MINISTRY OF
INVESTMENT, TRADE AND INDUSTRY

Circular Economy Policy Framework

for the Manufacturing Sector in Malaysia

e ISBN No. : 978-967-0020-47-1

PUBLISHED BY:

MINISTRY OF
INVESTMENT, TRADE AND INDUSTRY

Menara MITI, No. 7, Jalan Sultan Haji Ahmad Shah,
50480 Kuala Lumpur, Malaysia.

Tel : 603-8000 8000
Fax : 03-6206 4693
Email : webmiti@miti.gov.my

© MINISTRY OF INVESTMENT, TRADE AND INDUSTRY

MITI, 2024

All rights reserved
No part of this document may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without prior permission from Ministry of Investment, Trade and Industry (MITI). The information in this document has been updated as accurately as possible until the date of publication.

Table of Contents

Glossary

APAC	Asia Pacific
ASEAN	Association of Southeast Asian Nations
B2B	Business-to-Business
BUR	Biennial Update Report
CAGR	Compound Annual Growth Rate
CAPEX	Capital Expenditure
CE	Circular Economy
CEAP	Circular Economy Action Plan
CESW	Circular Economy Blueprint for Solid Waste
DMU	Delivery Management Unit
DOE	Department of Environment
DOSM	Department of Statistics Malaysia
E&E	Electrical and Electronics
EPR	Extended Producer Responsibility
ESG	Environmental, Social and Governance
EU	European Union
EV	Electric Vehicle
FDI	Foreign Direct Investment
FTA	Free Trade Agreement
G2G	Government-to-Government
GDP	Gross Domestic Product
GIP	Greening Industrial Park
GVA	Gross Value Added
HSE	Health, Safety and Environment
ID-TAP	Industry-Driven Talent Acceleration Programme
IoT	Internet of Things
IPPU	Industrial Processes and Product Use
IR4.0	Industrial Revolution 4.0
IRA	Inflation Reduction Act
ITIC	Industrial Technology Innovation Centre
KE	Ministry of Economy
KICOX	Korea Industrial Complex Corporation
KLN	Ministry of Foreign Affairs
KPDN	Ministry Of Domestic Trade and Cost of Living
KPKT	Ministry of Housing and Local Government
LCA	Life Cycle Assessment
MaGIC	Malaysian Global Innovation and Creativity Centre
MAREA	Malaysia Recycling Alliance
MATRADE	Malaysia External Trade Development Corporation
MEPS	Minimum Energy Performance Standard
MFA	Material Flow Accounting
MGTC	Malaysian Green Technology and Climate Change Corporation
MIDA	Malaysian Investment Development Authority
MIGHT	Malaysian Industry-Government Group for High Technology
MIMOS	Malaysian Institute of Microelectronic Systems
MITI	Ministry of Investment, Trade and Industry
MNC	Multinational Company
MOF	Ministry of Finance
MOHR	Ministry of Human Resources

MOSTI	Ministry of Science, Technology and Innovation
MRA	Mutual Recognition Agreement
MSIC	Malaysia Standard Industrial Classification
NACE	*'Nomenclature statistique des Activités économiques dans la Communauté Européenne'* - Statistical classification of economic activities in the European Community
NEP	National Energy Policy
NETR	National Energy Transition Roadmap
NIMP	New Industrial Master Plan 2030
NRES	Ministry of Natural Resources and Environmental Sustainability
OEM	Original Equipment Manufacturer
PET	Polyethylene Terephthalate
PIA	Promotion of Investment Act
PRO	Producer Responsibility Organisation
ProgRess	The Germany Resource Efficiency Programme
R&D	Research and Development
REISO	Resource Efficiency and Industrial Symbiosis Opportunity Assessment
RM	Malaysian Ringgit
RMK-12	Twelfth Malaysia Plan
SC	Securities Commission
SDG	Sustainable Development Goals
SEA	Southeast Asia
SEEA	System of Environmental-Economic Accounting
SLI	Starting, Lighting and Ignition
SME	Small and Medium-sized Enterprise
SRI	Sustainable and Responsible Investments
TVET	Technical Vocational and Educational Training
UK	United Kingdom
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
US	United States
USD	United States Dollar
WMAM	Waste Management Association of Malaysia

FOREWORD by

THE MINISTER OF INVESTMENT, TRADE AND INDUSTRY

Towards a Circular Manufacturing Industry

I am pleased to present the Circular Economy Policy Framework for the Manufacturing Sector, with the objective of developing a circular economy ecosystem to help the nation transition towards our Net Zero goal by 2050 and achieve our global climate goals.

The Framework has also been designed to complement the ambitions of the New Industrial Master Plan 2030 (NIMP 2030) and the National Energy Transition Roadmap. Additionally, the Green Investment Strategy (GIS) – in which the Circular Economy features as one of the focus areas – will seek investments in areas such as remanufacturing and refurbishment, industrial waste management and advanced recycling.

Indeed, the launch of this Framework is timely as markets increasingly become ESG-sensitive, and re-design their supply chains to source from producers and exporters that prioritise resource efficiency; waste reduction, climate-de-risking and sustainability.

It should be noted, however, that implementing a Circular Economy will also result in economic benefits, and could potentially unlock significant commercial opportunities, estimated to be valued at USD4.5 trillion by 2030. And while we recognise that a Circular Economy ensures that economic growth must not come at the expense of environmental health, we must also recognise its key role in creating a more resilient global supply chain, which can enhance national security and economic stability.

This is why governments and industries worldwide are embracing more sustainable practices of production and consumption.

Malaysia is blessed with abundant natural resources and feedstock, and it is projected that a billion tonne of natural resources will be extracted annually in Malaysia by 2030, based on current extraction rates. Such significant volumes of extraction will also result in a significant volume of industrial waste, as well as pollution risks in both land and marine environments. To continue as an open trading nation economy and strengthen our position as a global exporter of manufactured goods, Malaysia needs to build a sustainable ecosystem that will ensure the sustainability and resilience of our economy over the long-term.

Apart from the obvious reasons, we also need to adopt sustainable practices to secure our position in the global supply chain, and to prevent Malaysian companies from being shut out of ESG-sensitive markets. In fact, more and more governments and companies have realised that being ESG-compliant could also enhance their competitive advantages in the eyes of their stakeholders.

The initiatives under the Circular Economy Policy Framework call for our whole-of-nation commitment to shift towards an industrial production model that is restorative or regenerative by design, and resource-efficient. Additionally, the Framework also features recyclability and reuse, improved production and the availability of secondary sources of feedstock.

The effective and timely implementation of the initiatives under this Framework is expected to rapidly enhance the circular ecosystem, address the growing challenge of finite natural resources and feedstock, and unlock the greatest value from a maturing circular industry. The Framework will leverage the role of manufacturers with a strategic focus on material, heat and water input – particularly from a ‘life cycle’ perspective comprising the design, manufacturing, distribution and ‘retirement’ stages of a product, followed by how much of it can be recycled.

We must all do our part and work collectively for a circular economy and sustainable future. We must act fast because climate change will wait for no one. I am hoping our fast action, and the global drive to address it based on real sense of urgency, will see more impactful public-private initiatives for Malaysia to accelerate towards a truly sustainable manufacturing industry.

TENGKU DATUK SERI UTAMA ZAFRUL TENGKU ABDUL AZIZ
The Minister of Investment, Trade and Industry

Acknowledgements

The Circular Economy Policy Framework for the Manufacturing Sector is developed in line with the strategies and aspirations outlined by key roadmaps in Malaysia, including the New Industrial Master Plan 2030 (NIMP 2030) and the Twelfth Malaysia Plan (RMK-12), as well as various other industry roadmaps that push for sustainability and circular economy in Malaysia.

The Framework is co-created in collaboration with multiple stakeholders, spanning ministries, Government agencies, industry associations, industry players, topic experts, and other stakeholders. We are thankful for the active participation of all parties in jointly developing the Framework.

Ministries

Ministry of Economy (KE)
Ministry of Finance (MOF)
Ministry of Housing and Local Government (KPKT)
Ministry of Natural Resources and Environmental Sustainability (NRES)
Ministry of Science, Technology and Innovation (MOSTI)

Government Agencies

Bank Negara Malaysia (BNM)
Collaborative Research in Engineering, Science & Technology (CREST)
Department of Environment (DOE)
Malaysia External Trade Development Corporation (MATRADE)
Malaysia Automotive Robotics and IoT Institute (MARii)
Malaysia Steel Institute (MSI)
Malaysian Global Innovation and Creativity Centre (MaGIC)
Malaysian Green Technology and Climate Change Corporation (MGTC)
Malaysian Institute of Microelectronic Systems (MIMOS)
Malaysian Investment Development Authority (MIDA)
Securities Commission (SC)
SIRIM Berhad
Solid Waste and Public Cleansing Management Corporation (SWCorp)

Industry Associations & Players

Chemical Industries Council of Malaysia (CICM)
Federation of Malaysian Manufacturers (FMM)
Malaysia Metal Recyclers Association (MMRA)
Malaysia Semiconductor Industry Association (MSIA)
Malaysia Steel Association (MSA)
Malaysian Automotive Association (MAA)
Malaysian Furniture Council (MFC)
Malaysian Iron & Steel Industry Federation (MISIF)
Malaysian Petrochemical Association (MPA)
Malaysian Plastics Manufacturers Association (MPMA)
Malaysian Plastics Recyclers Association (MPRA)
Malaysian Pulp & Paper Manufacturers Association (MPPMA)
Malaysian Recycling Alliance (MAREA)
Malaysian Rubber Glove Manufacturers Association (MARGMA)
Malaysian Textile Manufacturers Association (MTMA)
The Cement & Concrete Association of Malaysia (C&CA)
The Electrical and Electronics Association of Malaysia (TEEAM)
Waste Management Association of Malaysia (WMAM)

Intergovernmental Organisations

ASEAN Secretariat

Key Collaborators

Petroliam Nasional Berhad (PETRONAS)
Boston Consulting Group (BCG)

Executive Summary

What is the Circular Economy Policy Framework for the Manufacturing Sector?

The Circular Economy Policy Framework is an avenue to guide the evolution and enhancement of circularity in the manufacturing sector in Malaysia. It complements existing policies and initiatives whilst guiding future developments in circularity, accounting for the impact and opportunities to manufacturers as well as to Malaysia's national climate goals and ambitions.

The Framework is designed to align with the goals and ambitions of NIMP 2030, with the target of supporting an industrial model that is restorative or regenerative by design, using a closed loop material flow in the economic system. In doing so, it seeks to encourage design and use of products with reduced raw material needs, enhance recyclability and reuse characteristics, and improve production and availability of secondary sources of feedstock.

In line with NIMP 2030 and RMK-12, this Framework will seek to catalyse green growth for Malaysia's manufacturing sector by improving the competitiveness of the industry and the marketability of products in export markets; support Malaysia's net-zero ambitions by decarbonising domestic operations through resource optimisation; contribute towards achieving the national sustainability agenda by reducing consumption of natural/virgin resources and post-production waste; enable the growth of the green economy including new sustainable industries and products; and enhance enablers to create a conducive circular economy (CE) ecosystem for industry adoption.

Why do we need the Circular Economy Policy Framework?

To advance Malaysia's capabilities in sustainable resource use, urgent steps are required to develop an effective CE approach that benefits business, the economy, the environment and the *rakyat*. Addressing this need not only provides a path to a more sustainable national ecosystem but will also unlock new growth areas from products manufactured with circularity in mind.

If the nation continues to consume resources at current rates, Malaysia is on course to extract over a billion tonnes of natural resources annually, while at the same time generating significant volumes of manufacturing waste and facing potential plastic pollution in both land and marine environments.

This not only poses a major ethical challenge due to expanding environmental impact, but also puts Malaysia at risk of falling behind global economic norms that strive to achieve more sustainable production and consumption. Without appropriate measures to improve resource efficiency, Malaysia may face increased vulnerability to global trade fluctuations and reduced economic competitiveness, as well as challenges in achieving its net-zero goals.

Strategic focus for Malaysia's CE Framework

This Framework centres on the role of manufacturers in the CE value chain, including a strategic focus on material, heat and water input, the design, production and distribution stages of manufacturing, and industrial waste generated by manufacturers.

The strategy outlined in this Framework covers all manufacturing sectors under NIMP 2030 and all stages of the circular value chain—Design, Produce, Distribute, Use, Collect, Recycle—to embed a holistic approach to improved circularity. It involves a range of actors including manufacturers, customers, CE industry players, ministries and agencies, with the Framework designed to unlock a wide range of benefits for these stakeholder groups.

Targets, aspirations, initiatives and enablers

The Framework was developed with reference to global trends, extensive baselining of Malaysia's current state in circularity, as well as a comprehensive benchmarking exercise of best-in-class CE policies and indicators. Based on this analysis, the Framework has set out key aspirations and targets for Malaysia across four key themes, namely (1) Circular Input, (2) Efficient Process, (3) Sustainable Output, and (4) Socio-economic Impact.

To achieve these aspirations, the Framework identifies 14 initiatives and enablers which are targeted interventions to spur and support the development of Malaysia's CE ecosystem. These have been developed to suit Malaysia's unique context, opportunities and challenges. They have also been prioritised based on relative impact and ease of implementation, to optimise the use of resources and determine the sequencing of initiatives.

Implementation and next steps

The effective and timely implementation of these initiatives is vital to enable Malaysia to rapidly enhance its CE ecosystem, address the growing challenge of maintaining the nation's natural resources, and unlock the greatest value from a maturing CE industry.

To translate strategy into action, a comprehensive implementation plan was developed, including detailed charters for each initiative. High-level timelines have also been developed for each initiative showing key activities, sequencing, milestones and responsible parties.

Implementation will be carried out by a Technical Committee comprising leads of each initiative and chaired by MITI. Initiative Leads are tasked with leading and driving the implementation of initiatives, regularly engaging industry to sense-check initiatives, and updating the rest of the Committee on progress, challenges, potential solutions and next steps on a quarterly basis. The Committee will report progress to the NIMP 2030 Mission 3 Delivery Management Unit (DMU), which will in turn report to the NIMP 2030 Steering Committee on a quarterly basis and to the National NIMP 2030 Council each year.

Methodology

The CE Policy Framework for the Manufacturing Sector in Malaysia ("the Framework") was developed by the Ministry of Investment, Trade and Industry (MITI) across six main steps, undertaken over a period of four months from December 2023 to March 2024. The Framework is a key initiative (Action Plan 3.3.3) under Mission 3 (Push for Net Zero) of NIMP 2030.

The Framework development process involved extensive engagements with industry and public stakeholders, including collaboration with ministries, government agencies, industry associations and industry experts to leverage a diverse range of views and insights.

Key national roadmaps and policies were referenced throughout this process, including NIMP 2030, the RMK-12, Malaysia Plastics Sustainability Roadmap 2021-2030, National Energy Policy (NEP), National Energy Transition Roadmap (NETR) and Circular Economy Blueprint for Solid Waste (CESW).

Step 1: Review of global CE trends
Step 2: Baselining Malaysia's current state
Step 3: Benchmarking of leading countries
Step 4: Setting of aspirations and targets
Step 5: Identification of initiatives and enablers
Step 6: Development of actionable implementation plan and timeline

Step 1: Review of global CE trends

A review of global CE trends in manufacturing, trade, and foreign direct investment (FDI) provided overarching strategic understanding of the global ecosystem. Comprehensive analysis of trends in manufacturing (such as shifts in market dynamics, government regulations and technology), global trade trends and evolution of the FDI landscape was undertaken to inform this Framework.

Step 2: Baselining Malaysia's current state

Malaysia's current CE state was assessed to provide a baseline foundation for the study. This involved assessing the significant contribution of the manufacturing sector to the national economy and examining existing efforts by industry players to adopt CE practices. Baselining also helped to identify challenges that industries face in pursuing CE initiatives. A wide array of stakeholders was engaged in order to gather on-the-ground perspectives and provide deeper understanding of CE in Malaysia. In total, approximately 20 key stakeholders from both private and public sectors were continuously engaged in sessions over the course of the study.

Topics discussed included the current plans and opportunities for CE in manufacturing, challenges faced in driving circularity, ideas for initiatives to advance adoption and maturity of CE, and the enablers required to support that transformation.

A further assessment was undertaken to understand the waste currently generated by Malaysia's manufacturing sector, as well as to identify the main types of recycled inputs and players within the CE ecosystem.

Overall, the baselining exercise provided a better understanding of the state of CE in Malaysia and the obstacles faced, informing strategies for enhancing the CE transition.

Step 3: Benchmarking Malaysia's current state

An extensive benchmarking exercise was conducted to understand best practices in CE globally and assess Malaysia's performance in CE.

The selection for benchmarking was based on three key factors: (1) the importance of the manufacturing sector to the overall economy, (2) geographical diversity, and (3) a range of income levels. Utilising this approach, 10 countries were selected for detailed analysis across three categories—Best-in-class Leaders, Regional Champions and Southeast Asian Peers. These countries were then further assessed and benchmarked based on two main aspects of circularity:

- **Circularity policies.** The benchmarking examined policy levers adopted by each country across the value chain, spanning six key stages of manufacturing: Design, Produce, Distribute, Use, Collect & Sort, and Recycle/New Input. This analysis revealed variations in policy coverage and the focus of each country, depending on their maturity levels.

- **Circularity Indicators.** Utilising an economy-wide material flow accounting (MFA) framework and reviewing the CE strategies and roadmaps of the benchmarked countries, this exercise pinpointed four common themes across nations and the indicators typically used to measure CE progress. Based on these themes, 16 indicators were identified for benchmarking and data points gathered using a wide range of sources such as the Department of Statistics Malaysia (DOSM), Eurostat, the United Nations' Global Material Flows Database, reputable market reports, press search and industry interviews. This approach offered a unified understanding of Malaysia's level of maturity in comparison with the benchmarked countries.

Step 4: Setting of aspirations and targets

Based on the identified themes from Step 3, aspirations and targets were then set for Malaysia, informed by learnings from other countries and designed to complement existing national targets and policies. This approach ensures that Malaysia's CE ambitions are not only globally informed but also locally applicable, fostering synergy between new initiatives and the nation's established strategic direction.

Out of the 16 indicators identified for benchmarking, five were selected to serve as target metrics. These five metrics were chosen as they reflect performance along all stages of the material flows process and can be feasibly tracked on a regular basis. As the Framework is an initiative under NIMP 2030, targets were set for 2030.

Step 5: Identification of initiatives and enablers

Initiatives and enablers were then identified which would assist Malaysia in achieving the stated targets to advance CE in manufacturing. A three-stage process was implemented to develop, refine and finalise 14 initiatives:

- **Stage 1: Ideation.** Ideas for initiatives and enablers were brainstormed and generated based on the findings of Steps 1 to 3, including the review of key global trends, benchmarking of best practices and policy levers, baselining of Malaysia's current state, and stakeholder interviews with key public and private sector players in the CE ecosystem.

- **Stage 2: Refinement.** Stakeholder feedback was gathered to test and refine the initiative ideas. This was done through a half-day stakeholder engagement workshop involving over 40 individuals from more than 20 public and private-sector stakeholders. At the workshop, participants were introduced to the potential initiatives, including benchmarks of similar programmes implemented elsewhere. Participants were then invited to comment and provide feedback on the initiatives, individually and in breakout group discussions. Topics discussed included identification of relevant sectors for possible pilots, potential stakeholders to involve, similarity to any local policies and initiatives, initiative considerations and challenges, and any new initiative suggestions.

- **Stage 3: Prioritisation and detailing.** Initiatives were further developed and detailed through stakeholder follow-up sessions with industry associations and relevant ministries. Initiative leads and key stakeholders were identified and aligned for each initiative. In addition, the initiatives were prioritised according to relative impact and ease of implementation to identify quick wins (high ease of implementation), big ticket items (high impact, low ease of implementation) and needle-moving initiatives.

High-impact initiatives were defined as those that are foundational (essential for enabling other initiatives), catalytic (expediting the development of Malaysia's CE ecosystem), and transformative (inducing fundamental changes in business models and operations).

Meanwhile, initiatives with high ease of implementation were defined as fast-to-launch (within a year), federally driven (primarily by the Federal Government with minimal coordination or dependency on external stakeholders), and asset-light (requiring minimal new infrastructure build).

Step 6: Development of actionable implementation plan and timeline

An actionable implementation plan and timeline, including mechanisms for governance, monitoring and tracking, was developed for implementation and delivery of the key initiatives outlined within the Framework. This plan includes clear objectives, activities, and timelines for each initiative, formulated through in-depth engagement with stakeholders from both the private and public sectors. Initiatives were also sequenced to launch in three distinct waves, to take into account the necessary preparation, dependencies, and time required to launch each initiative.

1 Overview

The circular economy is important because our status quo for resource use is unsustainable. If consumption rates continue at the current pace, by 2030 Malaysia could generate double the volume of industrial emissions that it does today[1], produce 22 million tonnes of manufacturing waste[2] and 84,000 tonnes of ocean-polluting plastic each year[3], and extract a billion tonnes of natural-resource material annually[4].

This could lead to several key risks for Malaysia, including vulnerability to global trade fluctuations due to an increased dependence on natural imports, and reduced export competitiveness if we are not able to keep up with requirements in export markets. In addition, Malaysia may not be able to meet its net-zero targets as increased usage of virgin materials drives industrial processes and product use (IPPU) emissions. Without a more circular approach, Malaysia is at risk of depleting critical natural resources while running short of vital production inputs. Finally, there may be missed opportunities to build new growth areas from higher-end recycled products within the country, offering the potential to generate additional economic value and jobs.

1.1 Definition and Scope of the Framework

Based on the NIMP 2030, a circular economy model promotes an industrial economy that is restorative or regenerative by design, using a closed loop material flow in the economic system. Examples of this include designing products that require less raw materials and can be recycled, or reusing wastes as secondary sources of feedstock.

This definition guides the strategic goals and aspirations of this document. The Framework will target five core objectives aligned with NIMP 2030 and RMK-12.

I. Catalyse green growth for Malaysia's manufacturing sector by improving the competitiveness of the industry and the marketability of products in export markets.

II. Support Malaysia's net-zero ambitions by decarbonising domestic operations through resource optimisation.

III. Contribute towards achieving the national sustainability agenda by reducing sourcing and consumption of natural/virgin resources, and post-production waste.

IV. Enable growth of green economy including new sustainable industries and products.

V. Enhance enablers to create a conducive CE ecosystem for industry adoption.

CE represents a key pillar of Malaysia's continued national progress, and one with significant importance in the manufacturing sector. This Framework is designed to complement existing CE efforts and align with the scope and targets of existing policies (see Figure 1).

[1] Projected using same emission intensity in 2019 from UNFCCC BUR 4 and GDP target in NIMP 2030
[2] Projected using same manufacturing waste intensity in 2019
[3] Projected using same ocean-pollutive plastic per person per year from survey by Utility Bidder
[4] Projected using same resource intensity from UNEP IRP Global Material Flows Database

CE is a key pillar of RMK-12 and NIMP, and complements other policies

	12th Malaysia Plan 2021-2025 (RMK-12)	New Industrial Master Plan 2030 (NIMP)	National Energy Policy 2022-2040 (NEP)	National Energy Transition Roadmap (NETR)	Malaysia Plastics Sustainability Roadmap 2021-30	Circular Economy Blueprint for Solid Waste (CESW)
Lead Ministry	**KE**	**MITI**	**KE**	**KE**	**NRES**	**KPKT**
Description	Strategic economic plan for a prosperous, inclusive and sustainable Malaysia	Industrial policy for the manufacturing and manufacturing-related services sector	Policy charting energy sector strategies and priorities	Roadmap to accelerate energy transition and improve climate resilience	Strategies and action plans to achieve greater plastic circularity levels in Malaysia	Strategic framework to transform solid waste management system into a circular economy
CE considerations in each policy	• "Embracing the Circular Economy" as a game-changer under theme of "Advancing Sustainability"	•"Develop CE policy framework" as a new green growth area under Mission 3 "Push for Net Zero"	• Industrial energy efficiency • Bioenergy (e.g. from agricultural waste)	• Industrial energy efficiency • Bioenergy (incl. solid waste management, waste-to-energy) • CCUS for industry	• Circularity for plastics, with initiatives across the value chain including design, EPR, recycling	• Circularity aimed at reducing volume of solid waste, with initiatives across value chain including design, EPR, recycling
Key takeaways for our study	CE Policy Framework should help contribute to economic and environmental targets	CE Policy Framework should help contribute to targets for manufacturing sector	CE Policy Framework should complement, not duplicate, NEP initiatives for the energy sector	CE Policy Framework should complement, not duplicate, initiatives for the energy sector	CE Policy Framework should complement Plastics initiatives, take into account other material use and focus on role of manufacturers	CE Policy Framework should complement proposed initiatives, take into account non-solid waste (e.g. heat) and focus on role of manufacturers

Figure 1. Key policies in Malaysia with takeaways for the Framework

The scope of this Framework is to focus on the role of manufacturers in the CE value chain, which has not been addressed by other policies. Specifically, this Framework focuses on (1) heat, water and material input, (2) the design, manufacturing and distribution stages, and (3) industrial waste generated by manufacturers (see Figure 2).

Illustration of material flows in the economy

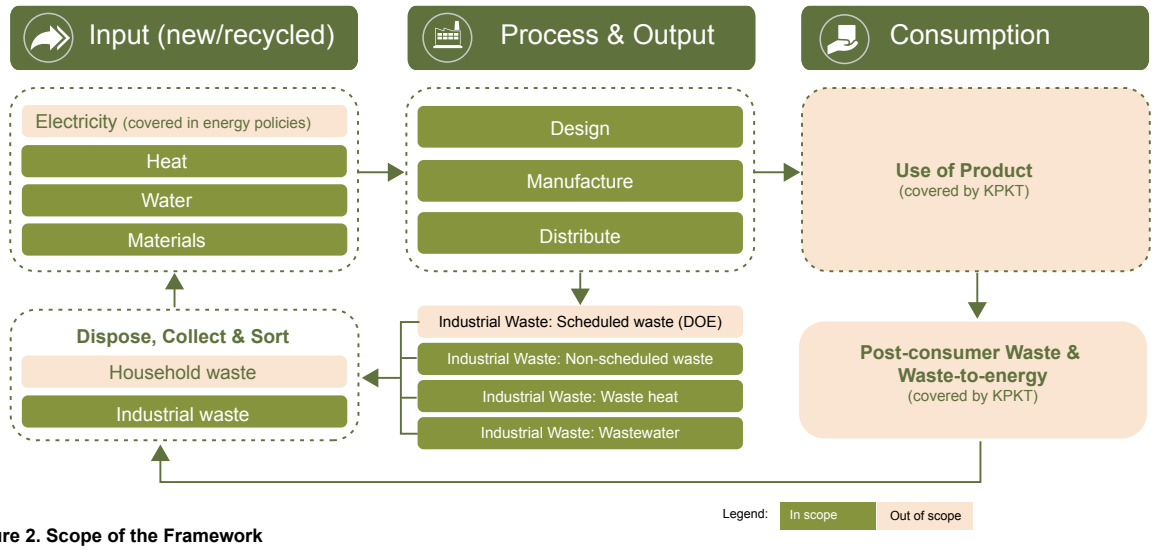


Figure 2. Scope of the Framework

The manufacturing sectors covered in this Framework include all manufacturing sectors under NIMP 2030, namely: automotive, including electric vehicles (EV); food processing; machinery and equipment; metal; minerals; palm oil-based products; petroleum products and petrochemicals; rubber-based products; shipbuilding and ship repair; textile, apparel and footwear; wood, paper, and furniture. It also includes the priority sectors for NIMP 2030: aerospace; chemical; electrical and electronics (E&E); pharmaceutical; medical devices.

1.2 Approach to Circular Economy

An effective CE ecosystem goes beyond recycling. It can be advanced at every stage of the value chain—Design, Produce, Distribute, Use, Collect, Recycle (see Figure 3). This is why the Framework emphasizes the role of manufacturers.

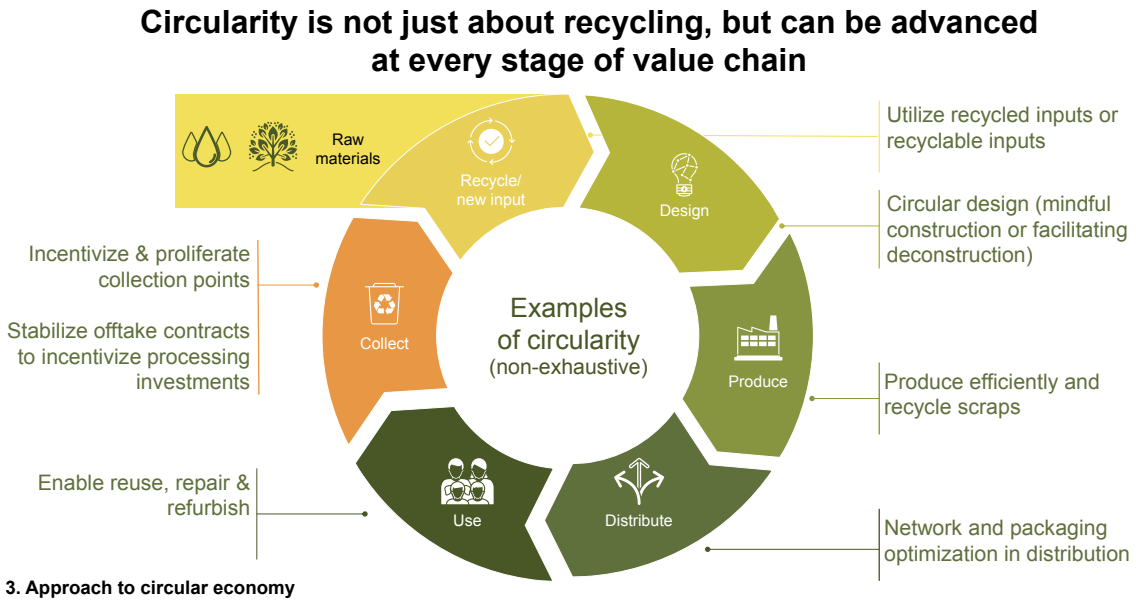


Figure 3. Approach to circular economy

In designing the Framework, MITI recognises that actors across the value chain are highly interlinked. For example, recycled products downstream can become material inputs for manufacturers further upstream in the value chain. This emphasises the importance of an ecosystem-led approach when designing CE polices. Key actors include manufacturers, customers and CE industry players, all of whom are integral to an effective CE strategy.

To participate in CE, manufacturers require a sufficient supply of recycled input materials and demand from customers for circular products. They also require offtakers for waste output generated during the manufacturing process. Customers require circular products to be available alongside the relevant data and certification. They also need legislation, regulations and/or incentives that create a business case for consuming circular products. CE industry players, such as recyclers, require a sufficient supply of good quality waste to process and recycle, as well as sufficient demand from manufacturers for recycled material inputs.

Advancing the circular economy benefits Malaysia on multiple levels, i.e. the manufacturing sector, workforce and community, and the environment. This can unlock widespread socioeconomic and environmental advantages and shift the nation's economy towards a sustainability-driven model. The Framework will explore all three levels of opportunity as fundamental elements of an effective and value-creating CE ecosystem.

- **Manufacturing sector.** Advancing CE can drive operational efficiency and cost effectiveness through waste reduction, improve the competitiveness of exports to markets where CE requirements are being imposed, mitigate the risk of resource scarcity, and encourage innovation, growth and the opening of new market segments.
- **Workforce and community.** CE can generate green jobs, develop talent and build a skilled workforce for industries such as advanced recycling, remanufacturing and refurbishing. It can increase the variety of green options for consumers and spread awareness of climate action and circularity among the public.
- **Environment and net-zero ambitions.** CE can contribute towards lowering emissions by reducing waste, increasing the efficiency of industrial processes and optimising distribution networks. It also can reduce pollution from waste dumping and incineration, as well as conserve natural resources through more efficient use of materials.

2 Global Trends Driving the Circular Economy in Malaysia

An effective CE strategy must be designed to reflect the complex and interconnected nature of the global trade, manufacturing and investment ecosystem. Comprehensive analysis of sector-specific shifts, global trade trends and the evolving investment landscape was undertaken to inform this Framework.

2.1 Sector Trends in Manufacturing

Six key trends are shifting the global landscape for manufacturing, with important implications for Malaysia's CE opportunity.

I. **Shift in market dynamics.** Demand from end-users and investors is shifting towards products which are more sustainable. This improves the economic viability of circular initiatives amongst manufacturers. Conversely, it poses a risk to manufacturers who are lagging in their sustainable transition.

II. **Regulations**. Governments around the world are imposing increasingly strict regulations to align with their own evolving sustainability targets. This is particularly acute in targets to minimise waste, evidenced in policies such as bans on single-use plastics which have seen growing adoption in international markets. This trend is driving shifts in how manufacturers design, procure and manufacture their products amidst a shifting global regulatory landscape.

III. **Accountability.** Pressure is mounting for manufacturers to increase their accountability beyond just manufacturing, to include end-of-life monitoring and post-consumer product recovery as part of a holistic manufacturing footprint.

IV. **Supply chain risk.** Growing awareness around preservation of virgin materials has prompted changes in processes to mitigate usage, manage costs and avoid potential shortages. This trend is particularly prominent in scarce but in-demand materials such as nickel and cobalt used in the EV manufacturing segment.

V. **Partnerships.** Changing market dynamics are driving complex impacts across all manufacturers. Many are turning to partnerships to develop circular solutions while managing cost of ownership, realising the synergies of partnerships through strategies such as shared resources in industrial parks.

VI. **Technology.** Breakthroughs in infrastructure development and advances in technology have lowered the barriers to entry for circular manufacturing practices. For example, advancements in pyrolysis technologies in the chemicals sector have improved scalability for the use of recycled plastics as petrochemical feedstock.

These trends pose both challenges and opportunities for manufacturers. However, together they emphasise the growing imperative for manufacturers to build capacity and capability in circularity to remain competitive and resilient in the current global landscape.

2.2 Global Trade Trends

Global trade trends have been widely affected by the push for improved CE practices. This has a significant impact on Malaysia given its role in global value chains.

The Association of Southeast Asian Nations (ASEAN), of which Malaysia is a member, adopted the Framework for Circular Economy for the ASEAN Economic Community, demonstrating the momentum for CE in the region. The ASEAN Framework is based on the five strategic priorities of (1) Standard Harmonisation and Mutual Recognition of Circular Products and Services; (2) Trade Openness and Trade Facilitation in Circular Goods and Services; (3) Enhanced Role of Innovation, Digitalisation, and Emerging/ Green Technologies; (4) Competitive Sustainable Finance and Innovative ESG Investments; and (5) Efficient Use of Energy and Other Resources.

In addition, the European Union (EU) launched its Circular Economy Action Plan in 2020, establishing pivotal manufacturing changes in legislation with impacts across seven key industries: E&E; plastics; textiles; food, water and nutrients; packaging; batteries and vehicles; buildings and construction. This policy is indicative of how legislation may evolve around the world.

Trends in international waste management have also impacted Malaysia. Malaysia has a strict stance against waste imports due to the cost of disposal and environmental risks that they pose to the country. Instead of relying on waste imports to provide sufficient feedstock for producing recycled materials, Malaysia can and must increase the availability of domestic recycling feedstock through initiatives such as extended producer responsibility (EPR) schemes. This will not only reduce the reliance on imported waste but also improve the domestic CE ecosystem. Malaysia's current recycling rate stands at approximately 35% of total waste, compared to around 80% in countries which have effectively implemented EPR programmes[7].

As with other global shifts, these trade trends represent both a risk and opportunity for Malaysia.

- **Risk**
  - Tightening regulations such as the EU's Ecodesign Directive may pose compliance risks to producers exporting to relevant markets, if they are unable to keep pace with requirements.
  - Low-value waste imports and illegal waste management pose environmental and economic risks.
- **Opportunity**
  - Increasing CE in Malaysia's manufacturing landscape could unlock fresh competitive advantage for exports in markets with tightening sustainability regulations.
  - Improving and maturing domestic recycling landscape presents opportunity to supply domestic manufacturers and even export recyclates to meet growing international demand for alternative feedstock.

Case Study: EU Ecodesign Directive

The EU's draft Ecodesign Directive has important implications for Malaysian manufacturers. The draft document mandates minimum sustainability requirements which products need to comply with in order to remain viable in the EU's shared market.

Regulation would apply to any physical goods seeking entry to the market, introducing new and ambitious sustainability requirements around product features such as durability and minimum recycled content.

This Directive would have major implications for key Malaysian exports, particularly the E&E sector, which exported goods to the EU were valued at over RM18 billion in 2022[5], and forecasted to reach RM23 billion in 2030[6].

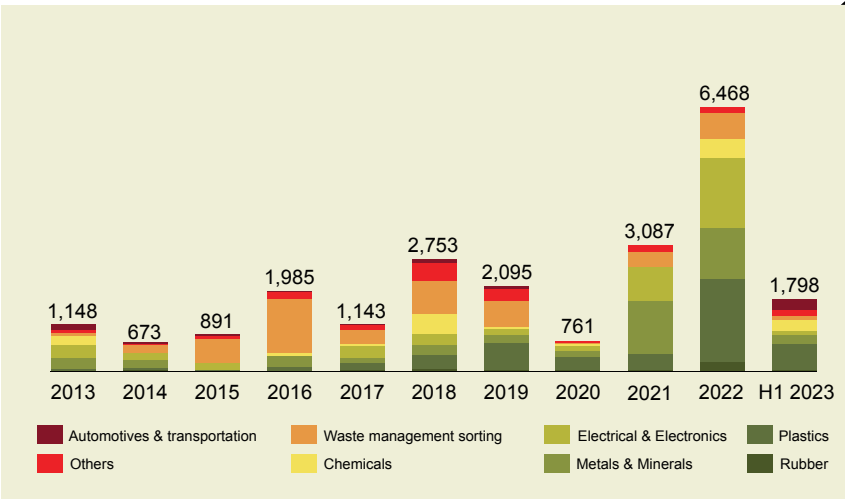
Malaysian agencies, including SIRIM, are undertaking extensive efforts in collaboration with industry players to ensure harmonisation of domestic standards with EU regulations. Continued efforts will be required to ensure all affected products meet required standards, while simultaneously raising awareness of the requirements among local Malaysian manufacturers.

[5] Trading Economics, European Union Imports from Malaysia
[6] Oxford Economics
[7] The Recycling Partnership

2.3 Global FDI Trends

Global FDI directed at CE projects reached a value of almost USD6.5 billion in 2022[8], which is more than double the previous year's value of USD3.1 billion. Over the years, the focus of CE FDI has shifted from waste management to sector-specific recycling activities (see Figure 4).

Global greenfield investments in CE, by sector (USD Million)



- Global CE FDI flows grew significantly in the last 2 years, reaching a record high of USD6.4Bn in 2022
- Greatest value is currently in plastics recycling which saw USD2Bn in FDI; projects in 2022 primarily in non-mechanical recycling
- Recycling-related sectors that also saw significant growth includes:
  - Metals & Minerals
  - Electrical and Electronics (including batteries)

Figure 4. Global greenfield FDI in CE, by sector

The majority of recycling FDI has been focused on Europe and the United States (US), with E&E, plastics and metals receiving the greatest share of investment. Over the decade from 2013 to H1 2023, the US received USD4.8 billion of FDI for recycling projects, concentrated in the metals and minerals and E&E sectors[9]. France was one of largest recipients in Europe, receiving over USD2.1 billion over the same period, primarily focused on plastics.

Emerging economies such as Mexico, China and Indonesia have also seen growing FDI inflows. Indonesia's most significant investments include plastic recycling projects by Alba Group (USD60 million) and Indorama (USD72.5 million), as well as battery recycling by Attero (USD100 million). Where possible, feedstock is sourced locally – for example, Alba Group is partnering with Tridi Oasis Group, an Indonesian recycling company specializing in processing locally sourced polyethylene terephthalate (PET) bottle waste into recycled PET flakes.

[8] fDi Markets database
[9] fDi Markets database

Case Study: France's CE Policies Attract High-value Investments

France's coherent and mature circularity policies have attracted high-value investments in the processing of hard-to-recycle plastics. This has encouraged a number of significant investments over the last five years from countries such as Belgium, Canada, the United Kingdom (UK) and US.

In 2022, US-based Eastman Chemical committed to a USD1 billion investment to develop a material-to-material molecular recycling facility in France for hard-to-recycle plastics. Canada's Loop Industries invested USD480 million in the same year, developing a facility to manufacture 100% recycled virgin-quality polyethylene terephthalate (PET) resin, with a planned capacity of 70,000 metric tonnes annually.

These two high-value investments, alongside other prominent FDI into France's recycling industries, are supported by six key drivers.

I. CE regulatory frameworks already in place in France
II. Strong incentives available for large and complex projects
III. Aggressive national recycling targets
IV. Strong market demand for recycled inputs in France and the EU
V. Decarbonised energy supply mix, enhancing potential for sustainable operations
VI. Strong local recycling industry

Case Study: Indonesia's strong EV policies attract high-value battery recycling activities

France's coherent and mature circularity policies Indonesia's aggressive push to develop an integrated EV value chain has led to the country attracting significant FDI in battery recycling technologies. A testament to this is the USD100 million investment from Attero, Indian-based electronics recycling giant, in its Indonesian battery recycling operations. Several key factors make Indonesia an attractive destination for battery recycling technologies:

- **Significant investments in complementary technologies to battery recycling.** Hyundai, LG Energy Solutions invested in the building of a USD1.1 billion battery plant, which creates a domestic buyer of recyclates.
- **Regulatory requirement for battery recycling.** Indonesia has instituted regulation on EV batteries that states that end-of-life batteries must be recycled.
- **Ban on deep-sea tailings disposal.** This ban encourages companies to turn mining waste into useful materials instead of releasing it into the oceans.

Case Study: Mexico Accelerates Investment in Automotive Recycling

Mexico has successfully attracted significant investment into automotive recycling, in turn supporting regional manufacturing value chains. This includes three landmark projects by major global organisations.

- **Steel Dynamics, low-carbon aluminium mill.** Steel Dynamics has invested USD350 million in two satellite aluminium scrap-recycling centres, meeting the demand for scrap aluminium driven by North American industries.[10] Primary uses for the metal include automotive and sustainable beverage cans. Mexico offered a convenient location within geographical proximity at a relatively lower-cost site to meet this recycling demand.

- **JL Mag, rare earth magnet-recycling facility.** China's JL Mag invested USD100 million to build a facility which transforms scrapped alloy into permanent magnets. The recycled magnets are used to supply surging global demand for rare earth required for EVs, wind turbines, and other high-demand technologies.[11] This investment reflects a trend of Chinese original equipment manufacturers (OEMs) taking advantage of the US-Mexico-Canada Free Trade Agreement.

- **Audi Mexico, reverse-osmosis plant**. Audi Mexico invested USD122 million to build a reverse-osmosis plant at its automobile manufacturing facility. Water used in the manufacturing process is treated and returned back as an input in the factory, helping to reduce wastewater. The plant has returned over 100,000 m3 to production in just two years—equivalent to 100 million litres of water.

As with supply and manufacturing shifts, global FDI trends represent both a risk and opportunity for Malaysia.

- **Risk**
  - Foreign investors may want to invest in low-value-added or manual recycling processes in Malaysia, which could pose environmental and socioeconomic risks especially if waste imports are required.

- **Opportunity**
  - Malaysia could capture higher-value recycling activities in segments such as advanced chemical recycling and metal recycling from electronics, generating quality employment opportunities and accelerating local adoption of CE practices while providing recycled inputs for domestic manufacturers.
  - As Malaysia advances in CE maturity, there could be opportunity to attract investors interested in CE-related projects.

[10] fDi Markets database
[11] fDi Markets database

3 Current State of the Circular Economy in Malaysia

3.1 Manufacturing and Recycling Sectors

Malaysia's manufacturing sector contributes over RM360 billion to annual gross domestic product (GDP), representing 24% of overall GDP in 2022.[12] Several industry players have also made efforts to advance the circular economy through investments in technology and efficiency. For example, Western Digital has built a smart factory in Penang harnessing Industry 4.0 (IR 4.0) technologies such as the Internet of Things (IoT), digital twins and advanced analytics, which has resulted in a 16% reduction in material waste and 45% reduction in water usage.[13] Petroliam Nasional Berhad (PETRONAS) is building Asia's largest advanced chemical recycling facility to convert end-of-life plastics into pyrolysis oil, which will be operational in 2026 with a capacity of 33 kilotonnes per annum.

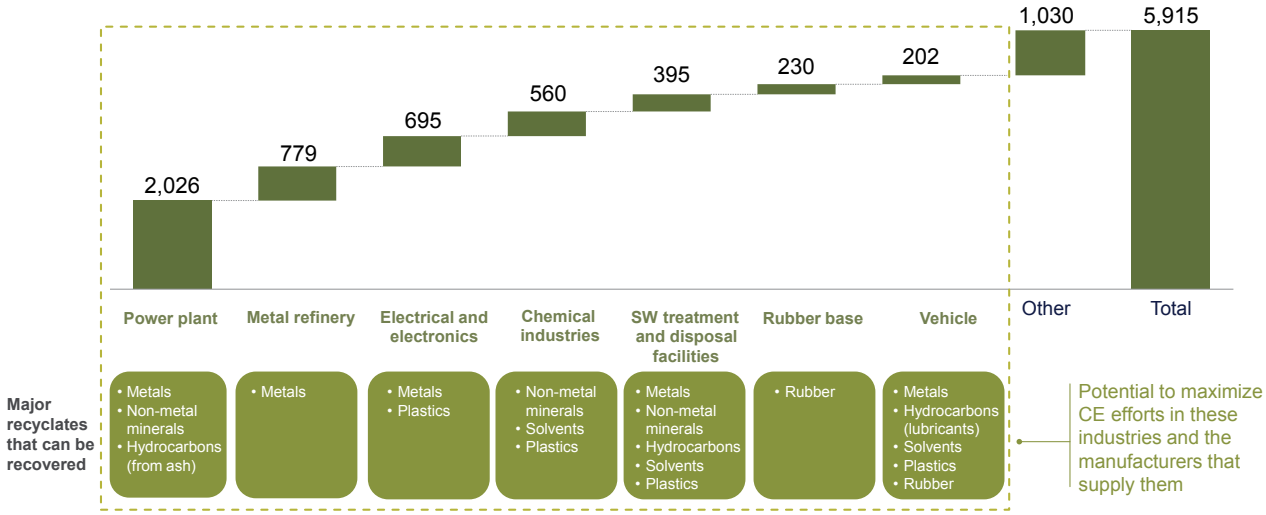
However, Malaysia's manufacturing sector also faces several challenges in adopting CE practices, namely:

- **Difficulty in justifying CE investments.** Circular products often have higher production costs, for example, due to more expensive inputs such as recycled plastic waste. However, customers may not be willing to pay a premium for these products.
- **Lack of acceptance of circular products.** Some customers may not accept the appearance or performance of products with recycled input, thus reducing overall demand for such products. For example, cartons made with recycled paper may have blemishes that consumer goods manufacturers may not want to accept.
- **Sourcing challenges for circular feedstock**. Difficulties in sourcing recycled inputs can undermine CE efforts. For example, discussions with industry players suggest that one-third of metal scrap is currently imported to fulfil demand for steel production. The plastics industry faces similar challenges, as more than half of the feedstock for recycled plastics is imported.[14]
- **Illegal CE practices.** Proliferation of illegal waste importers and recycling operators can undercut legitimate businesses. Illegal operators may also encourage poor health, safety and environment (HSE) conditions, which may allow them to operate at lower cost.
- **Awareness and capability gaps.** Limited awareness as to the benefits of circularity, especially among small and medium-sized enterprises (SMEs), hampers participation. SMEs may need particular support in understanding the benefits and levers for circularity—including eco-industrial parks, implications of EU regulations and potential financial benefits.
- **Lack of centralised tracking of CE metrics at national level.** Due to the lack of data and different levels of CE maturity across manufacturing sectors historically, there is a need to establish a coordinated effort to track and report CE performance in Malaysia.

The sector also generates a significant volume of industrial waste, estimated at around 11.9 million tonnes in 2019 including around 6 million tonnes of scheduled waste.[15] The largest share of scheduled waste comes from power plants, metal refineries, E&E manufacturing, chemical and automotive industries (see Figure 5).

[12] Department of Statistics Malaysia (DOSM).
[13] Western Digital press release.
[14] Malaysia Plastics Association whitepaper.
[15] Team analysis. Scheduled waste is defined as any waste hazardous enough to potentially impact public health or the environment.

Quantity of scheduled wastes generated by industry in Malaysia, 2022 (Kilotonnes)



Source: DOSM (Compendium of Environment Statistics), Team analysis.

Figure 5. Breakdown of scheduled waste in Malaysia, 2022

Malaysia's recycling industry is fragmented, with three main archetypes of players with different CE needs—large players, medium-sized players and smaller, long-tail players.

- **Large players.** Large players are characterised by sophisticated capabilities, access to large customers and advanced processing technologies. These players need access to domestic waste to utilise as feedstock for recycling (upstream), and access to domestic manufacturers with a requirement for recycled inputs (downstream). They also require continued investment in technology and research and development (R&D) to improve capabilities in high-value recycling.
- **Medium-sized players**. Medium-sized players have limited access to large customers, and a more significant focus on lower-technology processing. These players need access to domestic manufacturers with a requirement for recycled inputs (downstream), as well as upgraded technologies and capabilities to participate in higher-value and higher-technology recycling.
- **Long-tail players.** Long-tail players consist of smaller 'mom-and-pop' operators, primarily focused on manual recovery and recycling activities. Upskilling this portion of the industry is key to ensure a just transition, providing a pathway to higher-technology recycling or transition to employment in other sectors if required.

There are five main segments to Malaysia's recycling industry—metals, non-metal minerals, hydrocarbon, solvents, plastics—with a number of key subsegments within each. Hydrocarbons and plastics represent the most mature segments.

Hydrocarbons is subdivided into lubricants and non-lubricants. Lubricants are primarily generated by automotive assembly operations and petroleum refineries and are commonly recycled today. Non-lubricants are generated in petroleum refineries, shipping, and ash from powerplants, and are also commonly recycled.

Plastics are typically reused or recycled. Reusing cleaned plastic containers is a common practice. Recycled plastics primarily come from municipal sources, although evolving maturity levels see large multinational companies (MNCs) increasingly adopting positive recycling practices.

3.2 Benchmarking Malaysia Against Other Countries

Understanding Malaysia's relative position offers an important foundation to inform recommendations outlined in this Framework. A benchmarking exercise was undertaken to assess Malaysia's current CE performance against that of other markets.

This assessment first looked to (1) benchmark current circularity policies, then (2) benchmark indicators to enable tracking of progress on circularity improvements.

Countries were assessed based on three key factors:

I. Importance of the manufacturing sector
II. Range of geographies
III. Range of income levels

With the parameters for assessment identified, a country-level analysis was undertaken to evaluate countries across three categories—Best-in-class Leaders, Regional Champions and Southeast Asian Peers. This exercise identified 10 countries relevant to the assessment.

I. **Best-in-class Leaders.** France, Germany, Sweden, Finland.
II. **Regional Champions.** Japan, South Korea, China.
III. **Southeast Asian Peers.** Singapore, Vietnam, Thailand.

3.3 Benchmarking Circularity Policies

The benchmarking exercise analysed policy levers across six distinct segments of the value chain, looking at Design, Produce, Distribute, Use, Collect & Sort, and Recycle/New Input (see Figure 6). Each segment has unique policy considerations and levers which were assessed as part of the benchmarking process.

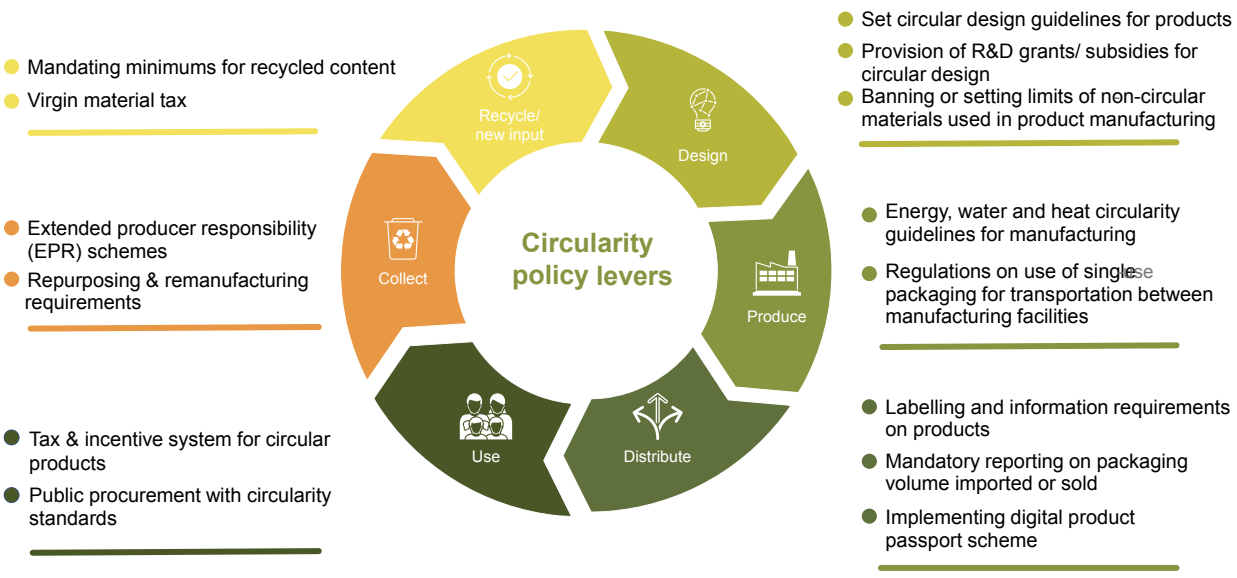


Figure 6. Examples of circularity policies across the value chain

Real-world experience shows that as countries mature in circularity, CE policies expand to cover a greater extent of the manufacturing value chain. The Framework has broadly identified three key stages in a country's CE development (see Figure 7).

I. **Beginning.** Policies are limited and primarily focused downstream on waste management, with limited involvement of manufacturers.

II. **Progressing.** Policies have a wider reach. They are still focused on waste management but with increased involvement of manufacturers upstream.

III. **Maturing.** Policies are comprehensive, encouraging the adoption of more circular practices across the value chain with heavy involvement of manufacturers

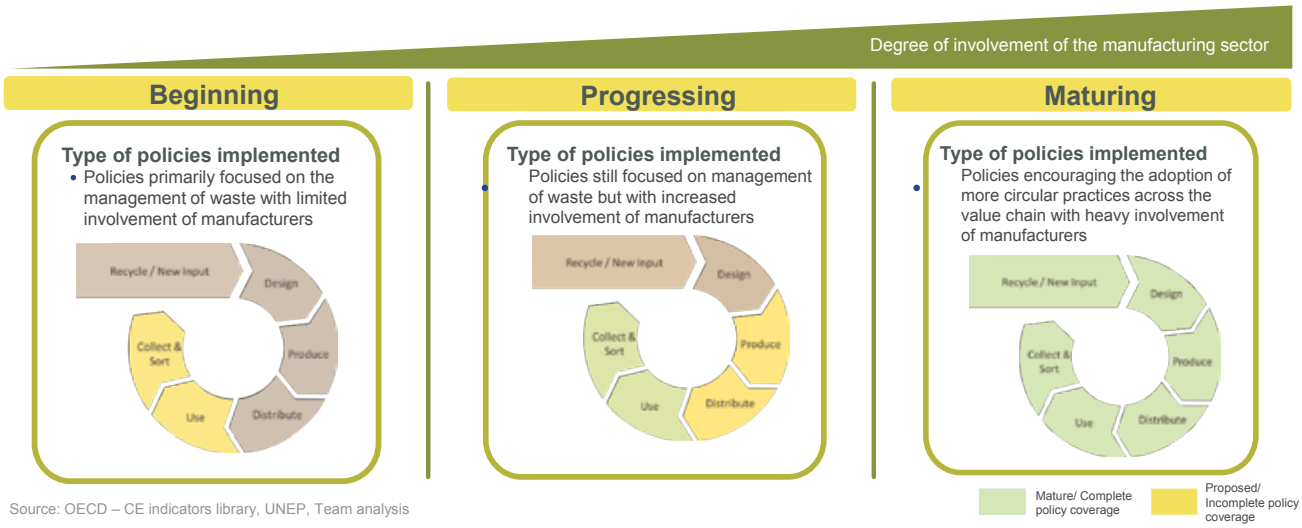


Figure 7. Three key stages of CE development

Selected countries were assessed across all six segments of the value chain to identify the relevant stage of policy maturity for each country (see Figure 8). Best-in-class countries such as France, Germany and Sweden have policies that cover all stages of the value chain, starting from Design to Production and Distribution as well as Use, Collection and Sorting, and Recycling. Other countries such as Japan, South Korea and Singapore have also introduced upstream policies such as grants and subsidies for circular design. Malaysia is performing slightly better than regional peers Thailand and Vietnam, with several proposed policies in the Design and Distribution stages. However, more can be done to expand and implement these policies to move toward greater maturity in Malaysia.

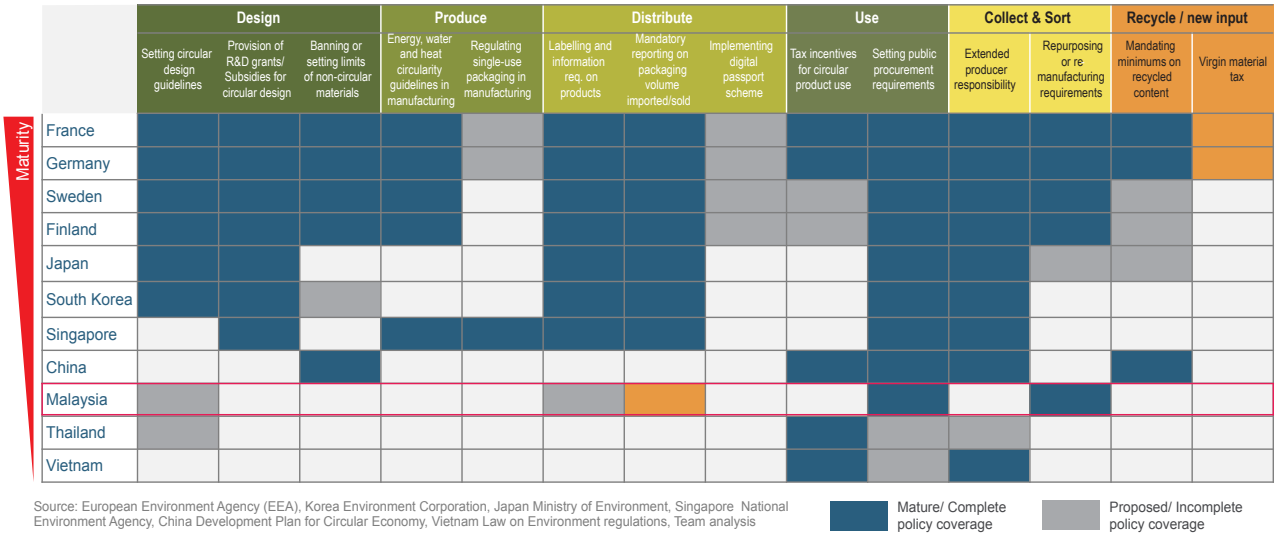


Figure 8. Policy coverage of benchmarked countries

Case Study: Germany's Maturing CE Policy Landscape

Germany introduced a comprehensive set of policies to address CE, moving from a focus on waste management towards increasing the role of manufacturers.

The Germany Resource Efficiency Programme (ProgRess) was introduced, setting out the targets, guiding principles and approaches to natural resource conservation. ProgRess was mandated to report every four years to assess ongoing performance. The scope of ProgRess cuts across manufacturing topics, including product design and product efficiency guidelines, as well as raw material procurement strategies.

The latest update to report on ProgRess, Progress III (2020-2023) was adopted by the federal parliament, the German Bundestag, on 17 June 2020. It incorporated policy recommendations which directly impact manufacturing, including measures to emphasise the importance of product design in achieving a circular product life cycle, ecodesign directives to promote reparability in product design, and even recommendations to provide technical assistance to SMEs in improving production efficiency.

Case Study: Finland's Strategic CE Action Plan

Finland launched a comprehensive national CE policy which cascades into targeted, sector-specific guidance for manufacturers. The country's Strategic Programme for Circular Economy sets both national targets on reducing consumption, alongside sector-specific policies to promote circularity levers across the life cycle of manufacturing products.

Sector-specific policies include coverage for sectors such as chemicals, plastics and batteries. This incorporates several manufacturing policy levers such as standards to limit use of unsustainable materials in production of chemicals, as well as levers to increase recycling rates and recyclate uptake in manufacturing.

3.4 Benchmarking Circularity Indicators

As countries mature in circularity, they also evolve to track a more sophisticated range of CE indicators.

I. **Beginning.** Typically track three or four basic indicators focused on downstream waste data.
II. **Progressing.** Typically track approximately 10 indicators. This includes those used in material flow accounting, providing more comprehensive information about input, processing and output stages of manufacturing.
III. **Maturing.** Typically track 15-20 indicators. This includes both indicators measuring material flows as well as those measuring consumer engagement and the broader socio-economic impacts of CE.

Benchmarking suggests that countries adopt four main themes in their CE aspirations. CE indicators are also identified according to these themes:

Circular Input: Incorporate more circular materials (e.g., reused, recycled) in the production process to close the loop of the circular economy and minimise raw material extraction.

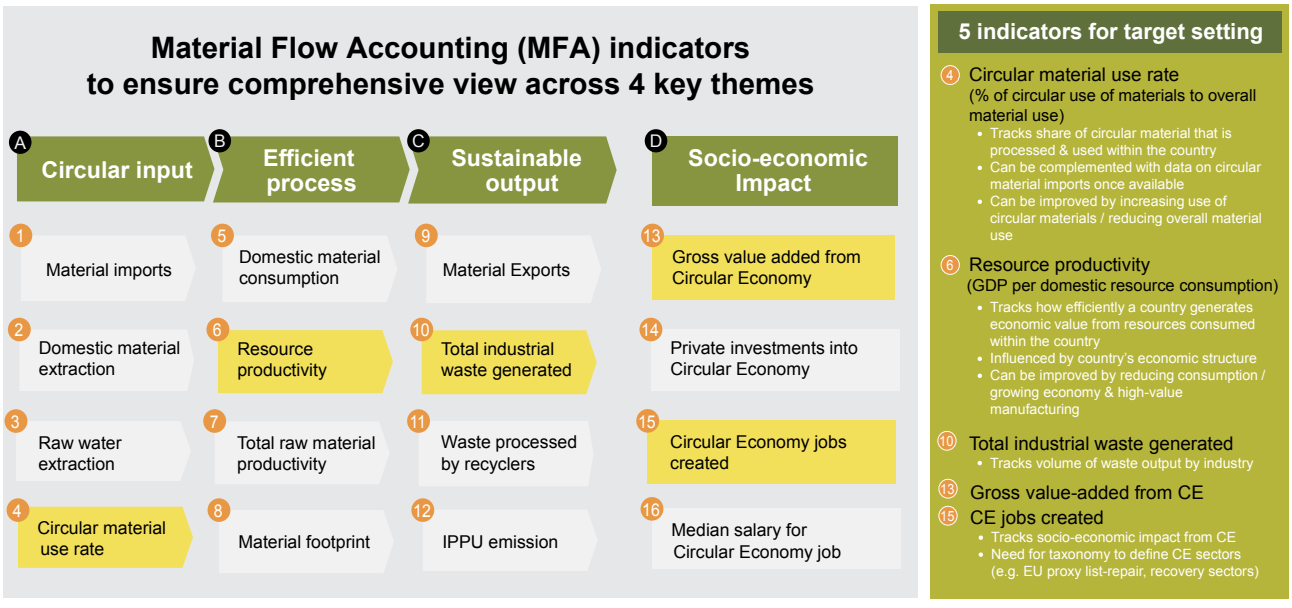
Efficient Process: Achieve higher productivity through manufacturing design, production and distribution processes—produce comparable or higher quality output with less materials consumed.

Sustainable Output: Minimise the amount of industrial waste products generated that ends up in landfill, incinerators or recycling facilities.

Socio-economic Impact: Achieve positive socioeconomic outcomes and benefit to the nation from implementation of the circular economy.

These themes also contribute towards NIMP 2030 targets through enhancing ESG practices, increasing economic complexity for higher-value manufacturing, extending domestic linkages, and driving manufacturing GDP and job creation.

Based on these themes, 16 indicators were selected for benchmarking analysis to inform the Framework (see Figure 9). These indicators encompass all stages across the value chain, as well as broader socioeconomic impact. Detailed definitions of each indicator can be found in Appendix A.



Source: Circularity gap report, Eurostat, Ellen Macarthur Foundation, World integrated trade solution, Team analysis

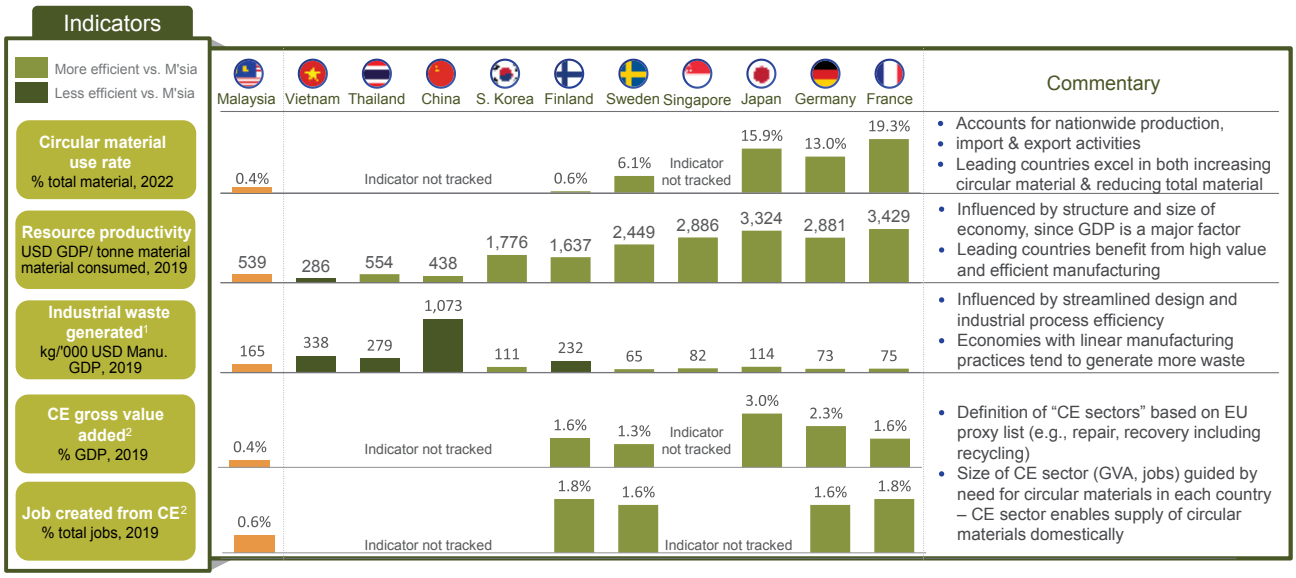
Figure 9. List of indicators for tracking progress and setting targets

Comprehensive assessment of all 16 indicators led to the identification of five key metrics to inform target setting for the Framework. Those five metrics are:

- **Circular material use rate.** The percentage of circular material that is processed and used within the country.[16]
- **Resource productivity.** The amount of GDP generated per unit of resources consumed within the country.[17]
- **Total industrial waste generated.** The volume of waste generated by industry.
- **Gross value added (GVA) from CE.** The GVA generated from CE sectors within Malaysia (e.g., recycling, repair, refurbishment)[18].
- **CE jobs created.** The number of jobs generated from CE sectors within Malaysia.

Further information on CE aspirations is detailed in Chapter 9: Circular Economy Policy Framework for the Manufacturing Sector.

The benchmarking assessment identified that Malaysia has scope for improvement across several key indicators (see Figure 10). It currently performs better than, or on par with, countries identified in the Southeast Asian Peer category, but lags behind more mature performers in Regional Champions and Best-in-class Leaders groups.



[1] Indicator has been divided by volume of manufacturing GDP to provide a better like-for-like comparison across different economies.
[2] Impact is measured by aggregating proxy sectors in recycling, repair & use;

Source: UNEP – Global material flow database, Circularity gap report, Eurostat, Ellen Macarthur Foundation, World integrated trade solution, team analysis

Figure 10. CE performance across 10 country benchmarks

[16] Calculated by dividing the total waste processed by recyclers (U) over the sum of domestic material consumption and total waste processed by recyclers (DMC + U).
[17] Calculated by dividing gross domestic product (GDP) over domestic material consumption (DMC).
[18] See Appendix A for a detailed list of activities used to identify CE sectors for calculation of GVA and jobs.

Malaysia's current maturity level sees it moving from the Beginning to Progressing stage of its CE journey, driven by current policies such as the Plastics Sustainability Roadmap. There remains opportunity for further upstream innovation and tracking of a greater range of CE indicators to see the nation progress to the Maturing stage of CE performance.

A number of improvement areas were identified during this assessment, for example the need for national standards for ecodesign. While the Plastics Sustainability Roadmap sets targets for minimum recycled content and sustainable design in plastics, there is still opportunity to implement ecodesign standards for a greater share of sectors and manufacturers beyond plastics.

Overall, five key learnings were identified from the analysis of Malaysia's current state, which were incorporated in the development of the Framework:

- Benchmarking suggests that the involvement of manufacturers is crucial for a mature circular economy. Mature policies and indicators increasingly involve manufacturers because they can transform entire value chains.
- CE should also account for the unique needs and challenges of each manufacturing sector—overall strategic frameworks should be translated into sector-specific approaches as a second step.
- Having the right policies is just the beginning, as execution is critical—for example, through ensuring robust enforcement of policies and the availability of financing.
- There is opportunity to mobilise regional action such as partnerships and harmonising standards in order to advance the local CE agenda.
- Measurement and tracking cannot be neglected in order to ensure data availability for decision-making and accountability across the value chain.

4 Circular Economy Policy Framework for the Manufacturing Sector

The Framework is designed to contribute to Malaysia's push for net zero, catalyse green growth and support the nation's overall sustainability agenda. As such, the Framework sets out key aspirations, initiatives and enablers for Malaysia across Circular Input, Efficient Process and Sustainable Output (see Figure 11).

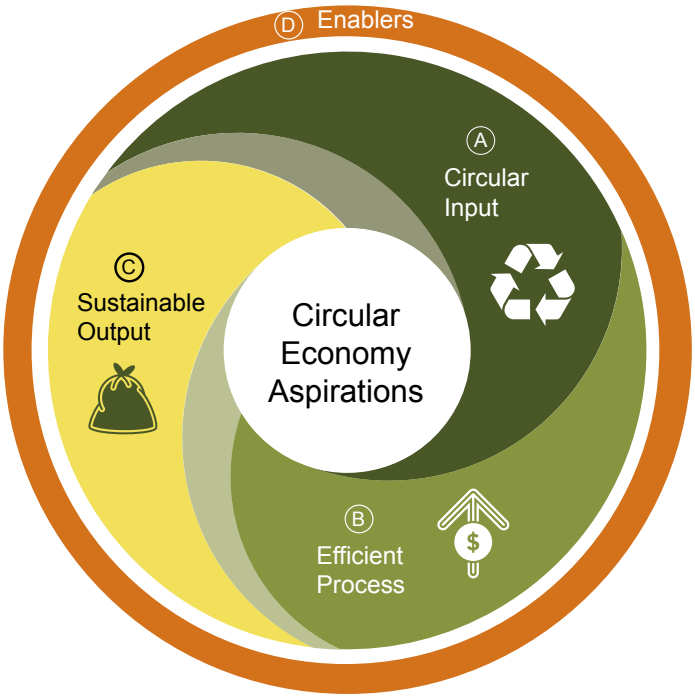


Figure 11. Circular Economy Policy Framework for the Manufacturing Sector

4.1 Aspirations

Four key themes were identified based on benchmarking of CE ambitions in leading countries and used to set the aspirations for the Framework:

Circular Input

Common aspirations for circular input include securing raw material supplies, reducing dependence on material extraction and imports, and establishing a secondary market for circular materials. Sweden, for example, has stated its aspiration to replace virgin materials with resources that are efficiently used in circular flows to reduce the dependency on new, unprocessed natural resources.[19]

Efficient Process

Common aspirations for efficient process include adopting sustainable production methods and reducing natural resource consumption. Germany, for example, aimed to enhance resource efficiency in production and expand a resource-efficient circular economy.[20]

[19] Swedish Strategy for Circular Economy.
[20] The German Resource Efficiency Programme.

Sustainable Output

Common aspirations for sustainable output include reducing the volume of manufacturing waste. In one example, France has targeted 50% reduction in non-hazardous waste going to landfill by 2025.[21]

Socio-economic Impact

Common aspirations for socio-economic impact include adding new jobs and innovative business models and transforming the perception of CE jobs to position them as desirable and sophisticated. France is targeting adding 300,000 local, permanent, and non-relocatable jobs through new business models as part of its own CE transformation.

Informed by robust stakeholder discussions, and leveraging the benchmarks outlined above, the Framework identifies key aspirations and targets for Malaysia across each theme (see Figure 12). These aspirations are aligned with the key goals and timeframe of NIMP 2030.

Theme	Aspiration	NIMP goals	2030 proposed targets
Circular Input	• Robust local CE industry with a consistent supply of circular materials • Closed production loops reinforced by strong supply chain linkages, including with local CE industry	• Extend domestic linkages • Develop new & existing clusters	**Circular material use rate** 4x vs. current (0.3% in 2019)
Efficient Process	• High-quality products produced with resource-efficient design, production & distribution • Technological excellence and productivity at the core of manufacturing companies	• Increase economic complexity	**Resource productivity** 30% increase of USD generated per tonne of raw material (USD539 / tonne in 2019)
Sustainable Output	• Industry-leading reduction of manufacturing waste at source through Best Environmental Practices (BEP) • Innovative redirection of by-products for use in other manufacturing applications	• Enhance ESG practice • Extend domestic linkages	**Industrial waste intensity** 20% reduction in kg of waste per USD1k of manufacturing GDP (vs. 165 kg/USD1k in 2019)
Socio-economic Impact	• Hub for innovation and entrepreneurship in CE • Society where CE practices enhance people's quality of life through good jobs and less pollution • Achieving a just transition towards CE	• Increase economic complexity • Create high-value job opportunities	**Gross Value added from CE** 3x vs. current (RM6.3B in 2019) **Jobs from CE** 2x vs. current (90k jobs in 2019)

Note: Absolute targets for 2030 as follows: 1.27% Circular Material Use Rate, USD700 / tonne material for resource productivity, 135 kg/USD1k industrial waste intensity, RM 20 billion GVA, 205k jobs ; Circular material: Materials from recycling, reusing, refurbishing, and remanufacturing
Source: Team analysis

Figure 12. Aspirations and targets for the Framework

These targets represent Malaysia's ambition to advance adoption and penetration of CE across the value chain, achieving progressive improvement to 2030 against our 2019 baseline (see Figure 13).

- **Circular Input.** Raise circular material use rate to 1.2% from 0.3%.
- **Efficient Process**. Enhance resource productivity from USD539/tonne to USD700/per tonne.
- **Sustainable Output.** Reduce industrial waste generated from 165 tonnes per USD1000 of manufacturing GDP in 2019 to 135 tonnes per USD1000 of manufacturing GDP.
- **Socio-economic Impact.** Increasing gross value added from CE sectors from RM6.3 billion to RM20 billion and expanding the number of jobs in CE sectors from 90,000 to 200,000.

[21] French Circular Economy Roadmap.

Theme	Indicators	2019 (baseline)	2030 (target)	Change	Rationale
Circular Input	Circular material use rate % of circular materials to overall material use	0.32%	1.20%	4x	• ~4x use of recycled materials vs. 2019 • Surpass more mature countries like Finland (0.6%) • Important to ensure accurate tracking of amount of material exchanged between companies as inputs or processed by recyclers within Malaysia
Efficient Process	Resource Productivity (USD / tonne) GDP divided by total amount of material consumed domestically	539	700	+30%	• 30% increase in resource productivity vs. 2019 • Typically gradual economic transition through efficiency & tech adoption (e.g. France took ~20 years to grow by 40%) • Surpass current productivity of peers with strong manufacturing – e.g. Thailand
Sustainable Output	Industrial waste generated (Tonne / USD1k Manufacturing GDP)	165	135	-20%	• 20% reduction in industrial waste generated per unit of Manufacturing GDP vs. 2019 • Gradual increase in efficiency through zero-waste design • Surpass the current performance of APAC peers – e.g. Japan, South Korea
Socio-economic Impact	Gross value-added from CE sectors (RM billion)	6.3	20	3x	• 3x GVA from CE vs. 2019 • Generate growth in new CE sectors (e.g. product-as-a service) in line with RMK-12
	Number of jobs in CE sectors	90k	200k	2x	• 2x number of jobs in CE sectors vs. 2019 • Create high-quality jobs with improved productivity (growth at 3-5% annually)

Source: Team analysis

Figure 13. 2030 targets and rationale

Achieving these targets could produce significant benefits for Malaysia by 2030, unlocking value across the nation.

Reducing the amount of material input required could unlock annual cost savings of RM13 billion, equivalent to 3% to 4% of manufacturing GDP by 2030. Reaching these goals will avoid 6.5 million tonnes of annual CO_2 equivalent (CO_2e) emissions from the IPPU sector due to reduced reliance on virgin materials for manufacturing input, roughly 20% of current IPPU emissions.

Achieving waste-reduction targets will avoid or divert 14 million tonnes of waste annually—over half of projected industrial waste in 2030—reducing waste to landfill from increased efficiency and recovery.

The maturing ecosystem will be bolstered by RM65 billion cumulative new and high-quality investment in CE by 2030, based on growing CE adoption and doubling of current CE investment.

In order to achieve these targets, 14 initiatives have been identified (see Figure 14). The initiatives and relevant case studies are detailed in the following chapters.

4.2 Summary of Initiatives

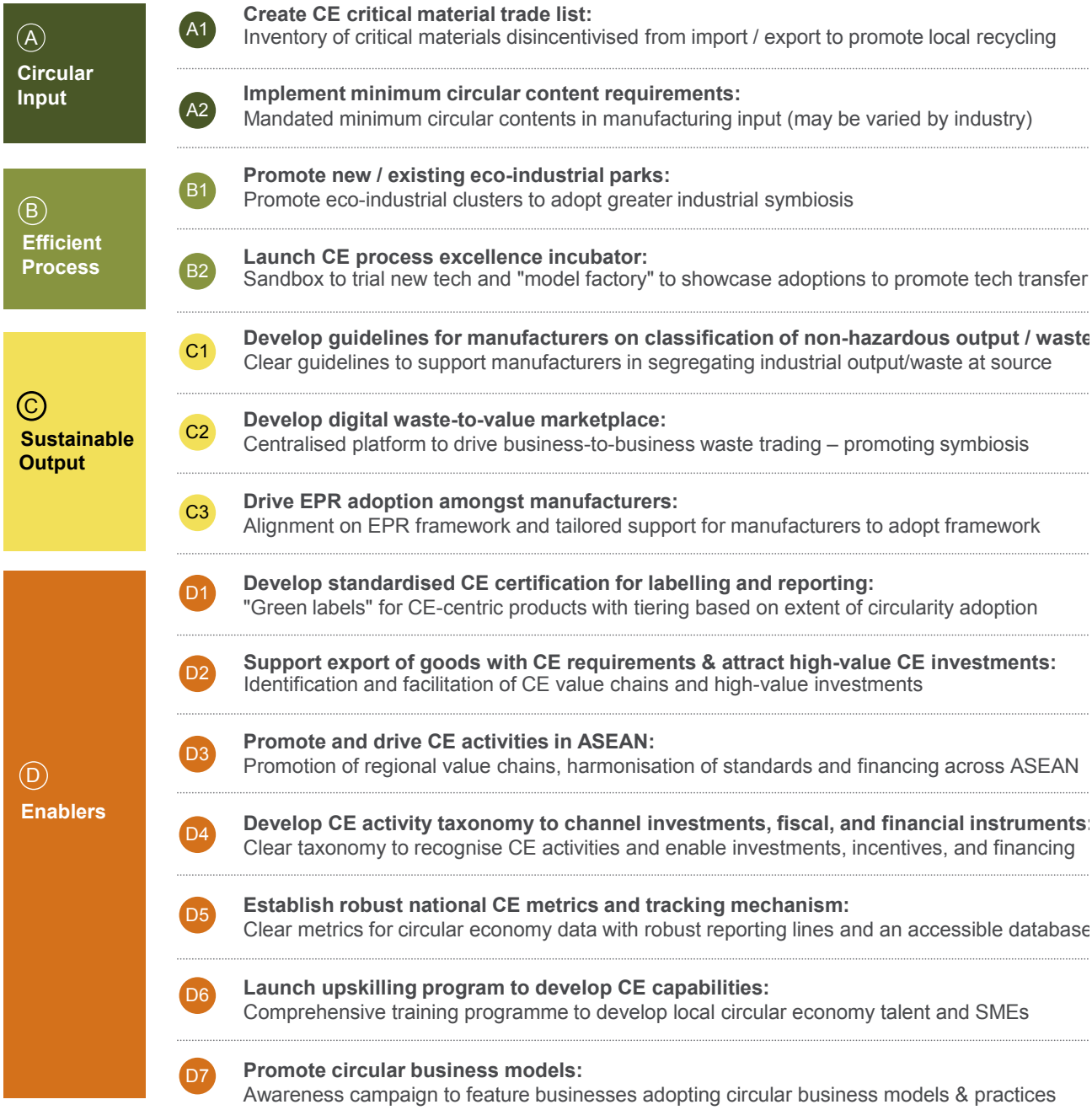


Figure 14. Summary of initiatives

4.3 Focus Area A: Circular Input

Initiative A1: Create CE critical material trade list

This initiative targets the creation of a list that defines and categorises scarce and non-renewable materials considered vital for Malaysia's economy and environment. This could include materials such as lithium, iron and aluminium.

Analysis of relevant materials should be based on current consumption and future projected demand in Malaysian industries. These materials will be prioritised based on recycling potential, economic value and environmental impact.

This initiative will be developed in line with the National Advanced Materials Roadmap 2021-2030 under the Ministry of Science, Technology and Innovation (MOSTI), which lays out advanced materials that can be sourced and manufactured locally to build Malaysia's technology ecosystem and reduce import reliance.

This list can be used in several ways to improve the CE ecosystem. It can enable identification of materials that warrant investment in recycling infrastructure, inform assessment of domestic supply of materials within the priority list and help identify any gaps.

The list can also be used to establish trade rules that facilitate movement of recyclable and reusable materials, while simultaneously imposing restrictions on export of scarce and non-renewable materials. This includes (1) the introduction of incentives and penalties relating to recyclables trading, (2) implementation of trade guidelines to prevent material outflow, and (3) partnership and offtake programmes for resources not available locally.

Benefits

This initiative will unlock a number of benefits. It will sharpen focus on truly critical materials for CE and help extend supply chain linkages through engaging with private-sector stakeholders to ensure a steady supply of the identified critical materials.

Furthermore, it will attract high-quality FDI through channelling investments into reuse, recycling or more efficient use of materials on the list. At the same time, it will reduce dependency on foreign sources of critical materials.

Global examples

There are several key examples of similar efforts in leading countries, such as the EU's Critical Raw Materials Act. Under this Act, the EU identified 87 materials as critical materials for strategic sectors and set targets for 17 strategic materials (e.g., copper, lithium, nickel, titanium) to be internally extracted, processed and recycled by 2030. The US has also passed the Inflation Reduction Act (IRA) which provides investment support in recycling infrastructure for critical materials and tax credits for domestic manufacturing of critical minerals.

There are several key learnings for Malaysia to consider based on best practices from the benchmarks:

- **Prioritise strategic sectors.** Prioritise strategic sectors that require critical materials, such as high-value and innovation-driven NIMP 2030 sectors (e.g., semiconductors, aerospace, specialty chemicals).
- **Set clear targets.** Set clear targets for critical material use to enable industry to align their operations and strategies.
- **Facilitate ecosystem development.** Facilitate development of the overall ecosystem, for example through ensuring advance offtake agreements are in place for recycled critical materials.

Initiative lead: MITI

Initiative A2: Implement minimum circular content requirements

This initiative involves mandating that specific products contain a minimum percentage of circular/ recycled materials.

Key activities will include defining eligible types of circular content (e.g., recycled, reused, or remanufactured content), as well as defining the specific threshold for circular content in key product categories such as packaging, E&E, and consumer goods. The aim is to establish gradual increases in minimum content requirements to allow industries more time to adapt.

This will be backed by transition programmes to support companies, as well as the introduction of grants, subsidies, or tax incentives to encourage and enable the participation of SMEs. Technical assistance for companies required to adapt their manufacturing processes will also be offered.

Mechanisms for monitoring and verification of circular content will be established. This will be enabled through regular audits and inspections to ensure compliance. Provision will be put in place for a third-party certification scheme to support these efforts, including funding and transition mechanisms. Third-party certifiers will be an important part of this initiative, working to ensure implementation of minimum circular content requirements and helping to accelerate adoption. Penalty mechanisms will also be established for non-compliant companies.

Benefits

This initiative will increase the usage of circular materials through greater adoption of circular content into products.

It will also reduce the volume of waste which ends up in landfills and increase resource productivity by reducing reliance on virgin raw materials.

Global examples

The EU offers an example of similar efforts, setting clear targets and implementation mechanisms for minimum recycled content requirements through the Directive (EU) 2019/904 on the reduction of the impact of certain plastic products on the environment. This EU directive sets minimum recycled content requirements for single-use plastics to incorporate 25% recycled content by 2025 and 30% by 2030.[22] The regulation also establishes mandatory minimum levels of recycled content for industrial batteries, starting, lighting and ignition (SLI) batteries and EV batteries. Targets are set at 16% for cobalt, 85% for lead, 6% for lithium and 6% for nickel.

There are several key recommendations for Malaysia to consider based on best practices from the EU:

- **Define key focus product groups.** Target the most feasible product groups such as plastics (both single-use and durable), battery for automotive, and E&E products.
- **Set up third-party certification schemes**. Increase the robustness of certification and verification processes while creating new business opportunities.
- **Standardise terms and definitions.** Use standard, nationwide terminologies with clear definitions and thresholds to avoid ambiguity.

Initiative lead: MITI, NRES

[22] EU Directive 2019/904 on the reduction of the impact of certain plastic products on the environment

4.4 Focus Area B: Efficient Process

Initiative B1: Promote new/existing eco-industrial parks

Industrial symbiosis or resource sharing between companies is one of the mechanisms to build circularity across the value chain. For example, symbiosis emphasises the use of waste or output as input from one company to another, a practice which is currently limited in existing eco-industrial parks despite the presence of many co-locators in proximity. Hence, there is an opportunity to promote greater symbiosis by leveraging existing programmes such as the Greening Industrial Parks (GIP) initiative and the NIMP 2030 Action Plan 3.4.1 – Accelerate transformation of industrial estates into eco-industrial parks.

Key elements to drive are as follows:

- **Regional symbiosis centres of excellence.** On-the-ground technical centres which leverage a good understanding of local park contexts and relationships can help accelerate adoption.
- **National resource identification and matching.** A programme to match supply and demand for waste or output streams will be a key enabler of symbiosis, for example SIRIM's Resource Efficiency and Industrial Symbiosis Opportunity Assessment (REISO). This programme must be regularly updated and shared with industry to continuously identify opportunities.
- **Tailored technical and commercial support.** Beyond providing resource matching and identification services, Government can play an enhanced role in driving adoption by supporting companies, especially SMEs, in performing commercial assessments or technical advisory.
- **Financial support.** Given the high capital barriers associated with symbiosis projects which can require entirely new infrastructure, upfront investment grants can be a critical driver of adoption.
- **Guidelines for eco-industrial parks**. To drive park co-locators towards the direction of green or circular practices, guidelines such as minimum circular content requirements or minimum symbiosis targets can be embedded into incentive schemes.

The initiative should also aim to promote symbiosis across the entire ecosystem, be it SMEs, large companies or MNCs. Given the varying levels of maturity and awareness across these company segments, comprehensive marketing programmes and tailored support mechanisms will also be critical in driving adoption of eco-industrial parks.

Benefits

This initiative will promote circular material use rate and resource productivity, with symbiotic resource sharing to reduce consumption of virgin materials.

It will also minimise the intensity of industrial waste by promoting the reuse of waste amongst industrial locators within industrial parks.

Developing new and existing clusters will also boost efficient use of resources and enhance cost competitiveness of the cluster and co-located operators.

Global examples

A number of countries have introduced similar initiatives. In South Korea's Ulsan Industrial Park, the Korea Industrial Complex Corporation (KICOX) was set up to specialise in growing industrial parks (e.g., via symbiosis projects) with the support of regional subsidiaries. These regional "Eco-centres" were supported by technical experts who were able to profile supply and demand in Ulsan to propose and approve symbiosis projects in the parks. Eco-centres co-funded select strategic projects and provided technical support in scaling these solutions amongst park locators.

In Denmark's Kalundborg Park, the Symbiosis Center Denmark was set up as an independent third party comprised of private and public entities dedicated to matching and realising high-potential symbiosis projects in Kalundborg. Responsibilities included:

- **Screening.** Profile technical expertise and readiness of companies to enter partnerships to maximise the success of potential projects.
- **Matching.** Facilitate collaboration and match eligible companies based on resource profiles.
- **Building.** Co-develop technical and commercial plans with partners to accelerate take-up.

Benchmarking of global best practices suggests three recommendations for Malaysia.

- **Tailored support.** KICOX customised its support, both commercial and technical, to fit the specific needs of park locators. This approach particularly supported manufacturers, especially SMEs, who were able to leverage KICOX's vast experience to drive adoption. Indeed, Ulsan Eco-Industrial Park only flourished following KICOX's establishment, suggesting that Malaysia could benefit from adopting a similar hands-on strategy.

- **Maximise local touchpoints.** Solely relying on federal oversight is inadequate. KICOX's strategy of empowering regional offices, leveraging their local connections and understanding of the market, proved to be a catalyst for symbiosis projects.

- **Co-financing for accountability.** Funding is a key lever given the upfront costs of symbiosis projects. Co-financing between public and private sectors ensures locators are incentivised to help drive success.

Initiative lead: MITI

Initiative B2: Launch CE process excellence incubator

This initiative recommends establishing an incubator programme to develop, showcase and launch innovations amongst manufacturers, technology providers, and academia. This raises awareness of innovations that promote circularity within Malaysia, whilst ensuring that high-potential solutions are adequately taken up within industry—based on proven implementation models such as those showcased within the model factory.

This includes identifying a set of CE industry innovations (e.g., IR 4.0 technology) to develop and offer as modular solutions. These will be based on the maturity of the local markets—assessing both technology and manufacturers—and the applicability of relevant sectors. These innovations can also include non-digital solutions such as advancements in new recycling technologies.

This initiative will establish research partnerships with relevant academia and government research agencies to support innovation. An example is MIMOS' Industrial Tech Innovation Centre (ITIC) to co-develop solutions with industry for IR 4.0 in the E&E sector.

Dedicated facilities will be established to develop and demonstrate value propositions of these solutions (i.e., through a model factory). This can leverage existing facilities such as the various labs available at MIMOS for the E&E sector to showcase efficiency gains from adopting such technologies.

Incubator services will be complemented by dedicated advisory and technology partners to help launch solutions for companies, especially SMEs. This could include activities such as working with system integrators to increase adoption within industry and leveraging programmes similar to the Industry-Driven Talent Acceleration Programme (ID-TAP) at MIMOS.

Existing funding and incentives, such as the Technology Adoption Programme (TAP) fund available for IR 4.0 advancements, will be channelled and scaled towards research and adoption of these technologies.

Benefits

This initiative will promote enhanced resource productivity as manufacturers will become more efficient in using materials, for example, through a more efficient process enabled by IR 4.0.

This has additional effects of reducing overall industrial waste, as well as creating additional economic and high-value job opportunities for the Malaysian manufacturing sector.

Global examples

This initiative is informed by similar efforts in leading countries, such as the Innovation and Model Factory at A* STAR in Singapore. The Singapore Government provides financing and capability support across the entire process, from developing to showcasing and launching digital solutions for manufacturing. A* STAR offers a pathway to scale IR 4.0 solutions, co-developing highly modular solutions at the Model Factory in collaboration with technology partners and tailoring products to the end market.

This benchmark suggests three main recommendations for Malaysia in developing this initiative:

- **Create and showcase value proposition.** Creating and showcasing a value proposition for CE is critical as the purpose of the programme is to develop scalable solutions or innovations and showcase the value proposition to industry. This creates customer demand which can justify further investments and drive economies of scale.
- **Provide upfront investment to spur adoption.** Singapore catalysed development and adoption of solutions by lowering upfront infrastructure costs in areas such as test beds and simulation facilities. Further financial support via partial co-funding from Government can spur adoption, while at the same time ensuring industry is accountable.
- **Complement financing with capability build.** Being a thought partner in collaboration with industry can drive adoption and is particularly important for scaling solutions. For example, helping SMEs size the value potential of CE solutions will encourage participation and adoption.

Initiative lead: MOSTI, SIRIM

4.5 Focus Area C: Sustainable Output

Initiative C1: Develop guidelines for manufacturers on classification of non-hazardous industrial output/waste

This initiative proposes the development of standardised categorisation or code guidelines for non-hazardous industrial waste or output. Manufacturers will be encouraged to sort their industrial waste according to the waste categories currently used for the management of solid waste by KPKT. In parallel, a study will be launched with industry to understand the feasibility of a waste "code" classification, which is comprised of detailed material codes for waste similar to what is practised in the EU. This detailed coding will better enable waste trading amongst manufacturers as it would provide sufficient detail about the material properties for buyers and sellers to make informed decisions. Thus, in the near term, manufacturers will be guided on using waste categories for sorting of industrial waste, with a transition to more detailed waste codes in the future.

In parallel, guiding documents will also be developed to support manufacturers on sorting guidelines for CE, including decision trees and questionnaires to help manufacturers identify the appropriate classification of waste. This will enable improved sorting at source, which can ease recycling of materials and ultimately reduce the volume of materials headed for landfills.

This initiative will progress from an initial voluntary phase to eventually become a mandatory requirement, in close collaboration with manufacturers to ensure a smooth transition.

Benefits

This initiative promotes overall circularity across the value chain, allowing easy identification of materials that are recyclable at source versus those that can only be sorted post-landfill. This helps promote a transparent waste landscape with greater recyclability.

This initiative also promotes domestic linkages, helping to build an ecosystem with improved cross-company waste trading.

Global examples

The EU Waste List, a harmonised list of waste codes across all sectors used to catalyse circular practices in the EU, is a leading global example of guidelines on non-hazardous industrial waste, with important learnings for the initiative. For example, the codes enable proper treatment and transportation of waste to facilitate reuse of products. It also enables granular tracking of waste movements within the EU.

The list comprises 839 waste types across 20 chapters, with six-digit codes representing sector, type of activity, and properties of the waste. It contains clear guidelines so producers can refer to online guidance papers with decision trees to identify their waste types based on activity.

The list is also designed to build upon existing sectoral frameworks to promote ease of recognition amongst manufacturers. Terminologies for sectors, subsectors and activities are anchored on existing statistical segments such as the Statistical Classification of Economic Activities in the European Community (NACE).

There are several key recommendations for Malaysia to consider based on best practices from the EU Waste List:

- **Leverage waste categories and codes.** Waste codes are a fundamental enabler for circularity. Sorting of industrial output becomes exponentially difficult further downstream, so promoting sorting upstream can help promote circularity within industry.
- **Gradually transition from voluntary to mandatory requirements.** Gradually transitioning from voluntary guidelines to mandatory requirements will support implementation. Without the ultimate introduction of mandatory guidelines, manufacturers are unlikely to take on the additional complexity, despite the clear benefits to minimising waste.
- **Ensure progressive uptake with ample support.** Given the complexity of the CE topic, it is important to support companies in progressively implementing waste guidelines—especially SMEs. This can be done by ensuring constant touchpoints as the initiative is rolled out.

Initiative lead: MITI, KPKT

Initiative C2: Develop digital waste-to-value marketplace

This initiative will establish an effective digital waste-to-value marketplace. It will incorporate a directory of waste or byproducts itemised by waste categories (and potentially waste codes) and harmonised across sectors based on guidelines to enable simple identification amongst manufacturers.

Matchmaking capabilities will be implemented to better automate matching of relevant waste and byproduct streams for a more efficient ecosystem. A panel of partner companies will work to support local companies with identification, listing and integration of traded waste, including transportation of waste.

This initiative can be piloted within and between sectors with high synergies in input/output and simpler waste-separation processes with less contamination. Examples include synergies between automotive and metals, and between paper and packaging sectors.

The waste-to-value marketplace should be driven by industry groups to ensure high applicability and relevance to industry.

Benefits

This initiative will increase the use rate of circular materials by enabling companies to better identify and integrate recyclates into their products.

Incentivising the commercialisation of waste and/or byproducts will also reduce the intensity of industrial waste.

Global examples

UpValue is an EU initiative co-financed through its European Regional Development Fund to develop a digital waste marketplace across regions. The platform cuts across sectors including metals, plastics, and textiles. This initiative clearly defines 15 categories and 288 subcategories of materials based on common regional waste trade items e.g., glass, wood, chemicals.

Each waste type is classified based on the six-digit European Waste Codes, which consider key characteristics such as origin and composition to facilitate exact waste profiling.

Common waste/byproduct requirements are posted and matched within the system, allowing initiation of business-to-business (B2B) conversations and facilitating pricing transparency. A network of partners is available to facilitate connections between enterprises at all stages from procurement to integration.

Based on the UpValue example, there are several key recommendations for Malaysia to consider in implementing this initiative:

- **Clear classification.** Clear waste classification with harmonised identification characteristics will accelerate profiling of materials and potential industry uptake. To avoid duplication, waste segmentation proposed in Initiative C1 of this Framework should be leveraged.
- **Third-party support is vital.** Given the complexity of profiling and integration of output streams, partners will be crucial in enabling trading of materials and byproducts. For example, third parties can provide support for manufacturers in classifying the right waste categorisation for their output or transportation of industrial waste in between companies.
- **Initiative should be business-led.** Having an industry-led approach to developing the marketplace ensures it is highly relevant to manufacturers.
- **Clear classification of waste at source.** In the EU, waste producers must separate waste at source prior to classification. This minimises the complexity of waste sorting downstream, where users may be less familiar with the origins of these materials.

Initiative lead: MITI, Waste Management Association of Malaysia (WMAM)

Initiative C3: Drive transition to mandatory EPR adoption amongst manufacturers

EPR schemes are a widely used policy strategy which assigns responsibility for end-of-life management of products to the original producer. Producers under this definition typically include manufacturers, importers, and retailers.

The Ministry of Housing and Local Development (KPKT) is currently exploring the implementation of EPR for packaging. In the near term, this will operate by encouraging voluntary EPR amongst producers, with the goal of introducing mandatory EPR in the longer term. The DOE is also exploring EPR for select consumer electronics categories.

This initiative focuses on working to prepare industry to transition from voluntary EPR schemes to a mandatory scheme over a three to five-year timeframe in key sectors such as E&E and packaging. This process will take a progressive approach to introduce EPR in relevant industries.

MITI will contribute to the EPR rollout by conducting early engagement with industry to inform them of the upcoming policies and assisting industry groups in the establishment of a producer responsibility organisation (PRO) within target sectors (i.e, packaging, E&E).

Financial and non-financial support will be provided for pilot studies in the implementation of EPR. This includes upskilling and provision of financial assistance to SMEs such as tax exemptions.

Data collection activities will be established to provide ongoing assessment of activities within EPR, assessing metrics such as volume of waste packaging produced and volume of packaging imported. The data collected from voluntary EPR participation will be leveraged to shape mandatory EPR implementation.

Benefits

Transitioning from voluntary EPR to mandatory EPR will ensure increased adoption of the scheme. The sector-led pilot programmes will also allow for early identification of pain points in areas such as infrastructure, finance and compliance.

This initiative will help ensure sufficient use of recycled inputs, increase availability of recyclates and complement other initiatives such as Initiative A2 to ensure minimum circular content in products.

Global examples

There are a number of countries implementing similar programmes, with two key examples from the Southeast Asia region.

In 2015, Singapore began engaging with stakeholders, including producers, to discuss the potential implementation of EPR. Informed by these stakeholder engagements, Singapore introduced a tailored and phased EPR in 2019 through the Resource Sustainability Act for two waste streams.

A producer-funded PRO was appointed for consumer E&E to manage waste collection in line with a national target, while a mandatory take-back and disposal scheme for equipment was introduced for non-consumer E&E waste. A packaging reporting system introduced in 2021 has also mandated reporting of packaging volumes, with the expectation that Singapore will introduce an EPR for packaging by 2025.

In Vietnam, under Law No.72/2020/QH14 on Environmental Protection, EPR has been implemented for packaging, tires and tubes, lubricants and batteries from 2024 onwards. This scheme will be expanded to electronics in 2025 and electric vehicles in 2027.

Vietnam's EPR scheme provides flexibility to manufacturers to decide the most cost-effective way to implement collection and recycling. Producers are allowed to self-organise to create and implement recycling plans on their own, hire recycling units or fully authorise a third-party PRO to manage waste. Producers who do not want to self-organise recycling can make a financial contribution to the Vietnam Environment Protection Fund.

Both examples of EPR in Southeast Asia suggest three key learnings for Malaysia:

- **EPR must be tailored to industry.** The right model for EPR depends on multiple factors, including type of waste stream, source of waste (e.g., post-consumer vs industrial) and local waste collection systems. EPR must be tailored at the right level to ensure ease of compliance for producers.
- **Early engagement with stakeholders is vital.** Clear signalling to producers on the potential implementation of EPR is essential. Upskilling stakeholders is also important to ensure strong compliance with mandatory EPR schemes.
- **Flexibility in EPR implementation is key.** Providing producers options allows large and small producers to take differentiated approaches to compliance that best suit their context.

Initiative lead: MITI, KPKT, DOE

4.6 Enablers

Initiative D1: Develop standardised CE certifications for labelling and reporting

This initiative is targeted at assessing existing and potential certifications that demonstrate CE criteria. This will include identifying where gaps may exist and gradually rolling out new certifications for labelling and reporting to address those gaps.

The Minimum Energy Performance Standard (MEPS) under the Energy Commission is the only mandatory labelling scheme currently in operation. Expanding mandatory labelling beyond energy would require legislation for mandatory eco-labelling, starting with labels indicating the recyclability of products and expanding to other aspects of circular economy (e.g., rethink, reduce, reuse, repair, refurbish, remanufacture, repurpose and recycle).

This initiative will ensure labelling schemes are aligned with upcoming international standards by monitoring and informing industry about new international eco-labelling and digital product passport requirements. It will also examine how the refined labelling scheme will fit into existing frameworks such as SIRIM's eco-labelling scheme and MyHIJAU. A playbook will be developed to advise companies on how to comply with international standards.

This initiative will also aim to increase outreach and encourage adoption of voluntary CE certifications amongst SMEs by providing subsidies for them to adopt these schemes.

Benefits

This initiative will drive improved CE performance of products. Mandatory labelling would require products to meet minimum product standards. It would also increase consumer awareness and enable consumers to choose more sustainable products.

Aligning CE requirements and certifications with international standards will also enhance access to global markets for Malaysian products.

Global examples

Recent labelling laws introduced in France under Decree 2022-748 provide a strong example of mandatory certifications. This decree applies to manufacturers or importers with an annual turnover exceeding EUR20 million and who are responsible for placing at least 10,0000 articles in the French market. From January 2024 onwards, electronic equipment such as smartphones and televisions have to display the French repairability index for electronics, an assessment of repairability for a range of products. Packaging must also use the Triman labelling framework, which provides information on the recyclability of products.

Analysis of this initiative indicates two key implications for Malaysia:

- **International eco-labelling will impact Malaysia**. New eco-labelling regulations introduced in global markets will have a clear impact on Malaysian exports. As these new labelling requirements apply to products that are imported into markets such as France, it is important for Malaysia to adapt accordingly in order to remain competitive.
- **Transition to standardised mandatory labelling is vital**. Transition to a mandatory labelling system is important to ensure compliance. Currently, multiple label schemes, both domestic and international, are present in Malaysia, which may lead to confusion. Having standardised mandatory labelling requirements allows consumers to refer to a single source of truth on the recyclability of products, hence improving compliance with recycling activities.

Initiative lead: SIRIM, MGTC

Initiative D2: Support export of goods with CE requirements and attract high-value CE investment

This initiative proposes several actions to identify high-value CE activities and provide support to manufacturers producing exports that are affected by CE requirements in destination markets.

To do this, the initiative will (1) identify key CE activities to prioritise high-value FDI and exports, (2) adapt existing incentive lists and other support mechanisms, (3) encourage international cooperation to promote business partnerships, and (4) provide support to Malaysian companies looking to remain competitive in the changing global CE landscape.

Prioritising high-value FDI and exports will require Malaysia to define a list of CE exports and high-value-added activities to focus on, such as battery recycling. The initiative will prioritise opportunities with strong global value chain linkages, while simultaneously safeguarding domestic interests, such as limiting imports of waste.

The Promotion of Investment Act 1986 (PIA) will be updated to target incentives towards CE activities. Steps will be taken to ensure domestic regulation such as EPR is in place to generate feedstock for CE activities.

Malaysia will also foster international cooperation to promote business partnerships and investments. This includes working with other countries to promote B2B and government-to-government (G2G) partnerships for CE, share knowledge and collaborate on upskilling. Local champions will be identified to prioritise for promotion to bilateral/multilateral partners.

Under this initiative, MITI will act as a knowledge partner for companies looking to adapt to global changes in CE-related policies. This means educating local companies on potential trends impacting exports, such as the EU's Circular Economy Action Plan (CEAP) to support the transition, safeguard local competitiveness and ensure market access.

Benefits

This initiative will create high-value jobs and manufacturing value added by encouraging exports and investment in the CE industry. It also aims to improve recycling rates in Malaysia by encouraging the commercial adoption of new technologies targeting previously hard-to-recycle waste streams.

Global examples

France's coherent and mature policies have attracted high-value investments in the processing of hard-to-recycle plastics. Strong incentives are in place for large and complex projects. Aggressive national recycling targets create an imperative for change, backed by strong market demand for CE products in France and the EU. A decarbonised energy supply mix creates a good ecosystem to manufacture products sustainably, and a strong local recycling industry creates a connected and engaged CE value chain.

Based on France's example, there are several key recommendations for Malaysia to ensure success of this initiative:

- **Implement strong regulatory framework.** Implementing a strong regulatory framework to establish advanced CE activities is essential. A regulatory framework is vital to provide investors with certainty, demonstrate Malaysia's commitment to CE and attract high-value investment.
- **Create incentives for CE activities.** Provide incentives such as tax incentives for specific high-value CE activities.
- **Explore global and regional markets for export.** Explore global and regional potential trading partners for export of CE goods.

Initiative lead: MATRADE, MIDA

Initiative D3: Promote and drive CE activities in ASEAN

This initiative aims to promote CE activities across Southeast Asia and drive regional actions on circularity. It involves several key activities that align with Malaysia's membership in the ASEAN Economic Community.

Leveraging Malaysia's ASEAN Chairmanship 2025 to push for CE development is a significant opportunity, with potential to set CE as a key agenda topic for ASEAN 2025 and drive implementation of the Framework for CE for the ASEAN Economic Community. The chairmanship also offers a platform for Malaysia to advocate for the integration of circularity standards into the product standards of ASEAN member states, encouraging the incorporation of these goals into mutual recognition agreements (MRAs). Malaysia can also push for increasing ambitions in areas such as setting common ASEAN standards and targets for recyclability and circular content.

Furthermore, creating a group of like-minded ASEAN member states sharing an interest in CE can bolster regional competitiveness. Malaysia has a golden opportunity to lead in CE initiatives by establishing alliances with ASEAN partners who have similar goals and uncovering avenues for both bilateral and multilateral cooperation. These efforts can include partnerships to promote innovation, digitalisation, and the adoption of emerging technologies such as pyrolysis for waste management.

Malaysia should also seek to develop regional CE value chains and products through collaborative partnerships. This initiative seeks to establish a Circular Economy Coalition for Southeast Asia which connects public and private sector participants across the region, thereby fortifying regional action on CE. Complementing these strategic alliances, the introduction of regional CE upskilling programmes will play a crucial role in enriching and sharing CE expertise.

Furthermore, fostering cooperation to promote private financing marks a critical step towards supporting the CE transition, promising to yield substantial regional benefits. Together, these interconnected strategies illustrate a comprehensive approach to advancing CE initiatives, with Malaysia helping to drive sustainable economic growth across the ASEAN region.

Benefits

This initiative aims to foster a spirit of cooperation among ASEAN member states, enhancing the collective regional CE landscape. By leveraging the distinct strengths and capabilities of each country, the initiative seeks to boost the region's overall efficiency and competitiveness. The collaboration is designed to not only merge efforts but also to optimise the diverse assets each member brings, creating a synergy that propels the ASEAN bloc towards a more sustainable and economically robust future.

Furthermore, the initiative is set to catalyse the flow of investments, incentives and capital towards CE-focused ventures, thereby fostering an environment conducive to sustainable business practices. This strategic move is anticipated to not only accelerate the transition to CE principles across the region but also to herald a shift towards more environmentally conscious and economically viable business models.

Alongside improved cooperation, this collaborative effort will pave the way for significant advancements in workforce development. By prioritising the acquisition of new skills and competencies, the initiative promises to transform both the domestic and regional labour markets. Workers will be equipped with the knowledge and tools needed for high-quality employment opportunities within the growing CE value chain. This comprehensive approach not only aims to reshape the economic landscape but also to ensure that the workforce is prepared and capable of thriving in the evolving circular economy.

Global examples

The EU CEAP is a prominent global example of efforts to promote and drive regional CE activities. The CEAP includes cross-cutting and sector-specific regional directives implemented to provide comprehensive coverage of CE value chain and activities. Regulatory mechanisms such as EPR, a digital product passport scheme, recycled content guidelines and targets, taxes on virgin materials and performance requirements are also included. Subsequent to the CEAP, national laws and policies on CE have been implemented across individual member states.

Analysis of the EU's CEAP highlights three main recommendations for Malaysia:

- **Encourage regional collaboration.** Enhance collaboration across ASEAN member states by facilitating the exchange of knowledge and the pursuit of joint initiatives. This approach aims to leverage the collective expertise and resources within the region to advance circular economy practices.
- **Synchronise regional policies.** Advocate for the alignment of environmental policies across the region to streamline regional trade within a unified policy framework. Synchronising policies can help mitigate barriers to trade and promote a more efficient, eco-friendly economic landscape.
- **Harmonise standards**. Work towards the standardisation of criteria for circular economy products and services to ensure uniformity in quality and sustainability across ASEAN. By harmonising standards, a more consistent and transparent market for CE goods can foster trust and facilitate easier compliance for businesses across the region.

Initiative lead: MITI

Initiative D4: Develop CE activity taxonomy

This initiative aims to develop a taxonomy to create standardised definitions and criteria for CE-related activities.[23]

This should include developing a comprehensive glossary of terms related to CE activities such as recycling, reuse and resource efficiency, to ensure consistency and clarity across all stakeholders. Clear technical thresholds should be established to easily identify projects that can be classified as recycling, remanufacturing, or other CE activities. Regular review and updates of definitions must be included to stay relevant with industry advancement.

These efforts should be supported by integration of these definitions with other taxonomies such as the Sustainable and Responsible Investments (SRI) taxonomy developed by the Securities Commission (SC).

The CE activity taxonomy will serve as the foundation for regulatory measures, incentives, financing programmes and other initiatives within the CE roadmap, and should be incorporated into nationwide investment promotion and FDI-attraction activities. Efforts must be made to encourage financial institutions and the private sector to adopt the national taxonomy.

Standardising reporting requirements will also be an important step. Developing standardised reporting templates for financing or incentive programmes will facilitate greater tracking and awareness of CE. Guidelines on data collection and verification should also be provided.

[23] A taxonomy is a classification scheme used for sorting and categorisation.

Benefits

This initiative will play a pivotal role in improving public understanding of CE by creating a common definition of the concept among public and private entities.

By clearly identifying and categorising CE activities, the taxonomy will facilitate targeted investments, incentives, and capital flows towards sectors and projects that are truly beneficial for the CE effort. This approach not only streamlines the allocation of resources but also boosts investor confidence by providing a clear, transparent basis for sustainable investment decisions. As a result, it supports the broader transition to a sustainable economy by encouraging the adoption of practices that have a positive CE impact.

Global examples

The EU taxonomy for sustainable activities (Commission Delegated Regulation (EU) 2023/2486 of 27 June 2023 supplementing Regulation (EU) 2020/852) has set clear definitions of CE activities under the objective of "transition to a circular economy". Each activity within the taxonomy links with industry classification standard (NACE) to ensure uniformity and avoid confusion for stakeholders.

Technical screening criteria are set for each activity linked with EU standards, with quantitative criteria defined for each activity where applicable. For example, manufacturers of plastic packaging using bio-waste feedstock must ensure at least 65% of the packaging product by weight consists of sustainable bio-waste feedstock. Each activity must meet the criteria of "Do No Significant Harm" (DNSH) to ensure the respective activity does not negatively affect other objectives. For example, producing a product with recycled input cannot increase GHG on a life cycle basis compared to manufacturing the same product with raw materials.

Based on the EU example, there are three key recommendations for Malaysia in developing this initiative:

- **Issue single, nationwide taxonomy.** A single taxonomy covering the whole nation will avoid confusion from stakeholders about multiple taxonomies with different objectives.
- **Ensure clear technical screening criteria.** Clear technical screening criteria with quantitative elements (where applicable) is key. This should link to existing standards such as SIRIM's eco-labelling scheme and be consistent with international standards.
- **Link with existing MSIC.** Taxonomy should be linked to the Malaysia Standard Industrial Classification (MSIC) to ensure uniformity across application, whether for finance, investment, or incentive purposes.

Initiative lead: MITI, Securities Commission

Initiative D5: Establish robust national CE metrics and tracking mechanism

This initiative aims to develop national-level metrics to track CE progress across Malaysia, with clear accountabilities and reporting. It will (1) align on CE indicators to track and monitor, (2) set up mechanisms for untracked data, (3) establish alignment on collection and reporting responsibilities, and (4) build a centralised dashboard for CE.

Aligning on CE indicators to define and track each indicator as well as tracking methodologies will be an important foundational step. As a start, the 16 indicators chosen for benchmarking in this Framework (see Section 9) can be used as potential metrics.

Mechanisms should be established to assess untracked data in areas such as non-hazardous industrial waste, with clear standards to inform the type and structure of data requirements. Indicators should also be integrated with other adjacent systems, such as the System of Environmental-Economic Accounting (SEEA) or Sustainable Development Goals (SDG).

Alignment on collection and reporting responsibilities amongst agencies must be clearly established. This includes clear responsibility for each indicator, noting which agencies collect, aggregate and report data. Reporting and reviewing mechanisms should be established through an inter-agency panel to ensure data collected is representative of Malaysia's local ecosystem.

A centralised dashboard for CE will underpin this initiative, for example through a CE microsite in the DOSM's eStatistik website.

Benefits

This initiative will be fundamental in enabling data-driven policy making. It will also enhance public trust and accountability through greater transparency of Government operations and decision-making processes.

It will further facilitate cross-ministry collaboration through joint efforts to develop and track CE progress.

Global examples

The EU's Circular Economy Monitoring framework and centralised database is a well-defined and communicated framework with clear indicators. Five CE themes with 11 statistical indicators are included, such as production, consumption and waste management metrics. Indicators are regularly reviewed, with studies to ensure data remains representative, and the framework revised as needed.

Various agencies have distinct roles in reporting, with national statistics offices (NSOs) compiling data from regional agencies such as intellectual property from the European Patent Office, and consumption data from the internal market.

The framework provides centralised access to critical CE data which is openly shared among participants.

Analysis of this benchmark highlights three main recommendations for Malaysia:

- **Align with global standards** to ensure consistency and comparability in reporting CE metrics.
- **Define clear roles and responsibilities** to foster collaboration between ministries and avoid redundancy during tracking and collecting.
- **Conduct periodic reviews** to ensure data collected is representative of Malaysia's evolving industrial landscape. These reviews can be conducted by KE or an inter-agency panel.

Initiative lead: MITI, DOSM

Initiative D6: Launch upskilling programme to develop CE capabilities

This initiative proposes (1) setting up a CE education curriculum, (2) developing industry-led training programmes, and (3) establishing a one-stop-shop self-help website to promote education and awareness of CE.

The CE education curriculum will be established to support industry on core CE skillsets. This will be backed by a programme developed or hosted in partnership with international experts to upskill workers on the fundamentals of CE, with specialised training modules for high-demand technical skills such as life cycle assessments (LCA).

This curriculum will include in-factory training programmes hosted by local market leaders. Short-term internship programmes will be open to participation from industry and technical and vocational education and training (TVET) stakeholders. Companies with market-leading CE practices will act as hosts. Participants of the programme will receive certification to recognise specific CE topics they worked on within the internship, such as design thinking or process optimisation. This can leverage the existing certified programmes available on MGTC's Green Academy.

In tandem, a one-stop-shop website will be developed to educate industry on CE practices. This will feature a self-diagnosis tool which enables participants to identify the range of regulations and/or supporting mechanisms available, including eligibility for online training programmes, regulatory priorities, incentives and more. Self-help modules will be available based on the diagnosis, such as application tutorials for incentives, learning modules on LCAs, a range of training programmes available, and other assistance. This can be embedded as an additional focus area within the SMECorp website.

Benefits

This initiative include developing a high-skilled workforce to meet the needs of the CE industry.

Holistic benefits will also be unlocked across the CE value chain, as access to necessary CE talent promotes and supports adoption across the ecosystem.

Global examples

Examples of similar efforts in leading countries can be found in Germany's Rhein-Erft Academy, and the UK's NetRegs system.

In Germany, the Rhein Erft-Academy provides a programmatic and applied curriculum approach to upskilling local talent. Key design elements include programmatic training on green concepts such as circular design and process optimisation, with clear modules provided to participants. Company representatives and TVET trainees can also participate, upskilling both existing and future talent. Applied training allows participants to work on or shadow interdisciplinary projects in the nearby chemical park with established CE manufacturers. Graduates are certified and recognised as trained technicians.

NetRegs acts as the UK's digital platform to guide SMEs on regulations and support available. It has attracted over 300,000 unique website visitors and achieved over GBP58 million in savings from services accessed. It is a one-stop-shop with prescriptive, sector-specific guidance on regulatory obligations, grants, support, and best practices. NetRegs also offers self-diagnosis tools, which include questionnaires to outline potential regulatory challenges and information on eligibility for grants and incentives.

Analysis of these case studies from Germany and the UK suggest three main recommendations for Malaysia in this initiative:

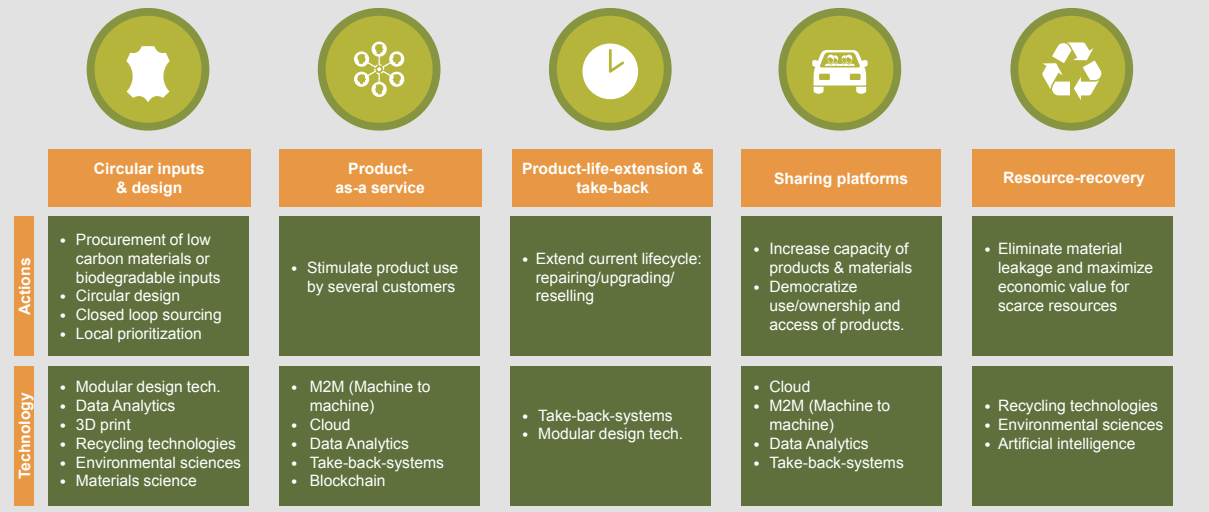
- **Provide direct guidance to SMEs.** SMEs have limited capacity to explore or fully grasp the complex concepts and requirements of CE. Direct guidance should be provided to help them to develop their CE capabilities.

- **Offer best-in-class opportunities to SMEs.** Supporting SMEs in identifying quick wins and mandatory needs can spur CE adoption. Without hands-on experience and poor access to TVET or CE employees in particular, SMEs will have limited capability to execute CE projects.
- **Enable recognition of skills to drive employability.** Easing identification of core talent relevant to the industry can help spur employment and cross-sharing of knowledge.

Initiative lead: MITI, MGTC

Initiative D7: Promote circular business models

This initiative proposes setting up a platform for companies to jointly participate and partner with Government to raise awareness of their CE products and business models to consumers and other businesses. Circular business models include circular inputs and design, product-as-a-service, product-life-extension and take-back, sharing platforms, and resource-recovery (see Figure 15)



Source: Waste to wealth, the circular advantage

Figure 15. Examples of circular business models

MITI and MGTC will be directly involved in supporting companies to launch promotion exhibits such as trade and road shows. Examples of potential platforms include the International Greentech & Eco Products Exhibition & Conference Malaysia (IGEM) hosted by MGTC, and the various i-ESG road shows hosted by MITI.

An online platform will also be established to promote CE business models. This will include a case study portal allowing companies to showcase their circular business models, details, and contact information, as well as an award scheme whereby companies can be recognised for their circular business models. Awards can include categories such as “Best CE Business”, allowing companies to gain access to grants and incentives. This can be an addition to the existing SMECorp platform.

A high-level playbook will be developed containing guidelines for industry on the guiding principles for a range of CE business models. This playbook will be regularly updated based on evolving industry best practice. It will include categorisation of key successful CE business models based on global benchmarks, key design elements and guiding principles for success for each business model. It can also be regularly reviewed and updated based on CE industry developments.

Benefits

Benefits of this initiative include improved outcomes across all Framework themes, i.e. circular input, efficient processes and sustainable output, which all benefit from increased CE awareness and adoption.

This initiative will also enhance the socioeconomic impact of CE initiatives more broadly, encouraging adoption of CE solutions by industry and the public.

Global examples

The Asia Pacific (APAC) region offers some valuable learnings. In Japan, the Partnership for Circular Economy (J4CE) is a platform which showcases local CE case studies and promotes facilitation amongst businesses, government, and non-profits. Key features include collection of over 100 best-in-class CE initiatives in Japan, globally segmented by industry and CE topics such as business models. Hosts provide information-sharing sessions and dialogues to promote case studies, and J4CE generates compendiums and brochures of case studies to circulate.

In Australia, the Circular Economy Hub is a community of businesses and public participants which promotes CE best-practices and information. It includes over 300 Government members, 900+ businesses, 250+ members of academia and 250+ consultants. Key features include sector-specific case studies segmented by industry and CE topic to showcase innovation and contacts for collaboration, a dedicated app for the CE community with profiles of businesses and CE efforts, as well as an events platform which facilitates the co-development of CE events by public and private partners.

These examples suggest three key recommendations for Malaysia in implementing this initiative:

- **Harness best-in-class exemplars.** Best-in-class companies in each sector can act as “north stars” to guide others, leveraging sector-specific local champions to inspire adoption of CE solutions.
- **Promote relationships between CE businesses.** Connecting successful implementors with aspiring companies can help companies anticipate potential challenges, spot good partners and identify the best technologies to adopt.
- **Support companies via road shows.** Local companies, particularly SMEs, have limited reach and experience in showcasing their businesses to the public. Leveraging existing platforms, such as MITI’s i-ESG road shows, to showcase best practices can support this effort.

Initiative lead: MITI, MIDA

4.7 Prioritisation of Initiatives and Enablers

In order to optimise the use of resources and focus Malaysia's efforts, the 14 initiatives have been prioritised based on relative impact and relative ease of implementation. This assessment guides the identification of three broad initiative archetypes (see Figure 16):

- **Big ticket.** High impact, low ease of implementation. These initiatives are important but highly complex. They will require early focus to pilot them in select sectors and scale them up over time.
- **Quick wins.** High ease of implementation. These initiatives are easier to implement and initiate. They should be started as soon as possible to show early impact.
- **Initiatives to develop.** Low impact, low ease of implementation. Initiatives should look to leverage existing efforts and collaboration with other stakeholders already driving these efforts.

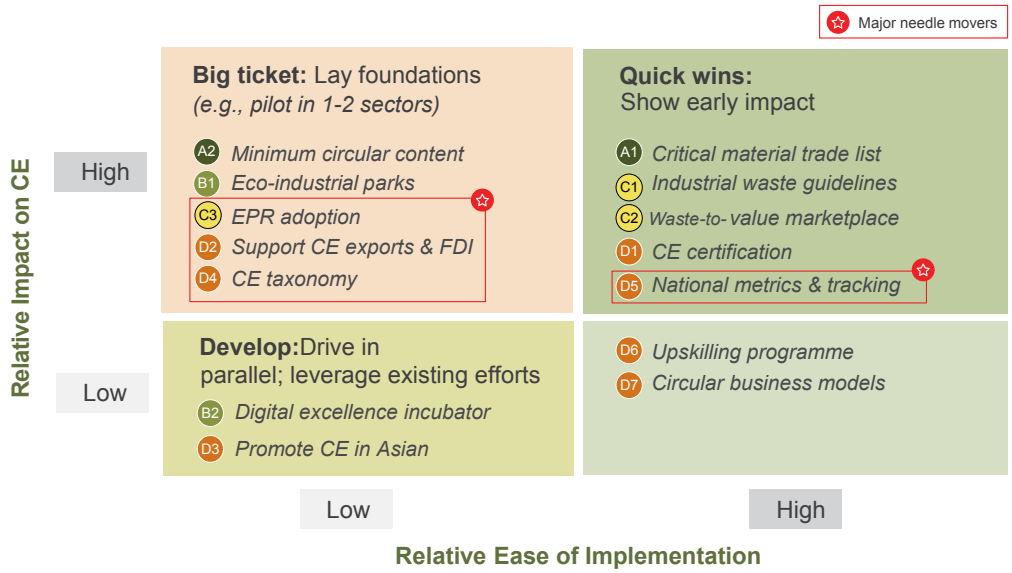


Figure 16. Prioritisation matrix

In addition, four initiatives with the most significant potential to move the needle on CE in Malaysia have been identified as "major needle movers" for MITI. These initiatives are assessed as having the highest importance in laying the foundation for the overall CE ecosystem in Malaysia. They are:

Initiative D4: Develop CE activity taxonomy

This initiative provides a single source of truth as to what constitutes CE across Government and industry. Thus, it is a key enabler for other initiatives and policy levers, such as identifying FDI target industries for incentives or facilitating financing. Ultimately, it provides a clear definition of circular economy to catalyse Malaysia's CE ecosystem.

Initiative C3: Drive transition to mandatory EPR adoption amongst manufacturers

This initiative encourages manufacturers to contribute to end-of-life product management, which also drives consideration of CE in design and manufacturing processes. Ensuring end-of-life products are collected and sorted for the recovery of recyclates will increase availability of domestic recycled material across the wider economy. This provides a market-making mechanism to drive positive economics of CE in Malaysia.

Initiative D2: Support export of goods with CE requirements & attract high-value CE investments

This initiative reinforces export competitiveness and rides on the global wave of green growth. It also helps to stimulate market demand for CE products to further develop Malaysia's ecosystem.

Initiative D5: Establish robust national CE metrics and tracking mechanism

This initiative provides a path to holistically measure CE across the value chain, including inputs, process, outputs and socioeconomic impact. This enhances accountability and informed decision-making in the CE ecosystem. It also clarifies the roles and responsibilities of ministries across the value chain, facilitating a coordinated, whole-of-nation effort.

5 Implementation Plan

Successful implementation of the Framework will require clear objectives, activities and timelines for each initiative, developed through extensive engagements with private and public-sector stakeholders. Strong governance, including tracking, monitoring and evaluation mechanisms, will also be critical, alongside sustained capability building to enable the transition to CE.

As part of the Framework development, detailed initiative charters have been produced including the initiative descriptions, challenges addressed, target outcomes, benefits and key stakeholders. High-level timelines have also been developed for each initiative showing the key activities, sequencing, milestones and responsible parties.

The timeline for the launch of the 14 initiatives under the Framework will be undertaken in three waves (see Figure 17) with milestones to 2030 (see Figure 18). Wave 1 consists of initiatives leveraging existing programmes and infrastructure, providing quick wins to catalyse adoption and rollout of the Framework. Wave 2 comprises initiatives that can be launched by existing teams but may require setting up new systems or undertaking additional detailed studies. Finally, the remaining initiatives will be launched in Wave 3, as they require extensive analysis and coordination with industry stakeholders or may be dependent on market demand.

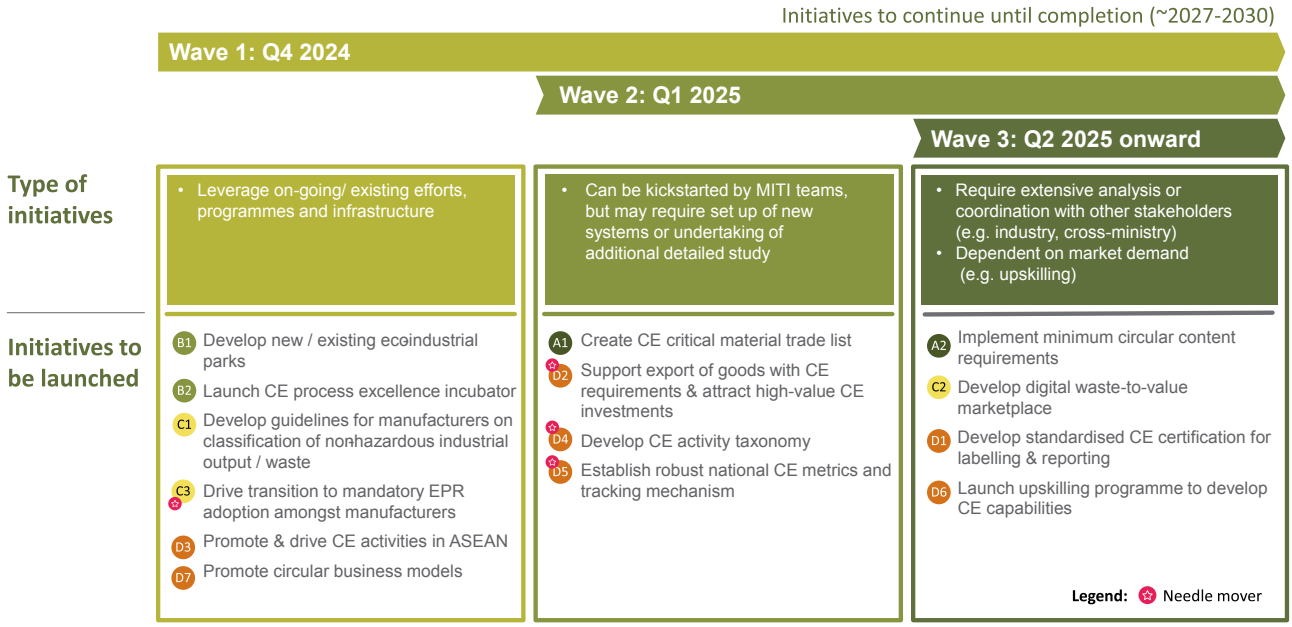


Figure 17. Three waves for implementation

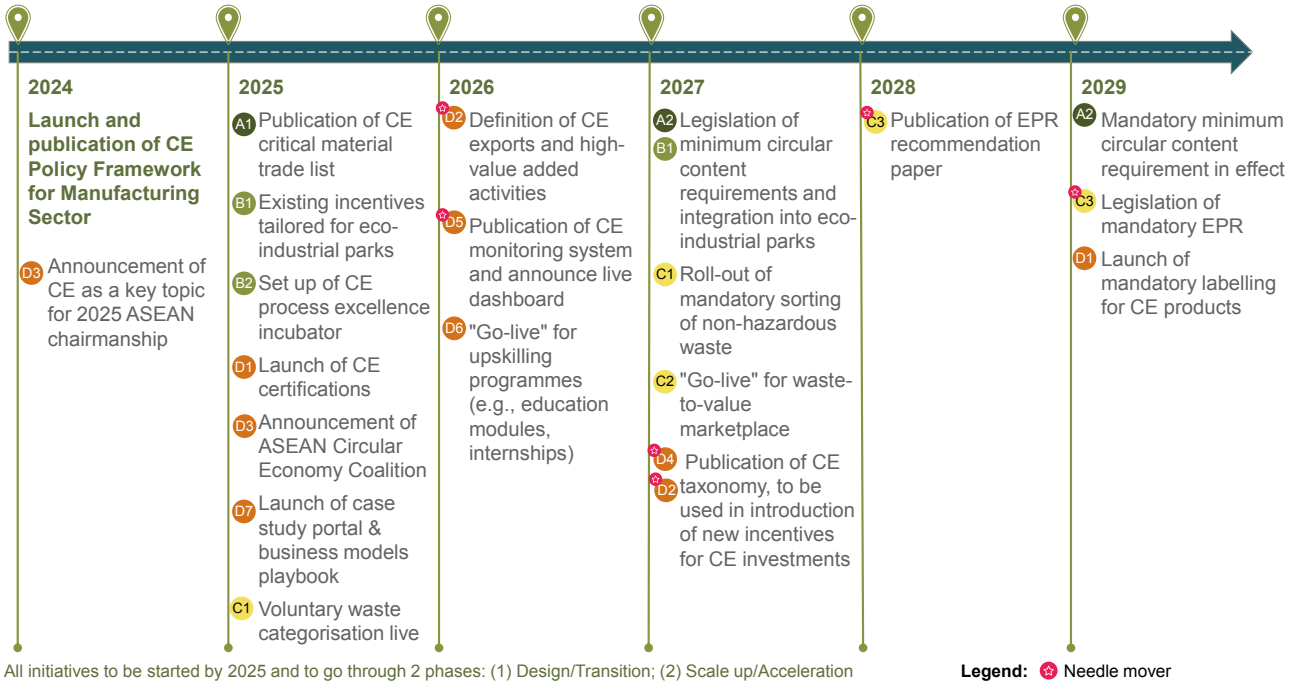


Figure 18. Key milestones to 2030

Implementation will be spearheaded by a Technical Committee. This Committee is chaired by MITI and comprises the leads of each initiative who are tasked with leading and driving the implementation of initiatives, regularly engaging industry to sense-check initiatives, and updating the wider Committee on progress, challenges, potential solutions and next steps on a quarterly basis. The Technical Committee will track progress across the initiatives, address roadblocks and escalate if needed, manage interdependencies between initiatives and oversee communications.

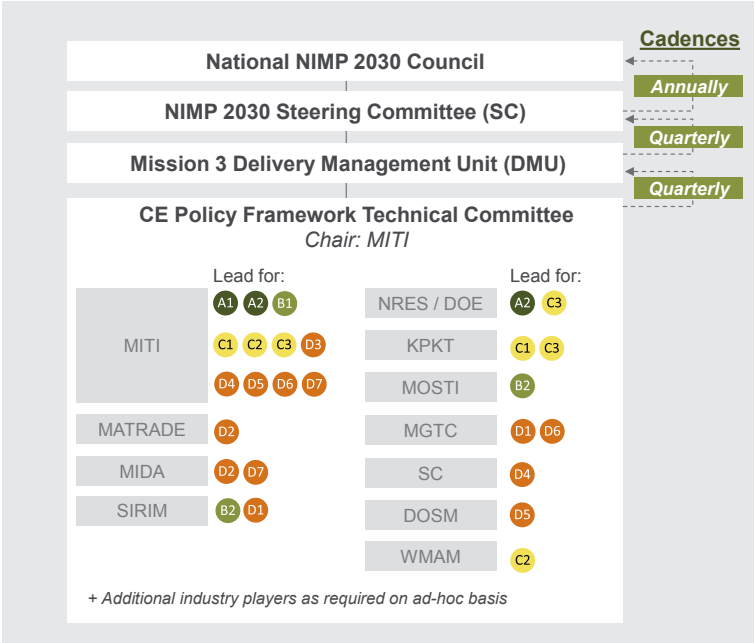


Figure 19. Governance structure

As the Framework is an action item under NIMP 2030, the Committee will report progress quarterly to the NIMP 2030 Mission 3 DMU starting from Q3 2024. The DMU will then report to the NIMP 2030 Steering Committee on a quarterly basis and to the National NIMP 2030 Council each year (see Figure 19).

As laid out in NIMP 2030, the DMU will focus on coordinating all efforts and driving cohesive implementation, while the Steering Committee will drive a whole-of-nation approach for successful industrial development. The National NIMP 2030 Council forms the highest level of Government oversight, led by YAB Prime Minister.

Further details on NIMP 2030 governance systems and structures can be found in NIMP 2030 policy documents.

New capabilities will be required to enable and empower the CE transition. These include CE business management skills, such as knowing how to identify CE business opportunities, improving business processes with CE design and ensuring compliance with CE regulations locally and internationally. Fundamental cross-cutting skills to enable CE will also be necessary, including data collection and analysis, communications, marketing and reporting on CE outcomes.

Deep industrial CE knowledge will be critical, such as understanding of life cycle assessments, eco-design principles, CE certifications, circular logistics and waste management (see Figure 20).

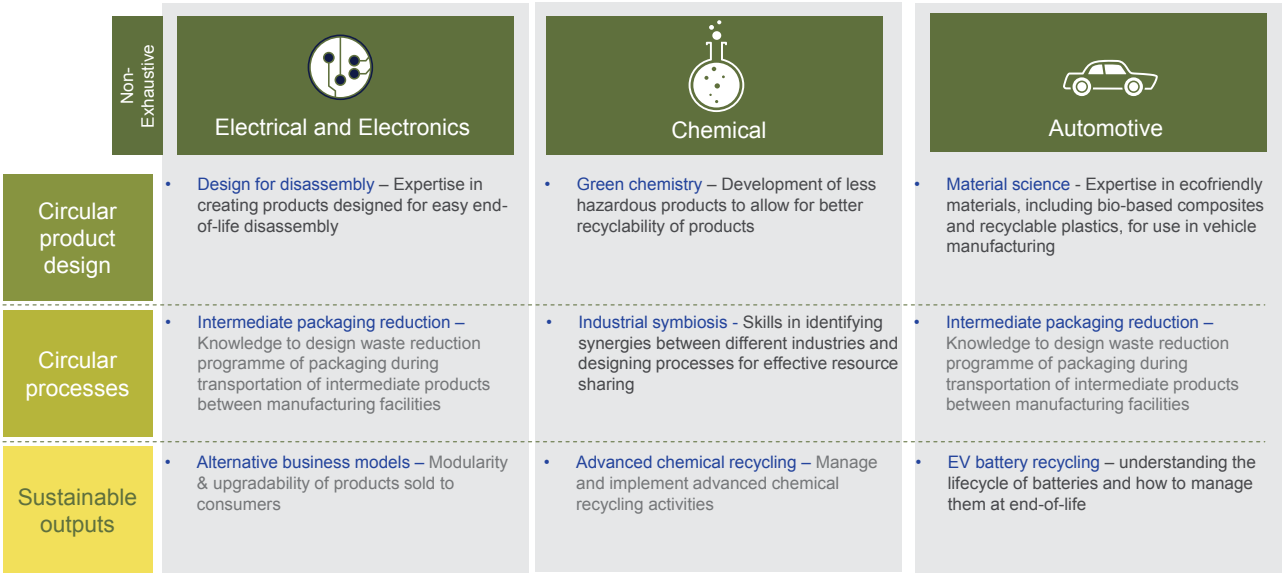


Figure 20. Examples of industrial CE knowledge for selected sectors

Various platforms can be used to build these capabilities and industrial CE knowledge for specific sectors, leveraging Government upskilling programmes such as HRDCorp, Upskill Malaysia and MGTC's Green Academy. Programmes offered by institutes of higher learning, the publication of playbooks on CE and expert masterclasses can also be harnessed. Finally, industry-led sharing by PROs, industry associations and eco-industrial parks can be valuable opportunities to raise awareness and to equip companies with practical insights and tips on adopting CE.

6 Conclusion

The CE Policy Framework represents an essential framework to guide Malaysia's transition to a more sustainable and future-proof economy. It offers a comprehensive and holistic strategy to guide industries and Government in navigating this transition with clearly defined timelines leading to 2030.

The Framework provides a pivotal opportunity for Malaysia to reduce its natural-resource consumption, enhance the sustainability of its industries and mitigate key sources of environmental pollution. It also provides a pathway for the nation to remain competitive in a shifting global landscape, unlocks higher-value opportunities in a wide range of sectors, and contributes to achieving Malaysia's net-zero targets. By achieving these aspirations under the Framework, the Malaysian manufacturing sector could generate up to RM16 billion in cost savings, reduce 6.5 million tonnes of CO_2 equivalent emissions and divert 14 million tonnes of industrial waste annually by 2030. Malaysia also stands to gain a cumulative RM65 billion in new and high-quality investments between now and 2030.[24]

An open and collaborative approach will be critical to successfully achieve these outcomes. Private and public stakeholders will need to work in partnership to put in place the structures, support, capabilities and commitment to deliver these aims.

As such, it is important for all parties to adopt, embed and champion the recommendations outlined within this Framework, and help create a more sustainable future for the industry, economy, environment and nation. With active participation from all stakeholders, the Framework can truly impact the journey of each Malaysian manufacturer to embrace circularity across the value chain and play a role in the push for net zero (see Figure 21).

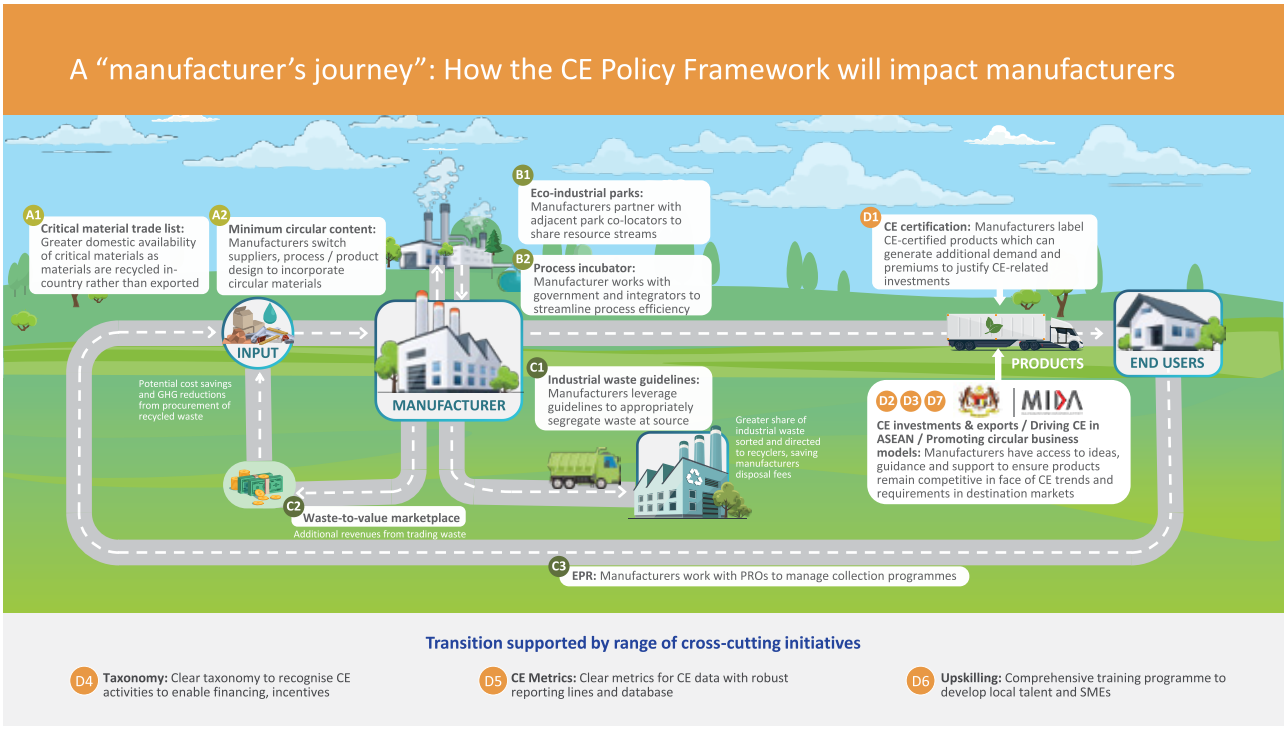


Figure 21. Impact of the Framework on a typical manufacturer's journey

[24] Team analysis.

7 Appendix

A. Key indicators for tracking CE

Theme	No.	Indicators	Description of indicator	Unit	Data available?	Agency
Input	1	Material imports (IMP)	Imports of raw material & products in their simple mass weight	Tonnes	✓ Tracked	MATRADE, MITI
	2	Domestic material extraction (DE)	The total amount of raw material[1] extracted from the natural environment	Tonnes	✓ Can calculate	DOSM – KE NRES
	3	Raw water extraction	The total amount of fresh water extracted from natural resource	Tonnes	✓ Tracked	METPU
	4	Circular material use rate	% of circular use of materials to overall material use Rate = U / (DMC+U)	%	✓ Can calculate	N/A – calculation
Process	5	Domestic material consumption (DMC)	The total amount of material actually consumed domestically DMC = DE + IMP - EXP	Tonnes	✓ Can calculate	N/A – calculation
	6	Resource productivity (RP)	GDP generated per domestic material consumption; RP = GDP/DMC	RM/tonne	✓ Can calculate	N/A – calculation
	7	Raw material productivity	The efficiency of domestic & imported raw material use; calculated by converting RP into raw material equivalent	RM/tonne	✗ Not tracked	Not tracked
	8	Material footprint	Total amount of raw materials (both domestic & imported) extracted to meet a country's final consumption demands	Tonne RME /capita	✗ Not tracked	Not tracked
Output	9	Material exports (EXP)	Exports of raw materials & products in their simple mass weight	Tonnes	✓ Tracked	MATRADE - MITI
	10	Total industrial waste generated	The total amount of waste generated by industrial process	Tonnes	✗ Not tracked	Not tracked
	11	Total waste processed by recyclers (U)	The total amount of recyclable waste[2] retrieved	Tonnes	✓ Tracked	KPKT
	12	IPPU emission	The total greenhouse gas emissions occurring from industrial processes in products	tCO_2eq	✓ Tracked	NRES
Economic impact[3]	13	Gross value added from circular economy	Total value added at factor costs of sectors relevant to the circular economy	RM	✗ Not tracked	Propose MITI to track
	14	Private investments into CE	Total international & domestic investment in sectors relevant to the circular economy	RM	✗ Not tracked	MIDA – custom req.
Social impact[3]	15	Number of jobs in CE	No. of persons employed in sectors relevant to the CE	# people	✗ Not tracked	Propose MITI to track
	16	Median salary for CE jobs	Median salary of sectors relevant to the circular economy	RM	✗ Not tracked	Propose MITI to track

RME: Raw Material Equivalent; 1. Raw material incld Biomass, Metals, Minerals and Fossil Fuel per UNCTAD-SoP1; 2. Recycleable waste include key waste in Malaysia: Wood, Plastic, metal; 3. Impact is measured by aggregating proxy sectors in recycling, repair & use
Source: Cicularity Gap Methodology, Eurostat, Ellen Macarthur Foundation, World integrated trade solution, Team analysis

Indicators used for target setting

Figure 22. List of CE indicators and data availability

Figure 22 shows the 16 indicators selected under the Framework to track progress on CE, their definitions and the availability of data for Malaysia. As reflected in the table, Malaysia is already actively monitoring most of these indicators through various agencies. Nevertheless, additional calculations are needed for several indicators, such as (6) resource productivity and (4) circular material use rate. Importantly, some indicators, such as (10) total industrial waste generated and (13) gross value added from CE, are not currently tracked by any ministry or agency. Establishing tracking for these indicators is essential to provide a comprehensive overview of CE progress within Malaysia.

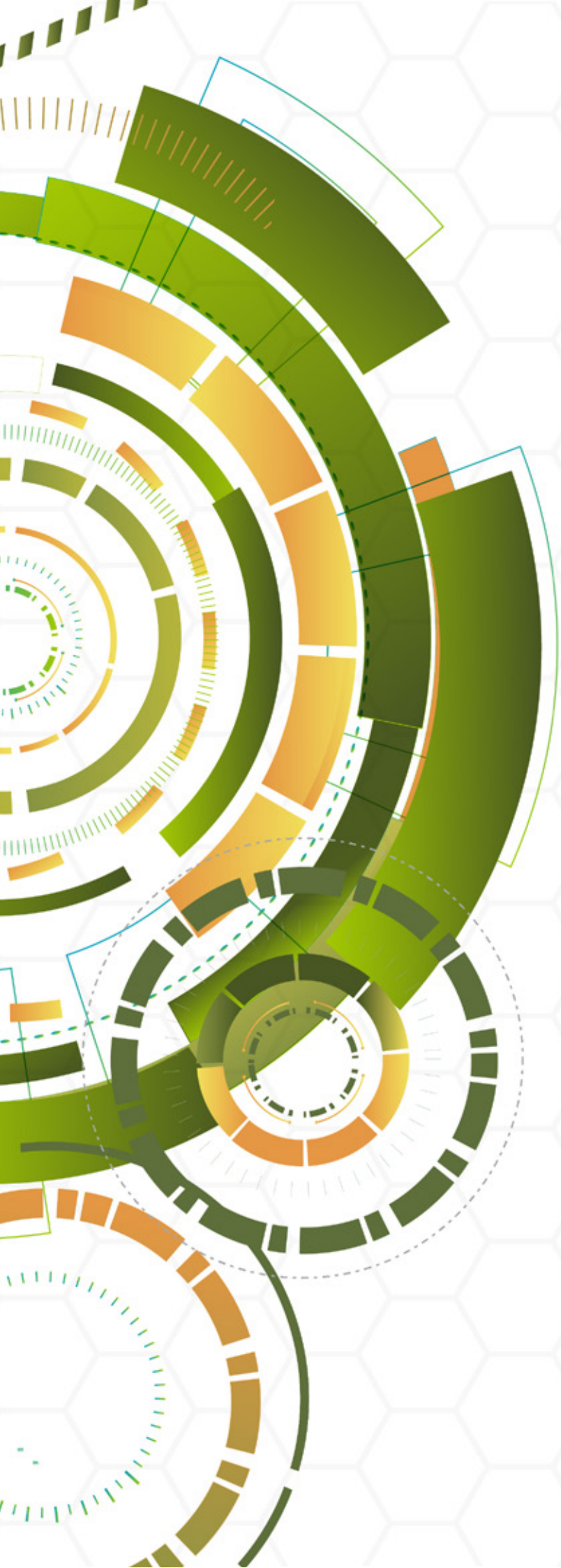
B. Proxy list of activities for Circular Economy

The EU's statistical agency, Eurostat, has developed a list of activities consisting of 24 NACE Revision 2 codes to be used as proxies to calculate private investments, jobs and gross value added related to circular economy sectors (see Figure 23). Defining which activities are considered part of CE is a complex task and will require the development of a CE taxonomy, as detailed in Initiative D4. In the meantime, we refer to the EU's proxy list of activities for CE as a temporary measure to estimate the socio-economic impact of circularity. For consistency in benchmarking, 20 equivalent MSIC codes have been identified to estimate these metrics for Malaysia, ensuring a uniform approach to measuring the circular economy's social and economic impact.

NACE 2	Description		MSIC Class	Description
Proxy code for recycling				
E 38.11	Collection of non-hazardous waste		3811	Collection of non-hazardous waste
E 38.12	Collection of hazardous waste		3812	Collection of hazardous waste
E 38.31	Dismantling of wrecks		3830	Materials recovery
E 38.32	Recovery of sorted materials			
G 46.77	Wholesale of waste and scrap		4669	Wholesale of waste and scrap and other products n.e.c.
G 47.79	Retail sale of second-hand goods in stores		4774	Retail sale of second-hand goods
Proxy code for repair and use				
C 33.11	Repair of fabricated metal products		3311	Repair of fabricated metal products
C 33.12	Repair of machinery		3312	Repair of machinery
C 33.13	Repair of electronic and optical equipment		3313	Repair of electronic and optical equipment
C 33.14	Repair of electrical equipment		3314	Repair of electrical equipment
C 33.15	Repair and maintenance of ships and boats		3315	Repair of transport equipment, except motor vehicles
C 33.16	Repair and maintenance of aircraft and spacecraft			
C 33.17	Repair and maintenance of other transport equipment			
C 33.19	Repair of other equipment		3319	Repair of other equipment
G 45.20	Maintenance and repair of motor vehicles		4520	Maintenance and repair of motor vehicles
G 45.40	Sale, maintenance and repair of motorcycles and related parts and accessories		4540	Sale, maintenance and repair of motorcycles and related parts and accessories
S 95.11	Repair of computers and peripheral equipment		9511	Repair of computers and peripheral equipment
S 95.12	Repair of communication equipment		9512	Repair and maintenance of communication equipment
S 95.21	Repair of consumer electronics		9521	Repair of consumer electronics
S 95.22	Repair of household appliances and home and garden equipment		9522	Repair of household appliances and home and garden equipment
S 95.23	Repair of footwear and leather goods		9523	Repair of footwear and leather goods
S 95.24	Repair of furniture and home furnishings		9524	Repair of furniture and home furnishings
S 95.25	Repair of watches, clocks and jewellery		9529	Repair of personal and household goods, n.e.c.
S 95.29	Repair of other personal and household goods			

Note: the NACE codes are used by Eurostat as proxies to calculate private investment, jobs & gross value added related to circular economy sectors
Source: Eurostat, NACE, MSIC (2008), Team analysis

Figure 23. Proxy list of CE activities, used for calculating socio-economic impact



e ISBN 978-967-0020-47-1