

INVESTING IN THE WASTE AND CIRCULARITY SECTOR IN KENYA

Plastic Waste Management Guide





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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.

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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	PE: Polyethylene
EPR: Extended producer responsibility	PET: Polyethylene terephthalate
ESOs: Enterprise support organisations	PP: Polypropylene
FMCGs: Fast-moving consumer goods	PPPs: Public-private partnerships
GHG: Greenhouse gas	PROs: Producer responsibility organisations
HDPE: High-density polyethylene	PS: Polystyrene
IoT: Internet of Things	PVC: Polyvinyl chloride
KSh: Kenyan shilling	R&D: Research and development
LDPE: Low-density polyethylene	SGBs: Small and growing businesses
NEMA: National Environment Management Authority	VAT: Value-added tax

▶ 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

Kenya generates 880,000 tons of plastic waste per year, comprising various subcategories such as polyethylene (PE),² polypropylene (PP), polystyrene (PS), polyvinyl chloride (PVC), and polyethylene terephthalate (PET), with PET, PP and polyester being the most prevalent. The widespread use of plastic, particularly in urban areas, combined with inefficient waste management systems, leads to the pollution of water resources and severe negative impacts on marine life. Furthermore, plastic waste disposed in nature or in landfills emits greenhouse gases during its decomposition. Finally, severe health problems can be caused by plastic waste as it also contains additives, fillers and organic compounds that form during decomposition and are linked to lung cancer and endocrine disruption.³

Figure 1 – Types of plastic waste

 PET	 HDPE	 PVC	 LDPE	 PP	 PS	 OTHER
Polyethylene Terephthalate	High-Density Polyethylene	Polyvinyl Chloride	Low-Density Polyethylene	Polypropylene	Polystyrene	Other
Water Bottles; Jars; Caps	Shampoo Bottles; Grocery Bags	Cleaning Products; Sheetings	Bread Bags; Plastic Films	Yogurt Cups; Straws; Hangers	Take-away & Hard Packaging; Toys	Baby Bottles; Nylon; CDs
						

Despite the high value of certain types of plastic and the environmental benefits of effective plastic waste management, only 3% to 8% of plastic waste in Kenya is currently being recycled or reused.⁴ However, producing recycled plastic consumes up to 37% less energy than producing virgin plastic and yields important resource conservation benefits, saving approximately 3,000 litres of oil per ton. Additionally, appropriate plastic waste management can reduce carbon dioxide equivalent (CO₂e) emissions by around 42% by reducing the emissions associated with virgin plastic production and plastic waste decomposition.⁵

2. Including both low-density polyethylene (LDPE) and high-density polyethylene (HDPE).

3. Vuppaladiyam et al., Waste to Energy: Trending Key Challenges and Current Technologies in Waste Plastic Management, 2024

4. PE and HDPE are highly recyclable, but other types of plastics such as PVC, PP, LDPE or PS require more complex industrial processes to be revalorised. The recyclability of PET and HDPE ranges from 50 to 60%, but some types of plastic have much lower recyclability rates (down to 10%). These plastic types are less recyclable for various reasons: PVC often includes additives; PP is often contaminated by organic waste; LDPE and PS have a very low density. Euric, Plastic Recycling Factsheet, 2020

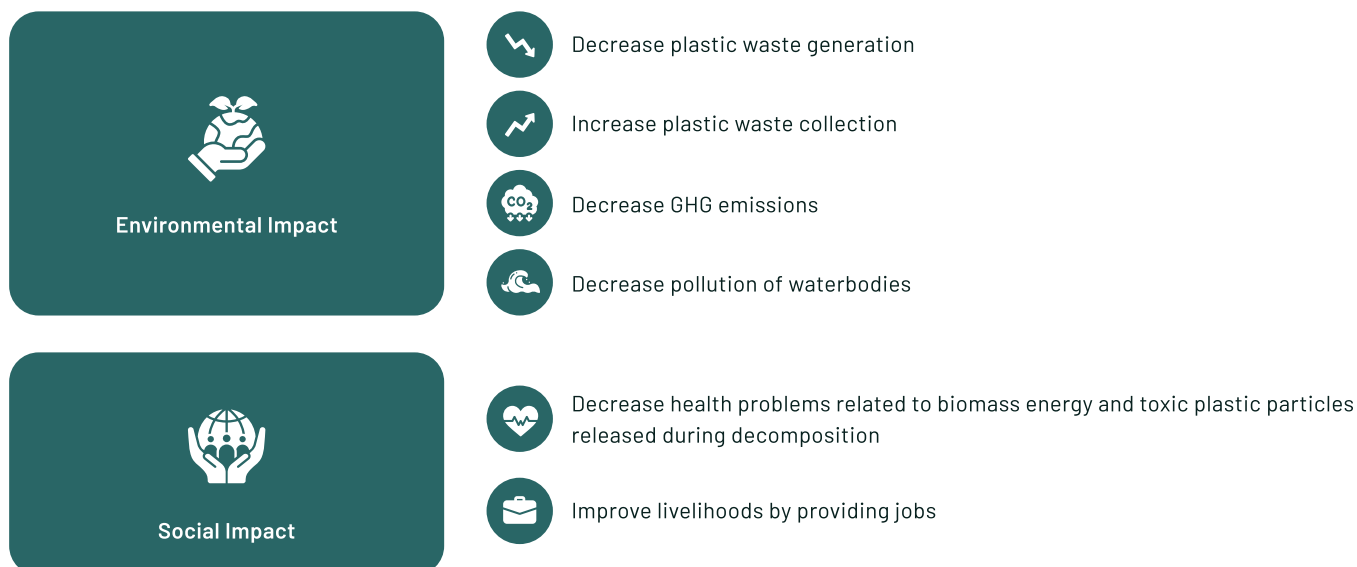
5. Osama & Lamma, The Impact of Recycling in Preserving the Environment, 2021; Team, Plastic Recycling Technology: What are the Environmental Benefits? - UBQ Materials, 2020; Saleem et al., Assessing the Environmental Footprint of Recycled Plastic Pellets: A Life-cycle Assessment Perspective, 2023

Figure 2 – Recycling by type of plastic waste in Kenya⁶

Type of Plastic	Amount of Plastics Recycled (tons/year)
PET	5,778
HDPE	10,943
PVC	177
LDPE	8,091
PP	6,806
PS	0
Others	4,398
Total	36,193

Plastic waste management is among the most mature waste sub-sectors in Kenya, driven by the high value of certain types of plastic, their industrial and commercial applications and the demand created by recent regulations. Out of the 122 businesses identified through this study, 17 businesses operating in the plastic waste management sub-sector in Kenya have been identified, covering applications ranging from plastic waste reduction, recycling into new plastic products and waste conversion into energy.

Figure 3 – Positive impact of plastic waste management businesses



6. Kenya Association of Manufacturers, Kenya Plastic Action Plan, 2019

METHODOLOGY

This study employed a mixed-methods approach to conduct a deep dive into the plastic waste management sub-sector in Kenya. The primary data collection consisted of 11 in-depth interviews with representatives of relevant businesses to explore their business models and with financiers and enterprise support organisations (ESOs) who have already supported and/or invested in plastic waste management businesses. Specifically, the interviews focused on the value proposition of each business in the market context, their target customer segments and channels, key activities and resources required, revenue streams and models, and cost structures. The interviews also sought to gather information on the impact of each business, their financing needs, secured investments, growth trajectories and timelines to profitability.

To complement these interviews, secondary research was conducted to gather additional information from publicly 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 triangulated with the interview data to provide a more nuanced understanding of the plastic waste management sub-sector in Kenya.

The use of a mixed-methods approach provided a richer understanding of the plastic 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 plastic 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

Plastic is the waste sub-sector in Kenya that benefits most from elaborate and comprehensive regulations, which promote responsible consumption practices and create a favourable environment for entrepreneurship in plastic waste management. Amongst these, Kenya's 2020 single-use plastic ban prohibits the import, production, sale and use of single-use plastics.⁷ This ban has been effectively implemented as the illegal utilisation of single-use plastics has become marginal.⁸ Incentives for plastic recycling plants include a 16% VAT exemption and a reduced corporation tax rate of 15% for the first five years.⁹ However, few businesses are aware of these schemes.¹⁰ Additionally, the extended producer responsibility (EPR) regulation is expected to have a significant impact on the sub-sector if correctly implemented.

Figure 4 – Main legislation and policies on plastic waste in Kenya¹¹

<p>2017 Polyethylene Terephthalate (PET) Task Force</p>	<p>A Framework of Cooperation to implement voluntary Take Back and Extended Producer Responsibility schemes for PET bottles, with the Kenya Association of Manufacturers responsible for clean-up and awareness campaigns.</p>
<p>2019 Incentives For Plastic Recycling (Budgeting)</p>	<p>A 16% Value Added Tax (VAT) exemption and a reduced corporation tax rate of 15% for the first five years. However, few businesses are aware of these schemes.</p>
<p>2020 The Ban On Single-use Plastics</p>	<p>A ban on the use and littering of single-use plastics in all protected areas, including national parks, beaches, and forests. The violation of this ban can lead to imprisonment and fines. The ban is part of the Action Plan for Implementation that also includes economic incentives, such as increased fees for single-use plastics, to encourage their reduction and elimination.</p>

7. Prior to this ban, about 100 million plastics bags were distributed every month by supermarkets.

8. UNEP, Single-use Plastics: A Roadmap for Sustainability, 2018

9. UNEP, Plastic Recycling, 2022

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

11. Nicholas Institute for Environmental Policy Solutions, Plastic Pollution Policy Country Profile: Kenya, 2022

2022

The Sustainable
Waste Management Act

This Act notably includes the introduction of the **Extended Producer Responsibility (EPR)** Regulation for plastic waste 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.

► OVERVIEW OF OPPORTUNITIES FOR ENTREPRENEURSHIP



Waste Prevention

Design of alternative packaging: Given the pollution caused by plastic, alternatives to plastic packaging need to be developed, such as biodegradable plastics and bioplastics.¹²

Reduce the use of plastic: Given the considerable use of plastic, technologies should be leveraged to allow the reduction or prevention of plastic waste, either by optimisation or by using the Internet of Things (IoT) to deliver products in bulk.



Waste Recycling

Design of recyclable products: Given the complexity of plastic recycling, progress should be made on designing products and packaging that can be repurposed by recycling companies.¹³

Integrating the informal sector: Plastic recycling and recovery technologies are generally too costly and complex for the informal sector. However, informal workers constitute a huge opportunity as waste pickers. Therefore, companies should integrate them into the value chain.

Polystyrene recycling: Due to its low density, PS (considered a problematic plastic to eliminate by the Kenya Plastics Pact) is rarely recycled, but some companies in other countries are successfully doing so.¹⁴ Investment into adapted recycling facilities would be highly beneficial as PS is commonly found in packaging for takeaway food, coffee cups and electronics.¹⁵

Improved implementation of existing regulations: The EPR regulations will increasingly create growth opportunities for plastic recycling companies. Working with producer responsibility organisations (PROs) can facilitate the process. Moreover, companies are increasingly required to incorporate a minimum percentage of recycled plastics into their products. This shift is expected to drive up demand from both local and international recycled plastic product manufacturers, creating new opportunities for recycled plastic suppliers to meet this growing need.

12. Euric, Plastic Recycling Factsheet, 2020

13. Ellen MacArthur Foundation, Circular Economy in Africa: Plastics, 2021

14. Kenya Association of Manufacturers, Kenya Plastic Action Plan, 2019

15. Ecolife, How to Recycle PS, n.d.



Waste Recovery

Conversion into construction materials: Materials made of recycled plastic represent a competitive alternative to virgin material. Recycled plastic can be transformed into bricks, pavements, partial replacement of the aggregates in concrete, road components and other construction materials.

Conversion of plastic waste into energy: By harnessing energy from plastic waste, Kenya can generate a significant amount of clean energy to meet its increasing power demands, thereby reducing its reliance on fossil fuels and mitigating the environmental impacts associated with them.

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

Even if the Kenyan policy framework on plastic waste is well-developed compared to the equivalent frameworks for other types of waste, it still has weaknesses. First, the high costs and delays associated with obtaining the mandatory licences for transporting and processing waste can act as a barrier to formal entrepreneurship. Additionally, there is limited clarity on whether single fraction shipments are considered waste, creating confusion within the recycling value chain. Furthermore, although VAT exemptions exist for plastic recycling companies, smaller businesses with less than KSh 40,000 yearly revenue do not benefit, necessitating further incentives for those businesses to enter the market.¹⁶

Additionally, plastic waste management businesses can face profitability challenges as they depend on the availability and quality of input materials which are closely linked to market prices. Plastic recyclers face issues with unreliable quantities and poor-quality input materials. Inconsistent input due to informal collection practices and rudimentary sorting leads to downcycling, where recycled plastics are used in low-quality applications.¹⁷ Furthermore, the profitability of plastic recycling companies can be highly volatile as their sales depend on the price of virgin plastic (new raw plastic), which depends on oil prices and can be very competitive. Moreover, recycled plastics' prices depend on the willingness of buyers (often big firms) to pay and are governed by the law of supply and demand.¹⁸

16. Kenya Revenue Authority, Value Added Tax (VAT), n.d.








17. Kenya Association of Manufacturers, Kenya Plastic Action Plan, 2019

18. Ocean Conservancy, Financing Waste Management and Recycling Infrastructure to Prevent Ocean Plastic Pollution, 2020

DESCRIPTION OF COMMON BUSINESS MODELS

The following table highlights the key business models identified in the plastic waste management sub-sector, together with examples of identified businesses for each of these business models.

Figure 5 – Illustrative businesses by business model identified

Business Model	Select Businesses
Prevention of single-use plastic with technology	
Collecting and recycling	  
Conversion into energy	 
Conversion into building materials	  
Conversion into decoration	 

Prevention of single-use plastic through technology

► DESCRIPTION

IoT technologies can be leveraged for many different use cases. This business model description focuses on Novek, which is using such technology to prevent the use of single-use plastics.

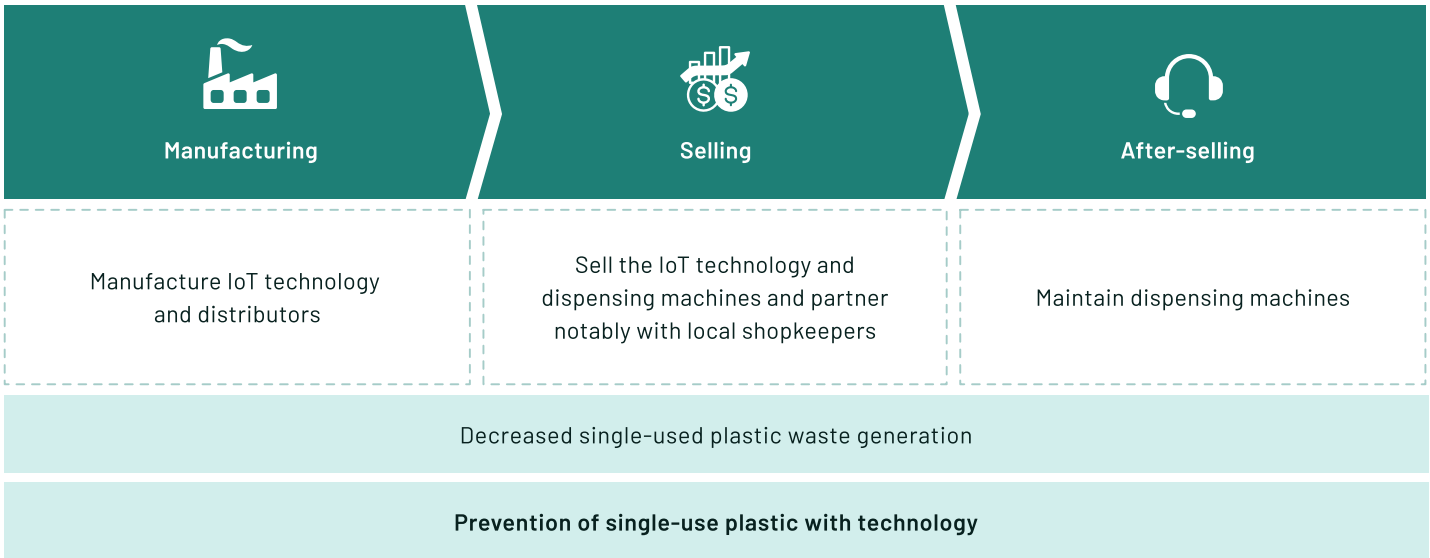
Novek's market proposition focuses on leveraging IoT technology to enable the sustainable and cost-effective supply of goods by retailers to reduce single-use plastics. This innovation aims to increase sales and profit margins for shopkeepers by allowing them to sell washing powder, cooking oil and other products at bulk prices without the need for single-use plastic packaging. By removing fixed packaging, Novek's technologies enable the sales of smaller quantities for more price-sensitive customers, reduce stockouts by leveraging technology for inventory monitoring, and decrease product prices through savings from reduced packaging costs. By improving product delivery and shopkeeper incomes, Novek seeks to drive economic prosperity while promoting environmental sustainability.

Novek targets a diverse customer base that includes low-income consumers and small business owners in markets like Kenya, where there is high mobile phone penetration and extensive use of digital payments. The company utilises local shopkeepers as a critical channel, educating them on the benefits of their IoT machines and providing necessary training to boost adoption. By engaging with local champions and community leaders, Novek aims to foster community buy-in and encourage wider consumer use of refill solutions. This strategy ensures that the benefits of reduced packaging waste and cost savings are communicated effectively at the grassroots level.

Cost drivers for Novek include the development and deployment of IoT-enabled refill machines, which involve significant upfront capital expenditure (CapEx) investments in technology and manufacturing infrastructure. These machines need to be reliable and adaptable to local conditions, such as intermittent power supply, which may require additional features like backup batteries. Regulatory compliance and consumer trust issues also add to the operational costs as the company must ensure product quality and prevent tampering. However, the use of IoT technology provides efficiencies by allowing manufacturers to track inventory and automate restocking, reducing logistical costs and minimising packaging waste.

Novek's revenue streams are primarily derived from sales of their IoT machines and partnerships with multinational consumer goods companies. These partnerships are built on Novek's ability to provide real-time supply chain insights and reduce packaging costs, which can be significant for small product quantities.

Figure 6 - Overview of the value chain



► **MAPPING OF BUSINESSES USING THIS MODEL**

Novek is the only business identified in this field in Kenya. The company is in its growth stage.



► **NOVEK - CASE STUDY**



Origin: **Kenya**
 Year of foundation: **2028**

“Eliminating plastic from consumer goods everywhere”

MARKET PROPOSITION

- 1 **Fights plastic waste generation in Kenya, where** (880,000 tons of plastic waste are generated yearly).
- 2 **Designs IoT technology to eliminate single use plastic from Fast Moving Consumer Goods (FMCGs) supply chains.**
- 3 **Partnered with Nestlé, Coca-Cola Beverages Africa, and Population Services International.**

IMPACT






Has **increased the sales of retailers by a percentage ranging from 50% to 100%** and increased profit margin of retailers through packaging costs saving.



Has **decreased single-used plastic generation in the FMCG industry.**



FUNDING SECURED

Amount	Types of Instrument	Select Investors
About US\$ 100k	Grant	 strive
About US\$ 100k	Grant	
About US\$ 1m	Seed capital	

KEY SUCCESS FACTORS IDENTIFIED

- ✓ **Working in partnership with businesses or municipalities:** has notably partnered with Nestlé, Coca-Cola Beverages Africa, and Population Services International.
- ✓ **Leveraging technology to streamline the process:** uses smart dispensers that leverage technology to monitor usage and automate refills, reducing waste and optimizing supply chain of fast-moving consumer goods.

Collecting and recycling plastic waste

► DESCRIPTION

Businesses that focus on collecting, sorting and recycling plastic waste into plastic pellets or recycled materials aim to reduce environmental pollution by diverting such waste from landfills and water bodies. This business model supports local economies while addressing plastic pollution, creating new job opportunities and contributing to sustainable development.

Key activities include collecting plastic waste from households, businesses and industrial facilities and transporting it to recycling facilities where it is sorted, cleaned, shredded and processed into recycled products. These businesses are exploring innovative solutions such as partnering with local governments to increase recycling rates, investing in technology to improve process efficiency, collaborating with manufacturers for sustainable products and participating in international initiatives to share best practices. Their customer segments include manufacturers using recycled plastic and businesses interested in sustainable products.

Primary cost drivers for this business model include CapEx for trucks, machinery and plants. For a facility processing about 25,000 tons of waste per year, the set-up costs would be around US\$ 850k.¹⁹ Additionally, all trucks and processing technology need to be licensed by the National Environmental Management Authority (NEMA).²⁰ Then, there are operational expenses (OpEx) for waste collectors, vehicle maintenance and energy.

Revenue streams are generated through the sale of plastic pellets and recycled plastic products to manufacturers and partnerships with businesses supporting sustainable practices. These businesses can also earn revenue through plastic credits.

19. Great for Growth & UK Aid, Attracting Investment into Plastics Recycling in Kenya, 2021

20. SEI, Plastic Waste Management and Recycling in Mombasa, Kenya, 2022







Figure 7 – Overview of collection and recycling of plastic waste the value chain



► **MAPPING OF BUSINESSES USING THIS MODEL**

This study has identified six businesses operating in the field. The leader is Mr. Green Africa, with more than US\$ 7m secured and a well-established revenue model which allows the company to be profitable. Key investors in this field are Unilever, the Minderoo Foundation, AlphaMundi and the Kenya Climate Innovation Center.

Figure 8 – 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	2	 
Mature stage	2	 

▶ MR. GREEN AFRICA – CASE STUDY



Origin: **Kenya**

Year of foundation: **2014**

Number of employees: **Over 120**

“Trading recyclable materials while achieving tangible social and environmental impact”

MARKET PROPOSITION

- 1 Collects post-consumer plastic waste, by formalising a network of informal operators, and it into plastic pellets or into packaging, by working in partnerships with brands, which informal operators can't access as setting up recycling factories meeting quality standards is costly.
- 2 Exploits widely available material in Kenya with 880,000 tons of plastic waste generated yearly (of which only 3 to 8% is treated).
- 3 Helps companies to meet their duties, as they are increasingly required to incorporate a minimum percentage of recycled plastics into their product or packaging.
- 4 The business model of Mr. Green Africa could be replicable in any country where there are waste challenges and an informal sector that is dealing with waste management.
- 5 Uses technology to manage and streamline operations, in particular to
 - ✓ Reward consumers with green points that bring their waste to collection points.
 - ✓ Pay the informal workers.

IMPACT



Provides decent living wages to waste collectors, who otherwise earn less than the minimum wage.



Has created over 120 direct jobs and over 2,500 indirect jobs, applying fair trade for waste collectors, notably by providing them with fair wages and protection material.







Has treated about 15,000 tons of plastic waste that would otherwise be likely be burnt or left in the environment.

KEY MILESTONES ACHIEVED

- ✓ **2014:** Started activities in Kenya
- ✓ **2015:** Started providing protection to waste pickers
- ✓ **2016:** Participated to the program Transform of Unilever, EY, and Ukaid, allowing them to make a partnership with Unilever
- ✓ **2020:** Launched a packaging made up of 100% recycled plastic
- ✓ **2021:** Has been certified B Corporation

FUNDING SECURED

Amount	Types of Instrument	Select Investors
More than US\$ 7m	Grants, debt, and equity – last round was Series B	   

KEY SUCCESS FACTORS IDENTIFIED

- ✓ **Working with the informal sector:** integrates informal workers and small entrepreneurs in the value chain, allowing them to benefit from fair remuneration and other advantages.
- ✓ **Working in partnership with businesses or municipalities:** has notably partnered with Unilever to launch its first operations. In exchange of funding, Mr. Green processed plastic litter into materials for Unilever’s local packaging needs.
- ✓ **Selling to businesses and industries:** sells recycled packaging to businesses.
- ✓ **Impact measurement:** is the first recycling company to be a Certified B Corporation on the African continent (certified in 2021), allowing them to attract funding.

Conversion of plastic waste into energy

► DESCRIPTION

Businesses that convert plastic waste into energy in the form of fuel or cooking gas are sustainably addressing environmental pollution and growing energy needs. This business model contributes to environmental sustainability by repurposing waste, therefore preventing it from ending up in landfills, and by allowing households, farmers, businesses and industries to decrease their reliance on fossil fuels, charcoal and wood. Moreover, plastic-to-energy companies could significantly contribute to the country's energy transition. Energy demand in Kenya is growing at an estimated 5% per annum; the Kenyan government is aiming to address this by increasing the share of clean energy from 80% to 100% by 2030.²¹ Additionally, fuel made from plastic is less toxic during cooking than biomass sources of energy such as charcoal, kerosene, firewood and dung, thereby reducing health issues related to biomass usage.²²

Key activities include collecting plastic waste from households, businesses and industrial facilities, transporting it to processing plants and converting it into energy through advanced technologies such as pyrolysis²³ and gasification.²⁴ Companies in this field form partnerships with local waste management organisations to ensure a steady supply of plastic waste. Their customer segments include households, energy companies and industrial users seeking sustainable energy solutions.

The main cost drivers include the CapEx for machinery, plants and trucks (with NEMA licences). OpEx costs are mainly related to the need for skilled labour.

Revenue streams are generated through the sale of the energy produced. Additional revenue comes from partnerships with businesses and organisations supporting sustainable energy practices and potentially earning carbon credits.

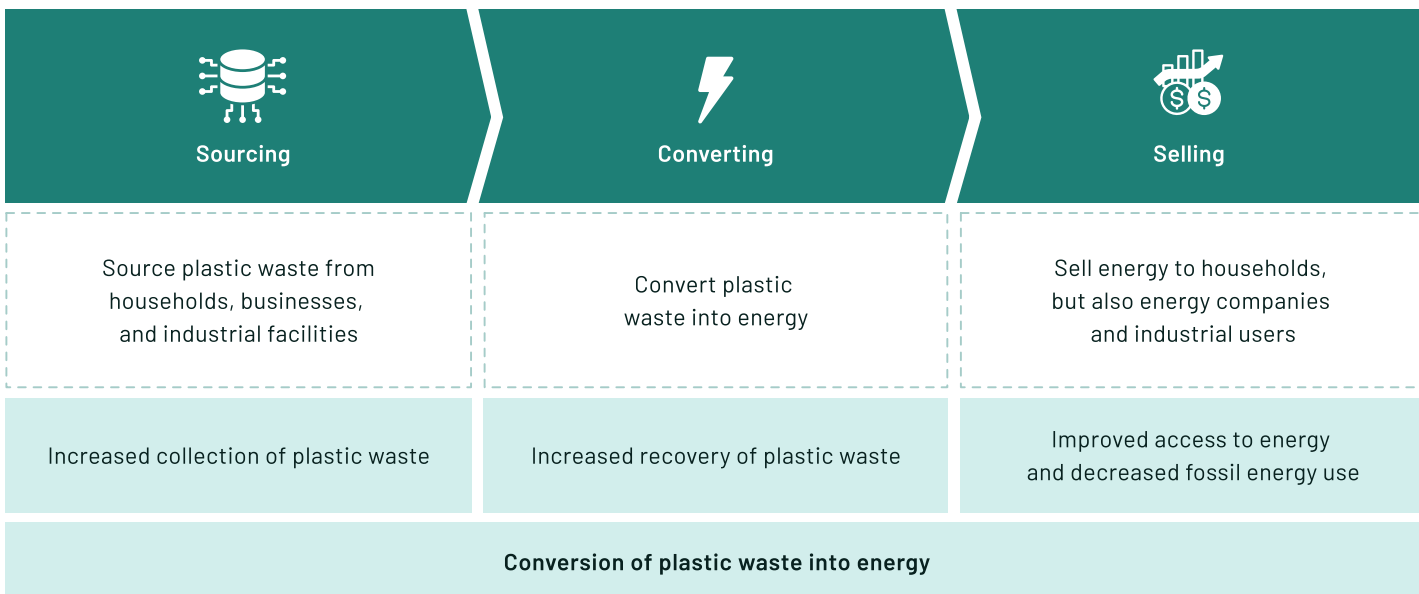
21. The International Renewable Energy Agency, Kenya Spearheads Landmark Renewable Energy Initiative at Africa Climate Summit, 2023

22. Africanews, Kenya Seeks to Shift towards Clean Cooking Fuels, 2023

23. In plastics pyrolysis, the degradation of solid plastic waste is carried out thermally in the absence of oxygen, producing organic vapours. These vapours are then condensed into a liquid fuel, such as oil.

24. In plastics gasification, the macromolecular structures of polymers are broken down into a mixture of gases, such as methane, hydrogen and carbon monoxide, through a high-temperature process.

Figure 9 – Overview of the value chain



► **MAPPING OF BUSINESSES USING THIS MODEL**

This study identified two businesses that are pioneering the conversion of plastic waste into energy in Kenya: **Adarsh Polymer and MegaGas**. Investors in this field include JICA, the Government of Canada and Kenya Climate Ventures.

Figure 10 – Mapping of businesses by stage of maturity

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

Conversion of plastic waste into building materials

► DESCRIPTION

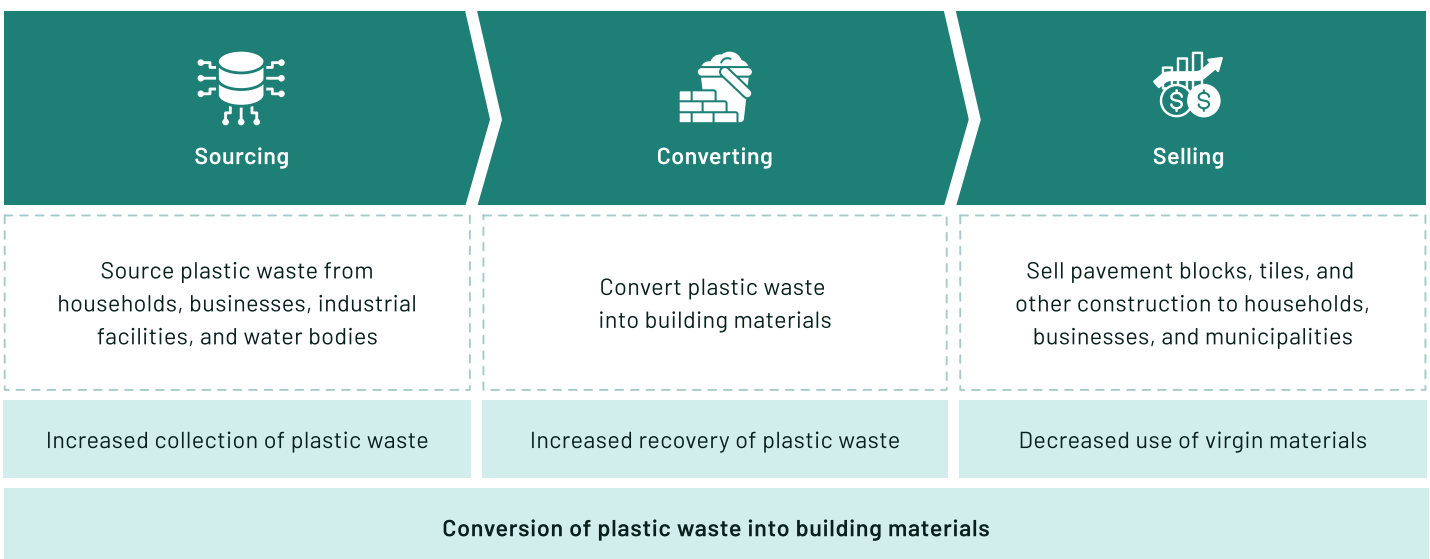
Businesses that transform plastic waste into building materials such as pavement blocks, tiles and other construction products address environmental concerns by reducing the amount of plastic waste that ends in landfills or is burnt. They can also prevent the manufacturing of building materials from virgin materials. These businesses generally serve a broad spectrum of clients including households, businesses and government entities undertaking infrastructure projects, such as roadbuilding.

The operational process encompasses several steps from sourcing to converting and selling. It begins with sourcing plastic waste from residential, commercial and industrial sources, as well as from water bodies like Lake Victoria. Once collected, plastic waste is subjected to drying if sourced from water bodies, followed by sorting and shredding into small pieces. These plastic fragments are then mixed with ground glass to improve material properties. The mixture undergoes heating and is subsequently moulded into various shapes and sizes, creating a range of building products ready for the market.

Establishing such a business requires significant CapEx to acquire the necessary manufacturing plants and equipment. If the company undertakes its own plastic collection, additional investments in trucks and the acquisition of licences from the NEMA for each vehicle are required. OpEx needs encompass labour, energy, marketing and administrative costs, all of which are essential to maintain smooth and efficient production processes.

Revenue generation is primarily driven by the sale of building materials. Additionally, companies have the potential to generate revenue through plastic credits, offering an extra revenue stream.

Figure 11 – Overview of the conversion into building materials value chain







► **MAPPING OF BUSINESSES USING THIS MODEL**

This study identified five businesses using this business model. Kubik and Gjenge Makers are the leaders, with millions of US\$ raised and international recognition, notably in the French press. Investors that have already financed these businesses include the Bestseller Foundation, JICA, King Philanthropies and the ShelterTech Accelerator.

Figure 12 – 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	2	 
Mature stage	1	

► CHEMOLEX – CASE STUDY



Origin: **Kenya**

Year of foundation: **2013**

Number of employees: **120**

Monthly revenue (2024): **US\$ 3.5 - 6.2k**

Revenue projections (by 2025): **500k US\$**

“Delivering impactful & sustainable solutions in waste management and renewable energy in developing countries”

MARKET PROPOSITION

- 1 Collects plastic waste from rivers thanks to its plastics capturing device, and from households and converts it into:
 - ✓ Pavements blocks, either for households or for governments building streets (about US\$ 3000 to US\$ 5000 of revenue per month).
 - ✓ Packaging material, particularly for FMCGs (about US\$ 500-1200 US\$ of revenue per month).
- 2 Exploits widely available material in Kenya with **880,000 tons of plastic waste generated yearly (of which only 3 to 8% is treated)**.
- 3 Addresses the high level of waterbodies pollution by plastic waste, which destroys the aquatic life and affects the quality of water.

IMPACT



Aside from fishing and recycling plastic waste, **works with women groups on river regeneration projects repurpose waste.**



Provides living wages to waste collectors, while informal waste collectors generally earn less than the minimum wage.



Has **treated over 200 tons of plastic waste and removed 500 tons of plastic from waterbodies** (has still a huge potential in Kenya with 880,000 tons of plastic waste generated yearly and only 3 to 5% that is treated).






Reduces aquatic life hazards by collecting plastic waste into water bodies.

RECOGNITION

- ✓ Elsevier Foundation Chemistry for Climate Action Challenge (2024)

FUNDING SECURED

Amount	Types of Instrument	Select Investors
US\$ 1m	Grant	 
US\$ 750k	Grant	

GROWTH PLANS

- ✓ Seeking to **increase its production capacity by 2x-3x, professionalize its operations, purchase new machines** that are more time and energy efficient, **buy a new truck**, and **improve its quality testing**.
- ✓ Investigating the possibility of generating **plastic credits as a new revenue stream**.

FUNDING NEEDED

Amount	Types of Instrument	Needs
US\$ 750k	Grant, debt, or equity	Increase its production capacity and professionalize

KEY SUCCESS FACTORS IDENTIFIED

- ✓ **Working with the informal sector:** Works with Community-Based Organizations (CBOs) and youth groups to collect, dry, and transport waste to the facility.
- ✓ **Working in partnership with businesses or municipalities:** Creates partnerships to be able to treat types of plastic and waste their current operations cannot support at the moment.
- ✓ **Selling to businesses and industries:** Sells construction material to public institutions and recycled products to businesses (construction businesses and recycled packaging to retailers).

Conversion of plastic waste into decorations

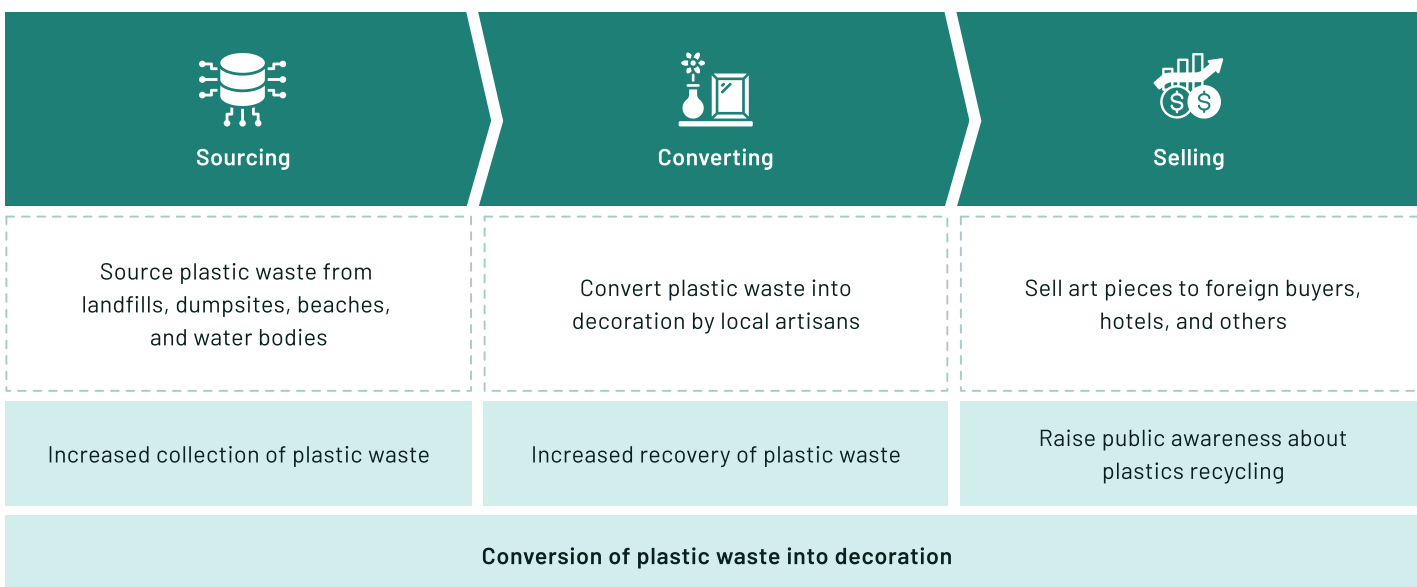
► DESCRIPTION

Businesses that transform plastic waste into unique artworks and sculptures are creatively addressing the global plastic waste problem. Such initiatives can significantly reduce the amount of plastic waste ending up in landfills and oceans, thereby protecting aquatic life and enhancing the health of coastal and marine environments. Additionally, this model seeks to formalise the role of waste pickers by integrating them into the supply chain, providing them with fair compensation and creating career opportunities for artisans in high-impact communities.

The process begins with a network of collectors and then continues with local artisans. Collectors gather plastic waste from landfills, dumpsites, beaches and wastewater sources for about KSh 30 per kilogram of plastic collected, ensuring a steady supply of raw materials while supporting local communities. The collected plastic is then transported to workshops, where it undergoes cleaning and transformation into artistic creations. These unique pieces of art are marketed both locally and internationally, with a significant portion being exported. Locally, they are sold in venues such as hotels, adding aesthetic value and raising environmental awareness among visitors.

The main cost drivers for this business model include shipping expenses for exported products, which constitute a significant share of its OpEx. Additionally, meeting the requirements set by the NEMA incurs further costs. These businesses generate revenue through the sale of artwork and sculptures, turning plastic waste into valuable, eco-friendly art while fostering environmental sustainability and economic development in the communities they serve.

Figure 13 – Overview of the value chain







► **MAPPING OF BUSINESSES USING THIS MODEL**

This study identified two businesses that are converting plastic waste into decorations. Both businesses are quite advanced in their growth journey, but they are not-for-profit companies and are not looking to raise funds.

Figure 14 – Mapping of businesses by stage of maturity

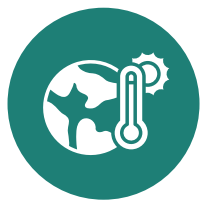
Stages of Maturity	Number of Businesses	Illustrative Businesses
Start-up stage/ Idea stage	0	
Early stage	0	
Growth stage	2	 
Mature stage	0	

FINANCING LANDSCAPE ASSESSMENT

Mapping of financing needs

As previously detailed, the financing needs of plastic waste management businesses in Kenya vary depending on their business model. However, in general, these businesses face significant financing needs, particularly in terms of high CapEx, regulatory requirements and OpEx for sourcing plastic waste. The recycling or conversion of plastic waste into valuable products often necessitates the installation of high-tech plants and equipment, which can be costly and require substantial investments. Additionally, regulatory costs associated with the mandatory licences for trucks and waste processing facilities add to the financial burden. Moreover, for some businesses, the sourcing of plastic waste represents a significant cost driver.

Potential innovative finance mechanisms



Climate Finance

The Plastic Waste Reduction Standard is an innovative finance solution financing projects that improve plastic waste management systems worldwide. The Plastic Standard issues two types of credits: Waste Collection Credits and Waste Recycling Credits, collectively known as Plastic Credits. However, such credits need to be a complementary financing solution rather than the primary one.²⁵ TakaTaka Solutions, a business active in integrated waste management is already registered at Verra for plastic credits.²⁶

Furthermore, plastic bonds are also a new instrument allowing plastic recycling companies to raise investments.²⁷ Although these have taken several forms, they generally combine debt provided to plastic recycling companies by investors and off-take agreements for plastic credits between the recycling companies and corporates. Examples include a US\$ 100m Citi and World Bank Plastic Waste Reduction-Linked Bond.

Additionally, blue bonds could be leveraged as plastic waste endangers aquatic life.

This mechanism is a conventional thematic bond that attracts impact investors. An example of a blue bond issued in the plastic management field is the World Bank's blue bond launched in April 2019 to address plastic waste pollution in oceans. This bond raised US\$ 10m from institutional and individual investors at a fixed rate.²⁸

25. Verra, Five Things You Should Know About Plastic Credits, 2023

26. Key informant interviews with businesses.

27. In Ghana and Indonesia, investors receive annual coupons linked to the issuance of plastic and carbon credits generated by projects.

28. Nasdaq, What Are Blue Bonds?, 2021

CONCLUSION

With about 880,000 tons of plastic waste generated yearly in Kenya and only about 3% to 8% of that recycled or recovered, there is a huge potential for plastic waste management businesses. Among the 122 businesses identified through this study, only 18 are dealing with plastic waste. As the plastic waste management challenge has been long present, the sub-sector encompasses several investable companies that have already raised substantial amounts of funding and reached break-even.

In addition to preventing the generation of single-use plastic waste, businesses are proactively tackling the plastic waste issue through a range of innovative recycling and recovery solutions. Processing plastic waste into plastic pellets or recycled packaging first requires the sorting of waste by type of plastic. Following this, plastic waste can be converted into energy, building materials or decorations, driving the decrease of energy costs and dependence on fossil fuels, reduced virgin material use, and increased public awareness, respectively. These businesses also reduce the GHG emissions related to plastic generation and plastic waste and contribute to a cleaner and healthier environment.

Private investors are needed to grow this sub-sector by responding to the high financing needs of plastic waste management SGBs. Although financing needs depend on the business model, the recycling or conversion of plastic waste into valuable products requires high-tech plants and equipment. Additionally, regulatory costs for licences and permits add to the financial burdens of businesses. Finally, sourcing plastic waste can be costly as businesses may need to compensate waste pickers fairly or invest in collection and segregation infrastructure.



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