

INVESTING IN THE WASTE AND CIRCULARITY SECTOR IN KENYA

Integrated Waste Management Guide





ABOUT ANDE

The Aspen Network of Development Entrepreneurs (ANDE) is a global network of organizations that propel entrepreneurship in developing economies. ANDE members provide critical financial, educational, and business support services to small and growing businesses (SGBs) based on the conviction that SGBs create jobs, stimulate long-term economic growth, and produce environmental and social benefits.

As the leading global voice of the SGB sector, ANDE believes that SGBs are a powerful, yet underleveraged, tool in addressing social and environmental challenges. Since 2009, ANDE has grown into a trusted network of over 250 collaborative members that operate in nearly every developing economy. ANDE grows the body of knowledge, mobilizes resources, undertakes ecosystem support projects, and connects the institutions that support the small business entrepreneurs who build inclusive prosperity in the developing world. ANDE is part of the Aspen Institute, a global non-profit organization committed to realizing a free, just, and equitable society.

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KOIS is a leading international impact investment and innovative finance advisory firm founded in 2014. KOIS offers consulting services to design, structure, and place a diverse range of innovative impact financing instruments, as well as to help organizations shape strategies to enhance their societal impact. KOIS also deploys return-seeking capital in social enterprises and impact investment funds.

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IKEA Foundation

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TABLE OF ABBREVIATIONS

▶ ABBREVIATIONS

CapEx: Capital expenditures	NGOs: Non-governmental organisations
CO2e: Carbon dioxide equivalent	OpEx: Operational expenses
DFIs: Development finance institutions	PPPs: Public-private partnerships
EMCA: Environmental Management and Co-ordination Act	PROs: Producer responsibility organisations
EPR: Extended producer responsibility	R&D: Research and development
ESOs: Enterprise support organisations	SDGs: Sustainable Development Goals
GHG: Greenhouse gas	SGBs: Small and growing businesses
IoT: Internet of Things	SWMA: Sustainable Waste Management Act
KSh: Kenyan shilling	VAT: Value-added tax
NEMA: National Environment Management Authority	

▶ DEFINITIONS¹

- 1 Idea stage**
The business is little more than an unproven idea, so the focus is on testing the idea and identifying a product-market fit.
- 2 Start-up stage**
The business is in the early stages of operations.
- 3 Early stage**
The business may have initial market traction and early revenues but will likely not yet be generating profit.
- 4 Growth stage**
The business demonstrates steady growth or scaling and likely profitability.
- 5 Mature stage**
The business has likely reached stable profits; growth may have slowed.

1. ANDE, Green Entrepreneurship in Kenya, 2023

INTRODUCTION

Integrated waste management refers to businesses that are providing solutions across the waste management value chain and its sub-sectors to prevent, reuse, recycle, recover or dispose of various types of waste. These businesses often provide households, companies and organisations with waste collection services before segregating the collected material and treating it. They then recycle a part of this waste themselves and/or sell segregated and treated waste of other types to specialised recyclers.

Every day, Kenya produces over 24,000 tons of waste, amounting to 8.8 million tons annually. Most of this waste is currently mismanaged, with more than 75% of waste in Kenya being incinerated or disposed at dumpsites. Moreover, Kenya is home to two of the world's 50 largest landfills – Dandora in Nairobi and Kibarani in Mombasa – highlighting its significant waste management challenges.²

Mismanaged waste in Kenya poses several environmental and health risks, which local actors are yet to comprehensively address. The proximity of landfills to residential areas in Kenya negatively impacts the quality of life of nearby communities and poses severe health risks by contaminating local land and water resources.³ Moreover, landfills are a significant source of greenhouse gas (GHG) emissions, contributing to about 11% of methane emissions globally.⁴ In addition, waste incineration releases toxic pollutants into the air, water and soil and produces hazardous ash that can contaminate the environment and pose health risks to nearby communities.

This study identified 16 small and growing businesses (SGBs) providing integrated waste management services. Numerous small private businesses also provide basic collection services, obtaining fees from households, estates, companies and organisations in exchange for their services. Over 5,000 companies have registered collection vehicles with the National Environment Management Authority (NEMA), indicating extremely high levels of sector fragmentation. A growing number of recycling and recovery companies have entered the sector in the last 15 years, taking advantage of the amount of waste material available, the increased accessibility of recycling technology and improved regulations related to waste management responsibilities in the country.

2. ANDE, Building the Green Economy Trends and Opportunities for Green Entrepreneurship in Kenya, 2023

3. Okalla, The Myth That Is Plastic Waste Recycling in Kenya, 2022

4. Reuters, Landfills Around the World Release a Lot of Methane – Study, 2022



Figure 1 - Positive impact of integrated waste management businesses



Decrease waste generation



Increase waste segregation at source and collection



Decrease GHG emissions



Contribute to a cleaner and healthier living environment



Improve waste pickers' livelihoods by empowering them



Educate waste actors (producers, collectors and recyclers)

METHODOLOGY

This study employed a mixed-methods approach to conduct a deep dive into the integrated waste management sub-sector in Kenya. The primary data collection consisted of 13 in-depth interviews with staff from relevant integrated waste management businesses and with financiers and enterprise support organisations (ESOs) who have already supported and/or invested in the sub-sector. Interviews focused on the value proposition of the most common business models, their target customer segments and channels, key activities and resources required, revenue streams and models, and cost structures. Interviews also sought to gather information on the environmental and social impact of businesses, their financing needs, investment track records and growth trajectories.

To complement these interviews, secondary research was conducted to gather additional information from available sources, such as industry reports, academic studies and government documents. This secondary research provided a broader context and helped to triangulate the findings from the interviews. The secondary research data were integrated with the interview data to provide a more nuanced understanding of the integrated waste management sub-sector in Kenya.

The use of a mixed-methods approach provided a richer understanding of the integrated waste management sub-sector in Kenya. The findings of this study provide valuable insights for policy makers and investors who are seeking to understand the integrated waste management sub-sector in Kenya, its entrepreneurial activity, and investment opportunities and strategies.

SUB-SECTOR OVERVIEW

Overview of the entrepreneurship ecosystem

► ASSESSMENT OF KEY REGIONAL, NATIONAL AND SUB-NATIONAL LEGISLATIVE AND POLICY FRAMEWORKS

Over the last decade, the Kenyan government has adopted a number of progressive waste management policies, making it one of the waste management champions of the East African region. General waste management policies and regulations have established clear waste management targets, assigned bodies responsible for their achievement and banned a number of harmful practices.

Figure 2 – Main legislation and policies on waste management in Kenya⁵

<p>1999 The Environmental Management and Co-ordination Act</p>	<p>Establishes institutions and regulates matters related to environmental protection.</p>
<p>2010 The Kenya Constitution</p>	<p>States that all citizens have the right to a clean and healthy environment and transfers the responsibility of waste management from the national level to the county level.</p>
<p>2016 Green Economy Strategy and Implementation Plan 2016-2030</p>	<p>Promotes low-carbon growth and sustainable resource management, including waste reduction and infrastructure development.</p>
<p>2021 The National Sustainable Waste Management Policy</p>	<p>Emphasizes waste recovery, recycling, and capacity building, advocating for the implementation of the waste hierarchy.</p>

5. International Water Management Institute (IWMI), Investment Climate Assessment for Circular Bioeconomy – Review of National Policies and Strategies in Kenya, 2022; Ngare & Muriithi, Transitioning Circular Economy from Policy to Practice in Kenya, 2023; NEMA, E-waste Guidelines, 2013

2022**The Sustainable Waste Management Act**

Provides guidelines for waste management licensing, monitoring, and enforcement, but also for waste segregation at source, and waste information systems. In addition, the Act mandates county governments to set up vital waste management infrastructure, such as central waste collection centers, recovery and recycling facilities, and sanitary landfills. And finally, it includes the introduction of the **Extended Producer Responsibility (EPR)** Regulation within two years, defined as the obligation for producers to be responsible for the collection, recycling, or safe disposal of the waste generated by their products.

Despite these important framework developments, the implementation of these laws and policies is lagging behind, in part due to a lack of standards, which complicates enforcement. There is a lack of data in the waste management sector, mainly on environmental impact, which prevents authorities from establishing standards to monitor and evaluate activities and implement regulations. Additionally, many informal actors operate without licences despite the Environmental Management and Co-ordination Act 1999 (EMCA) establishing mandatory licences for handling, transporting and disposing of waste. These small informal operators can often provide cheap collection services as they do not comply with regulations, and they undermine the competitiveness of compliant businesses. Similarly, the recently adopted extended producer responsibility (EPR) regulations, which make producers responsible for waste management across their products' lifecycles, suffer from poor enforcement due to low national awareness and limited monitoring.⁶

6. International Water Management Institute (IWMI), Investment Climate Assessment for Circular Bioeconomy – Review of National Policies and Strategies in Kenya, 2022

► OVERVIEW OF OPPORTUNITIES FOR ENTREPRENEURSHIP



Waste Prevention

Resource Efficiency Support: In order to support the integration of mandatory sustainable waste management practices within businesses, data tools and auditing services can help corporates identify waste-generating processes, design circular strategies and define compliant waste management guidelines.

Training: As there is a lack of awareness and understanding of regulations, businesses might be interested in paying for their staff to receive training on the new EPR regulations, opportunities (including financial incentives) for circular practices and responsible waste management practices.⁷



Waste Collection

Expansion: As rural households and the urban poor have little access to waste collection services, companies could design adapted logistics to serve them. As waste collection services are particularly low in rural areas (covering about 1.5% of rural households compared to 54.6% of urban households),⁸ rural households and farms use composting to manage their organic waste but incinerate or dump the rest of their waste on-site. In urban areas, companies provide collection and recycling services, but their services are often too expensive for poorer households. Moreover, waste collection trucks are often not designed to access informal settlements (e.g., slums), deepening the lack of access to waste management services for the urban poor. Strategic partnerships with counties and municipalities would be critical in any expansion efforts

Segregation: Given the segregation issues leading to contamination between waste, it would be valuable to design and build trucks and bins that allow users and pickers to segregate waste at source to avoid waste cross-contamination.⁹

Organisation: A few companies are leveraging advanced tracking systems and geographic information systems (GIS) to optimise waste collection and fleet management. If the carbon credits market keeps growing, these technologies will be instrumental in collecting the data required to verify, generate and sell carbon credits.¹⁰

7. International Water Management Institute (IWMI), Investment Climate Assessment for Circular Bioeconomy – Review of National Policies and Strategies in Kenya, 2022

8. UNIDO, Study on Plastic Value Chain in Kenya, 2019

9. Key informant interviews with businesses.

10. Takatakanimali, Bridging the Gap in Waste Management: Data and Regulatory Compliance for Sustainable Properties, 2024



Waste Recycling and Recovery

Sorting: Automated sorting technologies either in bins, collection trucks or plants are emerging innovations that could be leveraged to improve treatment efficiency.¹¹

Formalisation: As the informal sector is still highly present in integrated waste management, businesses should integrate informal workers, taking advantage of their knowledge in waste sourcing and segregation. Several businesses are already taking this opportunity, such as TakaTaka Solutions, WasteSwift and Mr. Green Africa.¹²

These businesses can also play an important role in raising awareness and educating stakeholders across the value chain, from waste producers to waste pickers and recyclers, and can also share valuable data or expertise with governments and businesses aiming to improve their waste management practices.

► CHALLENGES HINDERING THE GROWTH OF THE INTEGRATED WASTE MANAGEMENT SUB-SECTOR IN KENYA

Integrated waste management businesses face challenges due to the lack of enforcement of policy and legislative frameworks. Industries lack incentives to reduce waste generation, and regulations to appropriately manage their waste (such as those included by the EPR regulations) are rarely implemented. More communication between the sector's stakeholders is needed to help governments understand the challenges faced by waste actors and foster collaboration between the different authorities.

Waste producers (including households, businesses and other organisations) rarely understand the detrimental impact of their waste management practices. Public knowledge of waste issues and mitigation strategies is low, resulting in continued poor segregation and disposal practices. As a result, recycling companies struggle to source sufficient high-quality waste, impacting their ability to scale operations and requiring them to manage end-to-end waste collection independently.

Businesses face difficulties accessing the financing required to scale their operations rapidly. Businesses in the idea, start-up and early stages often face significant challenges in reaching investors. Many find it necessary to go through an accelerator or incubator to be supported to establish these connections. Investors typically require businesses to increase their processing capacity, but businesses need funding to achieve such growth. Additionally, they require technical assistance to develop a robust funding strategy and to effectively scale their operations as they sometimes lack financial and fundraising expertise. Moreover, the ticket sizes and types of financial instruments offered do not always align with the businesses' needs. This mismatch is particularly evident at the growth stage where businesses are too large for grants but do not meet the expected risk profile of return-seeking investors providing larger ticket sizes and expecting higher returns. Concessional capital investors providing larger ticket sizes are rare.¹³

11. However, it is essential to consider the impact on workers and potential job losses.

12. Key informant interviews with businesses.

13. Key informant interviews with businesses.

DESCRIPTION OF COMMON BUSINESS MODELS

The following table highlights the key business models identified in the integrated waste management sub-sector, together with illustrative businesses for each of those models.

Figure 3 – Illustrative businesses by business model identified¹⁴

Business Model	Select Businesses
Low-waste lifestyle products	 
Collection, sorting and recycling or recovery	  
IoT tools to connect and educate stakeholders	  
Smart bins	
Conversion into energy	

14. It is important to remember that there are certainly more businesses in the sub-sector, but we did not identify them all as part of this study. Moreover, one business can operate several business models.

Low-waste lifestyle products

► DESCRIPTION

Businesses focusing on products that minimise waste operate within a niche market, addressing the pressing environmental issues associated with landfill overuse, incineration and illegal dumping. These businesses develop products such as personal care items, food- and gardening-linked products and speciality items for hotels. These products are designed with sustainability at their core, promoting a zero-waste and circular lifestyle that reduces environmental impact. These products attract environmentally conscious and higher-income consumers, including both individuals and consumer-facing businesses such as hotels and restaurants.¹⁵

Revenues are generated through the sale of their products in both online and physical retail environments.

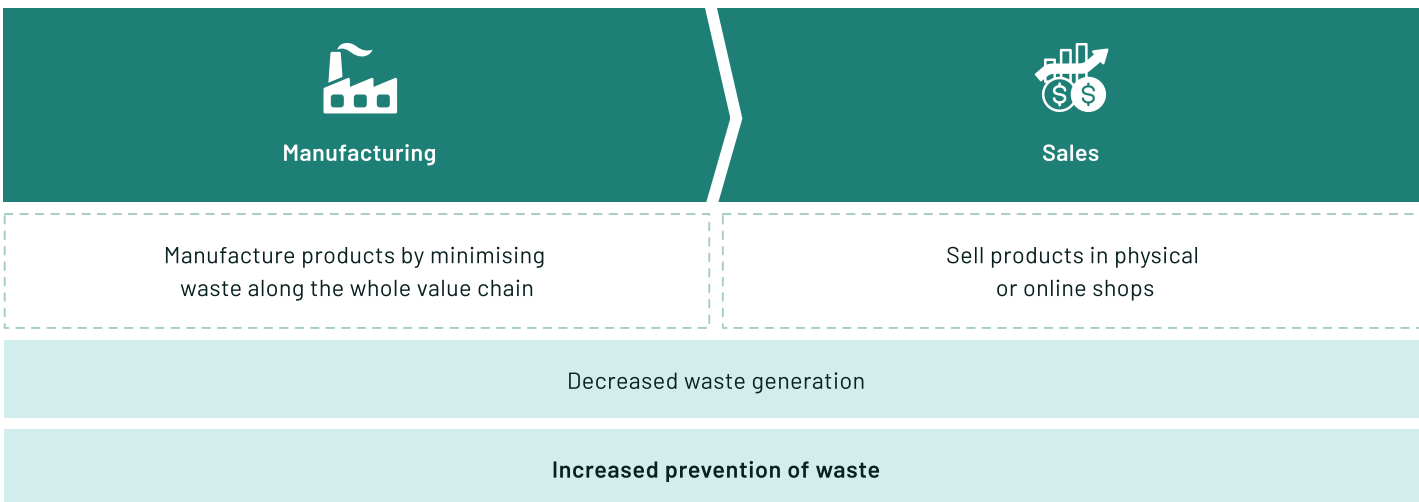
These core revenues may be complemented by awareness-raising activities such as paid workshops that aim to educate consumers on sustainability practices. These workshops not only provide additional revenue streams but also enhance customer engagement and reinforce the brand's commitment to environmental stewardship.

The core activities of these businesses revolve around the development, production and selling of their sustainable product lines. This involves rigorous research and development to ensure the highest standards of sustainability and effectiveness. Additionally, businesses have to establish both physical and online selling points to reach their audience. Marketing plays a crucial role in their strategies as it helps to build brand awareness and inform potential customers about the benefits of their products.

This business model incurs relatively low costs. Capital expenditures (CapEx) include investments in warehouse facilities, a robust e-commerce website and, eventually, physical retail outlets to store, showcase and sell their products efficiently. Operational expenses (OpEx) encompass marketing to drive brand recognition and customer acquisition, inventory management, delivery logistics, and the energy and production costs to manufacture the eco-friendly products.

15. Medium, Interview with Nelly Gesare SDGs Activist and Founder Green Thing, a Sustainable Products Company in Nairobi, Kenya, 2021



Figure 4 – Overview of the value chain



► **MAPPING OF BUSINESSES USING THIS MODEL**

This study identified two businesses in this field. Both have a diverse range of products sold via physical and online shops, but their annual revenues remain low (about US\$ 75k in 2023 for Greenthing),¹⁶ and they operate at a relatively small scale, with a small number of employees (between two and ten). This study has not identified any financiers for these businesses.

Figure 5 – Mapping of businesses by stage of maturity¹⁷

Stages of Maturity	Number of Businesses	Illustrative Businesses
Start-up stage/ Idea stage	0	
Early stage	2	 
Growth stage	0	
Mature stage	0	

16. Business Today, How Eco-friendly Items Maker Grew into a Sh10m Revenue Spinner, 2023

17. We were not able to find the amounts of investments secured for each of the businesses, therefore, we assessed their stage of maturity by the year of creation, the number and scale of projects achieved and the number of employees in the company.

Collection, sorting and recycling or recovery

► DESCRIPTION

Businesses providing solutions to collect, sort, recycle and/or recover all types of waste play a crucial role in addressing the waste management challenge. Significant investments are required to increase collection and recycling rates in Kenya, which stand at 25% and 10%, respectively, and manage the country's annual 8.8 million tons of waste. As households and businesses do not segregate their waste (despite the latter being legally obliged to do so), waste management companies need to provide solutions to collect, sort and recycle or recover all types of waste.

To be able to source quality waste before it reaches dumpsites and becomes contaminated, recycling businesses often have to collect waste directly from residential or commercial sources. In general, in addition to collecting, sorting and treating waste, companies also provide appropriate container solutions, such as bins and bags approved by the NEMA, and try to raise awareness among waste producers with a view to increasing sorting at source. Moreover, they sometimes provide waste auditing for commercial and industrial customers. Reporting technologies associated with the collection or recycling phase are notably provided by Green Miles Zero Waste and TakaTaka Solutions. Such technologies allow these companies to help customers quantify their impact and bring them an additional source of revenue.

Revenue streams involve collection fees and the sale of recycled or recovered products. Companies generally focus on commercial and industrial customers or wealthy households that are willing to pay more for the safe handling of waste. Moreover, these companies can leverage climate finance through carbon or plastic credits to benefit from an additional source of revenue.

High CapEx is required to finance collection trucks and recycling or recovery facilities to treat various types of waste. As recycling and recovery machinery is particularly costly, companies often first invest in recycling machines adapted to one type of waste material, before expanding to recycle other types of waste later in their business growth. These businesses work in partnerships with other specialised recyclers to sell waste they have collected and sorted if they lack the capacity to recycle specific waste types in-house. This allows them to specialise in the treatment of certain waste types at first, before investing in new machinery and processes. Regulatory costs are also incurred to acquire licences for trucks as well as approval from the NEMA for technology and equipment.

Figure 6 - Overview of the value chain



► **MAPPING OF BUSINESSES USING THIS MODEL**

This study has identified eight growth and mature-stage businesses and one start-up-stage business in this field. Key financiers that invested in these businesses include Kua Ventures, the Government of Canada, Open Road Alliance, UK Aid, and the German development finance institution KfW DEG.

Figure 7 - Mapping of businesses by stage of maturity

Stages of Maturity	Number of Businesses	Illustrative Businesses
Start-up stage/ Idea stage	1	
Early stage	0	
Growth stage	2	
Mature stage	6	

► TAKATAKA SOLUTIONS – CASE STUDY



Origin: **Kenya**

Year of foundation: **2011**

Number of employees: **Over 500**

Break-even: **2018**

“We collect your waste reliably and sustainably every day.”

MARKET PROPOSITION

- 1 **Collects, sorts, and recycles or recovers various types of waste, including hazardous waste.**
Collection happens via:
 - ✓ **20 recycling stations across Nairobi where households can drop off recyclable waste.**
 - ✓ **Direct collection from 20,000 households daily**, providing them with bin liners in different colours to sort waste.
 - ✓ **Direct collection from over 20 commercial businesses**, providing them with bins, trolleys, and waste compactors, as well as data reports (including on CO2 savings), and customized solutions helping them to develop take-back systems and meet Extended Producer Responsibility requirements.
- 2 **Converts organic waste into fertilizers, recycles plastic containers and packaging, and works with partners to recycle other materials.**
- 3 **Most revenues are therefore generated from waste collection fees and the sales of recyclables,** followed by the bins and liners sales.

IMPACT



Ensure its workforce **count about 50% of women.**



Has **created over 500 direct jobs**, provides a remuneration 1-5 to 2x higher than other players in the market and industry standards, but also non-financial benefits such as protection material and insurance.



Aims to **make Nairobi a cleaner and healthier city**, by collecting waste form residential and commercial customers.






Collects over 60 tons of waste daily, sorts them into 40 types of waste, and **recycles about 95% of them**

KEY MILESTONES ACHIEVED

- ✓ **2011:** First small scale composting plant in Kangemi, Nairobi (10 staffs and 0.5 ton of waste per day)
- ✓ **2013:** First sorting site in Kawangware, Nairobi (25 staff and 3 tons of waste per day)
- ✓ **2014:** Purchase of the **first waste collection truck** (50 staff and 6 tons of waste per day)
- ✓ **2015:** First medium-scale composting plant in Mutuini, Nairobi (80 staff and 12 tons of waste per day)
- ✓ **2019:** First **plastic recycling plant** for plastic containers and **switched waste sorting from tables to drum sieves and conveyors** (250 staff and 40 tons of waste per day)
- ✓ **2020:** First two **buy-back centres** for waste at Dandora and Thika dumpsite and New hazardous waste incinerator at Lusigetti (350 staff and 60 tons of waste per day)
- ✓ **2024:** Reached three sorting sites, one composting plant, two plastic recycling plants, one incinerator, and three buy-back centers (500 staff and more then 60 tons of waste per day)



FUNDING SECURED

Amount	Types of Instrument	Select Investors
More than US\$ 1m	Debt	Unknown
More than US\$ 1.4m	Grants	 
US\$ 130k	Recoverable grant	

KEY SUCCESS FACTORS IDENTIFIED

- ✓ **Working with the informal sector:** collaborates with informal waste collectors by offering them a price per ton of waste collected.
- ✓ **Working in partnership with business and municipalities:** collaborates with municipalities to secure access to waste collection points and disposal sites and partners with businesses to recycle types of waste their equipment cannot process.
- ✓ **Selling to businesses and industries:** has commercial customers for both its collection services and its recycled products.

Internet of Things (IoT) tools to connect and educate stakeholders

► DESCRIPTION

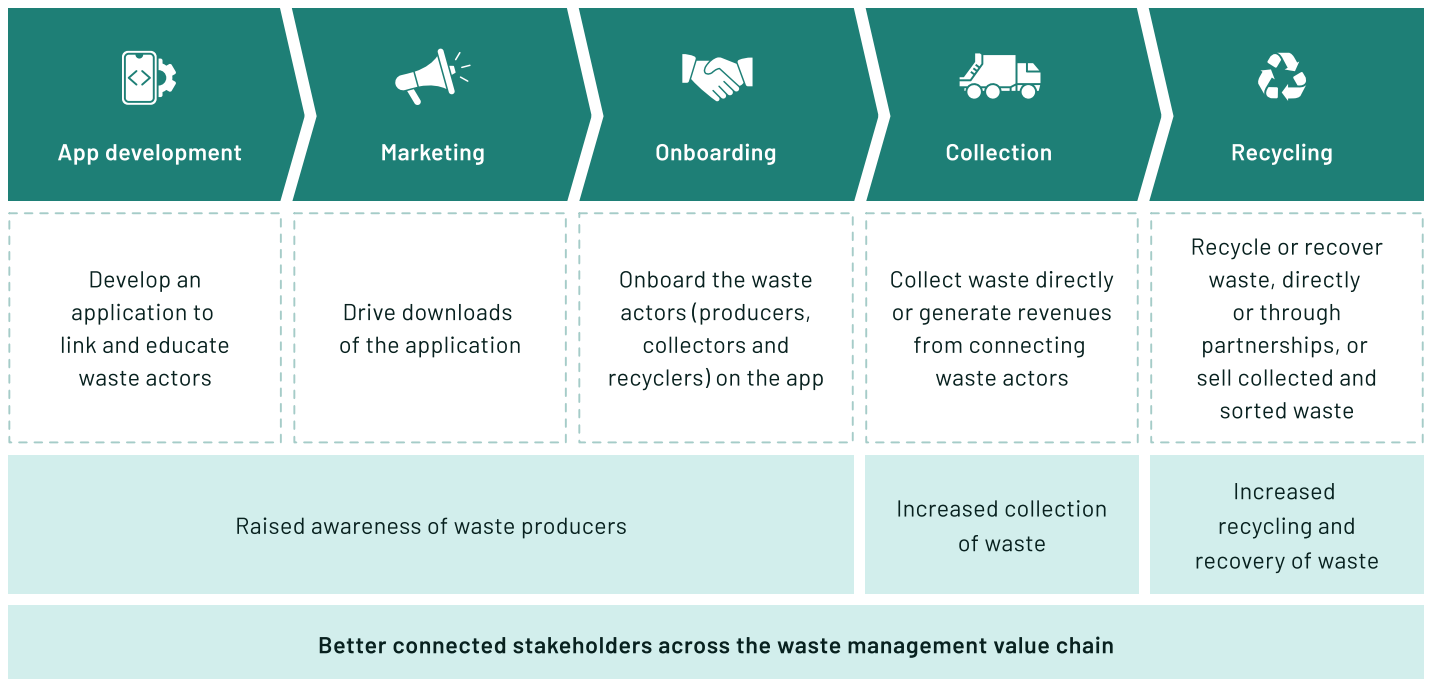
Businesses designing and managing IoT tools to educate stakeholders and connect them with other services aim to increase user awareness, foster improved waste management practices, increase waste collection and treatment rates, and empower the informal sector. These applications link stakeholders across the value chain, from waste producers to collectors and recyclers. Businesses offer a range of different products and services, including rewards for waste producers for good behaviours, collection service requests, and collection and recycler point locators. Collectors directly receive waste collection requests on the app and are paid directly via it. The incorporation of rewards, games and challenges around waste management makes recycling more accessible and engaging, incentivising users to participate actively. Customers can also use the app to evaluate the amount of waste and the GHG emissions that they generate thanks to monthly reports which provide insights on their waste generation and environmental impact. This data is valuable to raise individuals' awareness, contribute to research, policy development and innovation, and provide businesses with information on their carbon footprint and offsets. Finally, these business models help to empower actors in the value chain thanks to training and direct connections to waste producers.

Key activities handled by this kind of business include the development of an application or platform, collection services, training and waste audits. They also generally develop robust systems for measuring and reporting waste data. IoT businesses also collect waste directly from customers. Additionally, these businesses often conduct training sessions on waste management, enhancing stakeholders' understanding of the sector. Partnerships with recycling organisations are integral, ensuring efficient processing and recycling of collected waste.

Revenue streams for this business model are diverse. They include payments for collection services and revenues from providing sorted products to recyclers. Moreover, companies often provide training to public and private actors seeking to adopt waste management practices (for regulatory or voluntary reasons). They also take advantage of the data they collect on their app, which can be sold to research, government and other public organisations and for plastic or carbon credits.

IoT waste management businesses often require high CapEx to develop their apps. Purchasing collection trucks, obtaining licences from the NEMA for each truck and investing in sorting and tracking systems for trucks and sorting facilities can further increase these companies' CapEx. Moreover, to leverage new opportunities, some companies face regulatory costs to be compliant with the EPR regulations. OpEx for these companies encompasses ongoing software maintenance, labour, energy, marketing and the costs of administrative functions.



Figure 8 – Overview of the value chain



► **MAPPING OF BUSINESSES USING THIS MODEL**

This study identified three businesses using this model, which seems to be at an earlier stage compared to the other models. Investors in the field include Kenya Climate Ventures, the Circular Economy Catalyst and the Tony Elumelu Foundation.

Figure 9 – Mapping of businesses by stage of maturity

Stages of Maturity	Number of Businesses	Illustrative Businesses
Start-up stage/ Idea stage	0	
Early stage	2	
Growth stage	1	
Mature stage	0	

► M-TAKA – CASE STUDY



Origin: **Kenya**

Year of foundation: **2021**

Number of employees: **Over 30**

Monthly revenue (2024): **US\$ 15–45k**

Monthly revenue projections (by 2025): **US\$ 100k**

“A tech integrated waste management social enterprise.”

MARKET PROPOSITION

- 1 **Runs the M-Taka app, currently counting 2,100 users, which:**
 - ✓ **Connects stakeholders across the waste management value chain**, enabling users to ask for waste collection and M-Taka recycling agents, helping waste pickers to become entrepreneurs or find a buy-back center.
 - ✓ **Educates consumers** on safe and sustainable waste management practices (using gamification and rewards)
 - ✓ **Collects data** that can be used to influence and strengthen policy formulation, and decision making.
- 2 **Provides trainings and capacity building to:**
 - ✓ Empower waste actors.
 - ✓ Help businesses collect data on the M-Taka Platform.
- 3 **Has developed a material recovery facility through a Public-Private Partnership (PPP)** with Kisumu County and buy-back centers, which allows M-Taka to **generate revenue through the sales of value-added products to end-of-chain recyclers.**
- 4 **Responds to pressing structural needs in the sector**, including the need for further public awareness on waste segregation and recycling and the create between linkages between actors in the value chain.



IMPACT



Links the informal workers (offer) to the waste generators (demand), **improving waste collectors' revenues.**



Has **trained 200 waste collection agents and created over 180 direct and indirect jobs.**





Has **treated over 500 tons of waste and avoided emissions amounting to over 1,500 tons of CO2 equivalent.**

RECOGNITION

- ✓ Finalist of the Afri-Plastics Challenge (2023)
- ✓ Green Entrepreneurship Award from the Circular Economy Catalyst supported by IKEA Foundation (2023)
- ✓ Top Innovator in Kisumu County under the Presidential Innovation Award (2023)

FUNDING SECURED

Amount	Types of Instrument	Select Investors
About US\$ 100k	Grants	 

GROWTH PLANS

- ✓ **Wants to increase their processing capacity** to produce 200 tons of recyclable material and expand their outreach to 4,000 regular users, creating 400 jobs in the process.
- ✓ **Seeks additional revenue sources** such as **selling data to governments for planning or research purposes, conducting waste audits for businesses or leveraging their data to generate plastic credits.** Moreover, M-Taka wants to monetize its customer database and sell advertisement spaces on its app.



FUNDING NEEDED

Amount	Types of Instrument	Needs
US\$ 200k	Grant	Develop its products, upgrade its infrastructure and equipment, and cover its marketing and human resources costs
US\$ 200k	Debt	

KEY SUCCESS FACTORS IDENTIFIED

- ✓ **Working with the informal sector:** integrates informal workers in the value chain by allowing them to create an account on the application and answer to collection requests from waste generators.
- ✓ **Working in partnership with business and municipalities:** collaborate with recycling partners to ensure efficient processing of collected waste.
- ✓ **Selling to businesses and industries:** sells recycled products to end-of-chain recyclers.
- ✓ **Leveraging technology to streamline the process:** uses an application backed by Unstructured Supplementary Service Data (USSD) codes and Artificial Intelligence (AI) to connect people all along the value chain as well as to assess the amount of waste generated by customers and create reports.
- ✓ **Impact measurement:** has not been certified or evaluated by a third party for its impact, but the technologies allow to create precise impact metrics, which can be useful to run carbon credit programs in the future.

Smart bins

This study only identified one business using this business model, therefore, the following description is focused on that company: T-bin.

► DESCRIPTION

Smart bins represent an innovative approach to waste management by raising awareness, encouraging waste segregation at the source and automatically scheduling waste collection. T-bin provides smart solar-powered segregation waste bins that provide waste separation instructions at the point of disposal via a screen integrated on the bin and coloured compartments, therefore ensuring that recyclable and non-recyclable materials are sorted properly. Moreover, technologically advanced bins are equipped with sensors that notify waste collectors when they are full and need to be emptied. Geo-localisation helps T-bin's trucks and lorries to collect waste from homes and commercial organisations. The technology is based on the IoT, allowing reporting and tracking. This system not only enhances the waste management chain's efficiency but also significantly reduces the likelihood of waste overflowing and ending up in the environment. These bins are most suitable for urban public spaces, green spaces, schools, hospitals, bus and railway stations, restaurants, shopping malls, stadiums and outdoor business premises.

Businesses developing smart bins generate revenues from the purchase of bins and collection services. Additionally, these businesses can generate other recurring revenues through waste recycling and recovery, as well as occasional revenues with IoT and carbon-offset consultancy services and workshops on circularity.

Smart bin businesses develop and manufacture the bins, install them and organise the collection of waste from them. The development stage includes integrating the advanced sensor technology and developing the necessary software for monitoring and notification. Additionally, establishing distribution channels, backed by a robust marketing strategy to educate the market about the benefits of smart bins, is crucial to reaching municipalities, businesses, and other potential clients and driving adoption.

This business model involves large initial CapEx due to the investments required to develop the product, establish manufacturing facilities and acquire collection trucks, which require licences from the NEMA). OpEx includes marketing expenses, costs associated with maintaining inventory, logistics costs to deliver the smart bins and collect waste and production expenses including materials, energy and labour.

Figure 10 – Overview of the value chain



► **MAPPING OF BUSINESSES USING THIS MODEL**

The only business identified in this field in Kenya is T-bin. Launched more than ten years ago and active in several spaces, the business appears to be in its growth stage. The United Nations Development Programme (UNDP) and the Paragon Institute of Innovation have both invested in the company, but the amounts have not been disclosed.

Conversion into energy

This study only identified one company using this business model, therefore the following description focuses on that company: ProGreen Innovations.

► DESCRIPTION

Converting a mix of organic, paper and plastic waste into fuel can provide an affordable and sustainable alternative for farmers, agri-businesses and businesses with high energy consumption. For instance, polydiesel can be utilised for irrigation machines, tractors, lorries, and tuk-tuks, while polypetrol can be used for smaller motorised machines such as generators, lawn mowers and spraying machines.¹⁸ These fuels reduce reliance on fossil fuels and are an effective way of reutilising waste. With comparable performance, this solution is cost-effective as the price is about US\$ 1.30 for a one-litre drum,^{19,20} compared to US\$ 1.40 for one litre of petrol and US\$ 1.30 for one litre of diesel in Kenya.^{21,22}

Before converting the waste into energy, the company needs to source its inputs process the waste, package the fuel and sell it. Waste can be collected through waste picker networks or via business-to-business (B2B) contracts with waste producers, collectors or producer responsibility organisations (PRO) that support businesses to comply with EPR regulations.

This business model has both high CapEx and OpEx. Its main cost drivers include the regular fees paid to waste collection businesses and individual waste pickers to source waste, as well as labour, water (for the cooling process) and the cost of the energy spent to convert the collected waste material. However, it should be noted that the fuel generated by the business can serve as a cheaper energy source for the production process. Besides this, a lot of marketing is needed to make people adopt this new kind of fuel. High CapEx is required to set up processing facilities and machinery. Moreover, before reaching the market, businesses need to acquire approval for their fuel from the Kenya Bureau of Standards, which comes at a high cost for small businesses.

18. However, the petrol generated by this process is less adapted to power vehicles.

19. ProGreen Innovations, 2024, progreen.co.ke

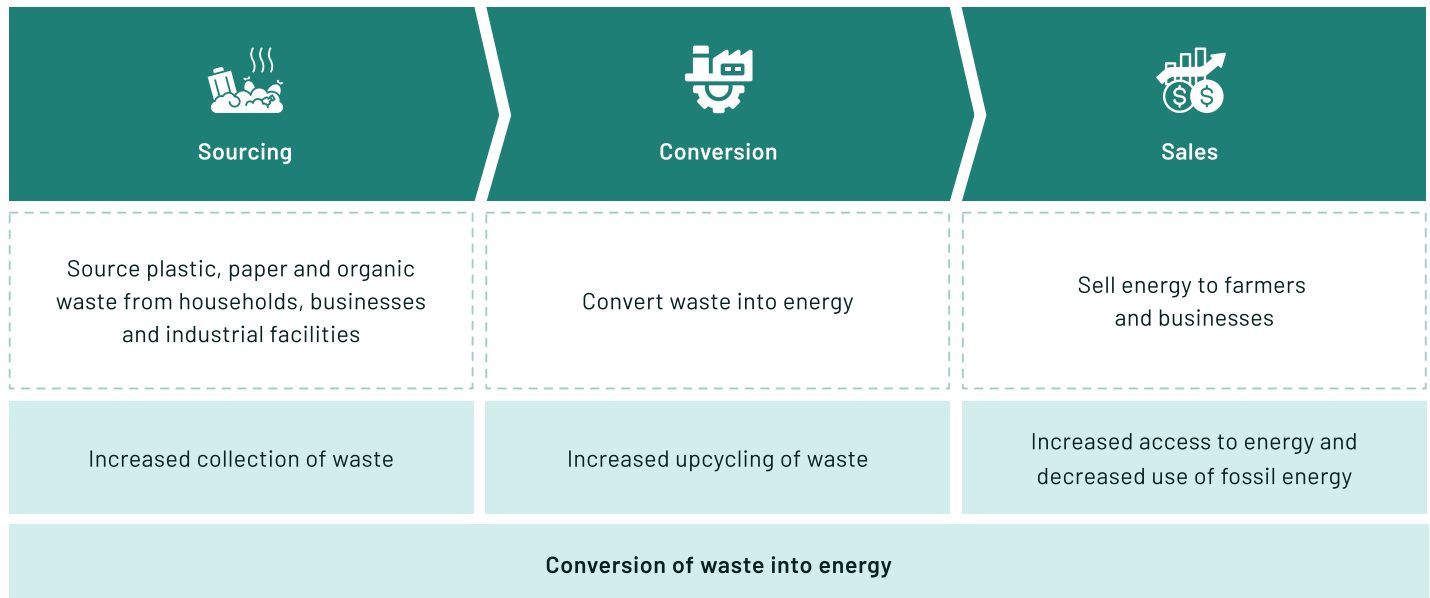
20. Both are sold for KSh 175.

21. GlobalPetrolPrices.com, Kenya Prix de l'essence, 22-juillet-2024, 2024

22. In Nairobi, super petrol retails at KSh193.84, diesel at KSh180.38.



Figure 11 – Overview of the conversion into energy value chain



► **MAPPING OF BUSINESSES USING THIS MODEL**

This study only identified one business in this field: ProGreen Innovations. In general, companies convert organic or plastic waste into energy but not paper waste or a mix of all three waste types. By doing so, ProGreen seems to be at the forefront of innovation. However, although the company is looking to grow, it is still at the start-up stage and has not raised financing to date.



► **PROGREEN INNOVATIONS – CASE STUDY**



Origin: **Kenya**
 Year of foundation: **2023**
 Number of employees: **9**
 Monthly revenue (2024): **US\$ 1.5k**

Break-even: **Expected by the end of 2024**
 Revenue projections (by 2025): **US\$ 10k**

“Researching, designing, and building non fossil fuel solutions that will effectively combat carbon emissions”

MARKET PROPOSITION

- 1 Converts organic, paper, and plastic waste into Polydiesel and Polypetrol.
- 2 Works with waste pickers from the informal sector to collect waste.
- 3 Works with one Producer Responsibility Organization (PRO) to collect businesses’ waste
- 4 Meets low- and middle- income countries clean energy’s needs, by allowing to increase access to affordable and reliable energy.

IMPACT



Provides cleaner energy, decreasing the use of fossil fuels



Avoids about 3.5 tons of CO2e each month

RECOGNITION

- ✓ The Elsevier Foundation
- ✓ Publicis Sapient



GROWTH PLANS

- ✓ **Seeking to expand its processing capacity and work with more PROs**

FUNDING NEEDED

Amount	Types of Instrument	Needs
US\$ 200k	Grant or equity	Expand processing capacity

KEY SUCCESS FACTORS IDENTIFIED

- ✓ **Working with the informal sector:** creates opportunities for waste pickers.
- ✓ **Working in partnership with business and municipalities:** collaborates with collection and recycling partners to source waste.
- ✓ **Selling to businesses and industries:** targets notably transporters and works with collectors and recyclers to use their waste, but also with PROs that execute the duty of businesses to deal with the waste their generate in a proper way.

FINANCING LANDSCAPE ASSESSMENT

Mapping of financing needs

Most integrated waste management businesses incur high CapEx, regulatory costs and OpEx. The purchase of waste collection trucks and licences from the NEMA and other regulatory bodies and investments in treatment facilities constitute the main cost drivers of these businesses. Moreover, these businesses need substantial working capital as they often have to pay for all costs required to collect waste, process it and sell their produce, a process that lasts from three to six months, before they can obtain payments from their customers.

Furthermore, as these businesses often utilise complex technologies and machines, they face additional research and development costs and need a qualified workforce. Specifically, new IoT and processing technologies require staff with more specialised knowledge of technology development and management, and it can be challenging to recruit people with such expertise.

Consequently, patient investors who understand the sector and its challenges in Kenya are required to support the growth journeys of these businesses. Investors should be prepared to provide capital that may require a longer time horizon to generate returns.

Potential innovative finance mechanisms

Innovative finance mechanisms that offer concessional or blended capital to catalyse investment from commercial investors are increasingly being leveraged in this sub-sector to fill financing gaps and reduce perceived risks.

Illustrative examples are presented in the Introductory Guide on Investing in the Waste Management and Circularity sector in Kenya. Most notably, the use of climate finance for the business models in the integrated waste management sub-sector is particularly relevant.



Climate Finance

Integrated waste management businesses can leverage climate finance as an additional financing mechanism. Companies with strong reporting systems are often eligible for carbon and plastic credits (TakaTaka notably registered to issue plastic credits via the carbon credit registry Vera). IoT-based companies can leverage their technology and data collection prowess to precisely measure the waste collected and treated and facilitate the issuance of these credits.

CONCLUSION

Out of the 122 businesses identified in KOIS and ANDE's study of Kenya's waste and circularity sector, 16 operate in the integrated waste management sub-sector. As outlined, a growing number of companies have entered the sub-sector in the last 15 years, taking advantage of the amount of waste material available, the increased accessibility of recycling technology and improved regulations related to waste management responsibilities in the country. The sub-sector is expected to grow as many of the businesses that start with one type of waste later expand to other types and then shift to the integrated waste management sub-sector. Although the sub-sector is still at an embryonic stage, the businesses that collect, sort, and recycle or recover waste are relatively mature compared to other business models that require more environmentally conscious customers and leverage innovative processes and technologies. Increasing awareness and educating stakeholders, integrating the informal sector, and expanding segregation, collection, organisation and recycling efforts are required to develop the integrated waste management sub-sector in Kenya, and businesses are increasingly taking advantage of these opportunities.

Financing needs are highly dependent on the business model. However, since these SGBs frequently leverage technology and disruptive innovations, they incur additional research and development costs and require a qualified workforce. This situation necessitates patient investors who understand the sector and its challenges and are prepared to provide capital that may require a longer time horizon to generate returns.



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