



Aluminum Cans Market Assessment

Improvement levers – South Korea

May 2023



List of abbreviations – selection

Abbreviation	Description
BCs	Beverage cartons
CAPEX	Capital expenditure
C2C	Can-to-can
DRS	Deposit return scheme
EPR	Extended producer responsibility
HH	Households
KSA	Kingdom of Saudi Arabia
MRF	Material recovery facility
PAYT	Pay as you throw
RVM	Reverse vending machine
SEA	South East Asia
UBC	Used beverage cans

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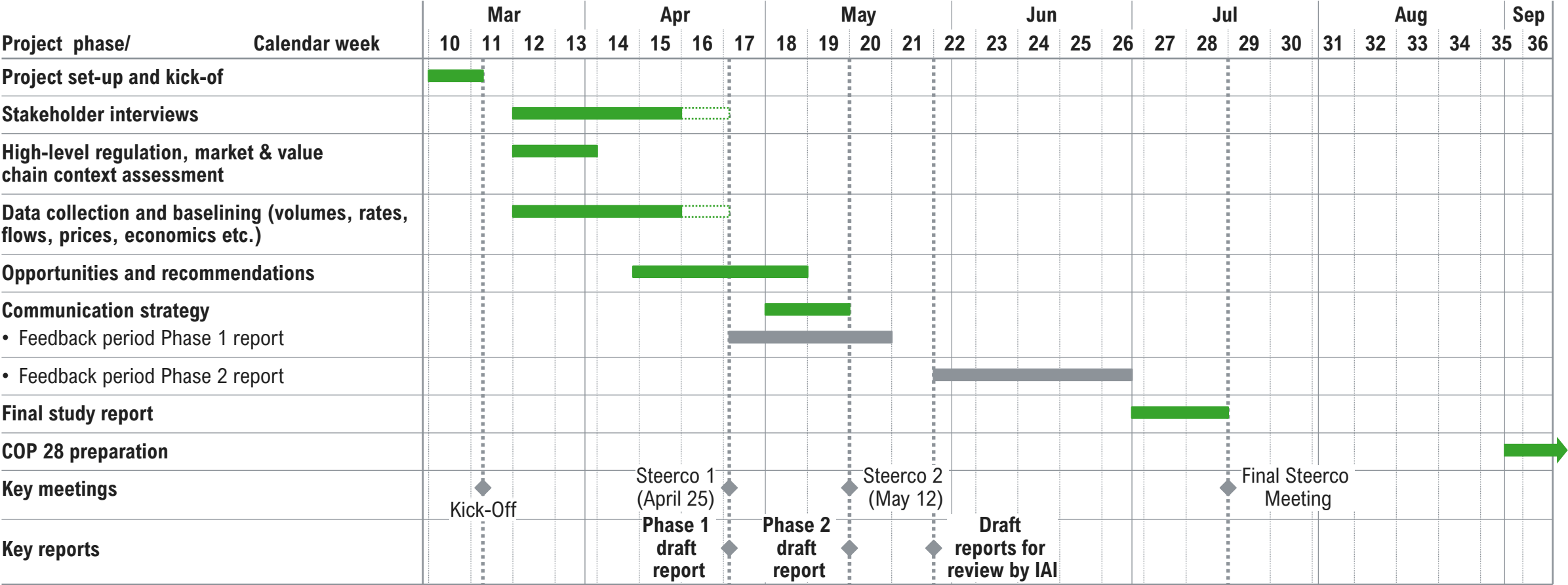
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1. Alu can lifecycle – overview of strategic recommendations

The main project timeline spans 2.5 months, with the draft report of phase 2 delivered in mid-May, followed by a review by the IAI team

Project timeline



The comprehensive review of the AS IS situation in the 6 countries in scope was used to develop levers and build a prioritized set of strategic recommendations

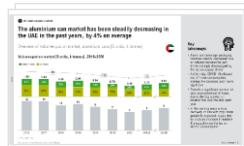
Strategic recommendations development process



1 Current aluminium can market assessment

- Modelling of Put-On-Market volumes
- Review of waste management framework & regulation
- Modelling of the aluminium can lifecycle (from production to disposal or recycling)

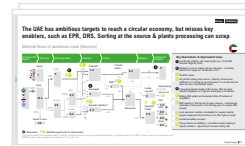
Put on market volumes



Waste management framework



Material flow analysis



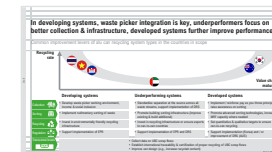
2 Improvement levers identification & consolidation

- Comprehensive list of improvement levers per country
- Consolidation on a cross-country level to identify synergies & common themes

Improvement levers per country



Common themes & cross-country synergies



3 Prioritized set of strategic recommendations

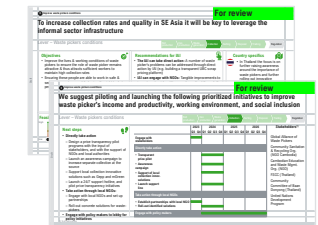


- Detailed one-pagers developed for each improvement lever
- In selected cases, more material has been provided to provide additional insights/inspiration/guidelines
- Recommendations were prioritized considering impact & feasibility

Prioritized levers per country

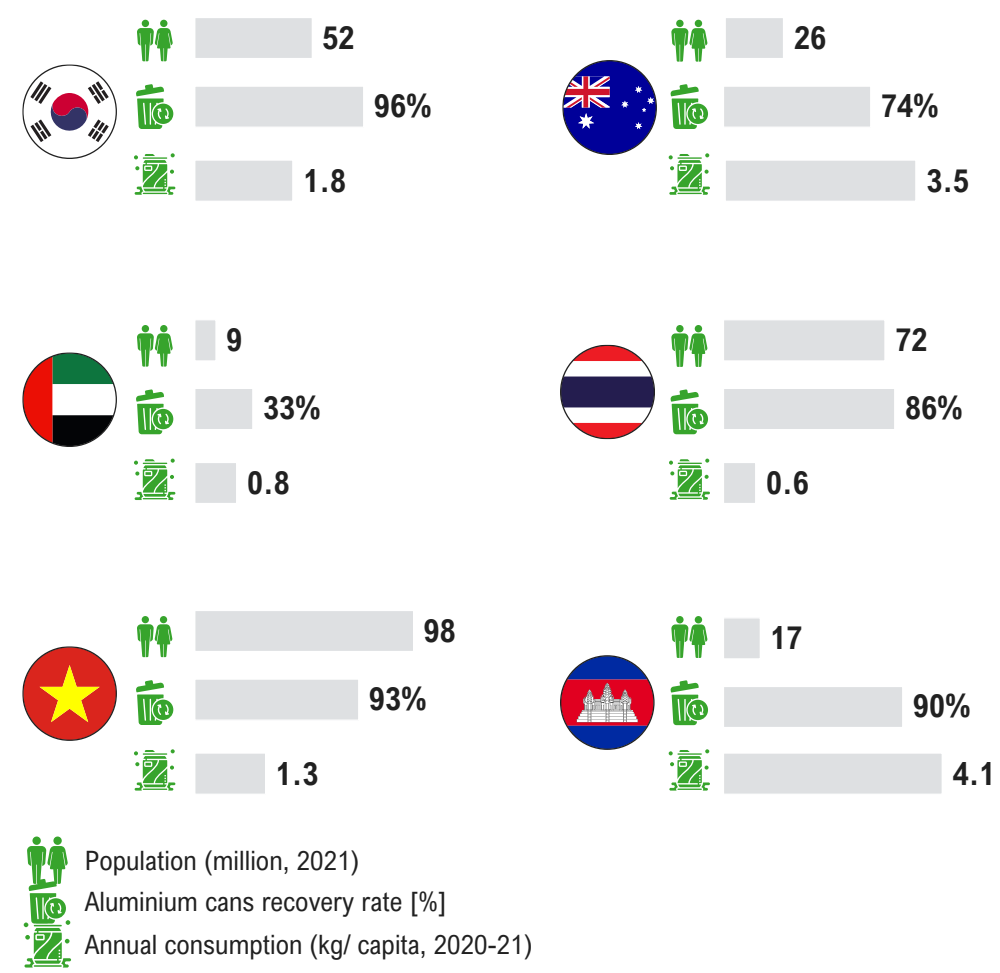
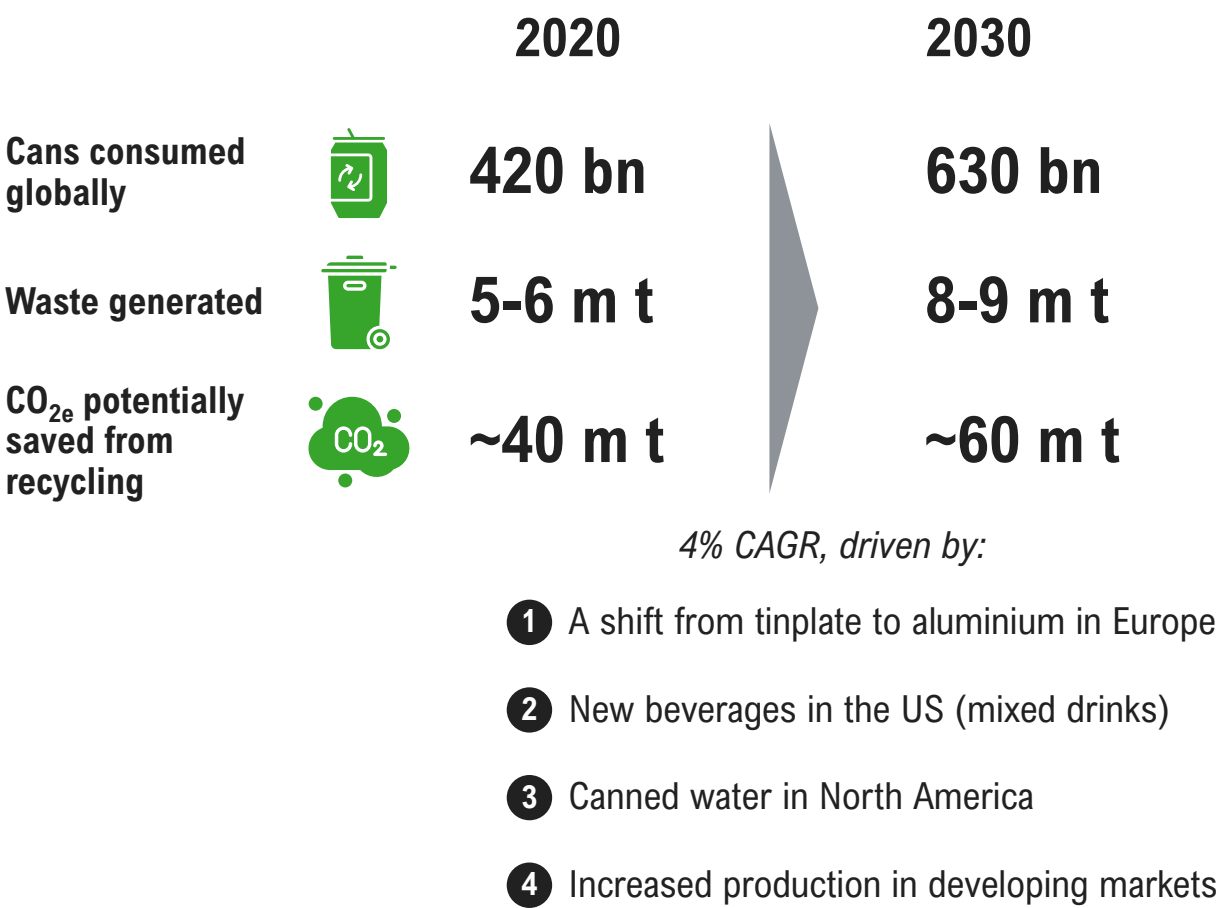


Detailed one-pagers & planning per lever



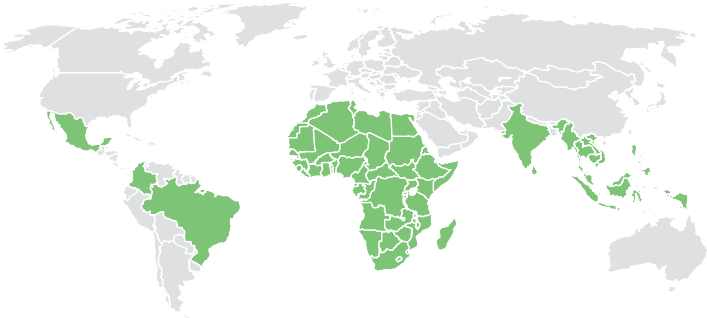
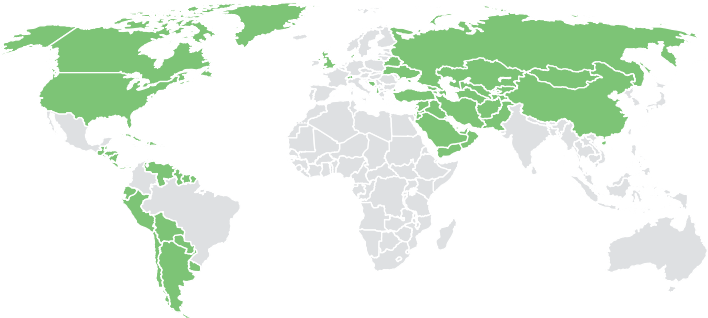
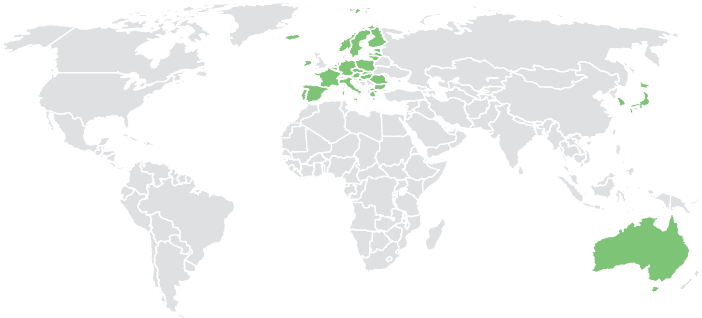




Aluminium cans are the package of choice for alcoholic and soft drinks, increasing to >600 bn units consumed annually by 2030; Recycling them could save 60 m t CO_{2e}

Aluminium cans global overview



Three groups of countries are identified based on the characteristics of their waste management systems

Global typical country characteristics by system type for UBC recycling

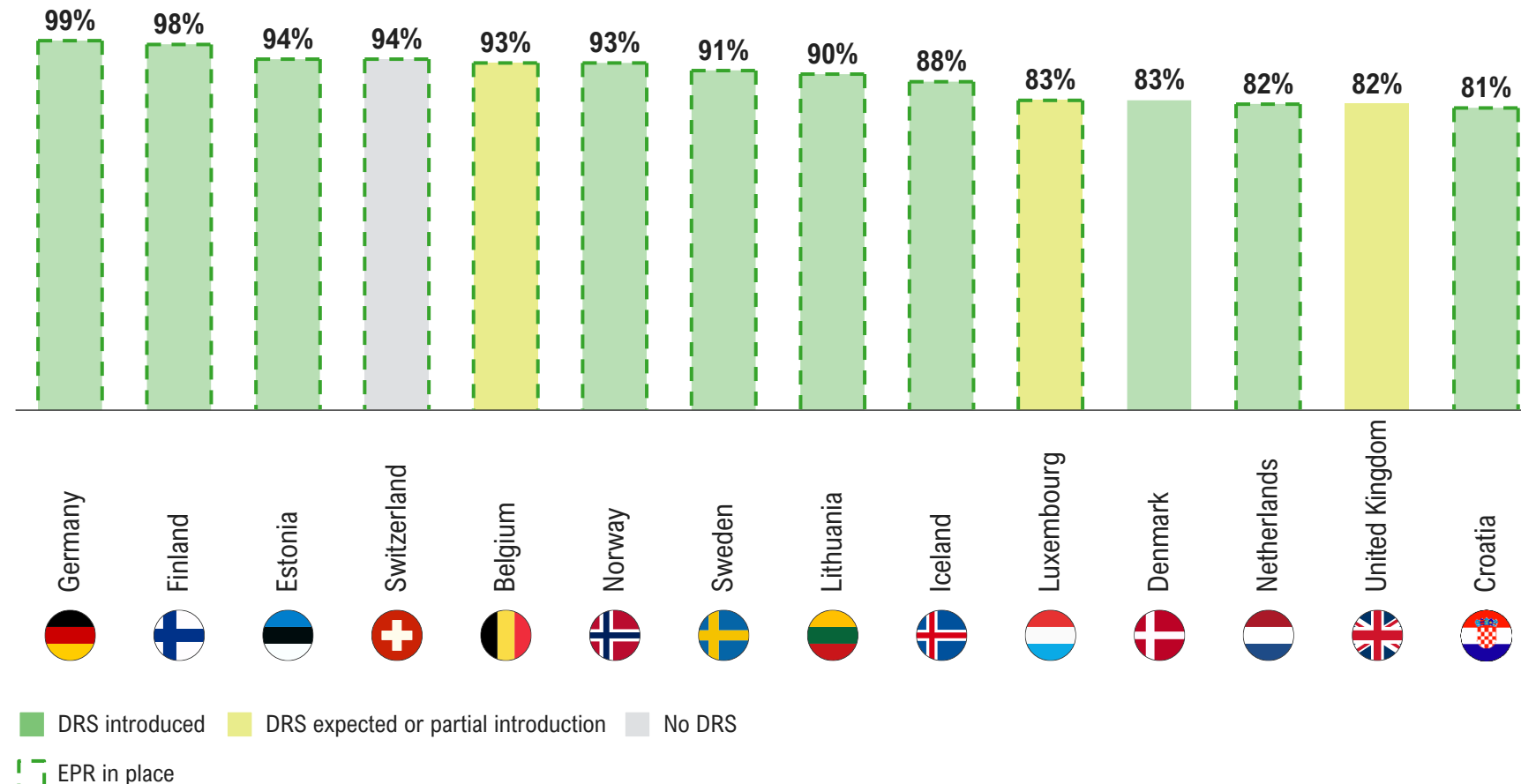
	Infrastructure light models	Transitioning systems	Infrastructure heavy systems
			
	Countries with high number of waste pickers ¹⁾ High proportion of collection from informal economy	Collection infrastructure largely to fully developed No mandatory/ well-functioning EPR, no DRS	More complex waste management systems EPR enforced and/or DRS present
Collection 	<ul style="list-style-type: none">• Street pickers collect UBC for their value• No source separation in formal system	<ul style="list-style-type: none">• Mostly single stream collection with some experiments into dual stream sorting, no DRS	<ul style="list-style-type: none">• Mature sorting at the source (with room for standardization / improvement); often with DRS
Sorting 	<ul style="list-style-type: none">• Junkshops trade scrap through aggregators• Further sorting done mostly on landfill	<ul style="list-style-type: none">• Developing, but lacking sorting infrastructure	<ul style="list-style-type: none">• Mature sorting infrastructure (with room for further streamlining / automation)
Recycling 	<ul style="list-style-type: none">• Cans often downcycled (exception is Thailand) with bad impact on environment	<ul style="list-style-type: none">• Missing local recycling infrastructure	<ul style="list-style-type: none">• Generally well-established quantitative targets, no qualitative targets
Regulation 	<ul style="list-style-type: none">• EPR-talks mostly ongoing, in various stages of advancement	<ul style="list-style-type: none">• EPR typically absent or not enforced• Lacking clear and ambitious targets	<ul style="list-style-type: none">• Well established EPR, with significant transparency on system performance

1) Roland Berger analysis

Very high recycling rates are achievable, as seen in European countries, with the support of efficient EPR and DRS in place

Aluminium cans recycling rate, Europe [%, 2020]

EU countries with >80% recycling rate of aluminium cans [%, 2020]



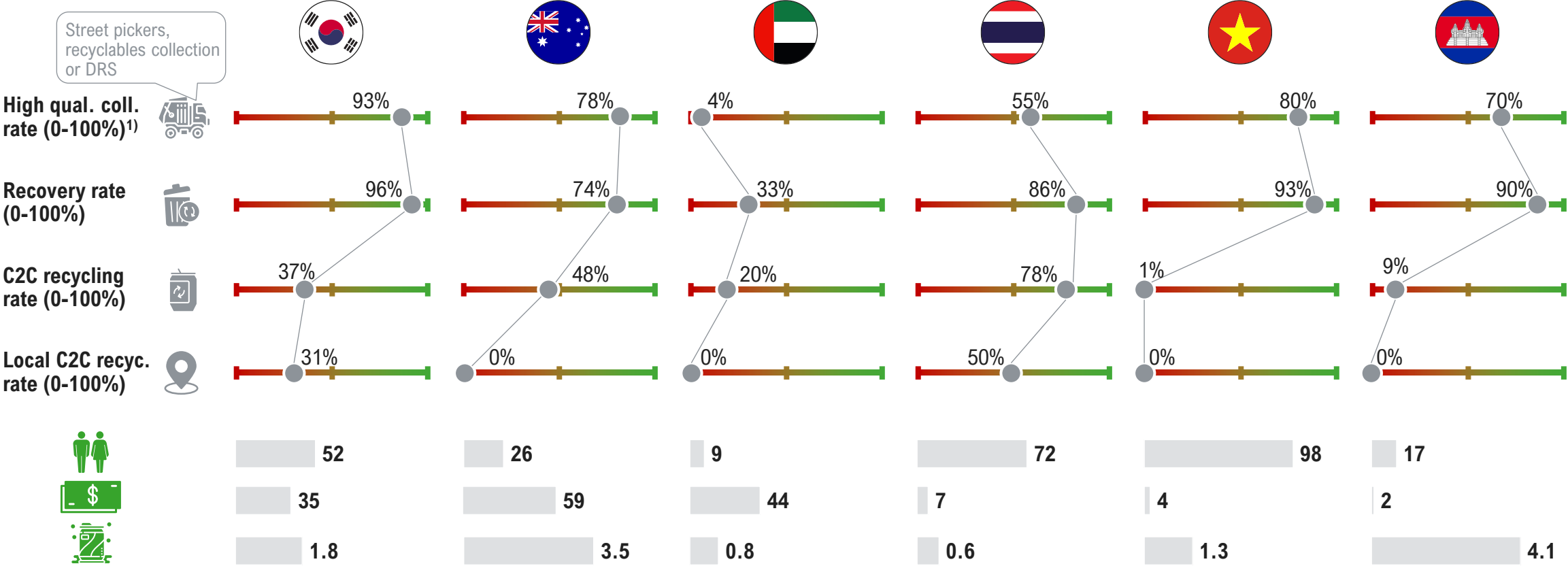
Key takeaways



- Many European countries have >80% recycling rates of aluminium cans, mostly in the Western and Northern parts of the continent
- Denmark is the only EU country without an EPR for packaging, together with the UK as the other major European country (expected in both)
- DRS are in place in most high-performing countries
 - All EU countries are set to introduce DRS for aluminium cans and PET by 2029
 - The UK will possibly introduce DRS by 2026
 - Scotland already has a DRS system in place

The performance of each country was analyzed in phase 1 of the project – particular challenges were identified at various stages and points of the value chain

Summary of aluminium can recycling performance for the countries in focus

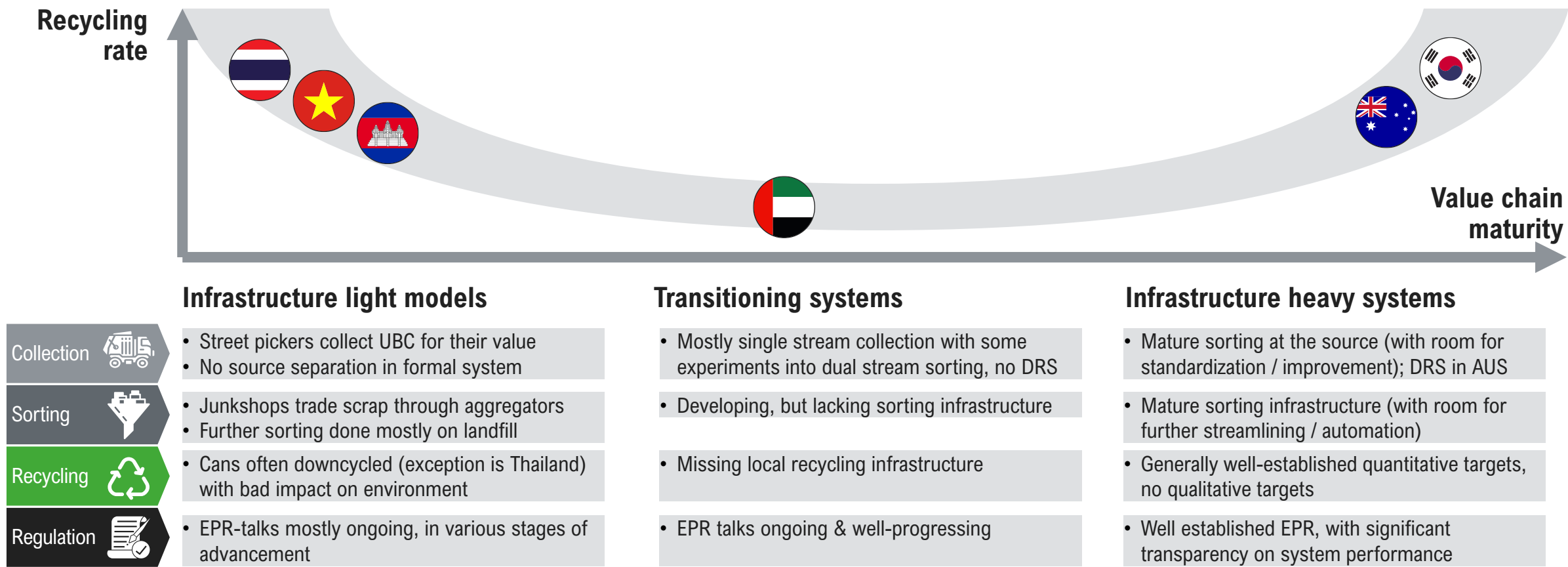


Population (million, 2021) GDP per capita (USD k/ capita, 2021) Annual consumption (kg/ capita, 2020-21)

1) High quality collection corresponds to collection done by street pickers, separate collection (e.g. curbside "recyclables stream") or DRS

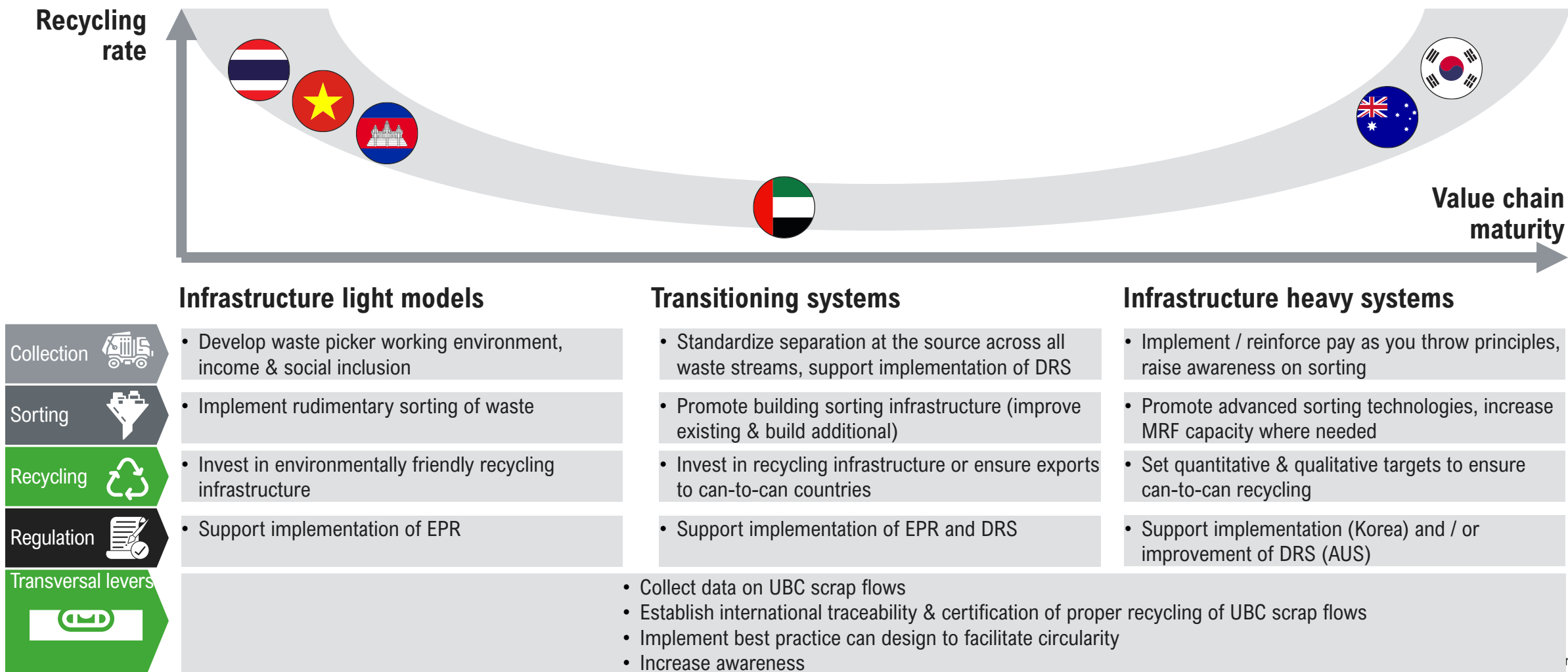
The collection-recycling systems of the countries in scope could be categorized into 3 broad categories, based on the common characteristics of the value chain

Performance of alu can recycling system types in the countries in scope



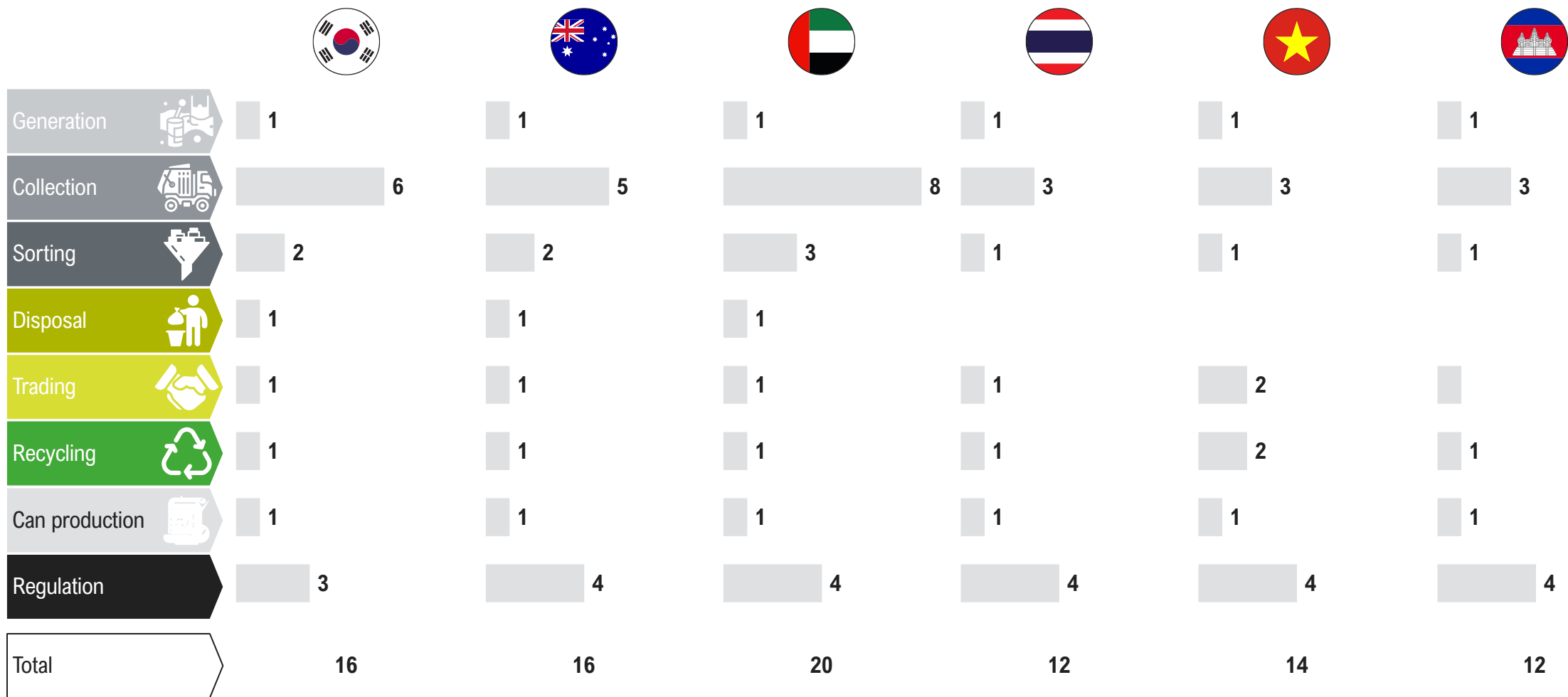
In developing systems, waste picker integration is key, underperformers focus on better collection & infrastructure, developed systems further improve performance

Common improvement levers of alu can recycling system types in the countries in scope



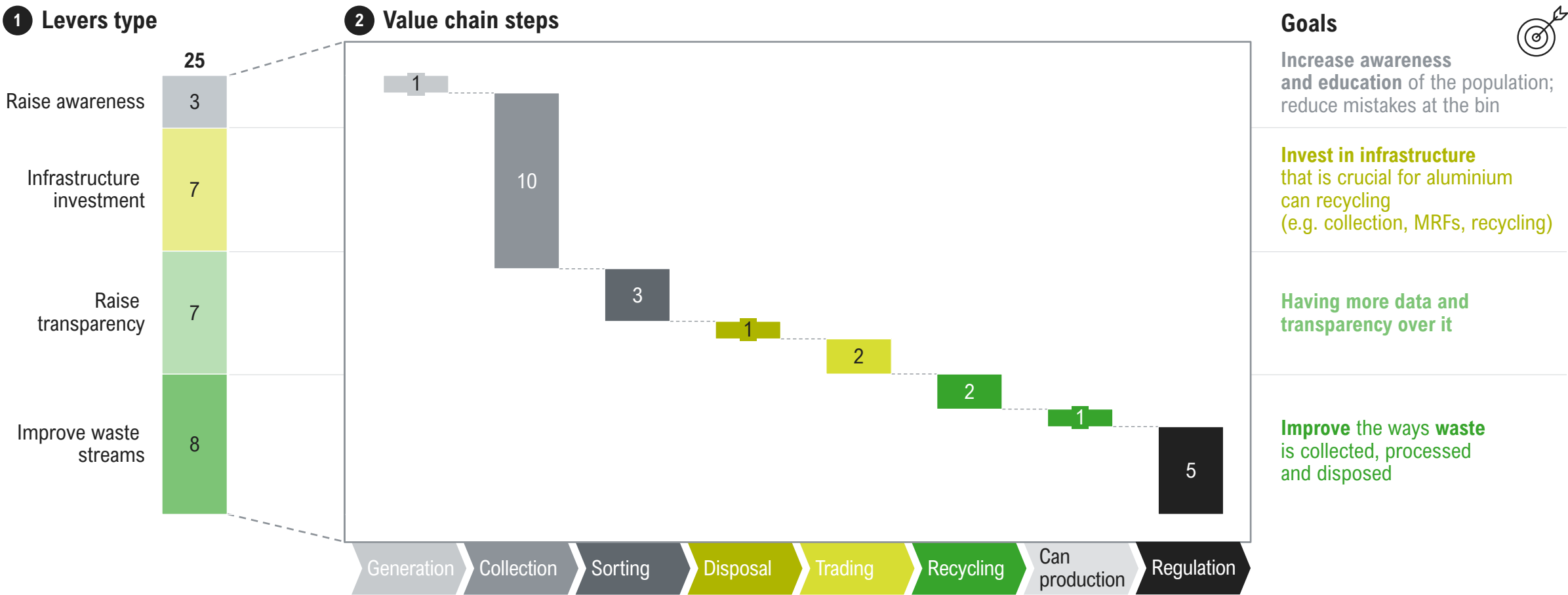
For each of the 6 countries we have outlined a series of potential strategic levers to improve the aluminum can circularity

Potential strategic levers overview by value chain stage and country [# levers]



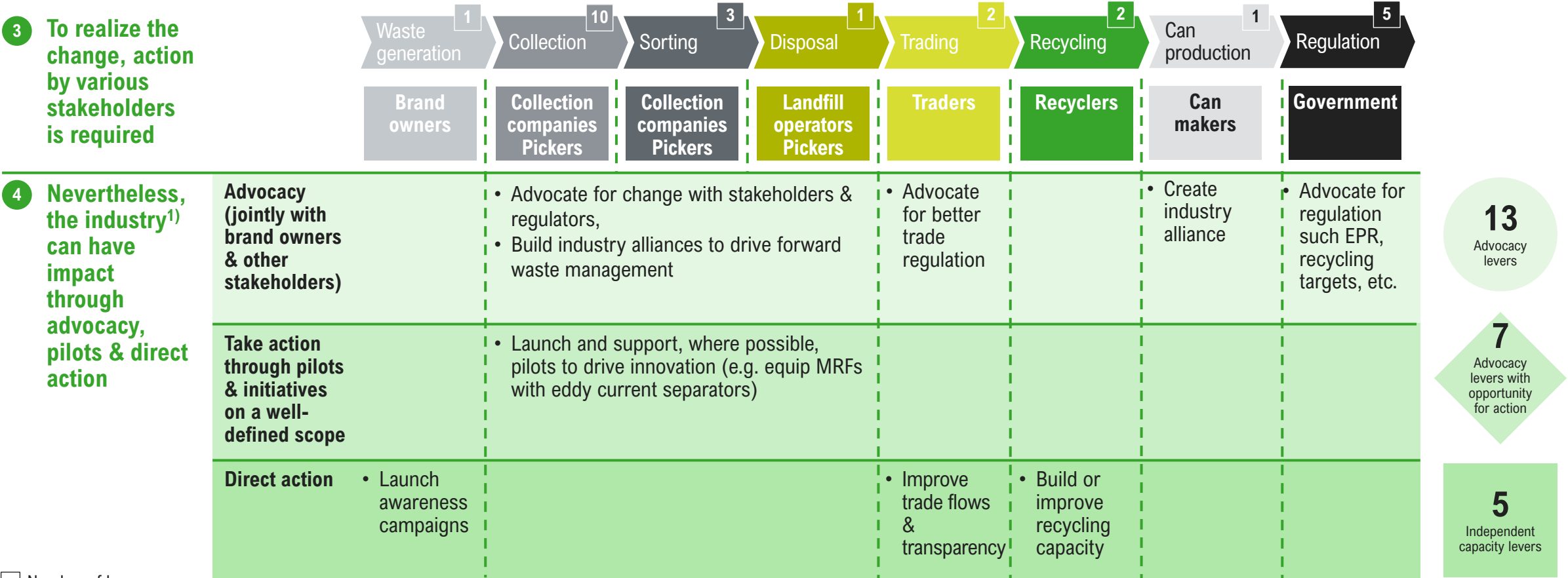
The potential levers could target an increase in awareness, transparency in waste flows or investments in infrastructure along the value chain

Potential strategic levers overview by value chain stage & category [# levers]



For the implementation of the levers the alu industry needs to consider roles of key stakeholders in value chain; to contribute through direct action or advocacy

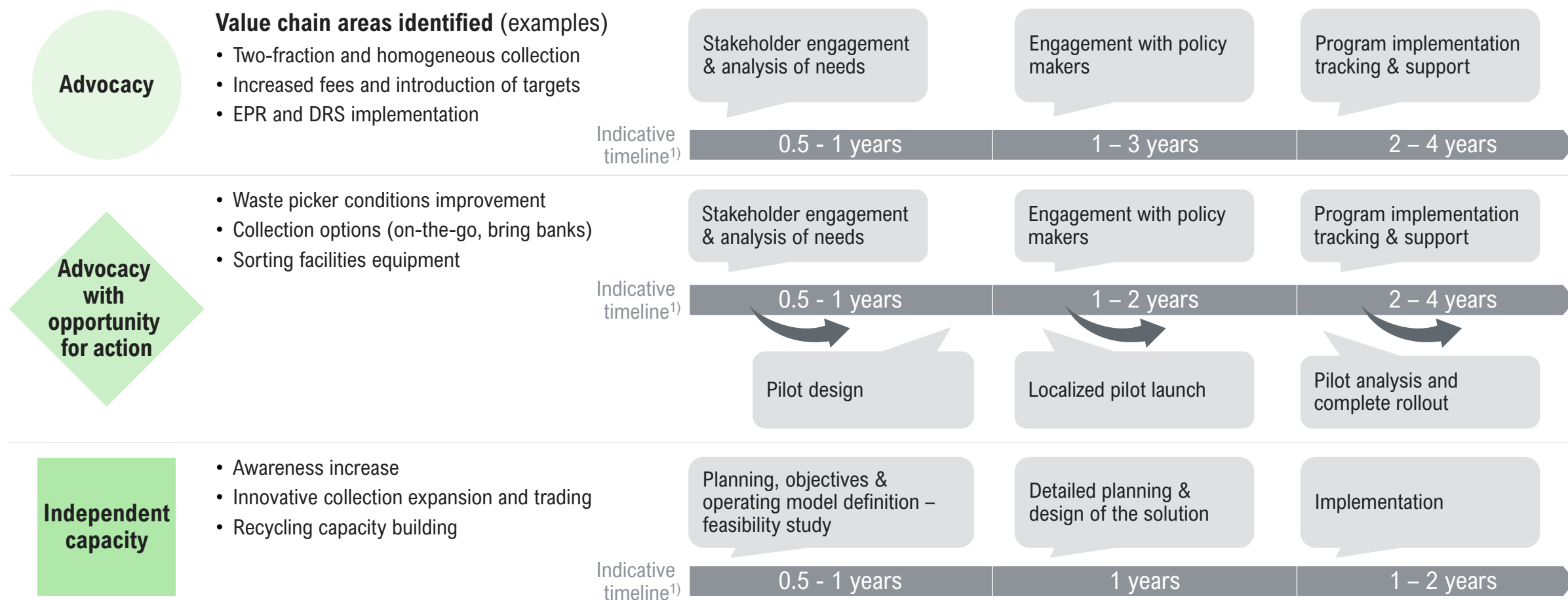
Potential strategic levers, by stakeholders and impact of the aluminium industry



1) The industry refers to the primary aluminium producers as well as those companies involved in processing aluminium for can production

Levers follow a structured timeline, with actions involving stakeholder engagement, pilot launch and full rollout – differences depending on industry involvement



Improvement levers typical general actions by aluminium industry impact category



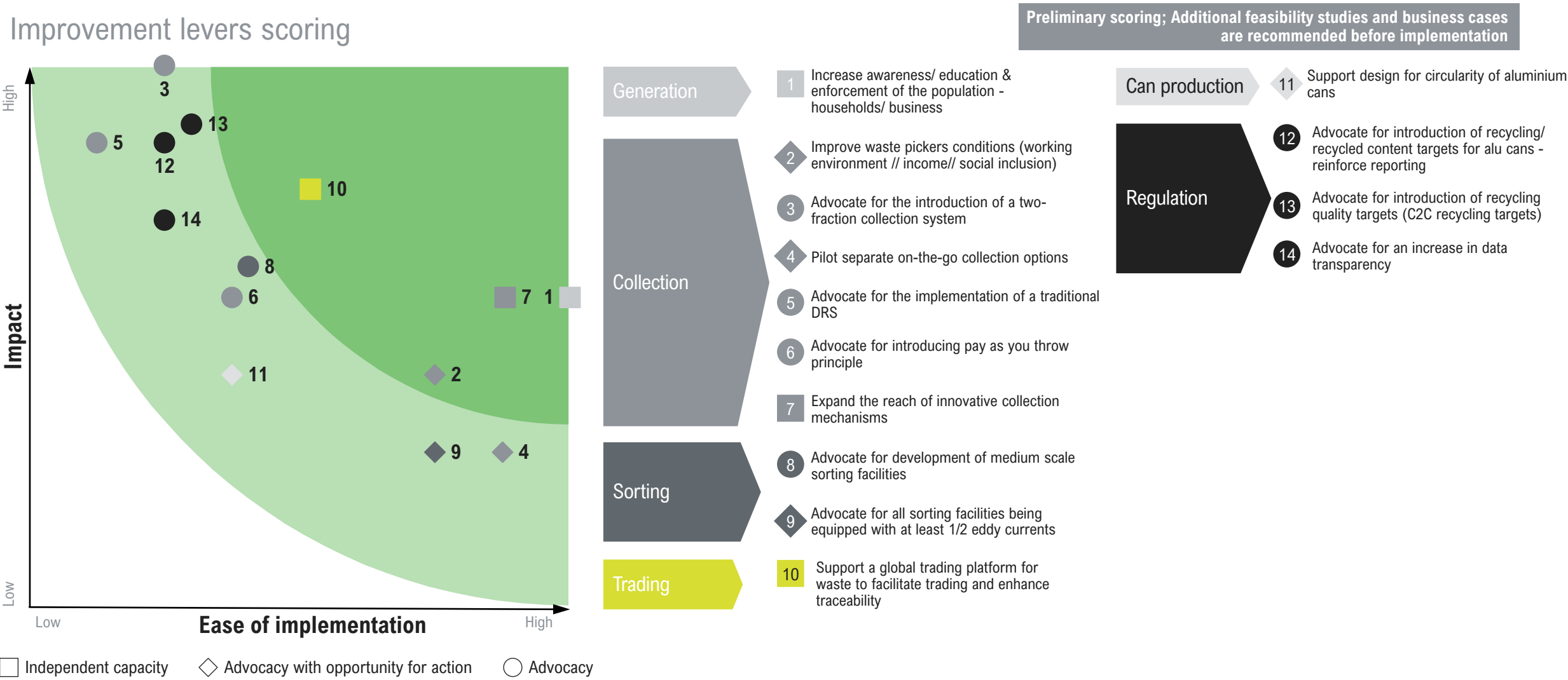
1) Indicative timeline which may differ significantly for individual levers

The strategic levers were scored top-down based on 8 criteria related to feasibility & impact; additional (pre)feasibility studies and business cases may be required

Potential strategic levers, assessment criteria

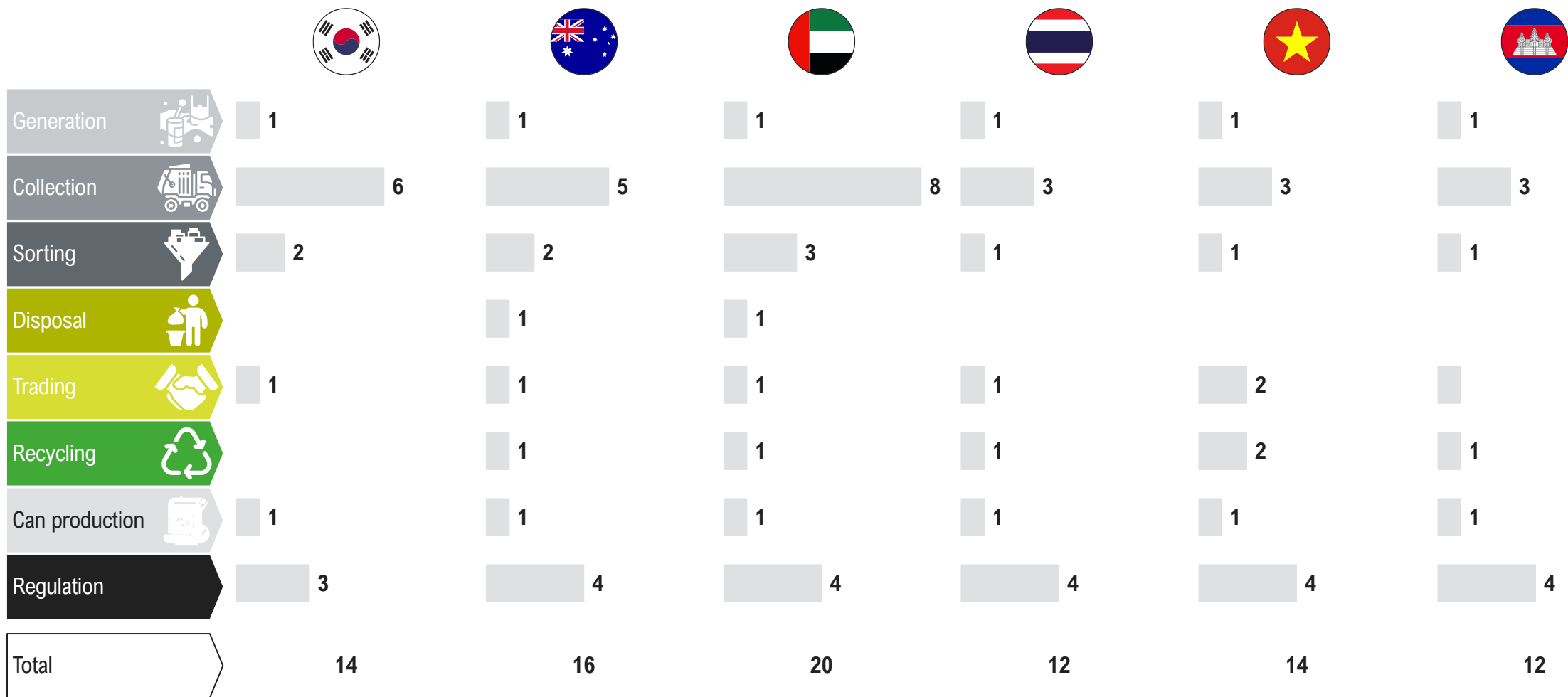
	Criteria	Description	Scoring		
			Low	Medium	High
Ease of implementation 	Cost of implementation	Approximate cost of implementation of lever (feasibility studies, pilots, investment)	High cost (USD 100s m)	Medium cost (USD m)	Low cost (<USD 1 m)
	Timeline	Time from the initiation of lever until full implementation and rollout	Long term (>=10 years)	Medium term (3-10 years)	Short term (<3 years)
	Stakeholder alignment	Number of key stakeholders involved in the initial discussions and throughout the process	Multiple stakeholders involved (>5)	A few stakeholders involved (3-5)	1-2 stakeholders involved
	Leverage of aluminium industry	Extent to which the aluminium industry can take action independently from other stakeholders & with limited regulatory constraints	Low industry leverage	Medium industry leverage	High industry leverage
Impact 	Recovery rate	Expected impact on the country's aluminium cans recovery rate after full implementation	Low/ no impact on recovery rate (<2%)	Medium impact on recovery rate (2-5%)	High impact on recovery rate (>5%)
	Quality of recovery	Expected effect on the quality of the aluminium cans recovered after full implementation	No impact on quality of recovery	Limited impact on quality of recovery	Some impact on quality of recovery
	ESG	Expected ESG impact (e.g. social inclusion, emission reduction) after full implementation	No social impact	Limited social impact	Some social impact
	Cost impact in value chain	Influence on the cost of UBC or recycling process after full implementation	Negative impact on cost	Limited impact on cost	Positive impact on cost

Recommendations have been mapped based on feasibility and impact assessment, recommendations with high impact & feasibility can be tackled first



For each of the 6 countries we have outlined a series of potential strategic levers to improve the aluminum can circularity

Potential strategic levers overview by value chain stage and country [# levers]



While some levers are internationally applicable, some topics of investigation are selectively relevant and were identified for South Korea



Improvement levers list and applicability

1	Increase awareness/ education & enforcement of the population - households/ business	Generation
2	Improve waste pickers conditions (working environment // income// social inclusion)	Collection
3	Advocate for the introduction of a two-fraction collection system	Collection
4	Pilot separate on-the-go collection options	Collection
5	Advocate for the implementation of a traditional DRS	Collection
6	Advocate for introducing pay as you throw principle	Collection
7	Expand the reach of innovative collection mechanisms	Collection
8	Advocate for development of medium scale sorting facilities	Sorting
9	Advocate for all sorting facilities being equipped with at least 1/2 eddy currents	Sorting
10	Support a global trading platform for waste to facilitate trading and enhance traceability	Trading
11	Support design for circularity of aluminium cans	Can production
12	Advocate for introduction of recycling/ recycled content targets for alu cans - reinforce reporting	Regulation
13	Advocate for introduction of recycling quality targets (C2C recycling targets)	Regulation
14	Advocate for an increase in data transparency	Regulation

While some levers are internationally applicable, some topics of investigation are selectively relevant and were identified for South Korea



Overview of strategic levers –Generation

#	Collection lever	Aluminium industry action	Ease of implementation	Impact
1	Increase awareness/ education & enforcement of the population - households/ business	<ul style="list-style-type: none"> Develop and promote educational resources that help the broader public understand the importance of UBC recycling Design and launch advertising campaigns (led by the industry or supported by a wider consortium of value chain players) 		

While some levers are internationally applicable, some topics of investigation are selectively relevant and were identified for South Korea

Overview of strategic levers – Collection (1/2)



#	Collection lever	Aluminium industry action	Ease of implementation	Impact
✓ 2	Improve waste pickers conditions (working environment // income // social inclusion)	<ul style="list-style-type: none"> Take direct action to increase awareness around waste pickers, improve transparency or provide waste pickers with digital tools Engage with NGOs to directly positively impact waste pickers' daily lives (e.g. provide tools & safety equipment) Advocate for waste picker's interests with policy makers 	low high 	low high
3	Advocate for the introduction of a two-fraction collection system	<ul style="list-style-type: none"> Advocate for widespread adoption of dual-stream collection across different waste streams Advocate for / get involved with pilot projects that aim to kick-start two-fraction collection 	low high 	low high
4	Pilot separate on-the-go collection options	<ul style="list-style-type: none"> Advocate for the widespread installation of separate on-the-go collection systems in public spaces Establish on-the-go initiatives in selected context (e.g. concerts, festivals, shopping malls, airports, etc.) in close collaboration with relevant parties 	low high 	low high

While some levers are internationally applicable, some topics of investigation are selectively relevant and were identified for South Korea

Overview of strategic levers – Collection (2/2)



#	Collection lever	Aluminium industry action	Ease of implementation	Impact
5	Advocate for the implementation of a traditional DRS	<ul style="list-style-type: none"> Advocate and provide support for the implementation of DRS in countries with an appropriate EPR Advocate for the implementation of best practices leveraging other countries' experience 	low high 	low high
6	Advocate for introducing pay as you throw principle	<ul style="list-style-type: none"> Perform feasibility study on the introduction of PAYT Advocate to policy makers to implement PAYT Support the launch awareness campaigns to educate people of the benefits and functionalities of the system 	low high 	low high
7	Expand the reach of innovative collection mechanisms	<ul style="list-style-type: none"> Support initiatives that propose innovative solutions for UBC collection Launch ideation initiatives (e.g. "hackathon") 	low high 	low high

While some levers are internationally applicable, some topics of investigation are selectively relevant and were identified for South Korea



Overview of strategic levers – Sorting and Trading

# Sorting lever	Aluminium industry action	Ease of implementation	Impact
8 Advocate for development of medium scale sorting facilities	<ul style="list-style-type: none"> Advocate for the building of additional capacity where needed 	low high	low high
9 Advocate for all sorting facilities being equipped with at least 1/2 eddy currents	<ul style="list-style-type: none"> Collaborate with MRF operators to further improve their operation wrt. UBC (provide technical expertise, ensure all sorting facilities are equipped with eddy current separators) Engage with collection & waste management companies to advocate for building relevant sorting facilities (e.g. transfer stations equipped with conveyer belts, material recovery facilities in UAE, etc.) 	low high	low high
# Trading lever	Aluminium industry action	Ease of implementation	Impact
10 Support a global trading platform for waste to facilitate trading and enhance traceability	<ul style="list-style-type: none"> Partner with relevant stakeholders to create an international UBC scrap trading platform that increases transparency 	low high	low high

While some levers are internationally applicable, some topics of investigation are selectively relevant and were identified for South Korea



Overview of strategic levers – Can production

#	Sorting lever	Aluminium industry action	Ease of implementation	Impact
11	Support design for circularity of aluminium cans	<ul style="list-style-type: none"> Continuously engage with players across the value chain to encourage all players across the value chain to always opt for the best possible design choices Continue ongoing research into can design (aim for unialloy cans, pursue further light weighting of cans, etc.) 	low high 	low high

While some levers are internationally applicable, some topics of investigation are selectively relevant and were identified for South Korea

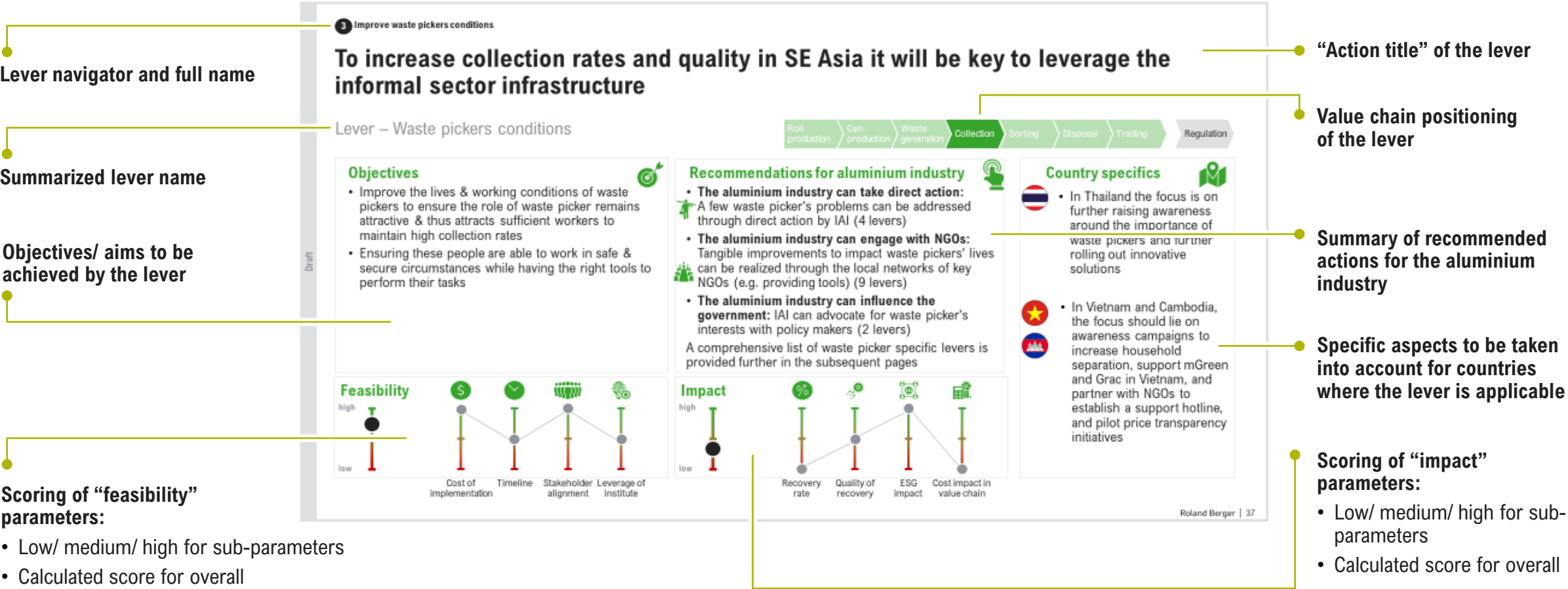
Overview of strategic levers – Regulation



#	Regulation lever	Aluminium industry action	Feasibility	Impact
12	Advocate for introduction of recycling/ recycled content targets for alu cans - reinforce reporting	<ul style="list-style-type: none"> Advocate for policies that support the introduction of recycling and recycled content targets Advocate for transparent reporting of progress Encourage research and development of innovative recycling technologies 	low high 	low high
13	Advocate for introduction of recycling quality targets (C2C recycling targets)	<ul style="list-style-type: none"> Advocate for policies that support the introduction of C2C recycling and C2C recycled content targets Advocate for transparent reporting of progress 	low high 	low high
14	Advocate for an increase in data transparency	<ul style="list-style-type: none"> Advocate for a legislative framework that requires mandatory recycling reporting Partner with relevant stakeholders and provide support to local policy makers in the designing of a centralized data sharing tool across the value chain 	low high 	low high

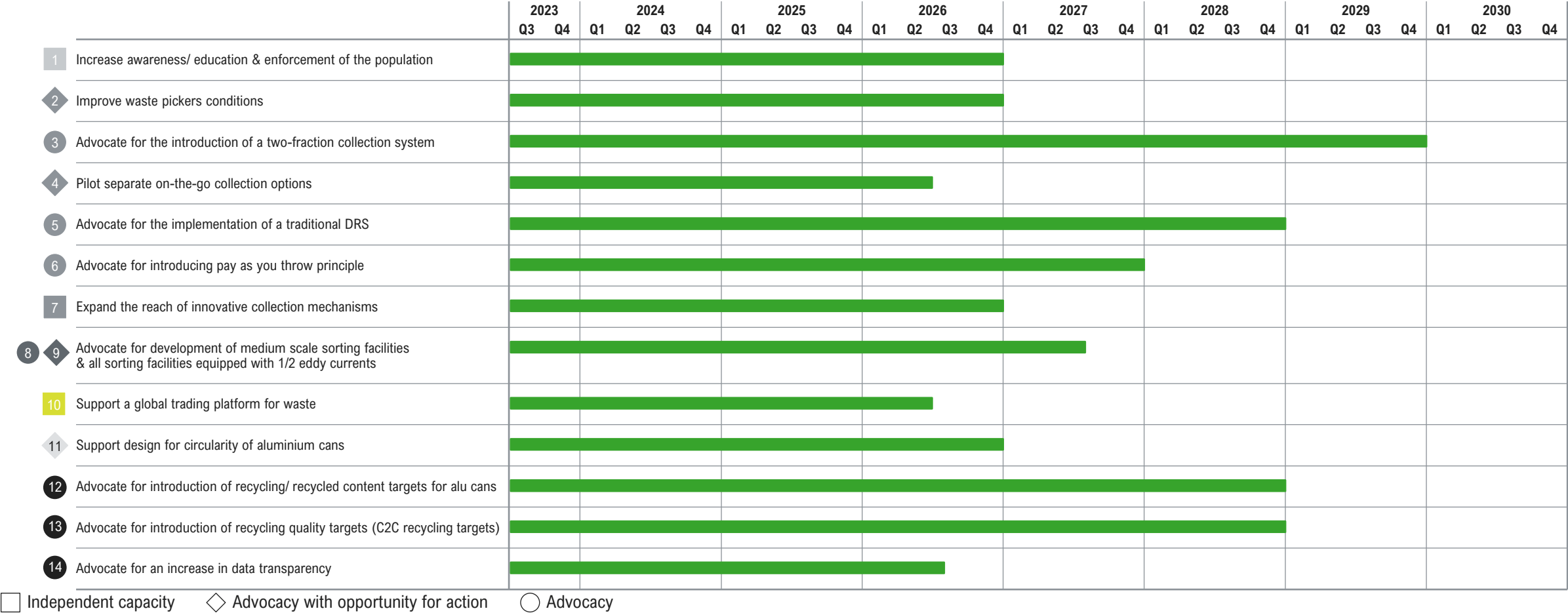
Each lever has been summarized in one-pagers, following a similar structure – for each lever an indicative planning is provided, subject to industry commitment

Structure of the lever summary pages



The suggested levers can be implemented in a timeline that spans across 4-7 years

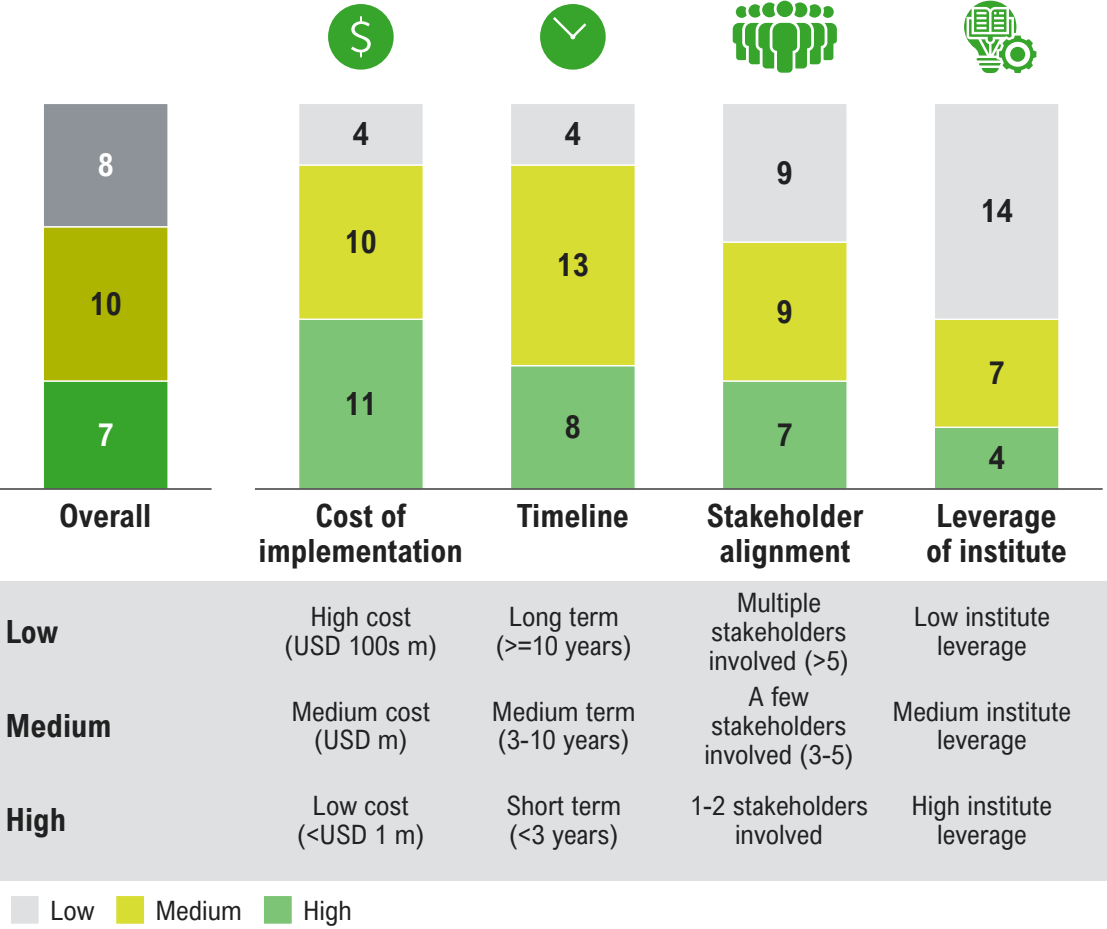
Strategic levers implementation timeline



Prioritization will be key as some levers will require significant investment, time, alignment & effort; high-impact/ low complexity levers can be tackled first

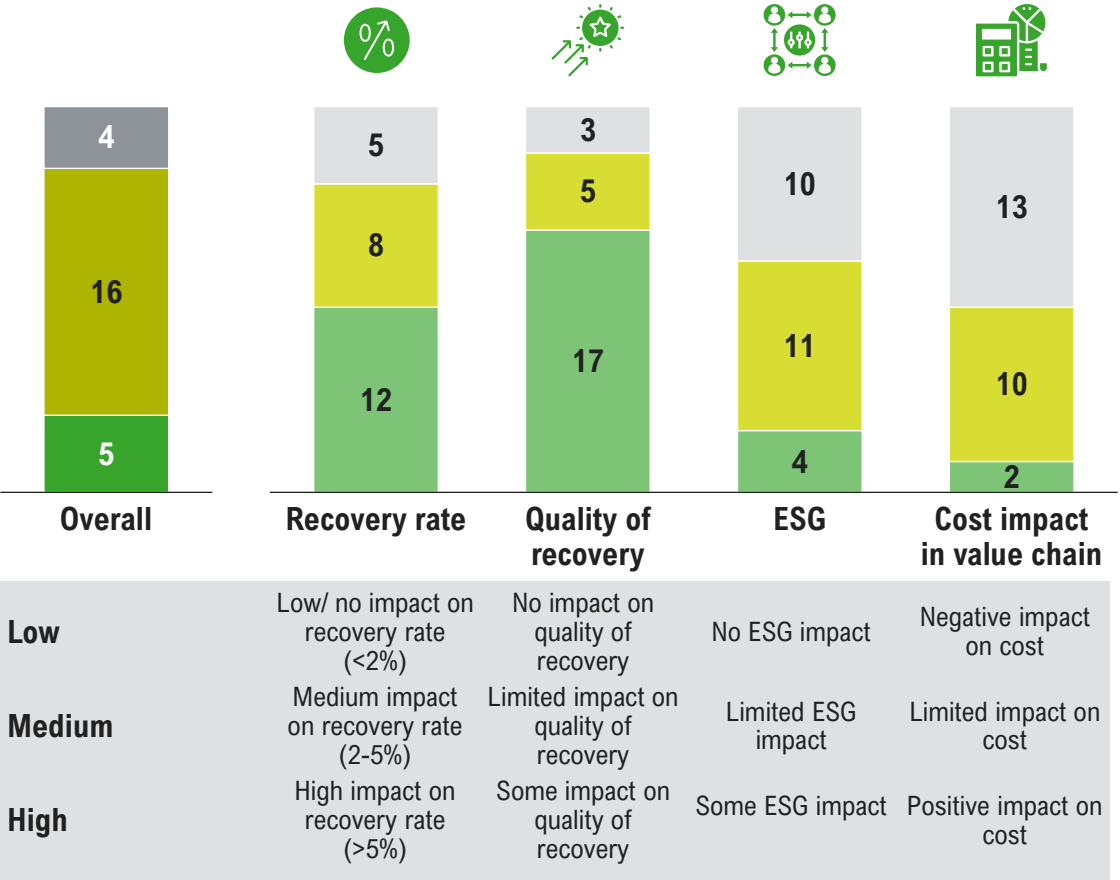
Criteria used for evaluating strategic levers [# levers]

Feasibility



Preliminary scoring; Additional feasibility studies and business cases are recommended before implementation

Impact



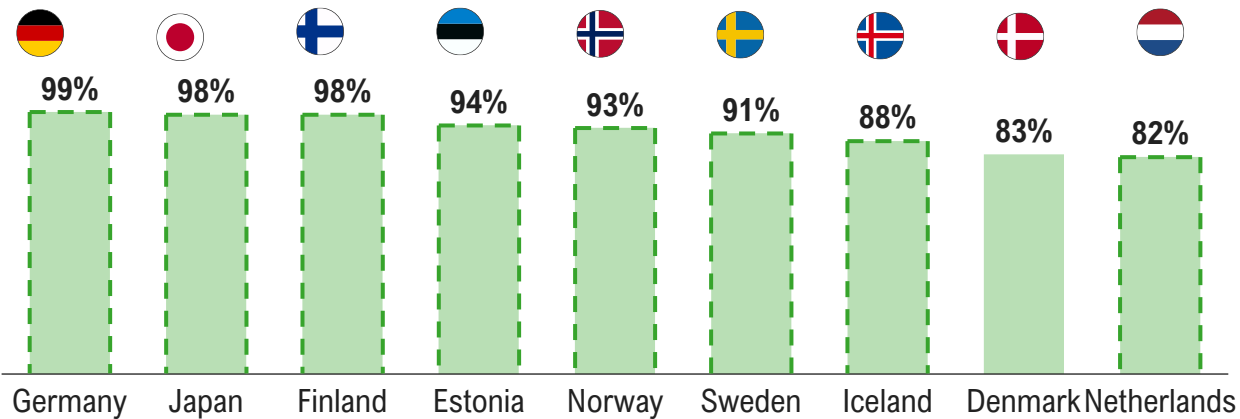


2. Target setting, short term action plan and expected benefits

The experience of various countries around the world shows that >90% recycling rates are achievable – 2 models of successful countries can be identified





Type 1 – Infrastructure heavy models, comprehensive waste management





Type 2 – Infrastructure light models, relying on pickers



~100%
recycling rate

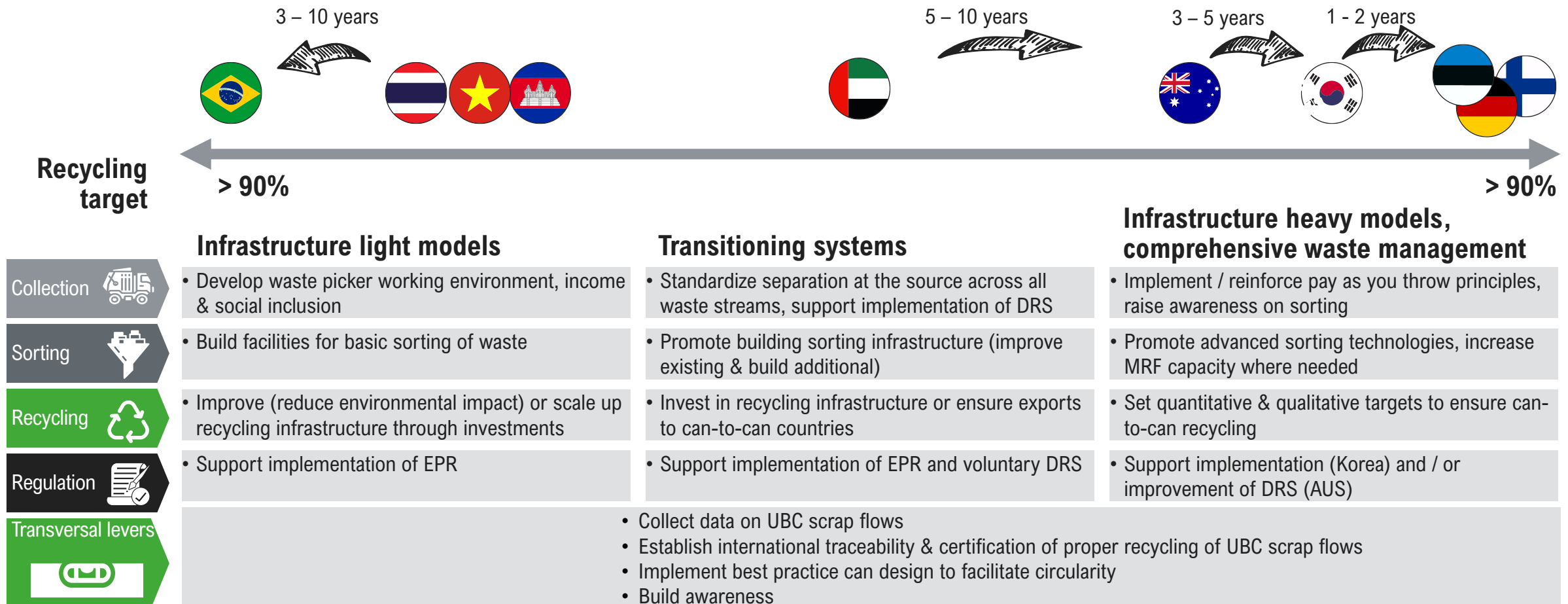


Collection 	<ul style="list-style-type: none"> Widespread separation at the source (with room for standardization / improvement) Deposit return schemes in place in most mature countries
Sorting 	<ul style="list-style-type: none"> Established sorting infrastructure (with room for further streamlining / automation)
Recycling 	<ul style="list-style-type: none"> Well established quantitative targets; sufficient access to nearby can-to-can recycling facilities
Regulation 	<ul style="list-style-type: none"> Well established EPR, with significant transparency on system performance and EPR fees reflecting the real cost of collection-sorting-recycling

Collection 	<ul style="list-style-type: none"> High population awareness Waste picker networks that benefit from the secondary value of aluminium cans
Sorting 	<ul style="list-style-type: none"> Well developed network of "junkshops" to collect & process cans across the country
Recycling 	<ul style="list-style-type: none"> Well established recycling infrastructure across all regions of the country
Regulation 	<ul style="list-style-type: none"> Established voluntary EPR

To reach 90 % recycling rate and beyond, countries can follow one of the two models – South Korea already reports high recycling rates & aims to maximize C2C recycling

Relevant alu can recycling targets per country



Driving forward all 14 levers will be key for success – to focus efforts, at the short term, the industry can focus on below 4 levers

Short term action plan



# Lever	Aluminium industry action	Ease of implementation	Impact	Key benefits	Rationale
1	<p>Increase awareness/ education & enforcement of the population - households/ business</p> <ul style="list-style-type: none"> Develop and promote educational resources that help the broader public understand the importance of UBC recycling Design and launch advertising campaigns (led by the industry or supported by a wider consortium of value chain players) 	low high	low high		<ul style="list-style-type: none"> Awareness campaigns can be launched at short notice and reach a large audience – they contribute to making impact at scale
2	<p>Improve waste pickers conditions (working environment // income// social inclusion)</p> <ul style="list-style-type: none"> Take direct action to increase awareness around waste pickers, improve transparency or provide waste pickers with digital tools Engage with NGOs to directly positively impact waste pickers' daily lives (e.g. provide tools & safety equipment) Advocate for waste picker's interests with policy makers 	low high	low high		<ul style="list-style-type: none"> Waste pickers play a key role in recycling of cans consumed in row houses Improving their working conditions is expected to improve recycling outcomes
7	<p>Expand the reach of innovative collection mechanisms</p> <ul style="list-style-type: none"> Support initiatives that propose innovative solutions for UBC collection Launch ideation initiatives (e.g. "hackathon") 	low high	low high		<ul style="list-style-type: none"> Proposing new collection practices, digital and with gamification, can contribute to additional stream of clean UBC
10	<p>Support a global trading platform for waste to facilitate trading and enhance traceability</p> <ul style="list-style-type: none"> Partner with relevant stakeholders to create an international UBC scrap trading platform that increases transparency 	low high	low high		<ul style="list-style-type: none"> Many countries depend on exports to reach high levels of can-to-can recycling – establishing transparent flows is key to secure feedstock for Korean C2C facilities



Recovery rate



Quality of recovery



ESG impact



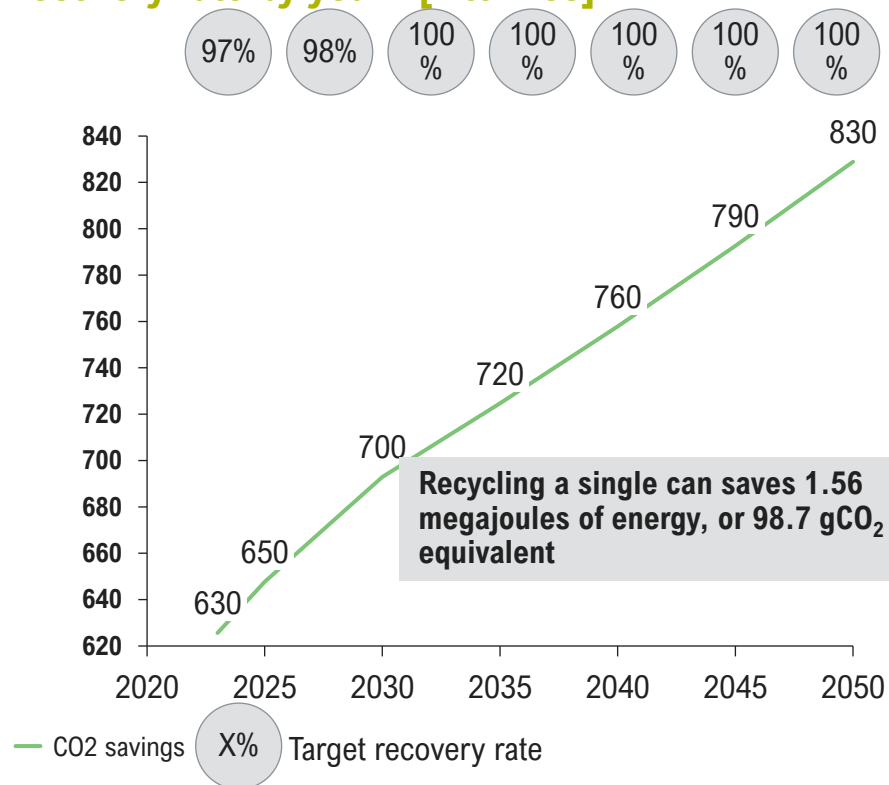
Cost impact in the value chain

Thanks to high recovery rate, can recycling enables significant avoided CO₂-emissions – in the future avoided emissions grow mainly from increased can consumption

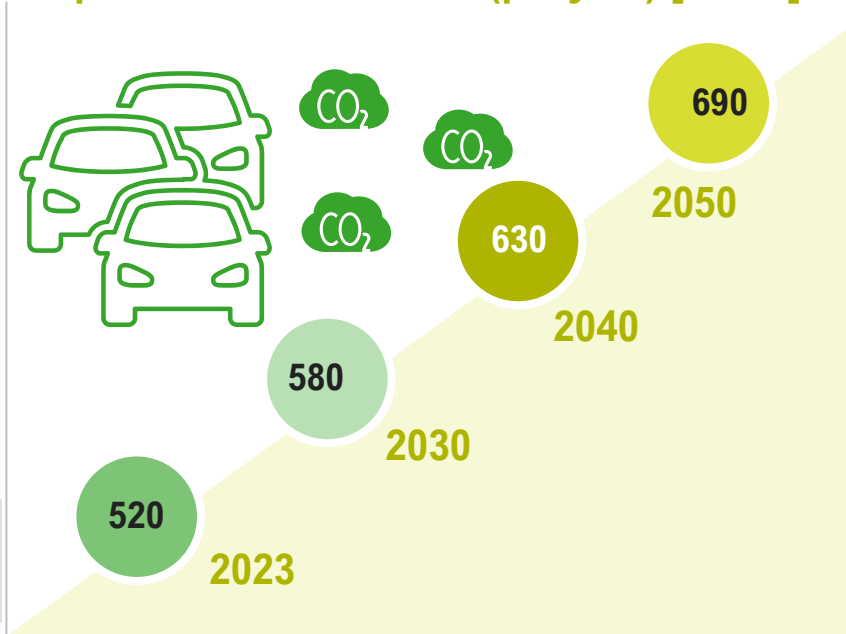
Environmental impact, CO₂e reduction derived from simulated collection rates



Annual CO₂e emissions reductions versus target recovery rate by year¹⁾ [k tonnes]



Equivalent car emissions (per year) [k cars]



Methodology:

- EEA car emissions 2020: 108 g CO₂e/ km
- Estimated vehicle-km/ year: 11,300 km
- Vehicle emissions/ year: 1.2 tons CO₂e



Key Takeaways

- As such it is estimated that, at its current recovery rate, Korea already saves around **630 kilo tonnes of CO₂** as a result of ongoing collection & recycling efforts, which is the equivalent of removing **~520,000 cars** from the roads
- Considering expected growth in put-on-market volumes and achieving ~100% recovery rate by 2030, around **~700 kilo tonnes of CO₂** can be saved, equivalent to the emissions of **~580,000 cars**
- By 2050, **830 kilo tonnes of CO₂** would be saved if ~100% of expected volumes is recovered, corresponding to the equivalent of **~690,000 cars**

1) Considering current and expected put on market volumes as presented in Phase 1 of the project; assuming continuous growth of put on market volumes of 0.9% per year after 2030



3. Improvement levers



3.1. Generation

The action of citizens and waste pickers is essential to improving recovery rates; proper awareness and education are needed to improve their participation

Lever – Awareness and education



Objectives

- Make the general population more aware about the importance of aluminium can recycling and the pivotal role each individual plays in recycling
- Increased awareness brings the following expected benefits:
 - Increase separation at the source, both via DRS/CDS and municipal collection
 - Reduce sorting mistakes in the population
 - Assuring that waste pickers acknowledge the value of aluminium cans and prioritize their collection accordingly



Recommendations for aluminium industry

- The aluminium industry can develop and promote educational resources and tools, such as "alucycle", that help people understand the importance of recycling and how to do it properly
- The aluminium industry can design and launch advertising campaigns to deliver the message on the importance of recycling
- As awareness is a continuous effort, it would be relevant to plan a yearly awareness campaign with the relevant target audiences



Country specifics



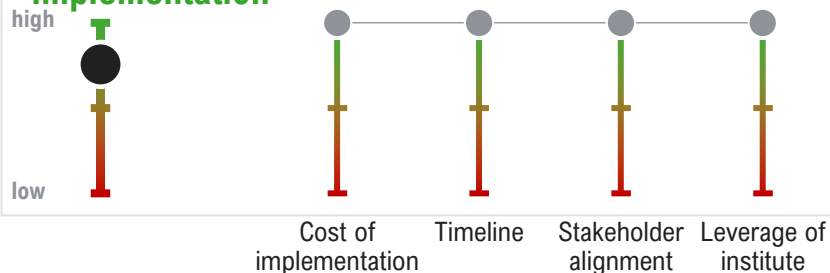
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 • Aluminium UBCs source separation highly depends on the action of citizens; therefore, awareness creation should be targeted towards citizens understanding the importance of recycling
- 

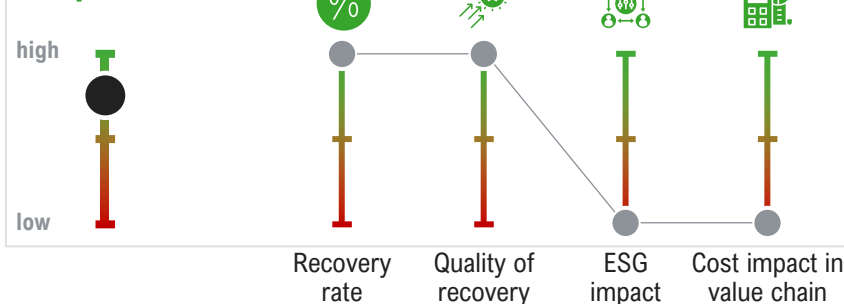


 • Aluminium UBCs are collected by waste pickers, who are mostly aware of the value of aluminium cans
- Awareness creation should be targeted towards the proper collection by waste pickers

Ease of implementation



Impact



The industry can leverage previous awareness campaigns to create awareness about separation at the source and the value of aluminium cans

Lever – Awareness and education



Next steps



- Define the objective to convey with the campaign:
 - Sustainability of aluminium beverage cans if properly recycled
 - Ways of improving aluminium beverage can recycling
 - Aluminium beverage cans are the most valuable recyclable
- Define the target audience:
 - Policy makers
 - Brand owners
 - Broader public
- Develop the material and engage with key stakeholders
- Launch the campaign and monitor the results
- Organize repeat campaigns

	2023		2024				2025				2026				2027	
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
Campaign design																
Define the objective	■															
Define the target audience		■														
Campaign creation																
Develop the messaging and materials		■														
Engage with key stakeholders																
Campaign launch																
Launch campaign		■														
Launch repeat campaign																
Prepare campaign			■				■				■					
Deliver campaign				■				■				■				
Measure results					■				■				■			

Key stakeholders

Brand owners (soft drink manufacturers, beer producers, etc.)

Policy makers

Can manufacturers

Waste pickers

Public institutions such as schools, businesses, community groups

Awareness and education on waste separation and recycling is essential for long term results

Separate collection at source in EU



Key pillars of communication and education

Communication campaigns on main-stream media (TV, radio, online) financed by:

- Government
- Municipalities
- PROs
- Waste collector

Clear disposal guidelines: digital & print

Organization/ financing of events:

- Music, sport events, city event
- School events
- Clean-up campaigns etc.

Education:

- Campaigns in schools, pre-school etc.
- Embedding topic in school curricula (class)
- Academic path/ career on circular economy (universities)

Enforcement

Positive incentives

- Pay-as-you-throw principle (paying only per weight of the residual stream)
- Competition, discounts for waste generators
- Gamification (digital) to track waste journey after disposal
- Etc.

Punitive measures

- Waste management/ collection as a stand-alone utility (bill), with unsubsidized pricing
- Penalties for waste generators (HH and businesses) for not respecting disposal guidelines, littering, collection infrastructure damage/ lack etc.
- Strict enforcement/ control

Key take-aways

- Awareness and education have **the highest marginal impact** on recycling rates increase beyond 50% and littering reduction (up to 70%)
- Complex process with long-term results needing **good collaboration and alignment of all stakeholders:**
 - PRO
 - Municipalities
 - Brand owners
 - Waste collectors
- Additional **challenge in countries with high amount of tourism** – communication needs to reach tourists as well



3.2. Collection

To increase collection rates and quality in SE Asia it will be key to leverage the informal sector infrastructure

Lever – Waste pickers conditions



Objectives

- Improve the lives & working conditions of waste pickers to ensure the role of waste picker remains attractive & thus attracts sufficient workers to maintain high collection rates
- Ensuring these people are able to work in safe & secure circumstances while having the right tools to perform their tasks



Recommendations for aluminium industry

- **The aluminium industry can take direct action:**
A few waste picker's problems can be addressed through direct action by alu industry (4 actions)
- **The aluminium industry can engage with NGOs:**
Tangible improvements to impact waste pickers' lives can be realized through the local networks of key NGOs (e.g. providing tools) (9 actions)
- **The aluminium industry can influence the government:** alu industry can advocate for waste picker's interests with policy makers (2 actions)



A comprehensive list of waste picker specific levers is provided further in the subsequent pages



Country specifics



- In Thailand the focus is on further raising awareness around the importance of waste pickers and further rolling out innovative solutions

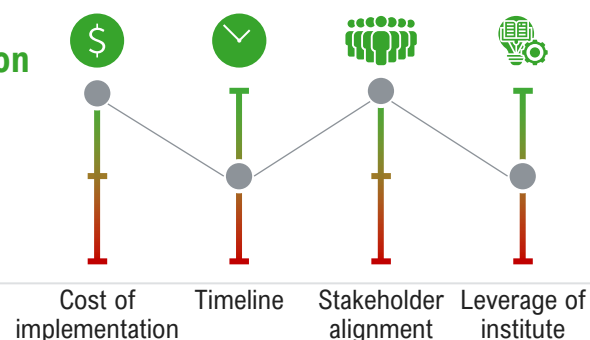


- In Vietnam and Cambodia, the focus should lie on awareness campaigns to increase household separation, support mGreen and Grac in Vietnam, and partner with NGOs to establish a support hotline, and pilot price transparency initiatives

Ease of implementation

high

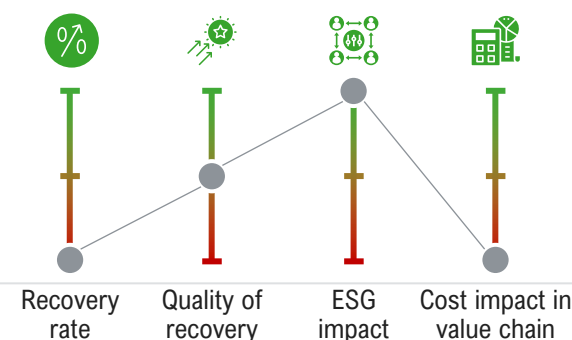
low



Impact

high

low



We suggest piloting and launching the prioritized initiatives to improve waste picker's income and productivity, working environment, and social inclusion

Lever – Waste pickers conditions



Next steps



• Directly take action

- Design a price transparency pilot programs with the input of stakeholders, and with the support of NGOs and local authorities
- Launch an awareness campaign to increase separate collection at source
- Support local collection innovative solutions such as Gepp and mGreen
- Launch a 24/7 support hotline, and pilot price transparency initiatives

• Take action through local NGOs:

- Engage with local NGOs and set up partnerships
- Roll-out concrete solutions for waste-pickers

• Engage with policy makers to lobby for policy initiatives

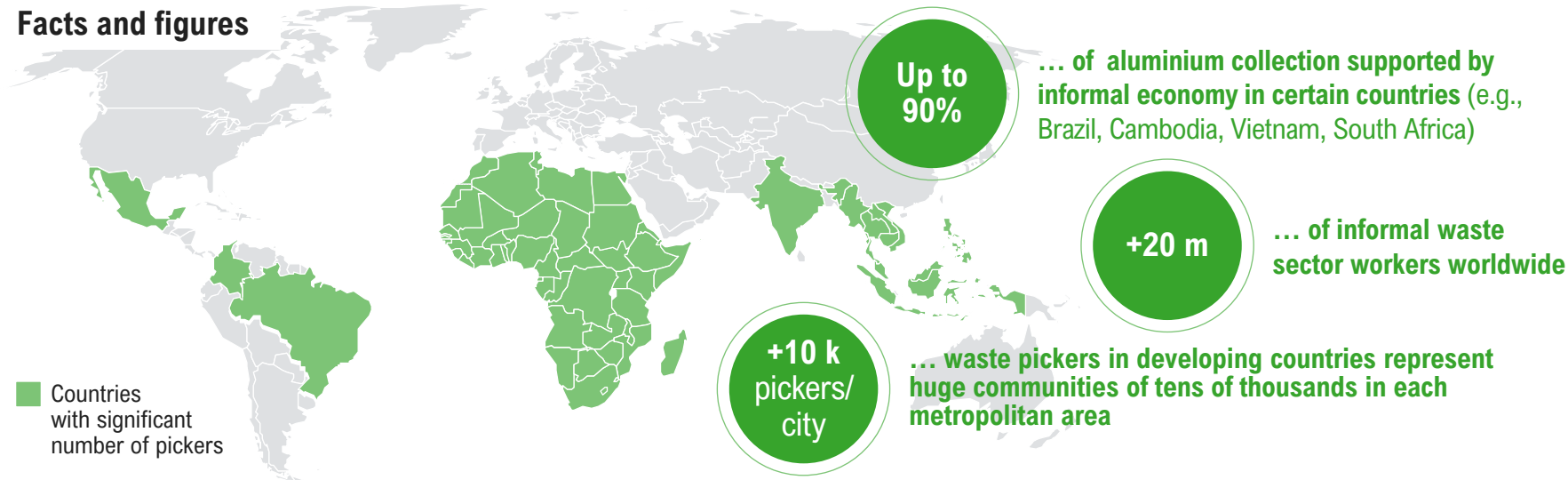
	2023		2024				2025				2026				Stakeholders ¹⁾
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
Engage with stakeholders	<div></div>														Global Alliance of Waste Pickers
A – Direct actions (4 actions) Full list of levers included in the subsequent pages															Community Sanitation & Recycling Org. (NGO Cambodia)
• I – Transparent price pilot			<div></div>												Cambodian Education and Waste Mgmt. Org. (NGO)
• II – Awareness campaign			<div></div>												FSCC (Thailand)
• III - Support of local collection innov. solutions			<div></div>												Community Committee of Baan Donyong (Thailand)
• IV - Launch support line			<div></div>												United Nations Development Program
Take action through local NGOs (9 actions) Full list of levers included in the subsequent pages															
• Establish partnerships with local NGO	<div></div>														
• Roll-out identified solutions			<div></div>												
Engage with policy makers (2 actions) Full list of levers included in the subsequent pages															
			<div></div>												

1) Non-exhaustive

The informal sector plays a key role in waste management around the world; more than 20 m waste pickers contribute to the underdeveloped waste m. systems

Waste pickers/ reclaimers, global overview and description – general information

Facts and figures



Activity description

- Street picking or landfill picking (where disposal sites are not controlled) of valuable waste material – sold by pickers to collection firms (small and large) to ensure a living income
 - Aluminium cans are the highest value recyclable and are a significant share of waste picker's income; UBCs are rarely littered and have high collection rates compared to other recyclables
- Working in unhygienic (odor, toxicity), polluted, dangerous (glass), and unsafe contexts (high crime rates)
- Sector is currently gaining a voice and benefits from more visible representation through organizations such as the International Alliance of Waste Pickers, WIEGO etc.

Key reclaimers contribution to waste mgmt. systems



- High level of productivity (+25% higher volumes collected per year vs. formalized collectors/employees)
- Street pickers typically collect better quality material (less contaminated than material collected single stream municipal collection and sorted out)
- Represent an important stabilizing factor in challenged communities with high level of criminality, unemployment etc.

Waste pickers need to be fairly remunerated, socially included and well-equipped to achieve higher collection rates on better quality cans

Key policy success factors for the waste picker sector

Success factors

- Fair remuneration – support in relationship with off-takers and other key stakeholders (e.g., authorities)
- Registration to ensure basic rights
- Empowerment and participative governance (with NGO support)
- Public recognition, respect and social inclusion
- Development of skills and motivation
- Financing assets and equipment



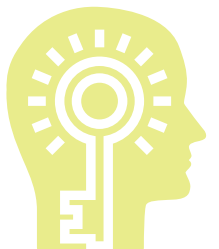
...instead of...

- Income support (on a monthly basis or as subsidy per volume collected)
- Marginalization, humiliation
- Formalization/ integration into formal sector
- Lack of development in their waste knowledge
- Fully manual inefficient work
- Dependency on junk shops



Rationale

- Frequently paid below their fair contribution to the sector
- General challenged societal background (poor living conditions, unemployment & health issues)
- Reluctance and lack of trust of pickers to work as employees in a controlled, rule-based environment
- Resilience and perseverance in a very challenging work environment
- Waste pickers highly depend on the equipment provided by junk shops
- Low efficiency when manually sorting cans out of general municipal solid waste



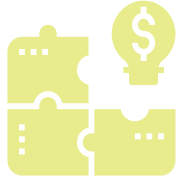
India and Mexico are progressing towards integrating the informal sector in their waste management systems

Challenges faced by waste pickers



Challenges of waste pickers

- Frequently without formal **income and social protection**
- At times, lacking alternatives, pickers are forced to collect materials from **landfills, in unsafe and unhealthy conditions**
- Unfavorable **public perception**



Principles for integration

- Integrating the informal sector into **organized systems of collection** shifting pickers to HH collection from landfill picking
- Ensuring picker productivity through **financial support**, as well as **operational support** on route optimization, digital best practices and improved means for picking (e.g., collection equipment)
- **Improving the working environment** of waste pickers, with focus on safety and health
- **Social inclusion programs** for the families of waste pickers (e.g., education for children)



Examples

India

- Waste pickers organized in **cooperatives** to provide front-end waste mgmt. services
- **Incentives** such as vocational training programs for women
- **Subsidies** offered to collectors in support of rag pickers

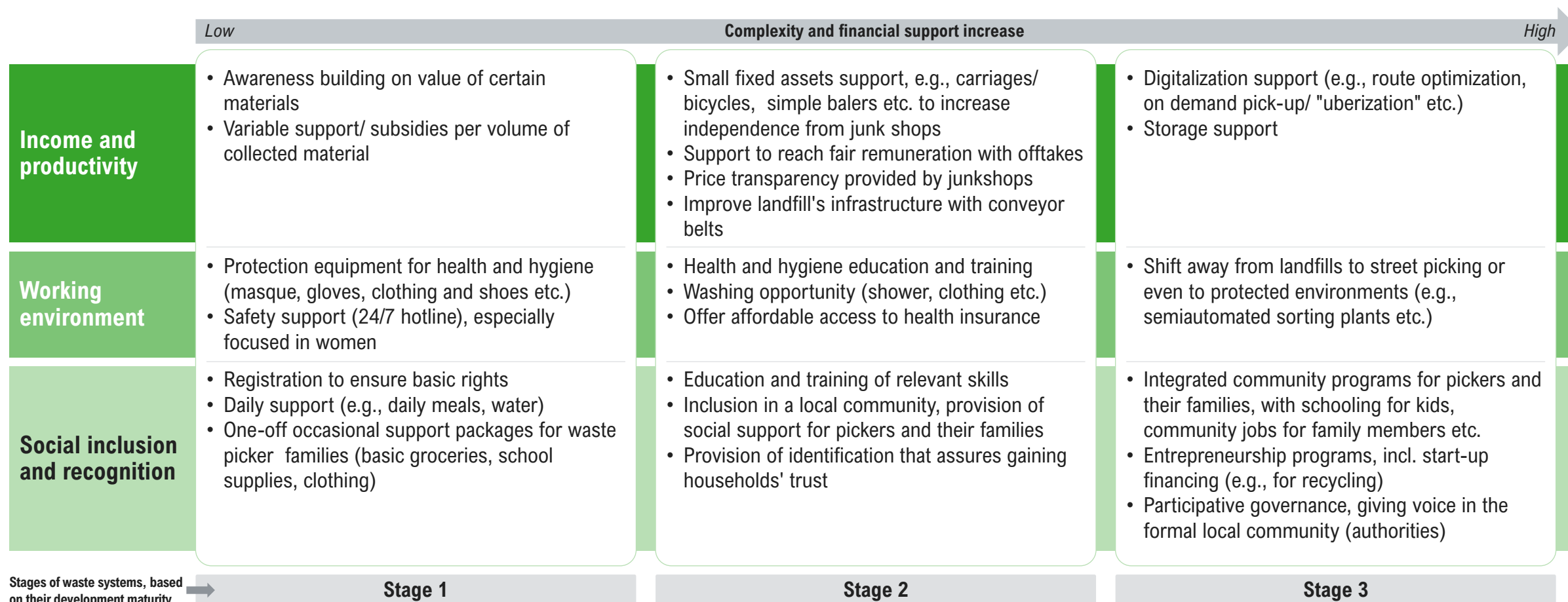
Mexico

- Helping pickers switch to a **formal, legal system** of work
- Organizing pickers and offering **incentives**



The support provided to pickers has to address dimensions related to income, working conditions and social inclusion – levers differ by system maturity

Key dimensions of waste picker support levers along relevant system maturity stages



Existing local good practices must be leveraged; Wongpanit utilizes franchise system and daily price list to aggregate more high-quality waste

Informal recyclable aggregation in Thailand

Informal aggregation system

Junk shops

Small, independent recyclable buyers, typical from waste pickers and households

Mostly small player; highly fragmented

Aggregator

Large-scale buyers aggregate the aluminium can scrap from waste pickers and junk shops before selling to recyclers



- Private entities / companies are the main parties in purchasing collected recyclables such as aluminium can scrap from waste pickers, households, and businesses
- For UBC, each step of the aggregation value chain gains small THB 1 – 2 (~ USD 0.05) / KG margin; margin per KG is higher for larger batches

Case Study



Wongpanit is the leading recyclables aggregator in Thailand with more than 2,000 branches throughout Thailand

Franchise system



- Wongpanit allows junk shops / investors to use its brand and franchise system **free of charge**
- Franchisees must follow **strict initial requirements and training** to ensure the branch success, i.e.,
 - Proposed location survey to ensure strong potential
 - Business and investment plan review
 - Close monitoring for first 3 months
- Franchisees are free to sell its collected recyclables to anyone, not bound to only Wongpanit

Daily pricing announcement

The middle price to buy garbage today

Wednesday, April 5, 2566

can	5.50	▼ 0.20
1 inch rebar (length 120 m. or more)	10.00	
No.4 Cast Iron Crank Mount Machine	6.90	
No.3 Large cast iron pieces (over 500-1500 kg)	6.10	
No.2 Large cast iron pieces (up to 500 kg)	7.30	

- Wongpanit **announce its buying price everyday** as well as its historical price list, promoting pricing transparency within the market
- This price list is **applicable to any sellers** who wishes to trade with Wongpanit

The aluminium industry can take several actions to improve the lives of waste pickers and recycling rates

A – Aluminium industry direct actions overview

Problem	Policy recommendation	Impact	Feasibility
I <ul style="list-style-type: none"> Lack of awareness on the value of aluminium cans in urban affluent areas 	<ul style="list-style-type: none"> Organize campaigns to raise awareness on the value of cans 		
II <ul style="list-style-type: none"> Lack of transparency from bigger junk shops towards smaller junk shops and waste pickers, sometimes leading to unfair prices 	<ul style="list-style-type: none"> Establish and support transparent pricing platforms that are easily accessible to waste pickers (e.g., displaying prices in the shops, updates via SMS, smartphone applications) 		
III <ul style="list-style-type: none"> Waste pickers routes are not updated on a day-to-day basis, and they yield different results every day 	<ul style="list-style-type: none"> Support the development of innovative solutions that allow businesses and households to ask for their waste to be picked such as Gepp, mGreen, and Grac 		
IV <ul style="list-style-type: none"> Few innovative private players that can trigger changes and improvements in the system 	<ul style="list-style-type: none"> Support, search for, encourage, and finance innovative solutions such as start-ups that will develop solutions to encourage sorting & collection 		

The aluminium industry can contact and work with NGOs to implement policies that require direct contact with the waste pickers

B – Actions through NGOs

Problem	Policy recommendation	Impact	Feasibility
I • Unavailability to sell the cans to different junk shops from the ones that lend the karts and equipment, junk shops exercise significant power over pickers	• Support a public free lending service of carts or other tools		
II • Lack of storage in the kart may force waste pickers to return earlier and follow more inefficient routes	• Support a public free lending baling portable machine , such as Zing or Pittsburgh Can Crusher		
III • Absence of protection equipment , leading to unhealthy working conditions	• Support and subsidize protection equipment such as masks and gloves		
IV • Waste pickers are often harassed (especially women) during night shift and when alone	• Establish and support a 24/7 safety support hotline		
V • Lack of HSE awareness from pickers, leading to not wearing the safety equipment even when available	• Provide health and hygiene education • Support the launch of awareness campaigns advocating for the use of equipment		
VI • Lack of access to sanitary washing facilities in their homes	• Support the installation of public showers in strategic locations such as landfills		
VII • Few and little significance waste picker associations that can represent the informal sector	• Support creation of waste picker associations , and promote and engage with the existing ones		
VIII • Absence of training of relevant skills , not allowing the workforce and the system to evolve	• Provide and support training of relevant skills • Design waste management training plans to cover mid-management positions		
IX • Waste pickers can't sometimes afford daily meals and groceries for their families	• Provide meals and water in junk shops and landfills and one-off occasional support		

The aluminium industry can support the Government and lobby for policies that can improve the lives and efficiency of formal workers

C – Alu industry next steps with the Government

Problem

Policy recommendation

Impact

Feasibility

I

- **Unsanitary HSE** conditions on landfills no matter how protected workers are

- Support the **creation of semiautomated sorting plants and transfer stations**
- Support the **installation of conveyor belts** in landfills and transfer stations



II

- **Lack of waste picker registers**, making it difficult to develop policies and solutions

- Lobby and support the creation of a **registration system for waste pickers**



Relevant solution



Existing solution to be improved



High impact/feasibility



Low impact/feasibility

Implementing a 2-fraction collection system across all streams in Korea would increase recovery rates for all recyclables and better utilize MRFs

Lever – Advocate for 2-fraction collection system



Objectives

- Deploy multi-stream collection in a standardized way across the UAE and South Korea
- Improve the MRF sorting capacity by:
 - Increasing the aluminium can content in the MRF feedstock (in the UAE only 0.1% out of the total MRF feedstock, and 1% out of the 12% recyclables sorted)
 - Feeding the MRF only valuable materials
- Reduce can contamination by organic waste



Recommended for aluminium industry

- Advocate for the widespread adoption of dual-stream collection across different waste streams (rural & urban households, HoReCa, shopping malls, etc.)
- Advocate for the establishment of source separation stream gradually in a phased approach, starting with hot spots of UBC consumption (HoReCa, night clubs, etc.), gradually expanding to urban & ultimately rural households
- Advocate for and get involved with pilot projects (e.g. provide expertise, resources, etc.) engaging with collection companies who are the waste owners



Country specifics

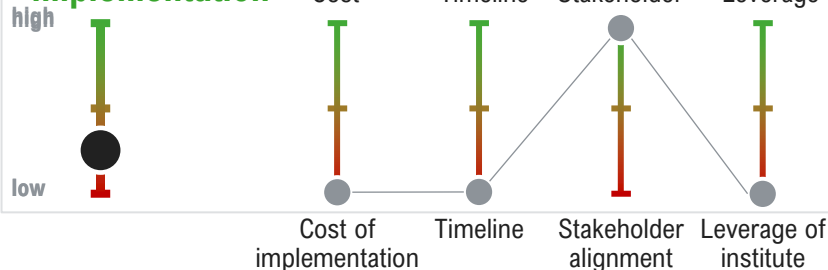


- Advocate for strategic multi-stream collection pilots partnering with waste owners
- Target B2B and big consumption centers in the first phase (i.e., malls, hotels, etc.)
- Leverage knowledge acquired from pilots and from other countries to support in the roll-out of multi-stream collection nationwide

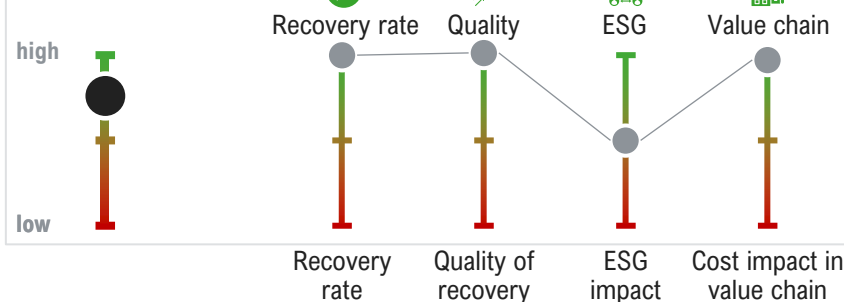


- Leverage knowledge acquired from the rest of the system to support in and advocate for the roll-out of multi-stream collection in row houses

Ease of implementation



Impact



A 4-phase plan would allow to deploy a two-fraction collection system; initial focus should be on waste generation hot spots

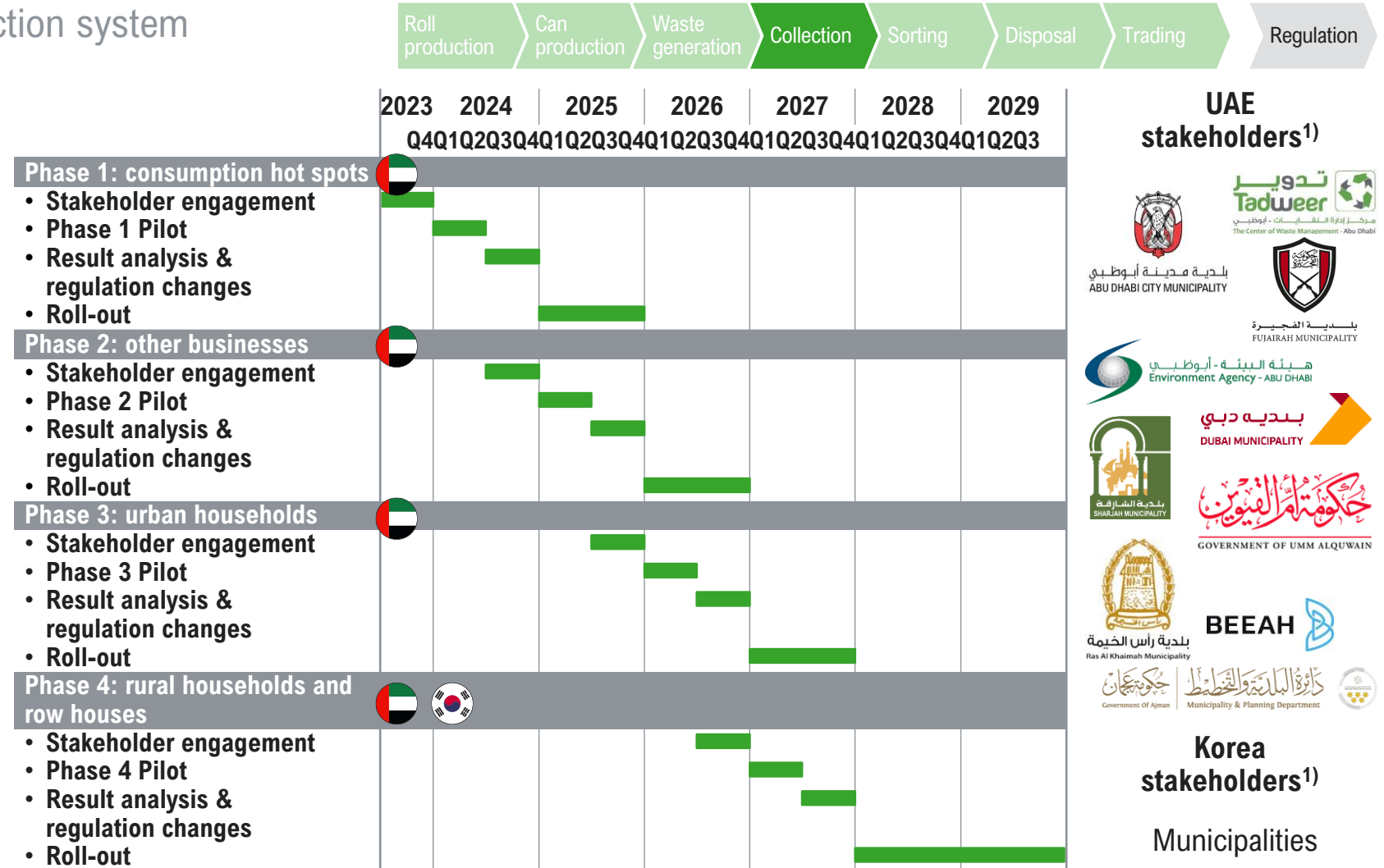
Lever – Advocate for 2-fraction collection system

Next steps

- Advocate for a phased roll-out of source separation starting with hot spots of UBC consumption, gradually expanding to other businesses and ultimately urban & rural households
- For each phase:
 - Engage with brand owners and other packaging associations to align on the steps to take, joint pilots, and roll-out
 - Design and execute pilot projects
 - Engage with policy makers to lobby for policy initiatives when required
 - Engage with policy makers to scale-up the pilots and take part in the design phases of the system



1) Non-exhaustive



We propose the AI industry to advocate for and support the roll-out of increased source separation in the UAE in 4 phases; starting from waste generation hot spots

Action plan for separate collection

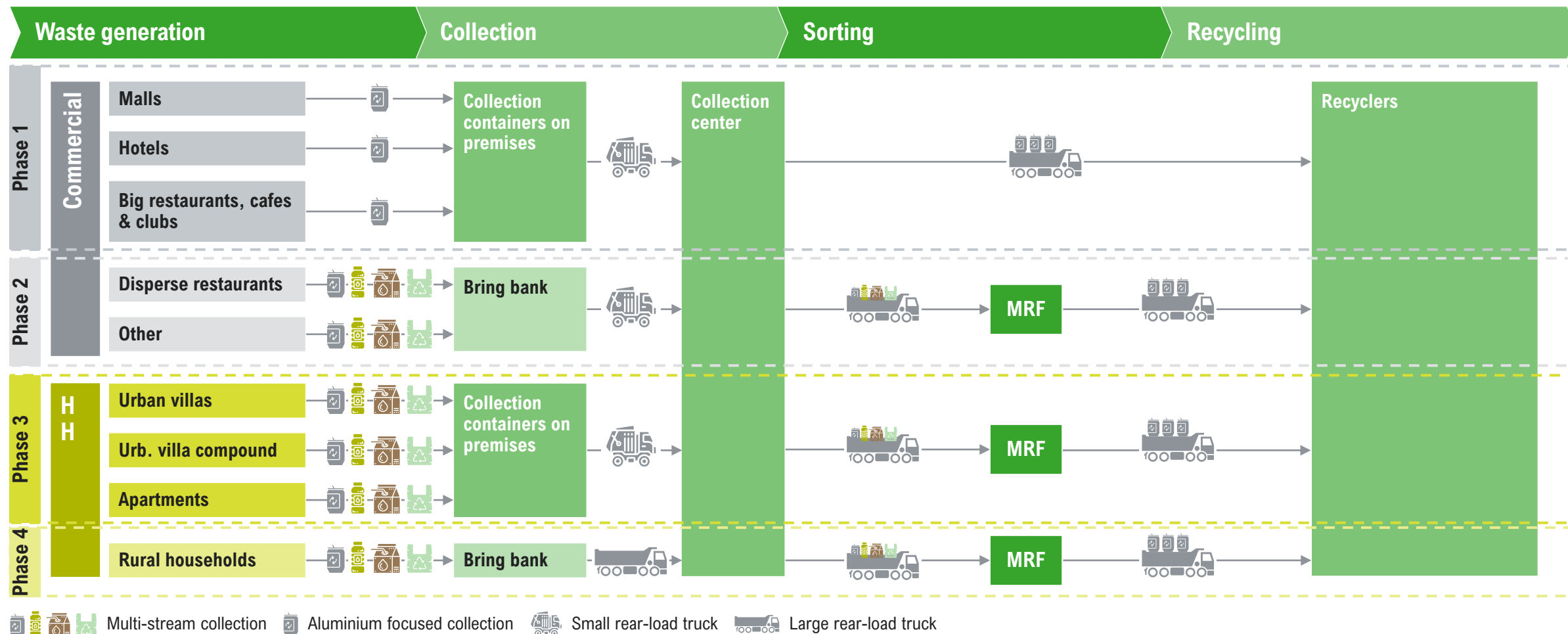


Phase	Definition	Stakeholder engagement	Estimated yrly. UBC volumes	% of total
Phase 1: hot spots of consumption	<ul style="list-style-type: none"> Target hotels, shopping malls, big restaurants and clubs 	<ul style="list-style-type: none"> Partner with hotel (e.g., Hilton), mall, restaurant, and club chains Partner with collection companies (e.g., Averda) 	1.7 ktonnes	22%
Phase 2: other businesses	<ul style="list-style-type: none"> Focus on smaller and disperse restaurants as well as business districts, both in rural and urban areas 	<ul style="list-style-type: none"> Advocate to policy-makers (e.g., Abu Dhabi City Municipality, Dubai Municipality) Partner with collection companies (e.g., Averda, Bee'ah) 	0.8 ktonnes	11%
Phase 3: urban households	<ul style="list-style-type: none"> Focus on urban villas (including villas in compounds) and apartments 	<ul style="list-style-type: none"> Partner with and advocate to collection companies Advocate to policy makers and compound operators 	4.4 ktonnes	58%
Phase 4: rural households	<ul style="list-style-type: none"> Target rural households 	<ul style="list-style-type: none"> Partner with collection companies Advocate to policy makers 	0.7 ktonnes	9%

Owned by waste collection companies

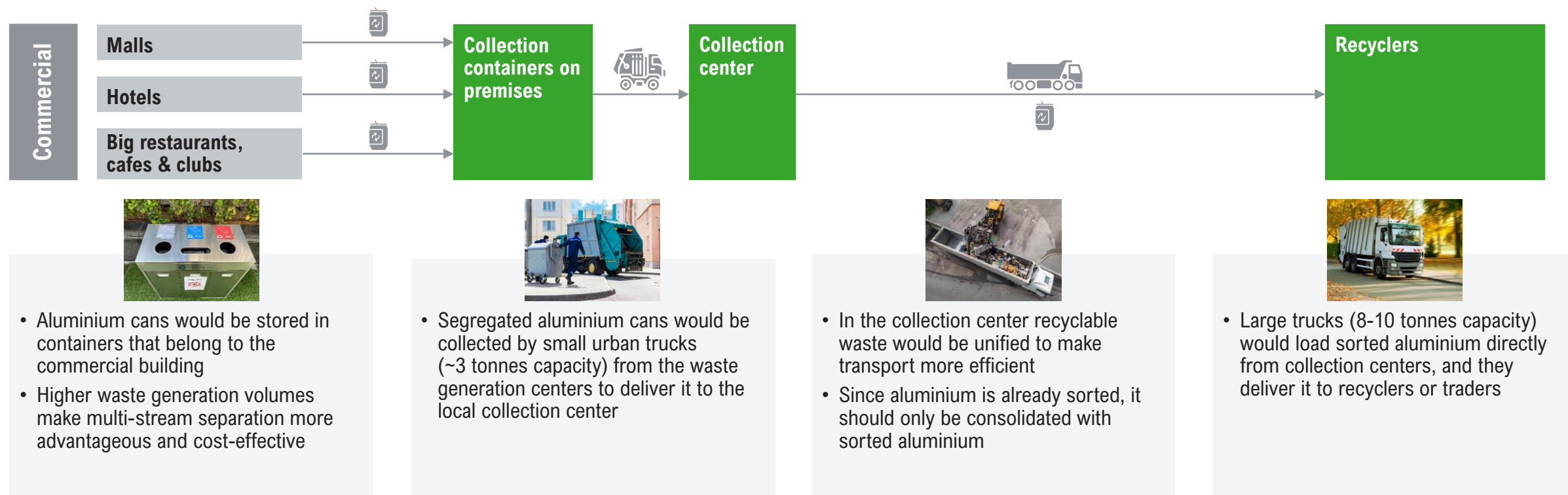
Establishing a two-fraction collection system requires changes across the value chain, from generation to recycling: a phased approach is recommended

Target two-fraction collection system overview



Phase 1 would target hotspots of UBC consumption, who produce UBC volumes that make multi-stream separation and collection advantageous and cost-effective

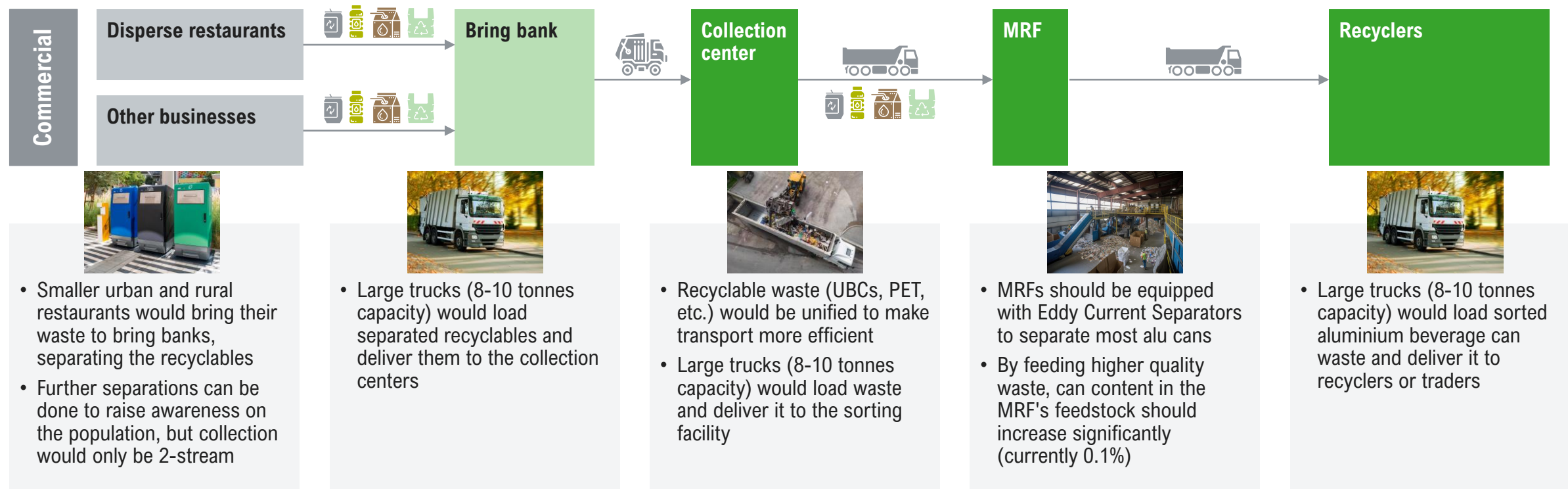
Phase 1: malls, hotels, and big waste generators



The aluminium industry can **advocate for a pilot which could be organized in a fairly short amount of time:** by including **a select number of hotels** (e.g., ~20), waste collection companies, and collection centers the well-functioning of the phase 1 collection system can be tested; the aluminium industry & other stakeholders can actively **get involved in the design & supervision of the pilot, data collection & processing of lessons-learnt**

Phase 2 focuses on smaller restaurants, for which multi-stream separation may not be cost-effective, so they would need drop their recyclables in nearby bring banks

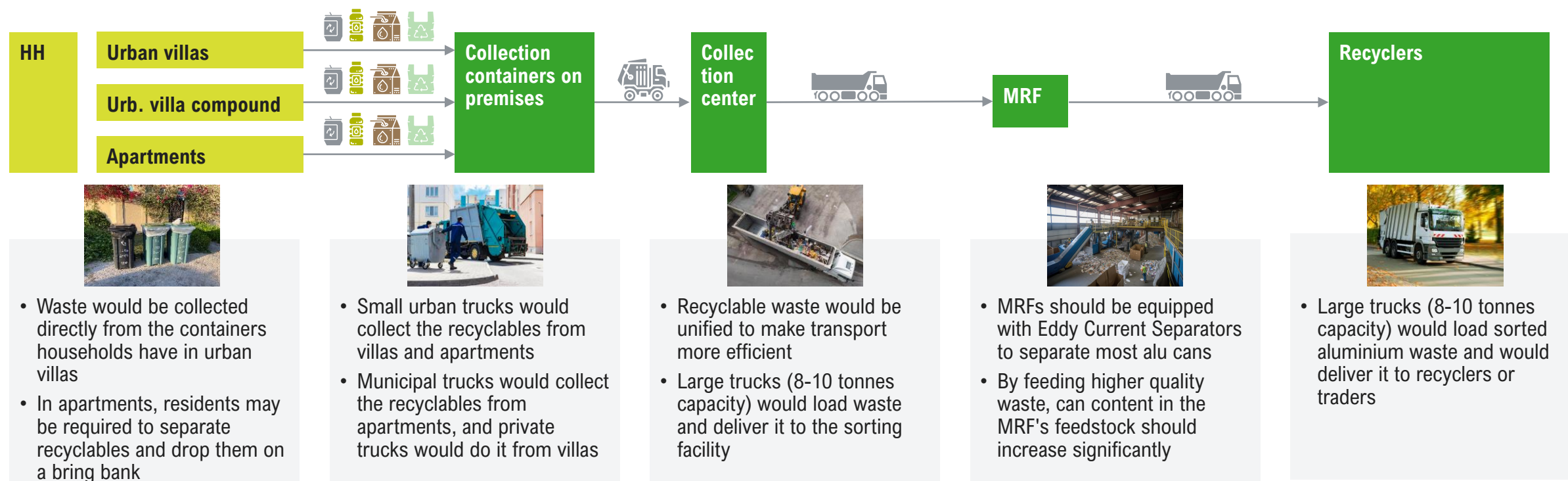
Phase 2: Other businesses



The aluminium industry can **advocate for a pilot which could be organized in a fairly short amount of time:** by including **a select number of urban restaurants** (e.g., ~5 clusters of restaurants), waste collection companies, collection centers, and MRFs; the aluminium industry & other stakeholders can actively **get involved in the design & supervision of the pilot, data collection & processing of lessons-learnt**

Villas and apartments in the main cities should separate their recyclables, which would be collected by small urban trucks, and consolidated in collection centers

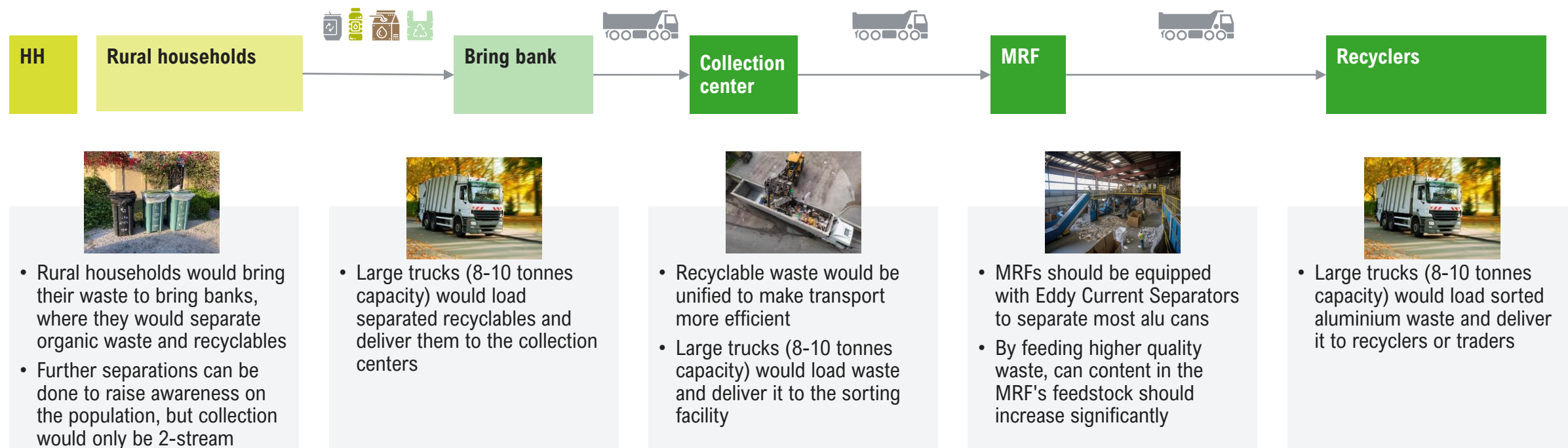
Phase 3: urban household



The aluminium industry can **advocate for the organization of a pilot** including **selected households from an urban compound** (e.g., Jumeirah Golf Estate), waste collection companies, collection centers, and MRFs; the aluminium industry & other stakeholders can actively **get involved in the design & supervision of the pilot, data collection & processing of lessons-learned**

Rural households would need to bring the waste to bring banks, from where large trucks would collect the recyclables and bring them to collection centers

Phase 4: rural households



The aluminium industry can **advocate for the establishment of a pilot in rural areas**: a successful pilot would reunite waste collection companies, collection centers, and MRFs; the aluminium industry & other stakeholders can actively **get involved in the design & supervision of the pilot, data collection & processing of lessons-learned**

Even in countries where separate collection is highly adopted in households, littering and one-stream collection are prevalent in public spaces

Lever – Pilot separate on-the-go collection system



Objectives

- Increase separate collection rates of recyclable waste generated in public places, in particular in places with high consumption
- Prevent littering that takes place due to the absence of convenient bins
- Increase awareness about recycling by displaying the bins and encouraging recycling in public spaces



Recommendations for aluminium industry

- Advocate to municipalities and policy-makers for the widespread adoption of separate on-the-go collection in public spaces
- The aluminium industry can act directly and kick-start the roll-out by actively executing / contributing to pilot projects in particular in well-defined contexts such as temporary events (concerts, festivals, etc.) or in well-defined places (e.g. airports, shopping malls, etc.)



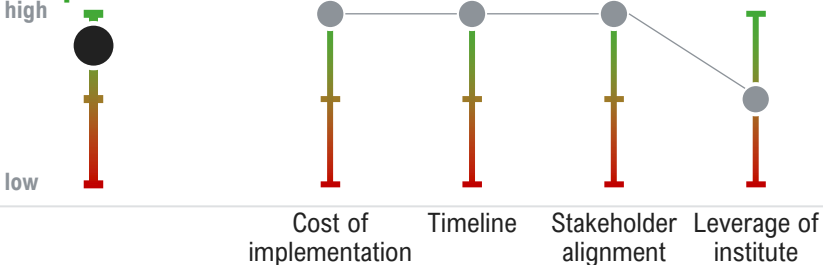
Country specifics



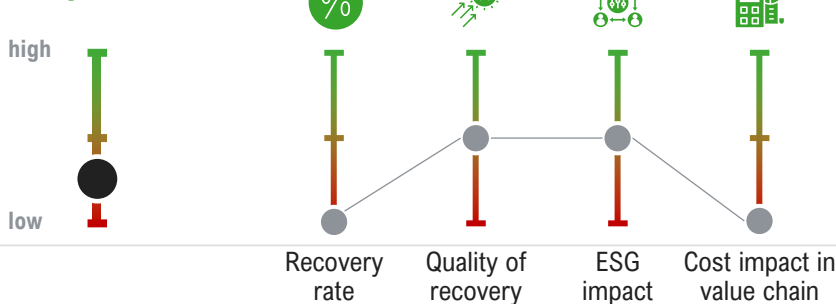
- In countries where a formal and comprehensive collection system is already in place, implementing separate on-the-go collection systems can aid in capturing the aluminium cans that are consumed outside of home environments and for which organizing comprehensive source separation is sometimes complex
- Some streams are not sorted at the source



Ease of implementation



Impact

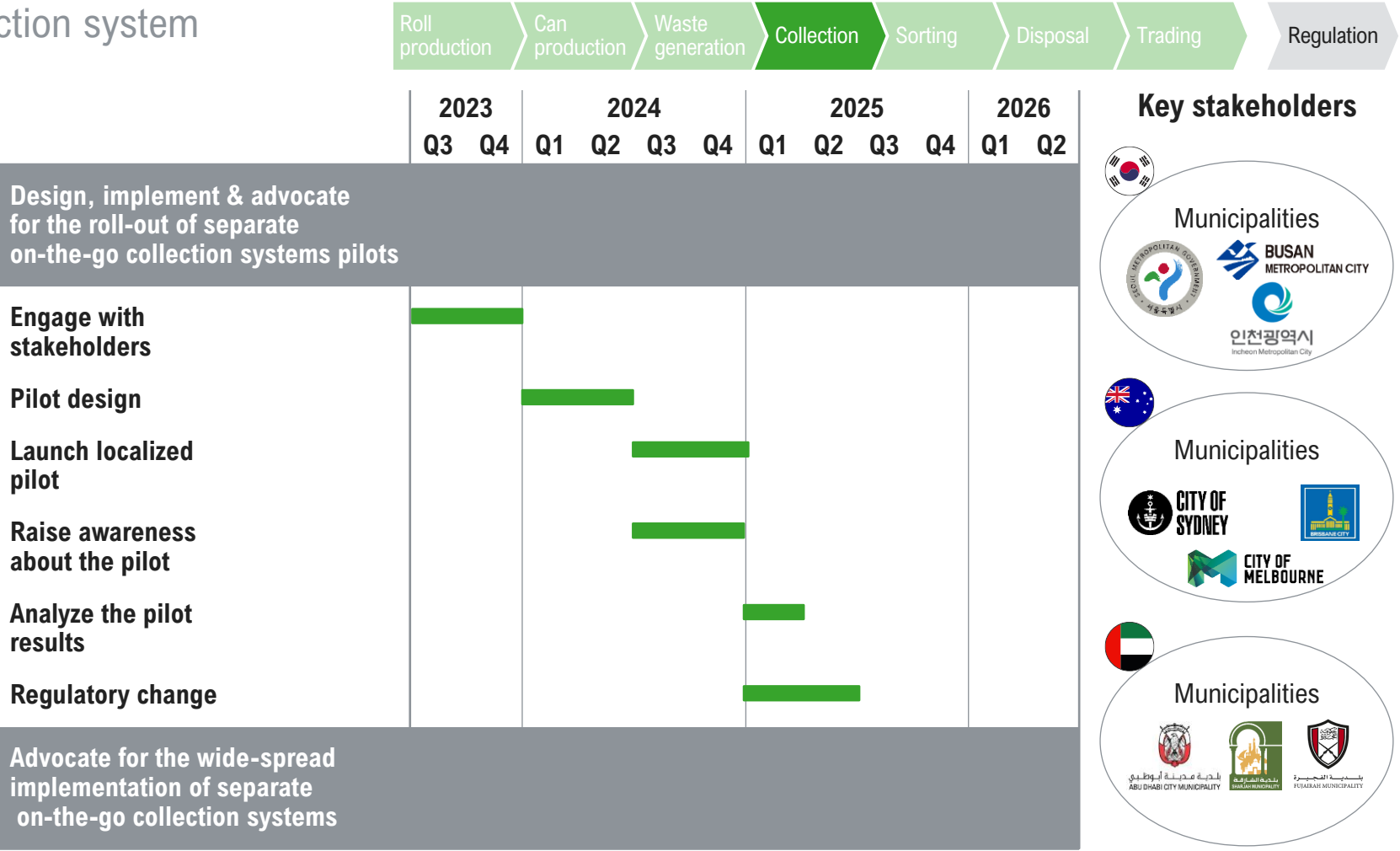


The industry can play a role in promoting the implementation of separate on-the-go collection systems by supporting the launch of localized pilot projects

Lever – Pilot separate on-the-go collection system

Next steps

- Set up relevant pilot projects and on-the-go collection systems in well-defined contexts:
 - Design the pilot defining the duration and the place, and engaging with other associations and brand owners
 - Launch the pilot and execute a targeted awareness campaign to promote its visibility and ensure that the local community is aware of its implementation
 - Analyze the pilot results and share them with local authorities to advocate for regulatory change and their engagement
- Advocate to municipalities and policy-makers for the widespread adoption of separate on-the-go collection in public spaces



We propose implementing a DRS in Korea to become the clean collection stream, improving the existing systems in Australia and analyzing the UAE context

Lever – DRS



Objectives

- A DRS (deposit return scheme) is putting a deposit value on eligible containers (including aluminium cans), redeemable at return points, typically in countries with a developed waste management infrastructure, also with a mature EPR
- It aims to establish a stream of clean and separately collected cans
- When implemented, it can increase recovery rates to high levels of >50%, and even >90% in ideal circumstances



Recommendations for aluminium industry

- The aluminium industry members support the implementation of DRS in countries with an appropriate EPR and a developed waste management system
- The industry advocates for the implementation of best practices and key success factors as observed in other countries such as:
 - High deposit values combined with a convenient return system
 - Industry led system with a separate operator & administrator
 - Inclusion of all container sizes
- To drive adoption, alu industry can **1/ bring together industry stakeholders & understanding best-in class systems, 2/ advocate for and support organization of pilot projects & 3/ support roll-out through policy maker engagement**



Country specifics



- Advocate for the implementation of a DRS to automate collection and strengthen the aluminium cans recovery rates
- Ensure alternative revenue streams for waste pickers

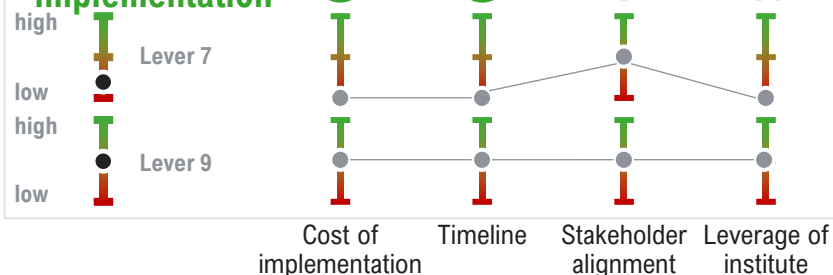


- Advocate for the increase in the current deposit value
- Increase the number and convenience of return points (especially in highly populated areas)

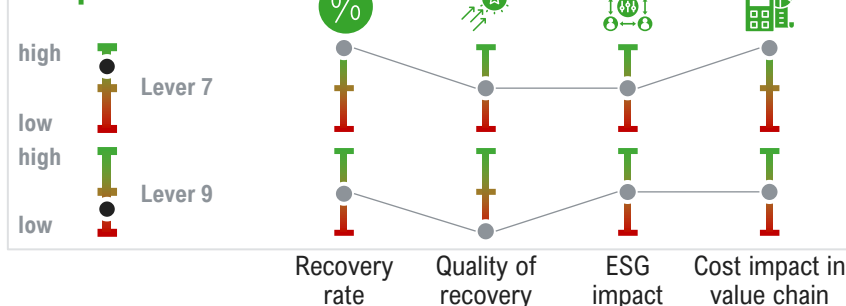


- Advocate for implementation of DRS in the next years, in parallel with an EPR and ensuring appropriate timing

Ease of implementation



Impact

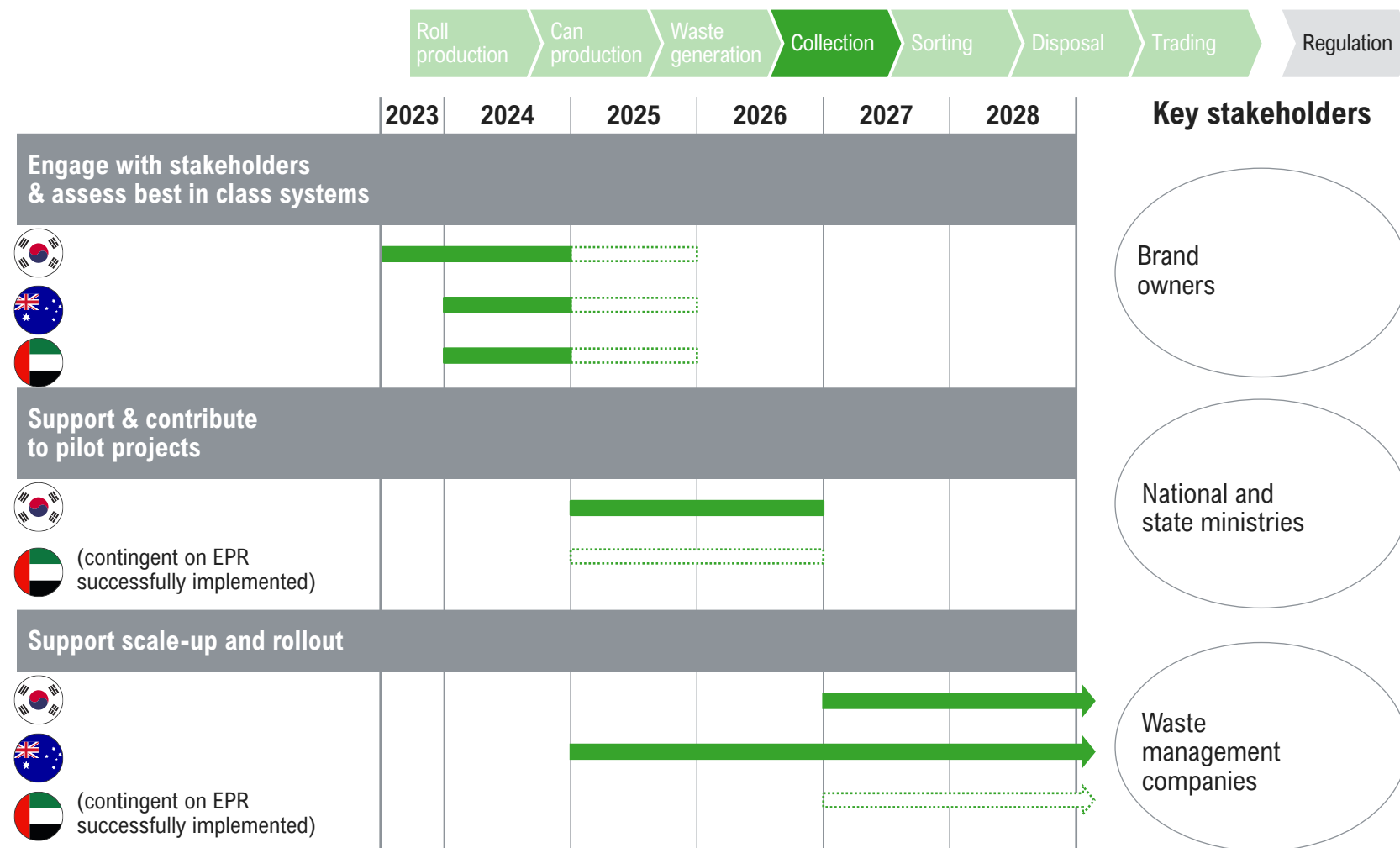


We suggest engaging with the relevant stakeholders and analyzing existing systems before initiating pilots and further deciding on scaling up

Lever – DRS

Next steps

- The AI industry can be a driving force by **engaging with stakeholders & assessing best in class systems**:
 - Initiate discussions with key stakeholders in the 3 countries where applicable (Korea, Australia and the UAE) to assess the feasibility
 - Assess the existing systems (e.g. in the EU, Australia, Canada) and other countries' case studies
- The industry supports the establishment of pilot programs and makes its expertise available to policy makers to understand and assess the impacts of the program
- Beyond pilot projects, the aluminium industry **engage with policy makers to support roll-out of a successful DRS**



While there is some structural variation in DRS systems across the globe, a set of key success factors can be identified

Key success factors

- 1

DRS Governance

 - DRS are usually **industry-led**, with a System Operator & Administrator intermediating the deposit flow and retaining material ownership
 - DRS are typically funded through **unredeemed deposits and material revenues**; resulting net costs covered by operator (funded by the industry)
- 2

Material type

 - **PET and aluminum cans are included in every DRS** system, thanks to a higher material value, coupled with lower logistics costs (e.g., relative to glass)
 - **Glass** typically included in the **systems to cover also alcoholic products** (beer, wine spirits, etc.)
 - Successful **inclusion of other packaging is generally seen in systems with manual** or mostly manual **redemption** (often in collection centers rather than in retail)
- 3

Product category

 - **Focus on non-alcoholic beverages and beer**, sometimes also spirits included; dairy products tend to be excluded from DRS as they pose issues related to odor, potential material contamination
 - Sometimes juice is also excluded to **avoid consumer confusion** regarding materials in the scheme
 - Most systems include some size restriction – generally between **0.1 and 3.0 L**
- 4

Take-back strategy













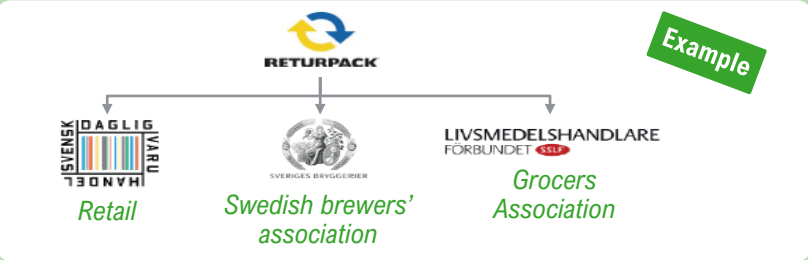


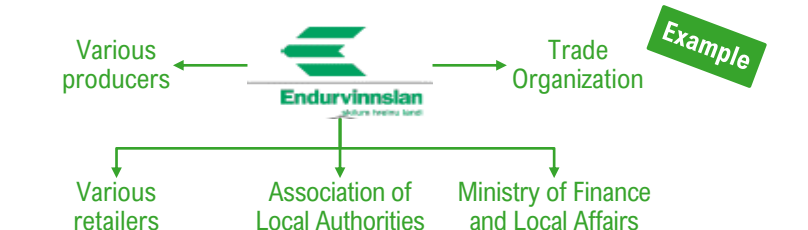
 - **Return-to-retail, return-to-collection center** and a mix of the two are all options seen in successful DRS systems
 - For return to retail, smaller stores are often exempt from the system or can opt for manual take-back instead of automatic (RVM); RVMs usually fit for super- and hypermarkets
 - While automated take-back is considered to be more efficient, **manual take-back is less expensive**
 - Network density in performant European system typically ~1-2 return points for 1,000 people
- 5

Deposit value

 - Deposits usually have a single, monetary value between EUR 0.05-0.25
 - Some DRS include deposits which vary depending on size and material, but this is generally regarded as confusing for consumers
 - Return rates are highly correlated with deposit value

Industry-owned system operator is the most frequent governance model – industry consensus and higher efficiency as differentiator

Options for DRS system governance models

Governance	Countries	Ownership structure	Key differentiators
1 State-owned SOA	 HR	 FOND ZA ZAŠTITU OKOLIŠA I ENERGETSKU UČINKOVITOST  Government of Croatia	<ul style="list-style-type: none"> Wide scope of state-owned fund (incl. packaging recovery systems, municipal waste mgmt.) may lead to cross-subsidization of waste management initiatives at country-level Direct influence over achievement of collection and recycling targets for one-way beverage containers
2 Industry-owned SOA	 DK ²⁾  DE  SE  CA  EE  FI  NO  LT  AU		<ul style="list-style-type: none"> Joint industry-level decision-making process – SOA control belonging to key stakeholder industry groups directly impacted by DRS Usually not-for-profit – incentive to reduce packaging recovery fees/ burden on producers depending on system results
3 State- & industry-owned SOA	 IS  NL ¹⁾		<ul style="list-style-type: none"> Platform to streamline consultation process on packaging waste between industry, central and local authorities Input to packaging waste legislation based on direct insight from DRS system

1) Members may include municipalities and/ or industry players

PET bottles and aluminum cans represent typical material types included across global mandatory deposit schemes

Overview of typical DRS material types and product categories

One-way glass bottles



- Shows **limited profitability**¹⁾ due to low secondary material value
- **Cannot be compacted without breaking** into shards which contaminate other packaging & raise maintenance costs
- Is **very heavy** compared to other types of beverage packaging (in relationship to volumetric content)
- **Separate sortation mechanism required for RVMs**, increasing CAPEX

PET bottles



- Shows **some profitability**¹⁾, especially in the past year where secondary material value has almost doubled
- **Easy to reduce volume** through compacting without damaging structure
- Can be mixed with aluminum cans before sortation

Aluminum cans



- Shows **good profitability**¹⁾ as a result of high secondary material value
- **Easy to reduce volume** through compacting
- **Good candidate for DRS** systems as otherwise can be binned/ littered due to small volumetric contents

Beverage cartons



- Shows **limited profitability**¹⁾ due to low secondary material value
- Can pose **certain hygiene risks** (e.g., smell, risk of spillage & contamination) especially if compacted
- Only certain RVM machines offer the capability to process BCs – Typically in the premium segment

Product category

Non-alcoholic drinks

- Drinks (except juice)
- Juice

Alcoholic drinks

- Beer
- Spirits & other drinks

Dimensions

Between 0.1 and 3 liters **volume content**

Key comments

- **PET bottles and aluminum cans** are typical materials for existing mandatory DRS as a result of their higher intrinsic material value and low volumes
- **One-way glass** is included in certain DRS systems both in mandatory ones across the global landscape and in local Russian private deposit schemes
- **BCs** are typically excluded from automated take-back DRS systems due to collection challenges and low secondary material value

1) Compared to other beverage packaging; 2) Especially in Europe

Appropriate take-back infrastructure needs to be put in place, with sufficient locations (preferable in retail) and appropriate level of automation

Take-back strategy

Redemption locations



Grocery retail

- All grocery retail
- Selected grocery retail chains
 - Based on size
 - Based on format
 - Modern retail¹⁾
 - Traditional retailers

Collection centers

- Commercial/ industrial locations

Others (e.g., schools)

Preferred due to convenience

Ensure sufficient density (~1 per 1,000 people as indicative benchmark)

Take-back methods



Automated take-back

- Through RVMs (various segments available, varying cost/ functionalities)

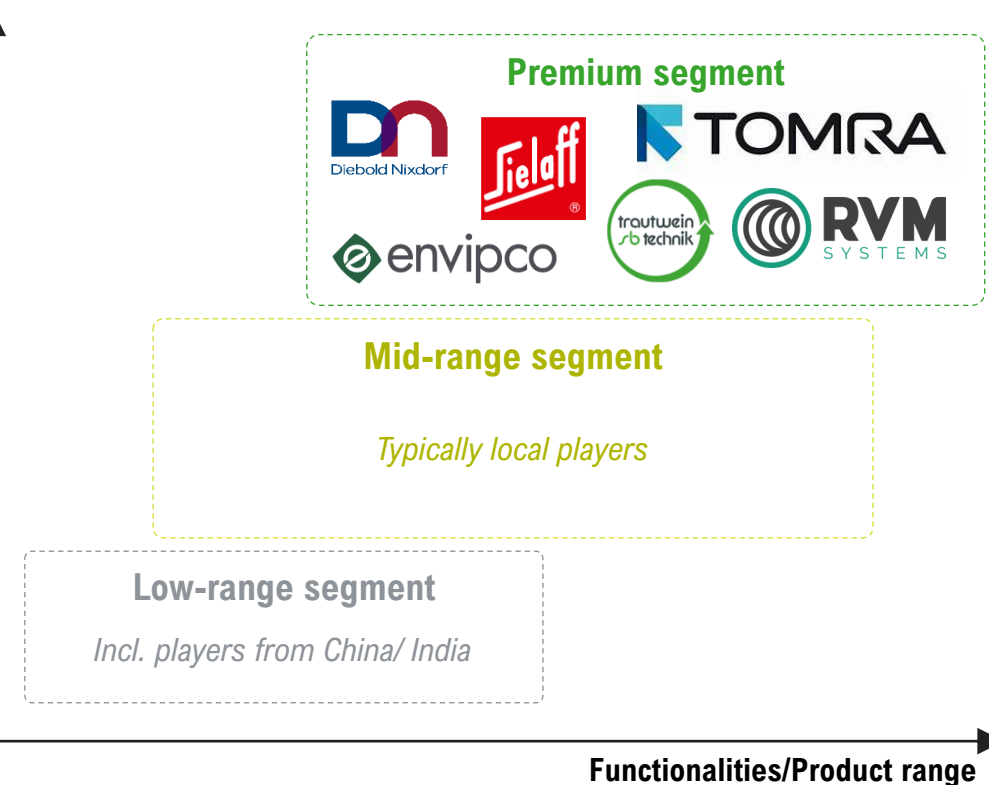
More efficient

Manual take-back

- Manual handling of received used packaging in stores

Less expensive

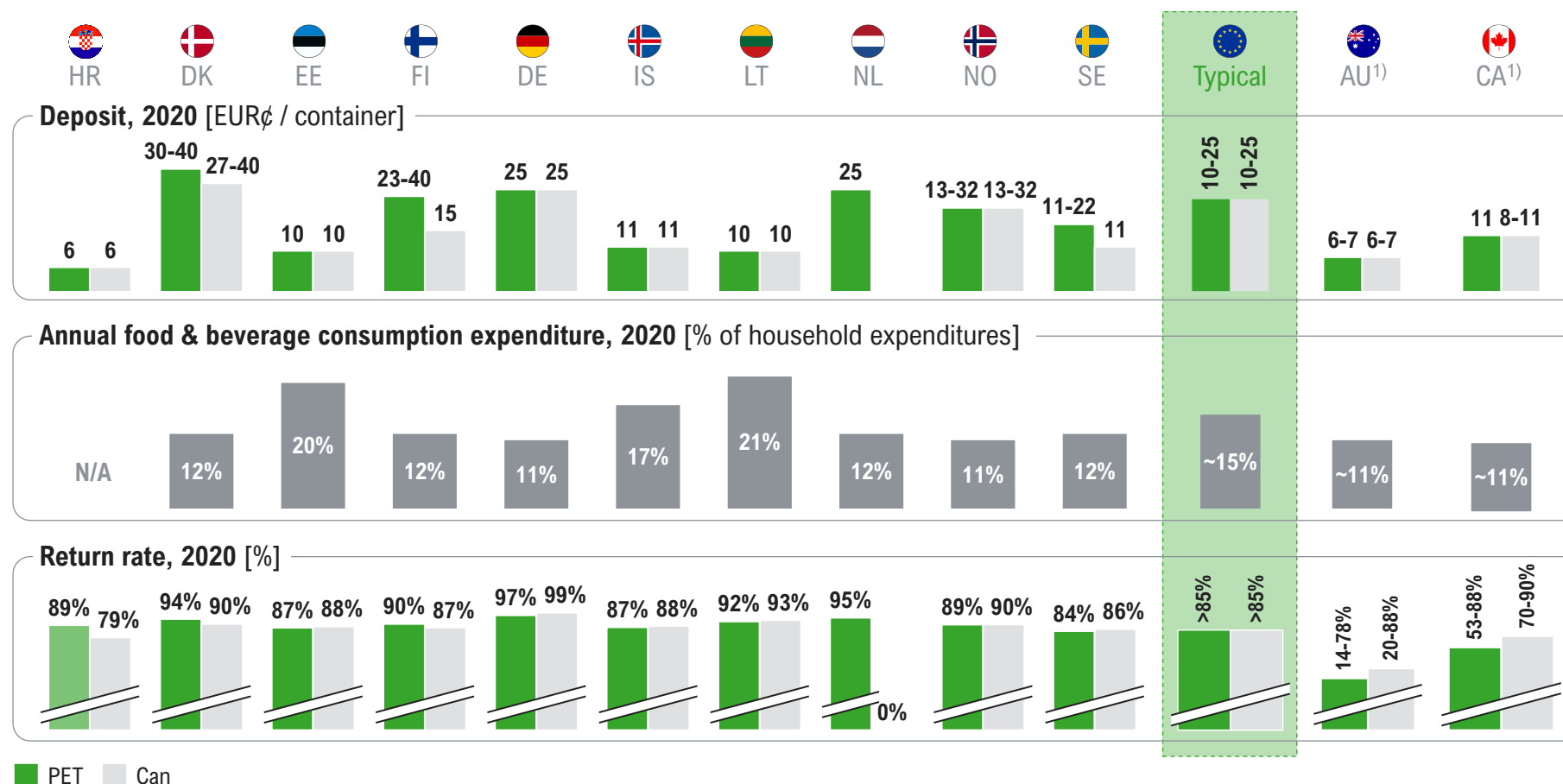
Avg. pricing [EUR/ unit]



1) Hypermarkets, supermarkets, convenience stores, etc.

Deposit fees range largely between EUR¢ 10-25, with high return rates of >85% typically achieved for PET & cans

Deposit fees and system performance



Key takeaways











- **Higher deposit fees** (above 15-20 EUR¢ threshold) are typically **associated with higher return rates and recommended**
- Deposits are **balanced with the retail spending power** on food and beverage of consumers in each individual country
- Apart from deposit value and consumer spending power, other country specific factors (e.g., availability of retail locations) play an important role as well

1) Return rate depending on region

Global best practices are recommended in the new DRS schemes and adjusting the existing ones in Australia to better fit the current context

System characteristics recommendation

System characteristic

			
Governance 	Industry-led	Keep existing models, industry-led for the new DRS	Industry-led
Material type 	PET, aluminium can, glass (with exceptions)	PET, aluminium can, glass (with exceptions)	PET, aluminium can, glass (with exceptions)
Product category 	Non-alcoholic and beer/ exemption for dairy	Non-alcoholic and beer/ exemption for dairy	Non-alcoholic and beer/ exemption for dairy
Takeback strategy 	Focus on return to retail and RVMs	Increase density of return points, focus on retail	Start with collection centers, focus on return to retail
Deposit value 	KRW 300-500 (USD 0.2-0.4 equivalent)	Increase to AUD 0.3 (USD 0.2 equivalent)	AED 0.7-1.0 (USD 0.2-0.3 equivalent)

In systems with established source separation, the nudging effect of the PAYT principle can reduce the share of cans in general waste

Lever – Pay as you throw principle (PAYT)



Objectives

- The objective of the PAYT principle is to nudge people to correctly sort recyclables (including UBC) which results in the following expected benefits:
 - Increase source separation – typically helping to reduce the share of UBC that ends up in the general waste in a context where source separation is already well-established and functioning
 - Increase awareness around the role of each individual
 - Reduce landfill diversion & capacity requirements of sorting infrastructure



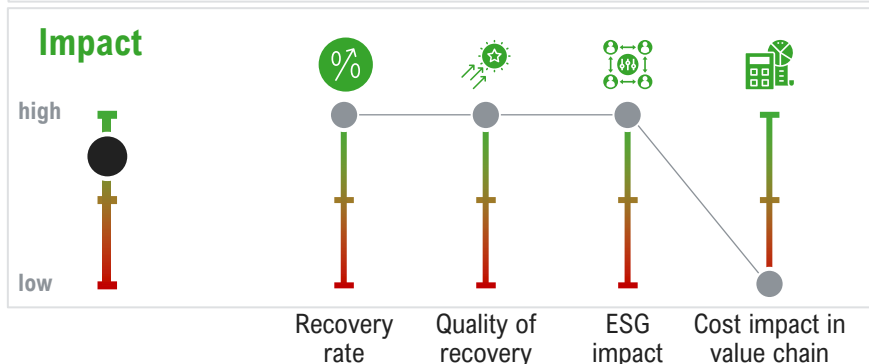
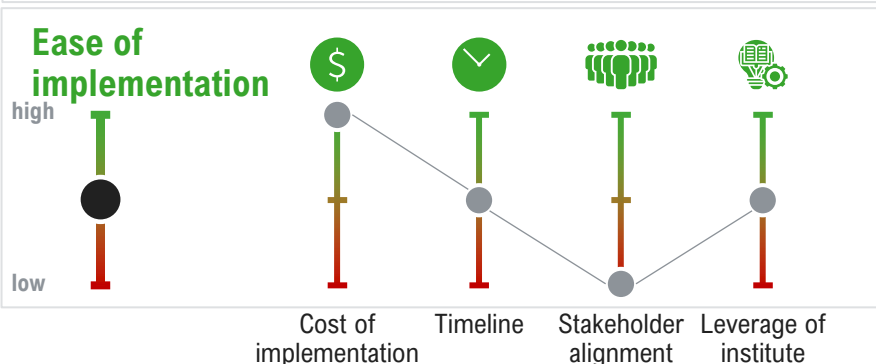
Recommendations for aluminium industry

- **Advocate with policy makers to create the conditions for establishing the PAYT**
 - Document lessons-learned from those countries who have implemented this principle
 - Demonstrate that – in principle – the waste management cost for individual households doesn't increase
 - Advocate with policy makers to establish pilot projects
 - Advocate with policy makers to enable the roll-out of PAYT principles



Country specifics

- The pay-as-you throw principle is relevant in mature waste management systems as a mechanism to maximize recovery rates, in particular by avoiding UBC to be wrongly sorted
- In the UAE the PAYT principle can be applied after roll-out of source separation



In countries with mature waste management systems the PAYT can be considered – diligent feasibility & impact assessment is a key success factor

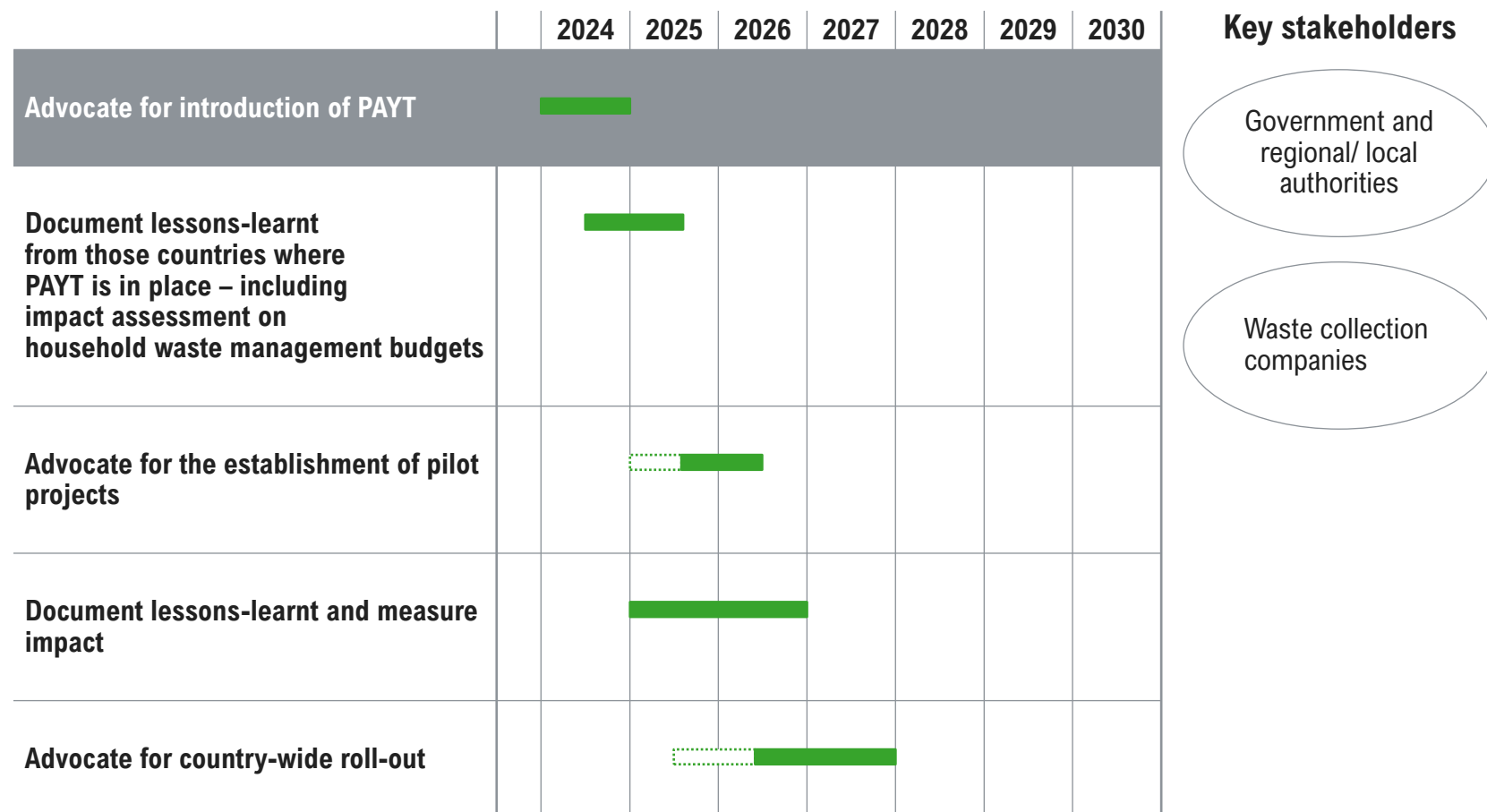
Lever – Pay as you throw principle



Next steps



- **Advocate with policy makers to create the conditions for establishing the PAYT**
 - Document lessons-learnt from those countries who have implement this principles
 - Demonstrate that – in principle – the waste management cost for individual households doesn't increase
 - Advocate with policy makers to establish pilot projects
 - Perform feasibility study on the introduction of PAYT (assess expected impact, cost & potential side effects)



Innovative collection mechanisms could help provide for a dedicated stream of high-quality UBC

Lever – Expand the reach of innovative collection mechanisms



Objectives

- Enhance the collection rates and quality of aluminium beverage cans by utilizing existing technologies and expertise
- Establish convenient and user-friendly methods to improve the separate collection rates of used beverage cans
- Improve the traceability of the collected UBCs
- Generate awareness around the importance of UBC recycling & establish the collection process as a fun & innovative activity which is appealing to a large section of the population



Recommendations for aluminium industry

- The industry can foster the development of innovative solutions that enable innovative approaches to collection for households and businesses
- To successfully implement the initiative, the industry can:
 - Identify relevant players that own existing solutions or have the capability to develop them
 - Study, learn from & leverage ongoing innovative approaches in various countries
 - Provide support and guidance to these players to develop solutions that facilitate the collection of UBCs
 - Assist in scaling up the developed solutions



Country specifics



- First experiments with solutions such as RECAPP are in place – the challenge will be to scale this solution



- Superbin, highly automated "bring banks" powered by industry 4.0 solutions shows promising business case

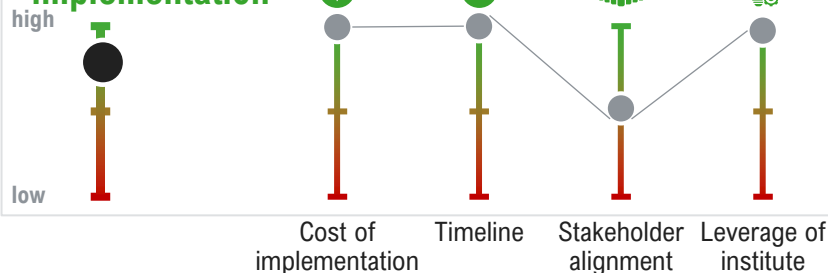


- Multiple digital collection platforms are gaining traction in Thailand & Vietnam – this success should be leveraged and learnt from in other countries

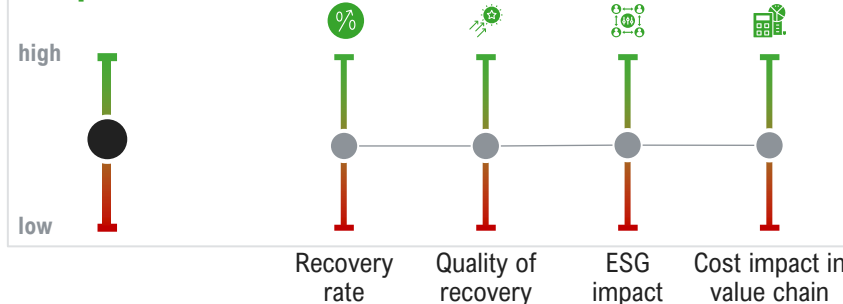


- No initiatives identified yet, but the successes of other countries can serve as inspiration

Ease of implementation



Impact



The industry can lead the identification and engagement of relevant recyclable collection solution, and support them in rolling out functional solutions

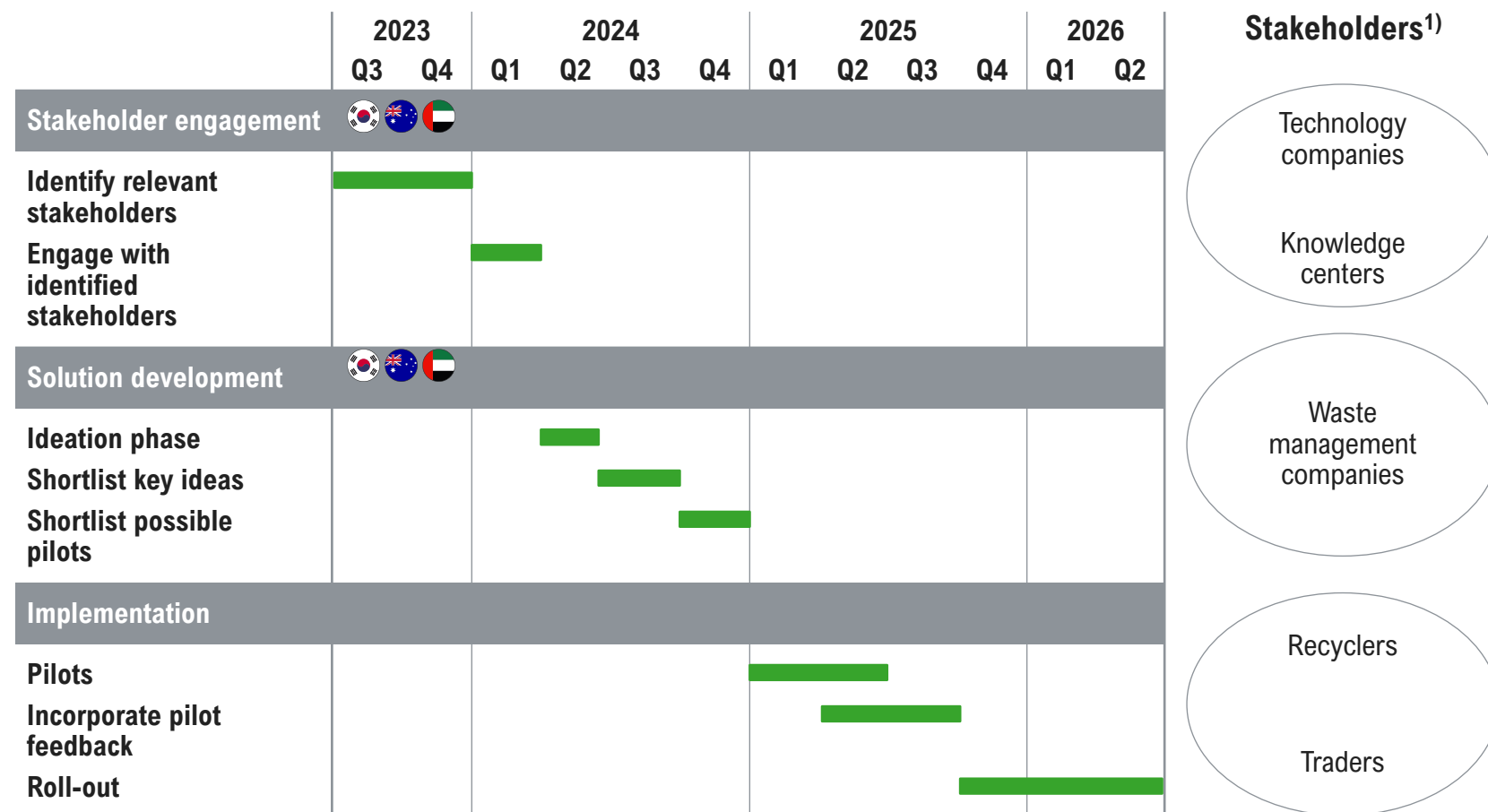
Lever – Expand the reach of innovative collection mechanisms



Next steps



- **Identify and engage with relevant stakeholders** in the market who possess technological expertise and the drive to develop innovative solutions for collecting UBCs and recyclables
 - A hackathon approach could be adopted to expedite the process
- **Lead and support the ideation phase:**
 - Provide guidance to structure brainstorm sessions to identify solutions
 - Shortlist the most relevant ideas and pilots
- **Provide technical support and guidance to grow the solution from pilot to roll-out**



1) Non-exhaustive

Across the countries in scope of the study, various solutions for innovative collection have been developed which can be used as a source of inspiration

Lever – Expand the reach of innovative collection mechanisms

Innovative collection



- They collect cans from households, and offer solutions for businesses
- Households can download the app and request their recyclables to be collected for free
- Recovered 20 tonnes of cans in 2022



”

"With its easy-to-book door-to-door recycling service, the solution maximizes convenience and helps overcome the main barriers to recycling."

– Regulator



- They connect individuals and restaurants with aggregators
- Go Greens offers rewards in exchange for the waste
- Recycle Day offers a fee payment in exchange for the recyclables



”

"A clean stream of UBCs is key for covering our feedstock needs"

– Roll manufacturer



- The 3 apps connect households with collectors; households can request their recyclables to be picked and they get rewards in exchange



”

"Sometimes, households do not trust waste pickers; any solution that allowed households to trust pickers would be well received"

– Association



- Since 2015, various Industry 4.0 technologies have been incorporated : AI, Big data, Remote control, robotics
- 800 machines located nation wide
- Recovers 150 tons of cans per month (120 million cans per year)



”

"Biggest issue is aluminum cans mixed with multiple materials from production phase (such as construction materials)"

– Collector

RECAPP by Veolia facilitates a separate collection stream in a highly-convenient manner for citizens in the UAE

Lever – Expand the reach of innovative collection mechanisms



Initiative

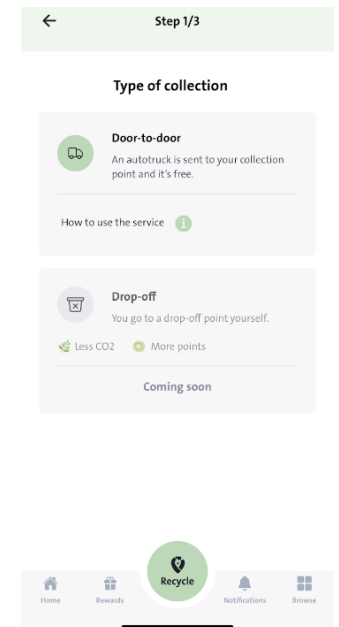
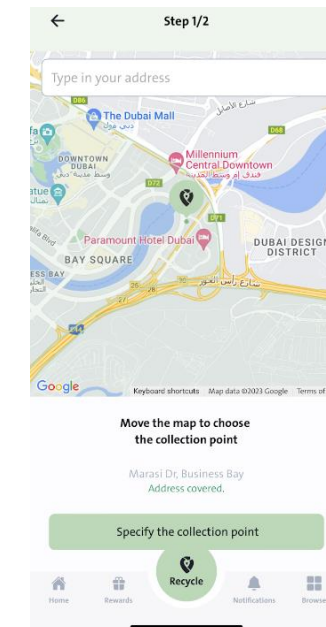
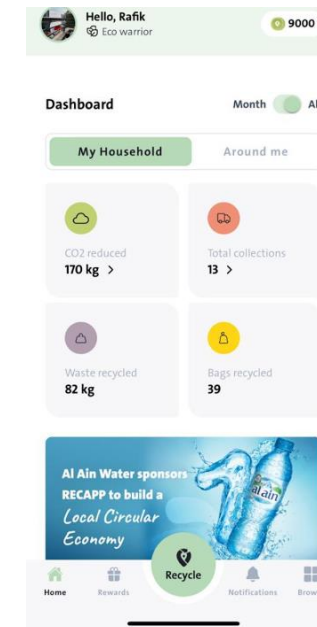


Description of initiative

- 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 tons out of which 3.5% are UBCs. This year our target is 1000 tons”



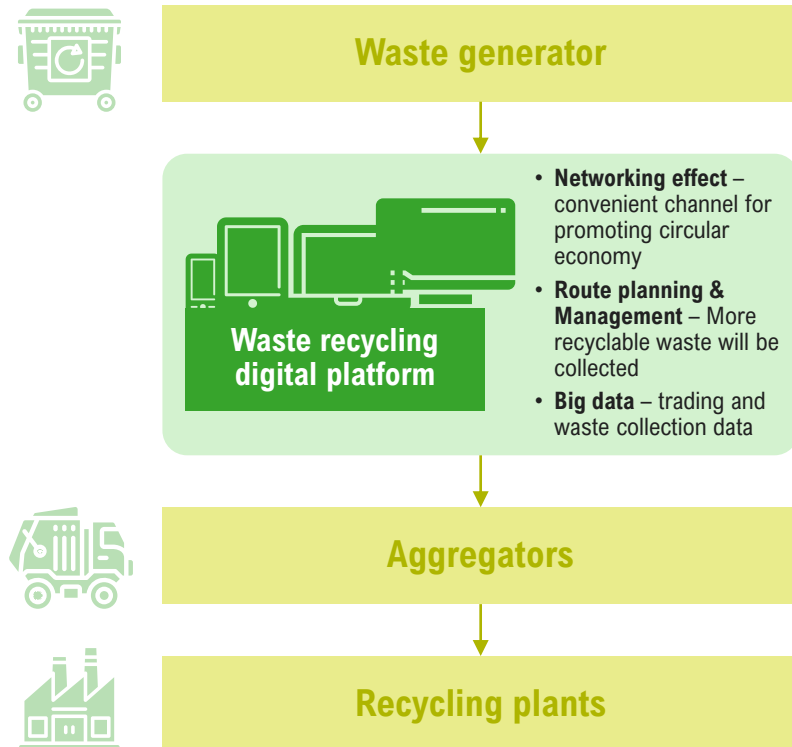


In Thailand, the use of digital platform has recently been emerging to better manage the waste and increase the separate collection rate

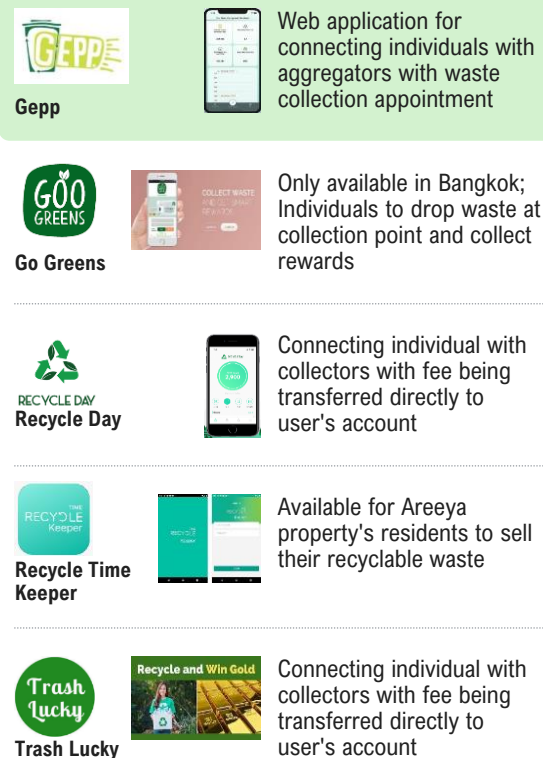
Lever – Expand the reach of innovative collection mechanisms



Business model



Company examples



Case study - Gepp



In Vietnam, some companies are launching innovative solutions to improve the waste management system and increase collection rates



Lever – Expand the reach of innovative collection mechanisms



mGreen

- There are **3 apps**:
 - The first one encourages users to **separate waste at source**, to **receive in exchange points** that can be redeemed for gifts
 - The second one allows collectors to receive collection requests; collectors can then sell the recyclables after paying a fee to cover the resident's rewards
 - The third one allows to redeem the points that have been collected
- The app is **focused on aluminum cans, paper, and plastics**
- The platform claims to have **100,00 users**, and **90 collector accounts**
- They claim to have managed to **collect 300 tonnes of recyclables** so far



- The company offers a mobile phone app that allows users to **exchange recyclables for points that can later be redeemed**
 - In order to receive the points customers can either bring their recyclables to Grac's shops or connect with collectors
 - Additionally, they offer an Enterprise Resource Planning software for collection enterprises to help them centralize waste collection data
- They claim to have **more than 1 m customers**, covering 250,000 households



- The company offer solutions to both businesses and households:
 - For households it offers a **mobile app** that provides **rewards in exchange of recyclable waste**; it is focused on Tetra Pack
 - For business it offers industrial scrap collection by connecting industrial plants with collectors
- The company claims to have **34,000 users**
- They claim to have collected **80 tonnes of industrial scrap and 100 tonnes of milk cartons**



3.3. Sorting

Sorting capacities are insufficient in the UAE and some Australian areas; Building facilities in SEA would need to consider the current waste picking practices

Lever – Sorting capacities



Objectives

- Meet the demand for sorting capacities, to reach the volumes collected and ensure no volumes “ready for sorting” end up in landfills
- Ensure the right level of automation of the facilities, with manual preferred for quality and automated for cost benefits
- Ensure eddy current separator is installed everywhere to maximize UBC recovery
- Assess the feasibility of sorting dirtier streams or rejects, with the corresponding feasibilities
- Analyze the options of improving the quality of the sorting process by ensuring sufficiently advanced equipment



Recommendations for aluminium industry

- Support building sorting capacities where required and ensure adequate equipment is present, also upgrading existing ones accordingly. Key steps to achieve their implementation include:
 - Perform detailed feasibility studies
 - Assess the impact of such projects on the waste management systems and recycling
 - Establish an alliance to create/ upgrade the sorting infrastructure
- Maximize cost advantages and scalability
- Assess risks: high investment and operational costs



Country specifics



- There is no identified need for sorting facilities (to be assessed)



- Assess the suitability of tendering process and contracts for MRFs



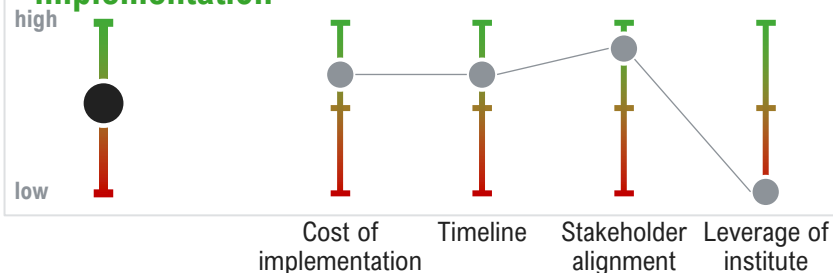
- Current capacity is not sufficient for existing volumes (to be assessed – collaboration from multiple industries needed)



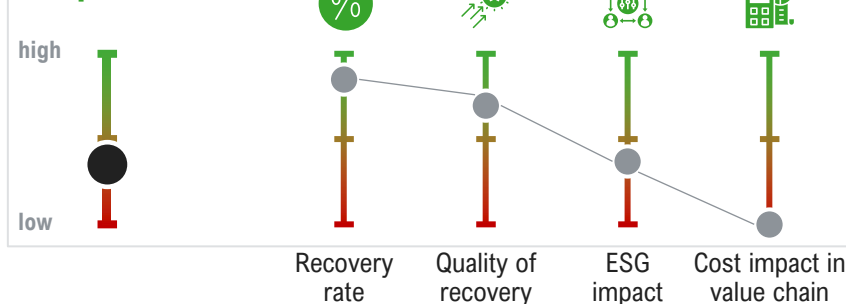
- Sorting capacities are virtually inexistent: assess the need and potential configuration of sorting facilities, taking into account current manual waste picking practices



Ease of implementation



Impact



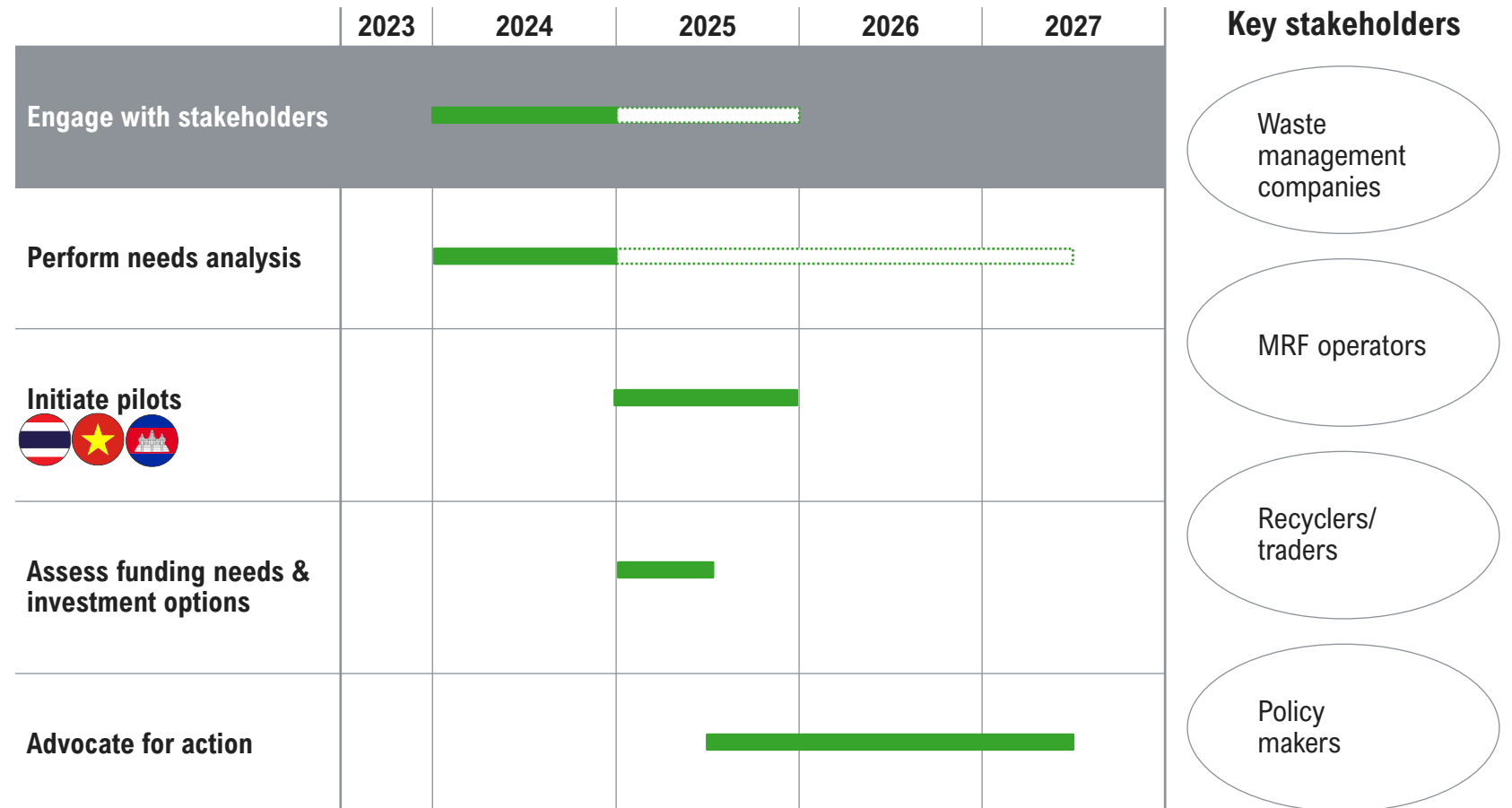
Additional required capacities (new and upgrades) are to be assessed during discussions with stakeholders and in feasibility studies (next ~3 years)

Lever – Sorting capacities



Next steps

- **Engage with key stakeholders in the relevant countries:**
 - Establish a detailed report about current and future sorting capacity & way of working of the facilities:
 - Volumes processed & projection
 - % of sorting facilities equipped with conveyer belt & eddy current separators
 - UBC handling practices
 - Assess the need for sorting facilities in the SEA countries, including the impact on the waste picking economy, and initiate pilots
 - Assess funding needs & investment options across relevant geographies
 - Advocate for action & follow-up on the progress of stakeholders



Waste sorting can broadly be organized at 4 moments in the waste collection and processing value chain

Waste sorting overview

Description



AI industry action



1 Source separation

- Separation by households & businesses
- Separation by street pickers & collection company employees

- Advocate for source separation

2 Transfer station

- Basic intermediate stations where waste is collected;
- Waste collection employees have access and may perform sorting tasks



- For countries where dedicated sorting facilities are not available:



- Advocate for the establishment of transfer stations if no dedicated sorting facilities are available
- Advocate for equipping them with basic conveyer belts & eddy current separators



Details on how to improve transfer stations are on the next pages

3 Dedicated sorting facility (e.g. MRF)

- Dedicated facilities aimed at recovering recyclable material from the waste stream, including UBC & other waste streams



- In countries with existing sorting plants:



- Advocate for building sufficient sorting capacity



- Advocate for automation (in particular for installing conveyer belts)
- Advocate for equipping them with eddy current separators

Details on how to improve transfer stations are on the next pages

4 Sorting at landfills

- Waste pickers at landfills scavenge through waste with the aim of recovering UBC



- Advocate for those measures that reduces sorting at landfills (in particular in an informal context) as creating reasonably good working conditions is very difficult



More basic semi-automated facilities can be more easily built or improved with a moderate investment in conveyor belts and eddy current separators

Lever – Implement rudimentary sorting before incinerators/ landfills

2

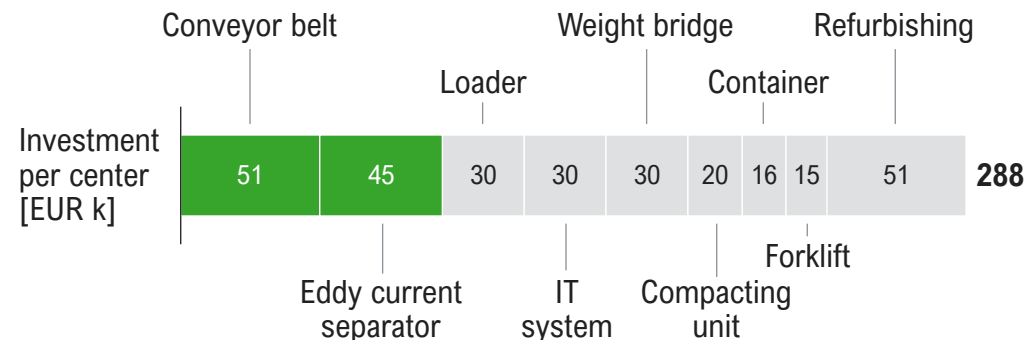
Description

- Rudimentary transfer stations can be improved by installing first conveyor belts and later eddy current separators
- Conveyor belts would improve the sorting efficiency and HSE conditions of waste pickers working in landfills and transfer stations
- Eddy current separators would allow the station to work in almost fully automatic mode

Components

- They are equipped with loaders and conveyor belts to intercept fleet dropping off packaging waste
- Includes infrastructure for compacting and lifting packaging waste, before sending it to sorting stations or to recyclers
- IT systems are needed to manage the plant, and refurbishing may be needed to adapt existing plants

Investment needed



Success factors



- Serves dual purpose of processing/ transferring waste collected from bring banks, as well as a drop-off point for pickers
- Potential to leverage as hub for waste pickers when the plant is working semi-automatically
- Operations can be easily scaled up

Limitations



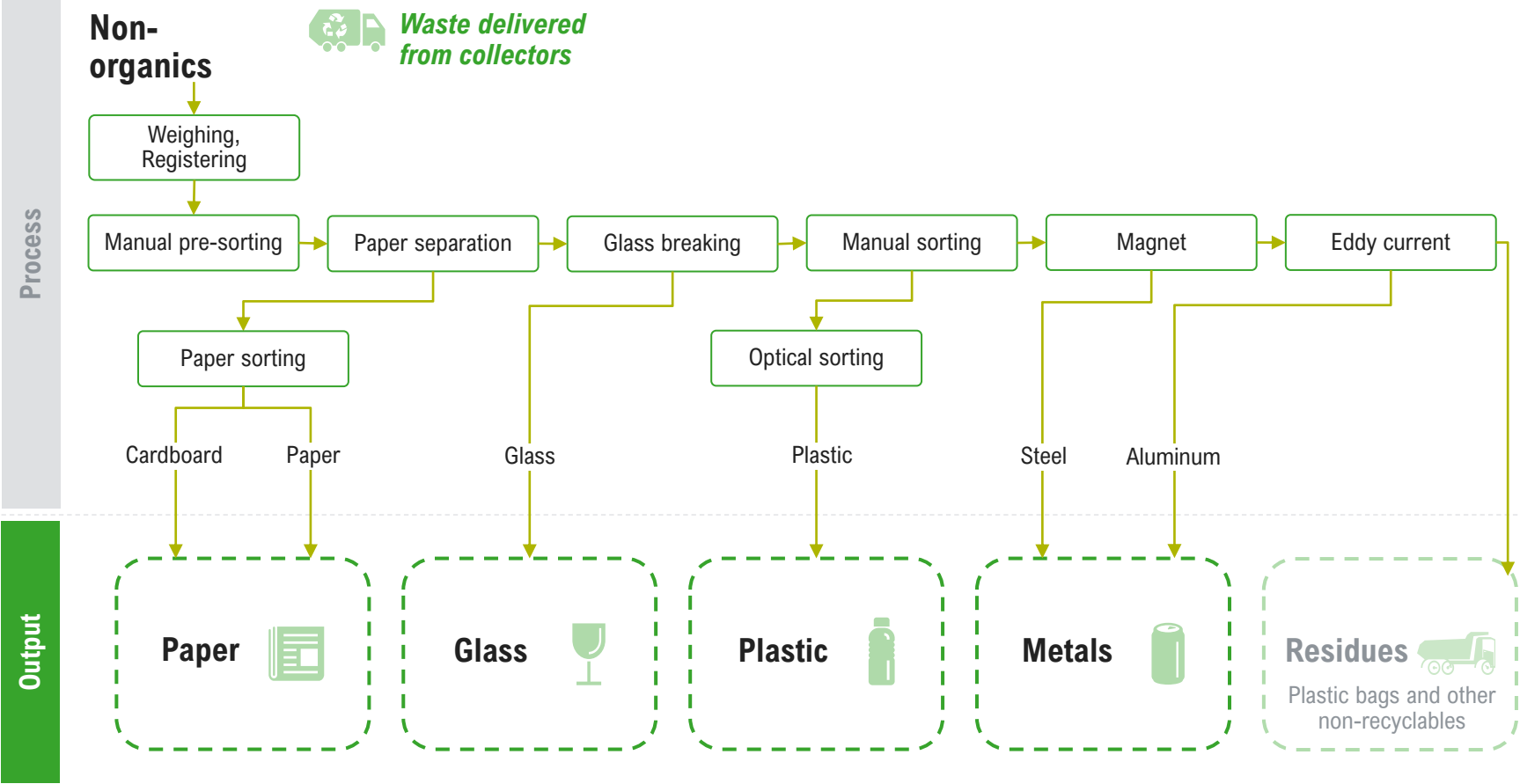
- Relatively high and fixed initial costs in setting up, also compared to manual waste picking



A typical dedicated MRF follows a general process steps from feedstock to final output, with the sequence of materials

Example of a typical dedicated sorting facility (MRF process flow)

3



Building a sorting facility requires investment in equipment, depending on the number of materials, up to a few EUR m

Sorting centers – Key components, investments, success factors and risks

3

Infrastructure

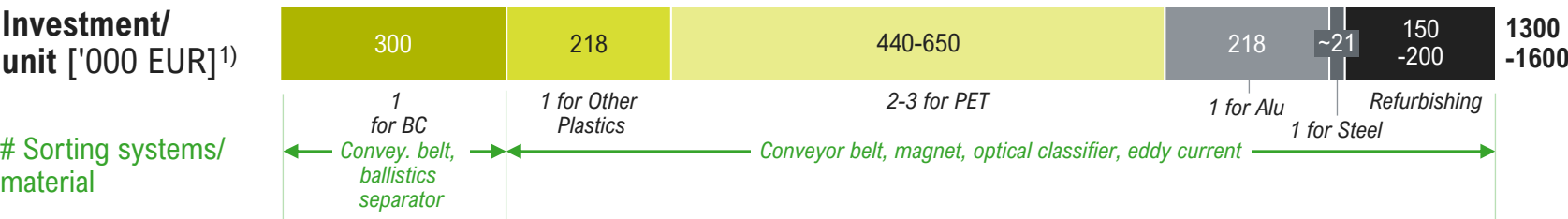
- **Pilot sorting centers**, each with an area of ~2,000 sqm, to be built for waste sorting infrastructure for alu, PET, other plastics, steel and bev. cartons
- Sorting can be **contracted** to tertiary sorting centers for the remaining volumes

Components



#1 Equipment

- Sorting systems for all materials: conveyor belt, ballistics separator rotating glass etc.



Components



#2 Auxiliary equipment

- > Equipment used to handle the different types of packaging



Indicative investments

Key advantages/ success factors



- Value creation for lightweight fraction collected via HH and non-HH (HoReCa) – Significant costs/ complexity otherwise to manage separate fractions for all packaging materials
- Can be scaled up gradually depending on alliance size/ volumes under compliance

Key risks/ limitations



- High investment/ fixed costs & complexity to operate
- Additional associated operational costs (personnel, fuel) that need to be covered, even for low generated waste volumes

1) Ranges account for differences between the two sorting center pilots



3.4. Trading

A global trading platform is needed to enhance transparency and a more efficient market where aluminium UBC can reach optimal recycling facilities

Lever – Support global trading platform for waste



Objectives

- Improve the overall UBC scrap market, enabling aluminium UBC scrap to reach destinations where it can be optimally recycled
- Facilitate global trade between countries and make the value chain more efficient
- Enhance price transparency and increase supply chain visibility to reduce the risk of fraud
- Provide the opportunity to recyclers to issue certificates on the actual recycling of the bails
- Provide confidence to consumers, brand owners & collectors that waste is actually properly recycled



Recommendations for aluminium industry

- **Partner with relevant stakeholders to create an international UBC scrap trading platform that increases transparency:**
 - Design the operating model for such trading platform (governance, process, organization)
 - Develop an MVP (minimum-viable product), establishing minimum functionality (likely in partnership with relevant service providers)
 - Run a pilot project with a select group of stakeholders
 - Scale the project, by onboarding more traders & recyclers over time



Country specifics

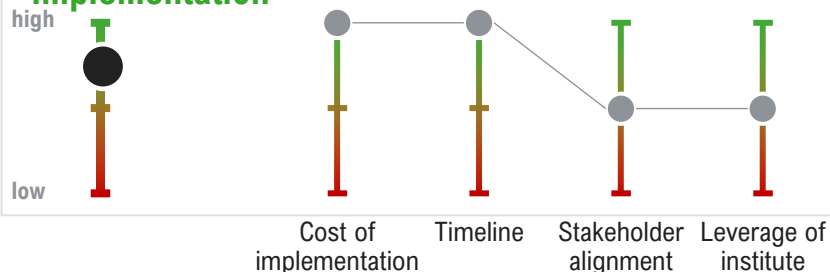


- The lever is applicable globally and is expected to reap benefits, both in the countries in scope of this study and beyond

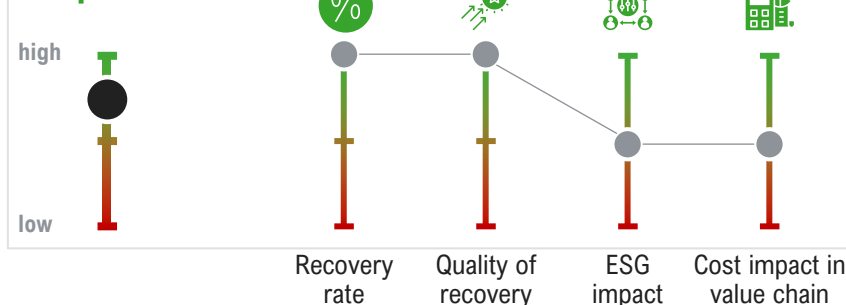


- The responsible stakeholders for creating the ID for the UBC bail would be junk shops

Ease of implementation



Impact



A pilot involving a significant percentage of all relevant stakeholders would allow fine-tuning the platform before rolling it out

Lever – Support global trading platform for waste



Next steps



- Initiate discussions with key stakeholders, which include collection companies, MRF operators, traders, and recyclers, to align on the requirements of the system
- Design the operating model (governance, process, organization) considering the received input from stakeholders
- Design a pilot with a select group of stakeholders test the platform and enhance it with the collected feedback
- Launch training and awareness campaigns to onboard all relevant stakeholders

	2023		2024				2025				2026		Key stakeholders
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	
Engage with stakeholders	■												Collectors
Design operating model			■										MRF and sorting facility owners
MVP development					■								Traders
Initiate pilot							■						Recyclers
Training and awareness							■						Customs authorities
Scale-up and rollout									■				

A clearing house approach is suggested for the creation of an aluminium scrap trading platform; the platform would increase transparency and market efficiency

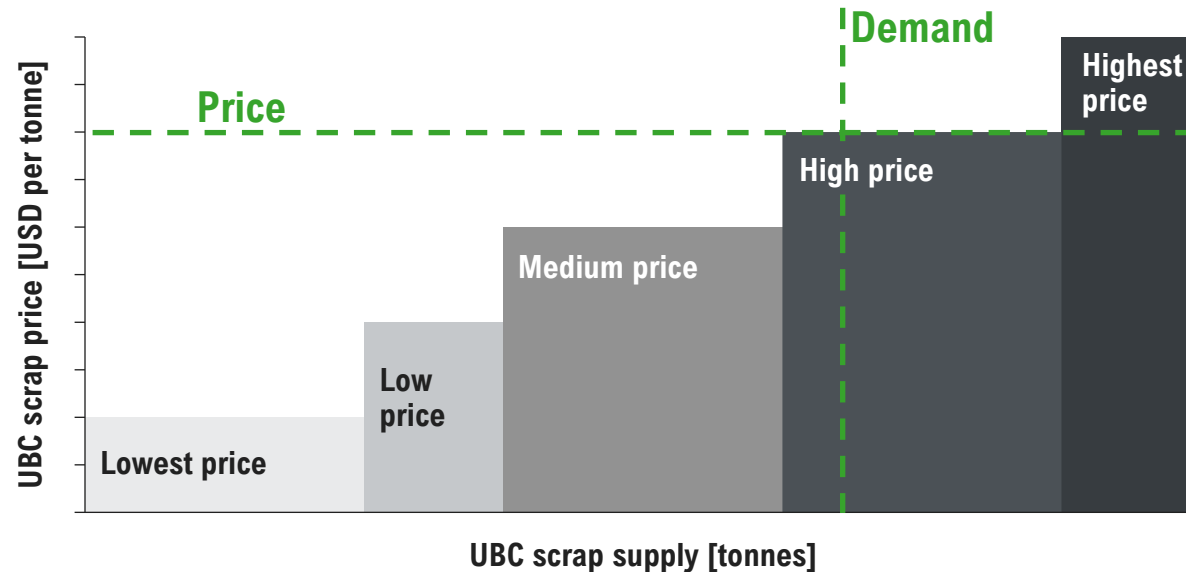
Clearing house platform overview

Global trading platform

Transparent offer & demand principles

- I • **Traders make their offers:** volume, price, scrap characteristics
- II • **Buyers make their buy bids:** volume, price, characteristics
- III • **The platform is transparent,** all market participants can get (anonymized) data about the actions of other market participants

Clearing house



- The offer-demand match will determine a price per each quality grade of the scrap (very high, medium, low quality, etc.)
- A market price will be determined on a timely basis (to be determined) based on the offer that is covered by the demand



3.5. Can production

Contemporary UBCs are the result of years of design and are fully recyclable – further innovation and guidelines can simplify closed-loop recycling

Lever – Support design for circularity of aluminium cans



Objectives

- **Continuously engage with players across the value chain to encourage all players across the value chain to always opt for the best possible design choices**
 - Emphasize, through the existing coalition the importance of implementing already identified best practice for can design that will make can-to-can recycling easier (cf. guidelines issued earlier by the International Aluminium Institute)
- **Continue ongoing research into can design (aim for unalloy cans, pursue further light weighting of cans, etc.)**



Recommendations for aluminium industry

- **Engage with players across the value chain – in particular brand owners – to maintain awareness on design choices that simplify processing of cans for can-to-can recycling**
 - Leverage existing global coalition and/or national coalition as a platform to drive optimal can design choices and in that way encourage circularity.
 - If relevant, establish a charter with principles & guidelines to be respected by all players to promote can design best practice
- **Maintain and deepen working relations with research institutions to:**
 - Ensure all stakeholders are informed about the latest developments in this field
 - Consider sponsoring further research in this field, e.g. through establishing grants



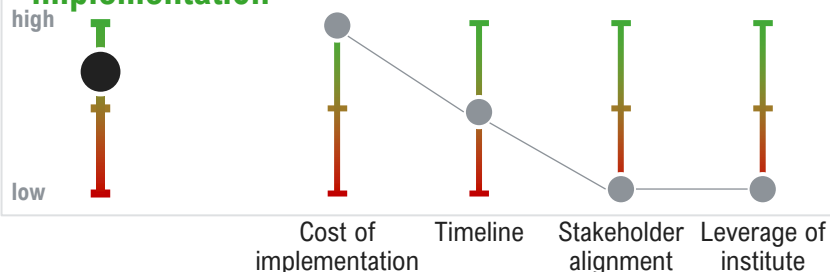
Country specifics



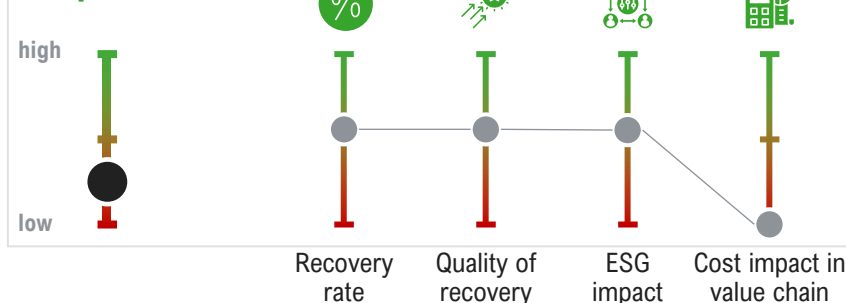
- The lever is applicable globally and is expected to reap benefits, both in the countries in scope of this study and beyond



Ease of implementation



Impact



The aluminium industry can be a driving force in bringing market stakeholders together around a common guidelines that simplify full circularity

Lever – Support design for circularity of aluminium cans



Next steps



- **Maintain awareness on optimal can design choices**
 - Reach out to stakeholders & establish a coalition
 - Define & negotiate charter for good practices can design
- **Engage with research institutes**
 - Establish fora & conferences on the topic
 - Assess the relevance / opportunity to further sponsor investment into can design

	2023		2024				2025				2026				Stakeholders ¹⁾		
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4			
Establish (global) coalition aimed at optimizing can design																Brand owners (soft drink manufacturers, beer producers, etc.)	
• Reach-out to coalition members																	
• Define & negotiate charter for good practices																	
• Monitor the implementation of identified good practices																	Can manufacturers
Engage with research institutes																Research institutes with a strong focus on material sciences	
• Establish discussion & exchange with research institutes																	
• Establish grants for specific investment into research on can design																	

1) Non-exhaustive



3.6. Regulation

Ambitious, yet realistic targets for aluminium cans could be set and achieved in all countries, and must be complemented by a strong regulatory framework

Lever – Recycling targets for alu cans



Objectives

- Setting ambitious targets for recycled content incentivizes suppliers to provide recycled aluminium and implement quality control to ensure required standards
- Improving recycling rates can be accomplished with clear targets and complemented by better collection and sorting, and other innovative solutions
- Ensure the regulatory framework is in place for setting concrete actions, auditing and enforcement



Recommendations for aluminium industry

- Engage with market participants on relevance & feasibility of setting or increasing recycling target / recycling content targets
- Study expected impacts of such targets, required investment needs and secondary effects
- Engage with policy makers to increase awareness around the importance of such targets & the need to further increase them



Country specifics



- Focus on recycled content targets due to already high recycling rate



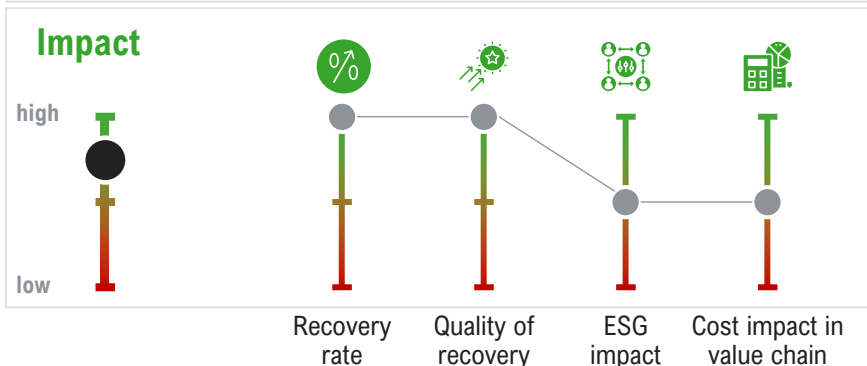
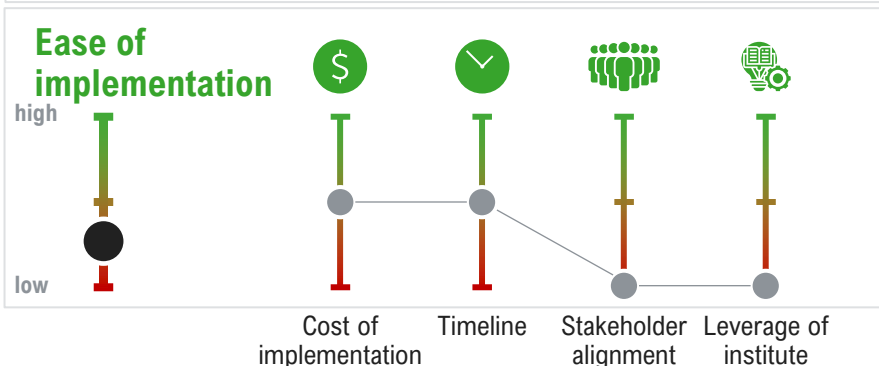
- No dedicated recycling or recycling content target. As an EPR is in place, the country should be ready to initiate the conversation around these targets



- As an EPR is not yet in place, establishing and enforcing targets may prove difficult



- Consider and leverage the already well performing informal sector in setting and meeting targets; establishing EPR first will facilitate target setting & required reporting



Setting and enforcing the targets is a process involving multi-stakeholder alignment and collaboration over 5-6 years for the countries analyzed

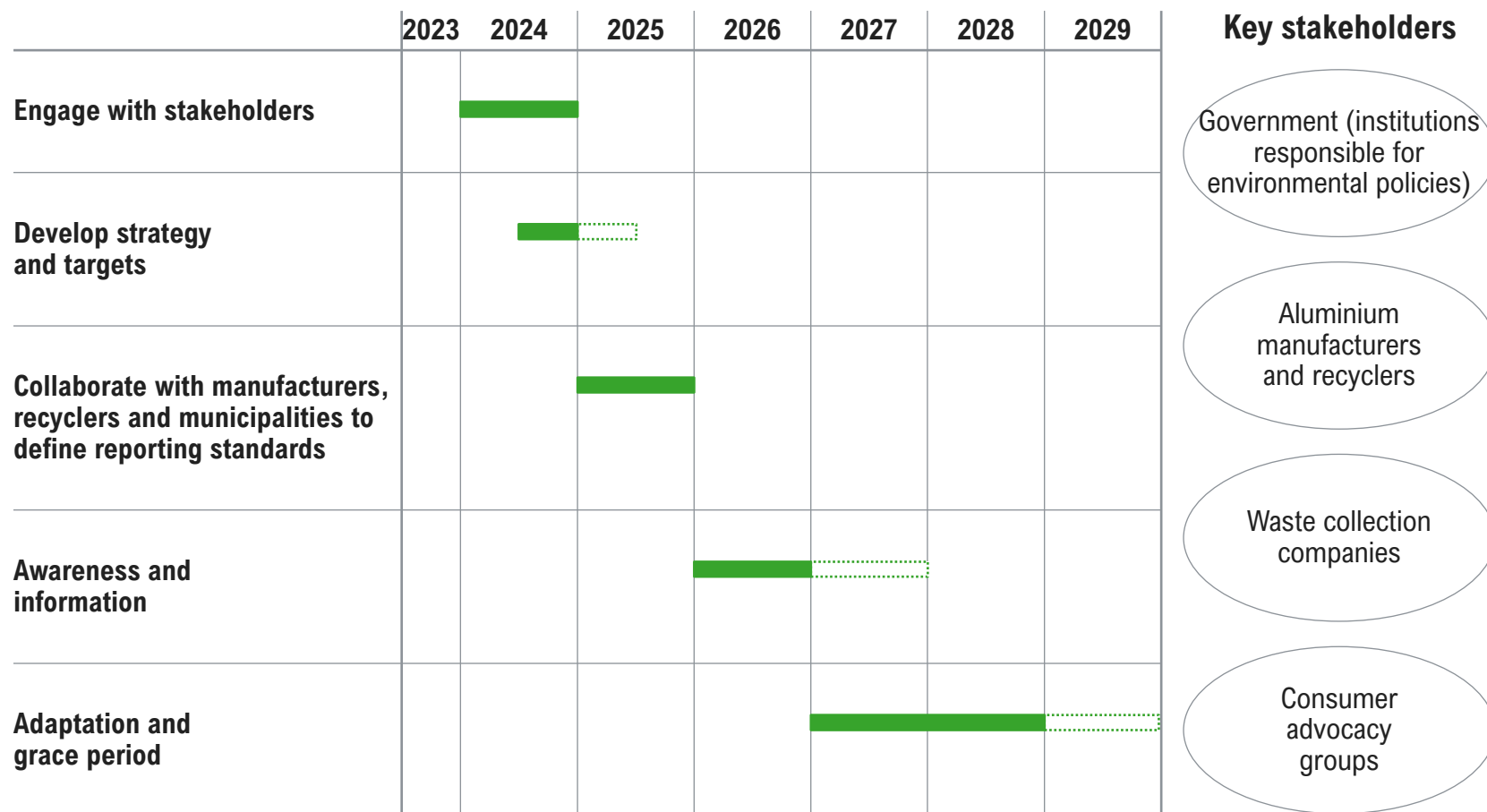
Lever – Recycling targets for alu cans



Next steps



- Review current UBC recycling targets & feasibility to increase the level of ambition:
 - Study current performance of the recycling sector
 - Identify feasibility to increase recycling targets & associated investment needs
- Engage with policy makers to advocate for ambitious, yet realistic targets



Ambitious targets for aluminium cans could be set and achieved in all countries, and must be complemented by a strong regulatory framework

Lever – Recycling quality targets



Objectives

- Incentivize can-to-can recycling over other end-uses of UBC to reduce the need for virgin aluminium for the production of cans



Recommendations for aluminium industry

- Understand & market the advantages related to can-to-can recycling – but also study the knock-on effects if less scrap becomes available for other industries
- Engage with the aluminium industry to calibrate realistic targets considering both the advantages & said knock-on effects
- Engage with policy makers to establish target, associated reporting as well as update the incentive mechanism to encourage can-to-can recycling
- A well-functioning EPR, with recycling targets, is a prerequisite for this lever



Country specifics



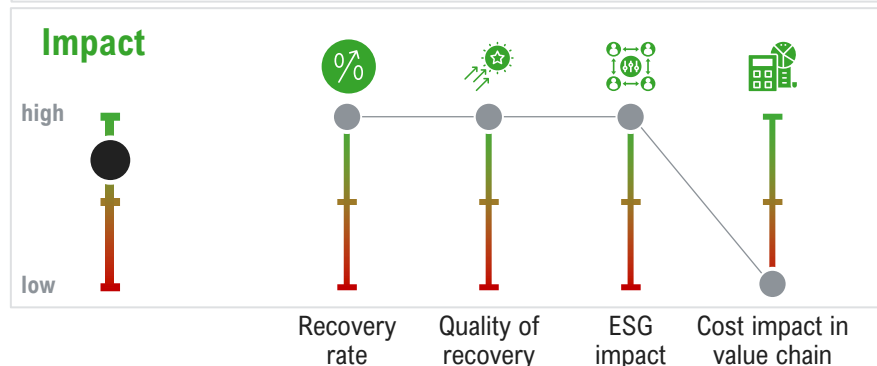
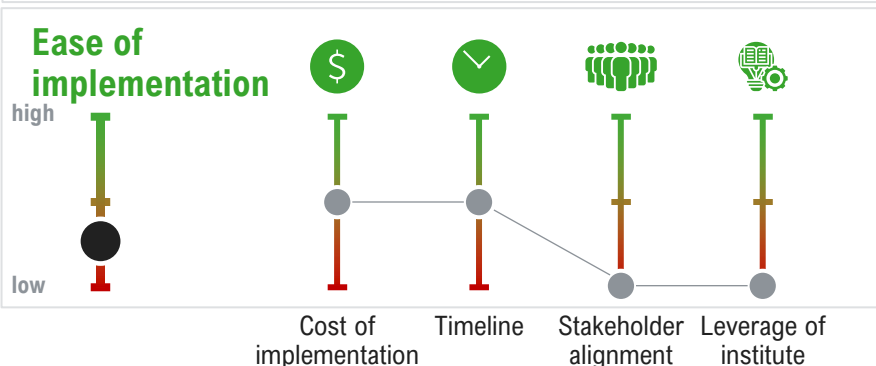
- Korean EPR implementation is mature and can be updated to include targets & incentives related to can-to-can recycling
- Knock-on effects on other industries (in particular production of deoxidizers) needs to be well-understood)



- Australia has an EPR, but no UBC recycling targets



- The other countries in the scope of this study have no functioning EPR, a prerequisite for the implementation of can-to-can recycling incentives



Setting and enforcing the targets is a process that needs to consider the recycling capabilities of the country

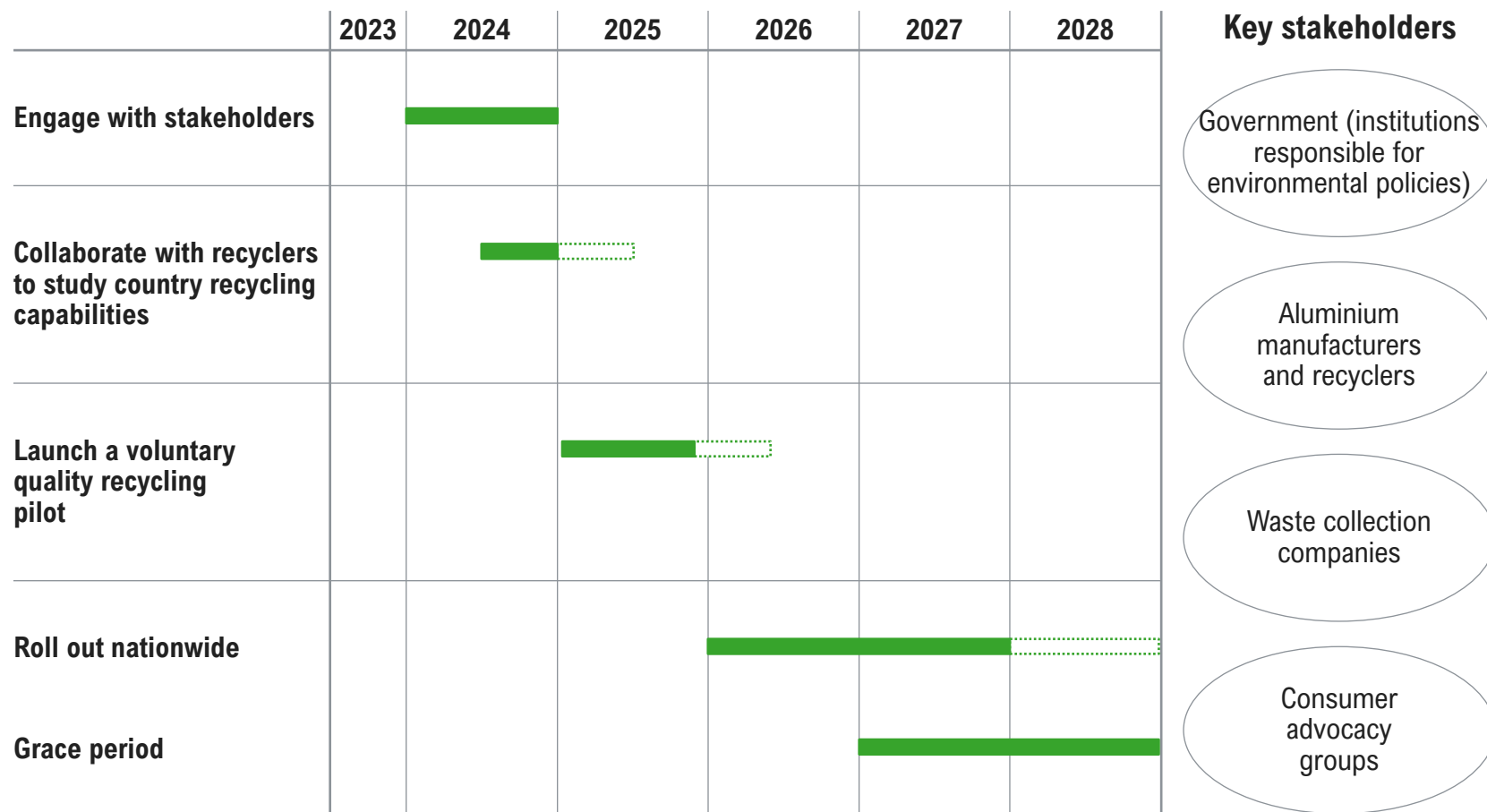
Lever – Targets for alu cans



Next steps



- Review current UBC recycling targets & feasibility to define targets aiming at increasing the quality of the recycling, i.e. incentivizing can-to-can recycling
 - Study current performance of the recycling sector
 - Study the benefits / downsides of can-to-can recycling
 - Identify feasibility to increase recycling targets & associated investment needs
 - Identify required incentives to establish can-to-can recycling
- Engage with policy makers to advocate for ambitious, yet realistic targets



Increasing data transparency would benefit policy and decision-making across all steps on the value chain

Lever – Increase data transparency



Objectives

- Establish clear processes & systems that will provide transparency on put-on-market volumes & real-time visibility on when & how these UBC are recycled. Increased transparency will lead to:
 - Better decision-making for local authorities to make better-informed decisions about waste management policies and strategies
 - Increased accountability of collectors, traders, and recyclers, to ensure that set targets are met
 - Improved efficiency of the value chain by identifying and avoiding the leakages

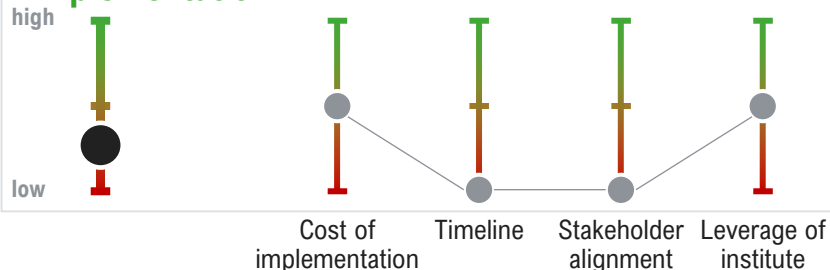
Recommendations for aluminium industry

- The aluminium industry and its members can provide support to local policy makers in the designing and implementation of digital tools to facilitate data-sharing across the aluminium beverage can value chain
- The aluminium industry and its members can actively engage with government officials and policymakers to provide input and advocate for legislative frameworks that require mandatory recycling reporting
- The aluminium industry can take the lead in creating transparency on those areas of the value chain where the industry has significant leverage (trading & recycling)

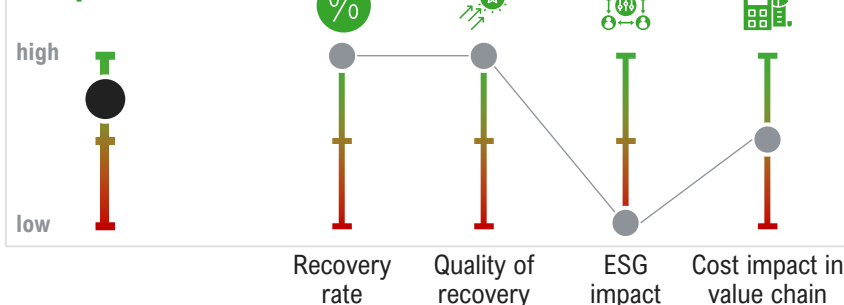
Country specifics

- Centralized consolidated reporting of put-on market volumes and recycling rates already in place
- Transparency on exports can be improved
- There is a consolidated tracking of put-on volumes through the DRS, but no tracking on the other streams and of recycling/trading
- The current maturity level is low; There is no data collection and no consolidated tracking
-
-

Ease of implementation



Impact

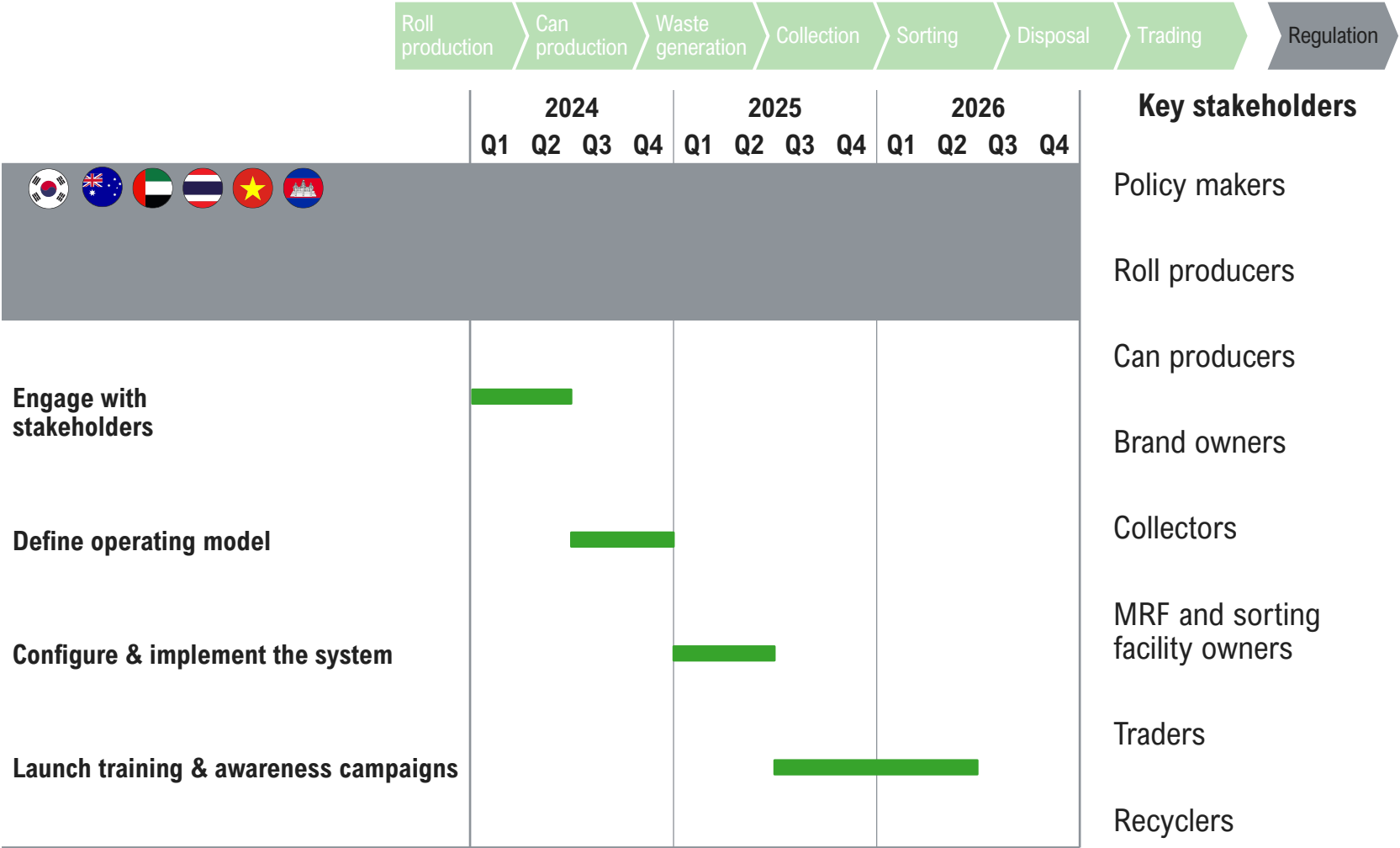


A functioning EPR is a pre-requisite for data transparency; the aluminium industry can offer its support lobbying policy-makers and engaging with stakeholders

Lever – Increase data transparency

Next steps

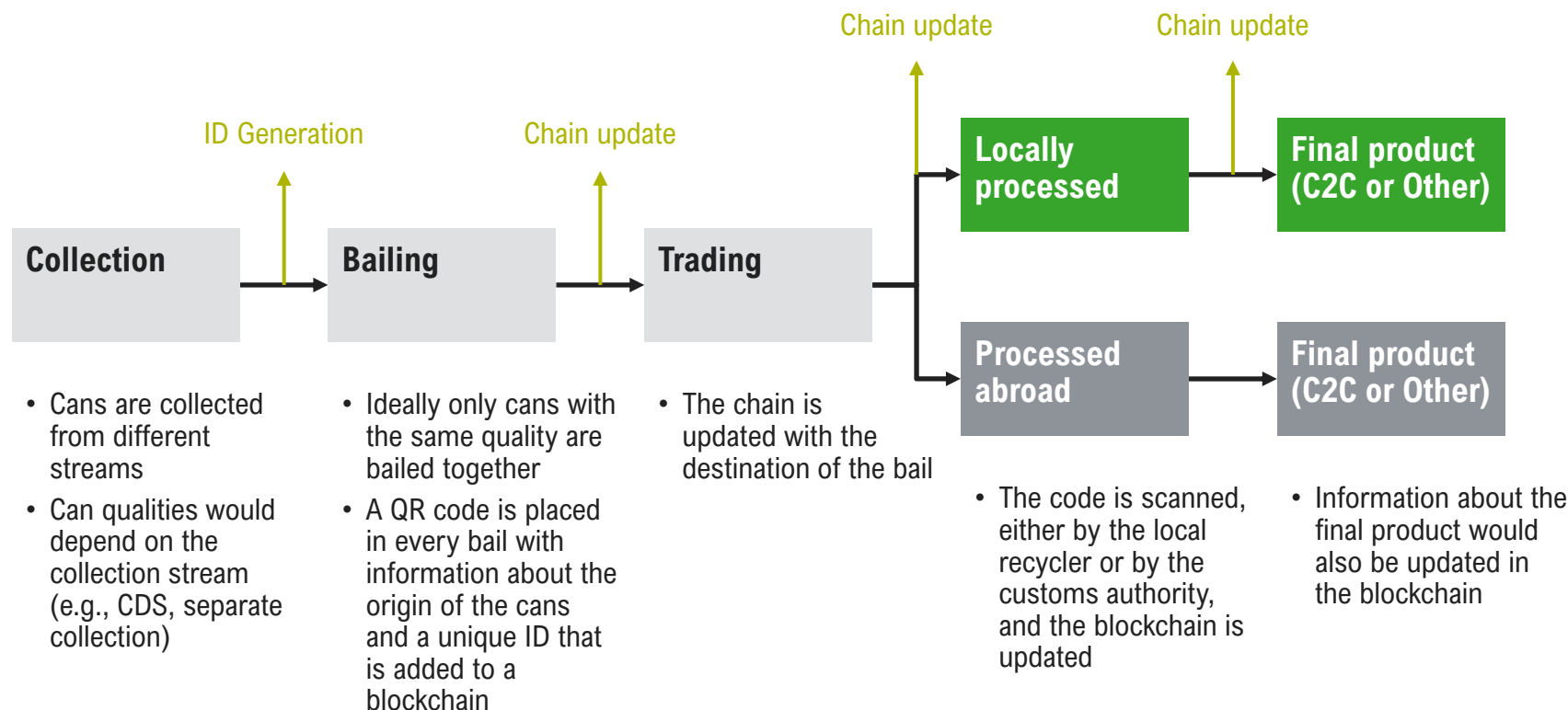
- Engage with relevant stakeholders and align on the requisites of the system
- Define the parameters of the process, i.e. its operating model:
 - Data collection frequency, data to be reported, etc.
 - System design such that human interaction is minimized
- Configure and implement the system as per the requirements of each country
- Launch training and awareness campaigns to all involved stakeholders
- Provide a grace period before enforcement



A reporting system available for all market participants is suggested; all the anonymized data allows the EPR operators to improve the system

Lever – Support global trading platform for waste

System available for all market participants



System requirements



- The system should be able to work if just implemented by one country; but it should be easily scalable to cover multiple countries
- The system should allow to accept transfers of money from the PRO to recyclers

User principles



- All the data is anonymized to ensure there is no breach of confidential information
- All the players that regularly upload the data can access the anonymized data
- EPR remains the custodian of the data and continues to do studies to improve the system using the collected data

Roland
Berger

