

GreenLoop: ASEAN's Digital Circular Economy

Turning Waste into Credit: A Blockchain-Enabled
Tracking & Credit System Empowering ASEAN
Businesses Towards a Circular Future

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8 DECENT WORK AND
ECONOMIC GROWTH



9 INDUSTRY, INNOVATION
AND INFRASTRUCTURE



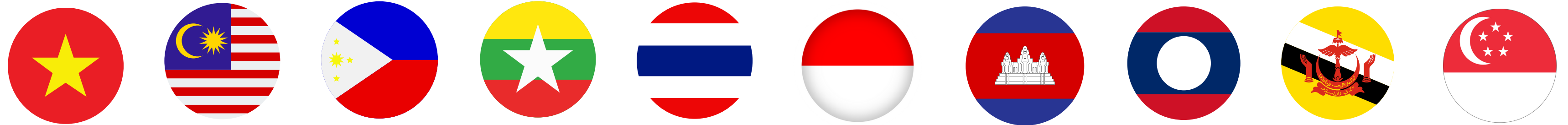
12 RESPONSIBLE
CONSUMPTION
AND PRODUCTION



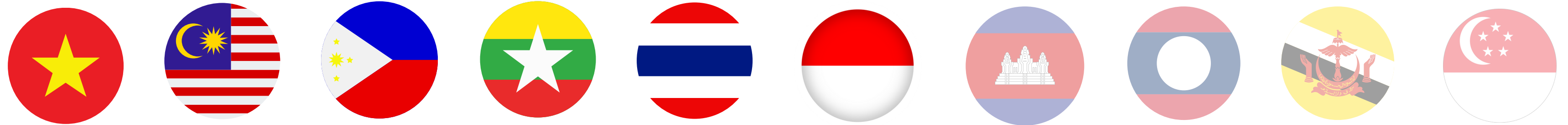


ASEAN's United Front Against Plastic Pollution

ASEAN's United Front Against Plastic Pollution



ASEAN's United Front Against Plastic Pollution



6 out of **10** ASEAN countries

are among the world's **top 10** plastic polluters

accounting for over **50%** of global ocean plastic waste



In 2024, ASEAN Member States declared a unified commitment to tackle plastic pollution across the entire life cycle.

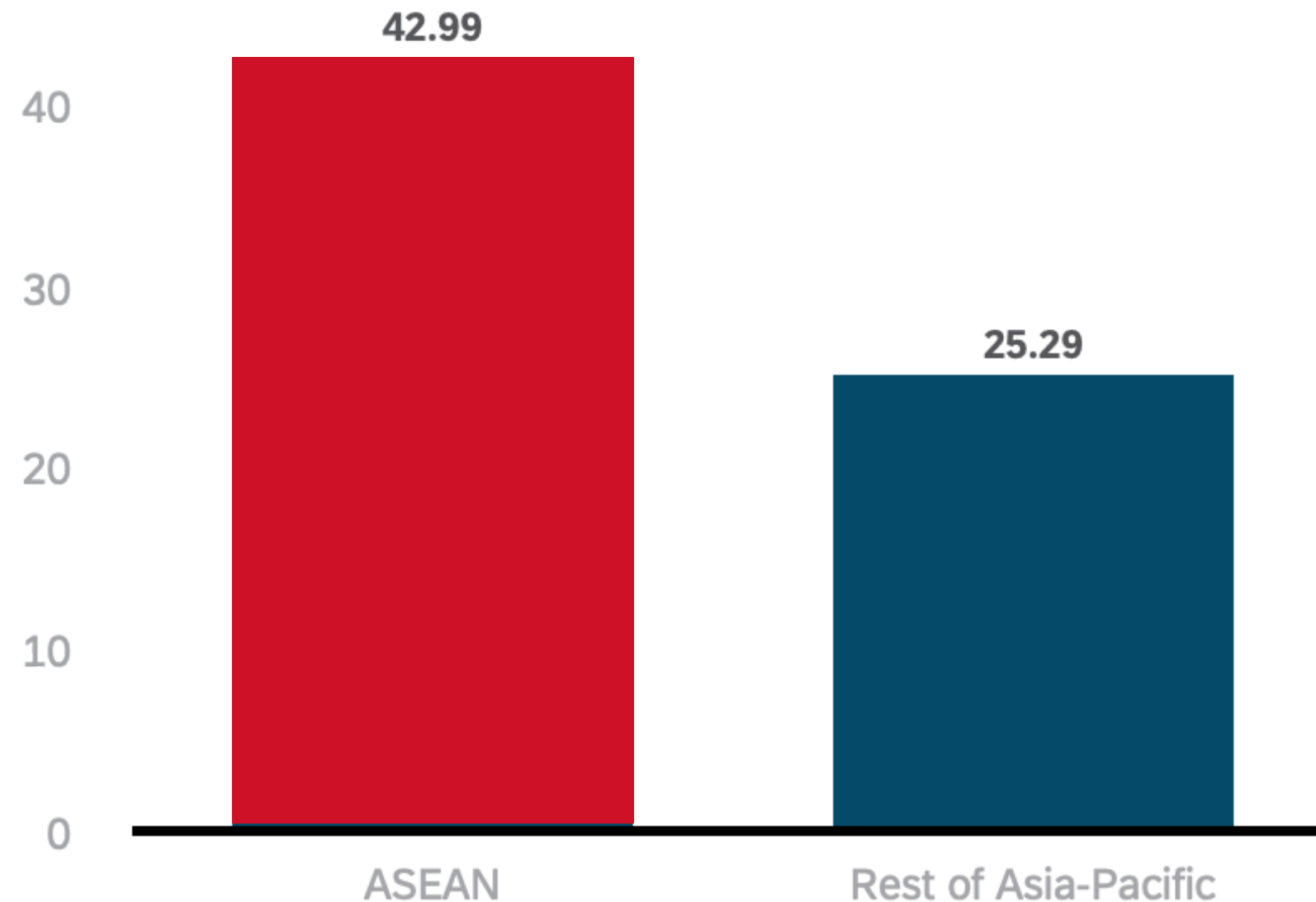
Source: ASEAN Secretariat (2024)
Suradja et al. (2023)

Issue 1

Low Plastic Recycling Rates Across ASEAN

Higher Per Capita Plastic Use in ASEAN

Per Capita Plastic Use (2022)



Within ASEAN

~ 42.99 kg/cap

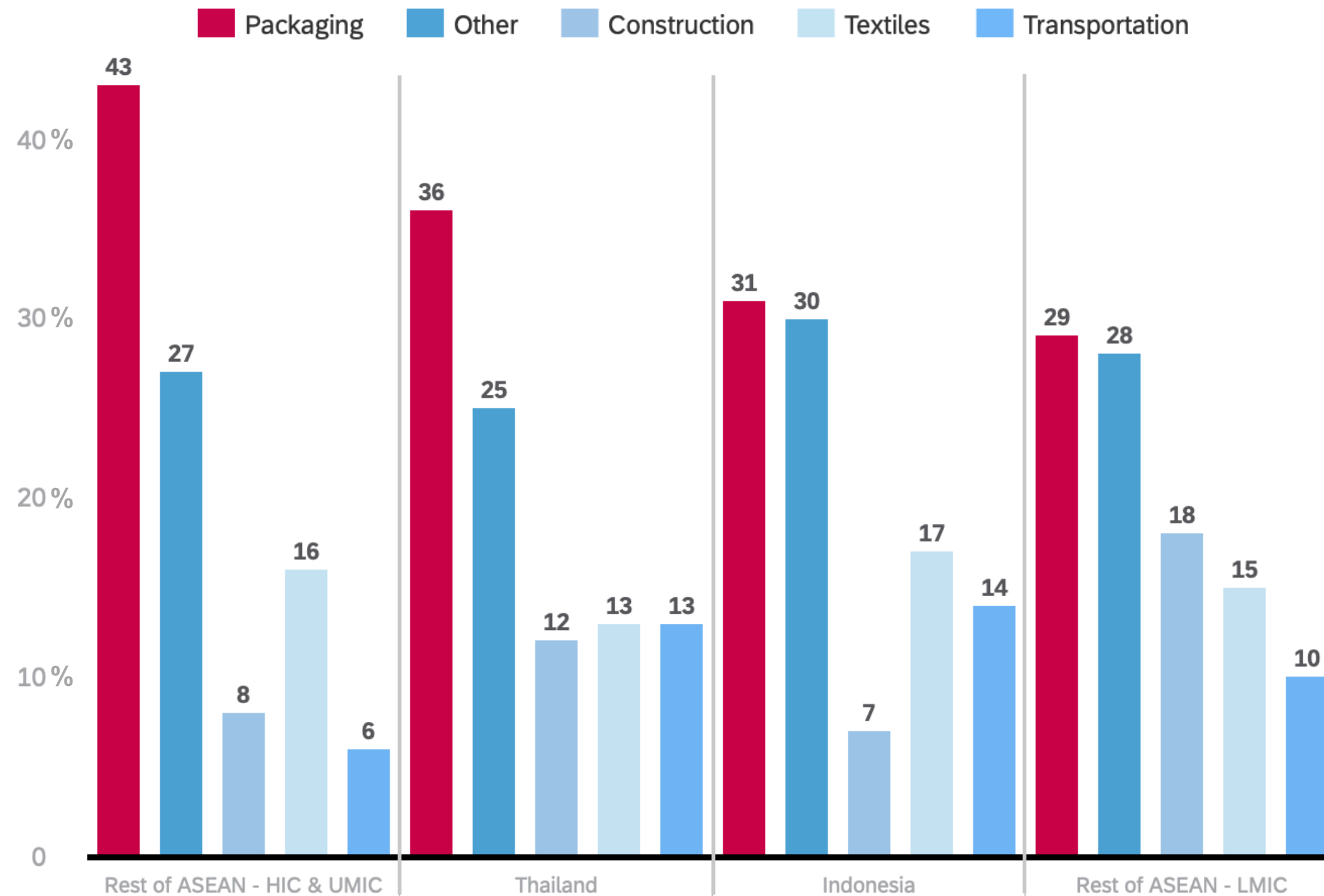
Rest of Asia-Pacific

~ 25.29 kg/cap

Source: OECD (2025)

Packaging Dominates ASEAN's Plastic Use

The largest plastic application across every ASEAN country



Packaging is the main use of plastic across every ASEAN country, driving most of the region's plastic consumption.

Source: OECD (2025)

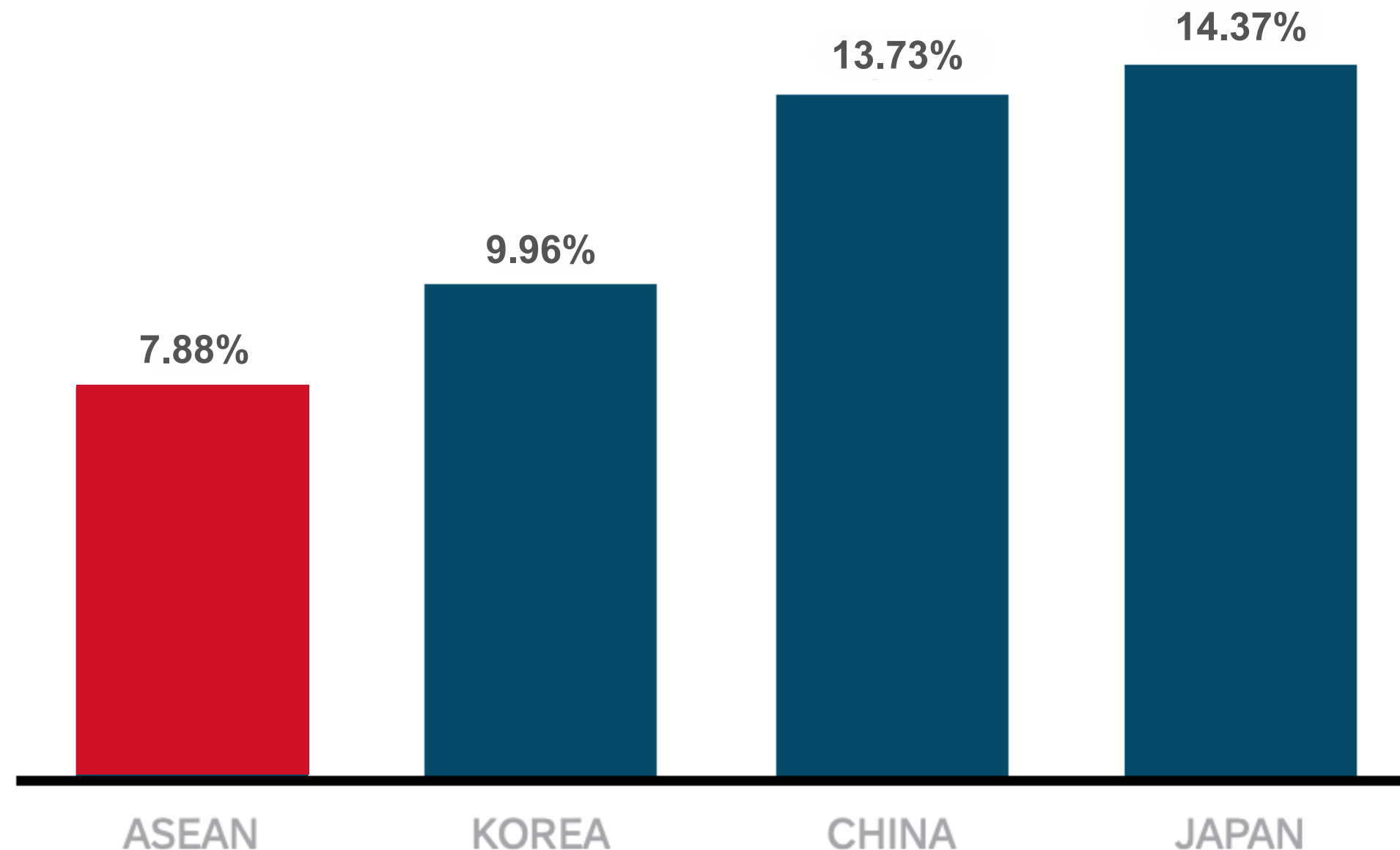
Note: Data grouped by income category using World Bank / ASEAN socioeconomic classification.

'Rest of ASEAN - High-Income Country (HIC) & Upper-Middle-Income Country (UMIC)' includes Brunei, Malaysia, Singapore;

'Rest of ASEAN - Low & Middle Income Country (LMIC)' includes Cambodia, Laos, Myanmar, Philippines, Vietnam.

Low Plastic Recycling Rates Across ASEAN

ASEAN lags behind China, Japan, and Korea



ASEAN's plastic recycling rate is **LOW**

7.88% ~ 1.93 MT

compared to **Japan (14.37%)**, **China (13.73%)** and **Korea (9.96%)**

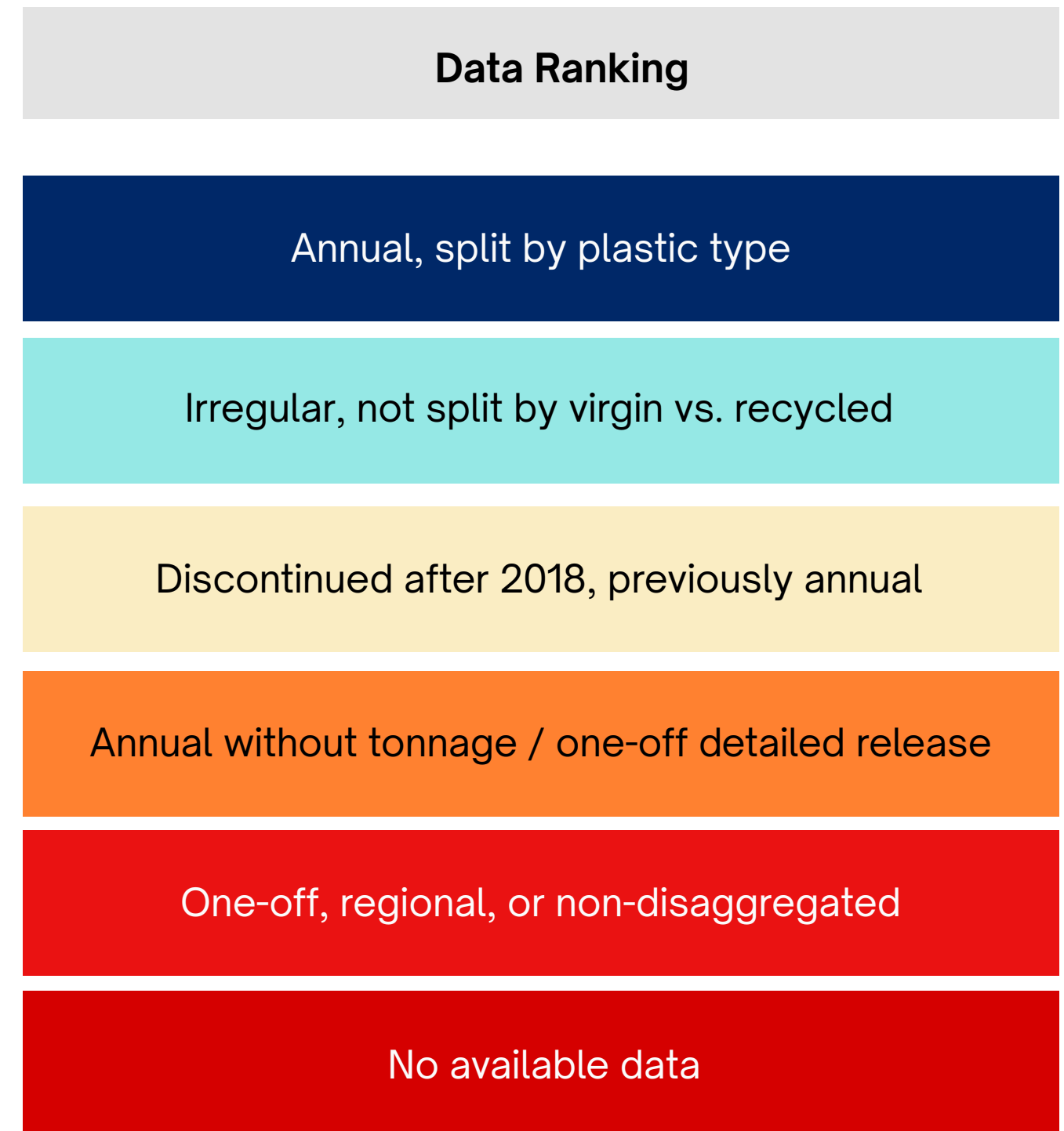
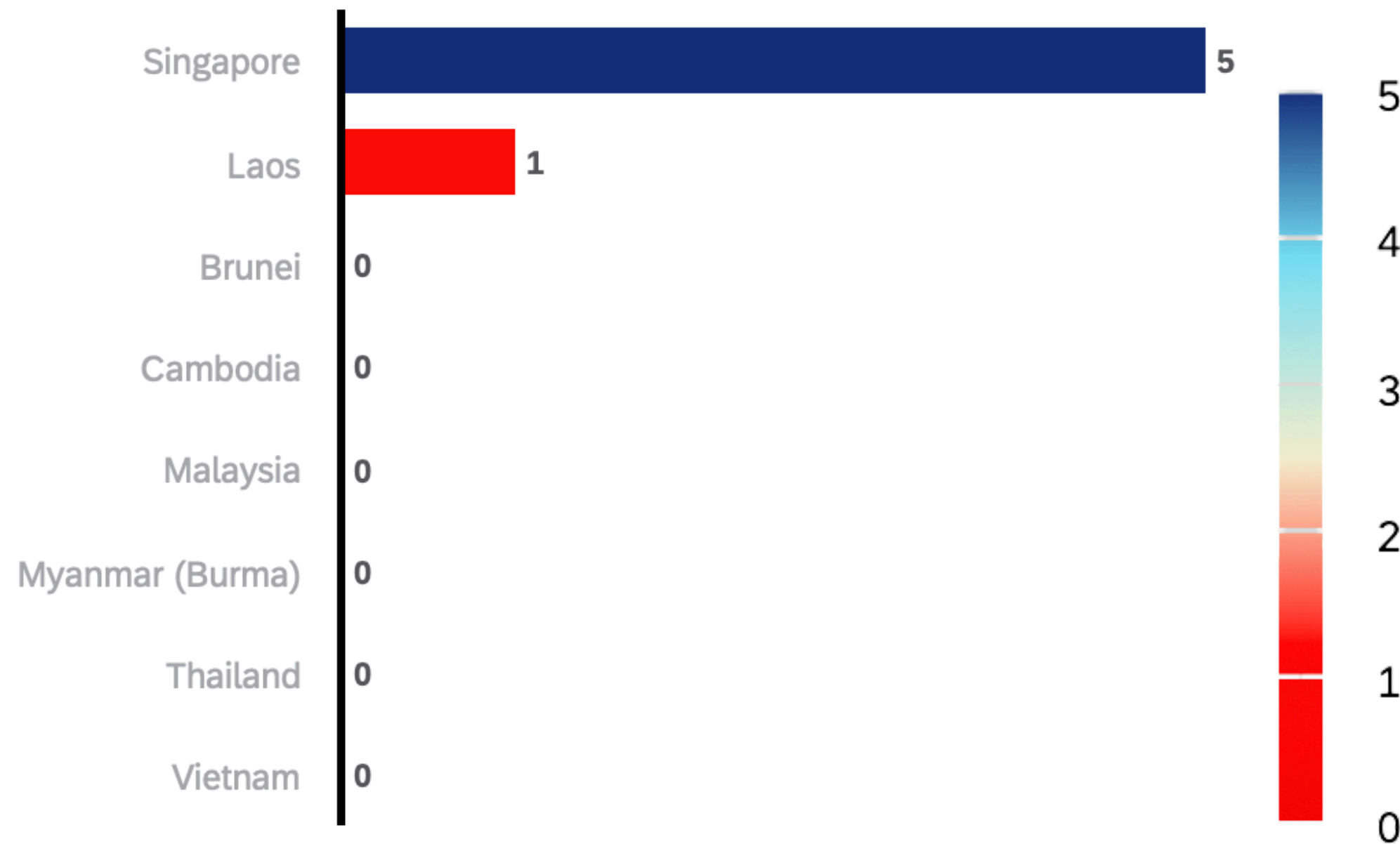
Source: OECD (2025)

Issue 2

Lack of Lifecycle Traceability and Data Transparency

Low Lifecycle Traceability

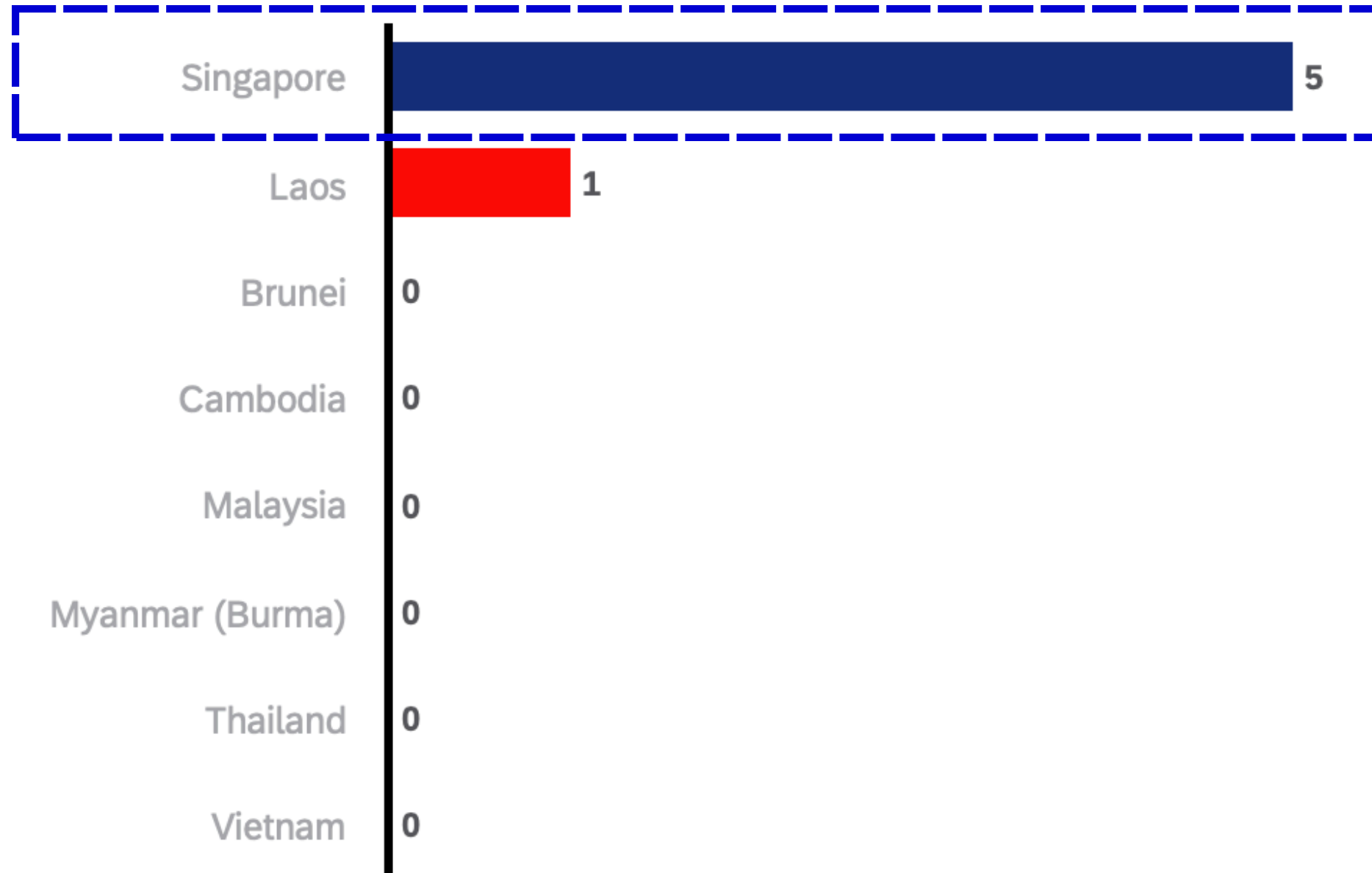
Most ASEAN Countries Lack Plastic Waste Data



Source: Northrop et al. (2022)

Low Lifecycle Traceability

Most ASEAN Countries Lack Plastic Waste Data



Only Singapore has a strong reporting system

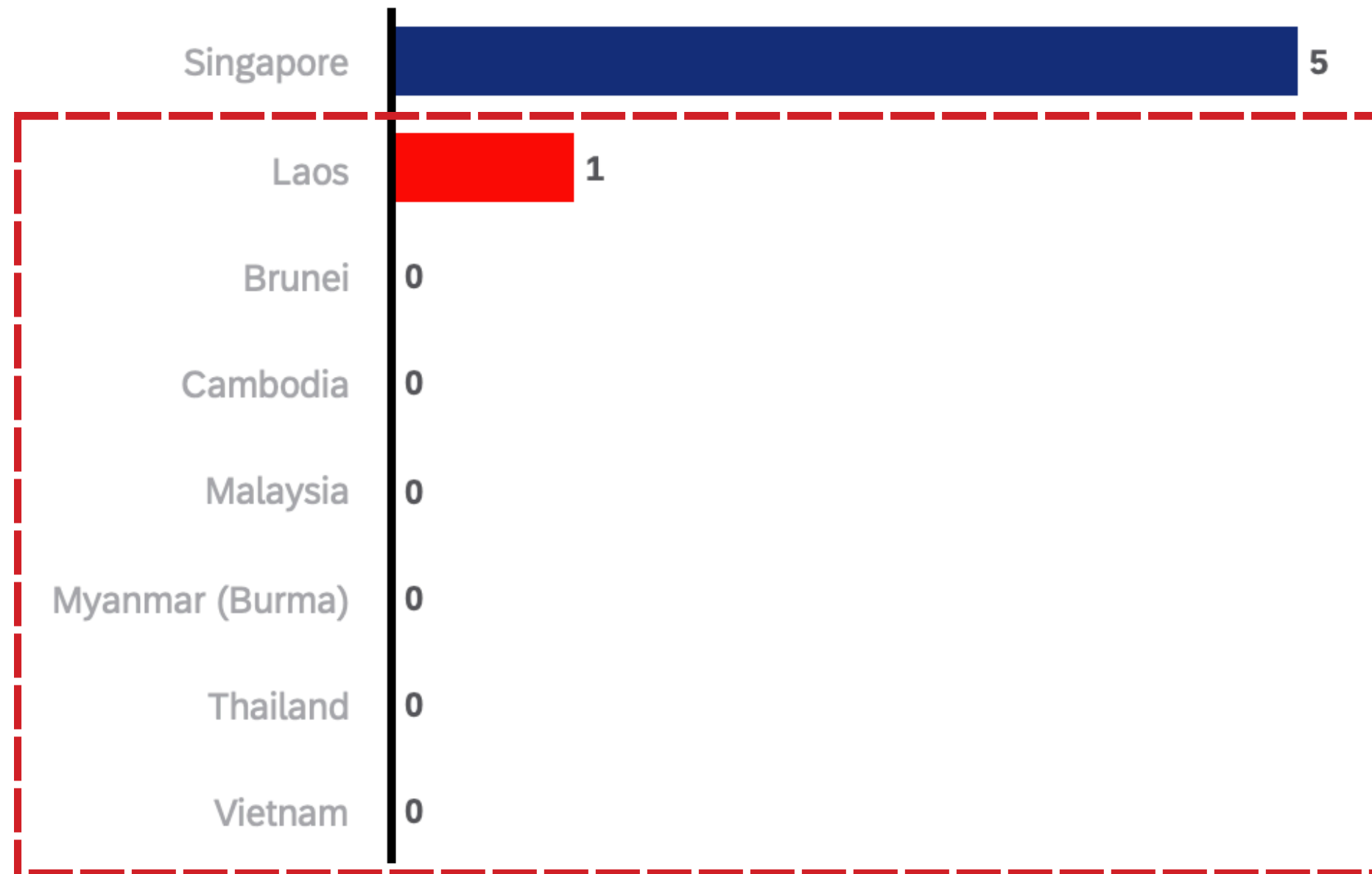


Scan to explore:
Waste Management and Recycling Rates, Annual
– Singapore Government Data Portal

Source: Northrop et al. (2022)
SINGSTAT (2025)

Low Lifecycle Traceability

Most ASEAN Countries Lack Plastic Waste Data



Other ASEAN Countries

LACK

of **consistent, detailed, and recent data**

REDUCES plastic traceability across its lifecycle

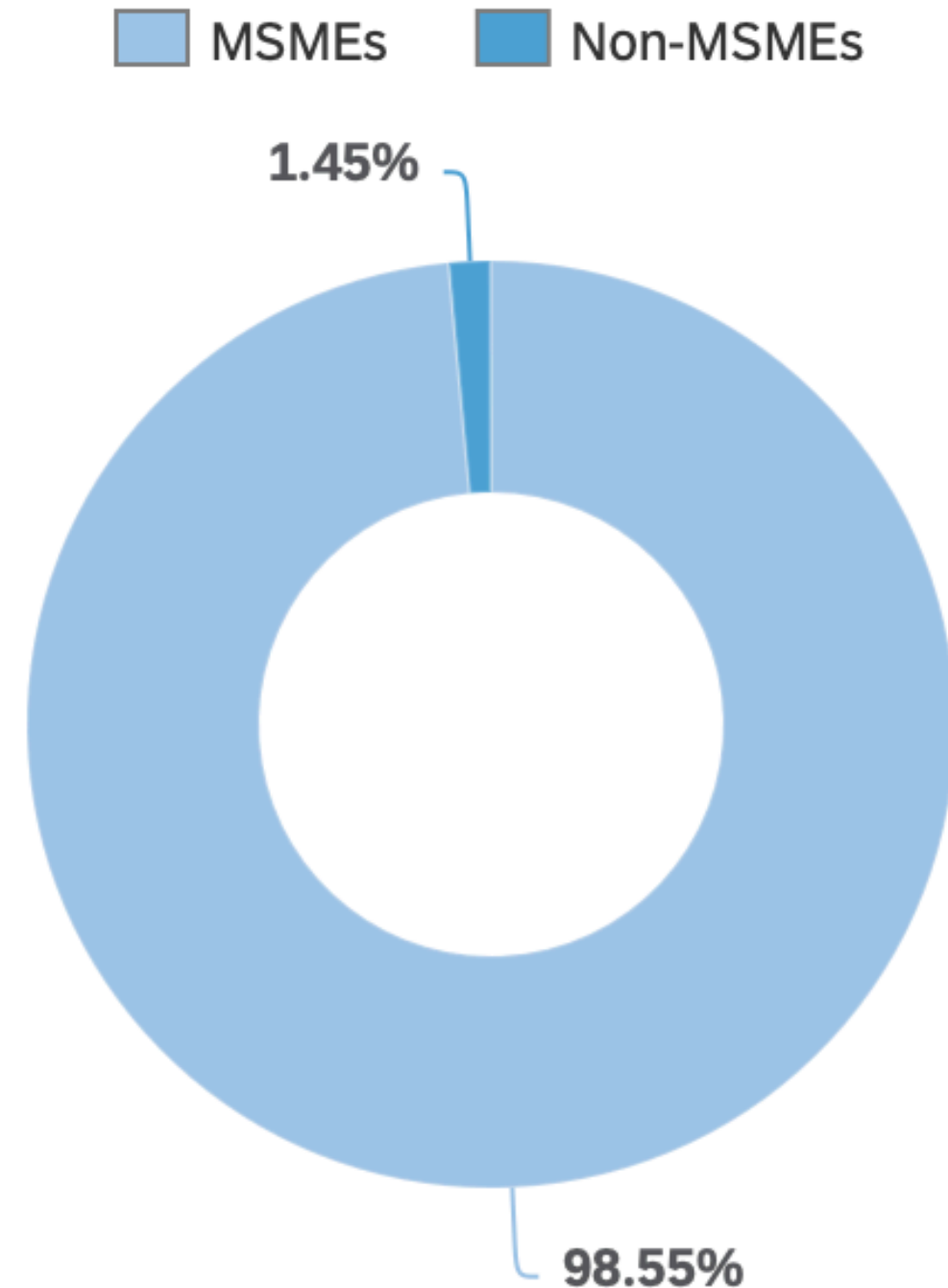
Source: Northrop et al. (2022)

Issue 3

The MSME Gap in ASEAN's Circular Economy

Micro, Small and Medium Enterprises (MSME)

MSME Share of Business Establishments in ASEAN'S Economy



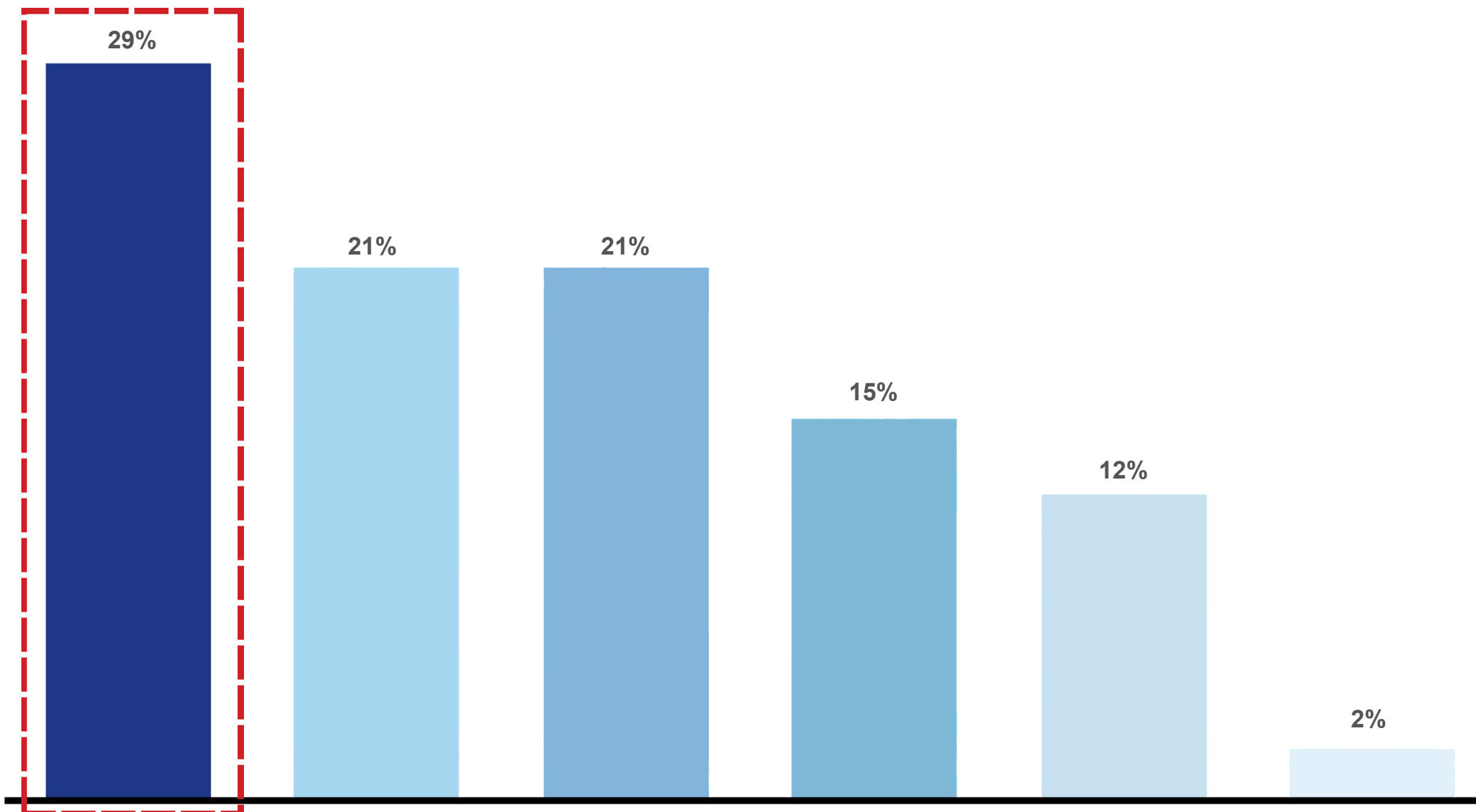
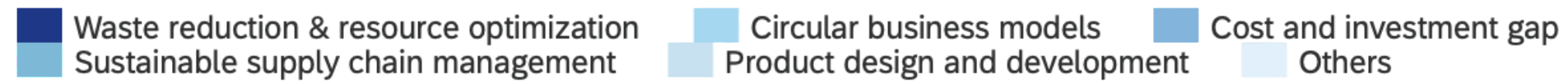
~70 million MSMEs across ASEAN

Contribute **85%** to employment, **45%** to GDP, and **18%** to exports

Source: ASEAN (n.d.)

ASEAN MSMEs

Knowledge Gap for Circular Economy



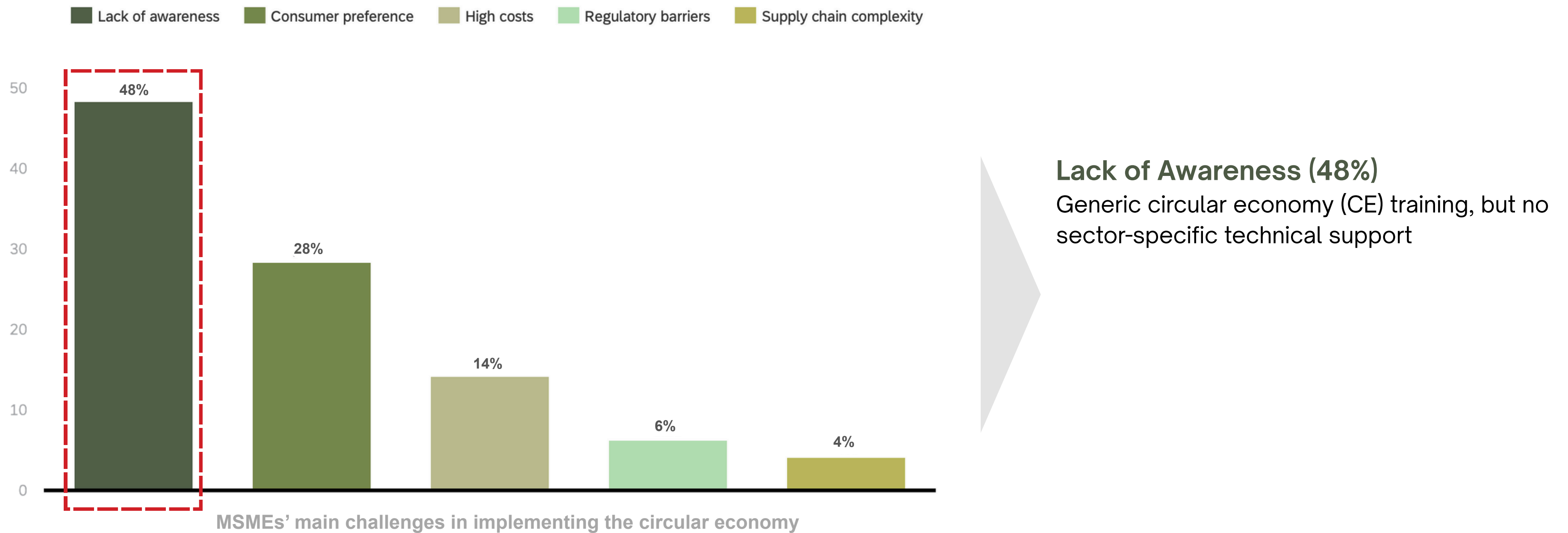
Main knowledge gaps for circular economy adoption in MSMEs

Waste reduction and resource optimization is the top priority for ASEAN MSMEs.

Source: ASEAN Secretariat (2025)

ASEAN MSME Circular Economy Adoption Barriers

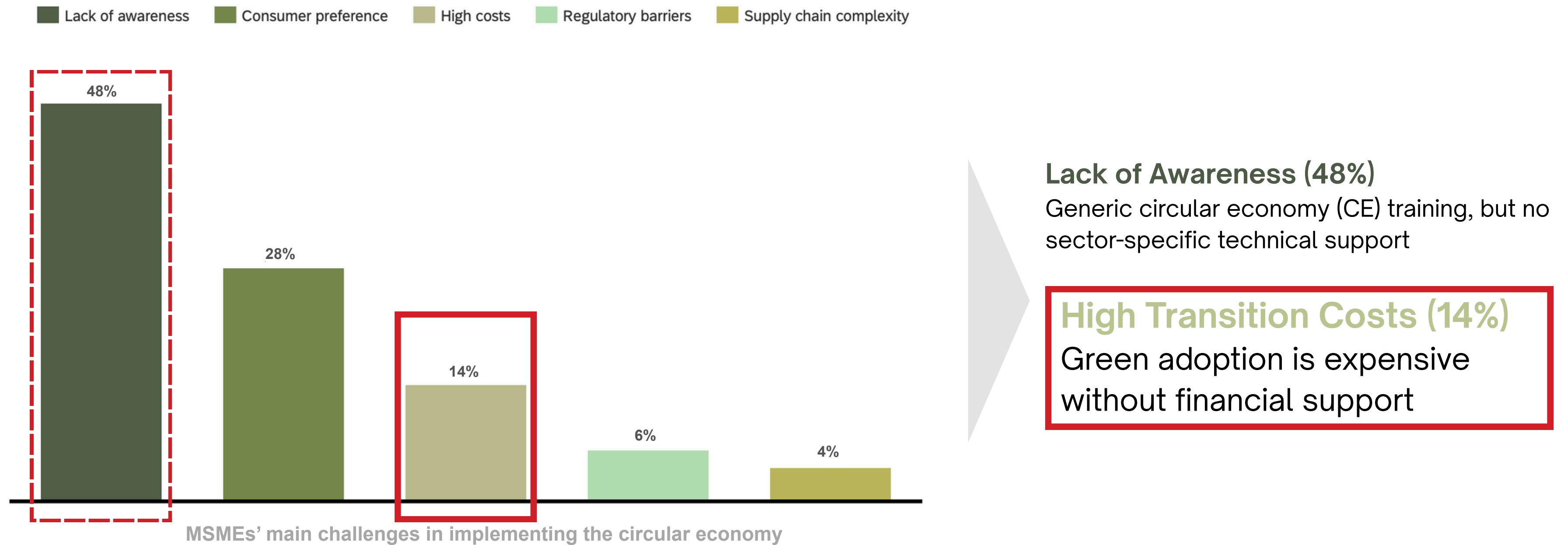
Knowledge Gap for Circular Economy



Source: ASEAN Secretariat (2025)

ASEAN MSME Circular Economy Adoption Barriers

Knowledge Gap for Circular Economy



Source: ASEAN Secretariat (2025)

Green Microfinancing Options

For ASEAN MSMEs

SLLs

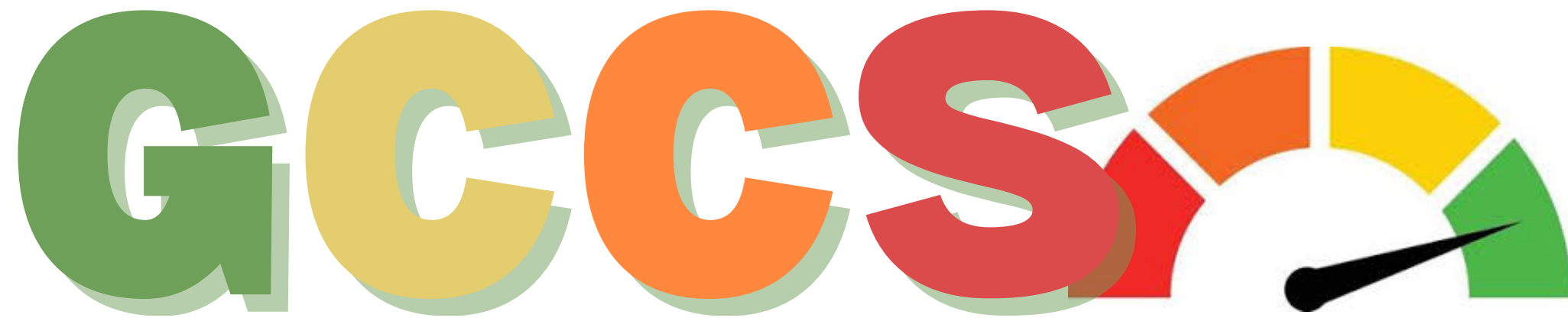
(Sustainability-
Linked Loans)

Loans with financial terms tied to sustainability performance targets, helping empower MSME expansion opportunities

**GREEN
LOANS**

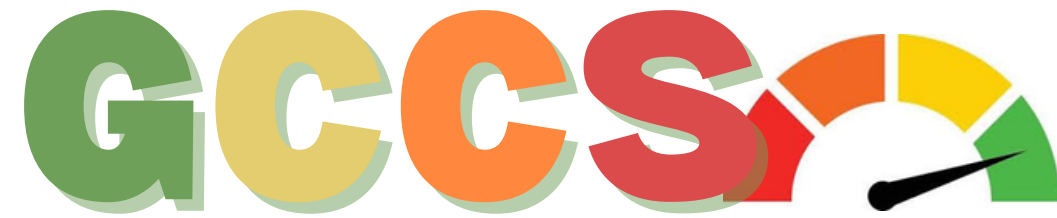
Financing to kick-start MSMEs' green initiatives

Source: Climate Bonds Initiative (2023)

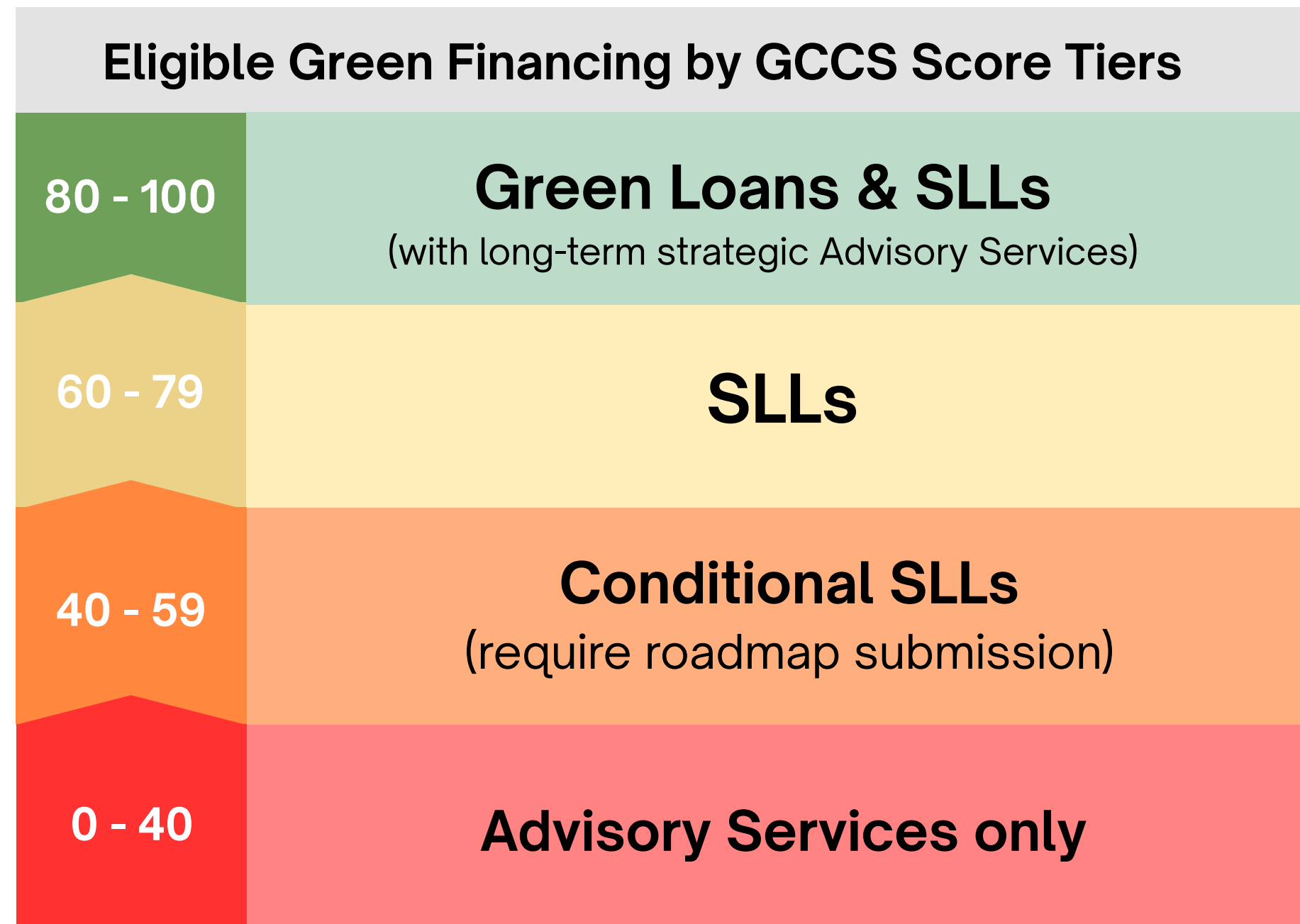


Green Circular Credit Scoring

Enabling access to **Green Financing** via a
4-tier Green Circular Credit Scoring system



Green Circular Credit Scoring



(Appendix 1.0 - Green Circular Credit Scoring (GCCS) Calculation)

HIGHER
Green Circular Credit Scores

MORE
Green financing options

GREATER
MSME Circular Economy Adoption

GREENLOOP

Blockchain Ledgedged Plastics (BLP) Circularity Loop

Blockchain Ledgedged Plastics (BLP) Circularity Loop



1 GreenLoop Plastic Manufacturer Partners



Blockchain Ledgedged Plastics (BLP) Circularity Loop



1 GreenLoop Plastic Manufacturer Partners

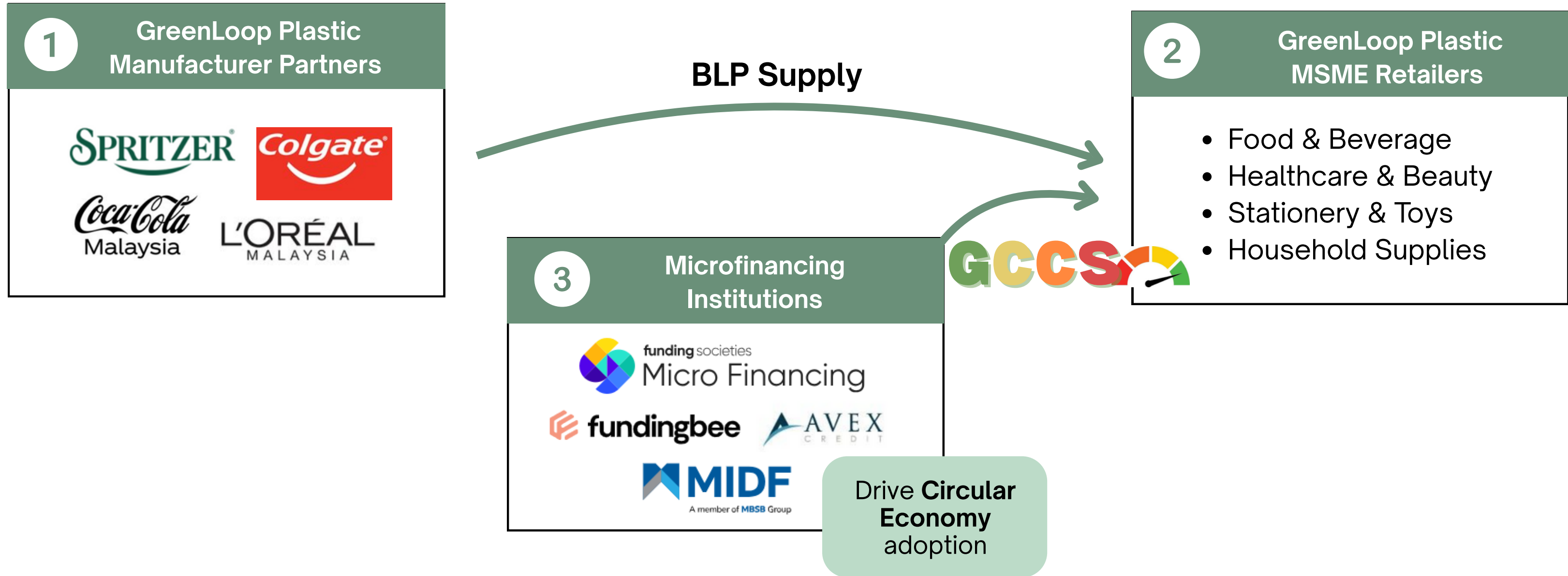
SPRITZER Colgate
Coca-Cola Malaysia L'ORÉAL MALAYSIA



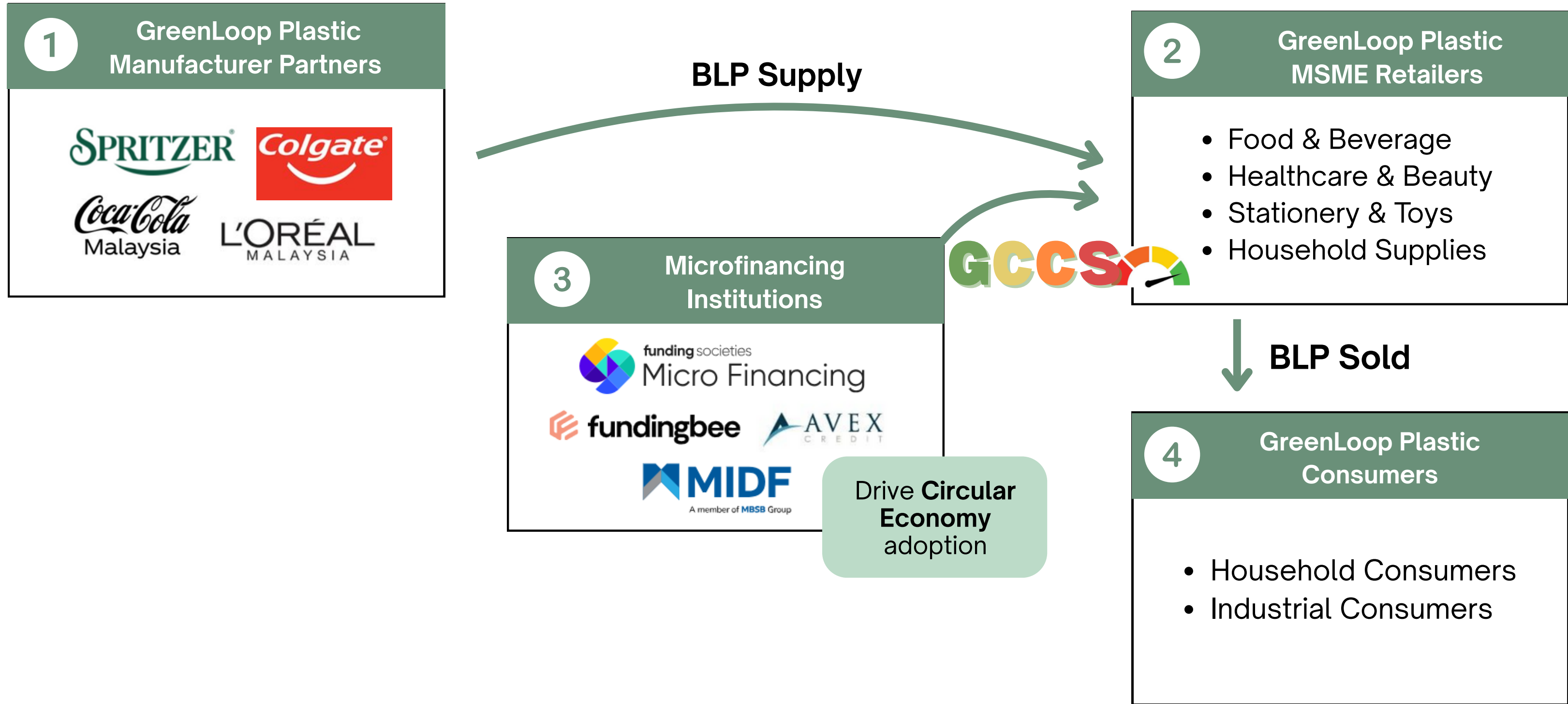
2 GreenLoop Plastic MSME Retailers

- Food & Beverage
- Healthcare & Beauty
- Stationery & Toys
- Household Supplies

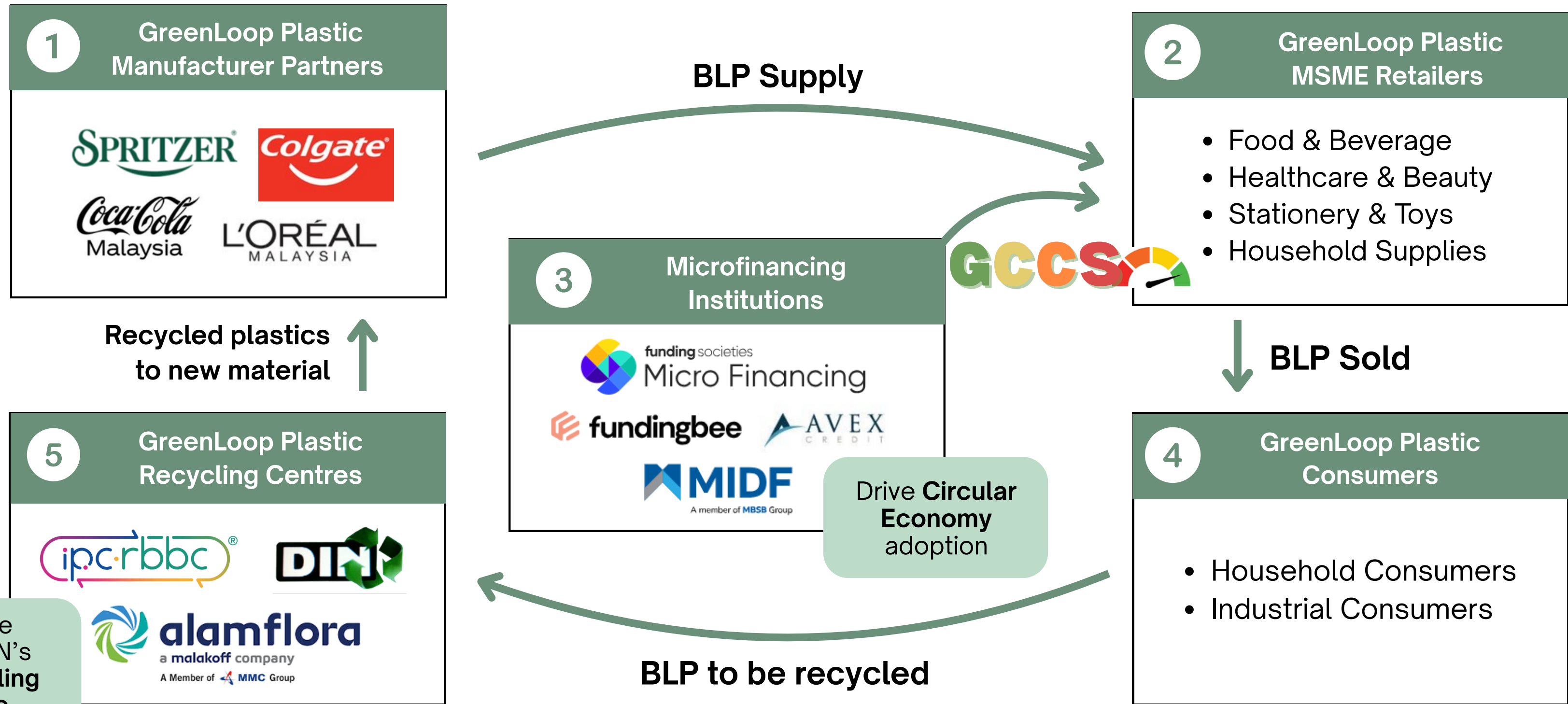
Blockchain Ledgedged Plastics (BLP) Circularity Loop



Blockchain Ledgedged Plastics (BLP) Circularity Loop



Blockchain Ledgedged Plastics (BLP) Circularity Loop



Raise ASEAN's Recycling Rate

Blockchain-Ledgered Plastics (BLP)

Smart RFID Labels



- labelled on all **mega or macro plastics**
- unique **product ID & weight** logged on blockchain

Multi-stage Plastics Tracking Recorded on Blockchain



Manufacturing to consumption → ERP Integrated barcode scanning
 Recycling centres & collection machine → RFID auto scanning

Real-Time Traceability & Immutable Data Source



Creditors:

Accurate assessment and administration of green credit



AGWCW
AGWESC

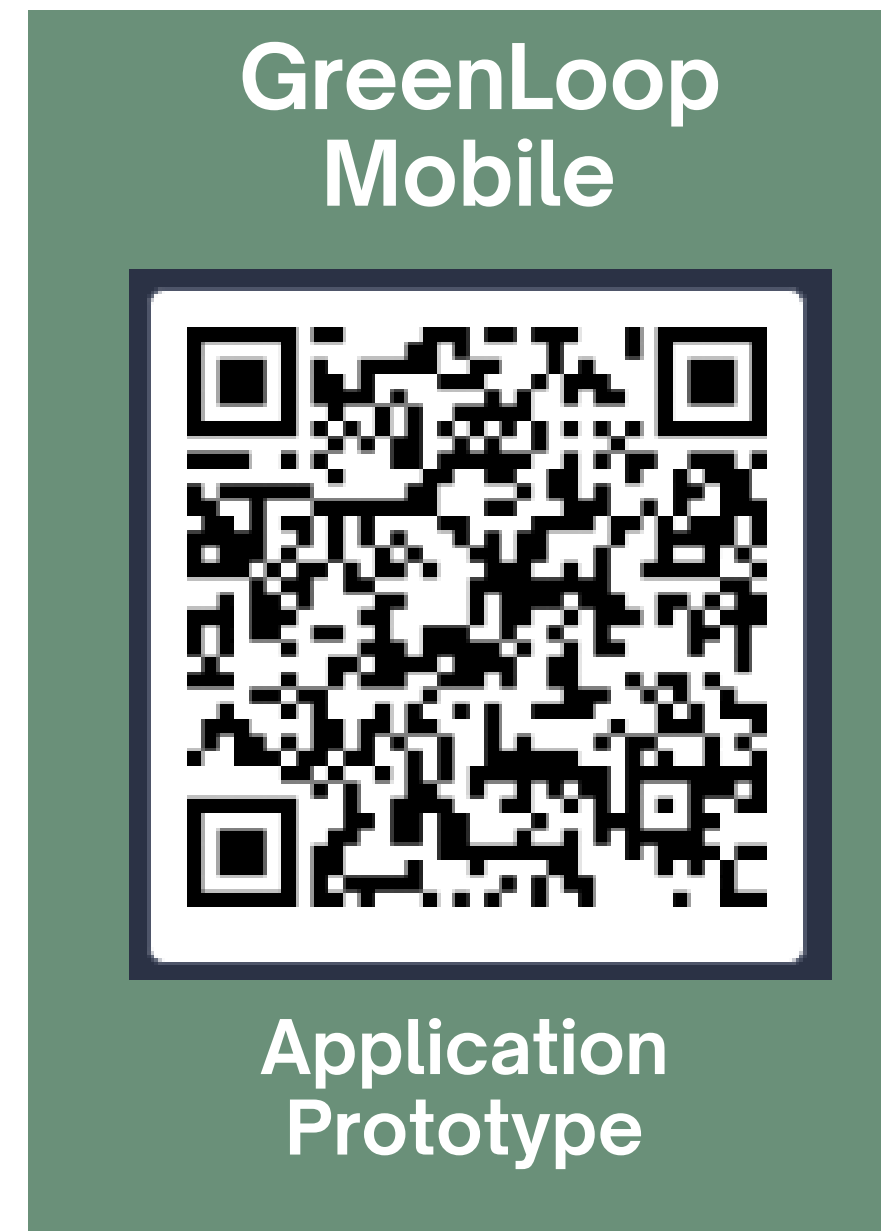
Regulators:

Real-time tracking, analysis, and annual reporting of plastic circularity data.

Boost plastics
lifecycle
traceability

(Appendix 2.0 - Classification of Plastics Size, Appendix 3.0 - XERAFY RFID Label Type, Price Quote & Suitability)

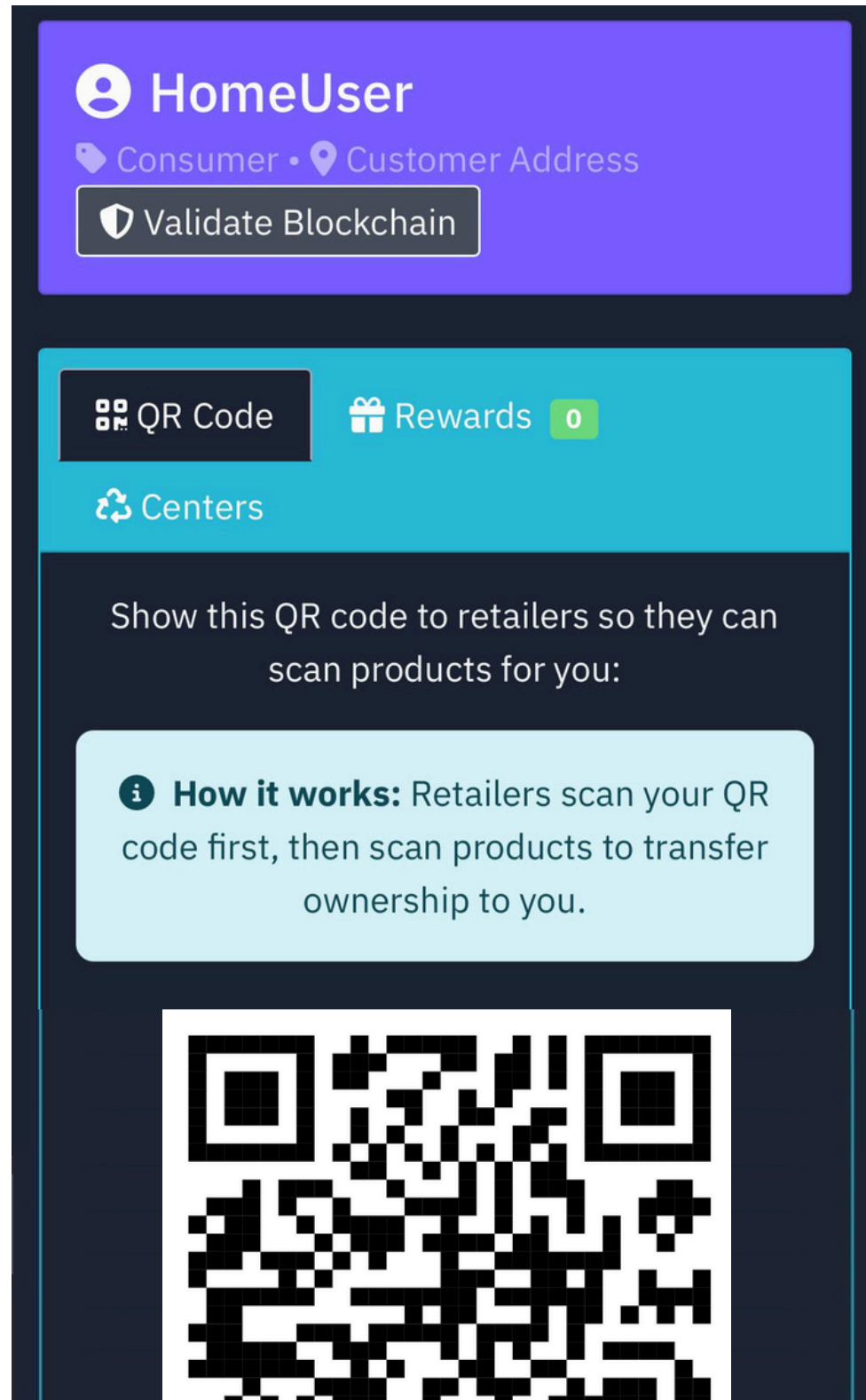
GreenLoop Mobile App



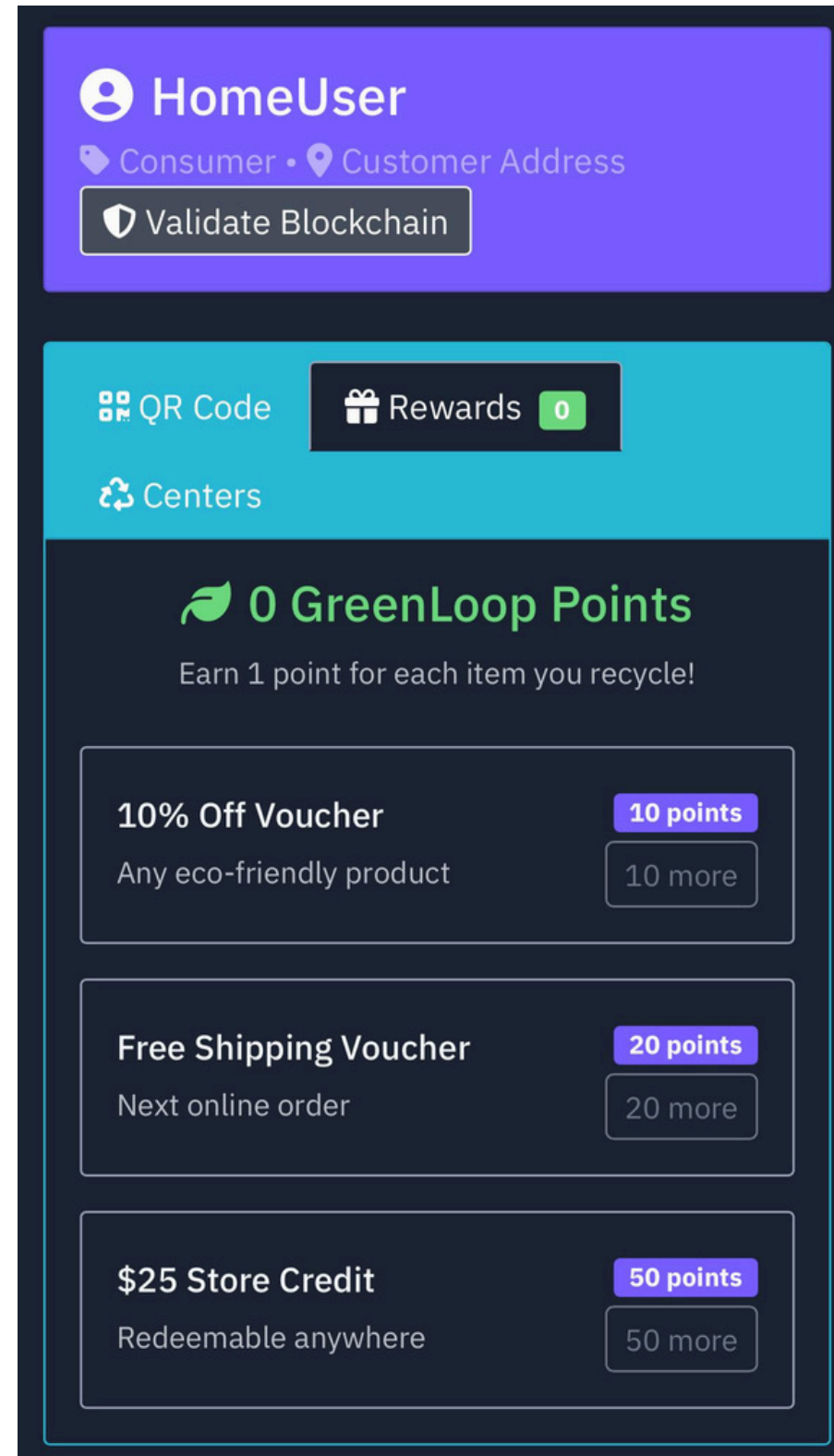
For BLP scanning, tracking and consumer rewards

(Appendix 3.0 - GreenLoop App Prototype Test)

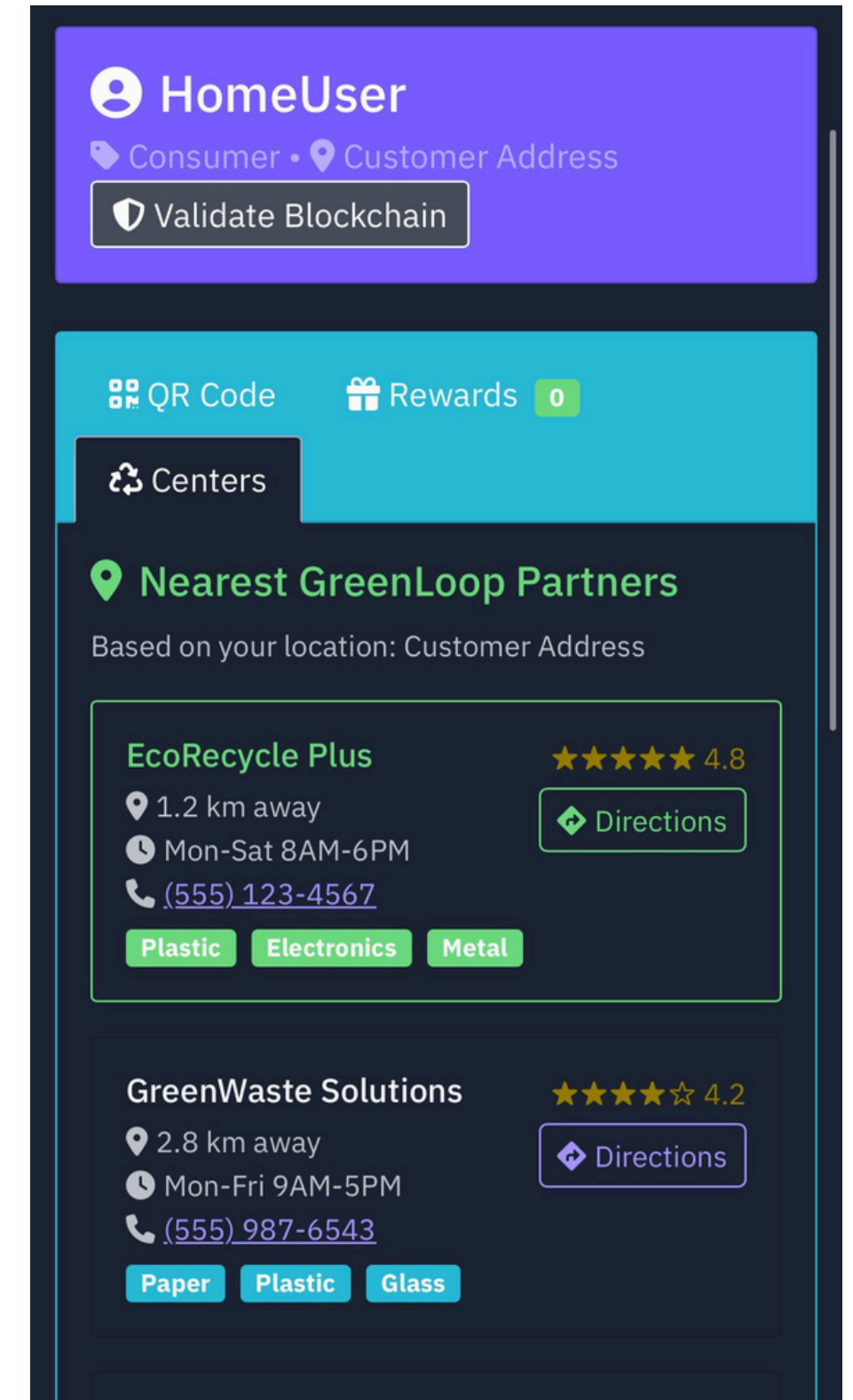
Customer ID QR Code



GreenLoop Points & Rewards



Nearest Recycling Centres



Distributor Interface

Welcome, GreenTrans! ✕

GreenTrans Distributor
 Distributor • Logistics Hub B
 Validate Blockchain

+ Add New Transaction

Product ID Scan ledger upon receiving product
 Enter product identifier or scan

Weight (kg)

Notes
 Select a note or leave blank ▼

Retailer Interface

BioRetail Retailer
 Retailer • Retail Store C
 Validate Blockchain

+ Add New Transaction

Product ID
 Enter product identifier or scan

Customer QR Code (Optional)
 Scan customer QR code
 Scan customer's QR code to process products for them Scan ledger to input customers ID upon selling of product

Weight (kg)

Blockchain Record

Product Chain for PROD001 - Complete supply chain journey for this product

Chain Block #1 Manufacturer
 2025-06-25 08:30:37

EcoPlastic Co. Block 1: Manufacturer
 Factory A
 1.0 kg
 Hash: 0fb2bb7d7fd984c5...
 Previous Hash: 87f94ec2144cc38a...
 Timestamp: 1750840237.3280592

Chain Block #2 Distributor
 2025-06-25 08:32:23

GreenTrans Block 2: Distributor
 Logistics Hub B
 1.0 kg
 Hash: 57a5757b0f82135d...
 Previous Hash: 0fb2bb7d7fd984c5...
 Timestamp: 1750840343.3510666

Alternative Decentralised Collection Model

Informal Collectors



Plastic Consumers



MSME Commercial Lot Area



GREENDROP

A smart reverse vending machine



Equipped with **RFID scanner** for **Automatic scanning** of RFID labels upon BLP drop-off



Customer log-in for **in-app points**, **informal collectors** receive **cash reward**

Introducing

ASEAN Consortium



**Private Permissioned
Blockchain Consortium**

(built on Hyperledger Fabric)

Isn't
blockchain
carbon-
intensive
and **costly**
to maintain?

Cost-saving

Lower gas fees
per transaction

Centralised governance

Private Server with
Permissioned Access

Carbon Friendly

Zero mining. Lightweight,
energy-efficient consensus,
faster validation

Members of ASEAN Consortium



ASEAN Working Groups

- ASEAN Working Group on Environmentally Sustainable Cities (**AWGESC**)
- ASEAN Working Group on Chemicals and Waste (**AWGCW**)
- Southeast Asia Regional Programme on Combating Marine Plastics (**SEA-MaP**)

ASEAN Grants & Partnerships

- **Annual grants** at constant rate (excluding first year)
- Utilise plastic circularity data for regional **analysis & reporting**
- Implement **action** and **track measurable impact** in low recycling regions.

Manufacturers



Primary Funding Members

- Pay **annual subscription fee**
- Pay **ledgering fee**
- Enhanced EPR compliance
- Enhanced ESG standing

Members of ASEAN Consortium



ASEAN MFIs



Secondary Funding Members

- Pay **annual licensing fee**
- Access GCCS data for green credit scoring
- Access GreenLoop's sustainable MSME network

Recycling Centres



Data Verification Partners

- Measure **plastic quality**
- Verify **data transparency**
- Quantify **circularity impact**

Members of ASEAN Consortium



Technology Partners



Technology Enablers

- **SAP - Data Analytics Cloud Partner**
 - Dashboard consolidation, metric tracking, and performance reporting.
- **Xerafy - RFID label technology provider**
 - Secure RFID system, and blockchain ledger ERP integration

GreenLoop



Central Hub and Service Provider

- Operate **blockchain platform**
- Manage **IT infrastructure**
- Oversee **ecosystem operations**

Users of ASEAN Consortium



GreenLoop Blockchain Ecosystem

Community Stakeholders

Retail MSMEs
Plastic consumers
Informal Collectors

Circular Economy Contributors

- Core users of GreenLoop blockchain
- Receive training, demo and education on GreenLoop and Circular Economy practices

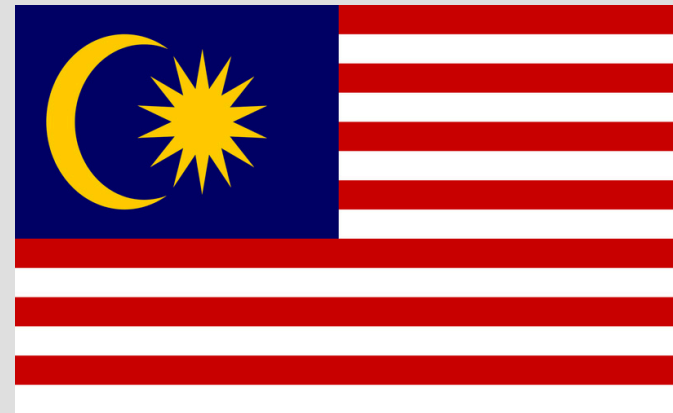
(Appendix 5.0 - MSME's Awareness Gap & Circular Economy Transition
Appendix 6.0 - ASEAN Access LEARN)

“Forging Ahead Together” with “Inclusivity & Sustainability”

ASEAN Consortium



Founding Countries

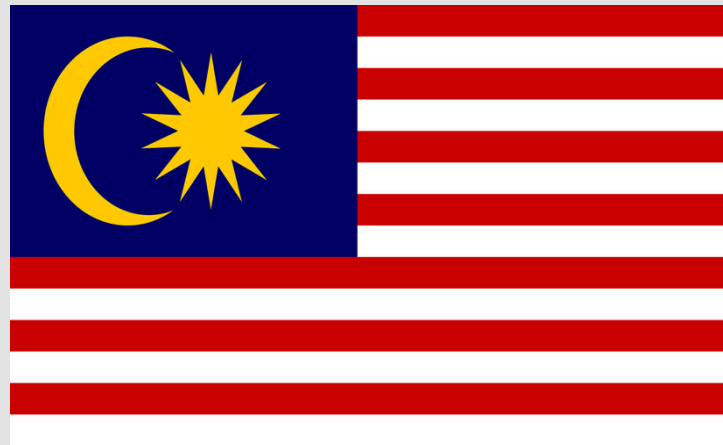


Core Operations & Strategy

Blockchain & Green Finance Advisory

Primary Focus High-Impact Market

(Appendix 9.0 - ASEAN Consortium Strategic Advantages)



Malaysia

Core Operations & Strategy

Objective: To establish a stable and efficient operational core to drive regional strategy and governance.

Consortium Role



Country Relevance

- Mated **legal & finance** system (including **islamic banking**)
- Adequate **land & infrastructure** capacity
- **Environmental & political** stability

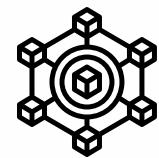


Singapore

Blockchain & Green Finance Advisory

Objective: To provide expert advisory on blockchain architecture and green finance, ensuring advancement and compliance.

Consortium Role



Blockchain Advisory



Green Finance Advisory



Digital Regulation Advisory



Talent Hub & R&D

Country Relevance

- Singapore-Asia Taxonomy for Sustainable Finance.
- Singapore Blockchain Innovation Programme
- MAS Fintech Regulatory Sandbox.
- Ranked 4th in Global Fintech Ranking

Source: Monetary Authority of Singapore (n.d.); Singapore Blockchain Innovation Programme (n.d.); Singapore Business Review (2025) (Appendix 10.0 - Sustainability-Linked Loans (SLLs) in ASEAN)



Philippines

Primary Focus High-Impact Market

Objective: To serve as the primary market for deployment & scaling of circular economy & financial inclusion solutions.

Consortium Role



Market Scaling



MFI-MSME Connect



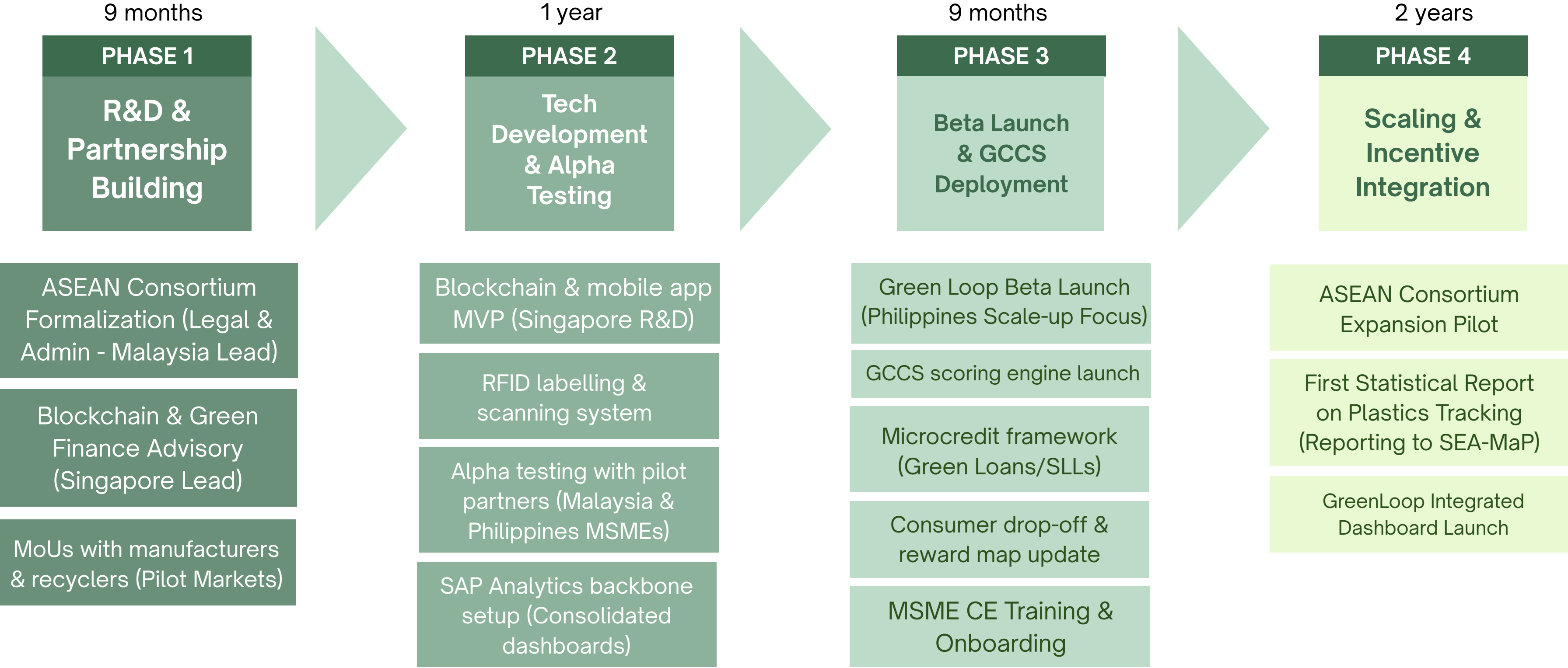
Impact Analysis

Country Relevance

- **Major plastic waste challenge**
 - 356,371 metric tonnes Annual Ocean Plastic Waste
- **Microfinance Council of the Philippines, Inc. (MCPI)**
 - 12 banks, 33 microfinance non-government organizations

Source: Suradja et al. (2023); Microfinance Council of the Philippines Inc (n.d.)

Project Implementation & Key Milestone Targets



Problem Statement

Issue Analysis

Recommendation

Implementation

Impact

Alignment with ASEAN Blueprint



ASEAN SOCIO-CULTURAL COMMUNITY (ASCC) BLUEPRINT 2025

Section C.3. Sustainable Climate

Section C.4. Sustainable Consumption and Production

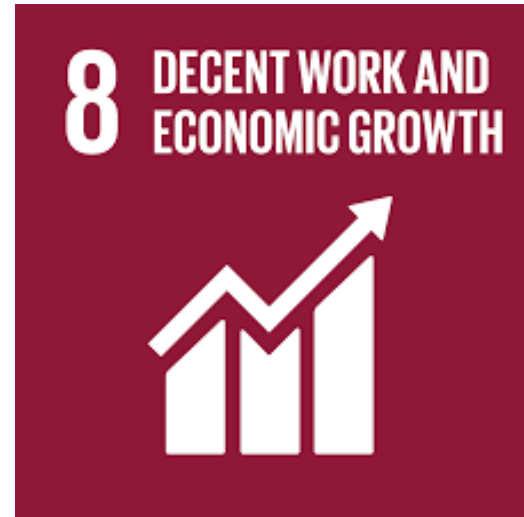


ASEAN ECONOMIC COMMUNITY BLUEPRINT 2025

Section B.4. Productivity-Driven Growth, Innovation, Research and Development, and Technology Commercialisation

Section D.1. Strengthening the Role of Micro, Small, and Medium Enterprises

SDG Impact Indicators



8.3 Promote policies to support job creation and growing enterprises

8.4 Improve resource efficiency in consumption and production



9.3 Increase access to financial services and markets

9.4 Upgrade all industries and infrastructures for sustainability



12.4 Responsible management of chemicals and waste

12.3 Substantially reduce waste generation

12.6 Encourage companies to adopt sustainable practices and sustainability reporting

By 2030,

GCCS X **GREENL****P**

TRACK

50,000+ metric
tons of plastics

Boost lifecycle
traceability

ONBOARD

Onboard 500+
MSMEs

Drive **Circular
Economy**
adoption

ENGAGE

Engage 150,000+
consumers

Raise ASEAN's
Recycling Rate

Lower ASEAN ocean plastic waste pollution

THANK YOU

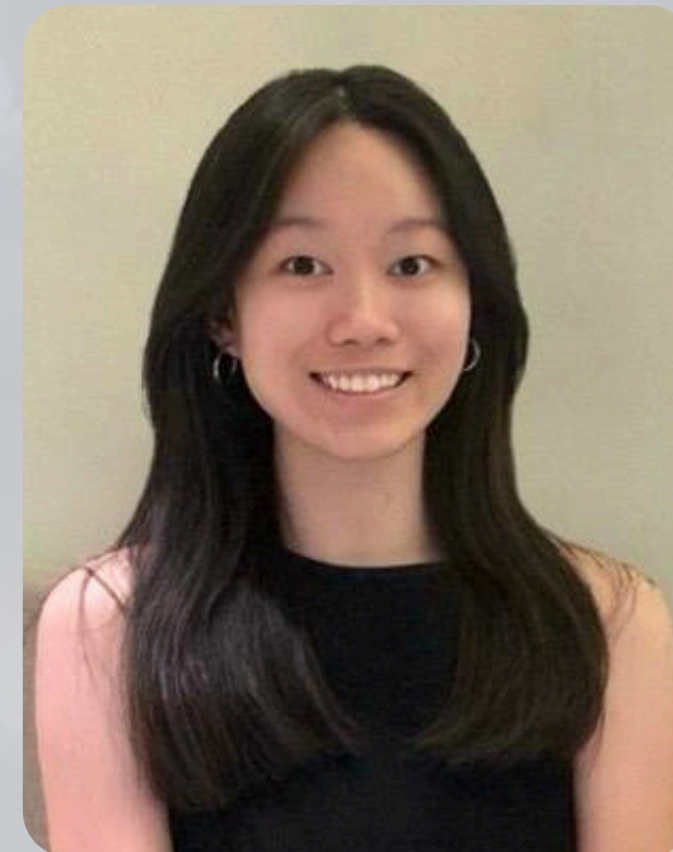
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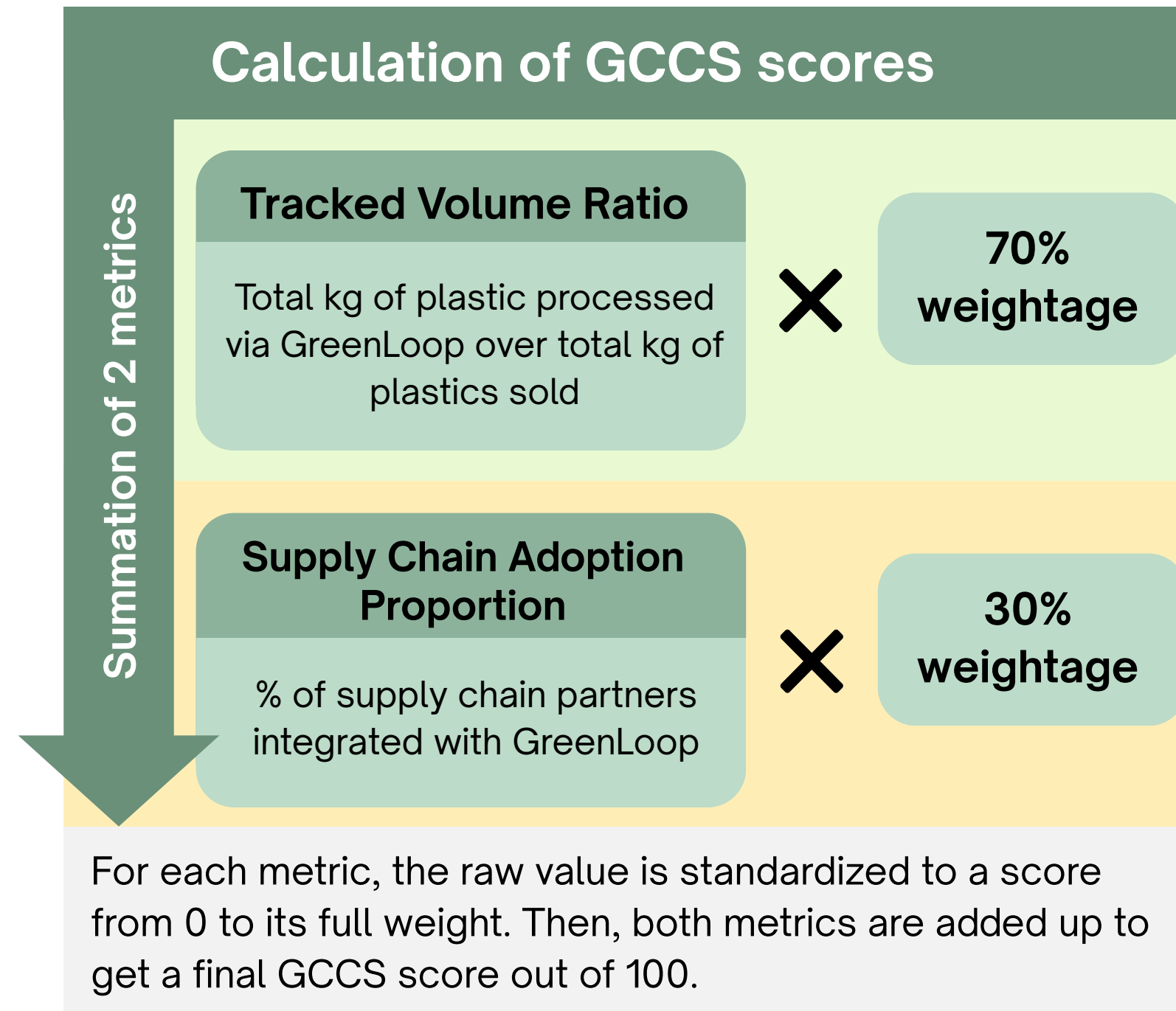
Talent Corporation Malaysia Berhad. (2025, August 29). ASEAN Green Skills Fair 2025: Malaysia leads ASEAN's green workforce transformation through skills, jobs, and innovation. <https://www.talentcorp.com.my/resources/press-releases/asean-green-skills-fair-2025-malaysia-leads-aseans-green-workforce-transformation-through-skills-jobs-and-innovation/>

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Appendix 1.0 - Green Circular Credit Scoring (GCCS) Calculation

The administration of GCCS credits to MSMEs are upon the recognition of GreenLoop adoption via the below metrics:



Appendix 2.0 - Classification of Plastics Size

Plastic Terminologies	
Macroplastics are large (>20 mm) plastic debris such as plastic bottles[1].	
Mesoplastics are large plastic particles such as virgin resin pellets and are usually defined as 5–10 mm in range [4].	
Microplastics are small plastic fragments typically less than (<5mm) that are derived from the breakdown of macroplastics [1].	
Nanoplastic are small microplastic particles defined in the range 0.2–2 mm [3].	
Microbeads/ microexfoliates are small plastic granules commonly manufactured and used in personal care products such as toothpaste and facial cleansers [9].	

GreenLoop Blockchain Ledgering Focus

“Labelling of Smart RFID labels with unique product ID & weight on mega & macro plastics”

Appendix 3.0 - XERAFY RFID Label Type, Price Quote & Suitability

What is an RFID label?

An **RFID label** is made of plastic or paper, with an embedded RFID chip and antenna and a printable face stock.



They are sometimes called **Smart Labels**, as opposed to disposable barcode labels, because they enable wireless tracking and additional functionalities, such as electronically storing identification information or embedding **sensors** (temperature, humidity, etc.). In that sense, they are fully flexible versions of hard **RFID tags**.

Label Types	Typical Use Cases	Cost Range per Label	Examples
Durable On-Metal	Critical assets and high-value items: WIP inventory, Automotive, MRO parts, Machinery, IT Assets...	\$0.50 - \$1.00+	Xerafy Metal Skin® series
Specialty Off-Metal	Complex Supply Chains: Pharma, Medical Devices...	\$0.20 - \$0.70	Xerafy XSKIN series
Rugged	High temperatures, waterproof, jets, solvents, acids, caustics...	\$0.50 - \$1.50+	Xerafy Pod TRAK series
Disposable Off-Metal	High-volume labeling for retail inventory	\$0.01 - \$0.50	
Inlays	Wet or dry inlays for Converters	\$0.01 - \$0.30	
Sustainable	Environmentally friendly solutions	\$0.15 - \$0.60	Plastic-free labels

2. Plastics: Pallets, containers, returnable packaging

Standard RFID labels perform well on most types of plastics and can be read through plastic materials, such as when embedded in a PET container.

However, specialized RFID labeling solutions are required for certain plastic materials, such as electrostatic discharge (ESD) materials used to protect electrostatic-sensitive devices.

The ledgering of RFID Smart Labels on Blockchain-Ledgered Plastics (BLPs) will use Standard Disposable Off-Metal RFID labels, suitable for high-volume application across most plastic types, especially in the packaging industry. Each label is estimated to cost under \$0.10, given it's standard label type, offering a low-cost and scalable solution that integrates easily with existing barcode or QR-based systems.

Alternatively, RFID Inlays can be embedded directly into packaging in a loose wire-like structure, providing greater durability and tamper resistance. However, it still requires an additional barcode for ERP-integrated scanning at the retail level. Therefore, Inlays are reserved for later stages requiring deeper product integration.

Appendix 4.0 - GreenLoop App Prototype Test

Due to the app being run and developed on Replit which does not run online 24/7, please contact Kai Li Chiam on [LinkedIn](#) to turn on the live app when testing the Prototype.

Example blockchain ledger for testing (Product ID & Weight):



Start with manufacturer login ID (eco123), followed by distributor(trans456), retailer (retail789), consumer (home321) and recycling centre (recycle999).

Appendix 5.0 - MSME's Awareness Gap & Circular Economy Transition

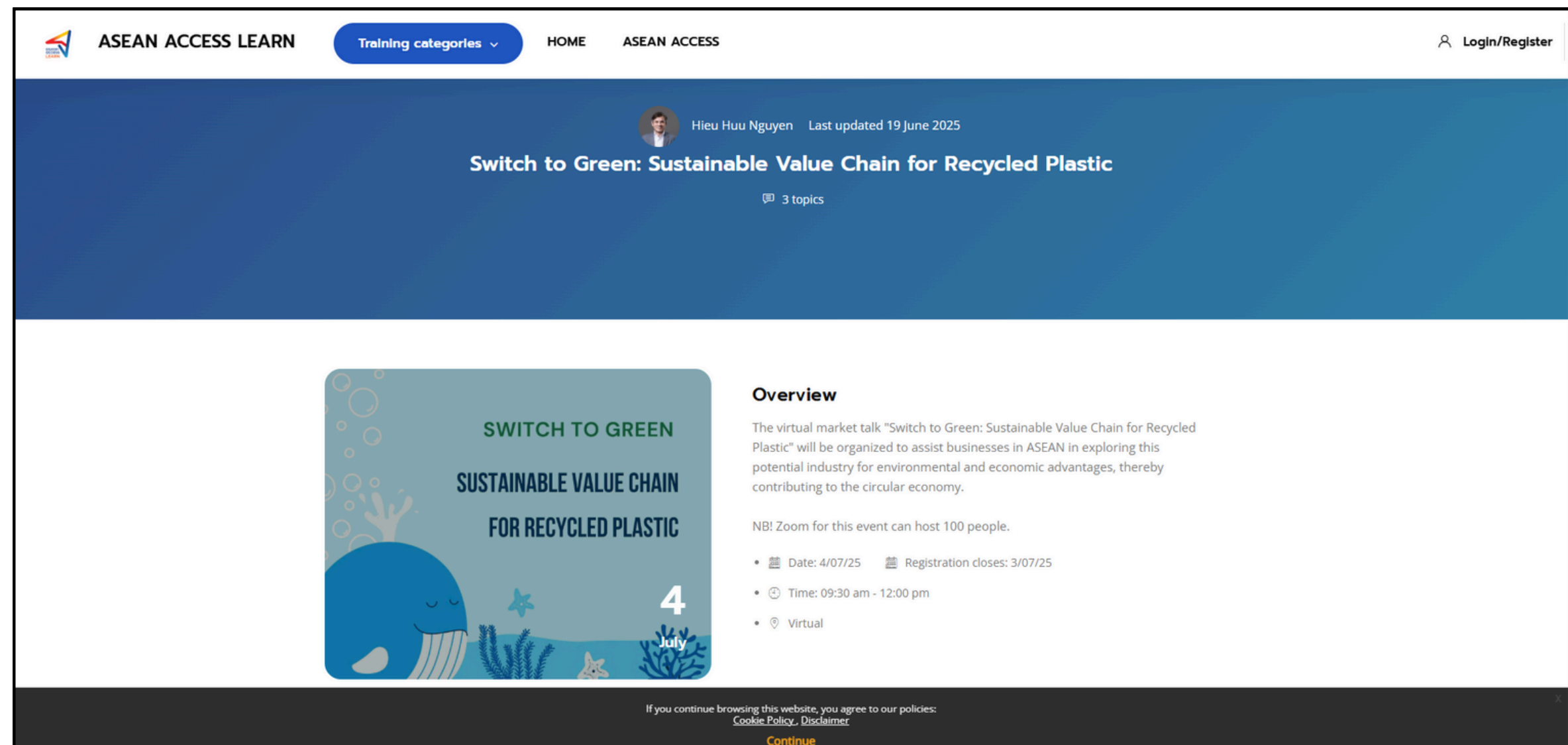
Multi-Stage Circular Economy Implementation

CE Stage	What They Need	GreenLoop Initiatives
Early Stage Adoption & CE Understanding	CE awareness training, technological support & close guidance	Use ASEAN Access LEARN to provide sector-specific CE education + demo GreenLoop via local pilot projects + offer free trials with integration mentorship
Intermediate Stage CE Implementation	Green Financing, Long-term sustainability strategy	Link high GCCS scores to sustainability-linked loans + provide strategy advisory

Appendix 6.0 - ASEAN Access LEARN









ASEAN Access LEARN offers live virtual training sessions and self-paced courses led by experts in international trade, each specializing in their respective industries. This ensures that all training provided meets the highest standards of quality. All sessions and courses are conducted in English, and participants who complete the training will receive a certificate from the platform.

A recent live market talk similar to GreenLoop's interest is the Switch to Green: Sustainable Value Chain for Recycled Plastic hosted by Hieu Huu Nguyen, Co-founder and CEO of FiinGroup, which has been actively monitoring and analyzing Vietnam's plastic and plastic recycling industries for over a decade through in-depth industry reports and tailored research services.



The screenshot displays the ASEAN Access LEARN website interface. At the top, the navigation bar includes the logo, 'ASEAN ACCESS LEARN', a 'Training categories' dropdown menu, 'HOME', 'ASEAN ACCESS', and a 'Login/Register' link. The main content area features a blue header with a profile picture of Hieu Huu Nguyen, the text 'Hieu Huu Nguyen Last updated 19 June 2025', and the title 'Switch to Green: Sustainable Value Chain for Recycled Plastic' with '3 topics' listed below. Below this is a promotional card for the event, titled 'SWITCH TO GREEN SUSTAINABLE VALUE CHAIN FOR RECYCLED PLASTIC' with a date of '4 July'. To the right of the card is an 'Overview' section with the following text: 'The virtual market talk "Switch to Green: Sustainable Value Chain for Recycled Plastic" will be organized to assist businesses in ASEAN in exploring this potential industry for environmental and economic advantages, thereby contributing to the circular economy.' Below the overview, there is a note: 'NB! Zoom for this event can host 100 people.' and a list of event details: 'Date: 4/07/25', 'Registration closes: 3/07/25', 'Time: 09:30 am - 12:00 pm', and 'Virtual'. At the bottom of the page, there is a footer with a cookie policy notice and a 'Continue' button.

Appendix 7.0 - ACCMSME policy recommendations

1		Enhance awareness and capacity building: Carry out targeted campaigns and programmes to increase MSMEs' understanding of CE practices, with the establishment of shared facilities to provide essential resources.
2		Leverage ASEAN Access MATCH and LEARN: Utilise these platforms to connect MSMEs with investors, buyers and mentors, facilitating knowledge sharing and support for transitioning to circular business models.
3		Design and promote eco-labelling incentives: Develop eco-labelling standards and incentives to enhance MSMEs' market competitiveness and encourage environmentally friendly practices.
4		Create synergy with ASEAN mechanisms: Utilise existing frameworks, such as ASEAN Circular Economy Stakeholder Platform (ACESP), to foster collaboration and knowledge exchange among MSMEs.
5		Facilitate sustainable finance and investment: Provide debt-free financing options, such as venture capital and grants, to support MSMEs in adopting sustainable practices.
6		Promote market access: a. Green procurement: Encourage government procurement of green products to create demand and support MSMEs. b. Supply chain enhancement: Collaborate with larger corporations to integrate MSMEs into circular supply chains and expand market opportunities.
7		Improve multi-stakeholder collaboration: Foster dialogues among MSMEs, private sector entities, governments and other stakeholders to develop innovative solutions and facilitate cross-border trade.
8		Empower local communities: Support MSMEs in adopting CE practices that align with local needs and resources, enhancing community engagement and sustainability.

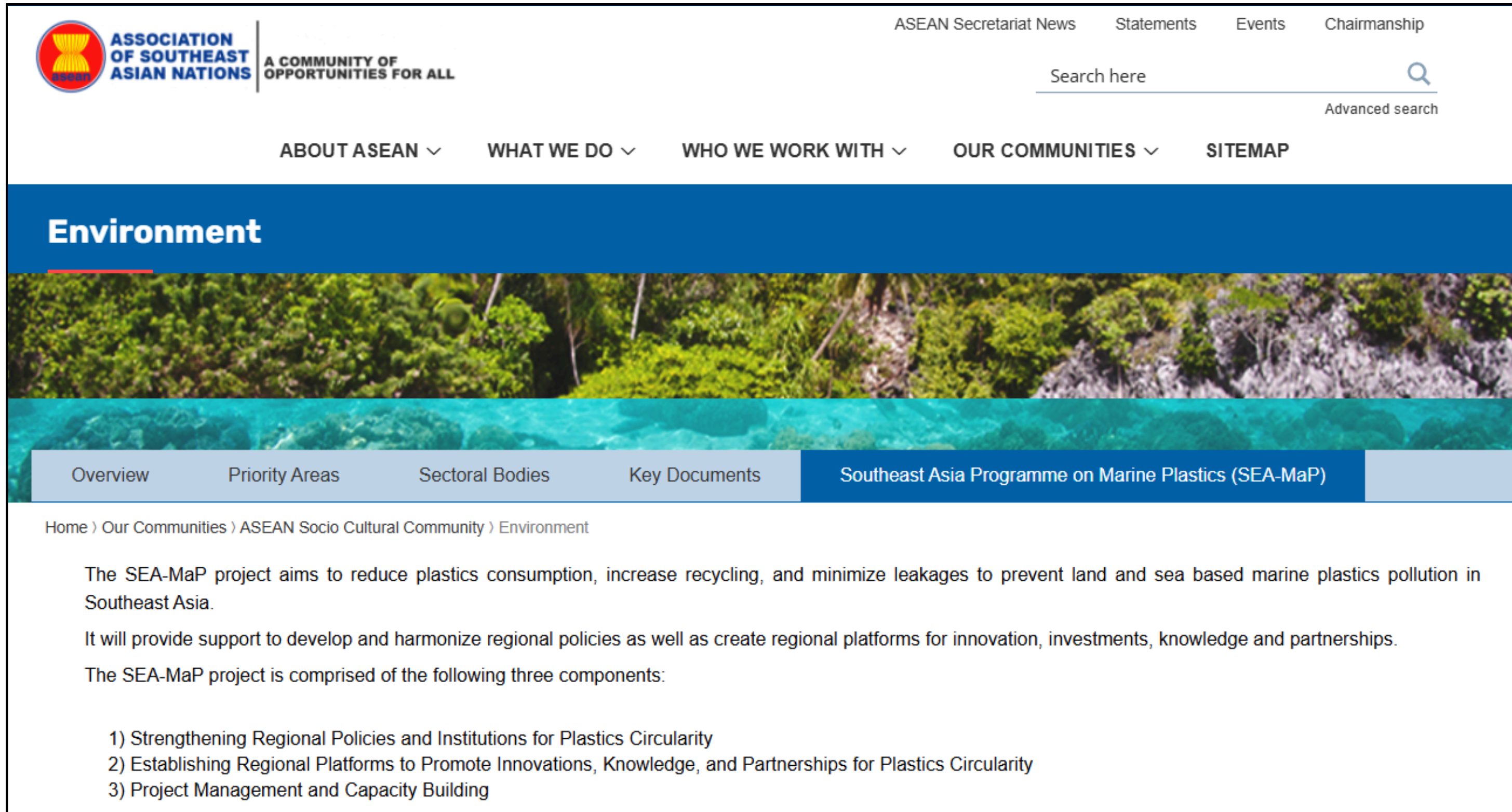
ASEAN Coordinating Committee on MSMEs (ACCMSME) Policy Recommendations on Enhancing ASEAN MSMEs' CE Participation

GreenLoop Alignment:

- Policy 5: Facilitate Sustainable Finance and Investment
- Policy 3: Design and Promote Eco-Labeling Incentives
- Policy 6: Promote market access: Green Procurement & Supply Chain Enhancement


Appendix 8.0 - SEA-MaP

Southeast Asia Regional Program on Combating Marine Plastics (SEA-MaP)



ASEAN Secretariat News Statements Events Chairmanship

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Environment

Overview Priority Areas Sectoral Bodies Key Documents **Southeast Asia Programme on Marine Plastics (SEA-MaP)**

Home > Our Communities > ASEAN Socio Cultural Community > Environment

The SEA-MaP project aims to reduce plastics consumption, increase recycling, and minimize leakages to prevent land and sea based marine plastics pollution in Southeast Asia.

It will provide support to develop and harmonize regional policies as well as create regional platforms for innovation, investments, knowledge and partnerships.

The SEA-MaP project is comprised of the following three components:

- 1) Strengthening Regional Policies and Institutions for Plastics Circularity
- 2) Establishing Regional Platforms to Promote Innovations, Knowledge, and Partnerships for Plastics Circularity
- 3) Project Management and Capacity Building

Source: ASEAN (n.d.)

Appendix 9.0 - ASEAN Consortium Strategic Advantages

Country	Country Advantage
<p style="text-align: center;">Malaysia (Core Operations & Strategy)</p>	<ul style="list-style-type: none"> • Anchors national green talent development through real-world blockchain, logistics, and sustainability applications, aligning with the Green Skills Fair 2025 agenda (Talent Corporation Malaysia Berhad, 2025). • Showcases Malaysia’s 2025 ASEAN Chairmanship priorities on “Inclusivity and Sustainability” by integrating MSMEs and waste workers into the digital circular economy. • Establishes the groundwork for circular plastics, high-tech investment, and digital economy growth as GreenLoop expands beyond Philippines and scale across Malaysia.
<p style="text-align: center;">Singapore (Advisory - Blockchain & Green Finance)</p>	<ul style="list-style-type: none"> • Builds on the Green Investments Partnership (GIP) with ASEAN, mobilises blended capital and advisory support to finance circular and waste management projects across ASEAN (Monetary Authority of Singapore, 2025). • Channels Singapore’s skilled talent pool into regional projects, expanding their global exposure and hands-on experience in digital governance and sustainability. • Positions Singapore as a reputable candidate for global ESG capital, directing investments toward verified and high-impact circular economy or sustainable projects in Singapore. • Strengthens Singapore’s position as ASEAN’s sustainable FinTech hub through the Green Circular Credit Scoring (GCCS) & GreenLoop integration framework.
<p style="text-align: center;">Philippines (Primary Focus High-Impact Market)</p>	<ul style="list-style-type: none"> • Addresses the nation’s leading role in marine plastic leakage through large-scale source reduction and value creation for collected plastics. • Strengthens financial inclusivity through green microfinancing, enabling MSMEs to access sustainable credit and participate in circular growth. • Positions the Philippines as a credible hub for ESG and climate investment, diversifying the economy and creating a stable market for recycled materials.

Appendix 10.0 - Sustainability-Linked Loans (SLLs) in ASEAN



Source: Climate Bonds Initiative (2023)

Appendix 11.0 - ASEAN Consortium Financial Projection

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
REVENUE						
Manufacturer Fees		RM600,000	RM720,000	RM960,000	RM1,080,000	RM1,200,000
MFI Licensing Fees		RM75,000	RM150,000	RM300,000	RM450,000	RM570,000
Government Grants		RM300,000	RM150,000	RM150,000	RM150,000	RM150,000
Ledgering Fees		RM65,250	RM78,300	RM104,400	RM117,450	RM130,500
Total Revenue		RM1,040,250	RM1,098,300	RM1,514,400	RM1,797,450	RM2,050,500
COST						
Blockchain Development	(RM400,000)	-	-	-	-	-
RFID Systems & Integration	(RM800,000)	-	-	-	-	-
Mobile & Web App Development	(RM100,000)	-	-	-	-	-
Initial Legal & Regulatory Compliance	(RM75,000)	-	-	-	-	-
Total CAPEX	(RM1,375,000)	-	-	-	-	-
Consortium Team Salaries		(RM350,000)	(RM360,500)	(RM371,315)	(RM382,454)	(RM393,928)
Blockchain Maintenance & Hosting		(RM150,000)	(RM154,500)	(RM159,135)	(RM163,909)	(RM168,826)
RFID System Maintenance		(RM250,000)	(RM257,500)	(RM265,225)	(RM273,182)	(RM281,377)
Marketing & Outreach		(RM50,000)	(RM51,500)	(RM53,045)	(RM54,636)	(RM56,275)
RFID Ledgering Cost		(RM150,000)	(RM225,000)	(RM300,000)	(RM375,000)	(RM400,000)
Annual OPEX		(RM950,000)	(RM1,049,000)	(RM1,148,720)	(RM1,249,182)	(RM1,300,407)
Total Costs	(RM1,375,000)	(RM1,100,000)	(RM1,274,000)	(RM1,448,720)	(RM1,624,182)	(RM1,700,407)
PROFITABILITY						
Net Profit/Loss	(RM1,375,000)	(RM59,750)	(RM175,700)	RM65,680	RM173,268	RM350,093
Cumulative Cash Flow		(RM1,434,750)	(RM235,450)	(RM110,020)	RM238,948	RM523,361

Appendix 11.1 - ASEAN Consortium Financial Projection Assumptions

Metric (USD)	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Number of Manufacturers		5	6 (+1)	8 (+2)	9 (+1)	10 (+1)
Number of MFIs		5	10 (+5)	20 (+10)	30 (+10)	38 (+8)
Pricing	Annual Fee					
Manufacturer Fee	RM120,000					
MFI Licensing Fee	RM15,000					
Ledgering Fee	RM13,050					
Grants	Year 1	Year 2				
Government Grants	RM300,000	RM150,000				

Financial Projection Assumptions

- i. A 3% annual inflation/growth rate starting in Year 2 is assumed to account for increased salaries and maintenance as the platform scales.
- ii. The consortium begins with 5 founding manufacturers in Year 1. We assume a growth rate of 25% annually for the first three years, and then a more conservative 15% thereafter as the market matures.
- iii. Microfinancing Institutions (MFIs): We assume a starting number of 5 MFIs in Year 1, with an aggressive growth rate of 100% annually for the first two years, as the GCCS proves its value, before tapering to 50% and 25% in subsequent years.