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Circular Economy in Singapore

Policy Brief

EXECUTIVE SUMMARY

Singapore has embraced the need for strong policy measures that will allow for sustainable growth and resilience to climate change. Recognizing the opportunity to examine closely the progress of Circular Economy adaptation within a nation with strong policy, this report seeks to explore the gaps and opportunities in advancing Circular Economy principles within the Singapore framework.

The European Union's approach to Circular Economy is evident both in the regulatory framework as well as the principles that underlie this regulatory framework. The underlying principles include:

- **Clear prioritization of waste management initiatives as evidenced by the waste hierarchy**, which allows for the emphasis on treatments that are higher up on the hierarchy. For e.g. supporting recycling over waste to energy.
- **The setting of measurable targets**, which allows each of Member States to develop plans to reach the required target rates such as recycling or recovery and explore the appropriate instruments (Extended Producer Responsibility, 'EPR', packaging fees, etc.) which will allow them to achieve the targets.
- **Development of focused and customized approaches for each object of circularity**, which allows for a more customized effort depending on the material and its circularity potential, for e.g. organic waste, waste, and electrical equipment (Waste Electronic and Electrical Equipment/ e-waste), packaging, single-use plastics.

In the context of circular economy, the regulatory framework retains the twin goals of ensuring that targeted businesses remain competitive and consumers are not inconvenienced. The EU legal framework consists of several Directives, which are binding for the 27 EU member states and need to be transposed into national laws and regulations. They include in particular the EU Waste Framework Directive, the EU Directive on Packaging and Packaging Waste, the EU Directive on the reduction of the impact of certain plastic products on the environment, the EU Directive on waste electrical and electronic equipment, and the EU Directive on the landfill of waste. Concerning plastic waste, the European Strategy for Plastics in a Circular Economy of 2018 has provided the policy orientation during the last two years. Amongst others, it sets the goal that by 2030 all plastic packaging placed on the European market is either reusable or recyclable in economic terms.

The most recent additions to the EU framework are (i) The Circular Economy Action Plan (as part of the EU Green Deal) which prioritizes a more legislated (rather than voluntary) approach towards product policies across the entire life cycle (not limited to energy consumption or sustainable sourcing) and (ii) The New Industrial Strategy for the EU which is intended to ensure the competitiveness of industry while becoming greener, more circular and more digital. The scrutiny on certain sectors is emphasized, along with a more harmonized approach to waste reduction (with a target to reduce residual or non-recyclable waste by 50%). This plan also recognizes the need for a market for secondary raw materials (ensuring offtake of recycled materials) as well as improving the state of local recycling efforts and reducing reliance on exports.

A review of the EU framework provides an expansive set of best practices, highlights potential challenges, and helps identify critical instruments that could help achieve circularity goals. Furthermore, it provides a rich discussion ground for policy forward economies such as Singapore that have made forays into the field of circularity more recently. Singapore's policy frameworks are driven by an obvious emphasis on an **integrated planning** approach as engaging in **dynamic urban governance** i.e. engaging extensively with the public, industry, and other stakeholders. Also important to the Singapore policy framework is aligned with its focus on **resilience**. The Climate Change Action Plan

and the more recent Zero Waste Master Plan lay the foundations for increasing circularity in Singapore. The Zero Waste Master Plan spells out specific targets such as a 30% reduction in waste to landfill by 2035 and a 70% overall recycling rate (81% non-domestic recycling rate and a 30% domestic recycling rate). The key drivers for action in the Zero Waste Master Plan are identified as follows:

- **Firstly, pushing boundaries through Research and Infrastructure,**
- **Secondly, transforming the environmental services industry,**
- **Lastly, co-creating solutions with the community.**

The Resource Sustainability Act 2019 provides legislative support to the Zero Waste Master Plan, mandating specific reduction and reporting requirements for e-waste, food waste and packaging waste. The Resource Sustainability Act introduces EPR for e-waste and packaging waste, which is a big step in terms of reorganizing financing and organizing of collection, sorting and recycling of waste.

Singapore's waste management is marked by some really noteworthy accomplishments as well some challenges - the recycling rates for construction waste as well as ferrous and non-ferrous metals are extremely high (99% and 81% respectively), however the recycling of other materials such as glass, paper, fabrics and plastics is considerably low. The low levels of household recycling (17%) and the particularly low plastics recovery (4%) rate has been recognized as an area of concern and has prompted some initiatives to address the situation. These include introducing a state-of-the-art integrated waste management facility (IWWMF) intended to extract recyclables as well as awareness-building efforts such as the Recycle Right Campaign. Other examples of exploring innovative technologies include the repurposing of incinerator ash into construction material, repurposing plastic waste into oil (chemical recycling into NEWoil) and piloting a Pneumatic Waste Collection System to extract recyclables from households etc. These **technology centred efforts** are supported by **community and industry-focused efforts** such as the RecycleRight campaign to build awareness, the INCUBATE program to support SMEs in the recycling sector, plastic bag fee pilots to explore consumer behaviour, as well as **research-based efforts**.

Singapore is in the process of significantly **improving its infrastructure** with state of the art waste processing facilities which are diverse in nature covering: waste to energy, recyclables segregation and plastics processing as well as biological treatment. Each of these efforts reflects a carefully considered approach to identifying innovative solutions to waste. In addition, in line with its multi-stakeholder approach to urban governance, the Singapore government is **fostering industry growth**, including, partnerships such as: those of Alba and Wah Hua to improve waste management efforts in the Jurong urban region¹; SME development through its INCUBATE program: government-industry partnership as the reverse vending machines pilot with the company F&N Foods² Singapore; as well as government to government initiatives with the Sino-Singapore Tianjin Eco-City project. Each of these efforts is a step towards more efficient resource management and ultimately will have an impact on Singapore's sustainability and circularity goals.

Singapore has **a unique leading position within the ASEAN** region that cannot be ignored when it comes to implementing the Circular Economy. Much like in Europe, certain countries in ASEAN are leading the way (including Singapore) and all benefit from one another by learning from their respective strengths and weaknesses. Like with many other schemes, it is likely that policies implemented in Singapore with regards to the Circular Economy will be replicated in other ASEAN countries and a good example of this is the Singapore Green Label or the Singapore Green Mark Scheme considered as raw models and benchmarks in the region.

¹ The ALBA Group, is a recycling and environmental services companies, which was awarded the contract by the Republic of Singapore to set up a completely new waste management system in the Jurong urban region of over half a million people, to be served by a digitalised system meeting high environmental standards and providing capacity to collect around 17,000 tonnes of waste a year. Wah & Hua Pte Ltd (WH) is a Singapore waste management provider, which is providing collection, recycling, processes and disposal services and technologically-driven energy generation across the island. Source : <https://www.alba-wh.sg/#about>

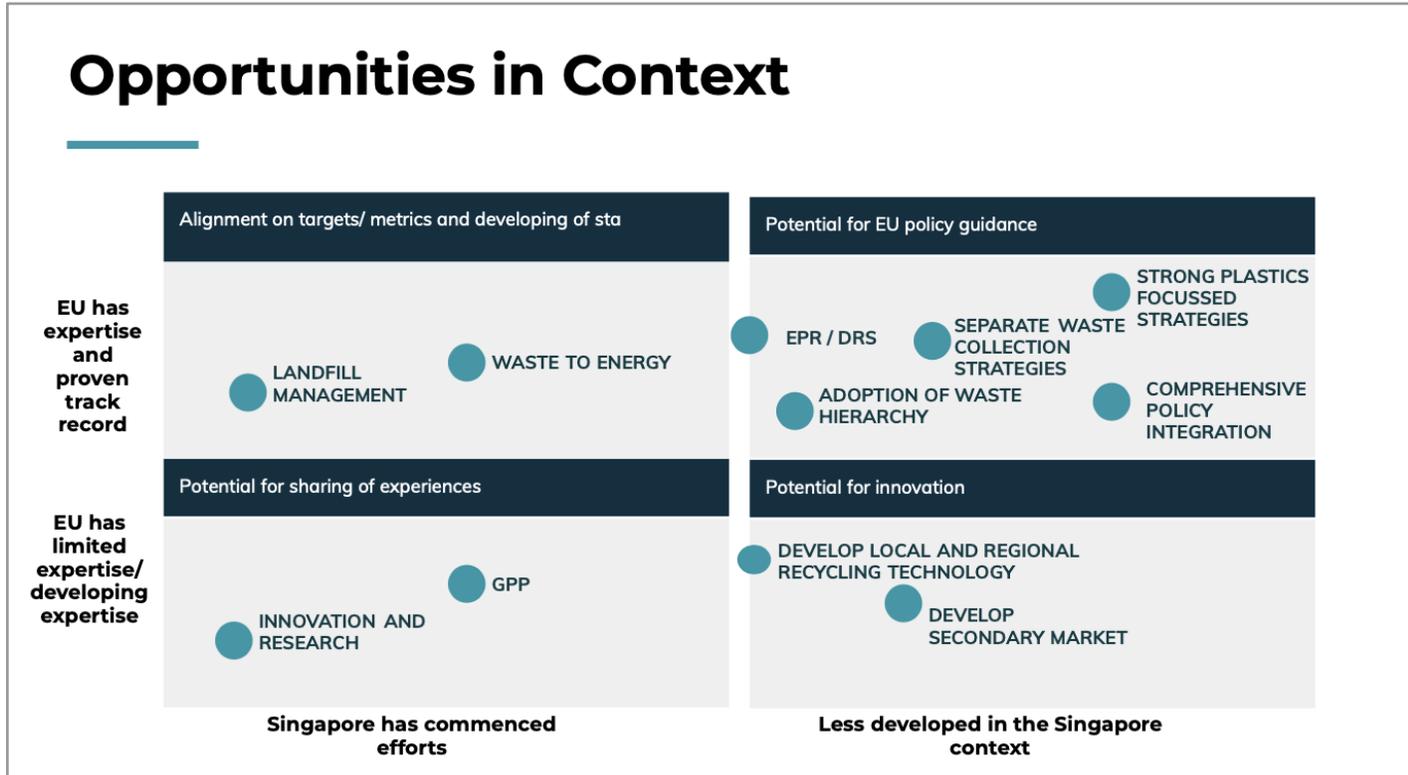
² <https://www.fnnfoods.com/>

Viewing Singapore’s efforts within a comparative framework across some of the more significant features of the EU Circular Economy framework reveals both the similarities and contrasts between the two approaches and also brings to light some of the opportunities for bilateral collaboration. This report highlights the avenues that are most promising for EU-Singapore Collaboration, which are summarised in the following table.

OPPORTUNITIES FOR EU -SINGAPORE COLLABORATIONS	
Policy Integration	Singapore could consider embracing a more comprehensive approach to the Circular Economy by enhancing its Zero Waste Master Plan while also benefiting from the refinements introduced by the EU. The shared goals of resource efficiency and climate resilience would also further the dialogue between the EU and Singapore.
Waste Hierarchy	Singapore could consider re-examining the waste hierarchy and identifying examples and opportunities from the EU to introduce greater emphasis and interventions at the reducing, reuse and recycling stages. Recognising the shared challenges of offshore recycling, both the EU and Singapore are in a good position to identify regional collaborations that are well supported and less vulnerable to political and business risks. Opportunities to explore innovative recycling infrastructure is another area of collaboration.
Plastics Focussed Strategies	A strong plastics focus could be considered with the possibility of drawing from the EU Directives, and adapting as necessary these to the Singapore context, by prioritizing more challenging aspects. These could include: progressively reducing single-use plastics production and consumption, reducing packaging waste, and increasing the recovery of packaging and other plastics. Using the EU approaches of quantifying and identifying the most challenging types/ forms of plastics would be beneficial to Singapore. For example, the EU Directive 2019/904 introduces a mix of measures that are tailored to certain plastic products (cutlery, plates, straws, cotton bud sticks, beverage stirrers, etc.) and includes an EU-wide ban on single-use plastic products whenever alternatives are available (effective 2021).
Economic opportunity	Given the focus on economic independence and maintaining its status as an attractive base for businesses, identifying economic and business opportunities through circularity would be paramount in the Singapore context. Studies and findings that substantiate this effect from the EU could be very useful.
Circular Economy in Design, Waste Management & Recycling	The EU and Singapore could collaborate in establishing and improving the collection of recyclables and to identify opportunities for recycling both locally and regionally. While the EU has considerable expertise with separate waste collection for recycling, many Member States may find themselves in a situation not too different from Singapore when looking for local recycling infrastructure and technology as well as regional offshoring potential. Therefore learning from this process would also benefit the EU.
Extended Producer Responsibility	The EU could collaborate with Singapore in sharing its EPR expertise and experiences. The varied use of EPR and other strategies to address plastics and packaging waste in the EU offer not only different approaches to enforcing these regulations but also the challenges to be anticipated and avoided. For example, Singapore’s EPR regulation with respect to e-waste has already established the requirements of the PRO.
Green Public Procurement	Even as the EU advances its efforts in establishing markets for secondary raw materials (or recycled materials) and adds greater emphasis to the offtake of green goods through mandatory green procurement targets, Singapore too, is on the cusp of expanding its green procurement policy. It is opportune timing to explore potential policy standards that could also be extended throughout the region.
Innovation and Research	Singapore has invested heavily in its research and development capabilities and has a strong preference for innovation. Sharing of research and collaborating on new research could be an important opportunity to liaise with the EU ³ .
Regulatory Frameworks	The advanced regulatory framework in Singapore allows for exploring potential adaptations of successful EU regulations paving the way for a more harmonized global policy framework.

³ In this regard, the research collaborative partnership between the French CEA and the NTU Singapore focussing on electronic waste and the Circular Economy, called ‘SCARCE’, could provide some useful lessons learned for future collaboration between Singapore and EU Member States

The opportunities discussed in the table above can be categorised based on the following approaches and what the priorities for each country are. The different approaches have been identified as **Policy Cooperation, Innovation & Collaboration, Standardisation, Sharing of Learnings**. Each of the opportunities/ policy instruments is then placed within this context and indicated in the figure below:



While each of the above policy measures is important in its own capacity, to manage the scope of the report we limit a more detailed exploration to EPR and Green Public Procurement (GPP). Both of these policy instruments have been prominent within the EU frameworks and have been carefully considered within Singapore as well.

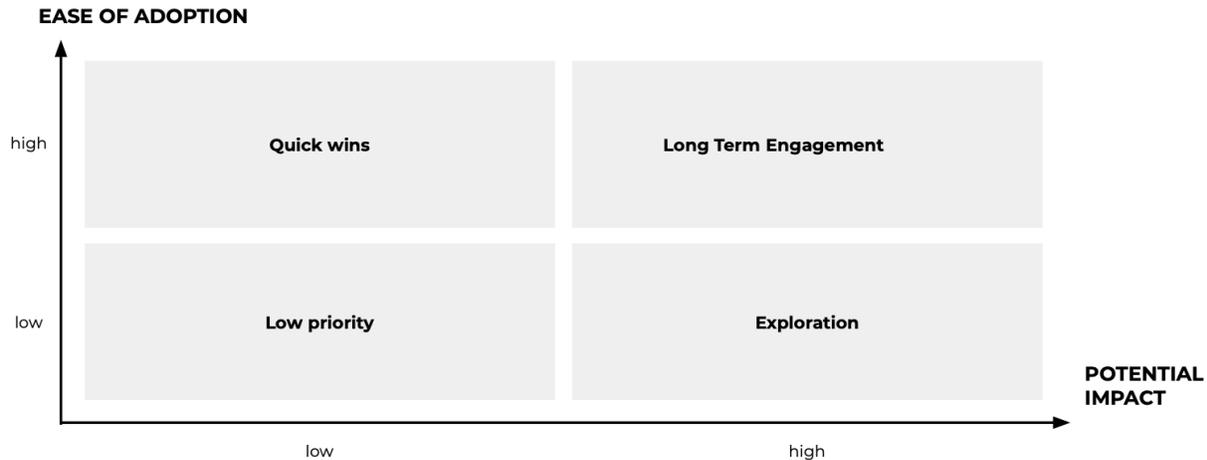
The report examines the opportunities for EU - Singapore engagement with respect to more detailed aspects of each of these instruments:

- EPR** - The EU approach to EPR is discussed keeping in mind the varied applications across Member States. The Singapore EPR policy specifically with respect to E-waste as well as the requirements with respect to packaging (mandatory reporting and Deposit Refund Scheme, ‘DRS’, systems) are discussed. Given the relatively nascent EPR policy application in other industries within Singapore, it could explore the EPR potential for other materials based on EU experiences. The EU has a long experience with DRS systems which could certainly be of use to Singapore’s implementation agenda. To the extent that there are innovative and industry-centric schemes that engage businesses in developing unique and novel approaches to address the issue of packaging design and recycling, Singapore could adapt these EU initiatives to its local context.
- GPP** - Singapore’s public purchasing power is very powerful yet currently unexploited with regards to GPP. Considering its extensive experience, the EU could contribute to policy formulations and customizing sector-specific purchasing solutions. Singapore’s GPP directives are predominantly targeting the country’s own labelling schemes. While it is a good effort to promote local initiatives this also restricts the choice of green

products and services. Exploring bilateral partnerships between Singapore Environmental labelling schemes and the EU Eco labels could be an avenue for GPP collaboration.

The report concludes with a framework to prioritize next steps with respect to Singapore-EU collaboration.

Prioritizing Action



QUICK WINS

Given the ease of adoption, these strategies will build trust and create a conducive environment for longer-term engagement. Examples include:

- Adoption of the Waste Hierarchy.
- Alignment on Landfill Management Principles. In Singapore, landfill solutions have become an urgent matter as its only offshore landfill is reaching saturation.
- Innovation and Research. Singapore is pushing for active research on circularity and welcomes foreign expertise. There is also significant funding available for research in Singapore.
- Adoption of GPP and strengthening of Eco Labels.
- Regulation to phase-out of certain single-use plastic products.

On this last point, based on the EU Single Use Plastics Directive (EU Directive 2019/904), Member States are required to have regulations in place that restricts the placing on the market of single-use plastic cutlery, plates, straws, beverage stirrers, styrofoam food, and beverage containers/cups, cotton bud sticks, sticks attached to balloons. EU Member states need to have regulations in place by July 2021. It remains to be seen how the market adapts, whether reusable alternatives or alternatives made of other materials will be available and the debate will focus on what is actually environmentally friendly and what is not. An exchange between Singapore and Europe exploring possibilities could be interesting.

LONG TERM ENGAGEMENTS

These strategies will lead to high levels of circularity and already have the required framework to adapt to the Singapore context.

- Segregated Waste Disposal and Collection.
- Adoption of EPR and DRS System.

LOW PRIORITY

These strategies are neither easy to adopt nor likely to have a great impact in terms of circularity for Singapore, given disparities when compared with the EU. Examples are:

- Alignment on production and source reduction standards (this would be very complex to implement in Singapore and it will take time to change the regulatory framework, furthermore Singapore is a very competitive economy so it is unlikely that the Government would put a break on the manufacturing sector easily especially for SMEs).
- Developing Secondary Market strategies. While these strategies are much needed, it would be best to strengthen existing frameworks before exploring secondary markets. Recycled content standards with a long implementation horizon could work, however Singapore would need to identify global sources for recycled feedstock, given the lack of a recycling industry. Secondary markets in the EU are still being developed and are not yet mature.
- Waste to Energy. This aspect is already well taken care of in Singapore and would be the least preferred option in terms of developing the Circular Economy.

EXPLORATION

These strategies may be harder to adopt/ implement but are likely to have great impact on circularity. They merit careful consideration. Developing longer term engagement with the EU will allow for continuous guidance and knowledge sharing. Examples include:

- Alignment on a comprehensive circular economy policy with deep focus on plastics.
- Local and Regional Recycling Opportunities.

Looking beyond Singapore, the context in **Europe and ASEAN are similar**, considering the great disparity between individual member countries on the adoption of Circular Economy principles. Singapore has a robust legal framework and is leading the way on certain circularity aspects such as research and construction waste recycling. However, other aspects and in particular plastic recycling are better reflected in other ASEAN countries, like Thailand. As in Europe there are a lot of opportunities to **learn from best practices at the regional and global level**. The Circular Economy journey has only just started in Asia and much still needs to be done to truly adhere to such a business model.

The timing for collaboration between the EU and Singapore could not be better as both geographies are in the process of increasing their efforts in waste prevention and management, and aiming for stronger circularity within their frameworks. This is well expressed in recent published reports in both geographies released at about the same time. There are clear synergies of objectives to achieve and many of the specific targets set out in these reports are well aligned; a promising sign that mutual collaborations could strengthen their individual programs.

IMPRINT

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The below organisations have contributed to our Circular Economy Questionnaire.

MSE: Ministry of Sustainability and the Environment

NEA: Singapore National Environment Agency

MFA: Norwegian Ministry of Foreign Affairs

EDB: Singapore Economic Development Board

JTC: Singapore Jurong Town Council

ZERO WASTE SG: Singapore non-profit organization

BASF: Chemical multinational company