprecedented historical challenge. According to the latest available assessments, about 4,500 to 6,000 people are directly employed by the informal e-waste sector in Ghana, while some 30,000 indirectly depend on it. Although the transition towards a formal waste management sector is unquestionably necessary, the livelihoods of informal workers should not be jeopardized and will require social protection.

Against this background, this study examined existing partnerships between formal and informal actors in Ghana by portraying a number of case studies that have made important contributions to the formalisation of the sector. Further, it provided insights on how these partnerships developed, what business and partnership models exist, what challenges they face and how they can be overcome. The study further provided recommendations for pathways under which informal workers can be integrated into the formal e-waste value chain without jeopardizing their livelihoods. Research conducted as part of this study suggests that successful step-wise transformation of the sector can only be achieved when the needs and constraints of relevant actors from the public, private and civil society are addressed. Scrap dealer associations are crucial vehicles for formalisation that are able to bridge the gap between formal and informal operators. There is a need for associations to further professionalize their business and for support from the government and the private sector (first and foremost formal recyclers).

Financial and non-monetary incentives are powerful instruments and should be chosen thoughtfully, tailored to the specific situation, and ideally, combined to achieve desirable effects and accelerate the pace of formalisation in the e-waste sector. Yet, non-monetary incentives alone are likely to be insufficient; hence, the creating of enabling framework conditions and enforcement of legal requirements from public authorities remains paramount. In addition, public authorities and private sector stakeholders can support the process of formalisation by means of capacity building measures and trainings, especially in regards to administrative operations and business literacy. Finally, NGOs can operate as intermediaries to facilitate the formalisation process and can take the role of mediators between producers and the informal sector.

## 7 BIBLIOGRAPHY

Chaturvedi, Bharati; Bacongus, Ira Beau; Heng, Kora; Ranjan, Abhay; Roy, Moushmi Ghosh (2005): inFORMAL-formal Creating opportunities for the informal waste recycling sector in Asia. Philippines. Hg. v. CHINTAN. Online verfügbar unter [https://www.chintan-india.org/sites/default/files/2019-08/chintan\\_study\\_informal\\_formal.pdf](https://www.chintan-india.org/sites/default/files/2019-08/chintan_study_informal_formal.pdf), zuletzt geprüft am 14.10.2020.

CTL (2017): Scrap agent who collects discarded mobile phones on behalf of CTL.

Daum, Kurt; Stoler, Justin; Grant, Richard (2017): Toward a More Sustainable Trajectory for E-Waste Policy: A Review of a Decade of E-Waste Research in Accra, Ghana. In: *IJERPH* 14 (2), S. 135. DOI: 10.3390/ijerph14020135.

Ebenzer Kumi (2019a): Biodigester at Safi Sana's site at Ashiaman.

Ebenzer Kumi (2019b): Fridge motors and cables bought by Fidev Company Limited from its agents.

Ebenzer Kumi (2019c): Mirror made from e-waste by Xtreme Upcycle.

epa and SRI: Technical Guidelines Environmentally Sound E-Waste Management. for Collectors, Collection Centers, Transporters, for Collectors, Collection Centres, Transporters, Treatment Facilities and Final Disposal in Ghana. Online verfügbar unter [https://www.sustainable-recycling.org/wp-content/uploads/2018/03/eWaste-Guidelines-Ghana\\_2018\\_EPA-SRI.pdf](https://www.sustainable-recycling.org/wp-content/uploads/2018/03/eWaste-Guidelines-Ghana_2018_EPA-SRI.pdf), zuletzt geprüft am 14.10.2020.

Ezeah, Chukwunonye; Fazakerley, Jak A.; Roberts, Clive L. (2013): Emerging trends in informal sector recycling in developing and transition countries. In: *Waste management (New York, N.Y.)* 33 (11), S. 2509–2519. DOI: 10.1016/j.wasman.2013.06.020.

Fairphone (2017): Day 3: Recell (our partner) visit. online. Online verfügbar unter <https://www.flickr.com/photos/fairphone/25890988348/in/album-72157690875311411/>, zuletzt geprüft am 15.10.2020.

George M. Bob-Milliar; Franklin Obeng-Odoom (2011): The Informal Economy is an Employer, a Nuisance, and a Goldmine: Multiple Representations of and Responses to Informality in Accra, Ghana. In: *Urban Anthropology and Studies of Cultural Systems and World Economic Development* 40 (3-4), S. 263–284. Online verfügbar unter [https://www.researchgate.net/publication/256979944\\_The\\_Informal\\_Economy\\_is\\_an\\_Employer\\_a\\_Nuisance\\_and\\_a\\_Goldmine\\_Multiple\\_Representations\\_of\\_and\\_Responses\\_to\\_Informality\\_in\\_Accra\\_Ghana](https://www.researchgate.net/publication/256979944_The_Informal_Economy_is_an_Employer_a_Nuisance_and_a_Goldmine_Multiple_Representations_of_and_Responses_to_Informality_in_Accra_Ghana).

Ghana NCPC (2020).

GIZ: Environmentally Sound Disposal and Recycling of E-waste in Ghana (E-Waste project). Unter Mitarbeit von Markus Spitzbart. online. Online verfügbar unter <https://www.giz.de/en/worldwide/63039.html>, zuletzt geprüft am 14.10.2020.

GIZ (2018): Inclusion of informal collectors into the evolving waste management system in Serbia. A roadmap for integration. Unter Mitarbeit von Višnja Baćanović, Bojan Batinić, Marija Bogdanović, Kristina Cvejanov, Vladica Dragosavljević, Zoran Milinković, Siniša Mitrović, Jelena Nešić, Čedomir Ribić, Šaban Salijević, Anne Scheinberg, Klaus Schmidt, Eva Schwab, Maša Šašić, Bojana Tot, Radmila Vladisavljević, Miodrag Živančev. Hg. v. Deutsche Gesellschaft für internationale Zusammenarbeit (GIZ) GmbH. Belgrade, Serbia. Online verfügbar unter [https://www.giz.de/en/downloads/GIZ\\_A\\_Road\\_Map\\_For\\_Integration\\_online\\_LiNKS.pdf](https://www.giz.de/en/downloads/GIZ_A_Road_Map_For_Integration_online_LiNKS.pdf), zuletzt geprüft am 14.10.2020.

Henzler, Mikael; Eisinger, Fredrik; Gaurav, Jai; Hemkhaus, Morton; Sinha, Satish; Mahesh, Priti; Mehra, Gautam (2017): Building the Link: Leveraging Formal-Informal Partnerships in the Indian E-Waste Sector. Unter Mitarbeit von Ellen Gunsilius Daniel Hinchliffe. Hg. v. Deutsche Gesellschaft für internationale Zusammenarbeit (GIZ) GmbH. Bonn, Germany. Online verfügbar unter <https://www.giz.de/de/downloads/giz2017-en-formal-informal-partnerships-e-waste-india.pdf>, zuletzt geprüft am 14.10.2020.

Hinchliffe, Daniel; Gunsilius, Ellen; Wagner, Michelle; Hemkhaus, Morton; Battgeiger, Alexander; Rabbow, Elena et al. (2020): Case studies and approaches to building Partnerships between the informal and the formal sector for sustainable e-waste management. Online verfügbar unter [https://www.step-initiative.org/files/\\_documents/publications/Partnerships-between-the-informal-and-the-formal-sector-for-sustainable-e-waste-management.pdf](https://www.step-initiative.org/files/_documents/publications/Partnerships-between-the-informal-and-the-formal-sector-for-sustainable-e-waste-management.pdf), zuletzt geprüft am 14.10.2020.

International Labour Organisation (2014): Tacking informality in e-Waste Management. The potential of cooperative enterprises. Geneva. Online verfügbar unter [https://www.ilo.org/wcmsp5/groups/public/-ed\\_dialogue/---sector/documents/publication/wcms\\_315228.pdf](https://www.ilo.org/wcmsp5/groups/public/-ed_dialogue/---sector/documents/publication/wcms_315228.pdf), zuletzt geprüft am 14.10.2020.

Kumi, Ebenezer; Hemkhaus, Morton; Bauer, Tim (2019): Money Dey for Borla - Assessment of Ghana's E-Waste Value Chain. Hg. v. adelphi. Berlin. Online verfügbar unter [https://www.adelphi.de/de/system/files/mediathek/bilder/Money%20Dey%20for%20Borla%20-%20Assessment%20of%20Ghana%E2%80%99s%20E-Waste%20Value%20Chain%20-%20adelphi\\_0.pdf](https://www.adelphi.de/de/system/files/mediathek/bilder/Money%20Dey%20for%20Borla%20-%20Assessment%20of%20Ghana%E2%80%99s%20E-Waste%20Value%20Chain%20-%20adelphi_0.pdf), zuletzt geprüft am 14.10.2020.

Manhart, Andreas; Akuffo, Bennett; Atiemo, Sampson; Attafuah-Wadee, Kweku; Jacobs, Johanna; Batteiger, Alexander (2019): Incentive based collection of ewaste – Results from pilot implementation in Ghana. Worl Resources Forum. Geneva, 23.10.2019. Online verfügbar unter <https://www.oeko.de/fileadmin/oekodoc/incentive-based-collection-ewaste-ghana-accra-agboglobshie.pdf>, zuletzt geprüft am 14.10.2020.

Manhart, Andreas; Akuffo, Bennett; Attafuah-Wadee, Kweku; Atiemo, Sampson; Batteiger, Alexander; Jacobs, Johanna; Osei, Nana (2020): Incentive Based Collection of E-Waste in Ghana. Findings from the pilot incentive system for waste cables from March 2018 to August 2019. Unter Mitarbeit von Alexander Batteiger. Hg. v. Deutsche Gesellschaft für internationale Zusammenarbeit (GIZ) GmbH. Accra, Ghana. Online verfügbar unter



[https://www.giz.de/en/downloads/giz2020\\_en\\_incentive\\_based\\_collection\\_e\\_waste%20ghana.pdf](https://www.giz.de/en/downloads/giz2020_en_incentive_based_collection_e_waste%20ghana.pdf),  
zuletzt geprüft am 14.10.2020.

Oduro-Appiah, Kwaku; Scheinberg, Anne; Mensah, Anthony; Afful, Abraham; Boadu, Henry Kofi; Vries, Nanne de (2017): Assessment of the municipal solid waste management system in Accra, Ghana: A 'Wasteaware' benchmark indicator approach. In: *Waste Manag Res* 35 (11), S. 1149–1158. DOI: 10.1177/0734242X17727066.

Oteng-Ababio, Martin (2011): When Necessity Begets Ingenuity: E-Waste Scavenging as a Livelihood Strategy in Accra, Ghana. In: *African Studies Quarterly* 13 (1&2). Online verfügbar unter [https://www.researchgate.net/publication/265143727\\_When\\_Necessity\\_Begets\\_Ingenuity\\_E-Waste\\_Scavenging\\_as\\_a\\_Livelihood\\_Strategy\\_in\\_Accra\\_Ghana](https://www.researchgate.net/publication/265143727_When_Necessity_Begets_Ingenuity_E-Waste_Scavenging_as_a_Livelihood_Strategy_in_Accra_Ghana).

Oteng-Ababio, Martin (2012): The Role of the informal sector in solid waste management in the Gama, Ghana: Challenges and Opportunities. In: *Tijdschrift voor economische en sociale geografie* 103 (4), S. 412–425. DOI: 10.1111/j.1467-9663.2011.00690.x.

Prakash, Siddharth; Manhart, Andreas (2010): Socio-economic assessment and feasibility study on sustainable e-waste management in Ghana. commissioned by the Inspectorate of the Ministry of Housing, Spatial Planning and the Environment of the Netherlands (VROM-Inspectorate) and the Dutch Association for the Disposal of Metal and Electrical Products (NVMP). Unter Mitarbeit von Yaw Amoyaw-Osei und Obed Opoku Agyekum. Öko-Institut e.V. Freiburg, Germany. Online verfügbar unter <https://www.oeko.de/oekodoc/1057/2010-105-en.pdf>, zuletzt geprüft am 14.10.2020.

Switch Africa Green (2016): Stories from Beneficiaries. Ghana, Kenya and Uganda. Quarterly Report (October - December 2016). Hg. v. UN Environment. UN Environment; UNDP; UNOPS. Online verfügbar unter [https://wedocs.unep.org/bitstream/handle/20.500.11822/33057/Quart\\_Dec2016.pdf?sequence=1&isAllowed=y](https://wedocs.unep.org/bitstream/handle/20.500.11822/33057/Quart_Dec2016.pdf?sequence=1&isAllowed=y), zuletzt geprüft am 14.10.2020.

Xtreme Upcycle (2019): Chair made from discarded car tyres.

# ANNEX I



## E-MAGIN GHANA E- Waste Management in Ghana

From Grave To Cradle

### E-MAGIN GHANA: A SWITCH AFRICA GREEN PROJECT – 2019

#### INTERVIEW GUIDE FOR BEST PRACTICE REPORT

##### INTRODUCTION

As part of the E-MAGIN project funded by the European Union, a consortium comprised of University of Cape Coast, Ghana National Cleaner Production Center, City Waste Recycling and adelphi is conducting a study on best practices for formalization in the e-waste value chain. The focus of the interview is on so-called formal-informal partnerships/initiatives which present forms of cooperation between “formalized” (i.e. registered) and informal stakeholders (unregistered) who are involved in collection, handling or processing of e-waste.

Interview partners include representatives from initiatives which make a positive contribution to formalizing informal structures, e.g. as part of an interface agency which bridges formal recyclers and informal collectors. The findings will be consolidated in a report on formal-informal partnerships which will provide recommendations regarding the process of formalization. These findings will be used to support a process of formalization in Ghana and provide policy advice which can scale up and replicate such initiatives.

##### DESCRIPTION OF INITIATIVE

- When was the initiative established?
- Where does it operate geographically?
- What are its activities / operations?
- How was it established?
- Who are the key actors? What is their role?
- How long have the partnerships between actors existed, are they still in place?
- What is the overall mission / aim of the initiative?
- In which regulatory framework does it operate? Are its activities mandated by legal provisions (e.g. in Act 917 and LI2250?)
- What is the legal form (e.g. for profit, cooperative, non-profit) of the initiative?

Figure 17: Interview guide (page 1)



Funded by the European Union



# E-MAGIN GHANA

## E- Waste Management in Ghana

From Grave To Cradle

### KEY INCENTIVES

- What are the motives of informal actors for partnering with you?
- What incentives do you give to the partnering actors?
- Why do your partners trust you? Why do you trust them?
- Do you offer any securities to your partners? If so, can you specify what type of securities?

### AGREEMENTS

- What are the specific agreements between you and your (formal/informal) partners? What form does this agreement have (contract, MoU, oral agreement)?
- What do these agreements entail specifically?
- How much time/resources were needed to make the partnership work?
- What are the most important agreements which make the initiative work?
- Which financial or other support mechanisms have been agreed upon between you and your partners?
- How tight or loose are actors coupled to one another?
- How do you communicate with your partners and how do they communicate with each other?
- What is necessary to ensure agreements persist in the long-term?
- What should the focus of formal-informal partnerships be? (e.g. knowledge exchange, agreements on areas of operation, work and environmental safety ...)

Figure 18: Interview guide (page 2)



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# E-MAGIN GHANA

## E- Waste Management in Ghana

From Grave To Cradle

### CHALLENGES

- What are to the main barriers to the success of your initiative? (barriers to formalisation)
- More specifically, what are the main barriers to
  - o linking the formal and informal sector?
  - o effective coordination among key stakeholders?
  - o efficient communication between all parties involved?
  - o making contractual agreements (if applicable)?
- How does the current legal and administrative context affect your initiative? e.g. Act 917, LI 2250, E-waste Guidelines and regional rules from MMDAs
- What are the external drivers that support/hinder the mechanism? How significant is their contribution towards the success or failure of the initiative?
- Were there any challenges in terms of making payments to actors from the informal sector? If yes, could you specify?

### SOLUTIONS

- What solutions did you apply to overcome the challenges mentioned before?
- Did you establish any binding agreements?
- How did you build trust among all parties involved and how did it help to overcome the challenges?
- How were payment mechanisms designed (if applicable)? How was this tailor-made to the needs of the informal sector?
- How can additional support from different stakeholders (e.g. government, private sector and/or civil society) be mobilized?

Figure 19: Interview guide (page 3)



Funded by the European Union



# E-MAGIN GHANA

## E- Waste Management in Ghana

From Grave To Cradle

### IMPACTS

- What are the impacts of the initiative in terms of
  - o environmental benefits?
  - o livelihoods of the local community?
  - o employment in the informal sector?
  - o bringing informal sector workers into a formal work status?
- How do you verify and quantify your impact?
- How much e-waste do/did you collect annually/monthly/weekly/daily?
- How did collection rates change after implementing the solutions outlined before?
- How did the solutions impact the initiative's financial situation? How did this affect the initiative?
- Which elements of the regulatory framework or which other conditions need to change in order to create impact on a larger scale?
- What resources are needed in order to increase the initiative's impact (e.g. finance, knowledge, people etc.)? In case of finance, can you quantify the needed amount and specify its purpose?
- What are the key aspects which could be replicated in other contexts and implemented on a larger scale?

### LESSONS LEARNT

- What are your key lessons learnt from working in this initiative when thinking about engaging the informal sector?
- Can you refer us to any other initiatives working to formalize informal workers in the e-waste space?

Figure 20: Interview guide (page 4)

## ANNEX II

**Table 4: Organisations interviewed within the scope of this report**

Organisation
The Agbogblo.Shine Initiative
Atlantic Recycling
Blancomet
Caritas
City Waste Recycling
Closing the Loop
Environment 360
Environmental Services Providers Association (ESPA): TRICYCLE SCHEME
Fairphone
Fidev
recellGhana
Safi Sana
Xtreme Upcycle

## **ANNEX III**

### **Case study: ESPA tricycle initiative**

ESPA, the Environmental Services Providers Association is an association of private waste companies handling waste of various categories for metropolitan and municipal and District Assemblies (MMDAs), in a public private-partnership (PPP) agreement. ESPA has set its principles in line with the government’s policy of maintaining a clean and a healthy environment for all citizens. As a declared priority, ESPA aims to close the gap between the informal and formal sector, while bringing together different environmental service providers together, to service as a platform for exchange on best practices.

In 2016, ESPA launched the Tricycle scheme, an initiative that aimed to improve the collection of solid waste in areas and communities not accessible by heavy-duty vehicles. Due to structural deficiencies in the local waste management systems, informal waste collectors were observed to dispose of waste at unapproved landfills by the municipal and metropolitan district assemblies. This resulted in several disputes between both parties, sometimes even leading to the persecution and arrest of informal workers. In order to alleviate avoidable stress and pressure in the relations between local authorities and informal collectors, ESPA introduced the tricycle initiative. The tricycle initiative was initiated with a tripartite agreement between ESPA, MMDA’s and the Association of Tricycle waste collectors. Under the agreement, informal collectors were to collect solid waste at slum areas only, to avoid conflict with traditional waste collection companies who operate with trucks. Working with a partner organization, ESPA arranged for 1500 tricycles to begin the project to boost the collection of solid waste.

A key incentive for informal collectors in joining the scheme was the chance to obtain the tricycles, which were more suited for collecting purposes than the often-used manual handcarts. Through flexible payment systems and long-term payment plans, the purchase of a tricycle was made more affordable. To assure a cost-efficient deployment of the tricycles, participants were guaranteed access to free repair services for their tricycles. Additionally, ESPA would agree to advocate for the participating collectors to ensure that they would avoid harassment and arrest by the Accra Metropolitan Authorities (AMA) authorities.

Since its inception in 2016, the ESPA tricycle scheme has managed to engage with around 600 waste collectors. According to ESPA, the collection of waste has risen from 60% to 80% in the targeted areas. Furthermore, AMA has recognized tricycles as an acceptable means of collecting solid waste, which other MMDAs are seeking to replicate around the country. Occasionally ESPA organised training for informal partners on the dangers associated with improper handling of waste and on their personal grooming.

However, these accomplishments were preceded by several challenges that had to be addressed by ESPA. Initially the scheme was met with dismissal from the informal sector, as it was seen as a

takeover agenda. In addition, some municipal administrations circumvented the project by obtaining their own tricycle fleet and foregoing the proper training, that was part of the ESPA tricycles scheme. With the help of the task force, non-licensed tricycle collectors upon identification were instructed to register to join the tricycle scheme. In order to build upon the initial achievements of the project, ESPA is trying to organise more training sessions for partners to help them improve their reading and writing skills. ESPA also identified that partly collection points for solid waste are sometimes inaccessible with tricycles, which is why they are advocating for additional “holding centres” that can be used for waste collection.



**Case study: Safi Sana Ghana**

Safi Sana is a social enterprise that was established in the Netherlands in 2010 by a collective of the NGO Aqua for All, the University of Wageningen and three companies, Rabobank, Shell and Royal Haskoning DHV. Safi Sana is dedicated to the development and testing of the usage of sanitary waste as a raw material to valuable products. A key objective of Safi Sana is the establishment of a viable business model, so that the proposed concepts can be adopted by local collectives.

The project started operating formally in Ghana after the Ghana Renewable Energy act 832 was passed in 2011. By 2016 Safi Sana had set up its first pilot plant in Ashaiman Municipality within a tripartite collaboration with the Training, Research and Networking for Development (TREND) and the Ashiaman Municipal Assembly. In the factory, waste is treated in a digester to create organic fertilizer, irrigation water and biogas-used for producing electricity. The irrigation water and part of the organic fertilizer are used to grow seedlings. Sales of these products (i.e. electricity, bio fertilizer, seedlings) cover operational cost, ensuring long-term sustainability.

Since becoming operational in September 2016, Safi Sana Ghana has managed to convert 30 tonnes of waste each day into 2,200 kWh of electricity, 2 tonnes of fertilizer and 20,000 litres of irrigational water.

Eventually managerial responsibilities of the plant, which is currently directly managed by Safi Sana Ghana, will be transferred to the Ashiaman Municipal Assembly. Waste is mainly sourced within the municipality from women working on local markets, abattoirs and the local community. Safi Sana provides waste bins at strategic points at local markets for waste to be sorted and dumped into it. This saves space and time needed to send waste to public waste bin.

Partially sorted waste is collected by motorist from Safi Sana and sent back to the company plant for conversion and treatment.

Agreements with informal partners such as market women are non-binding and verbal and are built upon a foundation of trust. As agreed upon in the MoU signed by the Ashiaman Municipal Assembly and Safi Sana Ghana, the municipality manages the relations with the communication and interaction with informal partners. With the help of the municipality, local collection partners were educated on the importance of sorting waste, which overall increased the process efficiency in the waste treatment plant. Furthermore, containers were provided to ensure the separate collection of different waste streams.



**Figure 21: Biodigester at Safi Sana’s site at Ashiaman**  
(Ebenzer Kumi 2019a)

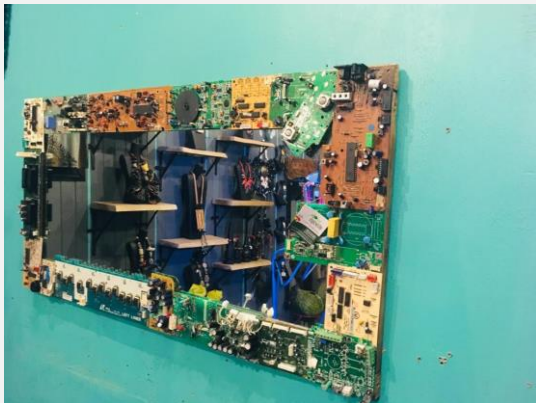
Few companies including Nestle Ghana and Olam Group also pay a fee to dispose of their solid waste to the company. Safi Sana offers these private companies the opportunity to monitor and trace their waste treatment. The company’s relationship with these multinationals and other waste companies are guided by service agreements. The agreements contain a code of conduct and specify the types of waste to be accepted and its mandatory conditions.

Currently the company employs 25 permanent staff on site, with 90% of employees coming from nearby communities, and regularly calls in additional staff when waste volume at the site increases. A toilet constructed in the nearby community and connected to the company’s bio digester has also reduced open defecation in the community, which improves sanitation and health. In collaboration with local and international NGOs, Safi Sana invests in social marketing activities to raise hygiene standards with the local communities. Moreover, the company provides slots for University interns and continuously conducts research. The objective is to use the plant not only for waste conversion, but also for promoting experiments by local students and/or researchers, from Ghana and beyond.

**Case study: Xtreme Upcycle**

Xtreme Upcycle is a manufacturer of accessories and jeweller established in 2002 as an NGO. In January 2019, it was registered as a limited liability company. It employs 57 people, out of which 50 are part-time and 7 permanent staff. The business model of Xtreme Upcycle is built upon the innovative use for sustainable materials and the conversion of e-waste, used vehicle tyres & tubes, scrap, bicycle wheels, palettes, broken bottles, coconut shells and reclaimed & drift wood into products ranging from chairs, tables, chandeliers, desk, pub counter, jewellery, amongst others. The company’s goal is to change the perception on waste and contribute to the Sustainable Development Goals.

Xtreme upcycle sources its materials from informal collectors at Agbogbloshe, where partnerships are established upon a mode of instant payment, which fosters reliability and trust between both trading intermediaries. Due to hesitancy of the informal sector to sign formal agreements, Xtreme Upcycle and informal waste collectors mostly rely on verbal agreements. To strengthen their bargaining position, the company offers trainings, especially for women, on business fundamentals and possible financial contribution to tuition fees of family members of waste collectors.



**Figure 22: Mirror made from e-waste by Xtreme Upcycle**  
(Ebenzer Kumi 2019c)

Xtreme Upcycle also had to organize educational seminars on the type and kind of waste that is suitable for the company. The company further stresses the inclusion of collectors, by regularly presenting finished products to the collectors.



**Figure 23: Chair made from discarded car tyres**

*(Xtreme Upcycle 2019)*

The aptly named “waste wizards” have been part of several local and international upcycle Exhibitions and have been recognized with three awards, from UNDP Burkina Faso, Green Awards in Ghana and SIAO. In order to address the inherent social responsibilities of the company, Xtreme Upcycle donates 5% of every sale of item to the education of underprivileged girls in different communities and has organised 20 mentorship programmes for schools so far. In addition, the company has held awareness events on climate change especially in basic schools. For instance, it recently launched a tree planting campaign at Dowenya Methodist B school.

The company notes that sourcing of finances and retrieval of sponsorships has been a tedious undertaking since its inception.

**Case study: Environment360**

Environment360 started operations in 2014 and is a fully licensed non-profit organization since 2015. Env360 primarily works together with stakeholders along the waste management value-chain in order to foster sustainable and efficient collection systems. Env360 informs scrap dealers on existing valuable fractions in waste streams, such as PET, HDPE and e-waste components, which results in more diversified collected fractions and a more streamlined collection system. Through close collaborations with scrap dealers' associations and their networks, they are able to disseminate their support directly to the local scrap dealers.

By sensitizing scrap dealers to the different waste fractions and their different values, collectors are made aware of the further processing potentials of the waste fractions. This incentivizes separate collection mechanisms, which in turn enables more efficient recycling and re-use practices in the waste sector. The company engages directly with the different scrap dealers and provides trainings and auditing services, which aid in the selection of the different waste fractions. Furthermore, Env360 offers capacity development trainings for waste collectors, which aim to equip enterprises with the basic proficiencies of effective business-related problem solving. For example, Env360 helps enterprises to define collection targets for the different waste streams in order to break-even. Additionally, Env360 acts as an interface agency for collectors to negotiate prices for their collected waste streams on their behalf with authorized buyers, such as licensed recyclers. Accordingly, collectors manage to obtain higher prices for their waste fractions with the provided buyers, than in the informal sector. Moreover, Env360 also seeks to make the waste sector more inclusive, by specifically supporting collection initiatives managed by women and by integrating women into the organizational structures of collection cooperatives.

Env360 also lead the establishment of the Pick-It sorting centre in Tema New Town, which provided the local coastal community with a collection and purchasing centre for waste fractions. The project addressed an existing gap in the means of collaboration for community waste pickers and recycling and reuse enterprises. Env360 is also involved in an on-going project in Kumasi and Accra, where two PET take-back systems have been set up in collaboration with the German development agency GIZ.

Referring to some of the challenges of engaging with the informal sector, Env360 has acknowledged that one of the prerequisites for a collaborative effort between both parties is a foundation of trust, based on long-lasting relationships. Similar to other organizations in the sector, Env360 calls upon legislators to assist the legitimization of informal networks and to form a just and holistically approved transition to the formalisation and professionalization of the waste sector.

### **Case study: City Waste Recycling**

City Waste Recycling Ltd. (CWR) is a registered e-waste management business. CWR has been operating their facilities since 2012 in the e-waste sector and is involved in numerous processes along the e-waste management value chain, including the collection, transportation, dismantling, recycling and export of e-waste. They are founded on the principles of sustainable and formalised e-waste management structures.

By 2019, CWR had established a total of official 8 collection points. The collection points were set-up in cooperation with Caritas Ghana, a catholic charity organization, which is why most collection points are nearby catholic houses of worship. Fifty percent of the collected waste is collected from private households, which primarily donate their non-functional electronic devices at the collection points, while the remainder is collected from both informal and formal collectors. If WEEE is not donated, the items are bought at the local market price. Collection at the designated points follows exact recording procedures, so that items can be traced back to the individual collectors, in order to avoid and trace the recurrence of possible stolen items. Once the collection points have accumulated around one tonne of WEEE, CWR picks up the containers.

In the year of 2018 City Waste had collected and treated 500 tonnes of e-waste, while in 2019 they had projected 1000 tonnes of collected and treated e-waste. At the end of the treatment process, around 90% of the dismantled materials are sold for re-use. According to CWR estimates, their collection network consists of around 500 collectors. Due to the close interweavement of the e-waste sector and informal networks, CWR has implemented certain policies, in order to withstand as a formal enterprise within the e-waste sector.

CWR has been actively acquiring formal collectors into their portfolio for their collection points and has built up a foundation of trust with the formal collectors, due to their records of accomplishment of implementing best practice treatment of WEEE. This primarily helps them to stabilize their collection input. Additionally, CWR has adopted the triple bottom line framework, which integrates the three pillars of sustainability into the business reporting structure. This falls in line with another effort by CWR, that is aimed at incentivizing informal collectors to trade in their collected e-waste at the Caritas collection points. CWR offers health insurance services restricted to one year to collectors, if the collector reaches 1000 tonnes of transacted WEEE with the formal collection points. To further integrate formalisation processes in the e-waste sector, CWR holds a Memorandum of Understanding with the scrap dealer’s association in Ghana, as well as written contracts with the collection points operated by Caritas. Furthermore, CWR has been conducting best practice trainings for workers employed in the e-waste sector. By providing a support framework for the training participants, CWR tries to ensure that efforts have a long-term effect.

However, similar to other formally established ventures, CWR is still disadvantaged by the highly competitive prices found in the informal sector. A level playing field or the informal and formal sector, manifested in a juridical framework, would ensure grounds of fair competition for formal enterprises.

## ANNEX IV

Table 5: Aggregated findings of the interviews

Incentives	Agreements	Challenges	Solutions
<b>The Agbogblo.Shine Initiative</b>			
<ul style="list-style-type: none"> <li>- Monetary</li> <li>- Trust and rapport</li> </ul>	<ul style="list-style-type: none"> <li>- Verbal (informal)</li> </ul>	<ul style="list-style-type: none"> <li>- Short term thinking of community members</li> <li>- Language barriers</li> <li>- Initial mistrust</li> <li>- Long term sustainability through donor funding</li> </ul>	<ul style="list-style-type: none"> <li>- Building trust gradually with informal e-waste dealers</li> <li>- Crossing Language barriers with local interpreters</li> <li>- Studying and understanding the ecology of Agbogbloshie</li> </ul>
<ul style="list-style-type: none"> <li>- Atlantic Recycling</li> <li>- Vouchers (partnership with telecommunication networks)</li> </ul>	<ul style="list-style-type: none"> <li>- Verbal</li> <li>- Pictures as proof of refurbishment of items</li> </ul>	<ul style="list-style-type: none"> <li>- The culture of keeping old stuff without giving them away.</li> <li>- Start-up capital for trainees</li> <li>- Funds for recycling and secondary recycling is not accessible</li> <li>- Competition with informal sector; informal dealers are willing to buy obsolete gadgets at lower price</li> <li>- Valuable resources found in WEEE is sometimes overhyped; only one-fifth of content is valuable.</li> <li>- Recycling of the plastic content of gadgets is also a challenge which Atlantic Recycling is facing</li> <li>- Inadequate storage space</li> </ul>	<ul style="list-style-type: none"> <li>- Training for informal dealers on the health issues</li> <li>- Sensitizing the public</li> <li>- Company segments, focusing on a niche: buying only items that can be refurbished in order to save storage space</li> </ul>

Incentives	Agreements	Challenges	Solutions
		<ul style="list-style-type: none"> <li>- Sensitization of e-waste not adequate</li> </ul>	
<b>Blancomet</b>			
<ul style="list-style-type: none"> <li>- Monetary Pre-financing in some cases (risky) Smaller incentives (e.g. cash or phones on festive occasions)</li> </ul>	<ul style="list-style-type: none"> <li>- Written</li> </ul>	<ul style="list-style-type: none"> <li>- Trust (disappearing workers)</li> <li>- Competing companies</li> <li>- Effective communication</li> <li>- Accusations of stolen items via police (documentation of every piece is not possible)</li> <li>- Lack of support by government (no recognition, no level playing field.</li> <li>- Lack of funding</li> <li>- Inappropriate location (many components cannot be treated at current location)</li> </ul>	<ul style="list-style-type: none"> <li>- Involvement with associations (can be held accountable if workers disappear)</li> <li>- Option of tapping into funds through legislation</li> </ul>
<b>Caritas</b>			



Incentives	Agreements	Challenges	Solutions
<ul style="list-style-type: none"> <li>- Monetary</li> </ul>	<ul style="list-style-type: none"> <li>- n/a</li> </ul>	<ul style="list-style-type: none"> <li>- Covering investment costs</li> <li>- Effective cooperation and support from public policy institutions. Work load in setting up such initiatives is underestimated</li> </ul>	<ul style="list-style-type: none"> <li>- Advocacy and training to build internal capacity (to understand the regulatory framework)</li> <li>- The need for religious leaders to hold policy discussions with governmental actors</li> <li>- Short term approach for funding: request to GIZ</li> <li>- Getting proactive in terms of public relations and resource mobilization (external funding)</li> </ul>
<b>City Waste Recycling</b>			
<ul style="list-style-type: none"> <li>- Monetary (Competitive prices)</li> <li>- Health insurance (1000 for 1 Initiative)</li> <li>- Training (on how to get best prices&amp; health topics)</li> <li>- Trust</li> </ul>	<ul style="list-style-type: none"> <li>- MoU (with scrap dealer association)</li> <li>- Written contracts (with collection points/ Caritas)</li> <li>- No contracts between collection points and local collectors</li> </ul>	<ul style="list-style-type: none"> <li>- Pricing</li> <li>- Cherry picking of e-waste (retrieving valuables and dumping or burning invaluable)</li> <li>- No level playing field which allows informal collectors to mishandle e-waste.                             <ul style="list-style-type: none"> <li>- no enforcement of legislation</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>- Broad portfolio of suppliers (incl. formal companies)</li> <li>- Offering health insurance as successful concept with collectors</li> </ul>
<b>Closing the Loop</b>			

Incentives	Agreements	Challenges	Solutions
<ul style="list-style-type: none"> <li>- Closing the Loop</li> <li>- Monetary Trust (longstanding business relationships)</li> <li>- Trainings and awareness raising events</li> </ul>	<ul style="list-style-type: none"> <li>- Verbal (with local partners)</li> <li>- Written, simple agreements planned</li> </ul>	<ul style="list-style-type: none"> <li>- Choosing the right partner Getting permits (corruption involved, costs time and patience)</li> <li>- Shipping can be difficult (companies might refuse loading even if permit is present)</li> <li>- Making locals understand the business model of CTL and communicating benefits of CE</li> <li>- Business illiteracy of locals (lack of book keeping etc.)</li> </ul>	<ul style="list-style-type: none"> <li>- Contract with representative of waste pickers (intermediaries help to overcome problem of illiteracy)</li> <li>- More financial investments: if the pilot works, CTL will scale up very fast</li> </ul>
<b>Environment360</b>			
<ul style="list-style-type: none"> <li>- Monetary (payments above market price, advance payments in rare cases)</li> </ul>	<ul style="list-style-type: none"> <li>- Mostly verbal and non-binding</li> <li>- Trust</li> <li>- Written documents in rare cases</li> </ul>	<ul style="list-style-type: none"> <li>- Reluctance of collectors to collect a variety of material-no long-term thinking.</li> <li>- Lack of value generating practices</li> <li>- Lack of knowledge on local conditions</li> <li>- Dependency on foreign aid (long history)</li> </ul>	<ul style="list-style-type: none"> <li>- Support of local organizations (to understand local conditions and promote positive waste actions)</li> <li>- Building trust and involving established middlemen</li> <li>- Getting policy makers involved (legitimization of action, (business) engagements)</li> <li>- More dynamic relationship between private and governmental stakeholders</li> </ul>
<b>Environmental Services Providers Association (ESPA): TRICYCLE SCHEME</b>			

Incentives	Agreements	Challenges	Solutions
<ul style="list-style-type: none"> <li>- Ownership of tricycle as transport equipment (improvement of operations, credibility, avoidance of harassment by authorities, potentially increased income)</li> <li>- Personal protective equipment</li> <li>- Trainings</li> </ul>	<ul style="list-style-type: none"> <li>- Payment plan for tricycles (incl. free repair guarantee)</li> </ul>	<ul style="list-style-type: none"> <li>- Language barrier</li> <li>- Collection outside of assigned areas</li> <li>- Getting recognized by institutions</li> <li>- Accessibility of dumpsite with tricycles</li> <li>- Politicization of Tricycle Initiative</li> <li>- Some members do not meet 18 months payments plan</li> </ul>	<ul style="list-style-type: none"> <li>- Identification and arrest of illegal riders - task force arrested them and later trains and registers them when they want to join the scheme</li> <li>- Trainings on health hazards</li> </ul>
<b>Fidev</b>			
<ul style="list-style-type: none"> <li>- Monetary (financial packages)</li> <li>- Trust (long-term relationships)</li> </ul>	<ul style="list-style-type: none"> <li>- Informal agreements</li> <li>- Written agreements (for bigger pre-payment amounts, exemption clause for stolen goods)</li> <li>- Guarantor for new dealers and background checks</li> </ul>	<ul style="list-style-type: none"> <li>- No subsidies by government but tax payments required</li> <li>- Trustworthiness of informal scrap dealers</li> <li>- Acquisition of funds such as bank loan</li> <li>- Price speculations</li> <li>- Hesitation of signing formal documents</li> <li>- Police harassment (stolen goods)</li> </ul>	<ul style="list-style-type: none"> <li>- Vetting informal dealers (understudy new collectors for close to 5 years before pre-financing)</li> <li>- Exemption clause for stolen goods on receipts</li> </ul>
<b>recellGhana</b>			

Incentives	Agreements	Challenges	Solutions
<ul style="list-style-type: none"> <li>- Monetary (competitive market prices)</li> <li>- Support (even in private matters, microcredits)</li> <li>- Trainings</li> <li>- Transparency about positive impact (creates motivation)</li> </ul>	<ul style="list-style-type: none"> <li>- Written contracts with agents</li> </ul>	<ul style="list-style-type: none"> <li>- Prices/ financing risks of pre-investment (although necessary)</li> <li>- Expectations from agents and the human relationship aspect</li> <li>- Relationships need to be handled well otherwise it becomes a strong demotivating factor for agents</li> <li>- Expectation from the Dutch Development Bank to increase capacity to other African countries in order to be eligible for financial resources</li> <li>- Exporting (takes a lot of time, since for every shipping several permissions are necessary)</li> </ul>	<ul style="list-style-type: none"> <li>- recellGhana sources from its network (recommendations from partners/ repair centres) for recruitment of new agents, to find trustful individuals</li> <li>- Continuous communication is a major factor in keeping agents engaged</li> </ul>
<p><b>Safi Sana</b></p>			

Incentives	Agreements	Challenges	Solutions
<ul style="list-style-type: none"> <li>- Reduction of travel time for waste collectors (sending it to Safi Sana instead of Kpone landfill site)</li> <li>- Monitoring of waste flows for multinationals which allow them to get ISO certification</li> <li>- Provision of waste bins at central locations (saves resources)</li> <li>- Partnership based on trust</li> </ul>	<ul style="list-style-type: none"> <li>- Written agreement with Ashaiman Municipal Assembly (MoU)</li> <li>- Agreements between Ashaiman Municipal Assembly and market women</li> <li>- Non-binding and verbal agreements with local partners</li> <li>- Service agreements with formal companies</li> </ul>	<ul style="list-style-type: none"> <li>- Lack of waste sorting culture (Plastics and other materials are sometimes added to organic waste which reduces the efficiency of the process)</li> <li>- Market women currently want to charge Safi Sana for collecting waste although previously they were paying other waste collectors to come for their waste</li> <li>- Realizing that Safi Sana turns the waste to valuable products they now are reluctant to give their waste for free</li> </ul>	<ul style="list-style-type: none"> <li>- Training of market women (waste sorting)</li> <li>- Provision of containers for sorting to informal partners</li> <li>- Training on non-monetary benefits</li> </ul>
<p><b>Xtreme Upcycle</b></p>			

Incentives	Agreements	Challenges	Solutions
<ul style="list-style-type: none"> <li>- Monetary (Instant and reliable payments) Social impact (donations to education of underprivileged girls) Contribution of child’s tuition of partners</li> <li>- Trainings</li> <li>- Showcasing of finished products (creating ownership)</li> </ul>	<ul style="list-style-type: none"> <li>- Verbal agreements</li> </ul>	<ul style="list-style-type: none"> <li>- Getting the right customers for such products</li> <li>- Lack of storage space</li> <li>- Money been the motive of collectors, they bring in unwanted materials.</li> <li>- Sourcing of finance and sponsorship for the nature of work</li> </ul>	<ul style="list-style-type: none"> <li>- Collectors are educated on the type and kind of waste to source for the company</li> <li>- To get the right customers: showcase their product at national and international events and fairs to draw the general public attention.</li> </ul>