



Aluminum Cans Market Assessment – UAE

Context, quantitative baseline, options

Final version

May 2023

List of abbreviations – selection

Abbreviation	Description
b units	Billion units
C2C	Can to can
DRS	Deposit return scheme
EPR	Extended producer responsibility
Horeca	Hotel, restaurant, and catering
m units	Million units
MRF	Material recovery facility
MSW	Municipal solid waste
POM	Put-on market
UBC	Used beverage cans
WM	Waste management
WtE	Waste to energy

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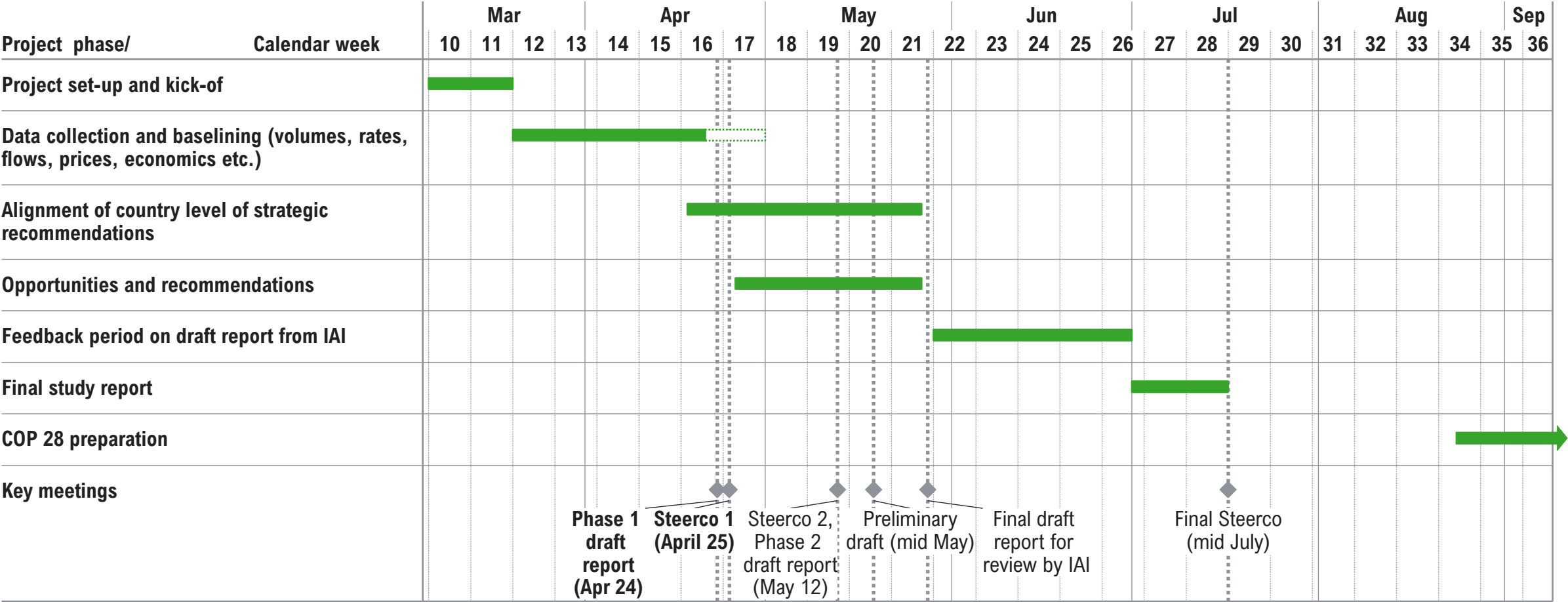
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1. Executive summary

This report summarized the key conclusions of the first phase of the study & provides guidance to develop strategic recommendations

Project timeline



The analysis has been supported by expert interviews – 20 experts were interviewed so far

Overview of interviews

Interviews by type



Stakeholder	Position in Value Chain	Position
1 EGA	Aluminum production	Senior manager - CSR
2 Crown	Beverage can manufacturing	General manager
3 Canpack	Beverage can manufacturing	Legal/ Sustainability director-Europe
4 Dubai Refreshment	Beverage manufacturing	CEO/Supply chain manager
5 Aujan	Beverage manufacturing	Chief procurement officer
6 RECAPP by Veolia	Collection	General manager
7 Resustainability	Recovery	Senior manager
8 Bee'ah	Collection, recycling & treatment	Head of sustainability
9 EGA	Recycling	Head of EGA's new recycling facility
10 Ministry of Economy	Policy maker	Senior specialist – Circular economy
11 RAAW Rock	Trader	General Manager
12 Metsol International	Trader	General Manager
13 Sharmetal	Trader	General Manager
14 ASF Metals	Trader	General Manager
15 RELIFE	Trader	Sales Manager
16 RAK Municipality	Collection, recycling & treatment	Waste Management Team
17 Tadweer	Collection, recycling & treatment	Landfill management
18 Dulsco	Collection, recycling & treatment	Recycling & Treatment director
19 Coca-Cola	Brand owner	VP Supply Chain
20 Min. Climate Change	Policy Maker	Employee

Statistics/databases

- Aluminium Recovery figures
- Export data

Industry players, experts, regulators

- Government and associations
- Recyclers

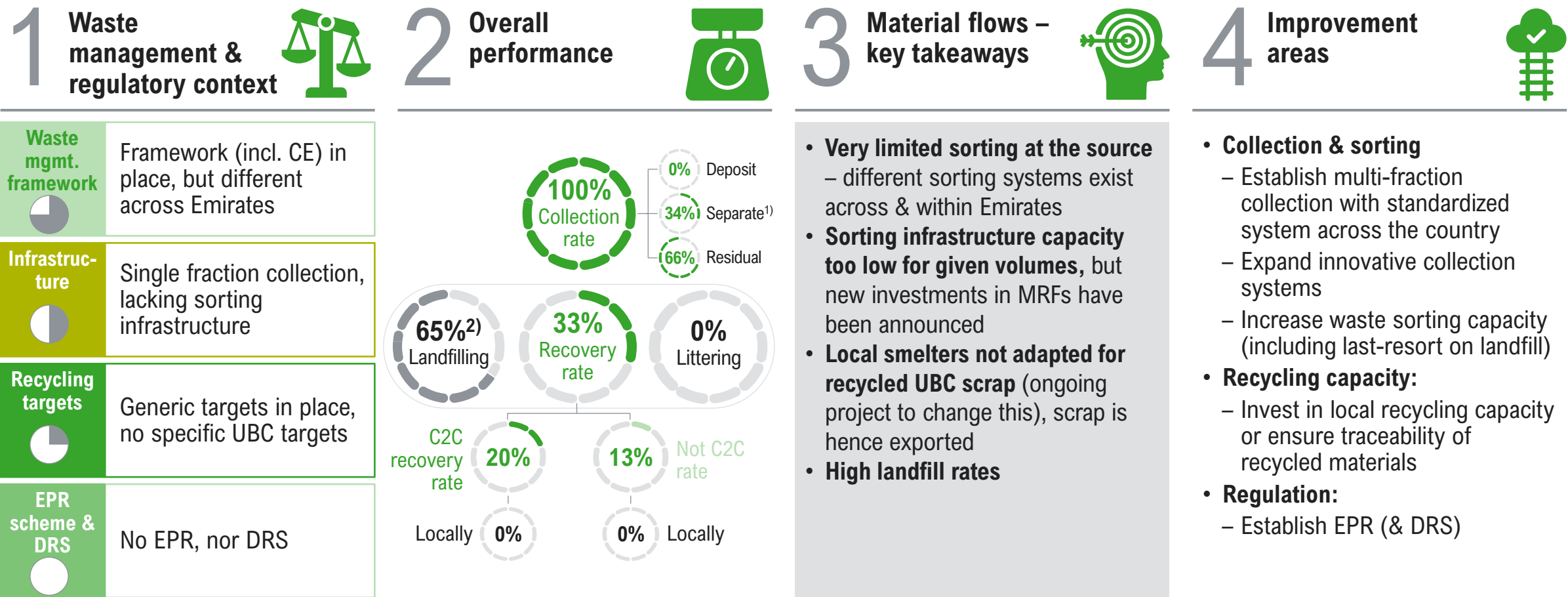
Market studies

RB sources

- Previous project experience
- Internal experts
- Industry contacts

The UAE has ambitious targets to reach a circular economy, but misses key enablers, such as EPR, DRS, Sorting at the source & plants processing can scrap

Aluminium can recycling in UAE





2. Aluminum Cans Market

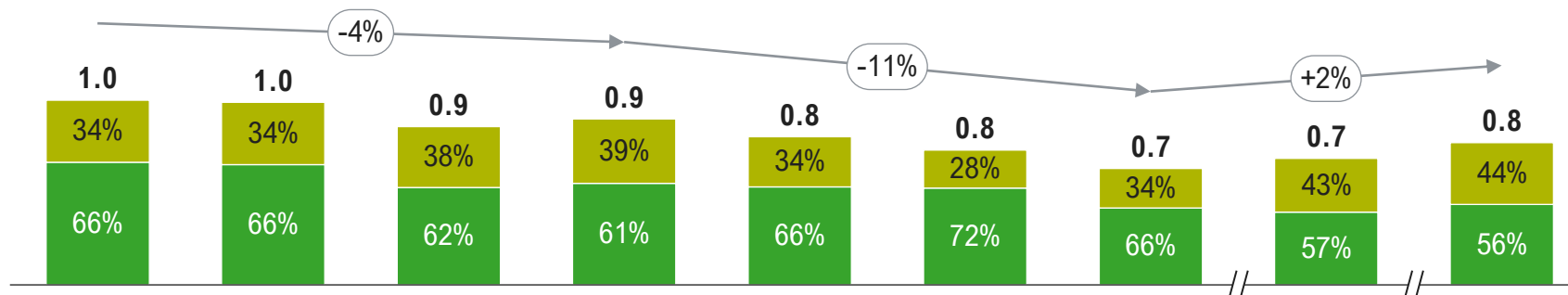
The aluminium can market has been steadily decreasing in the UAE in the past years, by 4% on average

Overview of volumes put on market, aluminium cans [b units, k tonnes]

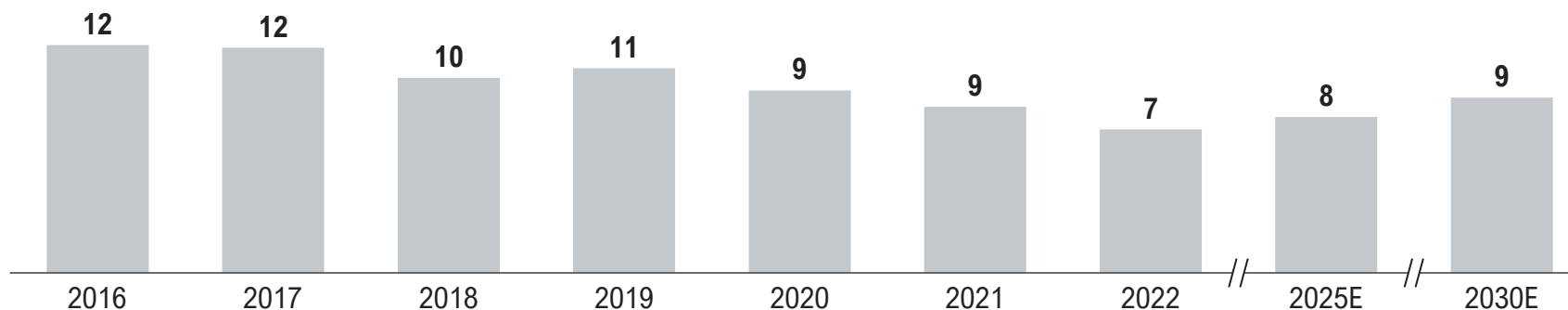


Volumes put on market, 2016-2030E [b units]¹⁾

■ Out of home³⁾
■ At home⁴⁾



Aluminium cans put on market, 2016-2030E [k tonnes]²⁾



1) POM volumes are estimated by averaging input data from interviews with market stakeholders combined with reports from market research 2) Estimated weight per can 11.3 g;

3) Out of home consumption includes hotels, restaurants, and catering; 4) At home consumption includes the remaining cans

Key takeaways



- Aluminium beverage packaging volumes steadily decreased due to reduced demand for soft drinks strongly discouraged by the tax on sugary drinks
- Additionally, COVID-19 affected out of home consumption, making the decrease even more significant
- There is a significant number of cans consumed out of home, due to the big number of tourists that visit the UAE each year
- In the coming years a slow recovery, in line with population growth is expected, supported by a steady increase in tourism & a reduction on the tax on alcohol consumption

The aluminium can market has been steadily decreasing due to decrease in alum. cans' market share

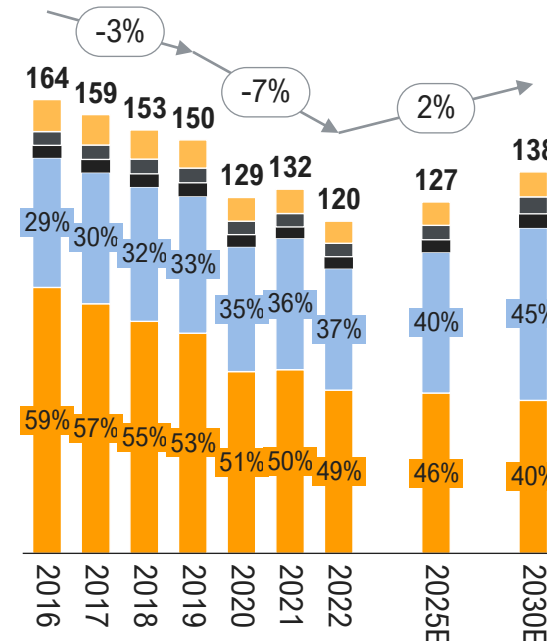
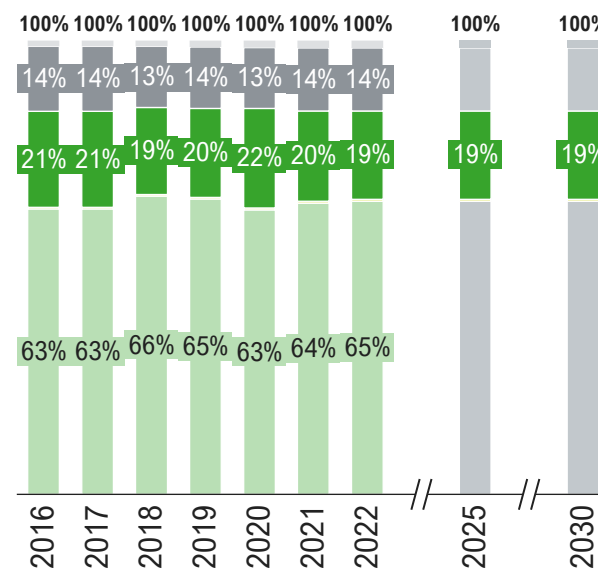
Population, package & beverage trends



Population, 2016-2030E [m inhabitants]

Estimated annual package consumption [%¹⁾]

Estimated annual packaged beverage [l/person, %]



Flexible Packaging
Glass
Aluminium Cans
Paper-based
Rigid Plastic

Soft Drinks
Bottled Water
Beer
Other alcoholic drinks
Other non-alcoholic drinks

Key takeaways



- Population is steadily increasing, and is expected to keep increasing in the following years
- Aluminium can's share has decrease in the past years due to a decrease in the consumption of soft drinks with high sugar contents, which comprise most beverages served in cans – this reduction is linked to the tax on sugary drinks introduced in 2017. This trend is expected to continue in the future
- Overall annual packaged consumption per capita hasn't fully recovered yet from COVID-19

1) Volume per package type of the total volume of packaged drinks



3. Waste management & regulatory context

The UAE boasts a very comprehensive regulatory framework, including a clear drive towards a circular economy, other domains of waste managements not mature

Overview of Regulatory Waste Management framework & infrastructure

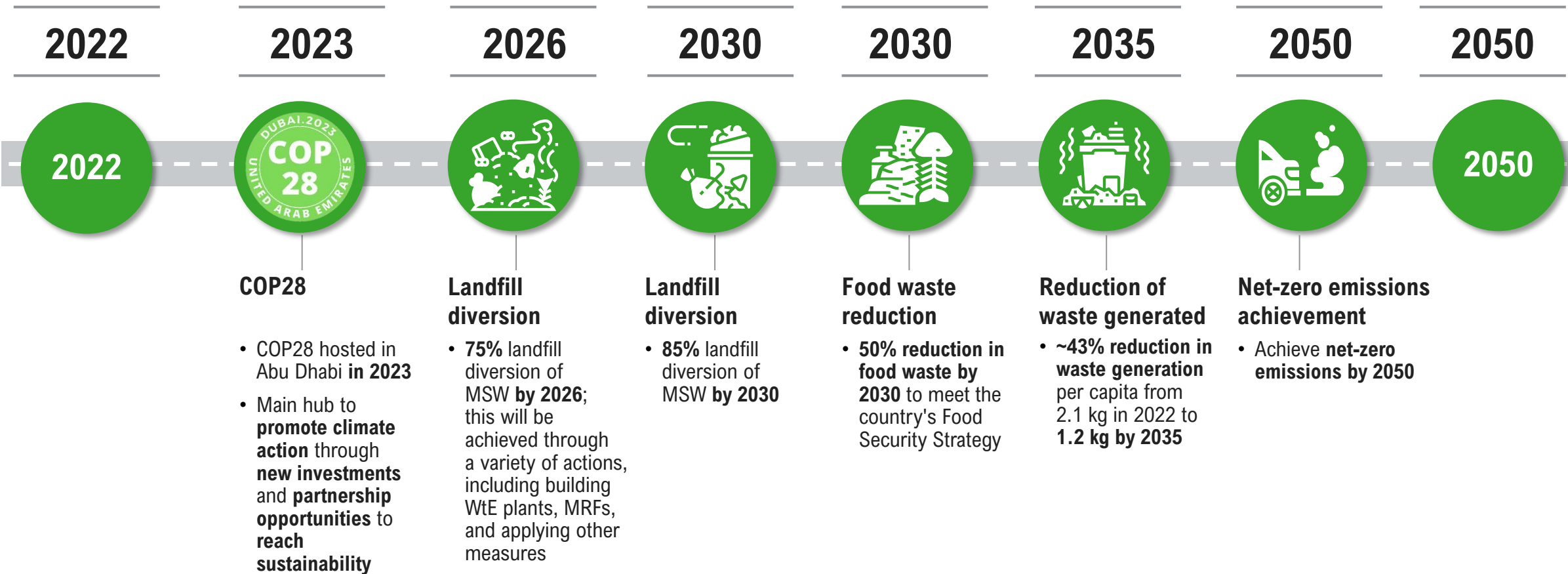


Waste mgmt. framework		<ul style="list-style-type: none">Roles & responsibilities: the UAE federal government establishes an overall waste management framework, the detailed elaboration & implementation is left to the municipalities overseeing the different EmiratesMaturity: UAE has an ambitious waste management framework, covering all aspects of waste management, which has been rolled out in the different Emirates, including policies to encourage the development of a circular economy
Collection infrastructure		<ul style="list-style-type: none">Organized collection: All areas of the country are covered by formal collection, either organized by the municipalities or by the building / compound management of the propertySource separation: Source separation is common in residential areas (with the exception of apartment buildings). Different maturity levels across the different Emirates. Correct sorting is however not enforced and treatment of waste is oftentimes not differentiated
Treatment Infrastructure		<ul style="list-style-type: none">Sorting is mostly done in Material Recovery Facilities; the capacity of these facilities is insufficient nowadays to sort through all waste, but further investments are on the horizonAn important share of waste is landfilled. Some manual sorting is done on the landfill
Recycling targets		<ul style="list-style-type: none">General waste recycling targets: The UAE hasn't set country-wide recycling targets; emirates like Dubai and Sharjah have set landfill diversion targets (100% in 2032 in Dubai), which includes recycling and WtEMetal recycling targets: No specific metal packaging recycling target
EPR scheme & DRS		<ul style="list-style-type: none">EPR: No EPR in place, conversations to initiate it are not very much advancedDRS: No deposit return systems are available, nor immediately planned

Maturity level, relative to most developed countries: Not existing Incipient, with limited scope Developing Matured Fully developed

The Government of UAE has lined up ambitious waste management targets for the next 30 years and is hosting COP28 in 2023

Overview of the strategic targets for waste management



At the federal level, there is a big push to move the UAE forward in the domain of the circular economy – major improvements required

Overview of UAE regulations



Country Wide Regulations

The UAE has launched **Federal Law No.12 of 2018** on integrated waste management aiming to regulate the process and to protect the environment

The UAE cabinet has approved the UAE **Circular Economy Policy** in January 2021, where waste management is one of the key focus areas:

- Regulations, legislation and contracts to ensure that waste is viewed as a potential resource
- More investment into material reuse and recycling infrastructure
- Addressing the generation of waste with regulations such as Extended Producer Responsibility

Emirate Specific Milestones in Waste Management

2007: Establishment of **Bee'ah** in Sharjah

- **Environmental management company** formed as a public-private partnership
- Provider of a **wide range of services** across the waste management value chain

2008: Establishment of **Tadweer** in Abu Dhabi

- **Center of waste management** in Abu Dhabi
- Responsible for the **development and implementation** of the integrated **WM solutions** in Abu Dhabi

2012: Establishment of Dubai **Integrated WM Masterplan**

- Promotion of **segregation at source**
- Range of **recycling activities**
- Development of **WtE facilities**
- **Reduction** of amount of **landfilled waste**

2020: Inauguration of **largest WtE plant** in Sharjah

- Aim to **reduce** the amount of waste being sent to landfills to **zero** in 20 years

2022: **Acquisition** by ADQ of **Tadweer**

- **Mandate** to **invest** and **advance** the **waste management system** in Abu Dhabi

2023: Establishment of **Abu Dhabi WM Masterplan**

- Integrated waste management **plan and regulation development** in Abu Dhabi by **EAD**

- At the federal level, the UAE has launched **Federal Law No.12 for integrated waste management** in 2018 and the **circular economy policy** in 2021, and the individual emirates are moving accordingly
- The UAE still lacks the **proper sorting** and **recycling infrastructure** on the large scale, but is being pushed forward with initiatives
- The UAE is pushing forward to establishing a **full waste treatment infrastructure** with Dubai's WtE plant under implementation
- There are currently **no available EPR and DRS** schemes in the country, but implementation of **EPR** is **currently under talks**

On the federal level, the UAE has launched Federal Law No.12 of 2018 on integrated waste management aiming to regulate the process and to protect the environment

Overview of Federal Law No.12

Objectives

- The Law aims to regulate the process of waste management and unify the mechanisms and methods of safe disposal
- The law places the competent authority liable for waste management within its territorial jurisdiction



Overview of competent authority's roles and responsibilities

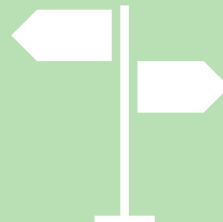
Reduction of waste

- Take necessary measures and procedures to reduce the generation of MSW
- Coordinate with the ministry to prohibit importing of single-use or short-term products whose disposal may be hazardous to the environment



Separation at source

- Take action to separate MSW at source through the provision of containers with different uniform colors
- Establish waste collection centers



Reuse and recycling

- Encourage the establishment of recycling plants and recovery facilities
- Compel reusing of certain types of products



Disposal

- Prohibit disposal in landfills unlicensed by the competent authority
- Take necessary measures to dispose of waste remaining from the treatment of MSW
- Treat and rehabilitate the unhealthy landfills located within its geographical scope



The individual emirates are moving in the direction of the Federal Law No.12, with major improvements still required

Overview of the current status of the UAE emirates in waste management [non-exhaustive]

Requirement	Dubai	Abu Dhabi	Sharjah	RAK
Responsibility of waste generator to safely get rid of generated waste	All waste collected by municipality/private contractors	All waste collected by municipality/private contractors , Tadweer is the sole custodian	Waste collected largely by Bee'ah	Waste collected largely by municipality contractors
Sorting of recyclables from the source	<ul style="list-style-type: none"> • 2-bin system implemented only for waste from individual houses, with limited awareness • Only hotels sort their waste at the source 	<ul style="list-style-type: none"> • Have just started implementation of the 2-bin system, but awareness still at very low levels 	<ul style="list-style-type: none"> • 2-bin system not implemented • Limited separate collection at source 	<ul style="list-style-type: none"> • Sorting at source for commercial and industrial waste • No separate collection at source for households
Diversion of recyclables from landfill	<ul style="list-style-type: none"> • MRFs with limited capacity • Most recyclables landfilled 	<ul style="list-style-type: none"> • Customer recycling centers • Most recyclables landfilled 	<ul style="list-style-type: none"> • MRF with limited capacity • Most recyclables landfilled 	<ul style="list-style-type: none"> • MRF with limited capacity • Most recyclables landfilled
Treatment of unrecovered waste	<ul style="list-style-type: none"> • WtE plant planned in the near future 	<ul style="list-style-type: none"> • No treatment of waste • MRF and WtE plants planned to be operational within 2026 	<ul style="list-style-type: none"> • Advanced system of waste treatment including composting and waste to energy 	<ul style="list-style-type: none"> • No treatment of waste

In addition, the Circular Economy Policy of 2021 also encourages waste management and stresses on viewing waste as a source of valuable materials

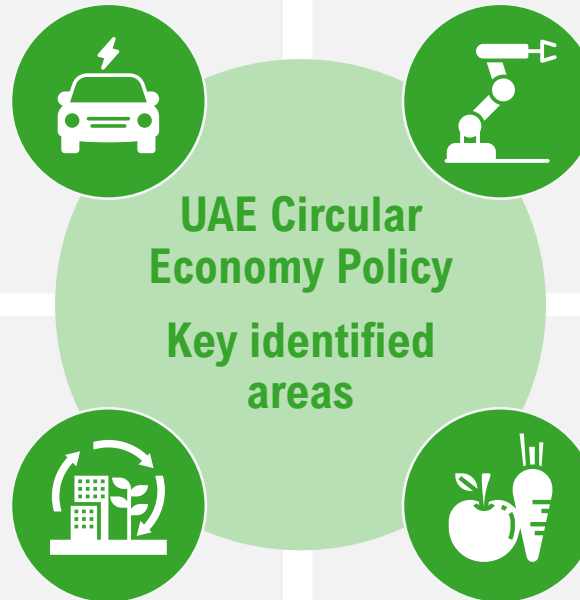
UAE Circular Economy Policy views on waste management [non-exhaustive]

Sustainable Transportation

- Introduce subsidies to encourage manufacturers to use reclaimed/recycled materials
- Assess how financial penalties and rewards could be used to reduce congestion and structural waste

Green Infrastructure and Development

- Increase awareness about value in waste streams
- Support adoption of industrial construction processes like 3D printing that can significantly reduce waste generation



Sustainable Manufacturing

- Increase awareness of the value in manufacturing waste streams
- Introduce industry awards to incentivize key players that are paving the way for more sustainable manufacturing processes

Sustainable Food Production and Consumption

- Public awareness and information dissemination campaigns on food waste reduction
- Support the production of compost from municipal and agricultural waste

Implementing the circular economy policy requires action from different entities at different levels, beginning with implementation at the level of each emirate

Overview of the circular economy policy enablers [non-exhaustive]

Secretariat
General

Circular
Economy
Council
Members

Emirates

Key
stakeholders

Ministry of Climate Change
and Environment responsible for overseeing
the implementation of the circular economy policy

Ministry of Climate Change
and Environment

- Develop rules, regulations and concrete **environmental targets** governing the implementation of the circular economy policy
- Organize **workshops** and **discussions** with the **private sector** to develop a shared understanding of the circular economy

Ministry
of Economy

- Support the **development of circular business models** through forms of financial support
- Develop **incentives** and **regulations** for **resource efficiency, waste reduction** and **recycling**
- Encourage **innovation** and **entrepreneurship** in the circular economy space

Ministry of Industry and
Advanced Technology

- Encourage the development and adoption of **Fourth Industrial Revolution (I4.0)** to **reduce the environmental footprint** of the various industries
- Increase **sustainability of production cycles** and **supply chains** by driving research and development

Minister of State for Artificial
Intelligence Office

- Encourage the adoption of **Artificial Intelligence** applications in the circular economy space, e.g., smart sorting and recycling

Ministry of Energy and
Infrastructure

- Develop and implement smart sustainable transport plans fully integrated across different modes of mobility
- Develop smart and sustainable urban plans with city designs more conducive to the effective reuse, collection and redistribution of resources

Abu Dhabi

Dubai

Sharjah

Ajman

Umm Al Quwain

Ras Al Khaimah

Fujairah



Key enablers to support achieving the objectives of the circular economy policy

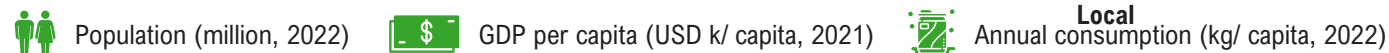


4. Value Chain

As source separation is not widespread in UAE and sorting facilities don't have enough capacity to treat all waste, only a minority of UBC is recovered for recycling

Overview of aluminum cans value chain





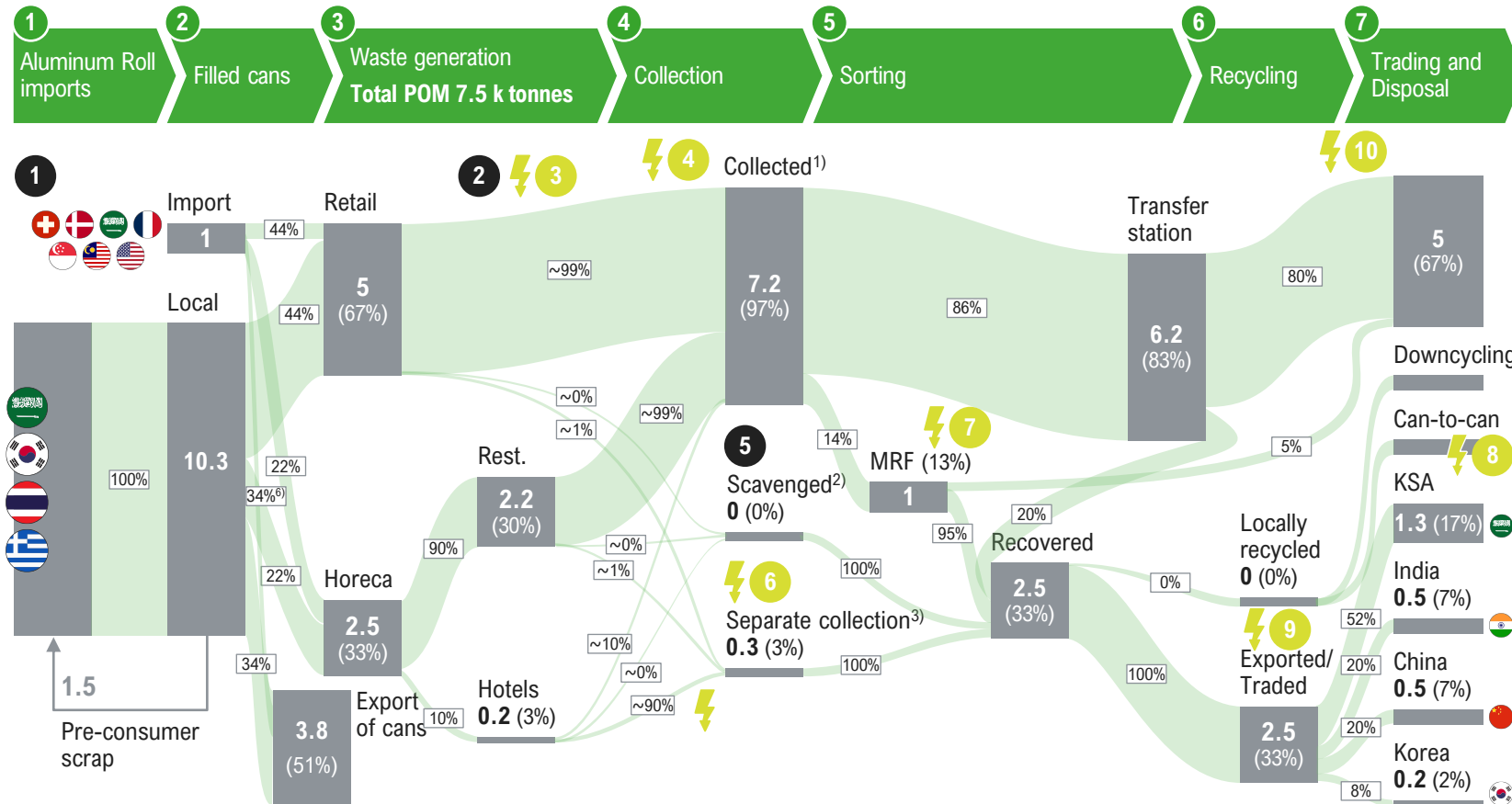
 Annual consumption (can/ capita, 2022, 11.3 g/ can)

X% Final destination [%POM]

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The UAE has ambitious targets to reach a circular economy, but misses key enablers, such as EPR, DRS, Sorting at the source & plants processing can scrap

Material flows of aluminium cans [k tonnes⁴⁾⁵⁾, (% of total POM volume)]



0 Observation **0** Identified opportunity for improvement

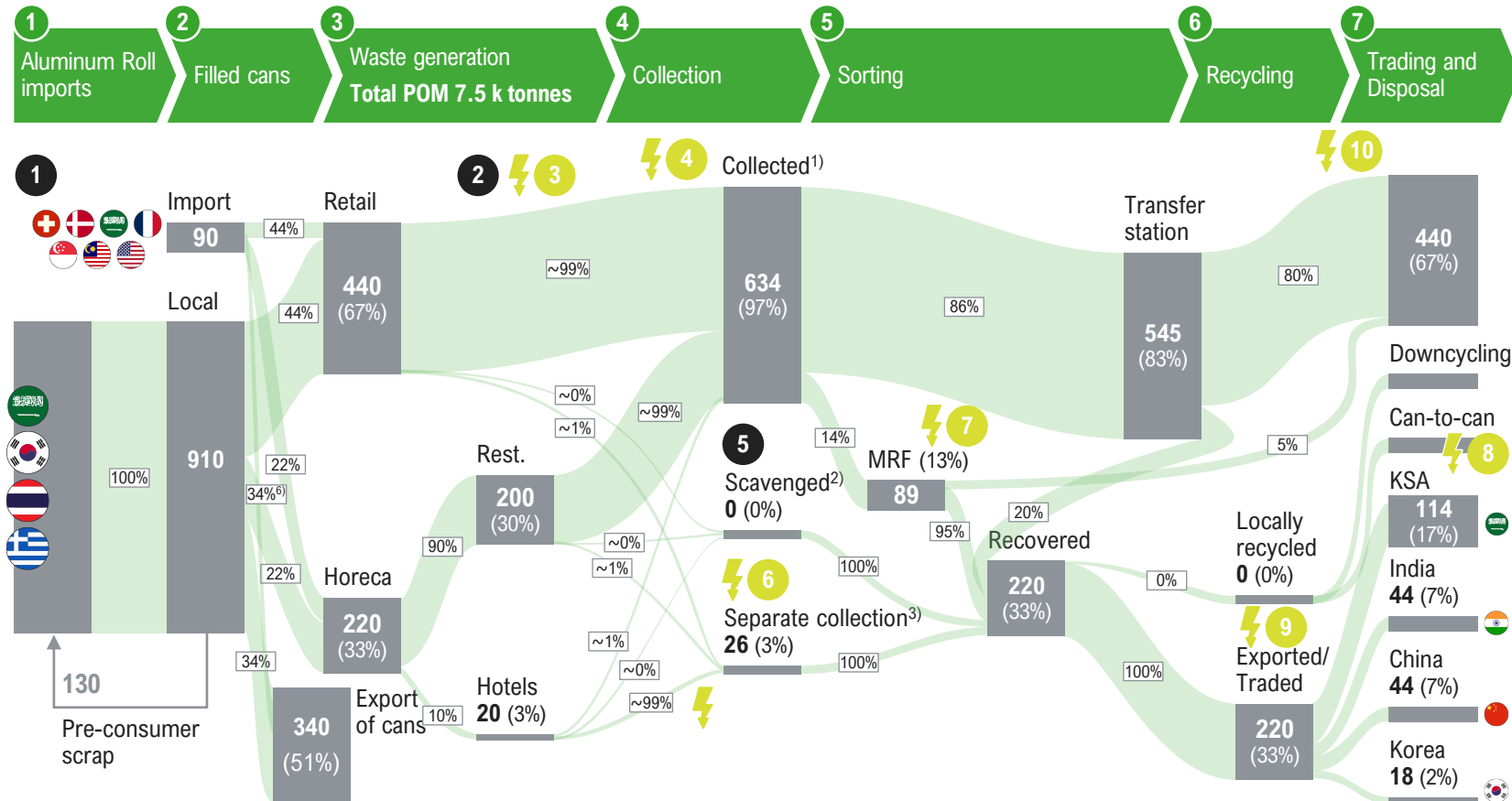
1) In general waste and recyclable waste; 2) Informal collection such as by security guards from buildings; 3) Separate collection of UBCs sorted at source by initiatives such as RECAP and by waste management companies; 4) Estimated weight per can: 11.3 g; 5) ~3.2% of can weight is due to paint; 6) Share of imports that are directly re-exported to neighboring countries in the region

Key observations & improvement areas

- Overall high ambition, with steep targets (e.g. 75% landfill diversion target by 2030)
- Reduction in put on market volumes observed – most likely linked to the "sugar tax" introduced in 2017
- No EPR in place
- Very limited sorting at the source – Majority of areas have inefficient or no sorting at source because it is not enforced and does not have a standardized system
- Scavenging happens largely at the source, often by waste collector employees as in general scavenging is not allowed
- Missing DRS system and convenient drop-off locations of recyclables
- MRF capacity in UAE too low for given volumes – infrastructure landscape is set to evolve in the coming years to increase MRF capacity
- Local aluminium smelters not adapted for recycled material (project ongoing at EGA, but focus is on other types of scrap)
- Limited traceability at export
- Strong reliance on landfilling – some incineration is done in Sharjah & major investment in WtE in Dubai is nearing completion. Some legalized scavenging is done on landfills, but as closed bags are often not opened & UBCs are not easy to pick out of the landfill, the recovery rate from landfill is estimated to be fairly low

The UAE has ambitious targets to reach a circular economy, but misses key enablers, such as EPR, DRS, Sorting at the source & plants processing can scrap

Material flows of aluminium cans [m units⁴)⁵, (% of total POM volume)]



0 Observation ⚡ 0 Identified opportunity for improvement

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EGA is the only aluminum producer in the UAE – However, the absence of rolling mills in the UAE leads to no local supply of aluminum sheets for can manufacturing

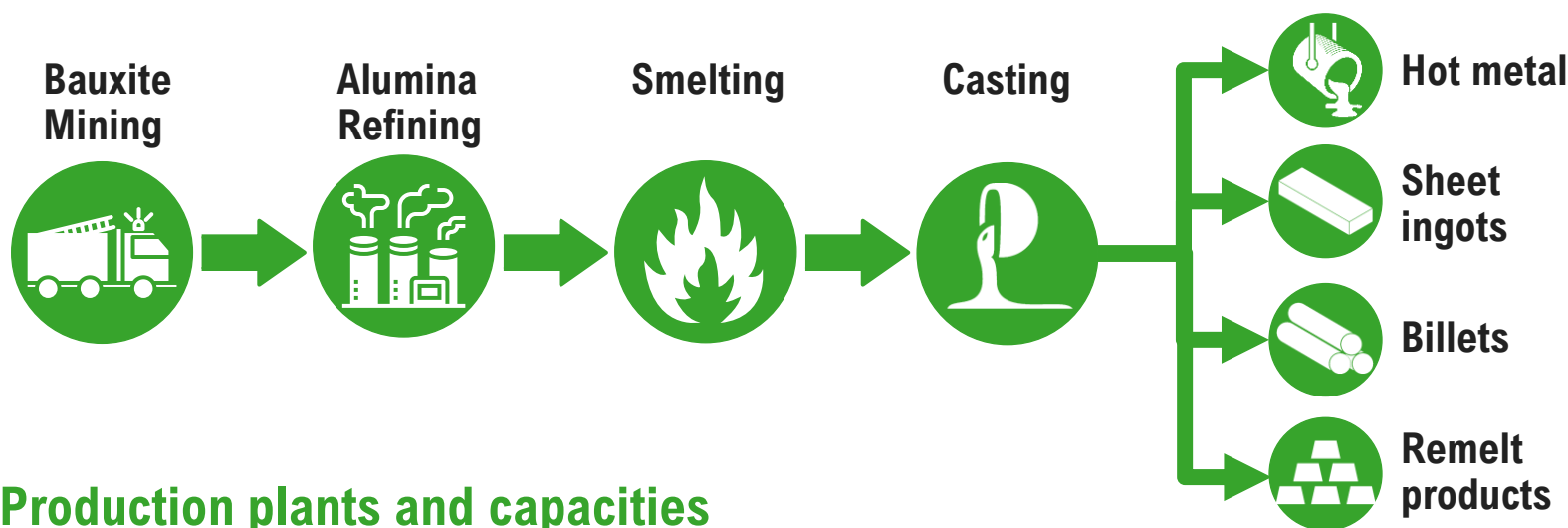
EGA company overview

Company overview

- Established in **2013** after the **merging of DUBAL with EMAL¹⁾**
- Owned **equally** by **Mubadala Investment Company** and **Investment Corporation of Dubai**
- Operate **two aluminum smelters** and an **alumina refinery** in the UAE and a **bauxite mine** in the Republic of Guinea
- Produce **~4% of world's aluminum** and **half of that for the GCC**



Scope of activities



Production plants and capacities

- Jebel Ali Smelter, Dubai:** ~1 m tonnes per year
- Al Taweelah Smelter, Abu Dhabi:** ~1.5 m tonnes per year
- Al Taweelah Alumina Refinery, Abu Dhabi:** ~2 m tonnes per year
- Guinea Alumina Corporation bauxite mining, Guinea:** ~12 m tonnes of bauxite per year

1) Emirates Aluminum

The two local can manufacturers largely source their aluminum rolls from KSA, Korea, Thailand and Greece and supply major bottling companies in the country

Overview of Crown and CanPack

Manufacturer



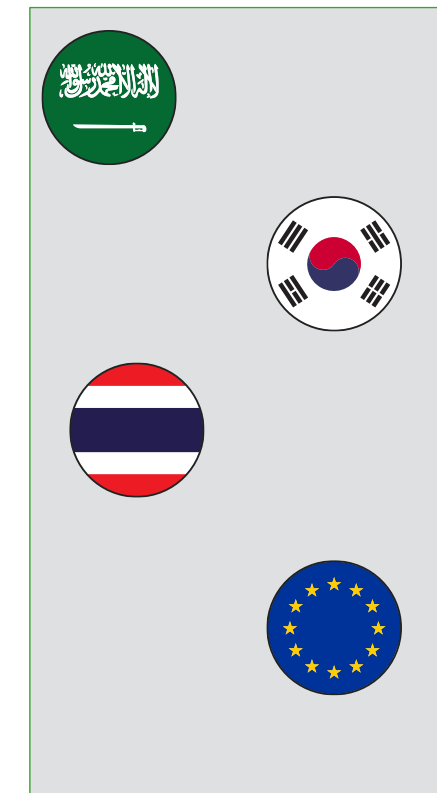
Supplied players



Production capacities





































- **200 manufacturing plants** and service facilities in **40 countries**, including the UAE
- **~100 b** annual can production capacity internationally and **more than 1.5 b** annual can production capacity in its **Dubai plant**
- **18 facilities** located internationally, including in the UAE
- Cans: **37 b** annual can production capacity and **more than 600 m** annual can production capacity in its **Dubai plant**

Source of aluminum rolls



Some beverage brands in the UAE in energy drinks, coffee, sparkling water, exotic drinks and malt beverages import all their finished products in cans from outside

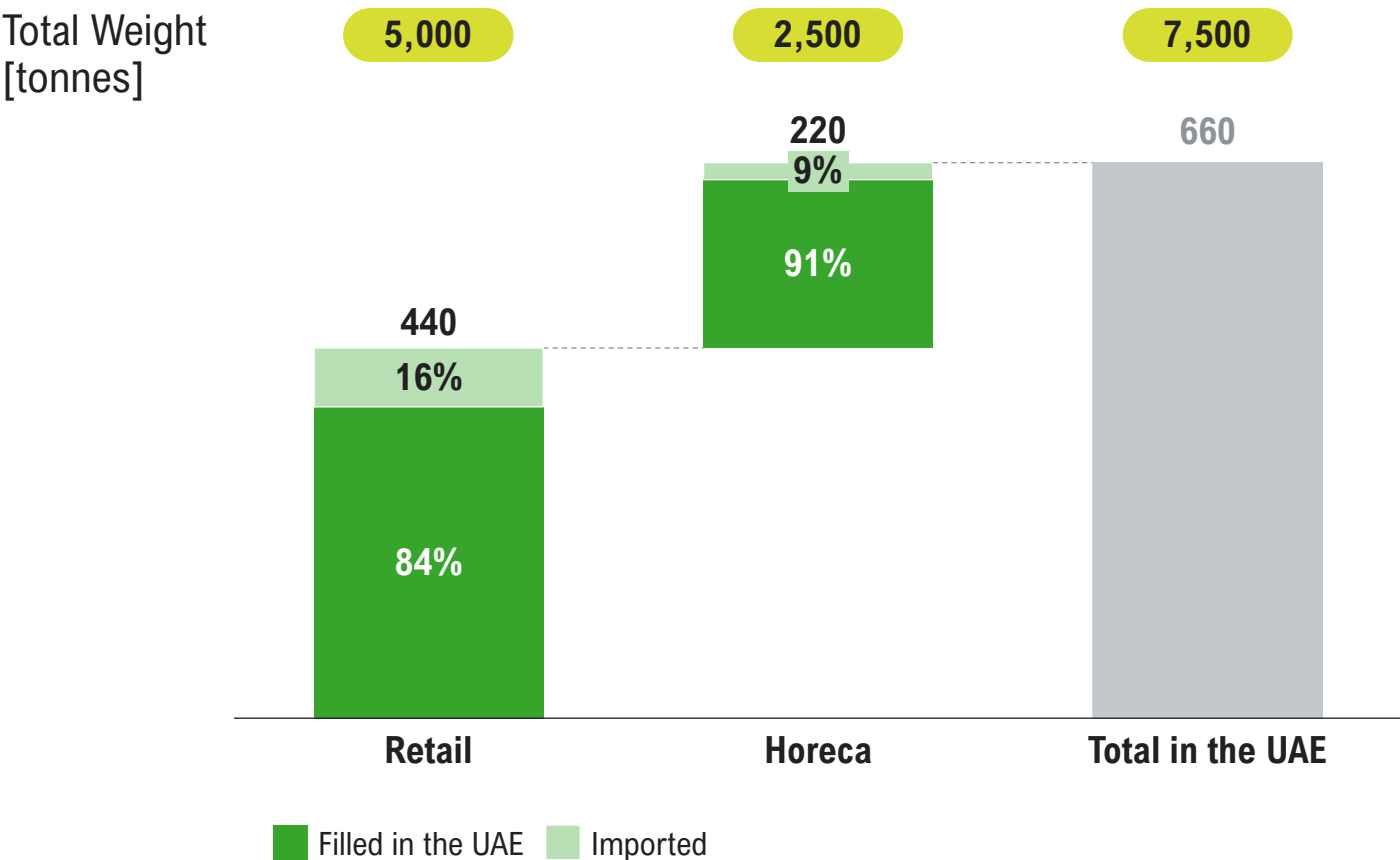
Beverage brands in the UAE that import their finished products from outside [sample from a supermarket in the UAE]

Brand	Can Manufacturer	Country of Production	Key Takeaways
			<ul style="list-style-type: none"> Beverage brands importing finished products in aluminum cans from outside include players in energy drinks, coffee, sparkling water, exotic drinks and malt beverages Countries of production and import come from all over the world including Europe (Switzerland, Austria, Denmark and France ...), Asia (Malaysia and Singapore), North America (United States) and the Middle East (Saudi Arabia)
			
			
	ArdaghMetalPackaging 		
	ArdaghMetalPackaging 		
			
	 CROWN		
	 CROWN		
			
			
	 CROWN		
	 CROWN		

Around 90% of the total put-on market volumes for aluminum beverage cans in the UAE are locally filled, 66% are consumed at home

Overview of put-on market volumes

Distribution of Put-on Market Volumes across Retail, Horeca and Export [million units, tonnes]



Key Takeaways

- Out of the total **660 million cans** put-on market volume, around **66% (440 million)** **remain in the UAE** and the remaining 30% are consumed in restaurants, bars, and hotels
- Respectively **84%** and **90%** and beverage cans distributed to **Retail** and **Horeca** are **all filled in the UAE**, and only 16% and 10% respectively are imported from outside



Waste collection is handled by both municipal and private contractors, and only rarely are UBCs collected separately at source except for hotels

Overview of waste collection activities by household type and waste collection companies in the UAE

Waste Generator	Dubai	Segregation at Source	Abu Dhabi	Segregation at Source	Sharjah	Segregation at Source
Households						
Individual households	DULSCO	✓	LAVAJET بيئة bee'ah AVERDA ...	✓	بيئة bee'ah	✓
Towers	Imdaad AVERDA NEVER STOP بيئة bee'ah ...	✗	ZONE FiveM ...	✗	AVERDA NEVER STOP بيئة bee'ah	✗
Labor camps	Imdaad AVERDA NEVER STOP بيئة bee'ah ...	✗	ZONE FiveM ...	✗	AVERDA NEVER STOP بيئة bee'ah	✗
Compounds	Imdaad AVERDA NEVER STOP بيئة bee'ah ...	✓	ZONE FiveM ...	✓	AVERDA NEVER STOP بيئة bee'ah	✓
Businesses	Imdaad AVERDA NEVER STOP بيئة bee'ah ...	✗	ZONE FiveM ...	✗	AVERDA NEVER STOP بيئة bee'ah	✗
HORECA						
Hotels	Imdaad AVERDA NEVER STOP بيئة bee'ah ...	✓	ZONE FiveM ...	✓	AVERDA NEVER STOP بيئة bee'ah	✓
Restaurants	Imdaad AVERDA NEVER STOP بيئة bee'ah ...	✗	ZONE FiveM ...	✗	AVERDA NEVER STOP بيئة bee'ah	✗
Cafes	Imdaad AVERDA NEVER STOP بيئة bee'ah ...	✗	ZONE FiveM ...	✗	AVERDA NEVER STOP بيئة bee'ah	✗
Public Institutions	DULSCO	✗	LAVAJET بيئة bee'ah AVERDA ...	✗	بيئة bee'ah	✗
Schools	DULSCO	✗	LAVAJET بيئة bee'ah AVERDA ...	✗	بيئة bee'ah	✗
Dubai Airport	DULSCO	✗	LAVAJET بيئة bee'ah AVERDA ...	✗	بيئة bee'ah	✗
Malls	Imdaad AVERDA NEVER STOP بيئة bee'ah ...	✗	ZONE FiveM ...	✗	AVERDA NEVER STOP بيئة bee'ah	✗

Key Takeaways

- Only with restaurants are UBCs sorted separately at source
- For individual households, waste is collected in two bins: a general and a mixed recyclable bin including UBCs
- Compounds waste collection is managed by private contractors. Some compounds may provide up to 3 bins for waste segregation, but UBCs are generally mixed with recyclables
- Restaurants and cafes do not sort their UBCs at source



“Even mixed recyclable bags are generally very contaminated”



“In villas, waste collection is through the government and there is relatively more sorting. In towers, everything is dumped through garbage chutes, therefore no segregation of waste and landfill diversion is almost null. The local promoters (such as of compounds) usually decide on their own waste management system”



UBCs sorted at source



UBCs mixed with other recyclables



UBCs mixed with general waste

There is no uniform system for sorting in the UAE, across different emirates & within the same emirate

Overview of collection in the UAE

Abu Dhabi



- Have just **started rolling out the 2-bins system** throughout the emirate in 5 of 7 lots – Plan to finalize roll-out in these lots by end of May and studies still ongoing for other lots
- **Barely any awareness** for sorting at source has been rolled out – Plan to enhance awareness initiatives ongoing
- **Green** for **recyclables** where aluminium cans are disposed

Dubai



- For **residential towers**, **chute for dumping** of trash and **no separation** at source
- For **compounds**, **depends on contractor** and may provide up to 3 bins
- For **individual** town houses, **2 bins**
- For **hotels**, **segregation** of UBCs **at source**
- For **restaurants**, **everything** dumped into **one container**

Sharjah



- **Two different bins**
- **Green** for **general waste**
- **Blue** for **recyclables** where the aluminium cans are disposed

Ras Al Khaimah



- Relatively **good sorting for commercial and industrial waste**
- **Poor sorting at source** in households

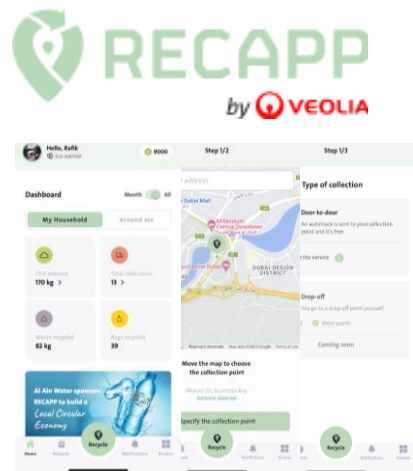
There are also dedicated aluminum can initiatives taken by private companies (minor)

Overview of UAE initiatives that collect UBC from households [selection]

Initiative

Companies and partners involved

Description of initiative



- Recycling solutions for plastic, metal, electronics and paper
- **RECAPP App**: Collection of plastic bottles and cans from households
- **RECAPP Business**: Deployment of recycling boxes, collection of bags and treatment for businesses
- **RECAPP Brand**: Deployment of recycling bins in stores and retail shops to collect end-of-life products brought back by customers
- Collected **~20 tonnes** of UBC in 2022



“Last year, we collected 558 tonnes out of which 3.5% are UBCs. This year our target is 1000 tonnes”

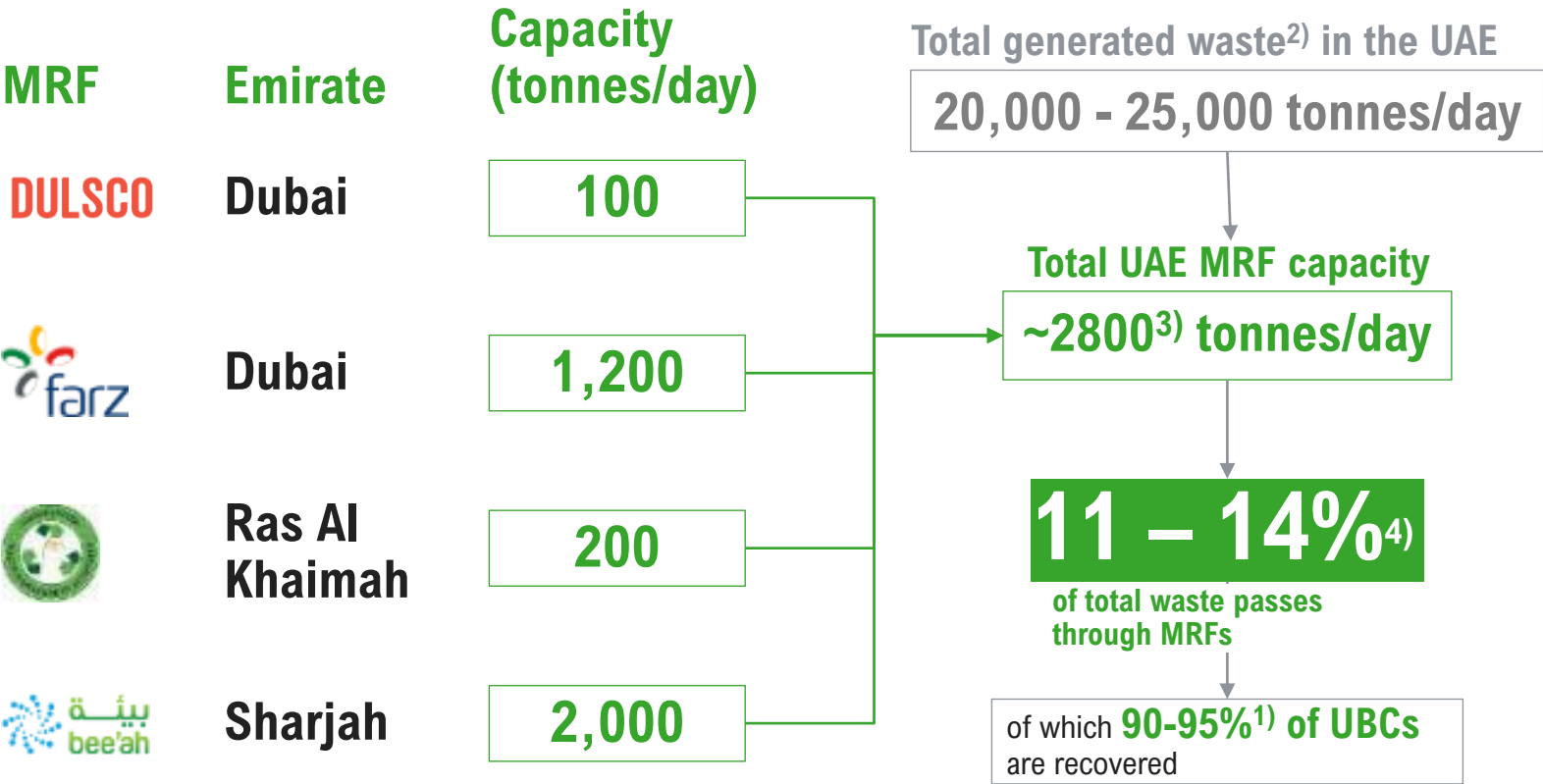


- **First can collection campaign** introduced by EEG in 1997
- **~7 tonnes of aluminum cans** collected for recycling in the latest campaign **from February 2022**
- **~6 tonnes of aluminum cans** collected for recycling in Can **Collection Drive through 4 stations** (Dubai and Ras Al Khaimah) on **one day** in 2021

There are currently 4 operating MRFs throughout the UAE receiving less than 20% of the total generated waste in the country

Overview of UAE MRFs and recovered UBC quantities

Major operating MRFs in the UAE



Key takeaways

- Only **11-14%** of the generated waste in the UAE passes through MRFs, indicating a **major area for improvement** along the waste management value chain
- 90-95%** of **aluminum cans** passing through MRFs **are recovered** due to the efficiency of the eddy current separator



“It is optimistic to say that 20% of total generated waste in the UAE passes through MRFs”



“Segregation of waste is generally contaminated. However, in Sharjah they are not able to reject or penalize any material. They have to take the waste in the MRF as it comes, whereas in Dubai they are able to reject bags because recyclables come in transparent bags”



1) Obtained from expert interviews and due to the high recovery rate of the Eddy Current separator used to separate aluminum from the remaining waste; 2) Commercial and Industrial Waste; 3) Assuming MRFs are operating at 80% of their design capacities; 4) Aligned with input received from stakeholder interviews stating <20%

Recovery and trading of aluminum cans in the MRF is a good source of extra income to the MRF operator, generating about USD 30 k /month in revenues

Brief high-level business model [example from 1 MRF]

Waste entering MRF



MRF **receiving** around **30 tonnes/hour** of MSW and C&I²⁾ waste

Sorting of Waste



Waste passed through eddy current separator, recovering **~90%** of aluminum cans

UBC Recovery



- **Recovery** of around **20 tonnes/month** of **UBCs** (0.1% of total entering waste)
- UBC scrap **sold** at an average of around **USD 1600 per tonne** in the year 2022 (around 68% of LME price)

Generated Revenue



- Estimated monthly revenues at around **USD 32,000** and yearly revenues at around **USD 384,000** for 2022

Key Takeaways

- Recovery and exporting of aluminum cans in the MRF is a good source of extra income to the MRF operator
- UBC scrap however represents ~0.1% of processed waste
- The cost to separate the UBC from the scrap is fairly low (~**USD 45,000 to implement an eddy-current separator**)
- **UBC scrap nevertheless only represents a small portion of an MRF's revenue**



“Eddy current separator and small bailer would provide good returns for recovered UBCs”




1) Average price in 2022 as reported by MRF operator 2) Construction and industrial

Multiple landfills exist across the UAE, with most landfills located within Abu Dhabi – significant recovery of UBCs is done by licensed scavenging companies

Overview of landfills in UAE

Overview of landfills in UAE

Non-exhaustive

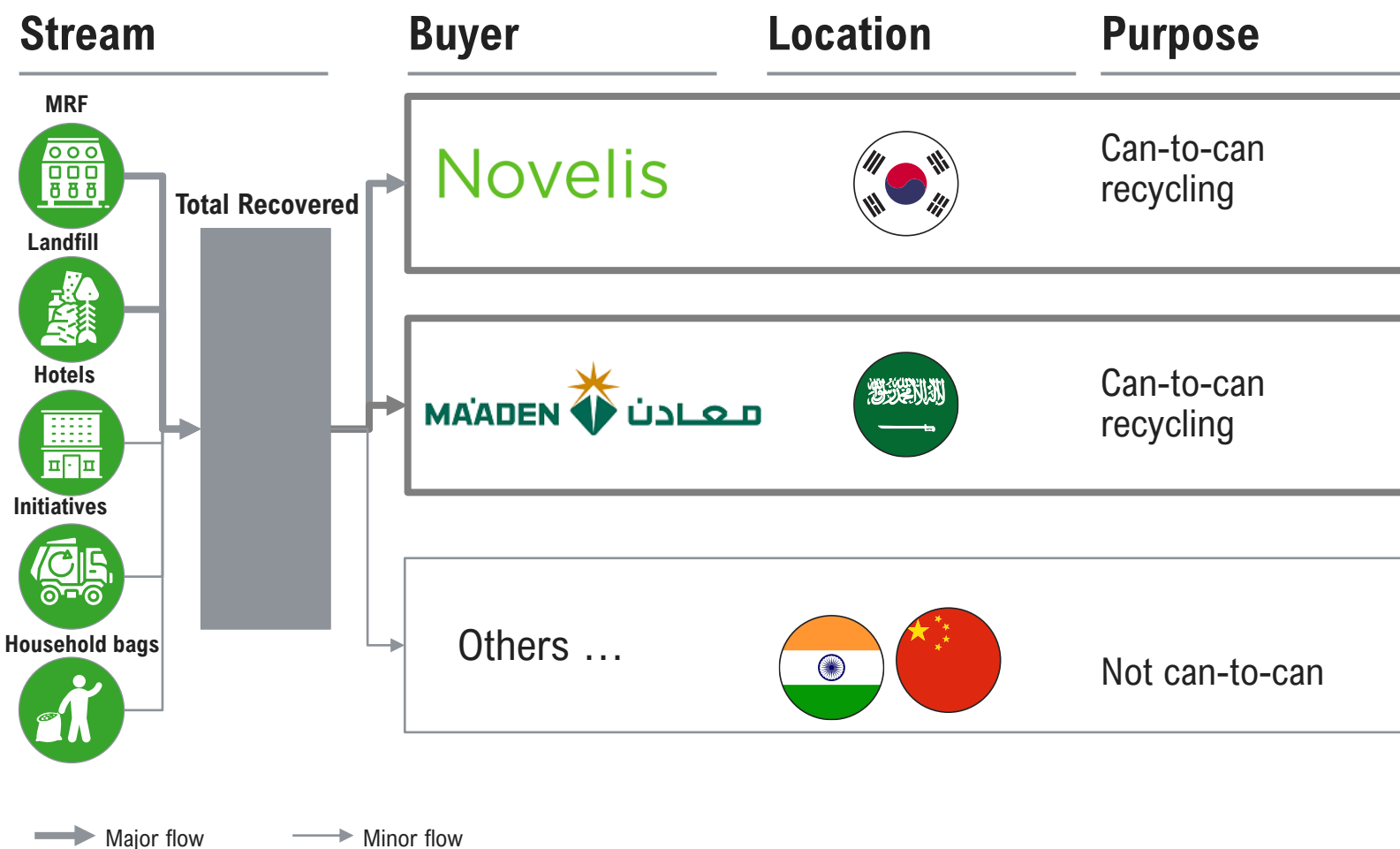


		Area [Km ²]	Operator
Abu Dhabi	Al Ain sanitary landfill	2	Star International
	Al Ain dumpsite	0.8	Train Environmental services
	Um Al Grban dumpsite	0.91	Train Environmental services
	Al Ruwaith dumpsite	2.2	Train Environmental services
	Al Jabbanah dumpsite	0.7	Train Environmental services
	Al Jiffin dumpsite	0.21	Train Environmental services
	Madinat Zayed dumpsite	1.1	Train Environmental services
	Al Mirfa dumpsite	1.5	Train Environmental services
	Al Sila'a dumpsite	0.15	Train Environmental services
	Al Dhafra dumpsite	21.8	TBD
	Ajman	Ajman landfill	N/A

		Area [Km ²]	Operator
Dubai	Al Qusais landfill	3.5	N/A
	Jebel Ali engineered landfill	0.1	N/A
	Um Al-Quwain I landfill	N/A	N/A
	Um Al-Quwain II landfill	N/A	N/A
Sharjah	Al Sajaa engineered landfill	~0.9	Bee'ah
	Khor Fakkan landfill	N/A	Bee'ah
	Al Dhaid landfill	N/A	Bee'ah
	Kalba landfill	N/A	Bee'ah
RAK	Madam landfill	N/A	Bee'ah
	Al Jazeera sanitary landfill	N/A	RAK WM authority
Fujairah	Al Qareem dumpsite	N/A	N/A
	Badia landfill	N/A	N/A

Non-sanitary /engineered landfill

UBCs in the UAE are largely exported to KSA and South Korea and minorly exported to India where cans are downcycled into alloys for other applications or deoxidizers



Key takeaways

- **Majority** of recovered UBC scrap is exported are exported to **Novelis** and **Ma'aden** for **can-to-can recycling**
- **Minority** of recovered UBC scrap is exported to other countries such as **India** and **China** for **down-cycling** into cookware, automotive parts, oxidizers, ...



"It is estimated that 60% of recovered UBC goes to Korea and KSA"



"Most recovered UBCs go to Korea and KSA. India is rarely a major buyer of UBC except in a couple of months of a year"



"There is no demand for UBCs in the UAE, and the prices being offered are low"



In the Middle East, KSA’s Ma’aden is the only company with can-to-can recycling potential

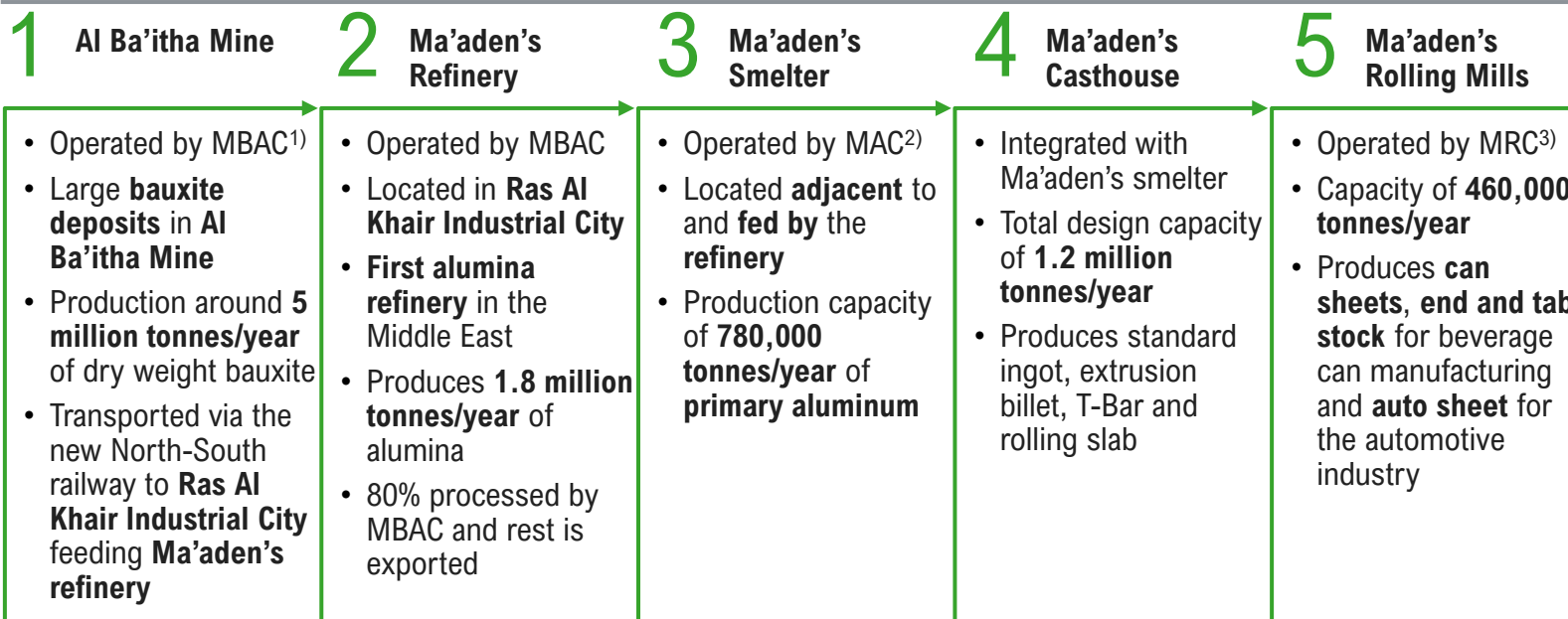
Overview of MA’ADEN can sheets supply chain

Company overview

- Established in **1997** by a royal decree with a mandate to develop KSA’s mineral sector
- One of the **fastest growing mining companies** in the word ranked among the top 10 global mining companies
- Publicly traded company **majorly owned by PIF**
- Business in **gold** and **base metals, phosphate, industrial minerals** and **aluminum**



Overview of Ma’aden Aluminum Can Sheet Supply Chain



MRC is also equipped with a Can Recycling Unit which has the capacity to recycle 120,000 tonnes/year of primarily used beverage cans. 40% recycled aluminum

1) Ma’aden Bauxite and Alumina Company, 2) Ma’aden Aluminum Company, 3) Ma’aden Rolling Company

Roland
Berger

