



Aluminum Cans Market Assessment - Cambodia

Context, quantitative baseline, options

Final version

May 2023

List of abbreviations – selection

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

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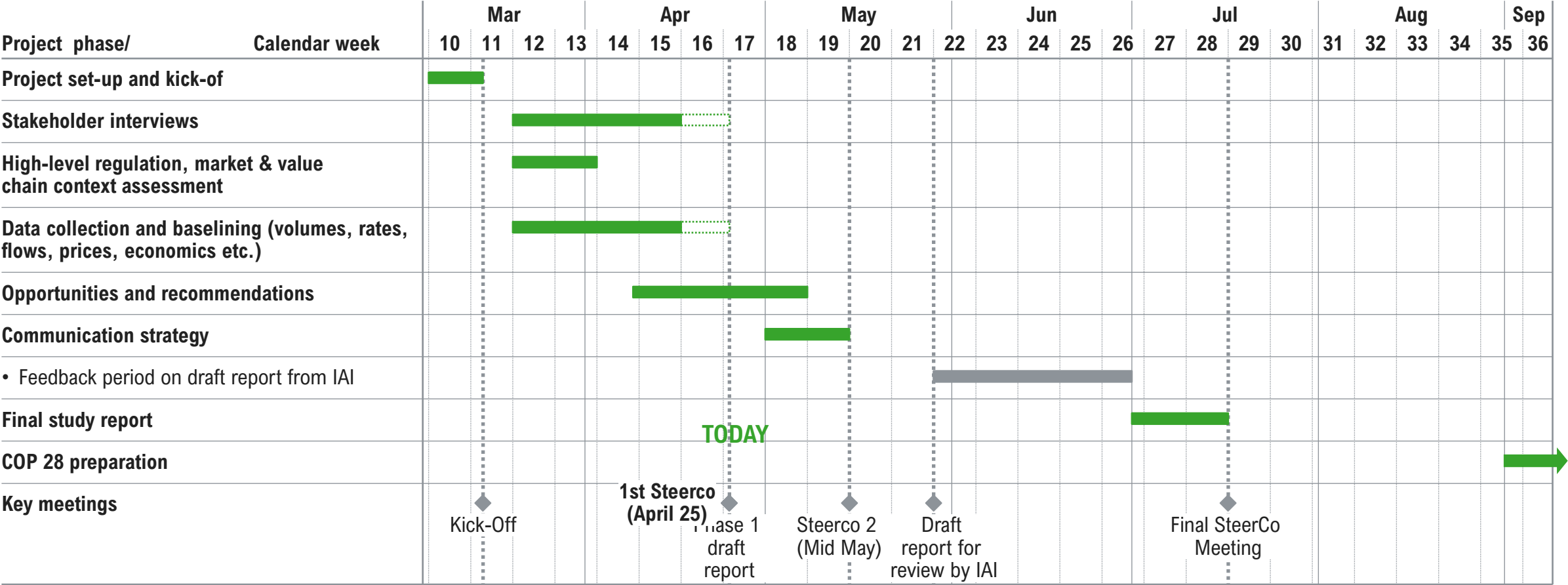
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1. Executive summary

We are approaching the end of phase 1 of the project, with the initial draft report sent and being discussed with relevant country representatives

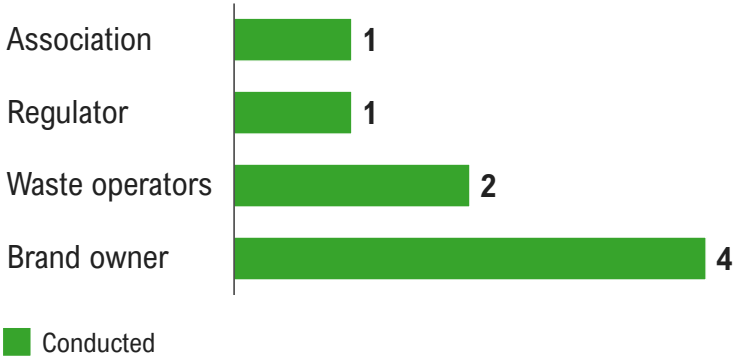
Project timeline



To well-document the recycling infrastructure in Cambodia, multiple interviews with stakeholders across the value chain were held, in addition to research sources

Overview of interviews and sources

Σ 8 total entities interviewed



	#	Company	Position
Waste operator	1	GAEA Waste Management	Former Board Member
	2	GAEA Waste Management	Former CEO
Association	3	Little Green Spark	Co-Founder
Regulator	4	GIZ, Ministry of Environment	Expert Strategic Planning Waste
Brand owner	5	Brand Owner	Regional Sustainability Director
	6	Brand Owner	Former Head of Strategic Planning
	7	Brand Owner	Country director
	8	Carlsberg	Head of Sales Operations and Planning



Statistics/ databases

- Aluminium Recovery figures
- Export data

Industry players, experts, regulators

- Government and associations
- Recyclers

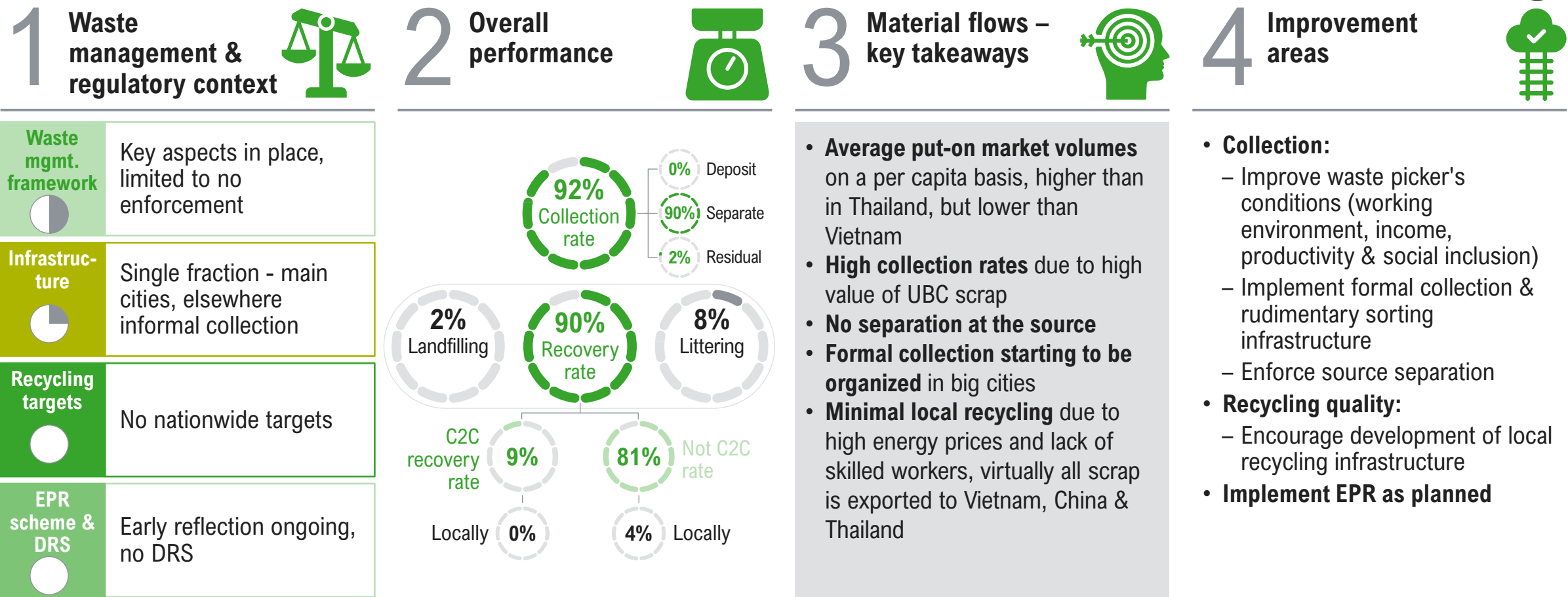
Market studies

RB sources

- Previous project experience
- Internal experts
- Industry contacts

Cambodia reports high collection rates as UBC scrap is valuable, lack of recycling capacity results in all scrap being exported to neighboring countries & China

Aluminium can recycling in Cambodia



Not existing
 Incipient, with limited scope
 Developing
 Matured
 Fully developed

1) Separate coll. includes recovered after MRF & transfer station, and all UBCs picked by waste pickers

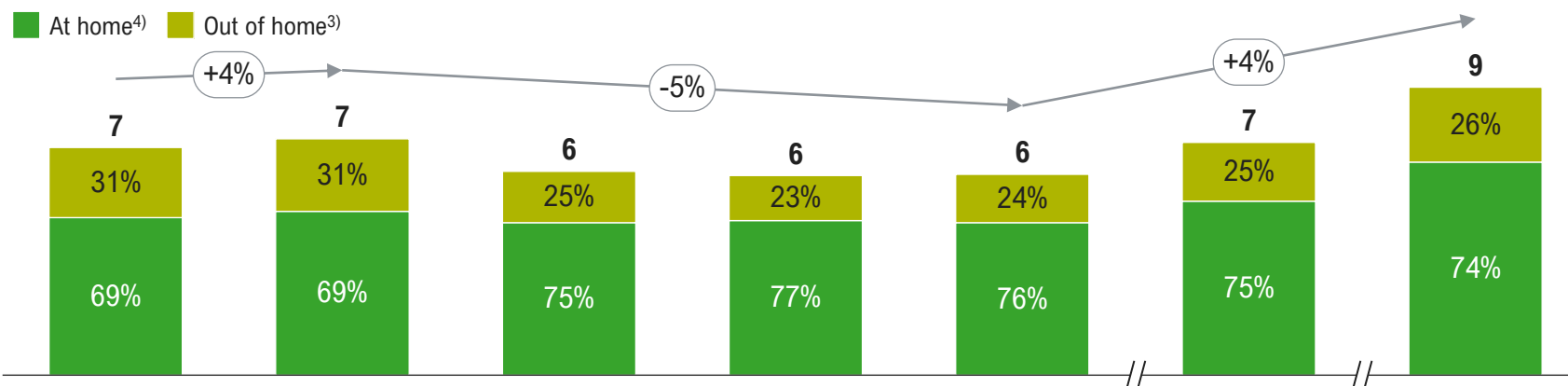


2. Aluminum Cans Market

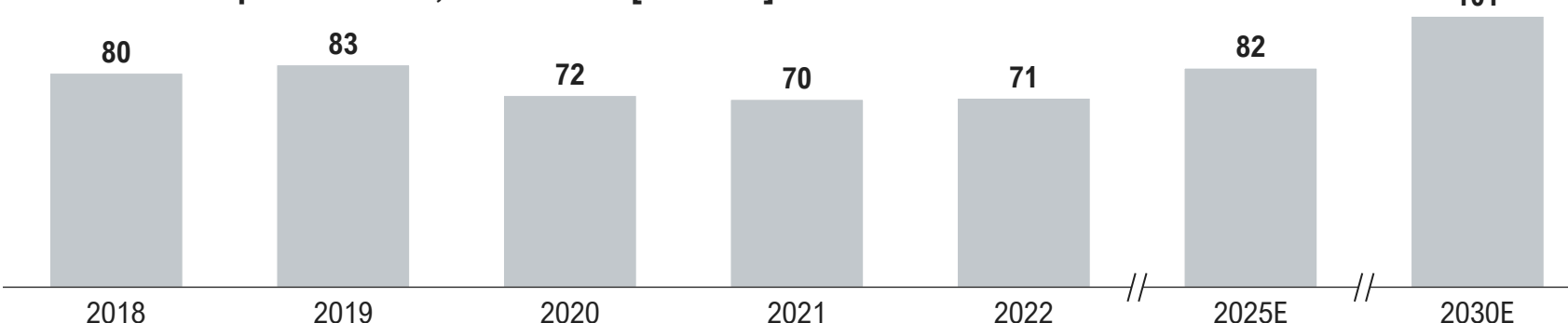
The aluminium can market has been steadily increasing in Cambodia in the past years, by 6% on average

Overview of volumes put on market

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



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



1) POM volumes are estimated by averaging input data from interviews with market stakeholders combined with reports from market research; 2) Estimated 11.75 g per can; 3) Out of home consumption includes hotels, restaurants, and catering; 4) At home consumption includes the remaining cans



Key takeaways

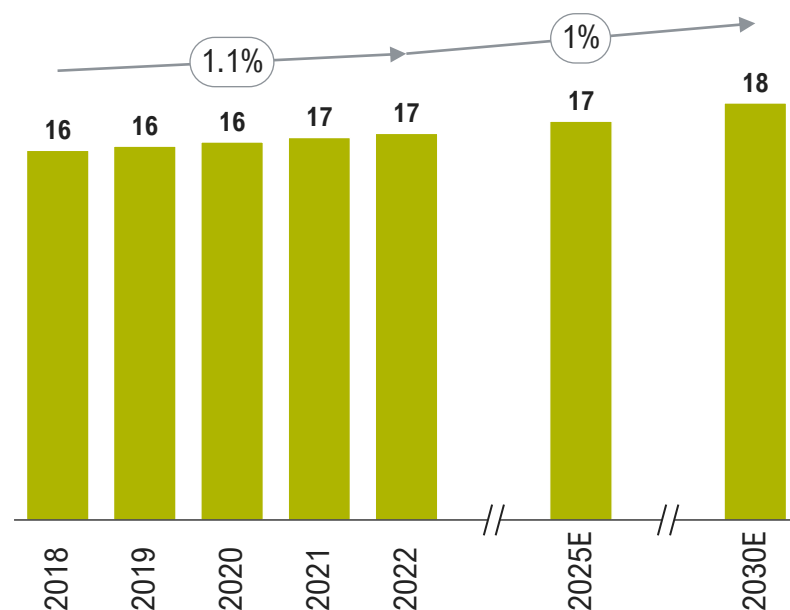
- Cambodia has average put on market volumes per capita compared to other South-East Asian countries,
- Aluminium beverage packaging consumption's growth before COVID-19 was 4%, but COVID-19 affected severely can consumption
- Can consumption is expected to grow over pre-COVID-19 levels in the following years
- Ring-pull lottery system plays an important role in can growth and consumption
- The majority of the aluminum cans are consumed at home, but the share of aluminium cans consumed in the out of home segment is relatively high as aluminium beverage cans are common in these establishments

The aluminium can market suffered a significant decrease due to COVID-19 and a decrease in beer consumption

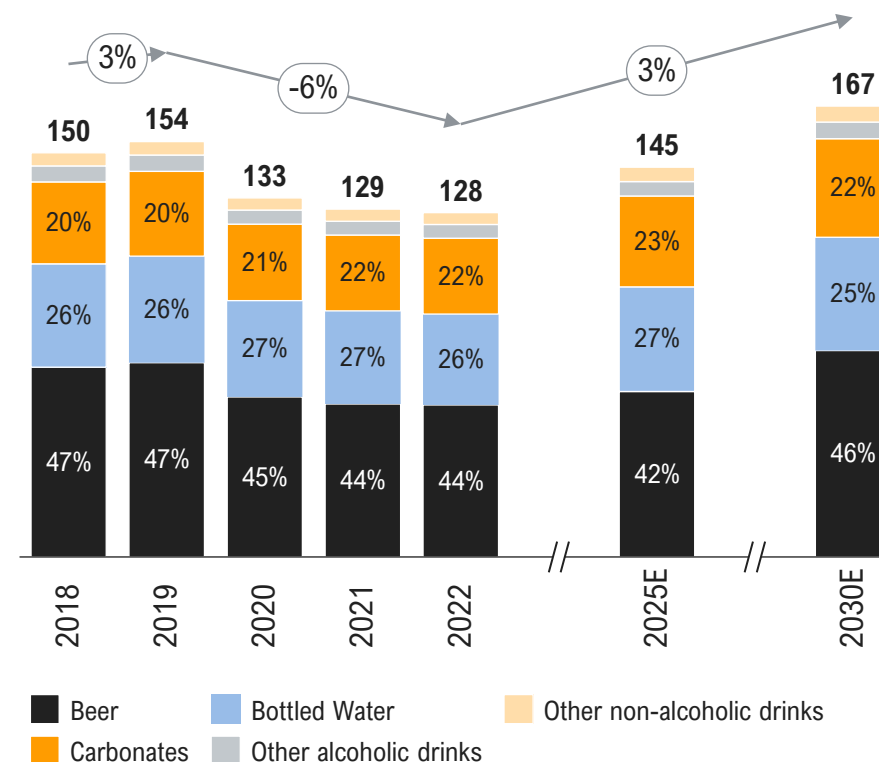
Population, package & beverage trends



Population, 2018-2030E [m inhabitants]



Estimated annual packaged beverage, 2018-2030E [l/capita, %]¹⁾

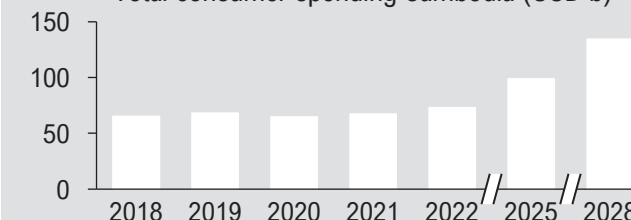


Key takeaways



- Population has been steadily increasing in the past years, and it is expected to keep increasing at the same pace
- Overall annual packaged consumption per capita suffered a significant drop due to COVID-19, and it hasn't been able to recover yet
- However, annual beverage consumption per capita is expected to increase at pre-COVID-19 growth level this growth is expected to be sustained by further consumer spending increase

Total consumer spending Cambodia (USD b)



1) Estimated based on expert interviews with market participants & available data sources



3. Waste management & regulatory context

The waste regulation framework in Cambodia is weak and relies on municipalities; moreover, enforcement is limited

Regulatory Waste Management framework & infrastructure overview



Waste mgmt. framework		<ul style="list-style-type: none"> Roles & responsibilities: The core legislative framework is weak; it is developed by the Ministry of Environment leads the implementation, but it relies highly on municipalities to develop their own laws and objectives, and implementing them Maturity: Most key aspects to ensure safe disposal of waste has been implemented in major cities, no strong drive towards circular economy yet; rural areas still don't have an infrastructure and a framework that ensure safe disposal
Collection infrastructure		<ul style="list-style-type: none"> Organized collection: 55% of urban population is covered by formal collection, the rest of the urban population & rural population is only covered by informal collection Collection targets: Cambodia has not set any nationwide collection targets; some cities like Phnom Penh have set a 90% collection rate target by 2023 Source separation: Cambodia's regulation does not mandate source separation, only some cities have started obliging it, but implementation and enforcement is missing
Treatment Infrastructure		<ul style="list-style-type: none"> Sorting & treatment infrastructure is missing, all sorting is done manually either by street pickers, employees of the waste management companies or waste pickers present on landfills Only two transfer stations in major cities provide opportunities for waste pickers to sort through waste in a more organized manner
Recycling targets		<ul style="list-style-type: none"> General waste recycling targets: Cambodia has not set any nationwide recycling targets; some cities like Phnom Penh have set a has set a 50% recycling rate for non-organic waste Metal recycling targets: No specific metal packaging recycling target
EPR scheme & DRS		<ul style="list-style-type: none"> EPR: <ul style="list-style-type: none"> –EPR talks are starting to take place, but it is not even in the design phase –EPR expected to be mandatory in 2027-2028 DRS: No deposit return systems are available, nor immediately planned, in Vietnam

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

Cambodia has established a waste management framework, implementation is left to local authorities (municipalities)

Cambodia – regulation overview



Act on Environment

- Responsibility of establishing waste management guidelines for MoE, and municipalities to develop waste plans
- Mandatory export license to send waste abroad
- Prohibition of MSW imports
- MoE to monitor waste storage, transport, recycling and treatment

Climate Change Strategic Plan 2014-2023

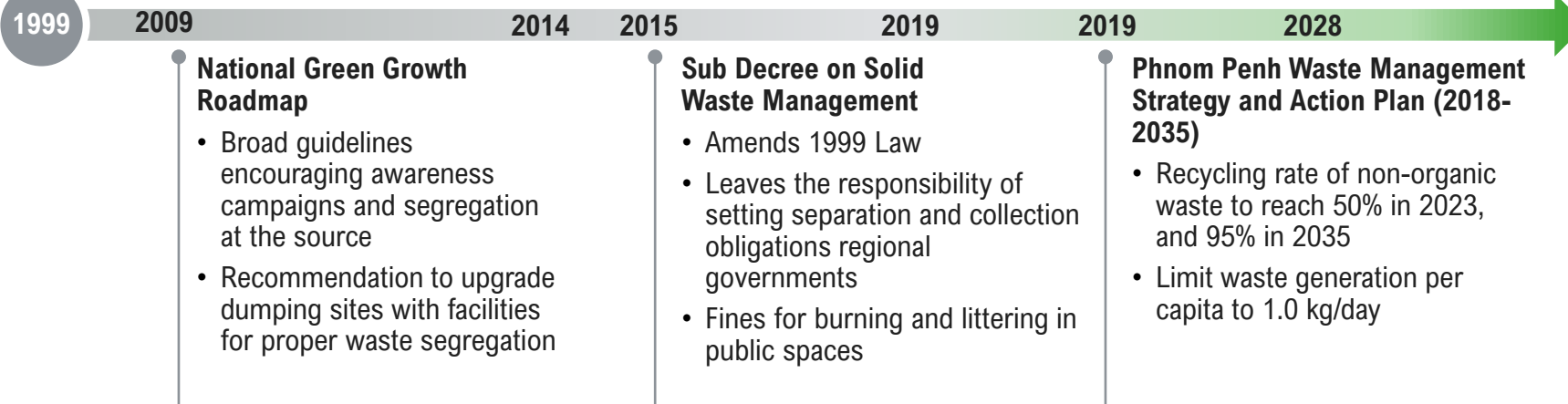
- 10-year plan capturing the main strategic objectives
- It doesn't elaborate on waste management, stating only the objective of managing waste through an integrated approach

Cambodia's Voluntary National Review of the Implementation of 2030 Agenda

- Includes targets and actions to implement for 2030
- Sets objectives for total recycled materials
- Sets objectives for collected general waste and segregation

EPR Implementation

- EPR expected to become mandatory
- EPR is not yet in the design phase
- They plan to firstly implement a voluntary EPR



Highlights and key takeaways



- Broad legislation framework without concrete objectives, relying mainly in municipalities to further develop the law
- Irregular development between municipalities, being Phnom Penh the most advanced
- No separate collection mandatory
- Waste management doesn't seem to be a priority in Cambodia's environmental strategies
- Mandatory EPR for packaging intended to come into force in 2028, but scope isn't defined yet



4. Value Chain

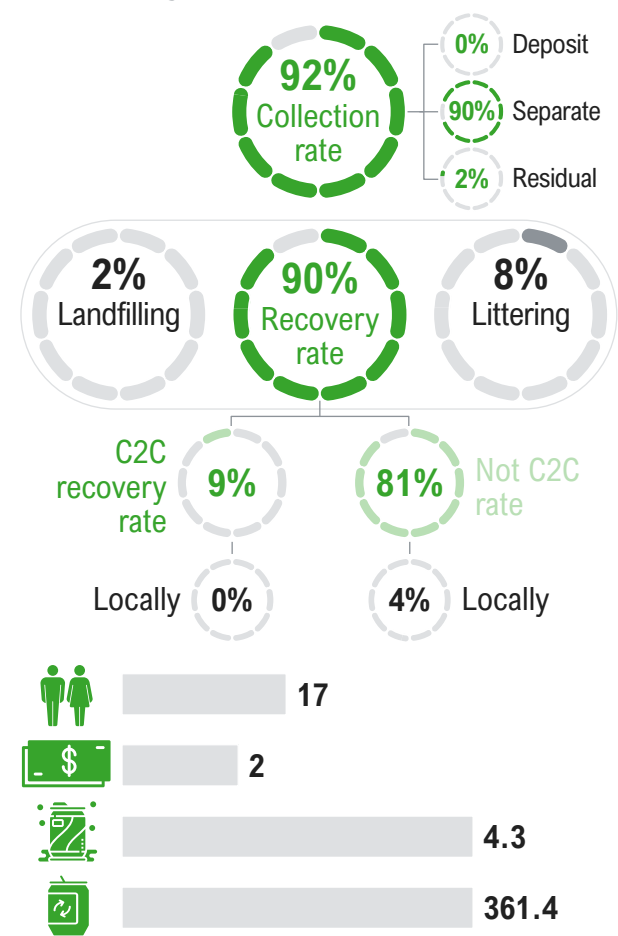
High recovery rates are achieved through a large network of waste pickers, recycling is done abroad as the recycling infrastructure never developed

Overview of aluminum cans value chain



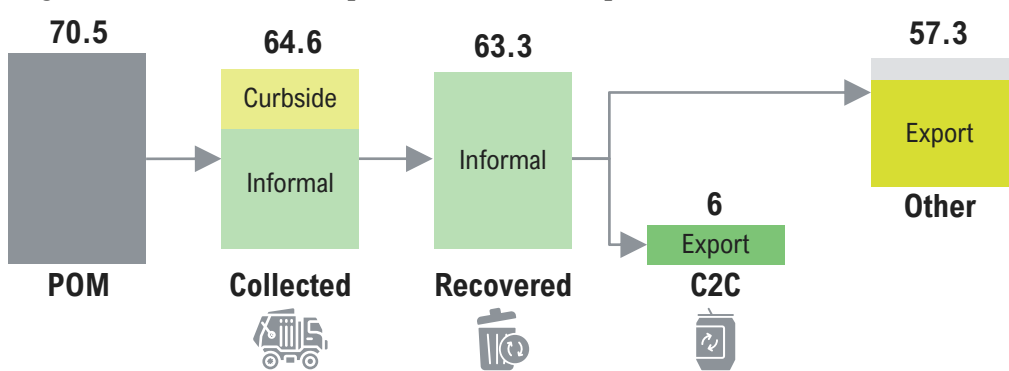
Cambodia reports high collection rates as UBC scrap is valuable, lack of recycling capacity forces to export

Summary of aluminium cans flows, 2022 [k tonnes]

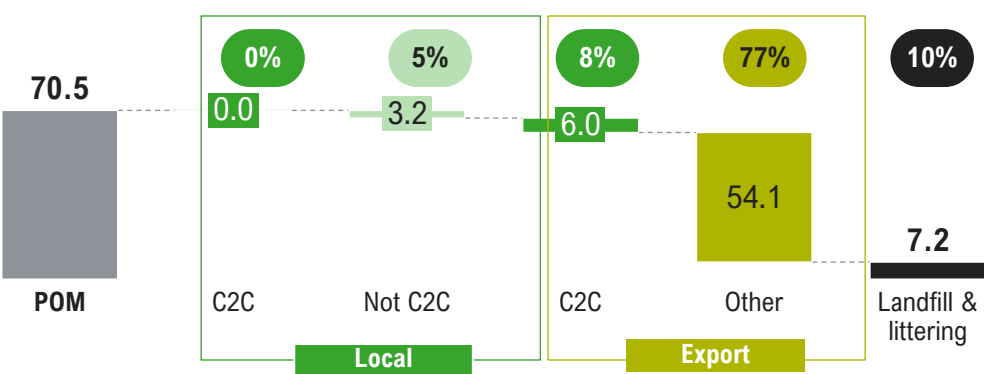


Population (million, 2022)
 GDP per capita (USD k/ capita, 2021)
 Annual consumption (kg/ capita, 2022)
 Annual consumption (can/ capita, 2022, 11.75 g/ can)
 Final destination [%POM]

Key market indicators [k tonnes, %POM]



Destinations [k tonnes, %POM]

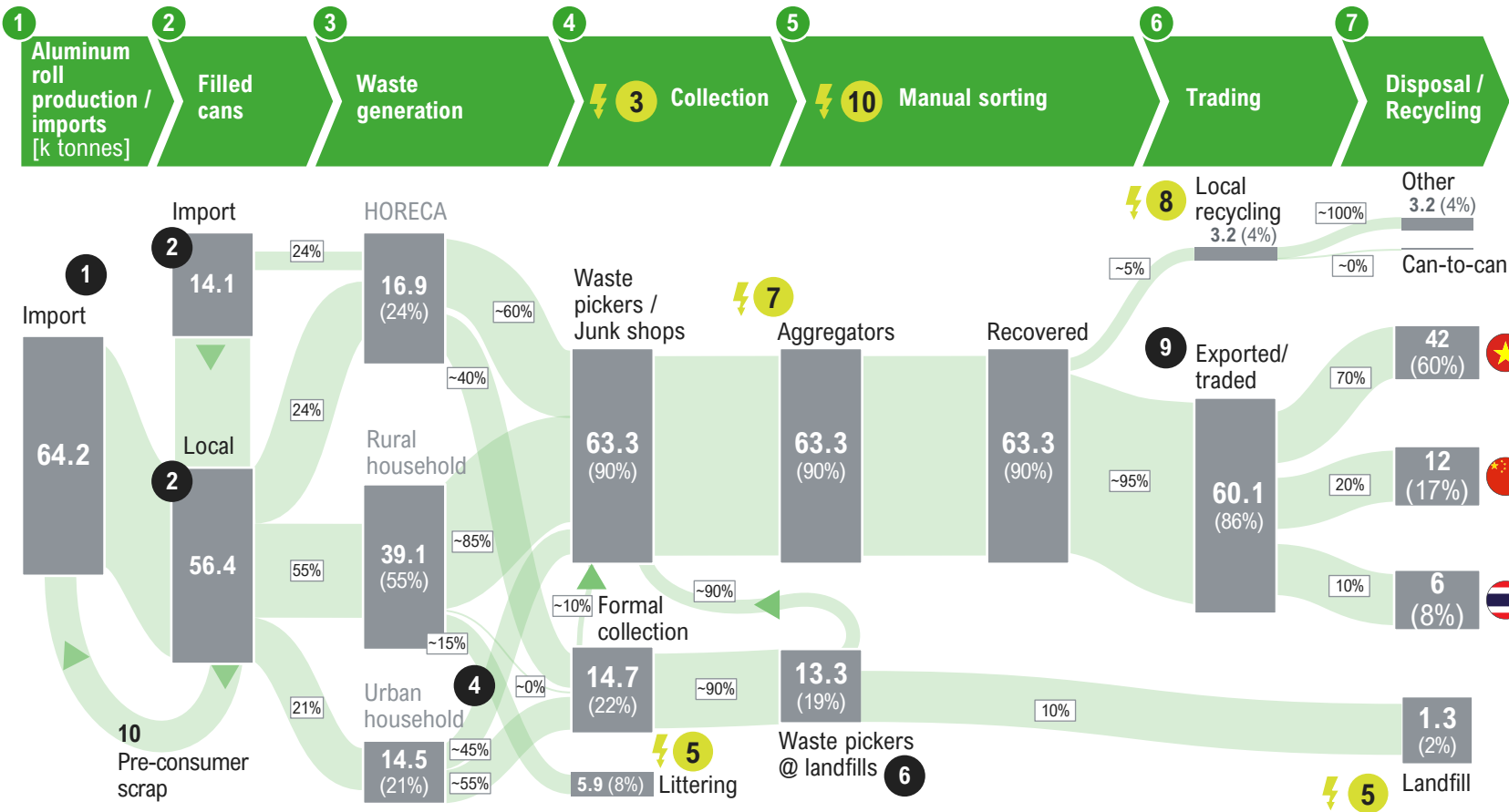


Key takeaways

- Average put-on market volumes** on a per capita basis, exceeding volumes put-on-market observed in Thailand and Vietnam
- No local aluminium roll production** & no capacity to process UBC, hence no local "closed-loop"
- High collection rates** due to high value of aluminium to the informal waste sector
- No separation at the source**
- Formal collection starting to be organized and efficient** in big cities
- Minimal local recycling** due to high energy prices and lack of skilled workers, virtually all scrap is exported to Vietnam, China & Thailand

The informal waste collection system in Cambodia guarantees high recovery rates– the lack of local recycling forces to export

Material flows of aluminium cans [k tonnes²⁾³⁾, (% of total POM volume)]

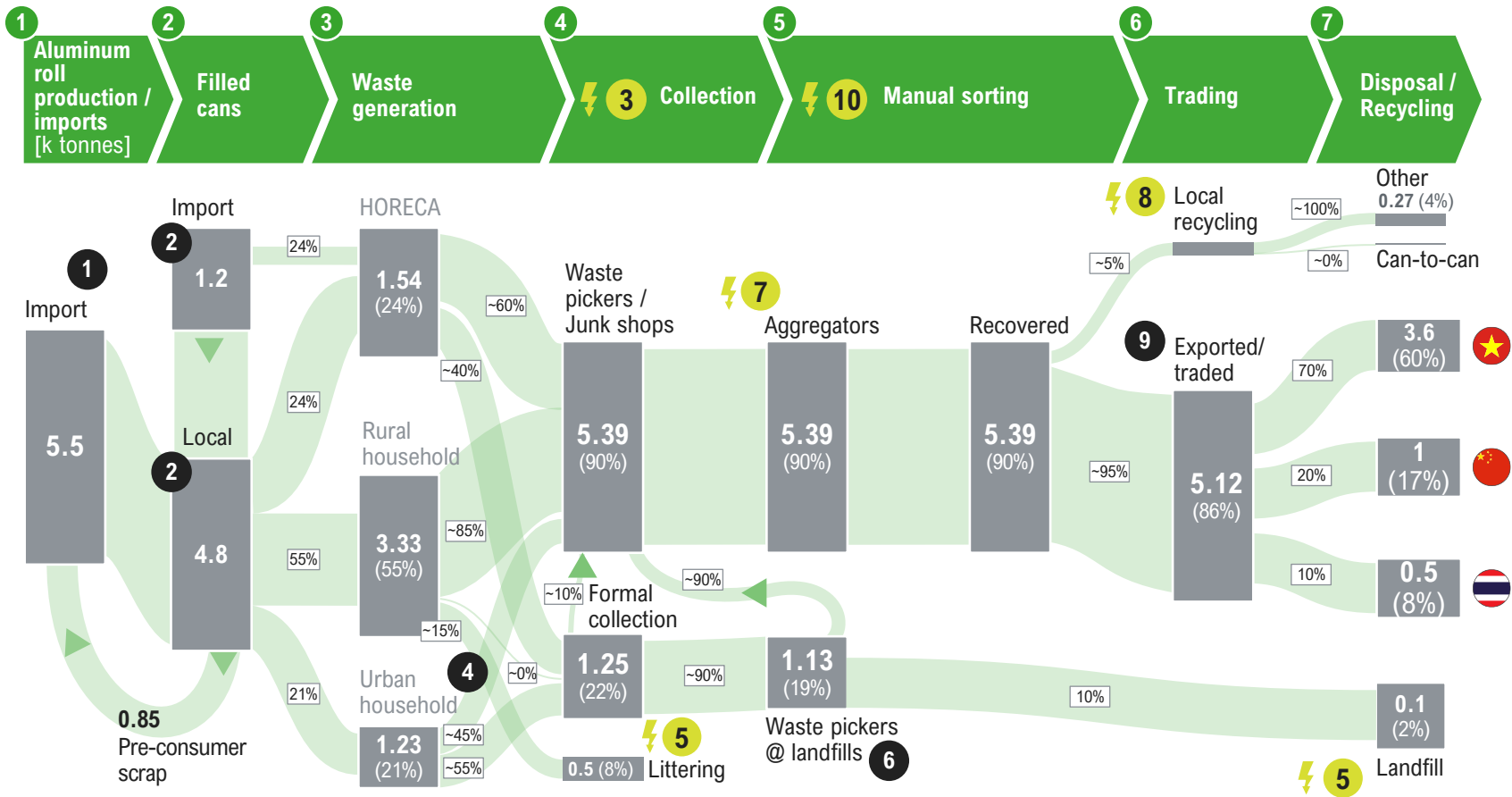


0 Observation ⚡ 0 Identified opportunity for improvement

1) The share of exports varies due to many factors, but the countries lister are always the top 3; 2) Estimated weight per can: 11.75 g; 3) ~3.2% of can weight is due to paint

The informal waste collection system in Cambodia guarantees high recovery rates– the lack of local recycling forces to export

Material flows of aluminium cans in Cambodia, 2022 [b units¹], (% of total POM volume)



0 Observation ⚡ 0 Identified opportunity for improvement

1) Estimated weight per can: 11.75 g

There are 4 can manufacturing plants in Cambodia, with some plans to build additional plants

Overview of the can manufacturing plants in Cambodia



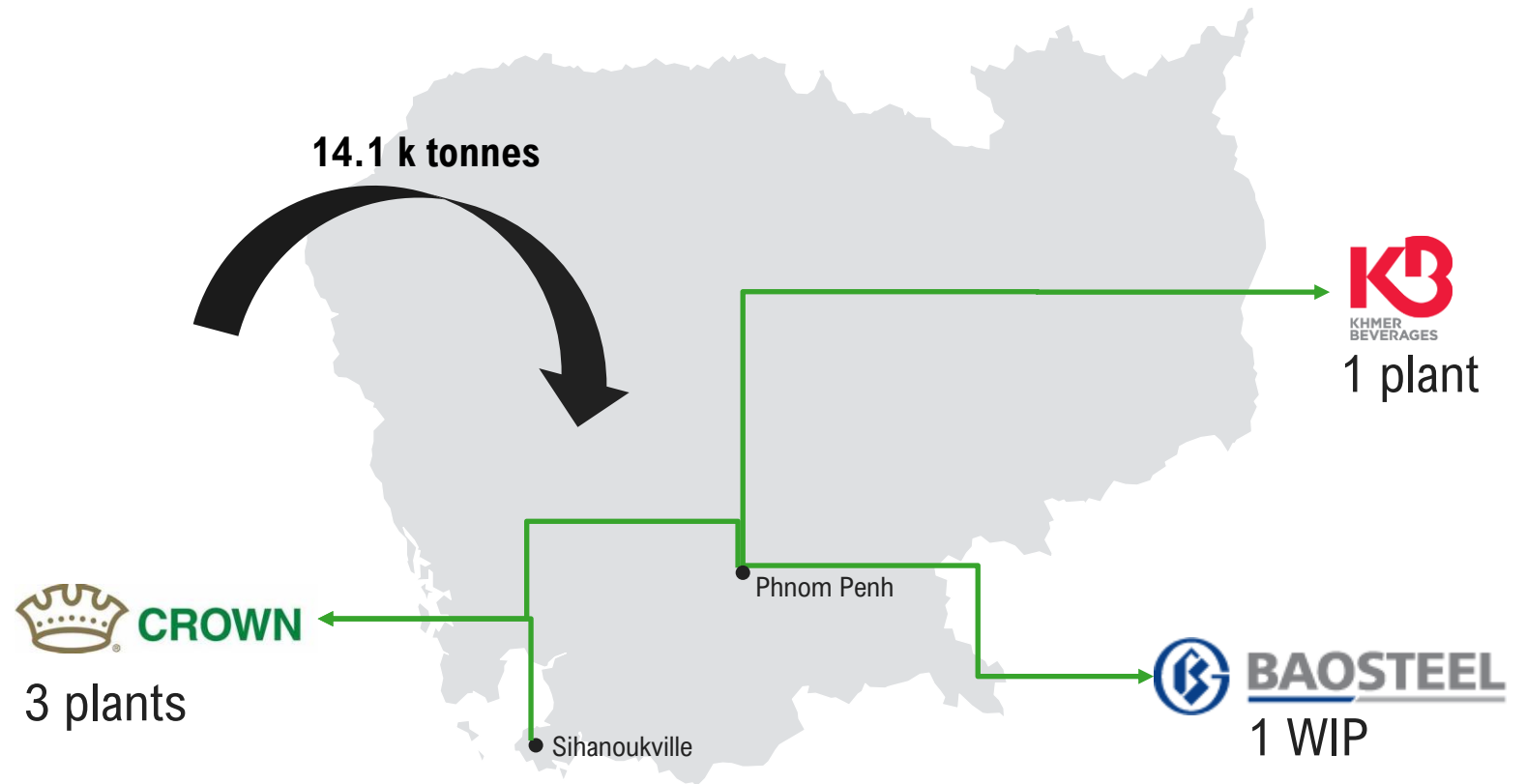
4 manufacturing plants



6 b cans put on market

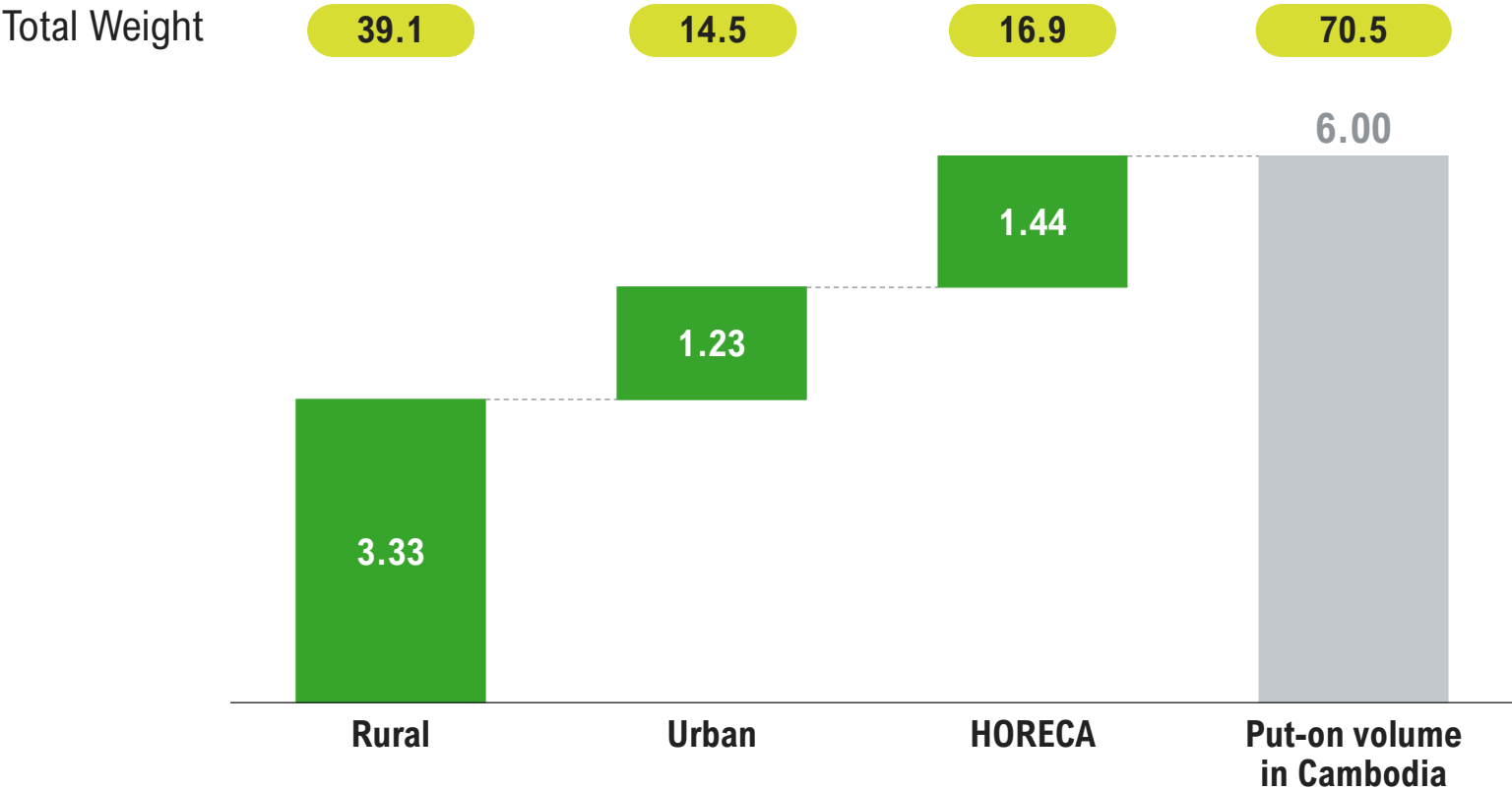


1.2 b cans import



Cambodia has a relatively high HORECA consumption due to the affordability of street food and the preference towards aluminium cans

Distribution of Put-on Market Volumes across Urban & Rural households and HORECA¹⁾
[million units, k tonnes]



Key Takeaways

- Out of the total put-on volumes in Cambodia, **70%** (i.e., ~1 billion) **is in-house consumption**
 - **rural consumption** is **higher than urban** consumption, accounting respectively for **70%** and **30%** of the total in-house consumption, linked to the urbanization rate of the country which is the lowest among Thailand, Vietnam & Cambodia
 - **HORECA consumption** accounts for **24%** of domestic consumption; relatively high compared to nearby countries due to **the affordability of street food** and the high **popularity** of aluminium cans in **street restaurants**

1) Including imports

The Cambodia beer market is highly competitive; several players have launched lottery in the back of the rings from cans to attract customers

Overview of the ring-pull lottery system in Cambodia

Beer companies in Cambodia



Ring-pull system

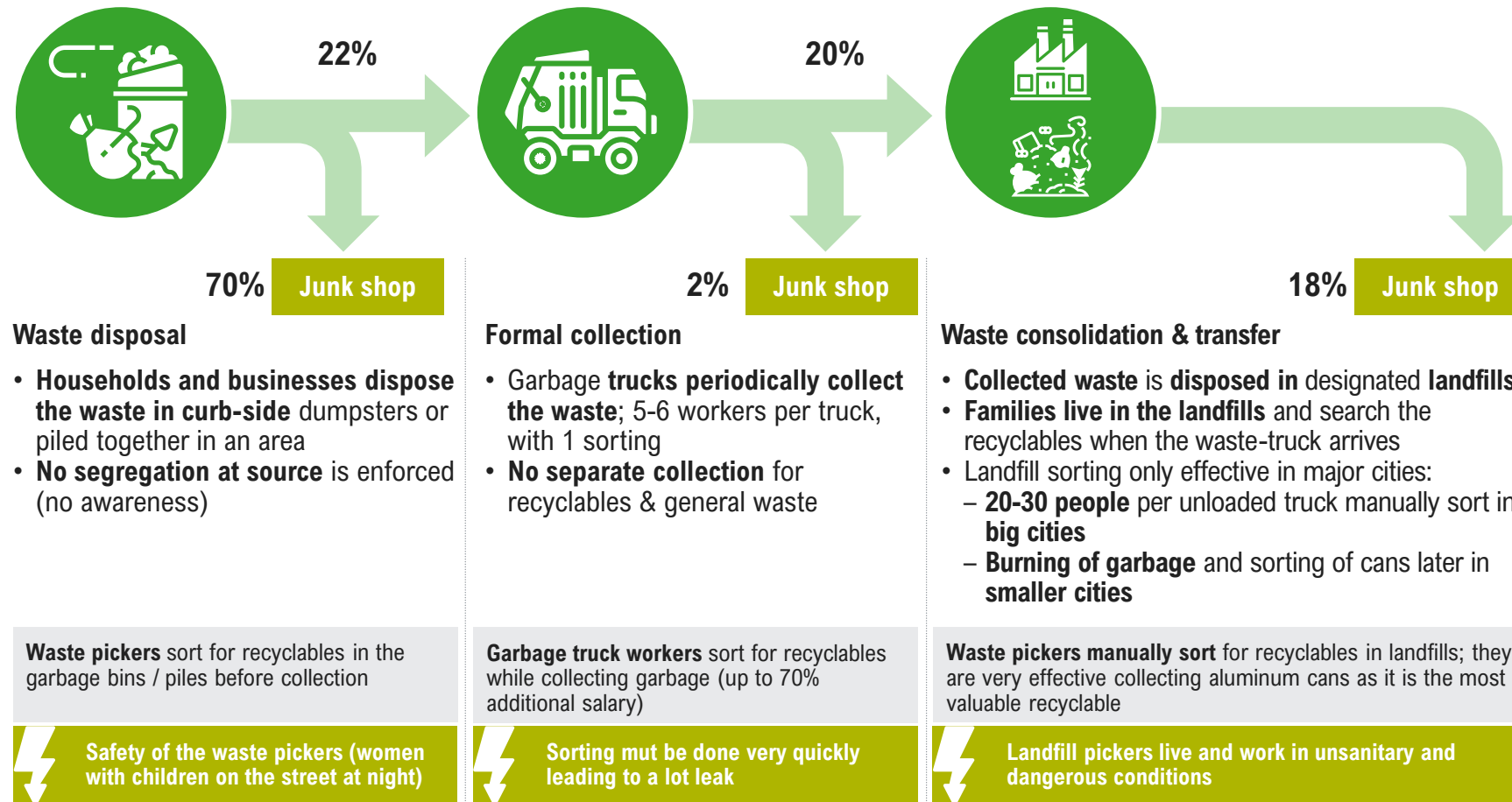
- **Competition** in the **beer market** in Cambodia is **very strong**, with multiple international and national players fighting to increase their market share
- Several beer companies have launched **lottery campaigns**:
 - **Every ring** from beer cans contains indications on the **prize** the customer has won
 - The **prizes**, if awarded, can **range from an additional beer to USD 1000 and even cars**
- Prizes **must be claimed before a specific date**

Key takeaways

- According to experts in the beer industry, the **growth in the beer market**, and therefore in the can market, is **highly dependent on the ring-pull system**
- The **ring-pull system is subsidized by the Government**:
 - Were the system to stop being subsidized, the POM volumes would decrease significantly according to experts
 - According to experts the **Government is in favor of continue subsidizing** these initiatives in the following years

Most of the recyclables are sorted before reaching formal collection; after formal collection high-value recyclables are sorted by workers or informal sector

Formal collection structure of municipal waste in Cambodia



Key takeaways



- There is **no segregation** at source (it is mandatory in some cities, but not enforced, and no separate collection)
- Three types of formal waste collection** can be observed across Cambodia:
 - Tier 1:** a professional collection company, paid using the collected taxes, recovers waste from the majority of the households
 - Tier 2:** a professional collection company recovers waste from the households that voluntarily pay the fee
 - Tier 3:** small entrepreneurs are appointed by the city hall, and they are paid either by collecting fees or from the collected taxes
- It is a **leaky system**, with aluminum cans exiting the formal flow in every step
- Sorting infrastructure is inexistent**, and all the sorting is done manually in very poor conditions

In small cities, any formal collection is organized through semi-informal systems, larger cities & the capital have professional waste management companies

Overview of the 3 formal collection systems in Cambodia

Tier 3 - Semi-informal

- This system is found in smaller cities / villages such as **Kep, Bavet, and Suong**
- **36.5% of the urban population** is in this stage
- **Small entrepreneurs** - One or few companies appointed by the city hall
- **Limited transparency** in the appointment process of the waste collector
- **No separate collection**
- **Cost varies** and it is either **paid for by voluntary citizens or by the municipality**
- **Lack of capital** to make the system more efficient (e.g., trucks)
- **Lack of transparency**

"Some informal collectors organize, put together some money, and buy vehicle"

– **Waste collection operations manager**



Tier 2 – Locally formalized

- Tier 2 systems are found in larger cities (**Battambang, Siem Reap, and Sihanoukville**)
- **11.5% of the urban population** is in this stage
- **Professional waste management company**
- **Tender process** for the waste collection
- **No separate collection**
- **KHR 4000 (~USD 1) per month per household, paid for by voluntary households** to waste companies
- Voluntary contribution: **lack of willingness to pay**, as they can dispose it in the neighbor's container or litter
- **Lack of transparency** in the tendering process

"Some recycling improvement levers would be forcing people to pay the collection fees"

– **Waste collection operations manager**



Tier 1 – Formalized

- Tier 1 system is only present in **Phnom Penh**
- **51% of the urban population** is in this stage
- **Professional waste management company**
- **Formal & extended tender process**
- The **private companies** are only **in charge of the collection**, and the local government collects the fees (as taxes) and manages the landfills
- **No separate collection**
- **KHR 6000 – 10000 (~USD 1.5 to 2.5) per month per household, paid using the collected taxes**
- Difficulty finding **skilled workers**, especially middle-managers – difficulties implementing standardized waste management practices

"100% of houses in Phnom Penh have access to formal collection"

– **Waste collection operations CEO**



The informal sector is not a homogeneous group, and is composed of different actors that conform an invisible infrastructure

Overview of the different participants in the informal sector



Street waste pickers

- Street waste pickers are usually women and children
- They work covering a specific area, and they depend on their reputation with waste generators
- They sometimes get the kart from junkshops, in exchange of selling to them their recyclables



Landfill waste pickers

- Landfill waste pickers live in the landfills or nearby
- In big cities around 20-30 sort the waste of each unloaded track
- In countryside cities they burn all the waste and separate valuables after burning



Occasional waste pickers

- Occasional waste pickers are a heterogeneous group that sometimes sort or/and collect recyclable to earn extra income



Formal workers

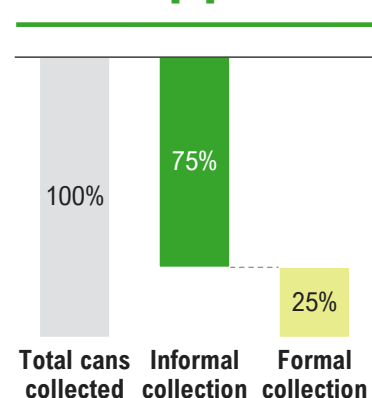
- Formal workers sort the recyclable to earn an extra income
- They can add around a 60-70% of their USD 250 average salary by sorting and selling recyclables



Most of the waste is collected by the informal sector except from some big cities; street pickers are not registered and there is a lack of transparency regarding them

Informal sector overview - Cambodia

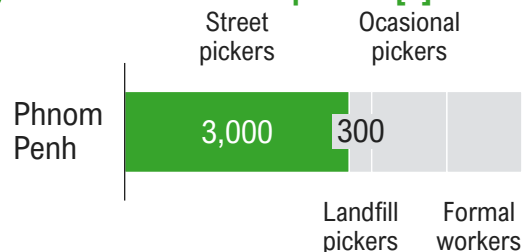
Informal sector collection¹⁾ [%]



Flow of aluminium cans collected by pickers [%]



Number for waste pickers [#]

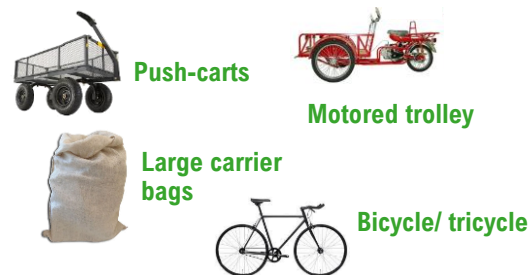


No registration system nor official data

Life of waste pickers

- Locally called **ed jai**, they organize waste as they see fit
- They are **organized covering a small area of the city** where they have gained a reputation (unwilling to formalize)
- Invisible infrastructure** that seems unorganized, but at local level is **well organized covering all the areas**

Collection tools



Key takeaways



- The waste picking profession offers an **attractive salary** (USD 100-230 per month), in some cases being higher than the minimum salary (USD 160 per month)
- It offers **flexibility to the workers**, allowing women to do the job with their children
- Most of the waste pickers are women**
- The waste pickers represent an **invisible infrastructure** that is unorganized at first sight, but is in fact very well organized and streamlined at the local level
- Most of them are **unwilling to be formalized**, as they have already achieved a reputation and control an area; they would lose their flexibility and their reputation

1) First step collection

There are numerous challenges affecting the informal sector in Cambodia, making it lag behind Thailand's and Vietnam's

Key challenges affecting waste pickers and the system

Challenges affecting waste pickers



Lack of transparency, which makes waste pickers vulnerable to the prices set by junk shops
"First-level aggregators are fair as market is competitive, but second aggregators lack transparency"



High **health/ environmental hazard risk** due to **lack of protective clothing or equipment**
"Waste workers have strong habits, and they don't easily accept help"



Lack of local recyclers, adding more steps to the value chain, and **leading to lower prices**
"There is no local recycling due to high energy prices, lack of capital, and lack of skills"



Unstable/ constantly evolving **aluminum UBC waste prices**
"Even if material prices increase, the increase is not reflected for waste pickers"

Challenges affecting the collection and recycling informal system



Contamination level of collected aluminum waste at the landfill/ dumpsite, as high percentage of waste collected in Cambodia is organic



Lack of **regulation and government recognition** of waste pickers
"Waste picker regulation would make the system less effective, but with better quality"



Opportunity to improve the quality of the collection system providing incentives, leveraging on the adaptation capabilities of the invisible infrastructure

Littering still exists in rural communities that are isolated from formal and waste picker's coverage; however, aluminium cans are typically sorted by households

Littering activities in Cambodia



Littering in Cambodia is mainly done by both households and businesses **outside of urban areas and in rural communities**

Littering locations

Household



- **Pit burial / open burn** in each household's backyard
- **Disposal in public space** (e.g., road side, forest, canal, water body)

Business

(e.g., manufacturing, construction)

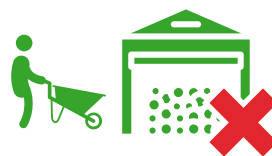


- **Disposal / Open burn in public space** (e.g., road side, forest, canal, water body)

Key reasons behind household waste littering



Limited formal waste collection in small, rural community



Lack of waste picker / junk shop coverage, not profitable sorting



Lack of knowledge on proper household waste management

Key Observation

Household

- Most households are conscious of the **high sales value of aluminium cans** and will try to sort and sell the UBCs
- UBCs are being littered in communities where it is **inconvenient to reach junk shops** due to distance and/or terrain (e.g., island, mountainous)

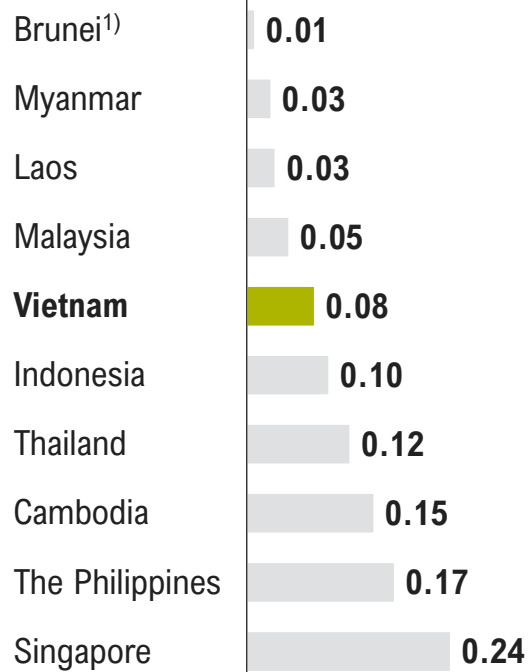
Business

- **Manufacturing and construction** companies are the main responsible for littering as proper waste disposal would incur extra cost
- Businesses that involves beverage cans such as **street hawkers** would keep the cans to sell due to **UBCs high sales value and ease of segregation at source**

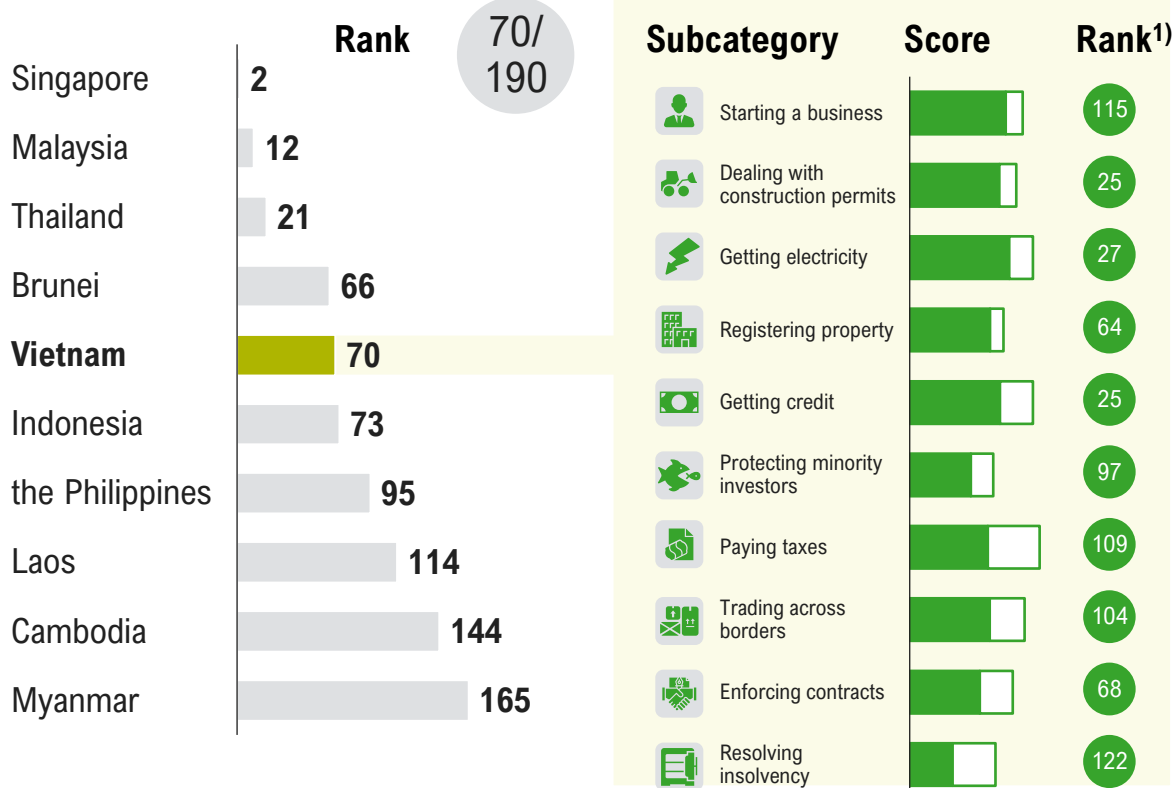
The recycling industry in Vietnam has developed easily due to the ease of doing business and the low energy prices

Vietnam's energy prices, ease of doing business, and skills overview

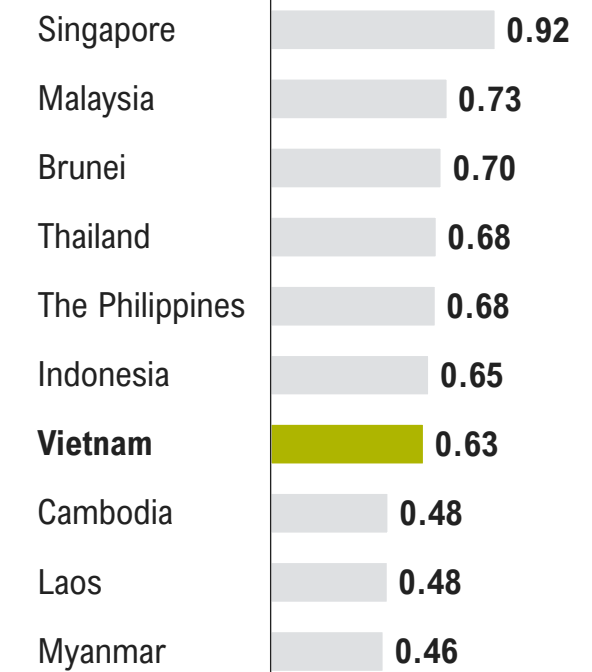
Electricity price ranking, 2022 [USD/kWh]



Ease of doing business index, 2020 [1=most easy country in the world]



Education ranking, 2019 [1=best education in the world]



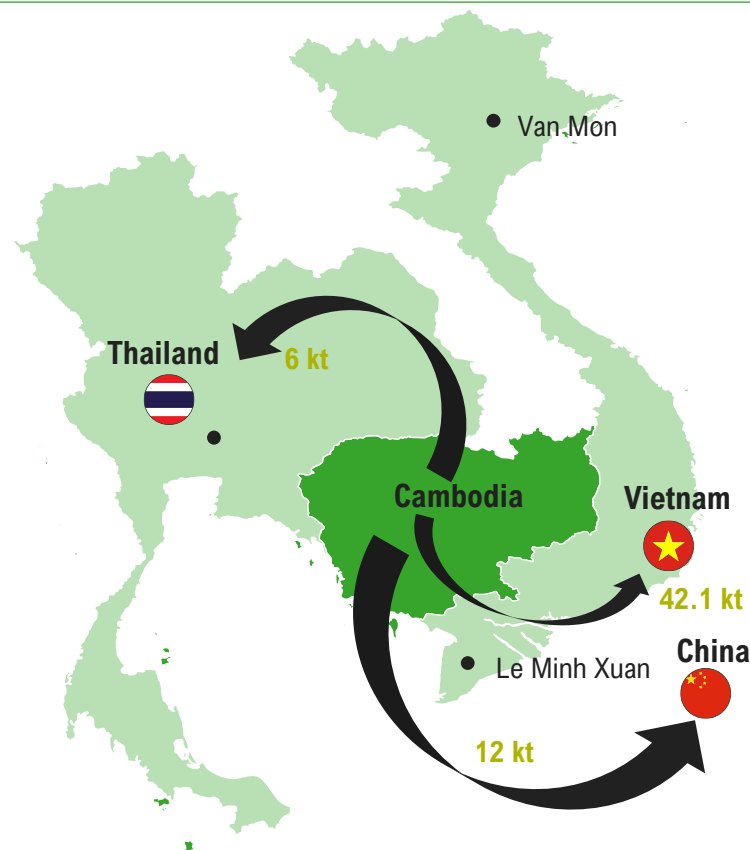
1) Brunei has multitier electricity tariffication, the rate shown corresponds to the first 600 kWh consumed on a monthly basis for households

Cambodia exports the aluminium cans scrap to Thailand, Vietnam and China; there is no local recycling in Cambodia, encouraging exports

Export volumes and destinations of scrap aluminium



Informal export sector



Key Observation



Exports

- Most of the locally collected cans are exported:
 - Lack of local recycling demand
 - High demand from neighboring countries with local recycling
- Informal exporters that buy the scrap to aggregators and sell it to local shops in Thailand, Vietnam, and Cambodia

Recycling

- No local recycling capabilities due to:
 - High-energy prices, as the country need to import most of their resources
 - Lack of skilled workers
 - Lack of capital for projects

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