Attracting investment into plastics recycling in Kenya

Manufacturing Africa

July 2021

This programme is funded by UK aid from the UK Government; however, the views expressed do not necessarily reflect the UK government's official policies

Context

Manufacturing Africa aims to **accelerate FDI in prioritised manufacturing sectors**, unlock barriers to investment, provide business linkages and drive active investor outreach

In early 2021, Manufacturing Africa developed a Green Manufacturing roadmap in close consultation with GoK and private sector entities, which established that Green manufacturing can unlock $2-4bn annual revenue potential by 2030 in Kenya. The roadmap specifically highlights 7 high-value industries:

- Convert waste into **black soldier fly** animal feed
- Manufacture **biological crop protectors**
- Produce **biodiesel** from used cooking oil to be used as fuel replacement in transport
- Manufacture clean **cookstoves**
- Assemble (with future potential to manufacture) **electric motorbikes** and other two-wheelers
- Manufacture **plastic products** from recycled plastic
- Set up **mechanical cotton recycling** factory with spinning and knitting/weaving capacity

Objectives and approach

- This document serves to **identify the critical pathway to promoting investment attractiveness** along the **plastics recycling value chain**, within which scale-up of Material Recovery Facilities will play a key role
- The intention is for the findings of this analysis to be considered by relevant **national and county governments** in their **deliberations regarding enablers** to support investment into plastics recycling
- The findings can also support **private sector players and investors considering investing in this space** on overall business case and opportunities for plastics recycling

Approach

- Engaged manufacturers, waste management companies, associations, experts, development agencies and government entities to identify the most impactful enablers
- Conducted economic analysis to define initiative specifics
- Tested outcomes with relevant Ministries and private sector players

Next steps

- Syndicate findings to relevant senior Ministry and County personnel
- Identify potential local and international investors through

We are in the process of finalizing syndication with manufacturers, ministries, associations and development agencies

Stakeholders engaged in developing this document

7 manufacturers & waste management companies

KenPoly, Unilever, Chandaria Industries, Trash Connections Limited, Nairobi Bins, TakaTaka Solutions, Mr. Green Africa

4+ government entities

Ministries of Industrialization, Ministry of Environment & Forestry, National Treasury; NEMA, Council of Governors, counties

5 associations

KAM, KEPRO, PETCO, KAWR, KEPSA SIB[1]

5 global McKinsey experts

Experts in sustainability and packaging, plastics recycling and material recovery

2+ potential investors

Confidential

4 development agencies

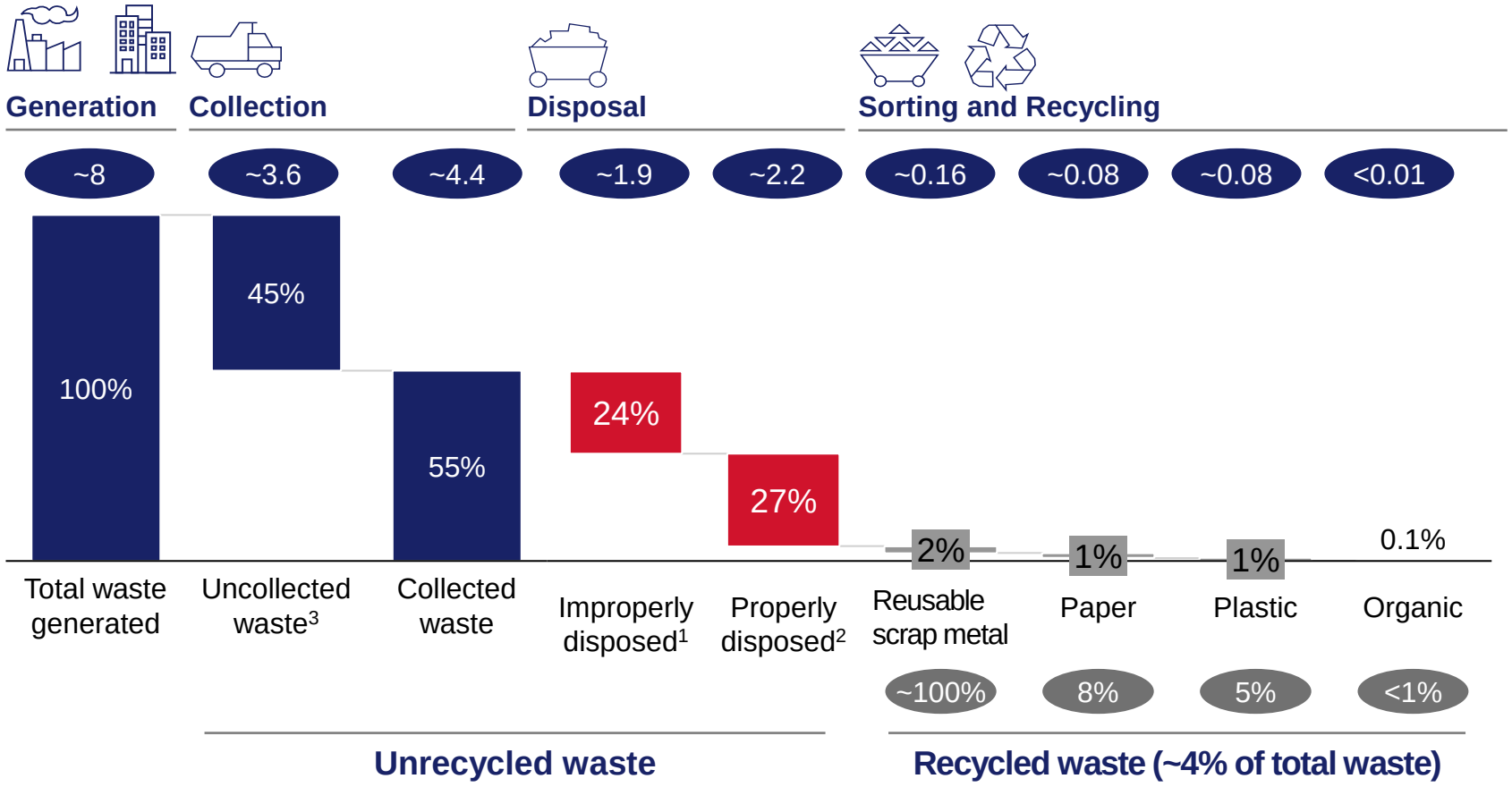
FCDO, DANIDA, Netherlands Embassy, GIZ

1. Kenya Association of Manufacturers (KAM), Kenya Producer Responsibility Organisation (KEPRO), Kenya PET Recycling Company Limited (PETCO), Kenya Association of Waste Recyclers (KAWR), Kenya Private Sector Alliance Sustainable Inclusive Business (KEPSA SIB)

The circular economy opportunities in Kenya are significant, given 96% waste is not recycled

Million tonnes of waste produced per year[4] Recycled waste as a % of total waste generated of this type

Overview of waste collection and recycling in Kenya, % of total waste generated



1. Waste that was not disposed at a designated disposal zone, e.g., rubbish tossed by the roadside, in rivers
2. Waste disposed at the appropriate disposal location and in the right manner (e.g., in a bin liner) but was not recycled, e.g., ended up in a landfill
3. Uncollected waste often in poor communities because of unaffordable waste collection. Waste is unofficially disposed or burnt
4. Using values from the National Waste Policy, Ministry of Environment and Forestry. Values may not add due to rounding

Source: Summary of waste sources and sinks, SWM in Nairobi , Africa Waste Management Outlook, press search, JICA, press search, US EPA, Eurostat, Statistica, press search, UNEP

Key insights

55% of waste in Kenya is collected – higher than African average of 44% but lower than East Asia and Pacific (71%), Middle East and North Africa (82%), Europe and Central Asia (90%) and North America (>95%)

However, **recycling as a percentage of total waste is low at ~4%** of total generated waste, which **aligns with the Africa average** of 4% but is very low compared with 40% in the EU and 25% in the US

Only **5% of total plastic waste generated is recycled,** not far off the USA rate of 9% but quite behind the EU rate of 31%

ILLUSTRATIVE

Waste collection, sorting and recycling is complex and has multiple pathways in Kenya

Waste collection value chain in Kenya

100%

Waste Generation

- Residential and commercial waste is largely unsorted
- In some areas, waste is placed on the roadside in bags or in household/business-owned bins (i.e. not public bins or skips)
- Very few official municipal or commercially-run waste recycling or other deposit sites exist

Waste that either goes to municipal dumpsite, illegal dumpsite or MRF, not all three

Percentage of total waste | Disposal | Sorting | Waste

~2%

~20%

FORMAL COLLECTION

- NEMA registered formal waste collectors collect 30-40% of aggregated waste from residential and commercial areas
- Waste is collected from a variety of clients in various areas
- Each area has an allocated collection day
- Collectors collect revenue on a monthly, quarterly or yearly basis
- Collectors will send waste either to municipal dumpsites, illegal dump sites or MRF, not all three due to cost implications (gate and dumping fees)
- **~ 10% of collected waste is sorted on trucks**

Example: Bins Nairobi Services Ltd.

"EN ROUTE" SALE

- ~10% waste is sold "en route" before it reaches dumpsites or an MRF (daily income per crew member KES ~300)
- Buyers are licensed or unlicensed "Jua Kali" customers

~35%

INFORMAL COLLECTION

- 60-70% of aggregated waste is collected by informal community based organizations (CBOs)
- Waste is sorted into high value/ recyclable and low value/ non-recyclable waste

~45%

NO COLLECTION

- ~45% of waste is not collected, often in poor communities because of unaffordable waste collection
- Waste is unofficially disposed or burnt

~10% OR ~7% OR <1%

MUNICIPAL DUMPSITE

- Official $1-2/ton fee (receipted, few pay), plus $4-5 security/offloading fee in cash and wear & tear and time spent (6 hours to 2 days)
- OR unofficial $10/truck offloading fee

Example: Dandora

- Long queues of over 100 trucks
- Bulldozers needed to assist in offloading
- Potential of major bottlenecks if one truck gets stuck
- Trucks can only afford to offload waste once a day at maximum
- Waste pickers collect high-value recyclables and sell them

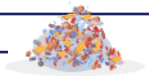
ILLEGAL DUMPSITE

- Gate and dumping fee vary
- 'Youth group safety fee' plus additional wear & tear costs, time spent
- Waste pickers collect high-value recyclables and sell them

MRF

- Potential $10/ton gate fee
- Time spent ~40 minutes
- Main revenues are from gate fees and sale of recyclable waste in form of bales
- Waste is separated into types - plastic, paper, glass, metals incl. aluminium
- Metal and glass revenue is marginal due to low price for sorted glass and low volumes of metal are received
- Visual criteria (looseness and state of decay) determine which waste can be sorted
- Unused waste is offloaded at a dumpsite

Example: Taka Taka Solutions



<1%

UNUSED WASTE

~4%

<1%

LOW VALUE/ NON - RECYCLABLE WASTE

HIGH VALUE/ RECYCLABLE WASTE

RECYCLER

- Sorted plastic waste is purchased by recycler and processed into flakes or pellets
- Pellets are more acceptable for manufacturers than flakes, due to technical nature of manufacturing
- Converting flakes to pellets is complex due to clarity, chemical and physical properties of various plastics (PET, PP, HDPE)

Example: Mr. Green

- Mr. Green has ~ 650 collectors in NBO sending waste to 40 centers

MANUFACTURER / PRODUCER

- Processed plastic waste is purchased by manufacturer who uses it to make plastic goods with a proportion of recycled plastic (up to 100%)
- Process is complex given the varied melt flow index of recycled plastic relative to virgin plastics

Example: Unilever

Source: Expert interviews, Desk research

A variety of enablers could be used to direct waste along an ideal pathway, where MRFs play a key role

Ideal waste collection value chain

NOT EXHAUSTIVE

Non-ideal waste path | Ideal waste path | **Bolded = priority enablers for MA to support[1]**

Percentage of total waste | Disposal | Sorting | Waste

100%

Waste Generation

- Conduct behavior change campaign to the public to encourage sorting at source
- Set up waste collection points with bins for different waste streams in public areas to improve access to and awareness of pre-sorting of waste
- Standardise eco-labelling to inform customers how/if materials can be recycled in Kenya

FORMAL COLLECTION

- Introduce waste collection levy on businesses and households to fund county-level collection

"EN ROUTE" SALE

- Collection companies (private and public) enforce policies of no "en-route sale" from trucks
- Increase salaries of crew to offset loss of earnings

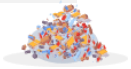
0%

INFORMAL COLLECTION

- Encourage formal collectors to employ informal collectors as their workforces expand
- Integrate informal waste collectors into associations or cooperatives to incorporate into formal waste collection value chain

0%

NO COLLECTION



- Enforce penalties on burning of waste

35%

MUNICIPAL LANDFILL

- **Exempt MRFs from landfill / dumpsite fees**
- Increase landfill / dumpsite fees over time
- Set aside suitable land and infrastructure for waste disposal (e.g. sanitary landfills)

LOW VALUE/ NON - RECYCLABLE WASTE

HIGH VALUE/ RECYCLABLE WASTE

0%

ILLEGAL DUMPSITE

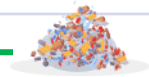
- Enforce illegal dumping penalties and allow for anonymous citizen reporting

65%

MRF

- **Allow MRFs to set up tiered gate fee structure tied to quality/grade of waste**
- **Provide access to strategically located, affordable public land for leasing under a PPP**
- **Exempt MRF equipment from VAT**
- **Issue capital allowance on CAPEX**
- **Issue bin liner licences to MRFs on a preferential basis**
- Streamline county waste transport licensing

1-15%



UNUSED WASTE

50-64%

RECYCLER

- **Introduce VAT exemption on sale of collected plastic waste, recycled plastic pellets and flakes**
- Introduce VAT exemption on equipment for recycling companies during first years of operation

MANUFACTURER / PRODUCER

- **Introduce phased regulation requiring plastics producers to use a minimum percentage of recycled plastics**
- **Base the EPR on international best practice, including anchoring PROs on waste streams**
- Introduce nationwide single use plastic ban from 2025 on specific items
- Introduce buy back schemes on plastic bottles

1. Enablers prioritised based on being non-consumer facing and core to stimulating demand, improving MRF economics or streamlining and raising funds for waste collection

Source: Expert interviews, Desk research

To redirect waste towards MRFs and enable greater sorting and recycling of waste, 3 categories of non-consumer facing activities need to occur

Category	Rationale
Demand needs to be stimulated 	Economic viability of MRFs depends on there being a market for the materials they sort. **Current demand for recycled plastics** can only justify establishment of **~10 medium-sized MRFs** (25,000MT) Given **aspirations** to establish **MRFs in each county,** local **recycled plastics demand** will need to be **stimulated**, such that more MRFs are economically viable
Economics of MRFs need to be improved 	In the current environment, **MRFs as standalone businesses[1] accepting dirty[2] waste are not investable** – **high costs associated** with dumping fees, land leasing and taxes on equipment all contribute to overall **poor economics**, with time to recover investment and achieve profitability being >10 years and a **7% IRR** and **4% EBIDTA margin** Specific **enablers** could be put in place to counter these factors, and **significantly improve the economics**, meaning **scale-up of MRFs** across the country would be possible
Collection needs to be funded and streamlined 	Only **55% Kenya's waste is collected** and **less than half** of that (~20% total waste) is collected by NEMA-registered **formal waste collectors** **Raising funds** for waste **collection** through the Extender Producer Responsibility Scheme will be critical in ensuring **MRFs receive sufficient quality and quantity of waste**, especially as they scale, given this is **fundamental** to their **economic viability.** Streamlining waste collection by **preferentially issuing bin liner licenses to MRFs** will also help **incentivise formal** collection and **sorting at source.**

1. Standalone businesses assumes the MRF is not part of a vertical business that has a co-located processing plant e.g. that makes plastic pellets / biofuels / compost
2. Waste that is not pre-sorted

Initiative options to improve investment attractiveness in plastics recycling

List of priority non-consumer facing levers, not being addressed by others

PRELIMINARY **DRAFT**

Industry stakeholder assessment on relative benefit: High Medium Low

Category		Enabling initiative options	Impact
Driving demand for recycled plastics	1	Introduce **phased regulation** requiring plastics producers to use a minimum percentage of recycled plastics: 15% by 2025, 25% by 2030 and 50% by 2050 for rigid plastic and PET bottles (non-food grade only in 2025, then all PET from 2030)	
	2	Introduce **VAT exemption** on sale of collected **plastic waste**, recycled plastic **pellets** and **flakes**	
Improving MRF economics	3	**Exempt MRFs from dumpsite fees** and, where possible, cost of transporting unsellable waste to dumpsites	
	4	**Provide access to strategically located affordable public land** for leasing under a PPP for private sector MRFs to establish operations	
	5	Introduce **VAT exemption** on **equipment for material recovery and recycling**	
	6	**Issue capital allowance** of 50% first year, 25% second and third years of production	
Improving waste supply/ collection	7	**Amend the draft EPR to follow international best practice**, including building in **accountability** mechanism for producer payments and regular **independent auditing** to avoid PRO malpractice	
	8	Implement phased regulation whereby NEMA issues **bin liner licences to MRFs** on a preferential basis	

There will be negligible loss in national revenue, given plastics recycling volumes are currently very low and there is currently only 1-2 MRFs in the country

1. As described in the National Sustainable Waste Management Policy 2019 (Revised Draft): : Carry out national public awareness on waste segregation categories, colour codes and national campaign on importance of sorting at source
2. As described in the National Sustainable Waste Management Bill 2019

Source: Interviews with manufacturers, government and private sector stakeholders

1 Current demand for recycled materials can only sustain 10 medium-sized MRFs

PRELIMINARY

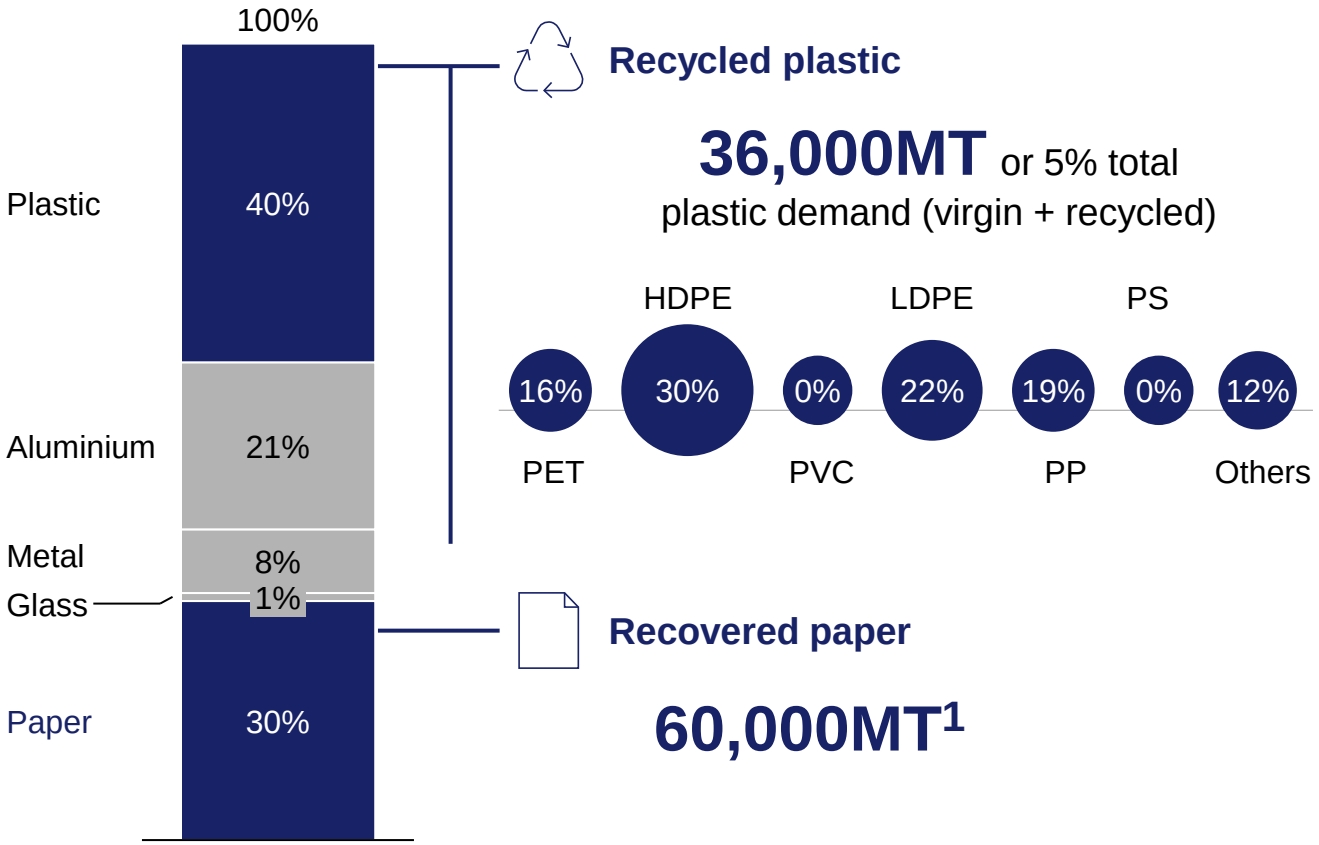
MRF size: xx Medium (25,000MT)

PRELIMINARY

MRF revenue streams, % of total revenue

Current demand for main waste streams, MT per year

No. MRFs required to meet demand



10

15

1. Current demand can be as high as 180,000 MT with 60,000 MT as a lower end

Source: Kenya Plastic Action Plan, Kenya Association of Manufacturers, Expert interviews, desk research

- **Current demand** for recycled plastics can only justify establishment of **~10 medium-sized** (25,000MT) MRFs
- Much of this demand is **already satisfied** by informal material recovery and existing MRFs, but waste recovery would be **more efficient and scalable** through set-up of **more MRFs**
- **Kenya aspires** to establishing **one MRF per county**, and has earmarked locations for **17 MRFs in Nairobi**
- For more than 10 medium-sized MRFs to be economically viable, local **offtake of recycled plastics would need to be higher,** particularly as export markets are saturated
- **Recovered paper demand is not a limiting factor** as current supply can absorb this demand

1 Some jurisdictions around the world are mandating producers to use a minimum % of recycled plastic in certain products

Timeline and target for recycled plastic mandate

PRELIMINARY

Jurisdiction	Plastic type	2020	2025	2030
California	PET/ bottles	15%	25%	50%
New Jersey[1]	PET/ bottles	10%	25%	50%
	Rigid plastic	35%		
	Plastic film bags	20%	40%	
European Union	PET/ Bottles		25%	30%

1. New Jersey's time lines are 2022, 2026 and 2031 for all mandated plastics

Source: Desk research, press search, European Commission; Cal EPA; NJ DEP

Insights

These regions have a number of **factors** in that **make achieving these targets** in a **shorter time more viable**

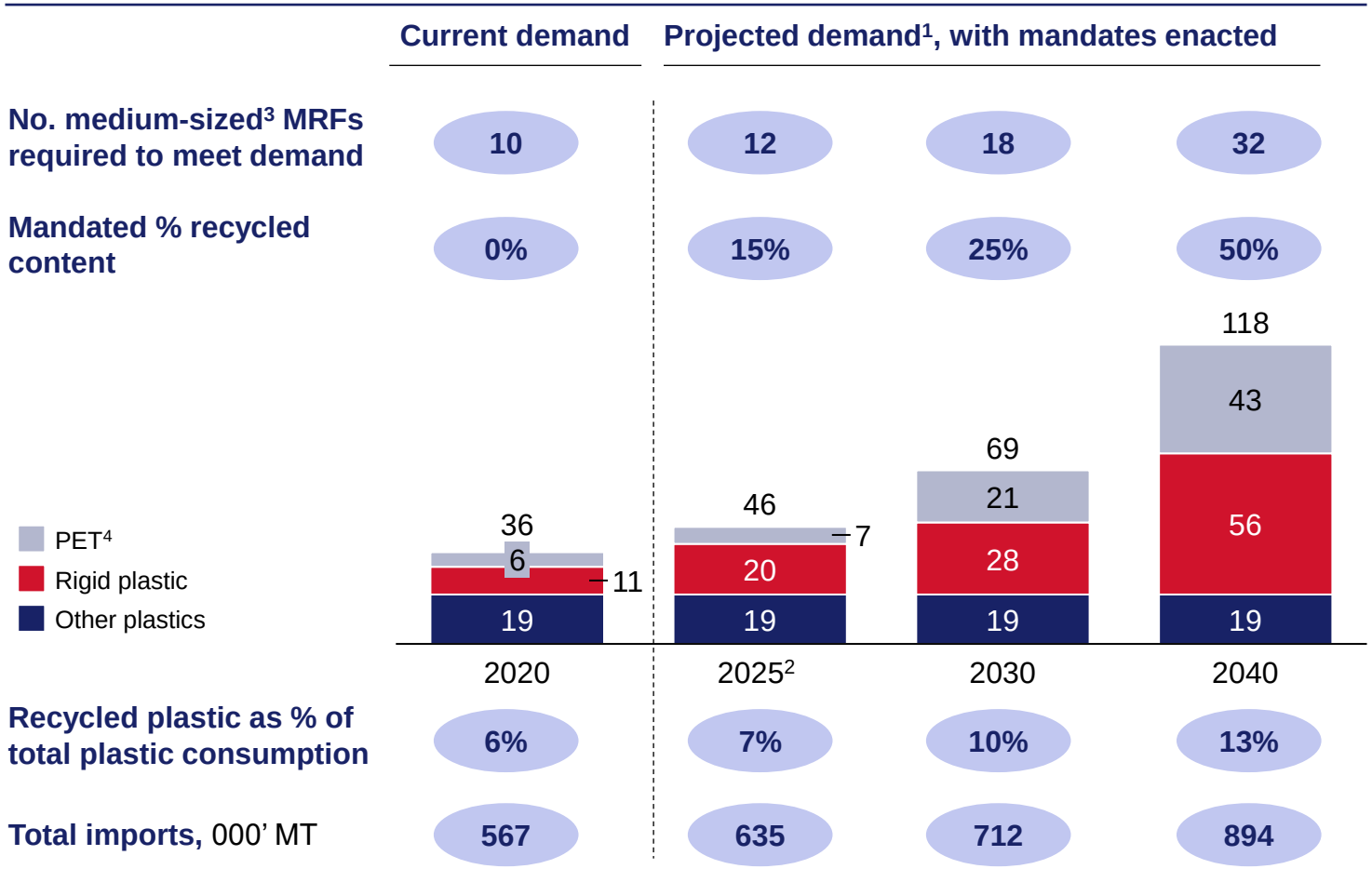
- Recycling is already **common place** and a **well established philosophy** in these regions
- Consumers in these regions **campaign for better regulation and recycling standards**
- From a young age children are taught at schools the **value of recycling**
- **Colour coded bags** and **bins force waste segregation** at the source

Whilst, Kenya has already banned plastic film bags, it could **consider similar mandates and measures for plastic bottles and rigid plastics**

Deploying these mandates and measures could be done over a **more conservative timeline**

1 A minimum recycled content mandate could create demand to support 12 medium-sized MRFs in 2025, 18 in 2030 and 32 in 2040

Recycled plastic demand in Kenya, ‘000MT



1. Growth of plastic demand benchmarked to population growth of 2.3% per year – World Bank
2. Figure assumes that 15% mandated contribution applies only to non-food grade PET and rigid plastic, 2030 and 2040 mandated contribution is for food and non-food grade as well as rigid plastic
3. Medium-sized MRFs are defined as having 25,000MT annual capacity
4. 88% of PET is food-grade PET and the remainder is non-food grade - Statistica

Source: Expert interviews, press research, Comtrade, Kenya Plastic Action Plan, World Bank, Statistica

Key insights

- If Kenya implemented **mandates for local manufacturers** using primary PET and rigid plastic to include a **minimum 15% recycled plastic** in their products by **2025**, **25% by 2030** and **50% by 2050**, this could stimulate enough demand to support:
  - **12 MRFs** in **2025**
  - **18 MRFs** in **2030**
  - **32 MRFs** in **2040**
- Announcing such mandates with **3-5 years’ lead time** would allow manufacturers time to set up the necessary equipment and infrastructure
- This would still only **drive demand** for recycled plastic up to **13% total plastics consumption by 2040**
- **More aggressive timelines** could be considered, **depending on local manufacturing readiness** (considering factors such as capabilities, global technology readiness and ease of technology transfer, profitability/economic viability)
- **Recovered paper is not a limiting factor** and **industry could absorb the increase** in recycled paper production from the MRFs

1 If these mandates are implemented, investment opportunity in MRFs is up to $20m by 2025, $30m by 2030 and ~$60m by 2040

Projected investment potential for MRFs if mandate on minimum % recycled content is introduced

Consolidated Model: aims to achieve economies of scale by setting up medium sized MRFs throughout the country

Projected investment potential, $m	**Number MRFs**	**Example locations**[3] (cities)
2025: 18	12	Nairobi, Mombasa, Kisumu, Naivasha, Ruiru/Thika
	0	
2030: 27	18	As for 2025 *plus* e.g., Machakos, Meru, Vihinga
	0	
2040: 48	32	As for 2025 and 2030 *plus* e.g., Kisi, Kakamega, Kilifi
	0	

Distributed Model: maximizes the number of counties that have MRFs by setting up small MRFs in relevant towns, and only scaling up to medium-sized MRFs where there would be >2 small MRFs in a single town/city

Projected investment potential, $m	**Number RFs**	**Example locations**[4] (cities)
2025: 11 + 9 = 20	7	Nairobi, Mombasa, Ruiru/Thika
	12	Machakos, Meru, Vihinga, Kisii
2030: 14 + 17 = 31	9	As for 2025 *plus* e.g., Kakamega, Bungoma
	23	As for 2025 *plus* e.g., Kilifi, Eldoret, Kericho
2040: 14 + 44 = 57	9	As for 2025 and 2030
	58	As for 2025 and 2030 *plus* e.g., Voi, Ngong, Kitui

Medium[1] Small[2]

Key Takeaways

In both models, **the total number of MRFs** is driven by the **mandated amounts of recycled plastic**

This means that in the **consolidated model, 12 medium-sized MRFs** could be set up in 2025, **requiring $18m investment**

The **distributed model** will require a higher **investment of $20m** in 2025 to set up **7 medium-sized** and **12 small MRFs**

The **total investment** needed to satisfy recycled plastic demand in **2030 is $27-31m** and in **2040 is $48-57m**

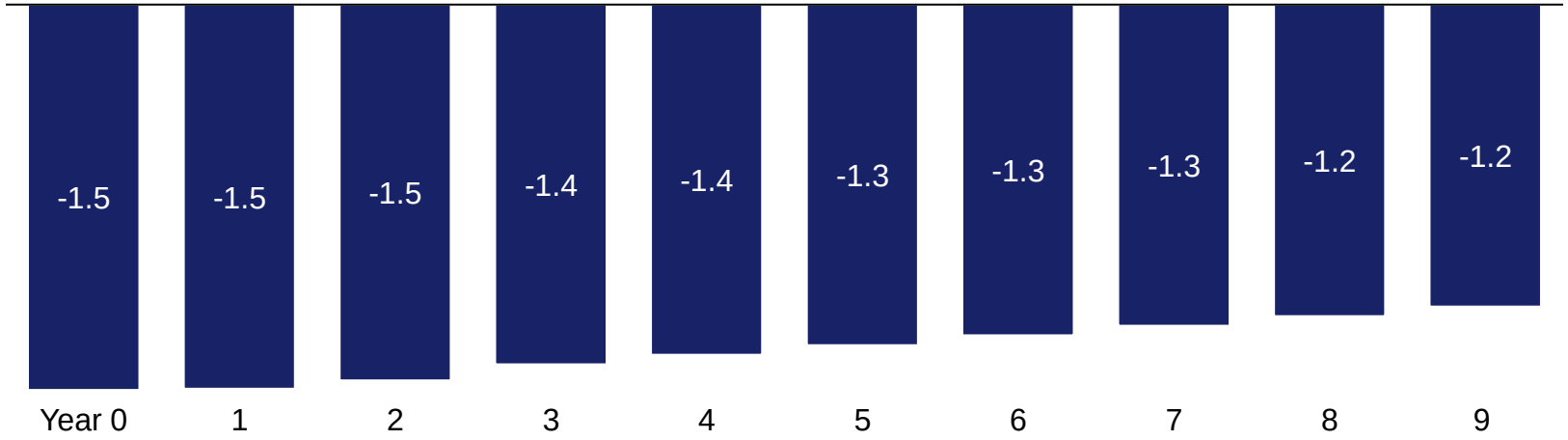
1. 25,000MT facility - investment of $1.5m based on CAPEX needed a facility of this type in Kenya
2. 10,000 MT facility - investment of $0.75m based on CAPEX needed a facility of this type in Kenya
3. Sample locations in the consolidated model were primary based by looking at cities where large demand would be located and addressing those locations first with medium-sized MRFs
4. Sample locations in the distributed model were determined by looking at cities where large demand was located and having medium-sized MRFs satisfy most of this demand first, then having the remainder of demand satisfied by small MRFs

Source: Press search, expert interviews

If MRFs receive unsorted waste, the business will be loss-making, given only ~25% unsorted waste is sellable and dumping costs are high

Supply driven economics modelled off a semi-automatic MRF[3] in Kenya processing 25,000 tonnes per year[1]

Potential cumulative cash flow and project economics, $m



>10 years	>10 years	-$1.12mn	-7%	~$37,500
Time to **profitability/ steady state**	Estimated time to recover **full investment**	NPV	IRR calculated over **10 years**	4%, EBITDA margin[2]

1. Medium size MRF in Kenya, based on expert call
2. Utilization at steady state after 4 years (60% in year 1, 70% in year 2, 80% in year 3 and 85% there after)
3. MRF receives 80% recyclable waste and processes paper (43%), plastics (30%), glass (13%) and metals (14%)
4. Percentage of total waste stream that enters the MRF
5. Includes the cost of land
6. At a gate fee less than 15$ the MRF starts to incure increasing negative cashflows

Source: Expert interviews, European Commissions "Best Environmental Management Practice for the Waste Management Sector

Key assumptions

Capex

- CAPEX to set up facility **$1m**
- Development and construction, miscellaneous[5] **$0.5m**

Operations

- Facility utilization[2] **85%**
- Gate fee[6] **$15**
- Sellable waste[4] **25%**

Opex

- Waste dumping costs as % of operational costs **52%**
- Labour costs as % of operational costs **29%**
- Utilities and other costs as % of operational costs **19%**

Five potential levers can be pulled to improve the economics of an MRF

Economic changes of a 25,000MT MRF based on the activation of various levers

Detail to follow

Change from base case: ↑ Increased ↔ Stayed the same

✳ Not called out on full list of 8 levers as MoEF confirms MRF gate fees will not be regulated

	Lever description	Lever action	Economic overview: Time to profitability/ steady state	Time to recover full investment	NPV, $'000	10 year IRR	EBITDA margin
3	**Exempt MRFs from dumpsite fees**	Eliminating $5 municipal dumpsite gate fees for MRFs that need to dump unused waste	**2 Years**	**> 10 years**	**-244** ↑ 875	**8%**	**12%** ↑ 8%
4	**Provide access to strategically located affordable public land** for leasing under a PPP for private sector MRFs to establish operations	Eliminating $500,000 land costs in CAPEX	**>10 Years**	**> 10 years**	**-356** ↑ 763	**4%**	**7%** ↑ 3%
✳	**Allow all MRFs to set up their own tiered gate fee** structure tied to quality/grade of waste	Assumes MRFs pay collectors for high quality waste[1] but charge for low quality waste, following a tiered structure	**>10 years**	**>10 years**	**-665** ↑ 454	**3%**	**7%** ↑ 3%
5	Introduce **VAT exemption** on **equipment for material recovery and recycling**	Adjusting only CAPEX related to equipment to 84% of total value to reflect true equipment cost ex VAT	**> 10 Years**	**> 10 years**	**-909** ↑ 210	**-2%**	**5%** ↑ 1%
6	**Issue capital allowance** of 50% first year, 25% second and third years of production	MRFs can offset tax payments when the business is no longer loss making	**>10 Years**	**> 10 years**	**-1,120** ↔ 0	**-7%**	**4%** ↔ 0%
	All 5 levers combined	Assumes all above levers are put in place to encourage establishment of MRFs	**0 years**	**7 years**	**998** ↑ 2,12	**24%**	**13%** ↑ 9%

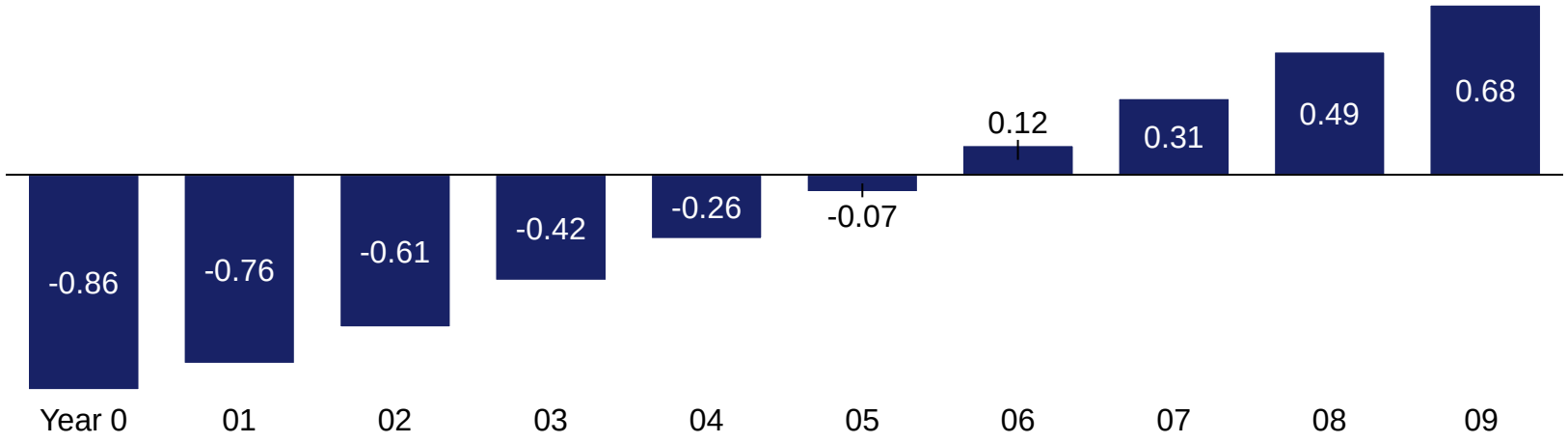
1. Assumes MRFs will pay $26/ tonne to reach 50% sellable waste

Source: Expert interviews, desk research

By activating all five levers an MRF can can be profitable within a year, and achieve an IRR of ~24% over 10 years

Supply driven economics modelled off a semi-automatic MRF[3] in Kenya processing 25,000 tonnes per year[1]

Potential cumulative cash flow and project economics, $m



0 years	~7 years	~$0.99m	24%	~$0.17m
Time to **profitability/ steady state**	Estimated time to recover **full investment**	NPV	IRR calculated over **10 years**	13%, EBITDA margin[2]

Key assumptions

Capex

- CAPEX to set up facility — **$0.86m**
- Development and construction, miscellaneous[5] — **$0m**

Operations

- Facility utilization[2] — **85%**
- Payment for high quality waste — **$20**
- Sellable waste[4] — **50%**

Opex

- Waste dumping costs as % of operational costs — **24%**
- Labour costs as % of operational costs — **24%**
- Utilities and other costs as % of operational costs — **13%**
- Payment for high quality waste as % of operational costs — **39%**

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2. Utilization at steady state after 4 years (60% in year 1, 70% in year 2, 80% in year 3 and 85% there after)
3. MRF receives 80% recyclable waste and processes paper (43%), plastics (30%), glass (13%) and metals (14%)
4. Percentage of total waste stream that enters the MRF
5. Includes the cost of land

Source: Expert interviews, European Commissions "Best Environmental Management Practice for the Waste Management Sector

7 EPRs can increase recycling, promote design and use of easier-to-recycle products, and reduce total plastic generated

	Korean EPR System	Japan EPR Scheme	France's EPR	Germany EPR
	• 2003	• 1995 (updated in 2006)	• 1992	• 1991
Fee structure	• Producers and importers can collect and recycle their end of life products or pay a recycling fee to the relevant PRO • Fees split by product and material e.g. PET bottle; plastic container tray; film and sheet type plastic materials • PRO example, KPRC rates: – PET bottle: 141-290 KRW/kg – ESP, EPP, EPE: 35-250 KRW/kg – PSP: 295 KRW/kg	• Producers are financially responsible for recycling the waste of packaging and bottles, fee proportional to waste and recycling cost of product category • Fees split into PET bottles; plastic – PET bottle: 4.5 ,\/kg – Plastic packaging 51 ,\/kg	• Fees are based on the quantity and properties of packaging, also penalties/ bonuses for certain characteristics • Fees split by product and material e.g. PET bottles; PS rigid packaging; packaging containing PVS – Bottle and vial in clear PET 28.88 €/kg – Rigid packaging in PE, PP or PET 30.92 €/kg – Packaging containing PVS 48.57€/kg	• Producers pay fees to a PRO of their choice based on the types and weights of material in the system • Fees not segmented • **Price depends on PRO**
PRO structure	• Several PROs • Producers and importers have the option of setting up a PRO to carry out their responsibilities • PROs cover multiple waste streams/products	• Only one PRO, the Japan Containers and Packaging Recycling Association However legislation allows for multiple PROs • Competitive tenders are organized by the PRO to ensure a level playing field amongst recyclers • PRO covers all materials	• Only one not for profit PRO, although legislation allows for more • PROs are not directly in charge of waste management operations, they use fees from producer to support municipalities • PRO covers all materials	• Initially based on a single non profit PRO, now based on multiple for-profit PROs • PROs manage fees and conclude contracts and agreements with waste management companies and municipalities • PROs cover all materials
Impact	• Promoted the design of easier-to-recycle products • Increased packaging recycling by 74%[1]	• Increased use of coloured plastic film labels instead of coloured PET bottles • Reduced average weight of PET bottle by 7.6%[1]	• Reduced the weight of packaging entering the market by 106,000 tonnes between 2008 and 2012 • From 1994-2016 average weight of plastic bottles fallen by 40%	• Between 1991 and 2017 the recovery rate of packaging rose from 37.3% to 94.3%

1. Heo and Jung, 2014; OECD, 2016
2. European Commission

Source: Press search

7 Kenya's draft EPR compares well to international benchmarks and could consider borrowing some additional ideas (1/2)

Global EPR case examples

Packaging	Austria	Belgium	Czech	Denmark	France	Netherlands	UK	Kenya	
Type of PRO responsibility	**Full organisational responsibility**	HH: Partial organisational responsibility C&I: simple financial responsibility	Financial responsibility through reimbursement contracts with municipalities and sorting plants	**Full organisational responsibility**	Financial responsibility through reimbursement contracts with municipalities	Financial responsibility through reimbursement contracts with municipalities and sorting plants	Simple financial responsibility	**Full organisational responsibility**: modulation and collection of EPR fees, reporting, full or partial collection, sorting, recovery, recycling, treatment of waste	✓
Is there competition among PROs?	HH: **Yes but low**, 2 PROs but one for beverage packing only C&I: Yes, 7 PROs	No, **1 PRO for HH and 1 for industrial packing**	No, **1 PRO for HH and 1 for industrial packing**	Yes, 10 PROs with one representing more than 50% of the market	No, **2 PROs** but one is the owner of the second	No, **1 PRO a "substantial majority"** being required to operate	Yes, over 30 competing PROs	**One PRO per waste stream:** *may wish to clarify which "waste stream" and follow international approach of anchoring on packaging, e-waste, organic, etc.*	?
Is there Competition among WM operators?	**Yes, Selected by PROs** every 3 to 5 years	HH: **yes selection by PRO** and local authorities C&I: yes, direct contracts with waste generators	HH: selection by local authorities	**Yes, selection by PROs**	Yes, selected by local authorities		Yes, 152 repressors and 162 exporter of packing waste	**Yes – selected by PROs**	✓
Surveill-ance on free riding — **How many free riders?**	Estimated to be low	HH: estimated -7% of the market C&I: no estimate	HH: 5% Estimated, C&I: 10% (estimations)	Estimated to be high (around 25%)	Estimated below 2%	Estimated to around 2%	Estimated to be an important issue	**Producers required to report through a system established by NEMA. PROs to monitor members:** *may wish to consider publicly accessible digital online self-reporting system*	?
Which sanction ?				Financial penalties				**KES 2 million or 2 years imprisonment**	✓

7 Kenya's draft EPR compares well to international benchmarks and could consider borrowing some additional ideas (2/2)

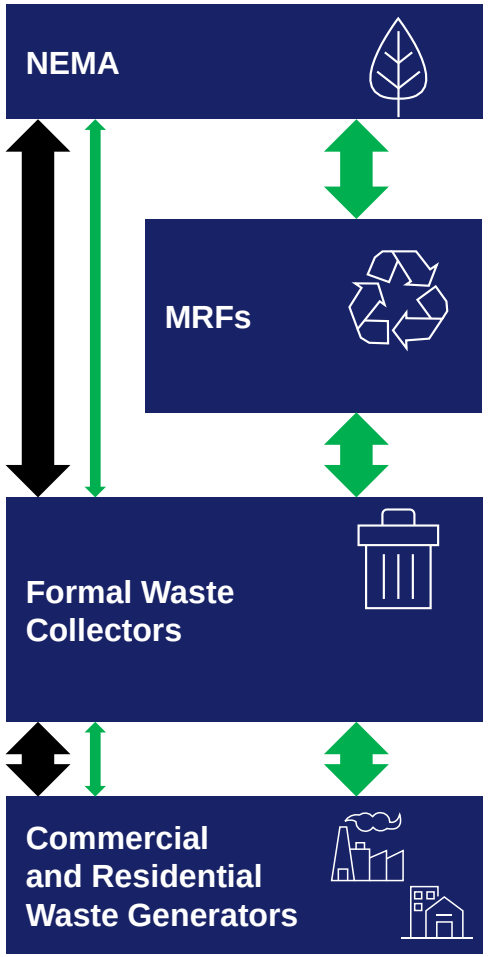
Global EPR case examples

Packaging	Austria	Belgium	Czech	Denmark	France	Netherlands	UK	Kenya
Surveillance on collection and treatment operations	Performed by the PROs through regular audits of recyclers			No information		A certificate ensures reliable data from waste operators. A PRO's internal organization performs audits of municipalities and waste operation	A regulatory accreditation system exists for reprocessors and exporters of packaging waste	**No detail provided:** *may wish to consider stipulating PROs conduct regular audits of recyclers*
Surveillance on PROs	**Carried out by a panel of experts commissioned by the Ministry of Environment and an abuse advisory board**	Authorization and regular audits by the IPC	Authorized by the Ministry of Environment	No information	Authorized by the Ministry for a 6 year period	No information	Audits on accuracy of data provided by the NWPD	**Annual audit by NEMA – license issued annually based on compliance:** *may wish to consider commissioning audit*
PRO's Status: Profit based or not-for-profit?	No specific requirement	**Non-profit**		No specific requirement Most PROs are for profit	**Non-profit**	No specific requirement. The only PRO is non-for-profit	No specific requirement	**PRO shall not engage in lucrative or profit-making ends:** *may wish to consider stipulating PROs should self-reporting of revenue-cost ratio*
Is there any multi-stakeholder dialogue procedure?	An **abuse advisory board** consisting of social partners and representatives of the federal state and municipalities.	Consultation by the Interregional packaging commission, through ad hoc platform Bilateral consultation of other stakeholders	No specific dialogue procedure identified		**Consultation committee**, regrouping all involved stakeholders +2 mandatory operational committees to be set up by the PRO	No specific dialogue procedure identified		**No detail provided:** *may wish to consider setting up a consultation committee or abuse advisory board*

8 Distributing bin liners through MRFs could help channel waste through MRFs

Current state
Ideal state

Distribution of bin liners



Ideal state: description

- NEMA contracts manufactures to manufacture plastic bags for garbage collection
- NEMA **provides MRFs with licences** to distribute garbage plastic bags on a **preferential basis –** as the number of MRFs increases, the proportion of licenses passing through them increases

- **A the number of MRFs grows, they become responsible** for distributing the majority of bin liners
- Bin liners are **only distributed to formal** waste collectors
- **Accountability mechanisms sit with MRFs** (see right side of page)

- Formal waste collectors then provide **bin liners to their customers**
- Waste is **only collected if in bin liners**

- **Commercial and residential** waste generators **receive bin liners**
- Waste is **only collected if in bin liners**

Source: Expert interviews, press search

Accountability mechanism options

1. **Deposit buy back scheme:**
   - Waste collectors pay the MRF the cost of each bin liner plus a deposit
   - Collectors receive a deposit refund when they return the bin liners to the MRF
2. **Monthly supply of bin liners:**
   - Waste collectors pay the MRF the cost of each bin liner
   - If they return an acceptable % of the bin liners to the MRF, they are eligible for the next month's supply
3. **Gate fee incorporated:**
   - Waste collectors pay the MRF the cost of each bin liner plus a distributed gate fee charge
   - As they have already paid for the gate fees, they are incentivised to go back to the MRF

Key insights

- Issuing **bin liner licenses through MRFs**, would encourage **formal waste collectors** to **only take waste to MRFs** and not to dumpsites (illegal or legal), **especially** if accompanied by **accountability mechanisms**
- Initially, only black or clear waste disposal bags could be provided, but over time providing **colour coded bags** to commercial and residential waste generators could be provided to **encourage sorting of waste at source**