



## Socio-economic profile

A city-state and island country located in maritime South-East Asia, covering a total surface area of 722.5 sq. km., Singapore is one of the most developed economies globally and one of the largest economies in South-East Asia.

Singapore's total population in 2018 reached 5.64 million, which is a 0.5% annual growth from the previous year. With 7,804 persons/sq.km., Singapore is one of the countries with the highest population density, and 100% of the population lives in urban areas. The country's Gross Domestic Product (GDP) at current market prices in 2018 reached Singaporean Dollar (S\$) 49.2 billion, with per capita GDP at S\$87,108. The percentage share of nominal GDP in 2018 was services sector (69.6%), manufacturing industry (26.7%), and 3.4% from the construction industry.<sup>i</sup>

## Coastal and marine ecosystem and economy

The main island of Singapore is about 49 km from east to west and 25 km from north to south with a coastline of 203 km. Among other islands, the larger ones are: Pulau Tekong (25.5 sq. km.), Pulau Ubin (10.2 sq. km.) and Sentosa (4.8 sq. km.). Singapore's coastline inhabitants are the entire population. The country includes of walls and stone embankments covering 70 to 80% of Singapore's coastline.

The rest are natural areas such as beaches and mangroves. The coral reefs of Singapore are located mainly in the islands south of Singapore, which still supports more than 250 species of hard corals from 55 genera, over 120 species of sponges, 120 species of reef fish and an undetermined number of gorgonians, nudibranchs and other invertebrates. There are a total of 12 species of seagrasses in Singapore, and their habitats can be found both on the northern and southern shores of the island. The largest patch of mangrove area in mainland Singapore found in Sungei Buloh Wetland Reserve covers an estimated total land area of 100 hectares.<sup>ii</sup>

In 2015, Singapore's coastal economy contributed 7% of the national GDP through shipping, port, and offshore and marine engineering sectors, and maritime services, and employs over 170,000 people.

Singapore's cruise industry alone directly contributed US\$515 million to the nation's economy in 2016.<sup>iii</sup>

As a low-lying island, Singapore is particularly susceptible to rising sea levels. Other threats to Singapore's coastal and marine environment include pressures exerted on the habitat from urbanization and human population growth.

The country may have lost almost 90% of its mangroves, over 40% of intertidal coral reefs and almost 38% of mudflats and sandflats in only the last 20 years.<sup>iv</sup> Despite having one of the most efficient waste management systems in the world, marine debris - largely plastics - pose a threat to the marine biodiversity in Singapore.

## Plastics and plastic packaging Production and usage

Singapore produces large amount of raw plastic polymers/resins and exports, it then imports plastic packaging and consumable plastics back into the country.<sup>v</sup> The plastics industry has grown alongside Singapore's economy. According to the Yearbook of Singapore Statistics 2019, there were 280 rubber and plastic manufacturing establishments in 2017 in the country.

The packaging industry in Singapore amounted to US\$42.5 billion in 2013. The packaging industry in Singapore is expected to grow with a compound annual growth rate (CAGR) of 4.2% between 2019-2024.<sup>vi</sup> In 2018, about one-third of domestic waste disposed of consisted of packaging waste, with approximately 55% of it as plastic packaging, 25% paper packaging, and the remaining 20% was made up of other types of packaging materials, such as metal and glass.<sup>vii</sup> Single use plastic consumption is high in Singapore. According to a study commissioned by the Singapore Environment Council (SEC) in 2018,<sup>viii</sup> Singapore uses about 1.76 billion plastic items each year. This figure translates to 820 million plastic bags from supermarkets (146 plastic bags per person and 13 plastic bags per day), 467 million PET bottles (1 to 3 PET bottles per person per week), and 473 million plastic disposable items and takeaway containers.

Table 1: International coastal clean-up efforts and marine litter items (number) found in Singapore\*

Country / location						People	KG	KM of coast	Total items collected
Singapore						3,580	13,730	32	171,464
Cigarette butts	Food wrappers (candy etc.)	Straws stirrers	Plastic forks Knives spoons	Plastic beverage bottles	Plastic bottle caps	Plastic grocery bags	Other plastic bags	Plastic lids	Plastic cups plates
24,687	9,509	11,453	1,692	139,296	6,374	3,302	8,082	1,625	4,670

## Solid waste management

In 2018, 7.70 million tonnes of solid waste was generated in Singapore. This amount is about 9,000 tonnes less than in 2017. However, the overall national recycling rate also decreased from 61% in 2017 to 60% in 2018. On the other hand, the domestic recycling rate increased from 21% in 2017 to 22% in 2018, while the non-domestic recycling rate decreased from 76% to 74% in 2018. In terms of plastic waste, in 2018, a total of 949,300 tonnes of plastic waste was generated, of which, 40,700 tonnes (4.3%) was recycled, the rest was disposed.

Public waste collectors (PWCs) are appointed through tender process by the National Environmental Authority (NEA) to provide waste and recyclables collection services for the respective sectors for seven to eight years. Currently, four PWCs operate in Singapore and serve in the six sectors. Collected recyclables are sorted and retrieved for processing to conserve resources. The remaining waste is collected and sent to waste-to-energy plants for incineration. Incineration reduces the waste by up to 90%, saving landfill space, and the heat is recovered to produce steam that propels turbine-generators to generate electricity, providing up to 3% of the island's electricity needs. The incineration ash and other non-incinerable wastes are then transported to the Tuas Marine Transfer Station (TMTS) from where they are barged to Semakau Landfill for final disposal.

The recycling of plastics in Singapore requires the collected plastics to be taken to material sorting facilities, where they are sorted mechanically, baled and sent to local recyclers or exported for recycling. Before China's 2018 Green Sword policy, Singapore used to export its recyclable plastic waste to China. In fact, 7.60% of the total plastic export from ASEAN to China was from Singapore.

## Marine litter status

In 2018, Our Singapore Reef<sup>ix</sup> removed 3,439 pieces of marine debris weighing around 704 kg from around Sisters' Island Marine Park and Lazarus Island. Plastic was the most common debris. The top three plastic items collected were bottles, food wrappers, and cutlery, followed by bottle caps, fishing lines and plastic bags. Increasing plastic waste is generated due to consumption and a culture of convenience for deliveries and take-out meals. Metal (15%) was the second-most common marine debris retrieved, followed by glass and ceramics at 5%, while the remainder included material such as wood, cloth and rubber. A similar result was observed in the International Coastal Clean-up activities. Table 1 below is the glimpse of marine plastic litter collected during coastal clean-ups.

## Action on marine plastic: Key stakeholders

### Government

The marine plastic litter issue is addressed by the Ministry of the Environment and Water Resources (MEWR) through the National Environment Agency (NEA). NEA is responsible for planning, developing and administering Singapore's solid (or general) and hazardous waste management systems. This includes licensing and regulatory functions to ensure that waste is properly collected, treated and disposed of. The Director of International Policy and Permanent Representative of Singapore to the United Nations Environment Programme, MEWR serves as the national focal point of the Coordinating Body on the Seas of East Asia (COBSEA).

### Private sector

The private sector is involved significantly in collection, transportation, recycling and disposal of municipal plastic waste in Singapore. There are many private sector associations in the plastic and packaging sector, including the Singapore Plastic Industry Association (SPIA), the Packaging Council of Singapore, and the Waste Management and Recycling Association of Singapore.

The NEA also works with partners from the People, Private and Public (3P) sectors on initiatives that contribute to reduce the generation of land-based solid waste, such as the Singapore Packaging Agreement (SPA).

NEA launched the first SPA on 5 June 2007, World Environment Day. SPA is a joint initiative (voluntary agreement) by government, industry and NGOs to reduce packaging waste, adopting cost effective solutions to reduce packaging waste. The SPA was signed by various parties including industry associations, individual companies, non-governmental organizations, the Waste Management and Recycling Association of Singapore, public waste collectors and NEA As of 17 July 2019, there are 239 signatories to the SPA, cumulatively 54,000 tonnes of packaging waste has been reduced saving S\$130 million over a 10-year period.<sup>xi</sup>

The SPA also announces annual award to recognize signatories who have made notable efforts and achievements in reducing packaging waste. Under the SPA, an eco-label, the LPRP is also administered. It is offered to winners of the SPA Awards (previously known as the 3R Packaging Awards) to print on products that have undergone improvements to reduce the amount of packaging materials used.

Consumers are encouraged to look out for the logo on consumer products and support these companies by opting to purchase products with reduced packaging. Similarly, the SPA has established packaging weight benchmarks ('Lightest', 'Median' and 'Heaviest') for the purpose of allowing companies to compare the weight of packaging of their products against that of similar products, and enable them to see the potential for improving their packaging design and use of materials. Equipped with this knowledge, businesses can then review their packaging designs, practices and/or processes to identify areas for improvement.

## Policy frameworks on MSW and marine litter

### Global frameworks on marine litter

#### International Convention for the Prevention of Pollution from Ships (MARPOL)

Singapore was one of the first countries in Asia to ratify all six Annexes of the International Maritime Organization's (IMO) MARPOL Convention 1997 (date of entry into force or succession from 27 August 1999). MARPOL is the key international agreement to prevent marine environment pollution caused by ships' operational and unintended activities. Annex V, enforced since 31 December 1988, specifically addresses the issue of plastic dumping from ships: 'The disposal into the sea of all plastics, including but not limited to synthetic ropes, synthetic fishing nets, plastic garbage bags and incinerator ashes from plastic products which may contain toxic or heavy metal residues, is prohibited'. Besides prohibition of plastic waste disposal, Regulation 3 number 2 of the Convention also calls for stricter regulations on mixed garbage discharge. As part of the MARPOL obligations, the Maritime and Port Authority (MPA) of Singapore deploys garbage collection craft daily at scheduled timings to collect garbage from ships at the anchorages.

#### Basel Convention on the Control of transboundary Movements of hazardous Wastes and their Disposal and the Ban Amendment

On 02 January 1996 Singapore acceded to the Basel Convention. The Basel Convention was designed to eliminate the risks from transboundary movements of hazardous and other wastes. In its initial version, the Convention covered several categories of waste, including wastes collected from households, but did not include the movement of solid plastic waste (including scrap plastic of non-halogenated polymers and co-polymers, cured waste resins or condensation products, and fluorinated polymer wastes) as listed in B3010 of Annex IX. In 1995, the Ban Amendment was adopted by the third meeting of the Conference of the Parties. Indonesia has not ratified the Basel Convention Ban Amendment on 24 October 2005.

### Regional frameworks on marine litter

Singapore as an ASEAN member State has welcomed the [Bangkok Declaration on Combating Marine Debris in the ASEAN Region](#) and the [Framework of Action on Marine Debris](#) in 2019.

#### The ASEAN Framework of Action on Marine Debris

The Framework was developed to act on the recommendations from the ASEAN Conference on Reducing Marine Debris in ASEAN Region in Phuket in November 2017, taking into account the East Asia Summit (EAS) Conference on Combating Marine Plastic Debris in Bali in September 2017. The Framework comprises four (4) priority areas namely: (i) Policy Support and Planning; (ii) Research, Innovation, and Capacity Building; (iii) Public Awareness, Education, and Outreach; and (iv) Private Sector Engagement.

Each priority area consists of actions and suggested activities for further collaboration in ASEAN region and among ASEAN and its partners in combating marine debris.

#### Bangkok Declaration on Combating marine debris in ASEAN region

ASEAN ratified the Bangkok Declaration on Combating Marine Debris and the ASEAN Framework of Action on Marine Debris at the 34th ASEAN Summit in Bangkok, Thailand on 22 June 2019.

#### The Coordinating Body on the Seas of East Asia (COBSEA) Regional Action Plan on Marine Litter

COBSEA brings together nine countries - Cambodia, People's Republic of China, Indonesia, Republic of Korea, Malaysia, the Philippines, Thailand, Singapore and Viet Nam - in development and protection of the marine environment and coastal areas of the region, for the health and wellbeing of present and future generations. At the 24th Intergovernmental Meeting of the Coordinating Body on the Seas of East Asia (COBSEA) in June 2019, participating countries adopted the revised Regional Action Plan on Marine Litter to guide action on marine litter in the East Asian Seas region. The Regional Action Plan on Marine Litter will thereby directly support COBSEA participating countries to deliver target 14.1 of Sustainable Development Goal 14, to prevent and significantly reduce marine pollution of all kinds, particularly from land based activities, including marine debris and nutrient pollution, and also contribute to the achievement of other Sustainable Development Goals and associated targets.

### National policy frameworks on municipal (plastic) waste management

The management of solid and hazardous wastes in Singapore is governed by the Environmental Public Health Act, Environmental Public Health (General Waste Collection) Regulations, Environmental Public Health (General Waste Disposal Facilities) Regulations) and Environmental Public Health (Toxic Industrial Waste) Regulations.

Under the [Sustainable Singapore Blueprint](#), which outlines Singapore's national vision and plans for a more liveable and sustainable Singapore, Singapore will also be working towards becoming a Zero Waste Nation by reducing our consumption, and reusing and recycling materials. Singapore's Zero Waste Masterplan maps out Singapore's key strategies to build a sustainable, resource-efficient and climate-resilient, and a Zero Waste Nation. This includes adopting a circular economy approach to waste and resource management practices, and shifting towards more sustainable production and consumption.

In 2019, the country's [Resource Sustainability Bill](#) was passed to implement measures to reduce waste from three key streams: electronic waste, food waste and packaging waste including plastics. The bill mandates a system-level approach to enable nation-wide reuse and recycling, establishes the mandatory reporting framework for packaging beginning 2020.

To encourage businesses to minimize their contribution to packaging waste, the implementation of mandatory packaging data reporting for packaged products producers and supermarkets from 2020 - Packaged products producers and supermarkets with an annual turnover of more than S\$10 million will be required to report data on packaging put on the market and their 3R plans for packaging. The mandatory reporting will be expanded to all large industrial and commercial premises, including large convention and exhibition centres.

Singapore is also laying the foundation for an Extended Producer Responsibility (EPR) framework for managing packaging waste, including plastics. NEA is currently studying this framework, and is targeting to have it in place no later than 2025.

## National policy frameworks on marine litter

Singapore utilizes both legislative controls and administrative measures to control marine pollution from land based sources. The NEA administers the Environmental Protection and Management Act (EPMA, 1999) and Chapter 94A (Original Enactment: Act 9 of 1999), which provides for the protection and management of the environment through controlling the discharge of trade effluent, oil, chemical, sewage or other polluting matters into the environment. Conviction of failure to comply shall result in payment of a fine not exceeding S\$5,000.

Another land-based litter prevention is provided in the Environmental Public Health Act Chapter 95 (Original Enactment: Act 14 of 1987). Part III Premise 19 Number (1) Letter (a) states: 'Any person who drops, scatters, spills or throws any noxious liquid, dirt, sand, earth, gravel, clay, loam, manure, refuse, sawdust, shavings, stone, straw or any other similar matter or thing in any public place (whether from a moving or stationary vehicle or in any other manner) shall be guilty of an offence'. Meanwhile, Part III Premise 20 Number (1) states: 'Any person who (a) dumps or disposes of any refuse, waste or any other article from a vehicle in a public place; or (b) uses a vehicle for the purpose of dumping or disposing of any refuse, waste or any other article in a public place, shall be guilty of an offence'. The Act was amended on 1 April 2014 to enable a mandatory reporting of waste data and submission of waste reduction plans by any owner, occupier, or lessee of a work place (any premises or place used for any industrial, trade, commercial or manufacturing purposes, including all construction sites, work sites, and farms).

Other upstream controls implemented by NEA include (i) our integrated solid waste management system; and (ii) our anti-littering as well as waterways clean-up measures ensuring that land-based litter, including plastic waste, that might otherwise wash into the ocean is prevented from doing so.

## Fiscal incentives

Singapore government provides various incentives in an effort to promote sustainable waste management in the country.

The 3R Fund is once such co-funding scheme (cap S\$1 million per project) to encourage organizations (companies, non-profit organizations, town council, schools, institutions) to reduce waste disposed of at NEA's incineration plants and disposal facilities through the implementation of waste minimization and recycling projects.

The Productivity Solutions Grant (PSG) is a strategic tool under the Environmental Services (ES) Industry Transformation Map (ITM) to raise the operational efficiency and productivity of the ES industry (including NEA-licensed waste management company or cleaning company) through technology adoption. With effect from 1 March 2020, PSG has been enhanced to provide funding support to 70% of the qualifying cost and increase the total grant cap to S\$ 350,000 per company. The funding programme will be extended until 28 February 2021.

The Environment Technology Research Programme (ETRP) is another S\$ 21 million funding programme by NEA, which aims to enhance the technological competencies and support companies and researchers in waste management research (related to energy recovery, material recovery, and special waste treatment).

From late 2017 to early 2018, in a collaboration between a food and beverage company and a supermarket chain, Reverse Vending Machines were installed in a few supermarkets around Singapore to let consumers exchange bottles and cans for vouchers. 50,000 bottles were collected within three months.

Singapore also takes path of taxation or penalties to reduce waste generation and reduce plastic consumption. The NEA takes strict enforcement action against litterbugs, who will be subjected to a composition amount of S\$300 for a first offence. Under the amended Environmental Public Health Act, the maximum court penalties for littering-related offences have been doubled since 1 April 2014. The Corrective Work Order (CWO) was introduced in 1992 to reform littering offenders. Recalcitrant offenders prosecuted in court may be required to perform CWO, which involves picking or sweeping up litter.

## Conclusions

For an island city-state like Singapore, the oceans and seas are inextricably linked to its survival and wellbeing.

Singapore therefore takes the issue of marine pollution seriously. It addresses marine litter through stringent regulations on pollution control as well as an efficient integrated solid waste management and collection system to minimize waste at source.

In Singapore, one-third of domestic waste is composed of packaging waste, so is the marine litter. Hence, the country has invested in regulatory and collaborative measures to tackle packaging waste through initiatives like SPA and the application of EPR.

Singapore is also financing research into innovative plastic packaging design, recycling solutions and technologies stimulating a transition from a linear to circular plastic economy.

Singapore also invests and relies on public education and awareness to reassess and mitigate its plastic use, reuse and disposal habits, and keeping the country's coastal environment free of marine litter. The country needs to focus on breaking the obsession with single-use plastic use and work towards source reduction.

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