

# CIRCULAR PLASTICS, REGIONAL IMPACT:

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PUTTING THE ECONOMY BACK INTO  
SINGAPORE'S CIRCULAR ECONOMY

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## EXECUTIVE SUMMARY

As Singapore continues its progress towards a Zero Waste Nation, this white paper, developed in partnership with the Circular Economy Committee of European Chamber of Commerce (Singapore) and Paia FROM CBRE, highlights pathways to enhance plastic waste management and unlock economic opportunities that strengthen the circular economy.

Existing efforts to develop circular economy solutions remain fragmented and limited in scale. In Singapore, the reliance on incineration, and commingled waste streams point to gaps in the existing Zero Waste strategy. A cohesive national approach will be key to unlocking the full economic and environmental value of circularity.

This paper highlights circular economy business models that are proving their commercial viability across industries, unlocking new revenue streams, and supply chain resilience. Drawing on leading case studies, it highlights the key factors behind successful circular economy strategies for plastics. These factors include strong collaboration between government, industry and consumers, a global orientation to scaling up circular economy solutions, and striking a balance between economic viability, environmental sustainability and consumer behaviour.

Singapore, with its strengths in governance, innovation, and regional connectivity, is well-positioned to lead the region in scaling these circular plastic solutions.

### **The key recommendations include:**

#### **1. A Unified, Comprehensive Circular Economy Action Plan, Co-Created by Government and Business**

Singapore should develop a unified roadmap for circular plastics, co-created by government and industry, that builds on existing initiatives and sets clear targets for innovation and investment. Extended Producer Responsibility schemes need to be designed collaboratively to encourage innovation and align with strategic sectors. Regulatory frameworks should be harmonised with global standards to attract investment and facilitate the growth of cross-border trade in recycled materials.

#### **2. Scaling Up Singapore's Circular Economy Infrastructure Through Public-Private Investments**

Singapore should consider co-investing in material recovery facilities, shared pre-processing hubs, and advanced recycling technologies. Predictable demand signals, procurement guarantees, and streamlined approvals will be essential to derisk innovation and attract private capital.

#### **3. Mobilising Consumers and Workers Through Joint Educational and Capacity Building Efforts**

Public engagement can be strengthened through education and incentives that empower households, consumers, and citizens to manage waste more effectively. At the same time, a skilled workforce will be vital to capturing economic opportunities in the circular economy. Targeted training and capacity-building initiatives can prepare workers for emerging roles in circular industries.

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## 1. INTRODUCTION

Plastics are a key material in daily life, but their widespread use can create significant environmental challenges if the end of life is not properly considered. This is especially true given the consistently high demand for plastics in our modern economies. In 2019, 460 million metric tonnes of plastic was in use globally, the equivalent of over 6 million Merlion statues<sup>1</sup>, of which only 9 percent was recycled. The amount of plastic waste generated will increase by nearly threefold to 1,231 million metric tonnes in 2060<sup>2</sup>. With this projected increase, the growth of the recycled plastics industry is essential to meeting global sustainability goals.

Singapore, like many countries, generates large amounts of plastic waste due to a combination of high consumption, a culture of convenience, and low recycling rates. Nearly all of Singapore's waste is incinerated, making up approximately 3 percent of Singapore's total greenhouse gas emissions<sup>3</sup>. Domestic efforts to innovate in recycling have been limited for various reasons.

Against this backdrop, it is critical to re-examine Singapore's plastic waste management by emphasising the role that a circular economy can play. This is not simply a matter of regulation, it is also one of economic opportunity. In other words, advancing the management of plastic waste in Singapore can be done by unlocking the "economy" in circular economy. Drawing from the successes of businesses that have embraced circularity, it is clear that there are economic gains that can be reaped if these solutions are brought to scale. To do this, collaboration among policymakers, businesses and other key stakeholders is key. Together, these stakeholders can leverage Singapore's strengths in governance, regional and global connectivity, as well as innovation to collectively lead the region in creating a truly circular economy for plastics<sup>4</sup>.

1 <https://www.visitsingapore.com/neighbourhood/featured-neighbourhood/marina-bay/merlion-park/>

2 [https://www.oecd.org/content/dam/oecd/en/publications/reports/2022/06/global-plastics-outlook\\_f065ef59/aa1edf33-en.pdf](https://www.oecd.org/content/dam/oecd/en/publications/reports/2022/06/global-plastics-outlook_f065ef59/aa1edf33-en.pdf)

3 [https://www.nas.gov.sg/archivesonline/data/pdfdoc/MSE\\_20191104001.pdf](https://www.nas.gov.sg/archivesonline/data/pdfdoc/MSE_20191104001.pdf)

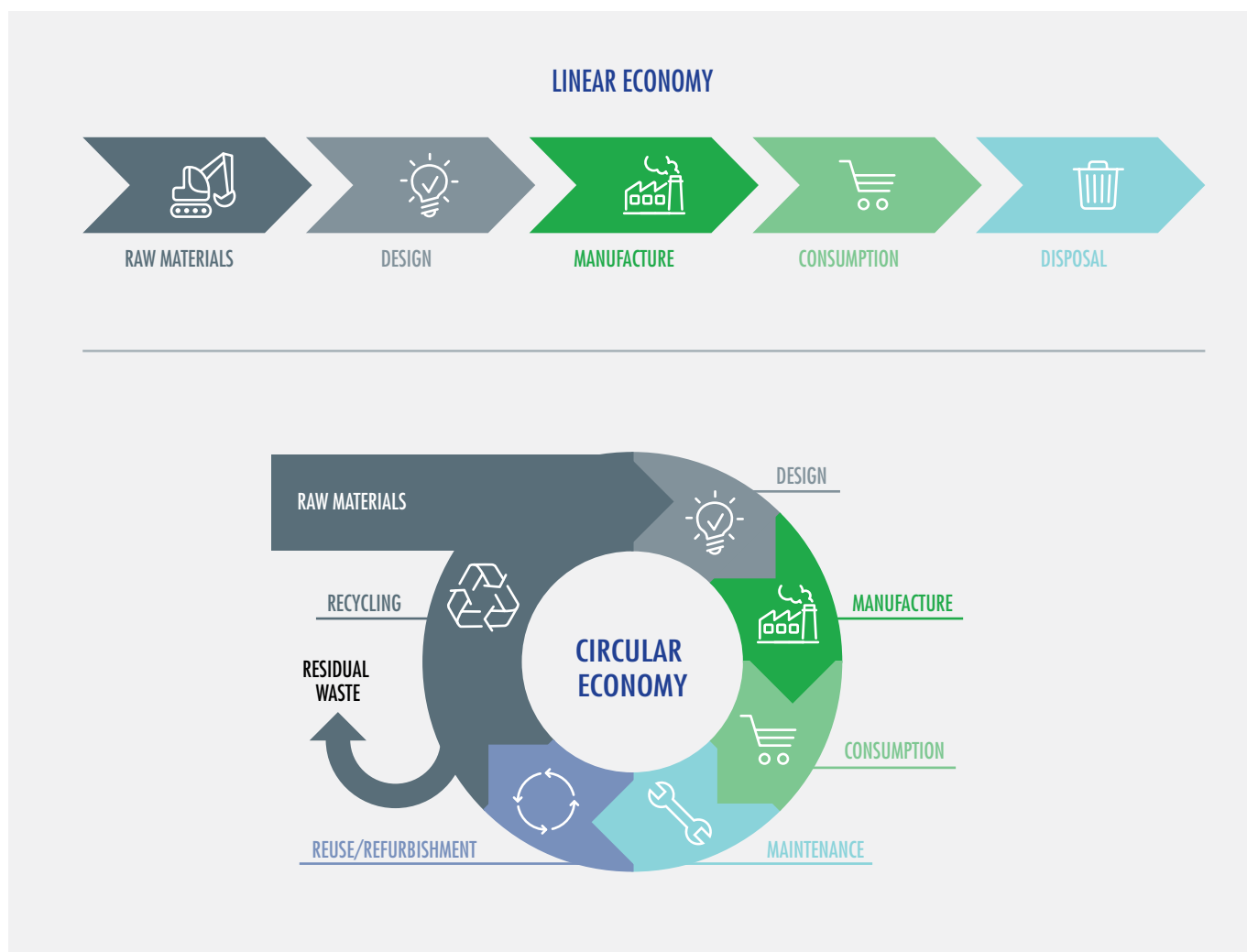
4 While this White Paper is centred around a circular economy for plastics, the European Chamber of Commerce Singapore Circular Economy Committee's remit extends to other broader issues relating to circular economy, such as food waste, textiles, or e-waste. Events and activities associated with this broader remit can be found on <https://eurocham.org.sg/committees/circulareconomy>.

## 2. WHAT IS THE CIRCULAR ECONOMY?

The Ellen MacArthur Foundation offers a widely accepted definition of a circular economy: “a system in which materials are never considered waste and nature is continually regenerated”<sup>5</sup>. This is often contrasted with the take-make-waste model of the “linear” economy. Circularity embraces a set of practices such as the 4Rs (Reduce, Reuse, Recycle, Recover) which allow for the sustainable use and regeneration of the material flows and resources that society depends on. In doing so, circularity “closes the loop” on the linear economy.

The concept of a circular economy offers a promising solution to traditional waste management models, in particular in improving plastic waste management practices.

However, current definitions of the circular economy put a heavy emphasis on the concept of circularity and miss the need to unlock the “economy” portion of the equation, which is a critical motivator for the increased attractiveness of turning the concept into reality.



Linear to Circular Economy <sup>6</sup>

5 [https://www.ellenmacarthurfoundation.org/topics/circular-economy-introduction/overview?gad\\_source=1&gad\\_campaignid=21028661931&gclid=EAlaIqobChMlpsf15N\\_mjgMVEso8Ah2TLAAhEAAAYASAAEgIAxvD\\_BwE](https://www.ellenmacarthurfoundation.org/topics/circular-economy-introduction/overview?gad_source=1&gad_campaignid=21028661931&gclid=EAlaIqobChMlpsf15N_mjgMVEso8Ah2TLAAhEAAAYASAAEgIAxvD_BwE)  
 6 [https://link.springer.com/chapter/10.1007/978-3-319-77547-0\\_9](https://link.springer.com/chapter/10.1007/978-3-319-77547-0_9)

## 3. UNLOCKING THE 'ECONOMY' IN THE CIRCULAR ECONOMY

### THE MACROECONOMIC VALUE

There are huge macroeconomic advantages to adopting circular economy practices in plastic waste management.

#### 1. GENERATING EMPLOYMENT

According to the International Labour Organisation ("ILO"), it is estimated that transitioning to a circular economy will generate seven to eight million new jobs<sup>7</sup>.

In France, the potential for an additional 300,000 jobs to be generated from a circular economy is forecasted from the implementation of an anti-waste and circular economy law<sup>8</sup>. Similarly in Australia, where a Circular Economy Framework was introduced in 2024, the recycling industry alone was estimated to contribute 30,606 jobs to Australian residents on top of \$5.1 billion in value-added to the Australian economy<sup>9</sup>.

#### 2. GENERATING REVENUE

Globally, the revenue from circular economy transactions was estimated at approximately US\$339 billion in 2022, and forecast to represent a market opportunity of US\$712 billion by 2026<sup>10</sup>. Additionally, global estimates of the recycled plastics market forecast strong growth in the coming years. These estimates predict a compound annual growth rate ("CAGR") of 7%, reaching a market size of US\$70 billion in 2030<sup>11</sup>. Growing use of recycled plastics will gradually displace virgin plastics in the share of global polymer demand, from 29% in 2023 to 41% in 2040, while virgin plastics drop from 49% to 21% in the same timeframe<sup>12</sup>.

In the absence of stronger circular principles being implemented, the continued growth of demand for plastic poses significant challenges in reducing waste and aligning with sustainability goals. As such, while future growth prospects look promising for recycled plastic, significant gaps remain in the present day to capture this value, representing missed economic opportunities. The Circularity Gap Report 2024<sup>13</sup>, has estimated that the amount of secondary materials being cycled back into the global economy has shrunk from 9.1% of total material inputs in 2018 to 7.2% in 2023.

### THE BUSINESS VALUE

The Organisation for Economic Co-operation and Development ("OECD") uses a typology of five circular business models: circular supply chain models, resource recovery models, product life extension models, sharing models, and product service system models<sup>14</sup>. Each model comes with its own benefits:

#### 1. CIRCULAR SUPPLY MODEL

A circular supply model, which may also be known as "cradle-to-cradle" design, seeks to replace traditional inputs into production with bio-based, renewable or recoverable materials. Products are designed from the outset to make use of these materials, and to ensure that these materials do not become waste at the end-of-life stage of the product. Such business models can be particularly viable when they attract consumers willing to pay a green premium, or as a way to manage regulatory and supply chain risks.

##### Business Benefits:

- **Reduced Material Costs:** Lower reliance on volatile raw material markets;
- **Supply Chain Resilience:** Enhanced security by diversifying material sources;
- **Regulatory Compliance:** Easier alignment with sustainability regulations and standards.

7 Global South Circular Economy Could Generate Millions Job Opportunities | ILO

8 <https://www.ecologie.gouv.fr/sites/default/files/documents/FREC%20anglais.pdf>

9 [https://acor.org.au/wp-content/uploads/2023/06/230523\\_economic\\_contribution\\_of\\_recycling\\_-\\_acor.pdf](https://acor.org.au/wp-content/uploads/2023/06/230523_economic_contribution_of_recycling_-_acor.pdf)

10 Circular economy revenue worldwide 2022-2026 | Statista

11 <https://www.statista.com/statistics/987522/global-market-size-plastic-recycling/> and <https://www.bccresearch.com/market-research/plastics/plastics-recycling-global-markets.html>

12 <https://www.globenewswire.com/news-release/2024/04/23/2867903/0/en/Virgin-Plastic-Packaging-Market-Size-Expected-to-Reach-USD-322-50-Bn-by-2032.html>

13 [https://circulars.iclei.org/wp-content/uploads/2024/11/CGRGlobal2024-Report\\_compressed.pdf](https://circulars.iclei.org/wp-content/uploads/2024/11/CGRGlobal2024-Report_compressed.pdf)

14 [https://www.oecd.org/en/publications/business-models-for-the-circular-economy\\_g2g9dd62-en.html](https://www.oecd.org/en/publications/business-models-for-the-circular-economy_g2g9dd62-en.html)

## 2. RESOURCE RECOVERY MODEL

A resource recovery model seeks the production of secondary raw materials from waste streams. Resource recovery typically involves three stages, each of which can be served by individual businesses. Firstly, the collection of waste materials from households, businesses and industry. Secondly, the sorting of that waste stream into its constituent materials, where it can then be channelled into specific uses. Finally, secondary production where the sorted waste material is transformed back into raw material, where it can then be sold to manufacturing firms or on commodities markets. Much of the mechanical or chemical recycling solutions mentioned in this paper conform to this ideal type.

### Business Benefits:

- **Waste Reduction:** Decreased disposal costs and environmental impact;
- **Revenue from Waste:** Monetisation of by-products and waste streams;
- **Enhanced Brand Image:** Positioning as an environmentally responsible company.

## 3. PRODUCT LIFE EXTENSION MODEL

A product life extension model seeks various ways in which a company's goods can be used for longer periods of time, thereby reducing the demand and extraction for new resources. This can be done in a multitude of ways. A company could charge a premium for more durable goods, facilitate transactions of second-hand goods, or offer maintenance, repair, refurbishing or remanufacturing services for their products. In many cases, these solutions can be offered by third party providers, and may also be enabled through legislation such as Extended Producer Responsibility policies.

### Business Benefits:

- **Increased Customer Loyalty:** Longer product life enhances customer satisfaction;
- **New Service Revenue:** Opportunities in repair and maintenance services;
- **Reduced Production Costs:** Lower costs associated with manufacturing by extending equipment life.

## 4. SHARING MODEL

Sharing models seek to make use of under-utilised consumer goods or assets more intensively, generally through some form of pooling or lending. They tend to make use of new technologies and platforms to facilitate sharing or may take advantage of any associated platform effects to scale up the circular use and reuse of products, increase efficiencies, or reduce barriers to circular practices and behaviour.

### Business Benefits:

- **Asset Utilisation:** Maximised use of existing products;
- **New Business Opportunities:** Platforms for sharing can create new revenue streams;
- **Consumer Engagement:** Encourages community building and brand loyalty.

## 5. PRODUCT SERVICE SYSTEM (PSS) MODEL

Product service systems model seeks to tie a physical product with a service component. The combination of product and service can come in a variety of permutations, for example by offering after-sale services that increase the durability of the product, or by incentivising greater utilisation of the product.

### Business Benefits:

- **Steady Revenue Streams:** Recurring income through service contracts;
- **Incentive for Sustainable Design:** Design products for longevity and efficiency;
- **Customer Retention:** Ongoing relationships through service contracts.

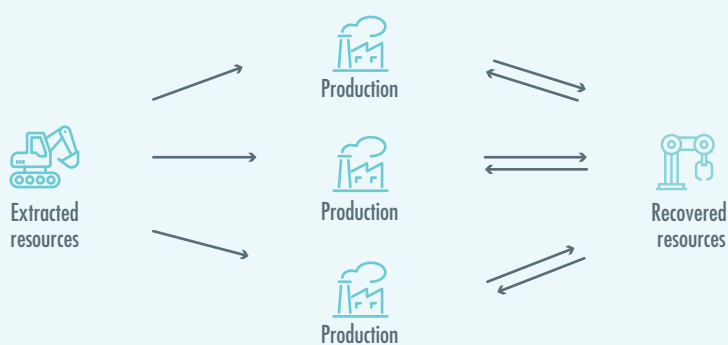
Of these models, the first two are of particular importance to the plastics sector, but this typology is not exhaustive, nor is each circular business model mutually exclusive. Instead, policymakers and businesses can use this typology to identify the various pathways by which circular economy businesses can be grown.

### CIRCULAR ECONOMY BUSINESS MODELS

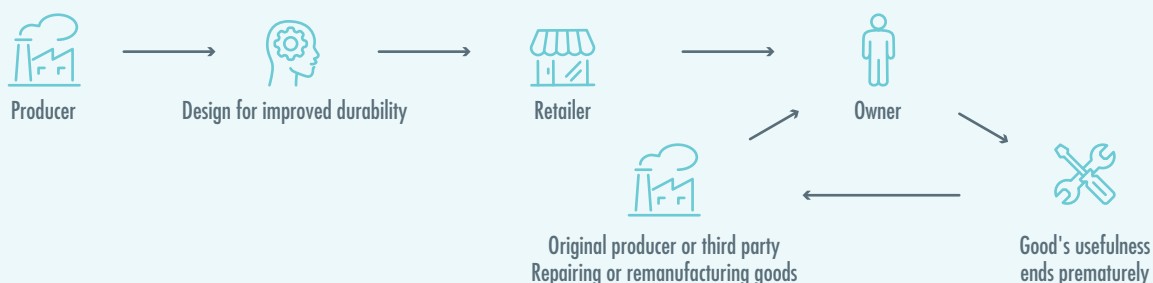
#### Circular supply model



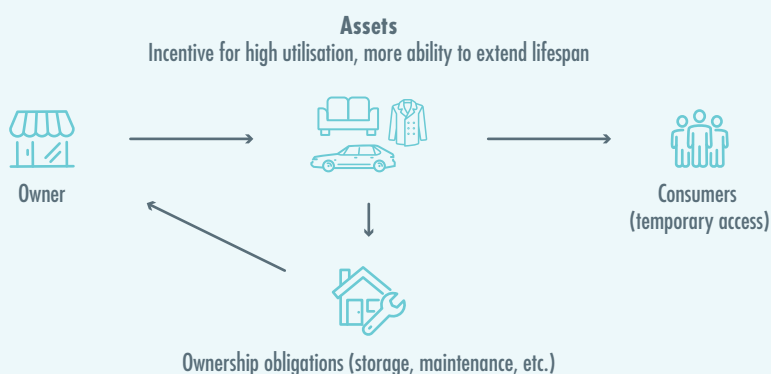
#### Resource recovery model



#### Product life extension model



#### Product service systems model



Source: OECD: Business Models for the Circular Economy - Opportunities and Challenges for Policy; Protix; L.E.K. research and analysis

## EXAMPLES OF CIRCULAR ECONOMY INITIATIVES ACROSS THE PLASTIC VALUE CHAIN

UPSTREAM	MIDSTREAM	DOWNSTREAM	WHOLE VALUE CHAIN
<p>Trade Policies, Agreements and Conventions</p> <p>China's National Sword Policy</p> <p>Basel Convention</p> <p>Waste Import Bans</p>	<p>Eco-design Initiatives</p> <p>Ecodesign for Sustainable Products Regulation ("ESPR")</p> <p>Design-for-recycling ("D4R")</p>	<p>EU Recycled Content Targets</p> <p>Single-use Plastics ("SUP") Directive</p> <p>Packaging and Packaging Waste Regulation ("PPWR")</p> <p>End-of-Life Vehicles ("ELV") Directive</p>	<p>Extended Producer Responsibility ("EPR")</p>
<p>EU Waste Framework Directive</p>		<p>EU Labelling / Marking Requirements</p>	<p>EU Taxonomy</p>
<p>Production Caps on Plastic</p>			<p>Singapore-Asia Taxonomy</p>
<p>Alternative Feedstocks</p>			<p>Global Plastics Treaty</p>

**Upstream policies** focus on enacting changes in production processes and material selection. For instance, China's National Sword Policy has significantly impacted global recycling dynamics by banning imports of certain types of solid waste and setting strict contamination limits on recyclable materials<sup>15</sup>. Similarly, the EU Waste Framework Directive sets stringent guidelines for waste management practices across member states<sup>16</sup>.

**Midstream policies** aim to promote sustainable design practices in product and service development. This approach is exemplified by various examples in the EU such as the Design-for-Recycling ("DfR") Workplan and the Ecodesign for Sustainable Products Regulation ("ESPR"), through regulating industrial carbon management and encouraging eco-design principles for chemicals and plastics.

**Downstream interventions** target consumer behaviour and market dynamics, at the selling and purchasing stage of end products. EU's Packaging and Packaging Waste Regulation ("PPWR") and the Single-use Plastics ("SUP") Directive tackles the end-of-life of products and reduce waste at the consumer level. Initiatives such as recycled content targets in packaging and bans on single-use plastics ("SUPs") have shown promise in driving demand for sustainable alternatives.

Finally, some policies are aimed at **the whole value chain**. Extended Producer Responsibility ("EPR") schemes are pivotal in creating accountability within the entire value chain. The EU's EPR directive mandates member states to establish systems for collecting and reusing packaging materials, thereby fostering a circular economy. International pressure has been rising for countries to adopt sustainable practices consistent with global commitments such as the Global Plastics Treaty. Originally intended to be finalised by the end of 2024, the treaty negotiations were extended. However, the August 2025 round in Geneva ended without an agreement, marking yet another delay in securing a global, legally-binding framework. Singapore must continue demonstrating its commitment to environmental stewardship amid this impasse. Additionally, the development of sustainable finance taxonomies like the EU Taxonomy and Singapore-Asia Taxonomy provide the financial and regulatory frameworks needed to make the circular model economically viable and scalable.

A circular economy ecosystem should integrate the various business models across the value chain. Businesses with a circular supply model would fall in the upstream parts of the circular economy, seeking to replace traditional material inputs with recovered or bio-based materials. These recovered or bio-based materials can be sourced from businesses with a Resource Recovery Model ("RRM"), which divert waste from the downstream parts of the circular economy into secondary raw materials. The Product Life Extension ("PLE") and Sharing Models are targeted at the midstream of the circular economy, seeking to extend the lifespan of existing products and utilise existing products more efficiently. In tandem, these different business models can serve complementary functions and help to close the loop on the plastics circular economy.

15 Impact of China's National Sword Policy on waste import: A difference-in-differences approach - ScienceDirect

16 EUR-Lex - 02008L0098-20180705 - EN - EUR-Lex (europa.eu)

## 4. SPOTLIGHT ON SINGAPORE

### WHY SHOULD SINGAPORE CARE? WHY NOW?

Singapore produces the highest volume of plastic waste per capita in the Asia-Pacific region, but has seen recycling rates drop to an all-time low<sup>17</sup>. In 2023, plastic was the 4th largest waste stream in Singapore, generating approximately 957,000 tonnes, of which only 5% was recycled. These figures suggest more can be done to advance Singapore's Zero Waste Master Plan, particularly in the realm of plastic waste management. Here's why Singapore must pay closer attention and take action fast.

#### 1. THE OPTIONS ARE RUNNING OUT

Singapore has few viable pathways for managing plastic waste. Currently, 96% of plastic waste collected is incinerated in waste-to-energy ("WTE") facilities, with the residue sent to Semakau Landfill, which is projected to reach capacity by 2035. Incineration, while reducing landfill pressure, permanently destroys material value and contributes to emissions. It also makes innovations like compostable plastics impractical.

Exporting waste is no longer a dependable alternative. Regional regulations are tightening, with neighbouring countries increasingly rejecting plastic imports due to contamination and environmental concerns. Much of Singapore's exported plastic waste is not properly cleaned, partly due to high water and labour costs, rendering it unacceptable to foreign processors. Without reliable export destinations or space to scale up local recycling, Singapore's margin for inaction is shrinking.

#### 2. HIDDEN COSTS: EMISSIONS, HEALTH RISKS, AND LOST VALUE

The reliance on incineration masks serious unintended consequences. Burning plastic generates greenhouse gases, contributing to climate change. Moreover, the current commingled waste collection system results in approximately 40% of items in recycling bins being unrecyclable due to contamination. This represents not only a loss of potentially valuable resources but also raises concerns of the health and safety risks for workers tasked with manual sorting at Material Recovery Facilities ("MRFs").

Contaminated plastics often cannot be recovered, undermining the core principle of a circular economy. Because households do not separate recyclables at the source, the quality of feedstock remains too poor to justify investment in large-scale recycling facilities. The result is a system that's inefficient, carbon-intensive, and costly in the long term.

#### 3. EXISTING SYSTEMS AND POLICIES AREN'T WORKING AS INTENDED

Despite national campaigns to promote recycling, the reality is that current systems and infrastructure face continued challenges. The commingled collection method hampers effective recovery. Investments in MRFs cannot keep pace with the need for better sorting technologies or contamination control. Domestic recycling facilities are constrained by high land and labour costs, and the volume of clean, recyclable plastic available is insufficient to sustain them.

These systemic gaps point to a disconnect between policy ambition and practical outcomes. While Singapore's Zero Waste Masterplan outlines goals for a circular economy, the supporting ecosystem, collection systems, sorting infrastructure, and industrial processing capabilities, lags behind.

### SO WHAT ARE THE OPTIONS?

#### 1. DEVELOP A COHESIVE STRATEGY THROUGH STRONG COLLABORATION

Despite the challenges, Singapore has several advantages it can build on, namely a strong research and development ecosystem, a track record of pilot projects, and robust governance. In recent years, notable initiatives have demonstrated technical potential. These include:

- The NEWBitumen project (which incorporates recycled plastics into road construction);
- A chemical recycling facility on Pulau Bukom (converting hard-to-recycle plastics into chemical feedstock);
- The NewOil project (producing pyrolysis oil from plastic packaging waste).

<sup>17</sup> <https://www.statista.com/statistics/1361987/apac-plastic-waste-volume-percapita-by-country-subregion/> <https://www.eco-business.com/news/singapores-plastic-recycling-rate-drops-to-5-percent>

However, progress on these projects has stalled without a cohesive strategy. To move beyond isolated efforts, we recommend establishing a comprehensive framework that integrates current pilots with national recycling and waste-management goals. This framework would:

- **Enable structured collaboration** among government, industry, and consumers;
- **De-risk private capital expenditure** through targeted incentives and, where appropriate, public procurement;
- **Prioritise viable, scalable solutions** that deliver both economic and environmental value, backed by clear metrics and timelines

Without such strategic alignment, innovation risks remaining fragmented and its impact limited.

## 2. ADOPT A GLOBAL ORIENTATION TO SCALE CIRCULAR SOLUTIONS

Singapore should approach plastics recycling as part of a global system, not only a domestic issue. A global orientation is critical because it:

- Enables adoption of international best practices, drawing on proven case studies and regulatory models tested abroad; and
- Aligns Singapore with emerging frameworks, notably the Global Plastics Treaty, which will shape rules and incentives for plastics trade and recycling.

Taken together, this stance strengthens Singapore's role as a regional trade and finance hub, helping catalyse critical mass and attract investment in circular solutions. Harmonisation with global standards will also enhance investor confidence and improve the export viability of recycled materials and products.

## 3. STRIKE A BALANCE BETWEEN ECONOMICS, ENVIRONMENT AND CONSUMER BEHAVIOUR

The transition to a circular economy for plastics requires a delicate balance:

**Economic Viability:** Recycling, especially in Singapore's context of high land and labour costs, must achieve scale in order to make financial sense. Both mechanical and chemical recycling methods have strengths and trade-offs. Mechanical recycling works well with clean materials but also requires infrastructure;

**Environmental Sustainability:** Incineration, while effective at reducing waste volume, generates greenhouse gas emissions. Meanwhile, chemical recycling technologies offer potential but are energy-intensive and still evolving;

**Consumer Behaviour:** The current commingled waste collection system leads to high contamination levels. Without household-level sorting, the quality of recyclable feedstock remains too poor to support industrial-scale recycling. Changing consumer practices is therefore essential to improving both the quality and quantity of recyclables.

## 4. BUSINESS INNOVATION IN RECYCLING AND UPCYCLING

Despite structural limitations, innovative business models are emerging. Local enterprises like Sungai Design and Plana are already creating high-value upcycled products, including furniture and construction materials, from plastic waste. These ventures show how businesses can capture material value from waste streams, create economic incentives for better waste sorting, and raise public awareness of circular principles through design and application.

In parallel, chemical recycling innovations are being explored to overcome limitations of mechanical recycling, specifically the issue of contaminated or low-grade plastics that are currently unrecoverable. These techniques aim to break plastics down at the molecular level, potentially regenerating them into high-quality feedstock.

However, for such innovations to scale, supportive policies, infrastructure, and funding mechanisms are essential. Singapore's governance, R&D capacity, and skilled workforce provide fertile ground what's urgently needed is coordinated support to translate innovation into impact.

The following business case studies from European Chamber of Commerce ("EuroCham") Singapore members and other key players demonstrate that innovative techniques have been trialled with varying degrees of success across different regions and contexts, and with the right government and multi-stakeholder support, there is significant potential to bring these innovations to scale.

## BUSINESS CASE STUDIES

### ChemCycling® by BASF



ChemCycling® is the name of a chemical recycling project launched by BASF with the aim to manufacture high-performance products from chemically recycled plastic waste on an industrial scale. In chemical recycling, the polymer chains of the plastics are chemically broken down into basic building blocks that can be used as raw materials by the chemical industry (e.g. syngas, pyrolysis oil, monomers), which can then be used to make products with the same quality as those made from fossil resources. This means they can, for example, be used for medical applications or applications with food contact.

BASF cooperates with technology partners who use a thermochemical process called pyrolysis to transform plastic waste into secondary raw material (pyrolysis oil). We can feed this oil into BASF's production network (Verbund) at the beginning of the value chain, thereby saving fossil resources. The share of recycled material is allocated to products manufactured in the Verbund by using a third-party audited mass balance approach. The products which carry the name suffix "Cycled®" have the exact same properties as those manufactured from fossil feedstock. Customers can therefore further process them in the same way as conventionally manufactured products and use them in demanding applications.

BASF is developing chemical recycling for use on industrial scale as it enables us to:

- Recycle plastic waste for which no other recycling processes are applicable
- Recycle plastic waste into new materials which meet highest quality standards and are used, e.g. in food and medical packaging, safety-relevant automotive parts or electronics
- Support our customers in achieving their recycling targets
- Turn plastic waste into feedstock for the chemical industry and thus contribute to a circular economy
- Replace fossil resources and save CO<sub>2</sub> emissions against conventional plastics production

Overall, chemical recycling can take different plastic waste streams as its input material than mechanical recycling and is therefore a useful complementary process for plastic waste that cannot be recycled mechanically for technological, economic, or ecological reasons.

### foodpanda's "Choose to Reuse"



foodpanda's "Choose to Reuse" initiative in Hong Kong exemplifies how industry-led efforts can successfully contribute to sustainable practices in the takeaway food sector. As a leading player in Hong Kong's food takeaway market with a significant market share of 64% as of Q2 2022, foodpanda launched the "Choose to Reuse" programme, as part of its commitment to combat plastic pollution. This initiative offers a closed-loop takeaway experience, allowing customers to opt for reusable containers instead of single-use plastic packaging. foodpanda acts as the main operator, coordinating the roles and operations of various partner organisations, including cleaning and transportation companies, and collaborating with real estate developers to establish recycling facility sites.

The success of this initiative can be attributed to several key factors. Firstly, it directly addresses Hong Kong's pressing plastic pollution crisis by providing an alternative to single-use plastics. As a major player in the market, foodpanda's commitment to sustainability sets a precedent for other businesses in the industry, influencing consumer behaviour towards more sustainable choices. Additionally, foodpanda has showcased its dedication to this initiative by joining the "Plastic ACTION" led by the World Wide Fund for Nature-Hong Kong (WWF-Hong Kong). This pledge not only reinforces its commitment but also aligns the company with broader environmental goals. This initiative is further supported by stringent government regulations; Hong Kong's catering plastic ban imposes a tight timeline for compliance, restricting the use of oxo-degradable plastics and biodegradable alternatives commonly used in disposable tableware. This regulatory pressure creates a higher demand for reusable solutions and encourages businesses like foodpanda to adapt quickly.

Government support has also played a crucial role in the programme's success. Funding from the Environment and Conservation Fund Committee ("ECFC") of the HKSAR Government has provided significant financial backing for waste reduction projects, amounting to HK\$2,995,704 (approximately S\$488,000<sup>18</sup>). Such financial support underscores the importance of government involvement in facilitating sustainable practices. Moreover, foodpanda incentivises customers who choose reusable containers through food vouchers, discount coupons, and 'Carbon Wallet' points, encouraging participation in the programme and fostering a culture of sustainability among consumers. By making it easier and more appealing for customers to opt for reusable options, foodpanda effectively promotes environmentally responsible behaviour.

Therefore, the success of foodpanda's "Choose to Reuse" initiative offers valuable insights that could be adapted to Singapore's unique context. Similar to foodpanda's role in Hong Kong, Singapore's leading food delivery platforms could adopt reusable packaging initiatives that align with national sustainability goals. A coordinated effort among major players could create a significant impact on reducing single-use plastics. Government incentives for businesses that adopt sustainable practices would also further encourage participation and investment in this area.

### Innovation at Play: The LEGO Group's Push for Sustainable Materials



The LEGO Group demonstrates how innovation drives progress toward sustainable plastics. By 2032, the company aims to make its products from more sustainable materials, and has already tested more than 600 options across a wide range of methods and technologies, including advanced recycling. Since 2024, the LEGO Group has been producing transparent elements such as lightsabres, windscreens, and windows using advanced recycled artificial marble (arMABS). This material harnesses depolymerisation technology, a specific type of advanced recycling that produces segregated feedstocks. Today, more than 900 different arMABS elements, each containing 20% recycled material sourced from artificial marble commonly used in kitchen worktops, feature in over 85% of LEGO® sets. The feedstock is supplied from South Korea, showcasing some of the cutting-edge technologies emerging across the APAC region.

The LEGO Group has also explored other promising materials, such as an rPET prototype made from recycled plastic bottles. After two years of testing, the company decided not to pursue rPET further, as it would not have delivered carbon reduction benefits or met the company's high quality and durability standards. Crucially, the lessons learned from this experience are being applied to future material innovations. Through these efforts, the LEGO Group continues to push the boundaries of material science, underscoring the role of innovation in building a more sustainable future for plastics.

### Veolia's Plastiloop Indonesia



Veolia's Plastiloop Indonesia offers an innovative approach to plastic recycling that effectively integrates informal waste collectors into a sustainability supply chain for its state-of-the-art PET recycling plant in Pasuruan. By partnering with informal sector waste collectors through structured programs that provide training, facility improvements and enhanced local credibility, Veolia was able to create a network of identified potential suppliers to source domestic post-consumer recycled PET bottle feedstock. This helps to provide for the 25,000-ton annual capacity for its PET recycling plant to produce food-grade rPET pellets. Veolia implemented a blockchain-based traceability solution that tracks material flows and social/environmental impacts. Using this approach, savings of 70-95% in GHG emissions compared with virgin plastics can be achieved, while also generating social impacts with local communities.

Veolia's case study demonstrates the benefits when ecosystem effects are leveraged upon, and building relationships of trust and mutual benefit with local communities and stakeholders. At the same time, regulatory and economic barriers still remain, as the absence of strong government regulations and incentives has made it difficult to encourage FMCGs to move away from low-price virgin plastics, or to prioritise traceability and sustainability in their plastic supply chains.

## Standards promoting circular economy models by BSI



The British Standards Institution (BSI) has been shaping standards that are globally recognised with the aim to promote sustainability and circular economy.

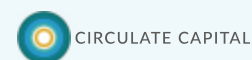
In 2017 BS 8001 was launched, introducing the world's first framework for the implementation of circular economy principles. The standard provides guidance for transitioning from linear to circular models, focusing on resource efficiency, waste reduction, and sustainable business practices.

BS ISO 59000 followed in mid-2024. This UK-specific version of the international equivalent offers a comprehensive, globally applicable, and certifiable framework to help organisations transition to a circular economy and provides guidance for redesigning business models, products, and processes to improve resource efficiency and regenerate products at the end of their life. This series of standards has also been implemented in Singapore under SS ISO 59000.

In January 2025, the sector-specific BS 8887-221:2024 was introduced. This standard, developed specifically for the lighting industry, provides guidance on remanufacturing luminaires and lighting equipment, with particular focus on the extension of product lifecycles, reduction of waste, and promotion of circular economy practices. It includes detailed guidelines for inspection, testing, and end-of-life processing.

Through these standards, BSI is facilitating the adoption of circular economy practices across various industries, promoting sustainability and resource efficiency.

## Circulate Capital's Reports



Circulate Capital is a Singapore-based investment management firm dedicated to financing innovation and infrastructure to prevent the flow of plastic waste into the world's oceans while advancing the circular economy. Through strategic financial backing, Circulate Capital empowers the development and scaling of sustainable solutions across the plastics value chain, fostering enhanced recycling and waste management practices. Their impactful investments in companies like Lucro, Nepra, Srichakra, and Recykal in India exemplify this commitment. These partnerships have significantly bolstered India's capacity to collect and sort over 188,000 tonnes of waste annually and upcycle approximately 67,000 tonnes of plastic into valuable end-products. Notably, these investments have facilitated the expansion of post-consumer flexible plastic recycling, introduced food-grade rPET materials, and strengthened infrastructure for traceability and responsible waste management.

The tangible outcomes of Circulate Capital's efforts are substantial, with over 100,000 tonnes of plastic waste kept in circulation and nearly 160,000 tonnes of greenhouse gas emissions avoided or reduced in 2023. This underscores the significant environmental and economic advantages of adopting a circular economy. In one of its notable cases, its investments into India's homegrown manufacturer Lucro helped guide it to open 16 new collection centres for high-quality, traceable feedstock and generating numerous offtake agreements with global brands. Since Circulate Capital's initial investment, Lucro has expanded its recycling capacity 30 times, generating five times the revenue and becoming the largest supplier of post-consumer recycled plastics in the market. These efforts help underscore the pivotal role that early adopters and investors can play in scaling up solutions for the private sector.

To fully leverage this potential and establish itself as a leader in the circular economy, Singapore should strategically invest in and aggressively accelerate its transition through robust collaboration between industry and governmental bodies.

## WHERE GOVERNMENT AND BUSINESS CAN COME TOGETHER IN SINGAPORE

Across all the above case studies, it is clear that technical innovation must be embedded within a supportive ecosystem. Whether it's advanced recycling (BASF, The LEGO Group), digital traceability (Veolia), or reusable container logistics (foodpanda), success depends not just on technology, but also:

- Regulatory frameworks that support adoption (e.g. Hong Kong's plastic ban accelerated foodpanda's initiative);
- Access to capital and financing mechanisms (e.g. Circulate Capital's investments enabled expansion in India);
- Multi-stakeholder engagement, including governments, communities, and supply chain actors.

For Singapore's context, its size and scale necessitate strong, intentional partnerships with all sectors of society in order to make a meaningful impact on managing plastic waste. In bringing out the 'economy' in the circular economy, there is significant potential for the government and businesses in Singapore to co-develop solutions, co-invest in infrastructure, and co-deliver results. The following areas show where and how this collaboration can take shape, drawing on insights from various case studies and experiences.

### 1. POLICY AND REGULATORY ALIGNMENT: CO-DESIGNING THE CIRCULAR ECONOMY ROADMAP

EuroCham recommends that Singapore adopt a unified, nationwide roadmap for circular plastics, co-developed by government and business. This roadmap should not only coordinate existing pilot efforts like chemical recycling or the NEWBitumen asphalt-plastics blend but also attract multinationals and SME startups to invest in scaling up circular solutions here.

To enable this, three key pillars must be pursued together:

#### I. Co-Created Action Plan

EuroCham recommends positioning Singapore as APAC's testbed and scale-up hub for circular plastics. BASF's ChemCycling, which integrates advanced recycling into global supply chains, illustrates the kind of end-to-end, standards-aligned model Singapore can enable. To move technologies from lab to market, the national plan should set clear R&D, infrastructure, and investment milestones, with policymakers acting as ecosystem enablers and businesses supplying technology and operating capacity.

A tracking and reporting framework should also be developed to measure progress on circular economy goals. This could come in the form of a National Circularity Index, and the provision of company-level ESG disclosure templates for plastic footprint and circularity performance. This Action Plan should also be aligned with Singapore's Zero Waste Master Plan, quantify progress made on targets to improve the overall recycling rate to 70% and reducing the waste sent to landfill by 30% by 2030.



## II. Business-Aligned Extended Producer Responsibility (“EPR”)

For any roadmap to succeed, EPR should be designed collaboratively, not imposed. Companies should have the opportunity to innovate and determine what works best. Case studies of successful EPR show the emergence of flourishing Producer Responsibility Organisations (“PROs”), given the impetus to develop new EPR initiatives and solutions through iterative innovation. EPR schemes should:

- Offer modulated compliance costs based on recyclability;
- Reward investment in reuse or take-back systems;
- Align with Singapore’s strategic sectors, like packaging, logistics, and food services.

Singapore’s plans to introduce a Beverage Container Return Scheme (“BCRS”) in 2026 incorporates an EPR-aligned approach, and represents a key step forward in building a circular economy. To ensure the successful implementation of this scheme, industry support is essential in areas such as education, traceability, eco-modulation and packaging innovation.

## III. Global Regulatory Harmonisation

To compete globally, Singapore’s regulatory framework should be compatible with international standards, from the Global Plastics Treaty to ISO 59000 (already adopted domestically as SS ISO 59000). The experience of Circulate Capital, investing in Indian firms such as Lucro and Srichakra, shows that alignment with global metrics helps attract finance and buyers. For Singapore, harmonisation will:

- Increase investor confidence;
- Enable cross-border trade in recycled materials;
- Facilitate multinational participation in Singapore-based circular economy initiatives.

Together, this tripartite approach—roadmap, EPR, and harmonisation—provides the certainty, scale, and strategic intent needed for businesses to commit to long-term circular models.

## 2. SCALING INFRASTRUCTURE THROUGH PUBLIC-PRIVATE INVESTMENTS

One of the largest barriers to a circular economy in Singapore is the lack of scalable infrastructure for collection, sorting, and recycling of plastics, especially hard-to-recycle and contaminated waste. However, with the right public-private investment model, Singapore can reinforce its efforts to support a circular plastics economy.

### I. Co-Funding Circular Infrastructure

The case of Veolia’s Plastiloop PET facility in Indonesia is instructive. By partnering with informal waste collectors and implementing traceability tools, Veolia built a 25,000-tonne/year food-grade rPET plant. Crucially, this was made possible through shared investment in local supply chains and technology. In Singapore, this could look like:

- Co-investing in semi-automated Material Recovery Facilities (“MRFs”);
- Funding shared pre-processing hubs for SMEs;
- Supporting advanced techniques such as pyrolysis and gasification for low-value plastics.

### II. Risk Sharing and Market Signalling

Businesses need predictable demand and returns on their investments to justify capital-intensive investments. foodpanda’s reuse initiative in Hong Kong, backed by government grants and regulatory signals, successfully aligned private innovation with public interest. For Singapore, this could mean:

- Providing matching funds for pilot-to-scale projects;
- Enabling offtake agreements or public procurement guarantees for recycled content;
- Streamlining regulatory approvals for circular economy tech and services.

Public-private collaboration offers a way to de-risk innovation and crowd-in private capital, while delivering long-term social and environmental returns.

### 3. MOBILISING CONSUMER AND WORKER PARTICIPATION THROUGH JOINT EDUCATIONAL EFFORTS

The success of circular economy initiatives, as well as schemes such as BCRS, ultimately depends on public participation. In Singapore, commingled waste systems lead to 40% contamination, undermining downstream recycling. Yet consumers are willing to change if given the tools and incentives.

foodpanda's "Choose to Reuse" programme provides a strong example. By offering vouchers and rewards for reusable container use, and integrating messaging across its platform, the company helped shift behaviour, even under regulatory pressure.

Beyond consumer awareness, education efforts must also extend into the workforce. The potential job creation opportunities from a circular economy must be met by a pipeline of workers with the requisite skills to take on those jobs. Specialised skills must be inculcated in areas such as recycling tech specialists, circular design engineers, material recovery technicians, and community educators.

Government and business in Singapore could jointly:

- Launch co-branded public education campaigns via major retailers, delivery platforms, and fast-moving consumer goods ("FMCGs");
- Offer nationwide incentive schemes tied to correct recycling behaviour;
- Equip households and estates with simple tools to improve source separation;
- Develop upskilling and retraining programmes to build workforce readiness for a circular economy in partnership with National Trades Union Congress ("NTUC").

Such campaigns would multiply reach and trust, especially if businesses deliver the message while the government backs it with skills, infrastructure, and policy.

Government Role	Business Role
Develop national circular roadmap	Align innovation and investment with roadmap
Co-invest in critical infrastructure	Deploy and scale up recycling technologies
Design EPR and incentives collaboratively	Develop recyclable, reusable products
Align with global standards	Ensure compliance and traceability
Lead public campaigns and education	Use customer platforms to change behaviour

## 5. CALL TO ACTION

Singapore stands at a critical juncture. As global waste export routes narrow and our domestic landfill space rapidly declines, the urgency to redesign how we manage plastic waste has never been greater. While industry-led innovations and pilot projects have shown promise, they remain fragmented and insufficiently scaled. Immediate action is required to create a comprehensive, unified approach that puts the "economy" back in the circular economy, in this case, unlocking the economic value of plastics circularity in the form of new industries, new technologies, and even new jobs.

This will include capitalising on Singapore's regional leadership position, advancements in technology, and, crucially, business ingenuity and innovation. Today's constraints can turn into tomorrow's competitive advantage in paving the way to a cleaner, prosperous future.

To conclude, integrating circular principles into plastic waste management can capture economic value and business opportunities. Singapore's current linear model of take-make-waste is less than ideal, negatively impacts environmental health, and is becoming one of the most pressing environmental challenges.

We must take immediate action through a comprehensive, balanced approach underpinned by stricter regulations and policies that encourage collaboration. This approach should be set out in a long-term roadmap that defines the foundations and objectives of a plastics circular economy. It should capitalise on Singapore's regional position, technological advances, and mature business partners. With the involvement of policymakers and business leaders, we can overcome challenges such as insufficient infrastructure, capital investment needs, and partnership development.



Success requires government, corporates, and financial institutions to co-invest in the critical infrastructure needed to scale circular-economy solutions and make them viable economic propositions. Existing policies, such as the EPR, must be expanded to generate the spillover effects necessary for a thriving circular-economy ecosystem. Finally, education efforts must continue apace to inculcate the right practices among producers, consumers, and citizens.

A coordinated effort, with strong commitment and conviction, will allow us to transform plastic waste management and pave the way to a cleaner, circular future.

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